BrR LOAD RATINGS

FOR

IOWA STANDARD BRIDGES

Interim Report

For

TR-832

Results for Models Completed to Date

This report will be superseded by a Final Report upon completion of all load ratings models.

FEBRUARY 2026

IOWA | DOT

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IOWA HIGHWAY RESEARCH BOARD
PROJECT TR-832

F I N A L R E P O R T

LOAD RATING FOR STANDARD BRIDGES

IOWA DEPARTMENT OF TRANSPORTATION
AMES, IOWA 50010

FEBRUARY 2026

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DISCLAIMERS

Federal and state laws prohibit employment and/or public accommodation discrimination on the basis of age, color, creed, disability, gender identity, national origin, pregnancy, race, religion, sex, sexual orientation or veteran's status. If you believe you have been discriminated against, please contact the Iowa Civil Rights Commission at 800-457-4416 or Iowa Department of Transportation's affirmative action officer. If you need accommodation because of a disability to access the Iowa Department of Transportation's services, contact the agency's affirmative action officer at 800-262-0003.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Iowa Department of Transportation.

1. INTRODUCTION

Objective:	Create AASHTOWare BrR templates for Iowa DOT standard bridge load ratings and provide load rating results for these standard bridges
Load Rating:	Evaluation of the capacity of a bridge to carry vehicle loads
Standard Bridge:	Bridge built according to standards issued by the Iowa Department of Transportation
BrR Template:	A virtual, fully modeled bridge superstructure based on the as-built standard plans and with idealized substructure support locations and restraints
Inventory Rating:	Load level which can safely utilize the bridge for an indefinite period of time
Operating Rating:	Maximum permissible load level for the bridge
Legal Operating:	Second level rating providing safe load capacity for AASHTO and state legal loads
Permit Operating:	Third level rating that checks safety and serviceability for passage of vehicles above the legally established weight limitations

The objective of this project was to create bridge template models in the AASHTOWare BrR bridge rating software for the Iowa DOT LRFD standards and historical LFD/ASD standards. These template models were produced to provide bridge owners with fully modeled bridge standards that could then be modified to a specific bridge's unique characteristics, such as deterioration, new wearing surfaces, new barrier rails, additional cover plates, etc. In addition, these template models were used to produce as-built condition rating results which are presented in this document for the use of bridge owners in the state of Iowa. Template models were created for thirteen Iowa DOT LRFD standards and one hundred forty-four LFD/ASD obsolete, or legacy standards formerly employed by the Iowa DOT.

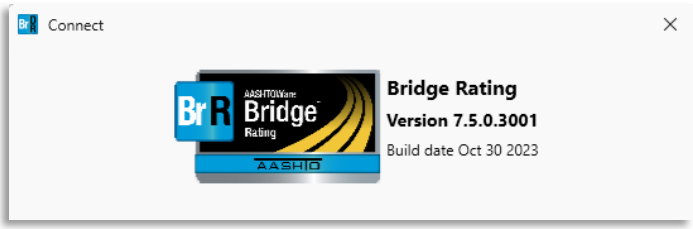
A secondary objective of this project was to provide users with AASHTOWare BrR (BrR) library and system files in addition to the templates. Future users of the templates could then take advantage of the library and system files to reproduce the rating results, as well as modify certain bridge elements without the necessity of modeling these elements from scratch. Modeling of non-standard bridges designed with Iowa DOT elements would also be considerably more straightforward and would limit errors in dimensioning, material properties, beam shapes, strand layouts, etc. These libraries also furnish the user with conveniences such as Iowa DOT specified material properties, railings, and standard vehicles.

Load rating results produced from templates are included in this report. Load and Resistance Factor methodology and Load Factor/Allowable Stress methodology were used dependent on the original design method and time period for each standard. Supporting materials accompanying this document, including rating calculations, details of the modeling ideology, and standard-specific assumptions were made available as well. The general project assumptions and more specific

assumptions associated with the modeling and rating of a bridge type are included in this document in the Summary of Assumptions section.

2. LIBRARY AND SYSTEM FILES IN AASHTOWARE BrR

The BrR version used to create the files is BrR Version 7.5.0.3001.

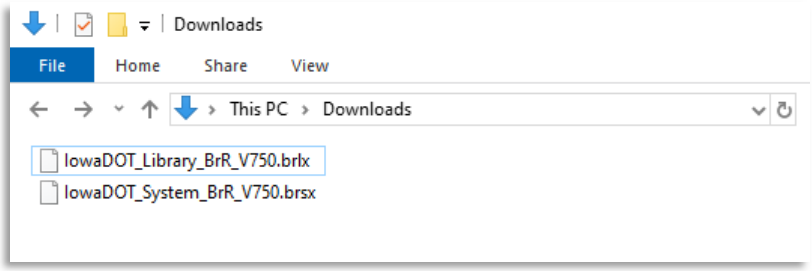


The following files are provided at this location (https://iowadot.gov/consultants-contractors/bridges-structures/structure-inventory-and-inspection-management-system-siims/siims-resources) and will be used to import the Iowa DOT System and Library files into the program. (NOTE: The files available at the above location will have a date after V750 in the name to represent when the file was updated (For example: IowaDOT_Library_BrR_V750_20250722.brlx). These system and library files were created to establish uniformity when creating Iowa's BrR standard templates. Load raters may choose to use different settings or add library items based on specific bridge conditions or rating needs.)

- IowaDOT_System_BrR_V750.brsx
- IowaDOT_Library_BrR_V750.brlx

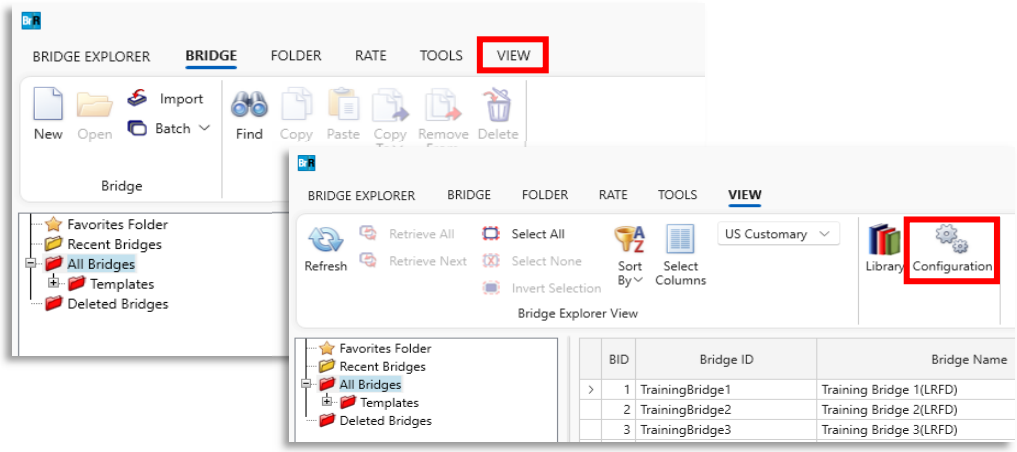
Download and save the above files to the user's desired location for import. In this example, the files are saved in the "Downloads" folder.

Import of the system and library files can only be accomplished by an BrR Administrator in your organization. Refer to ProMiles training material for group license setup and appropriate privilege.



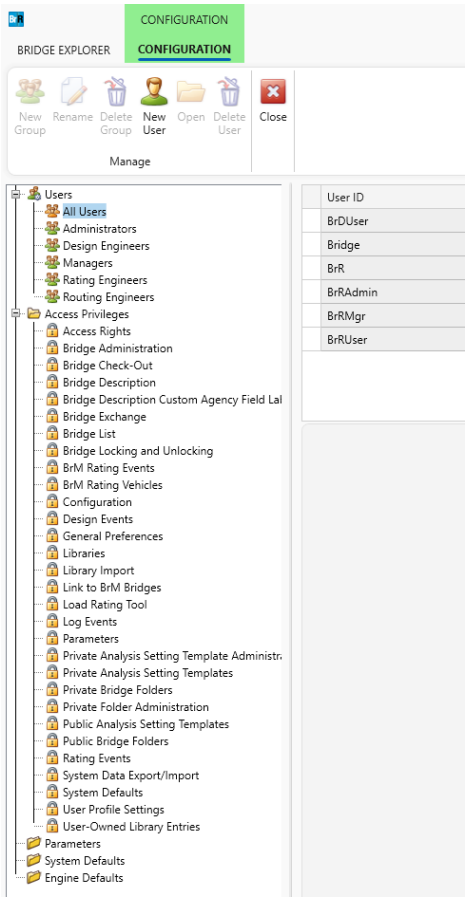
2.1. CONFIGURATION BROWSER IN BrR

To access the Configuration browser, click on "VIEW" in the top ribbon and select "Configuration". The Configuration browser provides access to the configuration features of BrR.



The following items are available in the configuration tree.

- Users: Add/modify users and user groups
- Access Privileges: Specify access privileges for each group of users defined in the Users tree
- Parameters: Edit names of counties, districts, etc
- System Defaults: Specify default settings and the analysis engine for the Bridge Workspace
- Engine Defaults: Specify analysis and rating methods for the different superstructure types



"IowaDOT_System_BrR_V750.brsx" contains the following modified data specific for Iowa DOT:

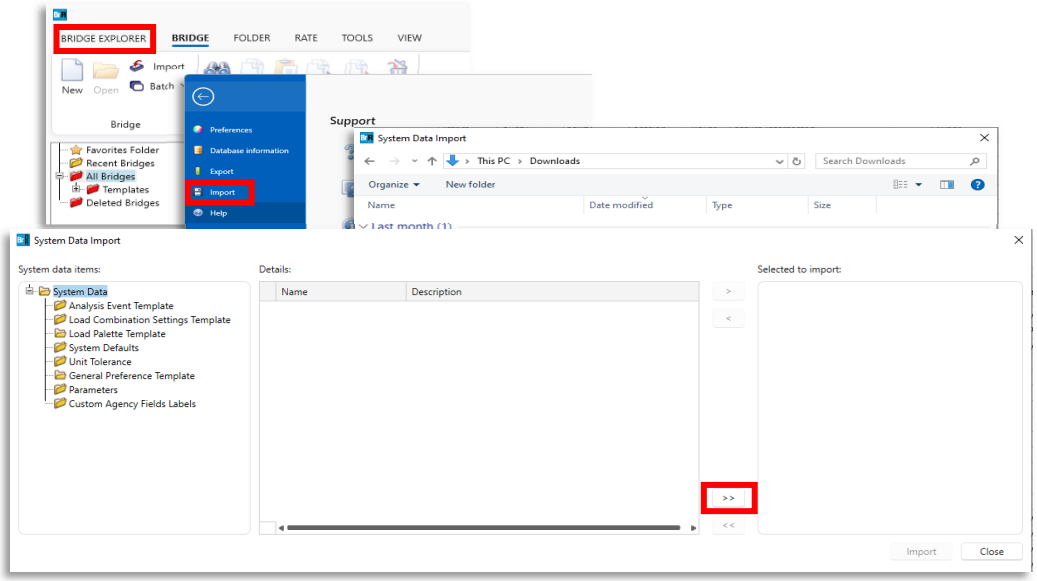
- Analysis Event Template
- System Defaults
- Unit Tolerance
- General Preferences Templates
- Parameters
- Custom Agency Fields Labels

Appendix A provides detailed documentation of the data, specifically for Iowa DOT, listed above.

If a consultant performs BrR ratings for multiple states, submit a ticket with ProMiles to set up multiple BrR system data for different clients. This will prevent Iowa DOT's system preferences from conflicting with other states.

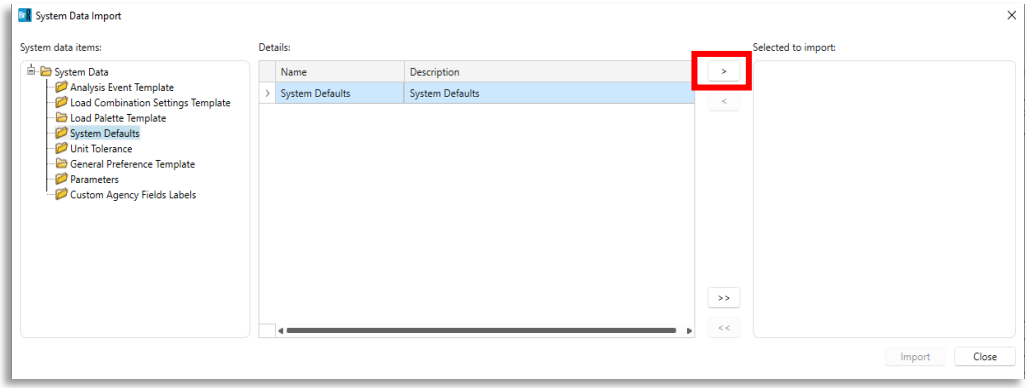
2.1.1. IMPORT CONFIGURATION SYSTEM FILE

1. After opening and logging into the BrR program, navigate to the Bridge Explorer window. Select "Import" and locate the "IowaDOT_System_BrR_V750.brsx" file in the folder where the file is saved at. Select the file and click "Open".



2. The left pane of the Import window under "System data items" shows the different configuration data categories. Clicking on these categories will show the available configuration system files in the middle pane under "Details". To import all the configuration data at once, click on "System Data" to highlight it. Then click on the double arrow button ">>". This selects all the configuration data available under the "System Data" tree for import.

   To import a specific configuration data, select the appropriate category under the "System data items" pane and select the setting item under the "Details" pane to highlight it. Then, click on the single arrow button ">" to move the setting into the right pane under "Selected to Import". Multiple setting items can be selected and imported at the same time.

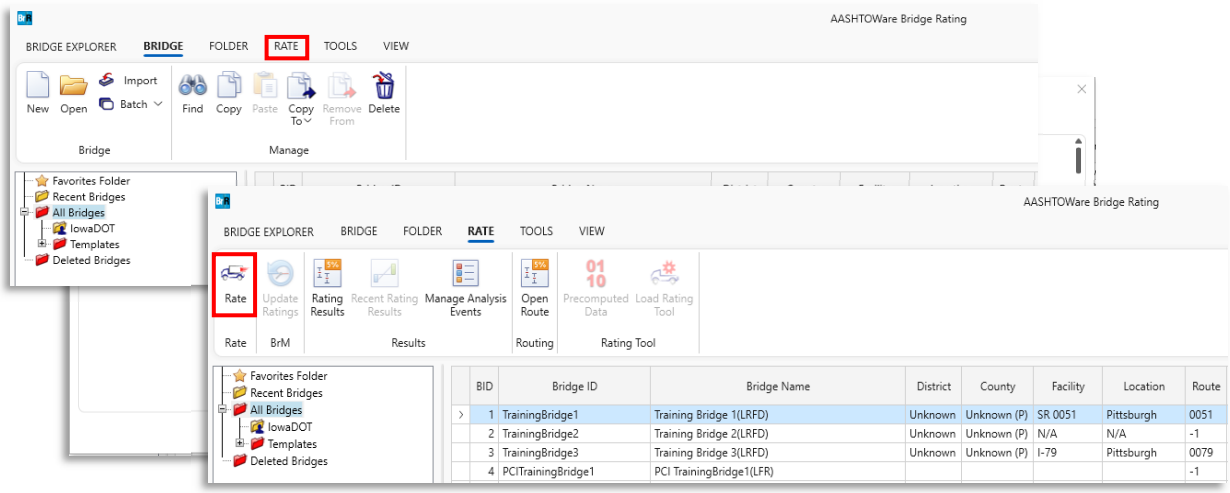


3. Click on the “Import” button on the bottom right to import the configuration data. Once you’ve imported the data, a dialog box will pop up indicating the import is successful.

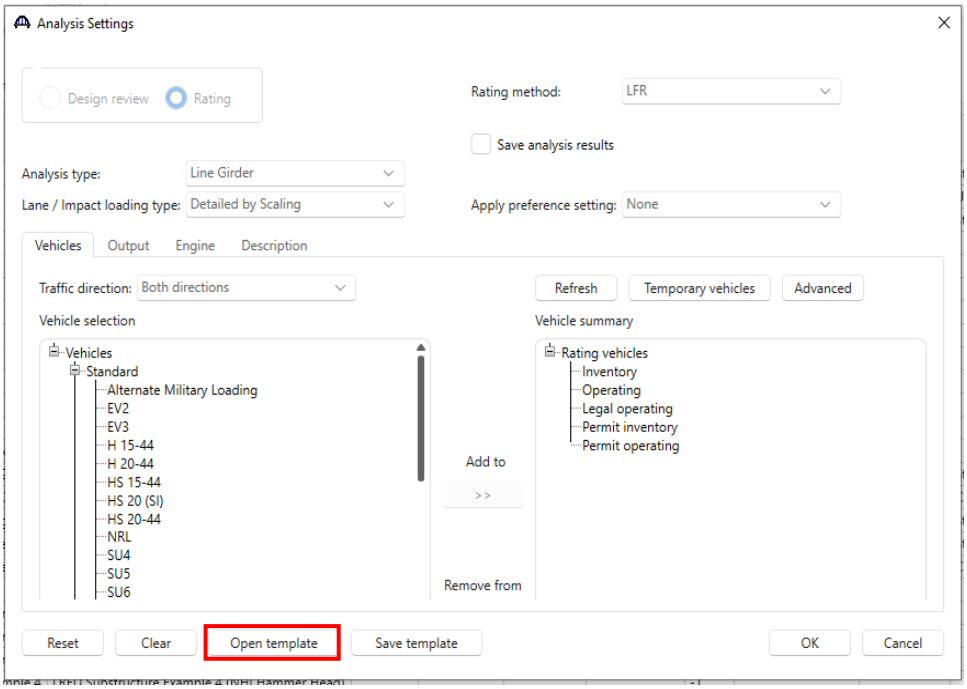
2.1.2. DELETE ANALYSIS TEMPLATES

If there is an existing template in BrR that has an identical name to the one being imported, a duplicate may be created with “ ~1” at the end of the name. Therefore, the existing template will need to be deleted before importing the new one. The steps below provide detailed instructions on deleting the existing Analysis Event Template.

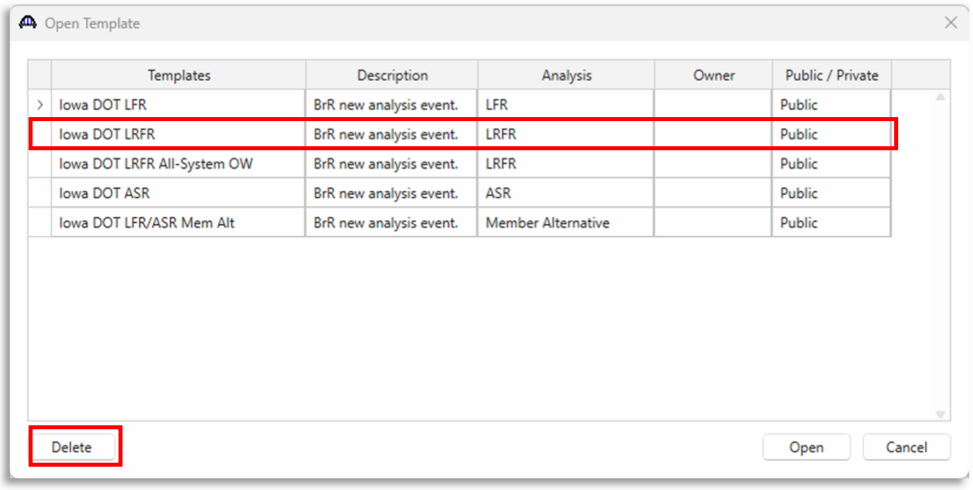
a. In the top ribbon in Bridge Explorer or Bridge Workspace, select “RATE” and click on the “Rate” icon to bring up the “Analysis Settings” window.



b. In the “Analysis Settings” window, click on “Open template” at the bottom.



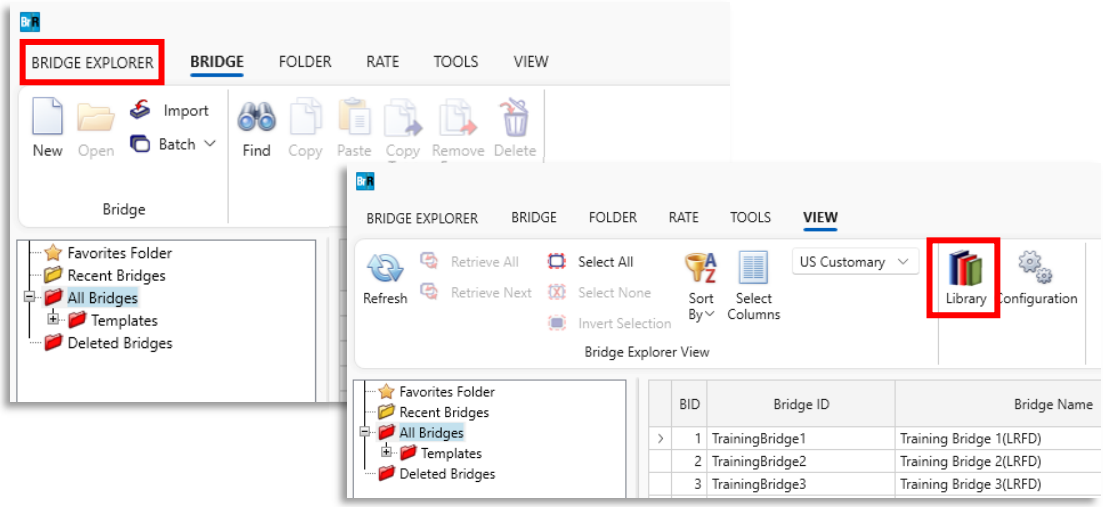
c. Select a template and click “Delete”. This deletes the template from the template library. In this example, the “Iowa DOT LRFR” template is selected.



d. After the analysis template is deleted, the updated template can be imported using the instructions from the previous section.

2.2. LIBRARY EXPLORER IN BrR

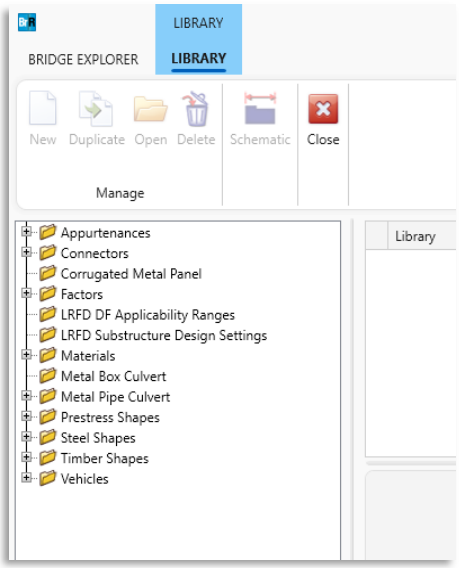
To access the Library Explorer, click on “VIEW” in the top ribbon and select “Library”. The



Library Explorer is used to navigate the library module to access the various library windows. The library is used to save commonly used items in the program and eliminate the need to define the same items repeatedly. Library Items can be created, duplicated, modified, and deleted.

There are three types of library items:

- Standard: Default AASHTO database that cannot be modified
- Agency Defined: Items added to the library by a user
- User Defined: Currently only available for vehicles that are added by a user.



"IowaDOT_Library_BrR_V750.brlx" contains Iowa DOT specific data for:

- Appurtenances
- Materials
- Prestress Shapes
- Vehicles

Appendix B provides detailed documentation of the library data, specific for Iowa DOT, listed above.

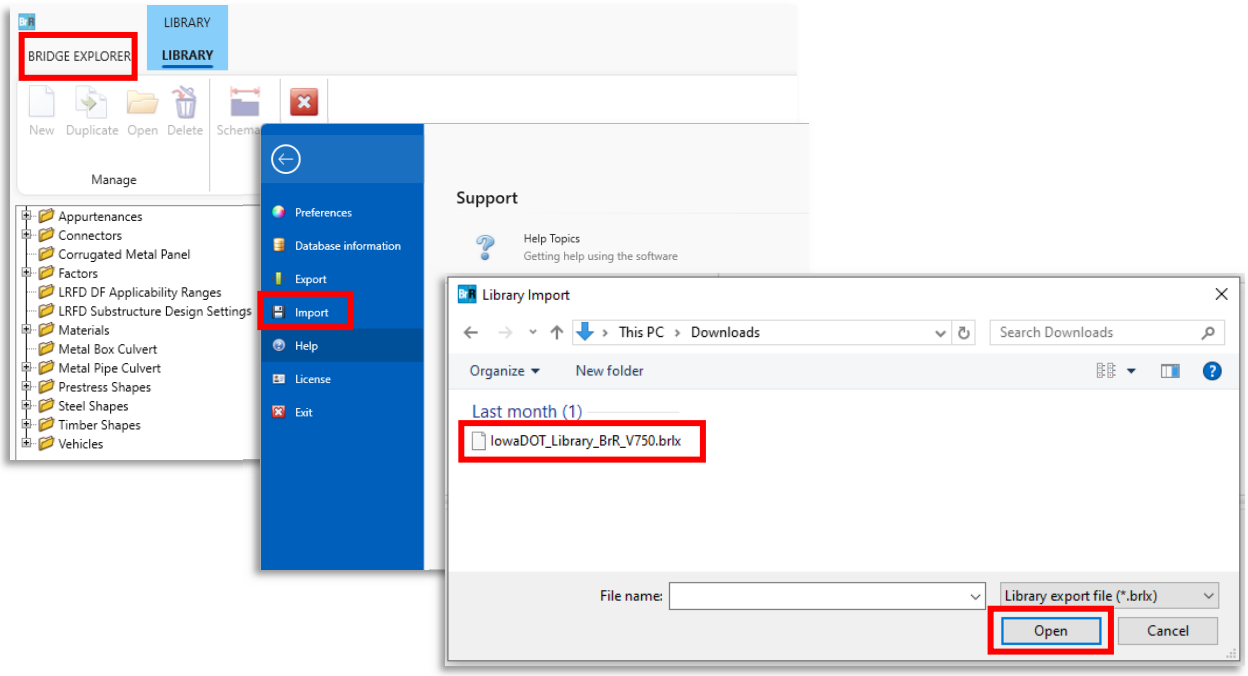
Notes:

1. Updating a library item or importing a new library file does not automatically update the bridge model that used the previous library data. As such, the library data in the bridge model will need to be reselected from the updated library to have the most up-to-date library definition inputs & properties.

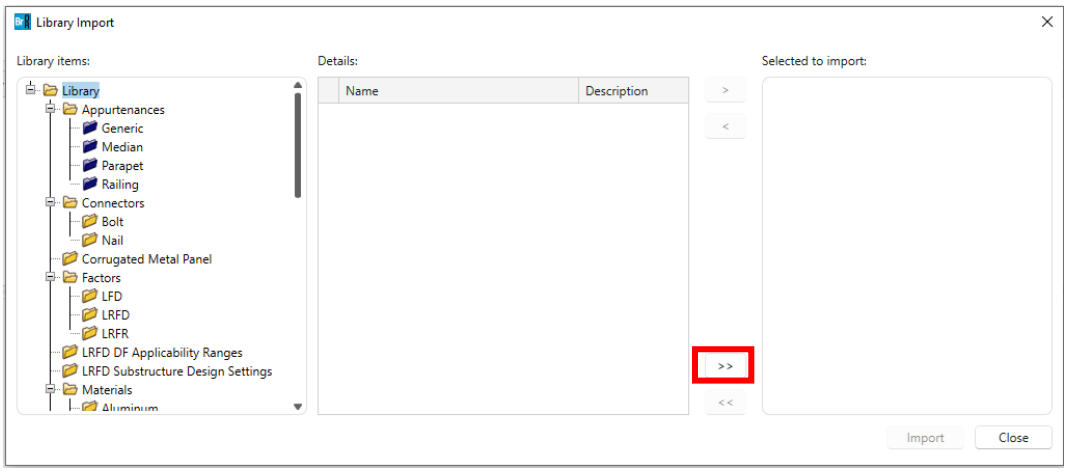
2. The vehicles in the Library File that are used in the Analysis Event Templates will not be imported if the System File is imported first as the vehicles' names are not unique. These vehicles have been imported into the library as part of the System File Import. The rest of the vehicles in this library will be imported with the Library File.

2.2.1. IMPORT LIBRARY FILE

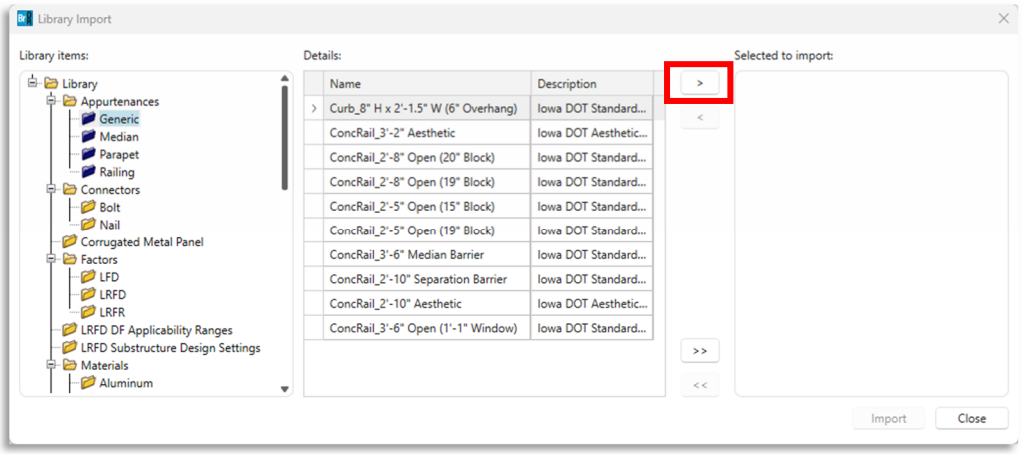
1. In the Library Explorer, click on “Bridge Explorer”. Select “Import” and locate the “IowaDOT_Library_BrR_V750.brlx” file in the folder where the file is saved at, select the file and click “Open”.



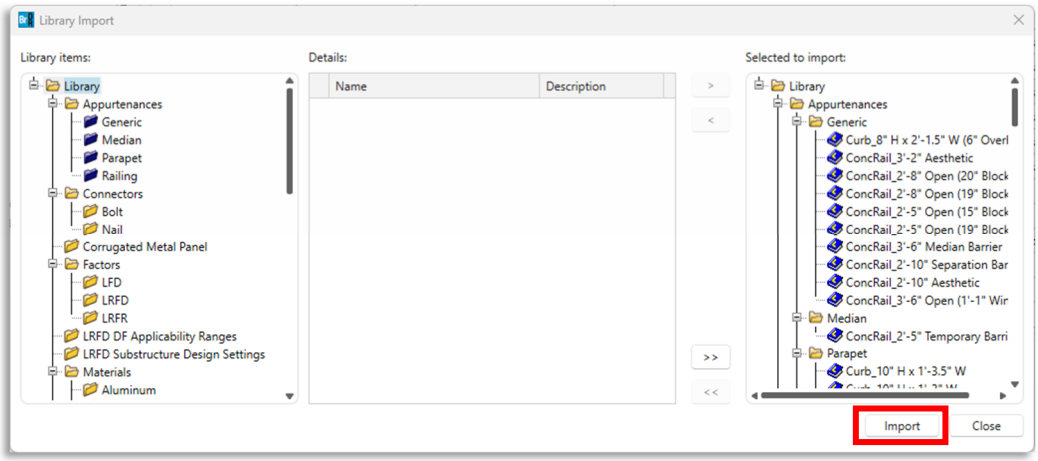
2. The left pane of the Import window under “Library items” shows the different library folders for all the bridge elements. Clicking on the folder will show the contents of each folder under the middle pane under Details. To import all the library data at once, click on “Library” under the left pane to highlight it. Then click on the double arrow button “>>”. This selects all the library files available under the “Library” tree for import.



To import a specific library item, select the appropriate library folder under the “Library items” pane and select the item under Details box to highlight it. Then, click on the single arrow button “>” to move the item into the right pane under “Selected to Import”. Multiple items can be selected and imported at the same time.



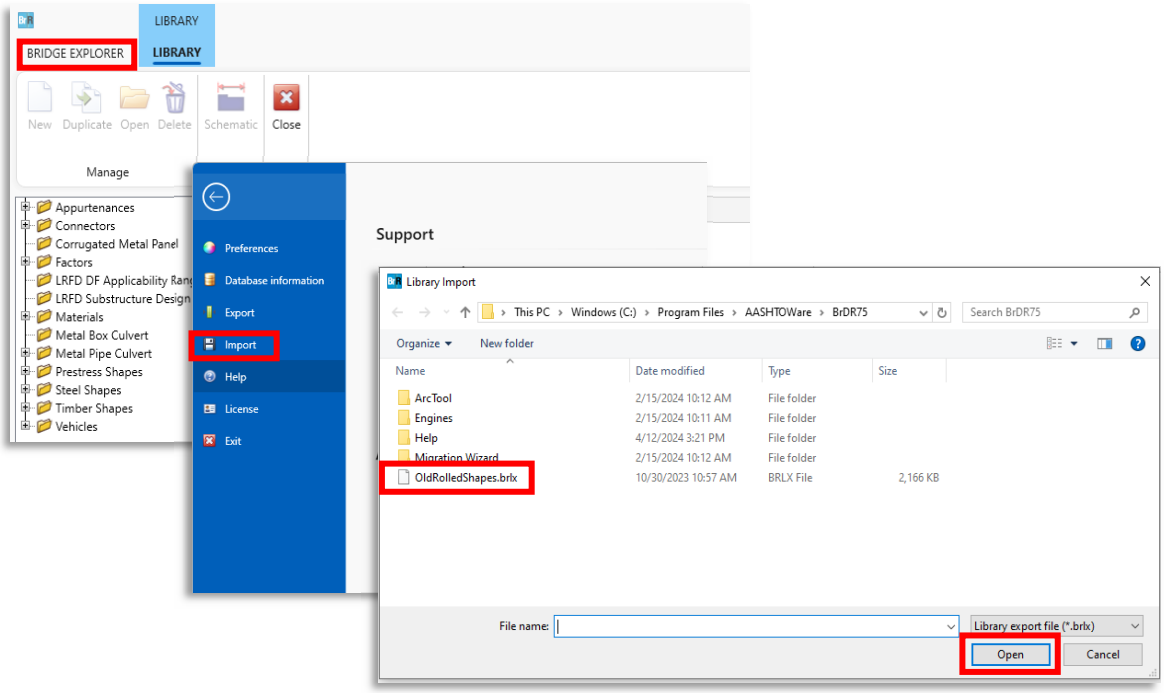
3. Click on the “Import” button on the bottom right to import the library data. Once you’ve imported the data, a dialog box will pop up indicating the import is successful.



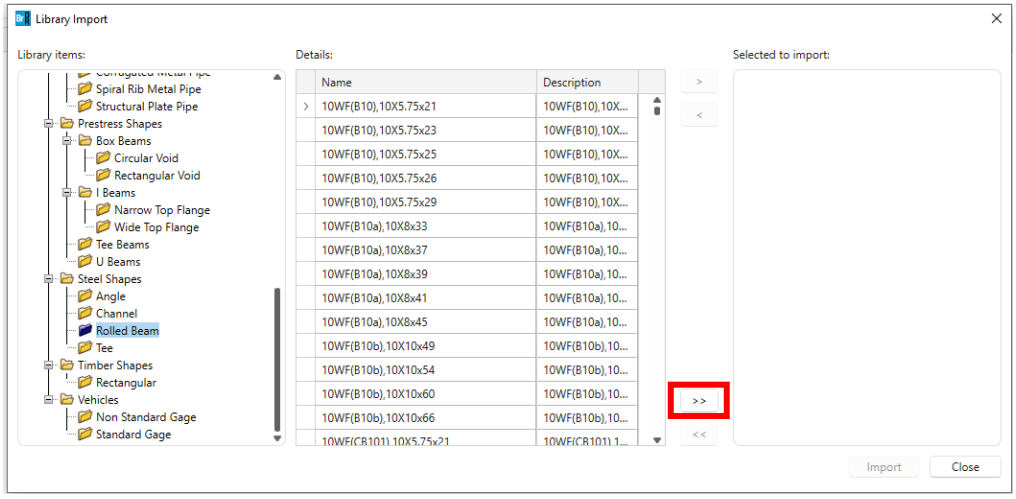
2.2.2. IMPORT HISTORIC STEEL ROLLED BEAM SHAPES LIBRARY FILE

The historic steel rolled beam shapes library file is provided by AASHTOWare but is not imported into BrR library by default. It is optional but if required, contact the BrR Administrator in your organization for import guidance. Below are instructions to import and use these historic shapes.

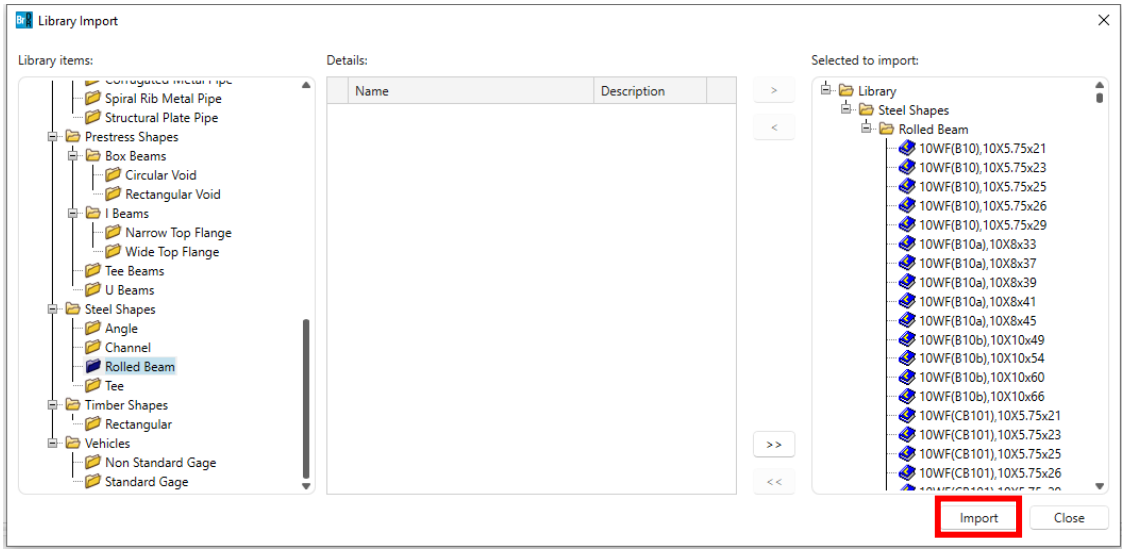
1. In the Library Explorer, click on “Bridge Explorer”. Select “Import”, navigate to “C:\Program Files\AASHTOWare\BrDR75” and select the file named “OldRolledShapes.brlx”. Select the file and click “Open”. A dialog box will appear to confirm import, select “Yes”.



2. To import historic shapes data, click on “Rolled Beam” under the left pane to highlight it. Then click on the double arrow button “>>”. This selects all the historic shapes data available under the “Rolled Beam” branch for import.

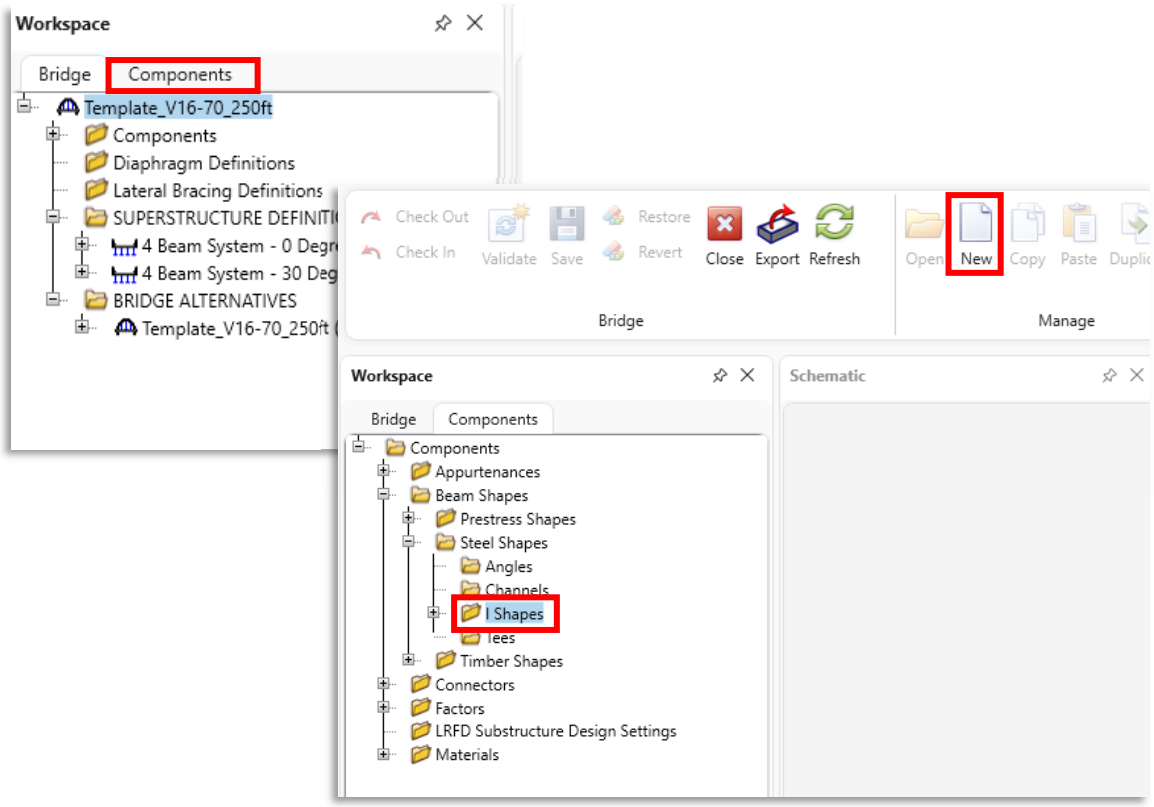


3. Click on the “Import” button on the bottom right to import the historic shapes data. Once you’ve imported the data, a dialog box will pop up indicating the import was successful.

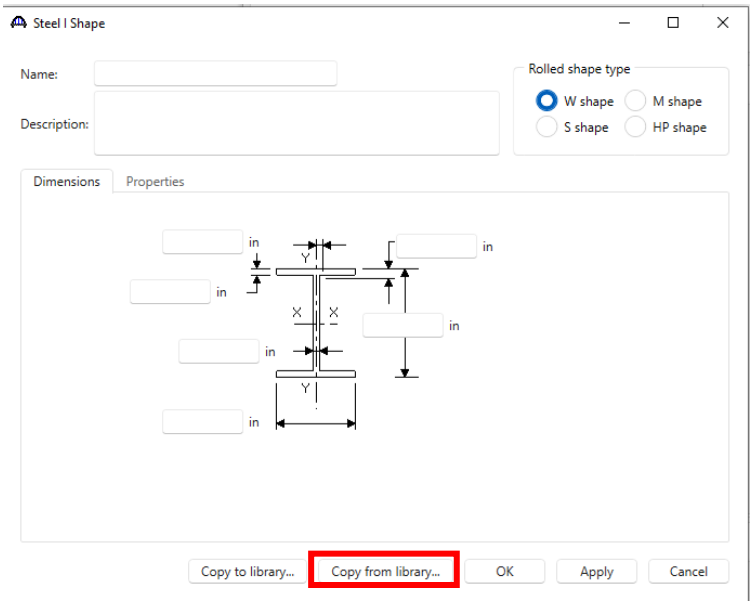


After the import, the historic steel rolled beam shapes are saved in BrR library. The next three steps demonstrates the steps to copy these shapes from BrR library into the Bridge Workspace.

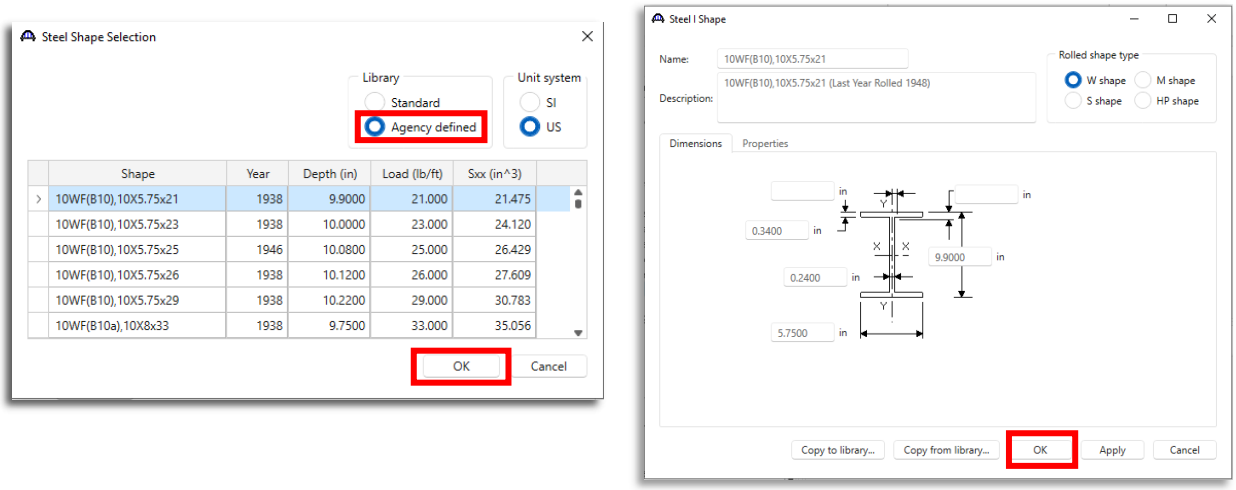
4. In the Bridge Workspace, under “Components” -> “Beam Shapes” -> “Steel Shapes”, double click on “I Shapes” or click on “New” in the top ribbon to open the “Steel I Shape” definition window.



5. Select “Copy from Library” at the bottom of the window to open up the “Steel Shape Selection window”.

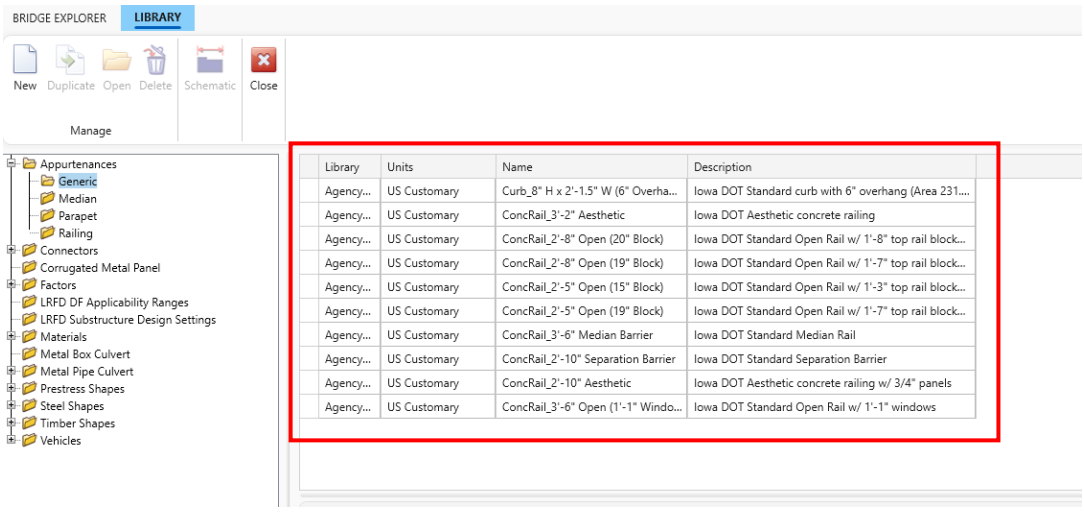


6. The historic shapes data can be found by selecting the “Agency Defined” button under the “Library” box. Select the appropriate shape and select “OK” to copy the shape information into the “Steel I Shape” definition window. Select “OK” to save the definition in the Bridge Workspace.

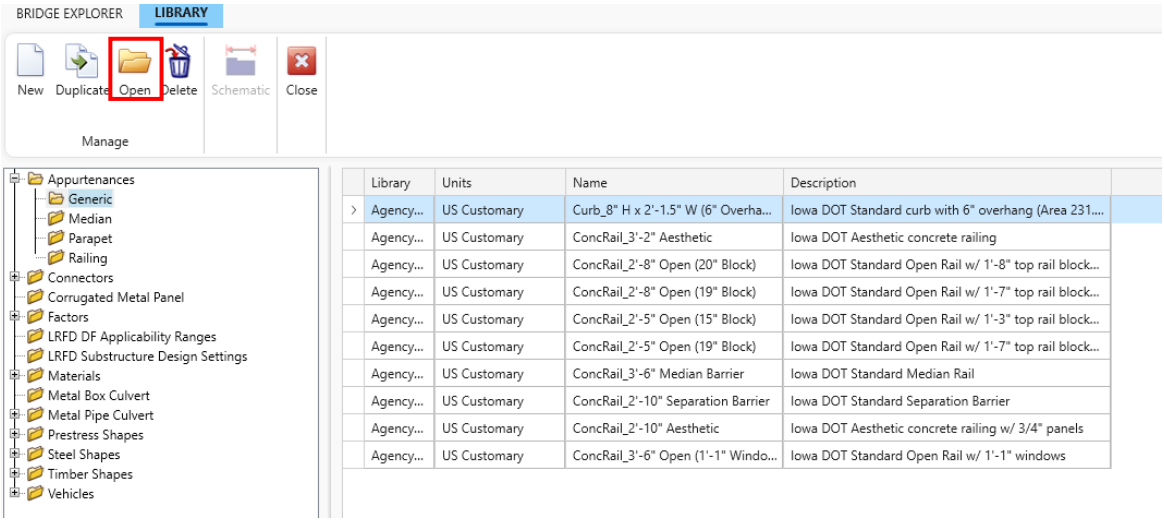


2.2.3. MODIFY AND DELETE LIBRARY ITEMS

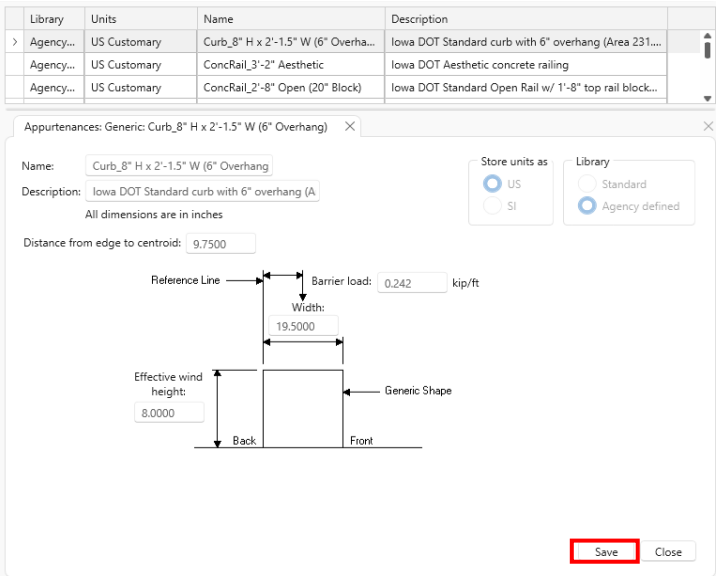
1. In the Library Explorer, select a library folder on the left window pane and a list of library items will show on the right window pane. In this example, select “Appurtenances” -> “Generic” on the left window pane and all Generic appurtenances created under this category will be shown on the right window pane.



2. Double-click on a library item or click on “Open” in the top ribbon and the library item definition window pane will open below the right window pane.



Modfying Library Items: In the library item definition pane, the item’s name, description, dimensions and properties can be modified. Once the item information has been updated, click on “Save” on the bottom right corner to save the information in BrR library.

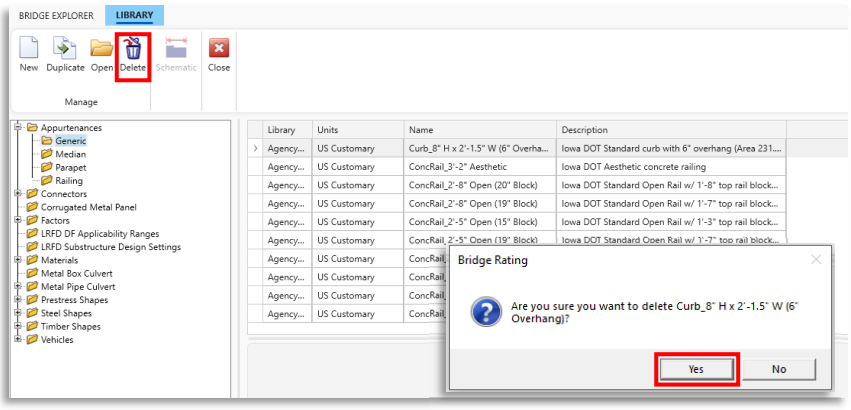


Note:

1. Any updates made to the library items in the Library Explorer will not affect the items used in a bridge model. The items in the bridge model will need to be reselected from the updated library to have the most up-to-date library definition inputs & properties.

2. If the library item needs to be modified for a specific bridge (modifying dimensions, weight of rail etc.), the rater should copy the library item to the specific bridge and modifying the copy instead of modifying the actual library item.

Deleting Library Items: On the right window pane, select a library item to highlight it. In the top ribbon, click on "Delete" to delete the library item and a confirmation dialog box will appear. Click on "Yes" to delete the selected library item. Only one library item can be deleted at one time. Only Agency Defined or User Defined library items can be deleted.



Note: Deleting a library item does not delete the same item in a bridge model. The item in the bridge model will remain in the Bridge Workspace and will need to be deleted manually if that is the intent. Additionally, once a library item is deleted from the BrR library, the only way to retrieve it back is to re-import the library file. See Section 2.2.1 for details on importing library files.

2.3. ANALYSIS EVENT TEMPLATES

The following analysis event templates are imported into the BrR after completing Section 2.1.1, which contain the necessary live load vehicles and analysis settings, specific to Iowa DOT, used to load rate bridge structures in BrR.

- LFR Analysis Template
- LRFR Analysis Template
- ASR Analysis Template
- LRFR All-System OW Template
- LFR/ASR Mem Alt Template

These Analysis Event templates were created to establish uniformity when creating Iowa's BrR standard templates. They are a conservative baseline, but load raters may choose to adjust analysis settings for their agencies.

Assumptions and restrictions for Iowa DOT BrR LFR, LRFR & ASR Analysis Templates:

- Set up for multilane and with full impact for all vehicles.
- Set up for bridges with span lengths equal to or less than 200 ft.
- Fluid Milk Truck should be used for state routes only. For LPAs bridges, it is up to the rater to remove the truck in the analysis template when appropriate.
- State specific restrictions of the legal and permit load analysis were not included.

"Advanced" settings in the "Analysis Settings" window allows the rater to override vehicle properties. Refer to the BrR Help Manual for details.

2.3.1. LFR ANALYSIS TEMPLATE

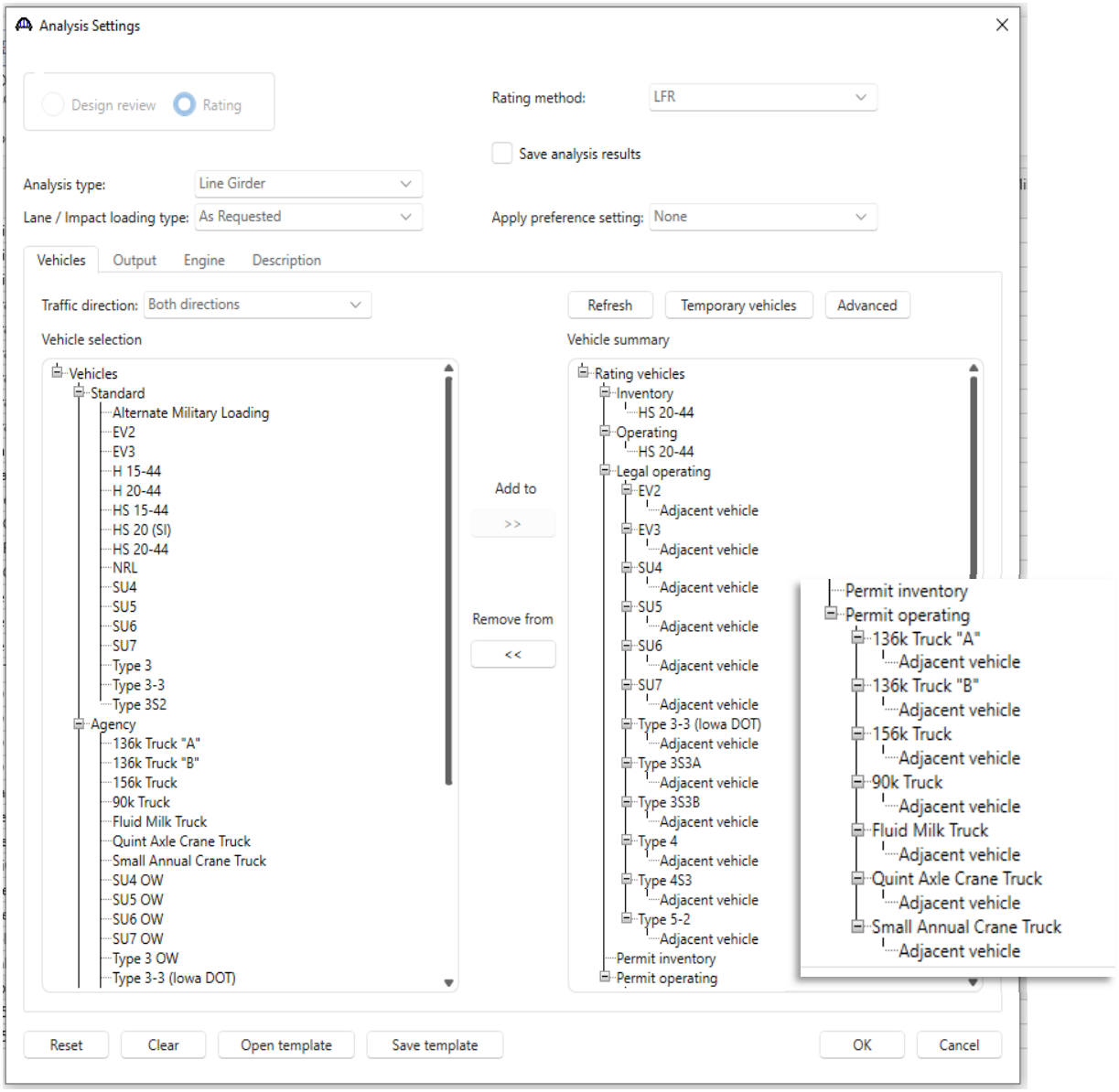
Template Name: Iowa DOT LFR

Live loads included in the "lowa DOT LFR" analysis template are listed below, per Iowa DOT Bridge Rating Manual (BRM), and Instructional Memorandum (IM).

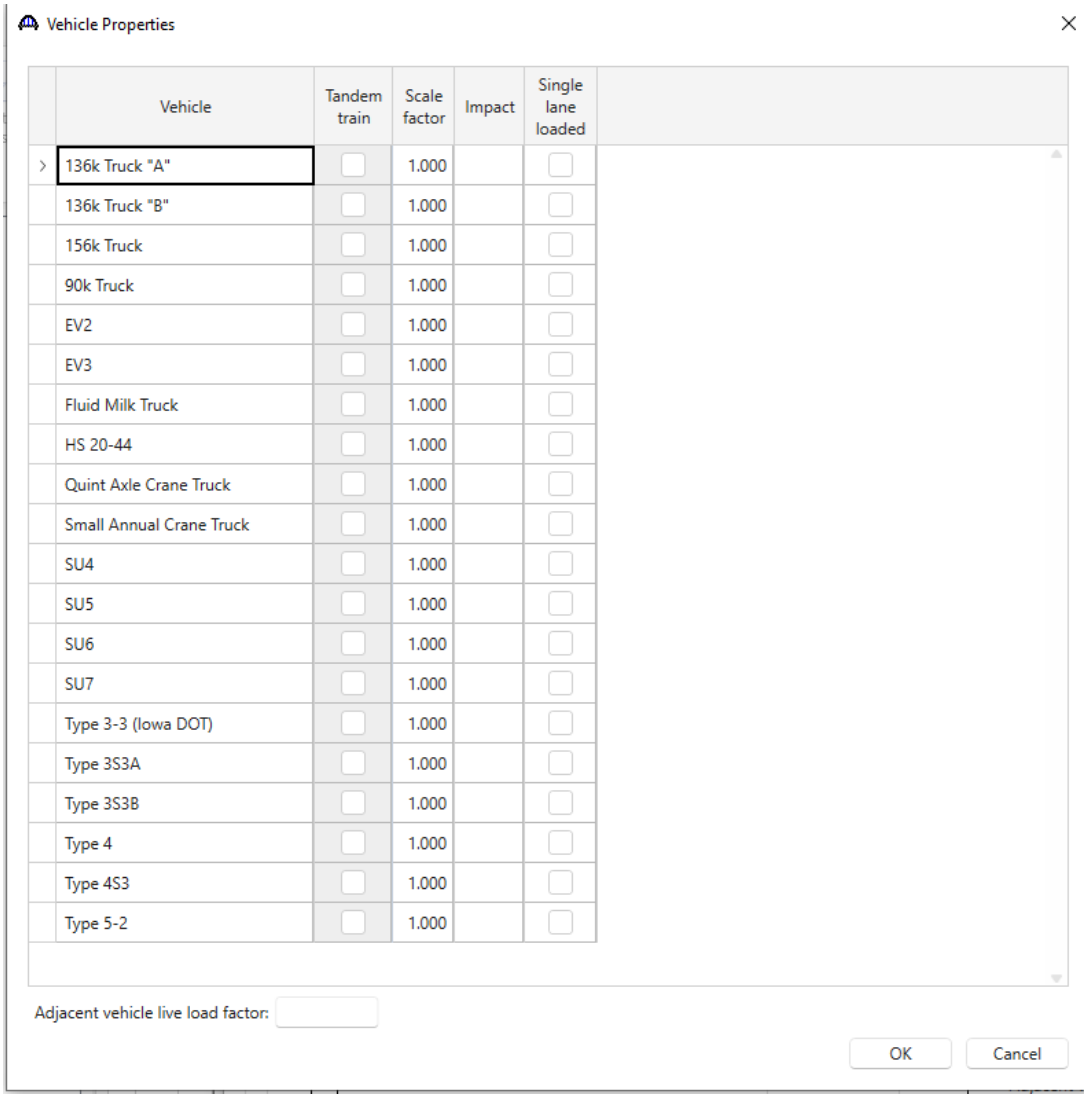
1. Rating Live Load (Inventory & Operating Level)
    a. HS20-44

2. Legal Loads (Legal Operating Level)
    a. Routine Commercial Traffic
        i. Type 4
        ii. Type 3S3A
        iii. Type 3-3 (IowaDOT)
        iv. Type 3S3B
        v. Type 4S3
        vi. Type 5-2
    b. Specialized Hauling Vehicles (SHVs)
        i. SU4
        ii. SU5
        iii. SU6
        iv. SU7
    c. Emergency Vehicles
        i. Type EV2
        ii. Type EV3

3. Permit Loads (Permit Operating Level)
    a. 90 kip Six-Axle Vehicle
    b. 136 kip (A) Seven-Axle Truck with Triple-Axle Configuration
    c. 136 kip (B) Seven-Axle Truck with a Quad-Axle Configuration
    d. 156 kip Eight-Axle Truck with a Quad-Axle Configuration
    e. Fluid Milk Truck
    f. Quint Axle Crane Truck
    g. Small Annual Crane Truck



"Analysis Settings" window for the "Iowa DOT LFR" analysis template



"Advanced" settings window for the "Iowa DOT LFR" analysis template

2.3.2. LRFR ANALYSIS TEMPLATE

Template Name: Iowa DOT LRFR

Live loads included in the "lowa DOT LRFR" analysis template are listed below, per Iowa DOT Bridge Rating Manual (BRM), and Instructional Memorandum (IM).

1. Design Live Load
    a. HL-93 (Inventory & Operating Level)

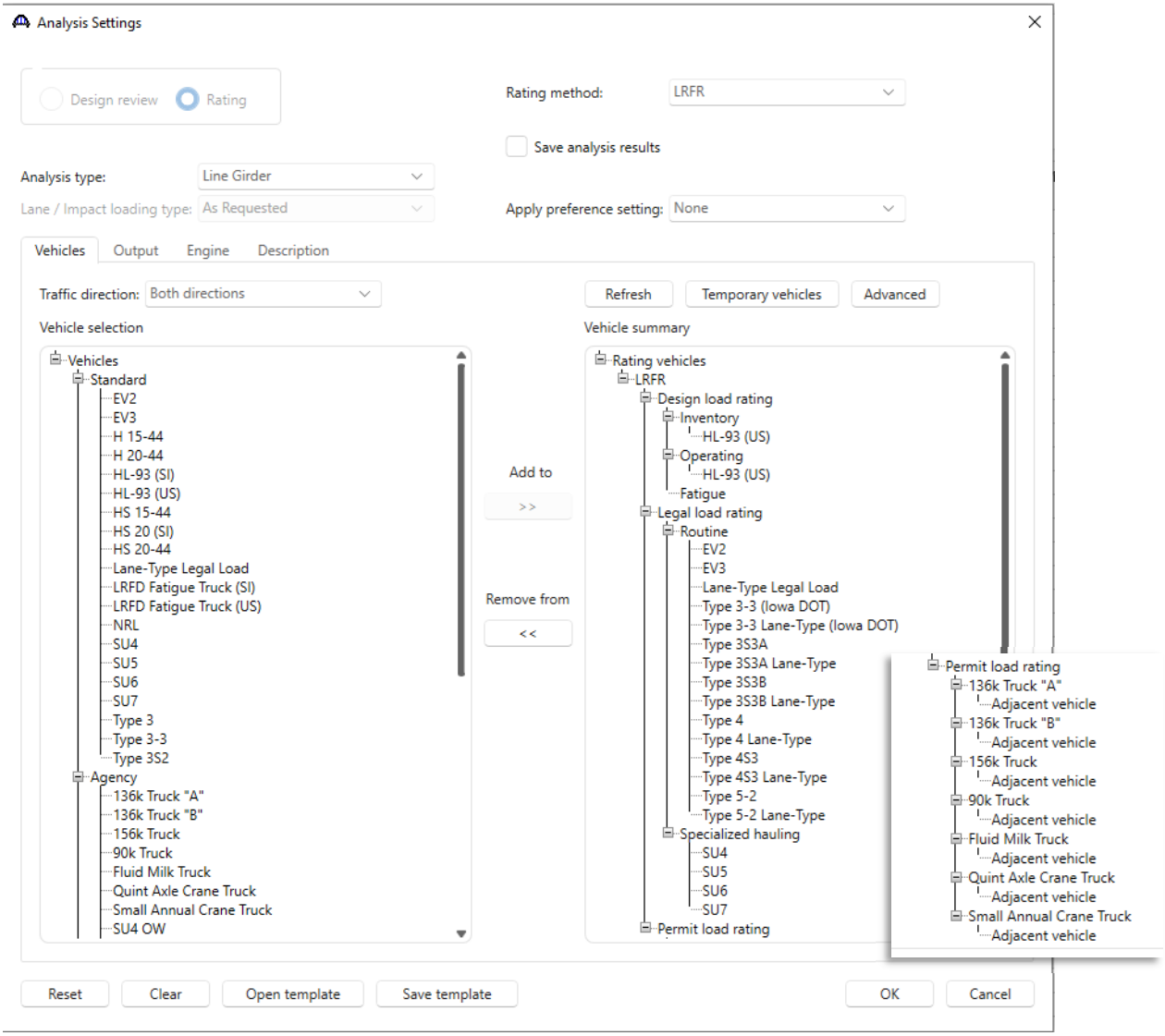
2. Legal Loads
    a. Routine Commercial Traffic Trucks (RCTT)
        i. Type 4
        ii. Type 3S3A
        iii. Type 3-3 (IowaDOT)
        iv. Type 3S3B
        v. Type 4S3
        i. Type 5-2
        vi. Lane-Type Legal Load
        vii. Type 4 Lane-Type
        viii. Type 3S3A Lane-Type
        ix. Type 3-3 Lane-Type (Iowa DOT)
        x. Type 3S3B Lane-Type
        xi. Type 4S3 Lane-Type
        xii. Type 5-2 Lane-Type
    b. Specialized Hauling Vehicles
        i. SU4
        ii. SU5
        iii. SU6
        iv. SU7
    c. Emergency Vehicle
        i. Type EV2
        ii. Type EV3

3. Permit Loads
    a. 90 kip Six-Axle Vehicle
    b. 136 kip (A) Seven-Axle Truck with Triple-Axle Configuration
    c. 136 kip (B) Seven-Axle Truck with a Quad-Axle Configuration
    d. 156 kip Eight-Axle Truck with a Quad-Axle Configuration
    e. Fluid Milk Truck
    f. Quint Axle Crane Truck
    g. Small Annual Crane Truck

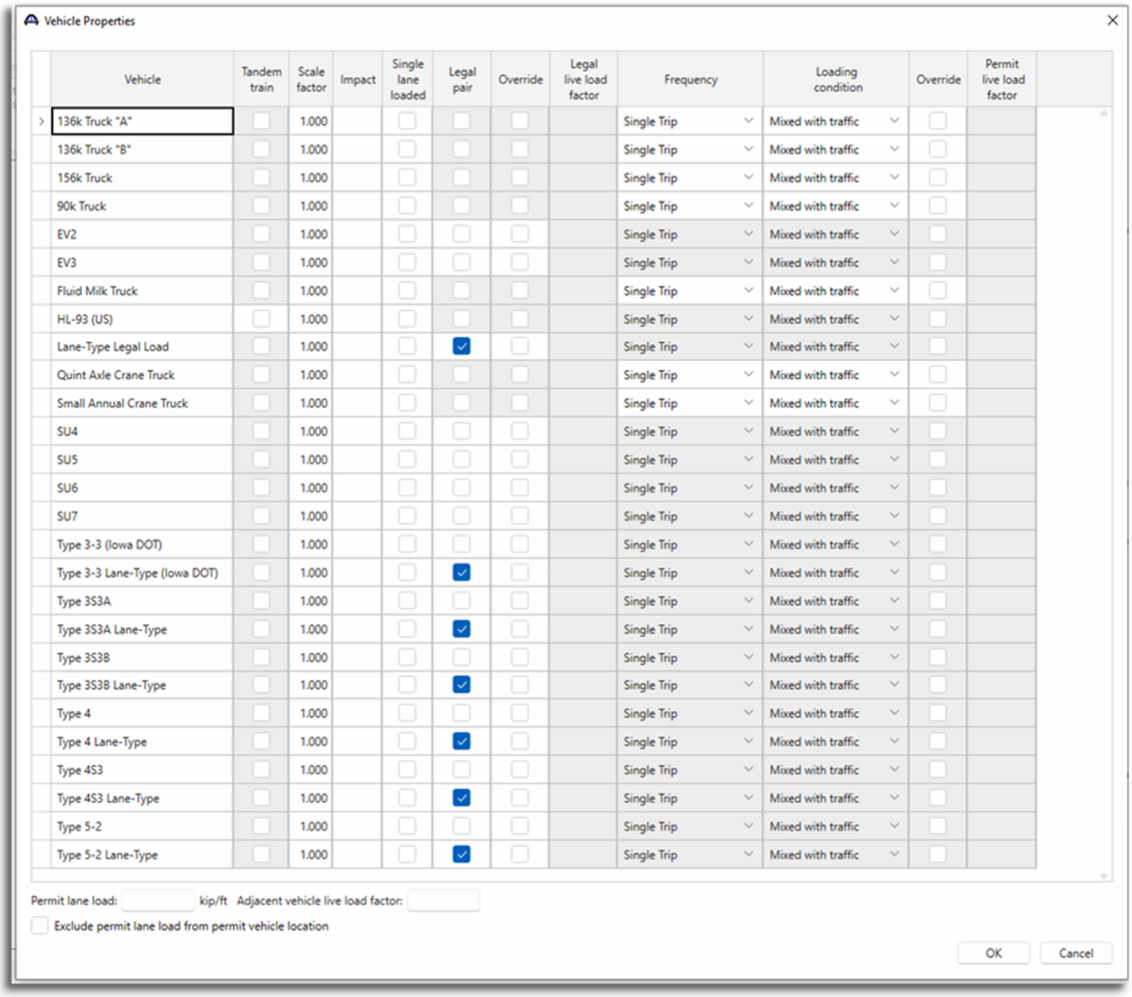
RCTT (Item 2.a.vii to 2.a.xii) are created for lane-type load and added to the BrR library and the LRFR analysis template for analyzing negative moments and reactions at interior supports per BRM and AASHTO MBE 6A.4.4.2.1a.

Modifications to the rating trucks include:

- Added “Lane-Type” to Truck Naming to differentiate from the regular RCTT
- Axle weights reduced by a factor of 0.75
- Additional uniform lane load of 0.2 kips/ft
- Selected Legal pair in “Advanced” analysis settings



“Analysis Settings” window for the “Iowa DOT LRFR” analysis template



"Advanced" settings window for the "Iowa DOT LRFR" analysis template

2.3.3. ASR ANALYSIS TEMPLATE

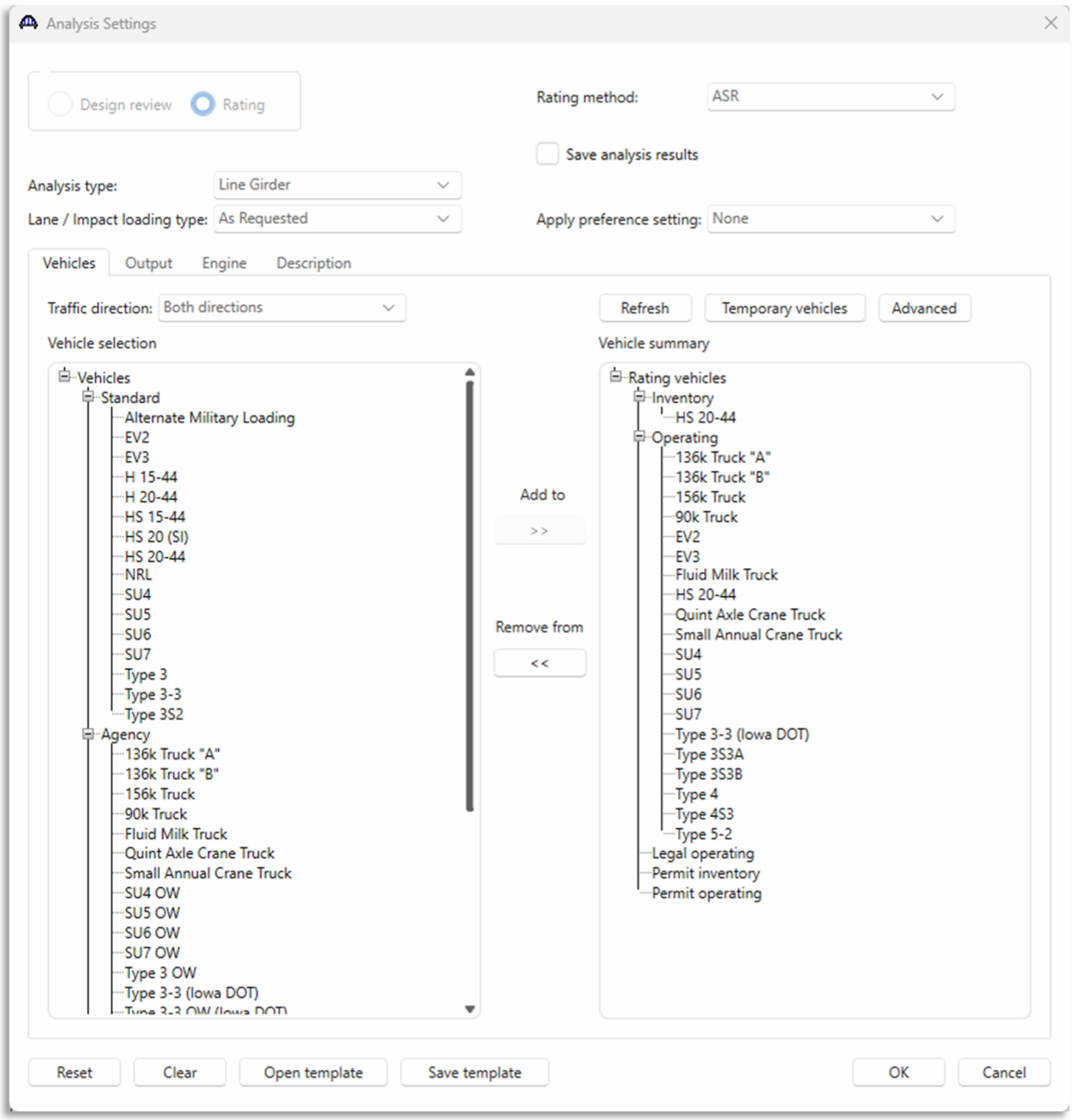
Template Name: Iowa DOT ASR

Live loads included in the "lowa DOT ASR" analysis template are listed below, per Iowa DOT Bridge Rating Manual (BRM), and Instructional Memorandum (IM).

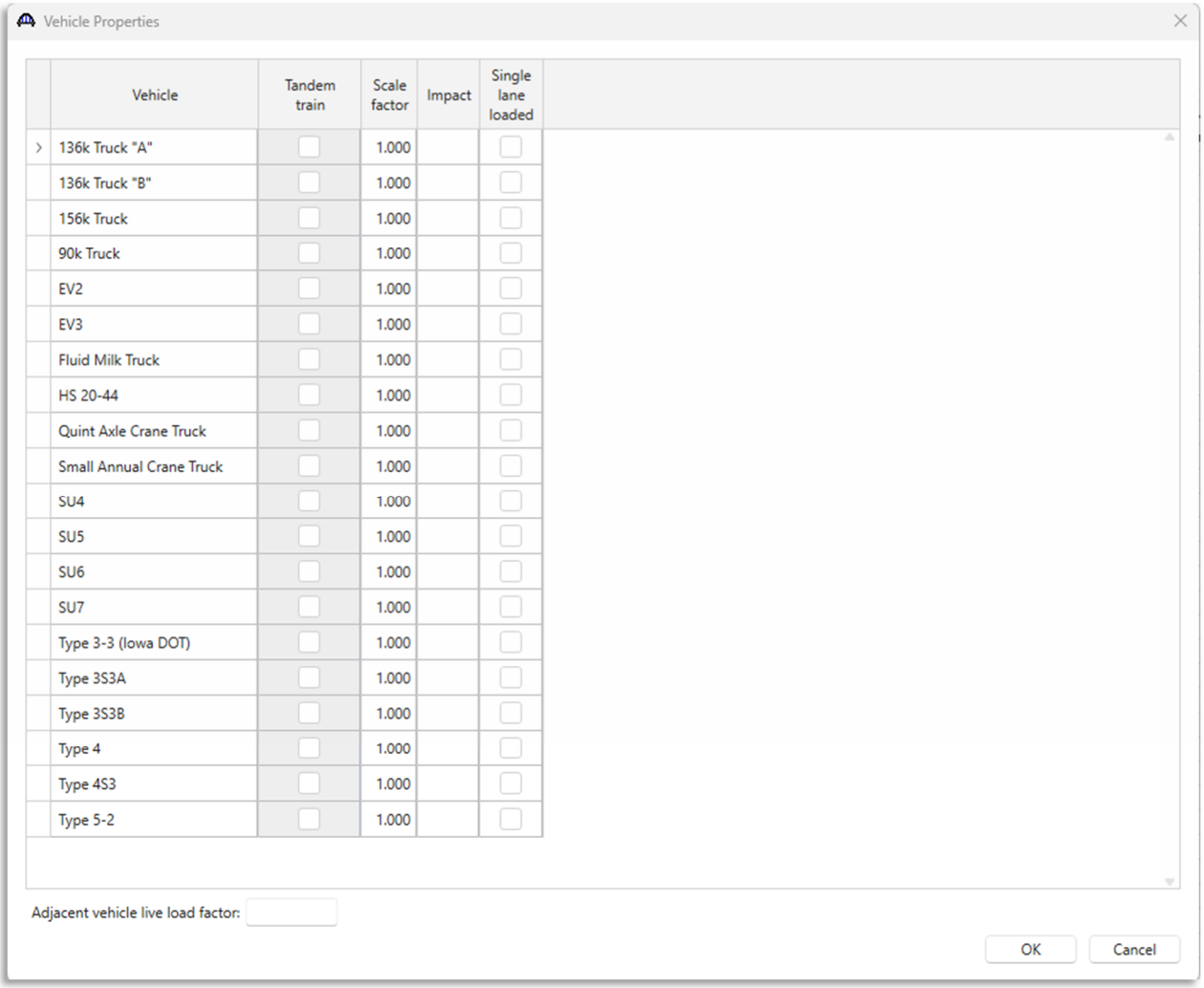
1. Rating Live Load (Inventory & Operating Level)
    a. HS20-44

2. Legal Loads (Operating Level)
    a. Routine Commercial Traffic
        i. Type 4
        ii. Type 3S3A
        iii. Type 3-3 (IowaDOT)
        iv. Type 3S3B
        v. Type 4S3
        vi. Type 5-2
    b. Specialized Hauling Vehicles (SHVs)
        i. SU4
        ii. SU5
        iii. SU6
        iv. SU7
    c. Emergency Vehicles
        i. Type EV2
        ii. Type EV3

3. Permit Trucks (Operating Level)
    a. 90 kip Six-Axle Vehicle
    b. 136 kip (A) Seven-Axle Truck with Triple-Axle Configuration
    c. 136 kip (B) Seven-Axle Truck with a Quad-Axle Configuration
    d. 156 kip Eight-Axle Truck with a Quad-Axle Configuration
    e. Fluid Milk Truck
    f. Quint Axle Crane Truck
    g. Small Annual Crane Truck



"Analysis Settings" window for the "Iowa DOT ASR" analysis template



"Advanced" settings window for the "Iowa DOT ASR" analysis template

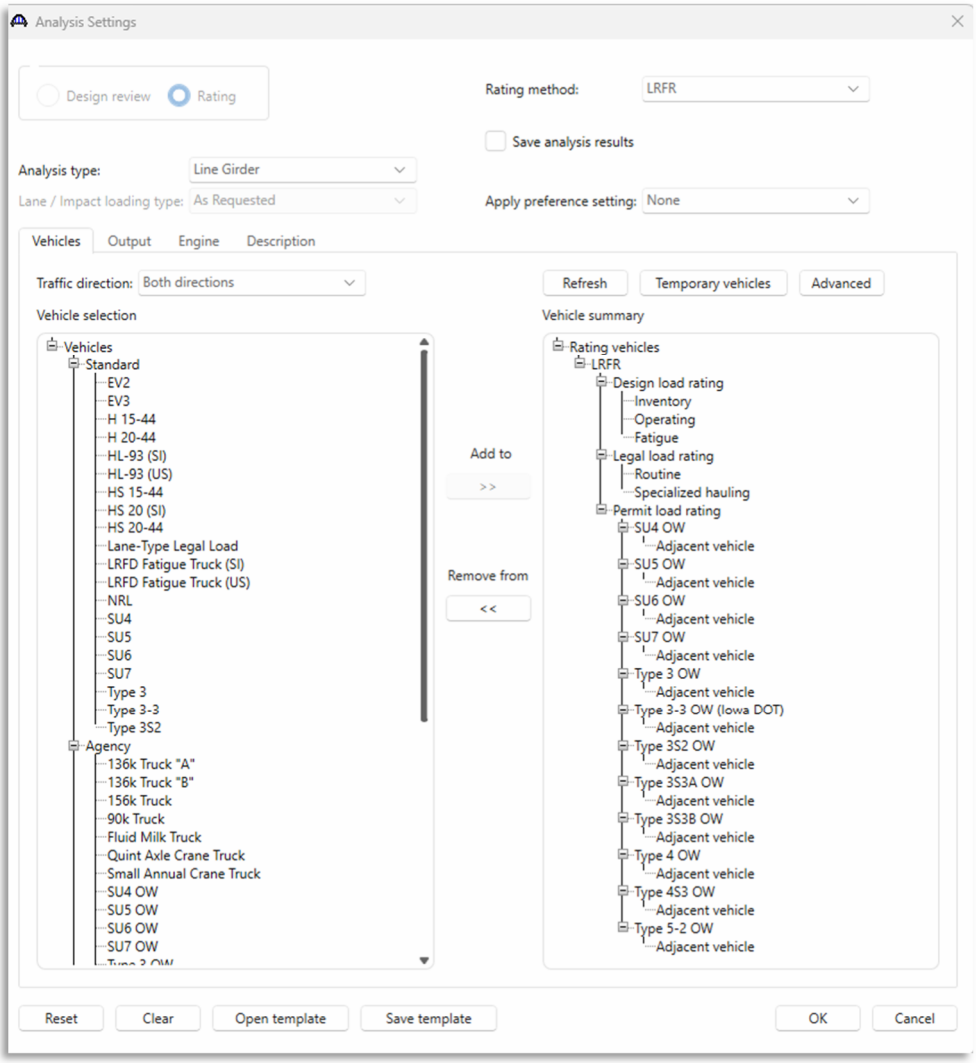
2.3.4. LRFR ALL-SYSTEM OVERWEIGHT (OW) ANALYSIS TEMPLATE

Template Name: Iowa DOT LRFR All-System OW

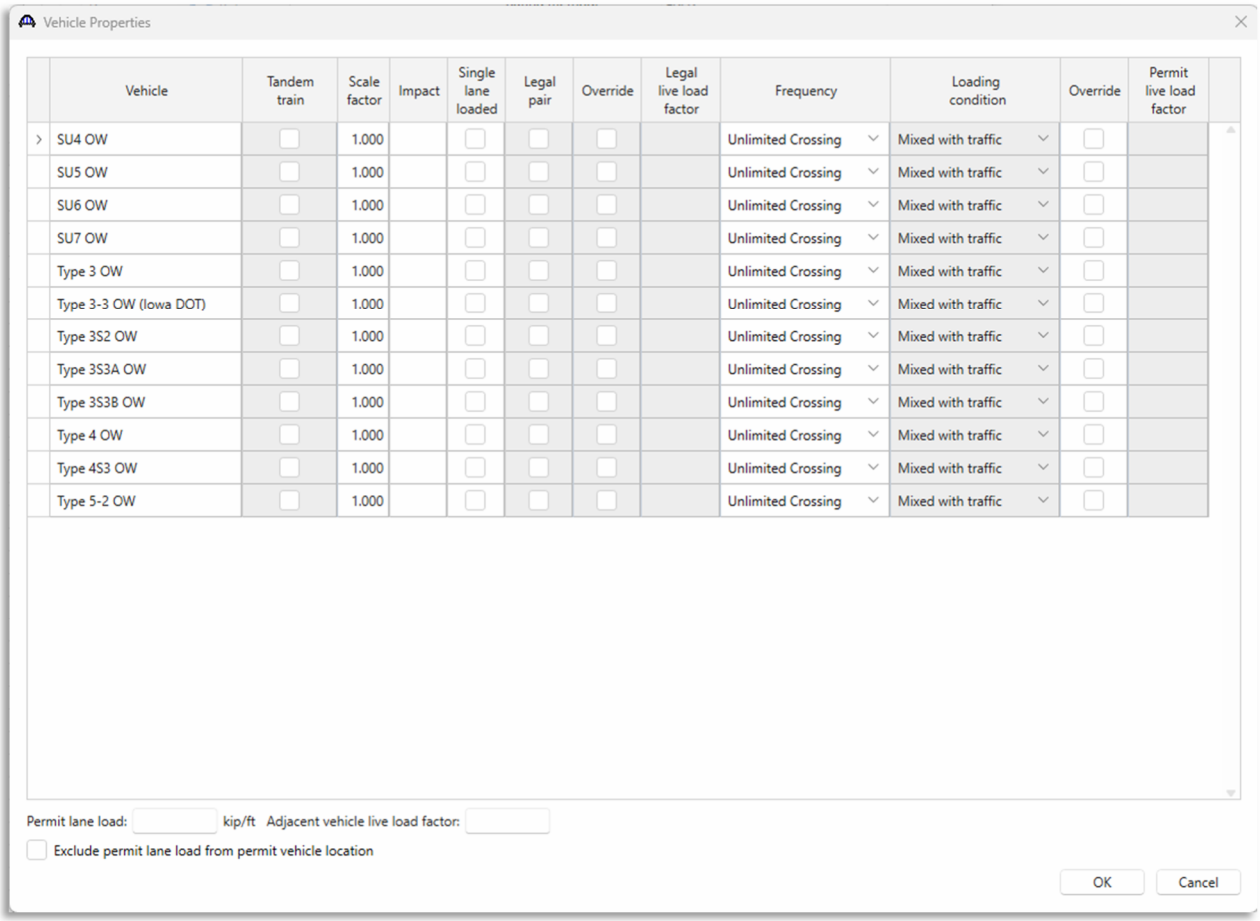
Live loads included in the "Iowa DOT LRFR All-System OW" analysis template are listed below.

1. Permit Loads
    a. SU4 OW
    b. SU5 OW
    c. SU6 OW
    d. SU7 OW
    e. Type 3 OW
    f. Type 3-3 OW (Iowa DOT)
    g. Type 3S2 OW
    h. Type 3S3A OW
    i. Type 3S3B OW
    j. Type 4 OW
    k. Type 4S3 OW
    l. Type 5-2 OW

The rating trucks used in his template are Iowa DOT Legal Trucks that have been modified by increasing the axle load by 12.5% to represent Iowa's All-System permits.. This analysis template was created as an option if the user wanted to refine their load ratings by running all-systems trucks using permit load factors.



"Analysis Settings" window for the "Iowa DOT LRFR All-System OW" analysis template



"Advanced" settings window for the "Iowa DOT LRFR All-System OW" analysis template

2.3.5. LFR/ASR MEMBER ALTERNATIVE ANALYSIS TEMPLATE

Template Name: Iowa DOT LFR/ASR Mem Alt

Live loads included in the "Iowa DOT LFR/ASR Mem Alt" analysis template are listed below.

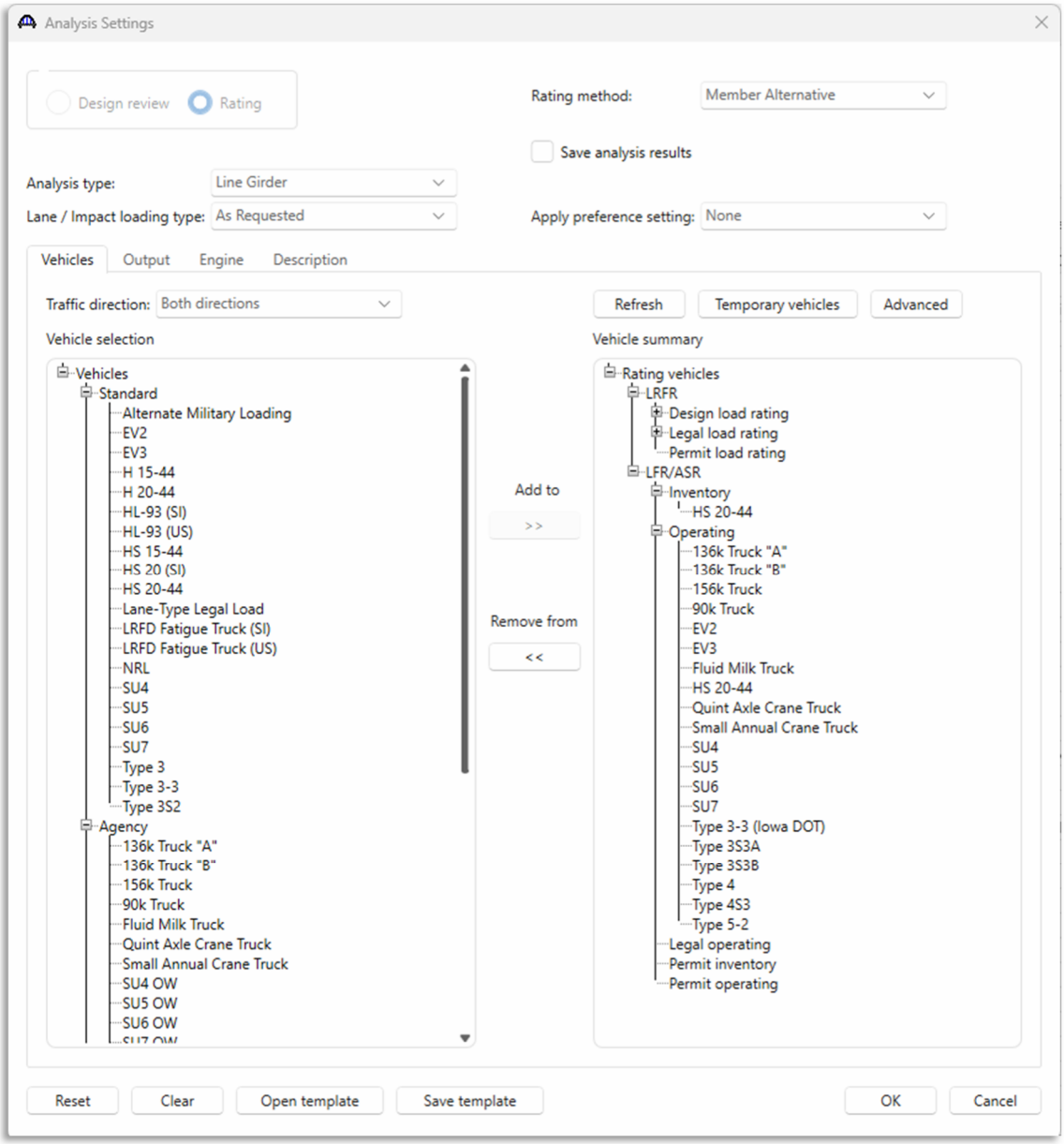
1. Rating Live Load (Inventory & Operating Level)
    a. HS20-44

2. Legal Loads (Operating Level)
    a. Routine Commercial Traffic
        i. Type 4
        ii. Type 3S3A
        iii. Type 3-3 (IowaDOT)
        iv. Type 3S3B
        v. Type 4S3
        vi. Type 5-2
    b. Specialized Hauling Vehicles (SHVs)
        i. SU4
        ii. SU5
        iii. SU6
        iv. SU7
    c. Emergency Vehicles
        i. Type EV2
        ii. Type EV3

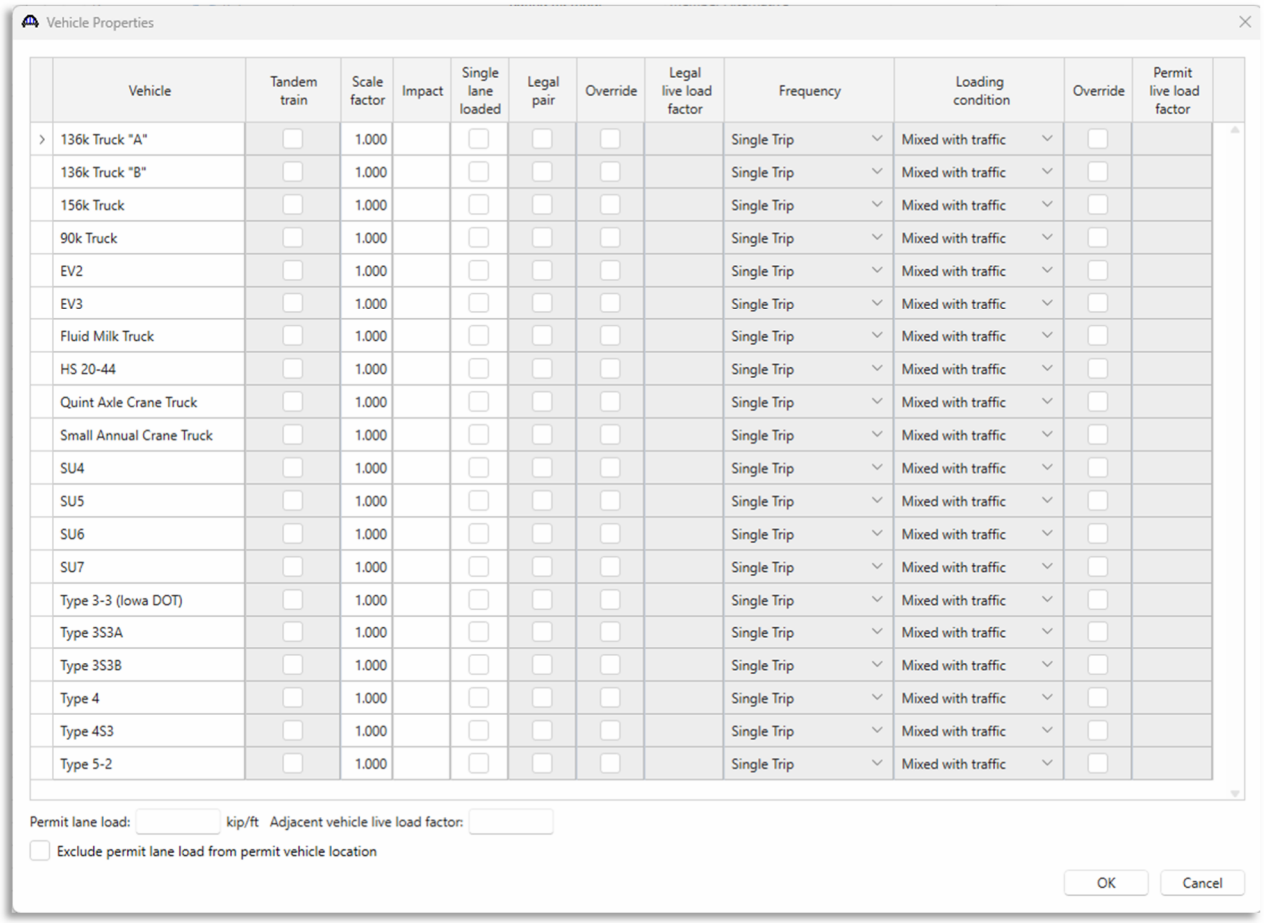
3. Permit Loads (Operating Level)
    a. 90 kip Six-Axle Vehicle
    b. 136 kip (A) Seven-Axle Truck with Triple-Axle Configuration
    c. 136 kip (B) Seven-Axle Truck with a Quad-Axle Configuration
    d. 156 kip Eight-Axle Truck with a Quad-Axle Configuration
    e. Fluid Milk Truck
    f. Quint Axle Crane Truck
    g. Small Annual Crane Truck

This is a combined template to generate both LFR and ASR rating results. This template is generally used for truss models based on Iowa DOT's historical standards that have the timber deck. This template analyzes each element based on the rating method selected while creating the members (ASR for the timber deck and LFR for rest of the components) preventing the need for multiple runs for the timber vs steel components.

Please note that because the rating analysis is performed in both LFR and ASR, the legal and permit trucks are evaluated under the Operating level and not separated into Legal Operating and Permit Operating levels. As such, if the user wants to run adjacent trucks with the legal and permit vehicles, they will not be able to use this analysis template. The user will need to perform two (2) rating analysis runs, one (1) for LFR and one (1) for ASR.



"Analysis Settings" window for the "Iowa DOT LFR/ASR Mem Alt" analysis template



"Advanced" settings window for the "Iowa DOT LFR/ASR Mem Alt" analysis template

2.4. PERFORM RATING ANALYSIS

There are two ways to perform the rating analysis of a bridge model using the analysis templates

- In the Bridge Explorer
- In the Bridge Workspace

2.4.1. PERFORM RATING ANALYSIS IN BRIDGE EXPLORER

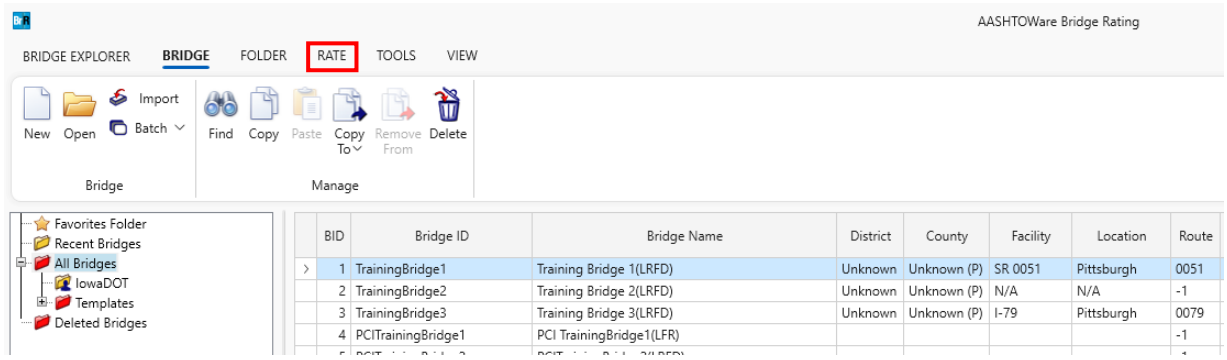
To perform a rating analysis in Bridge Explorer:

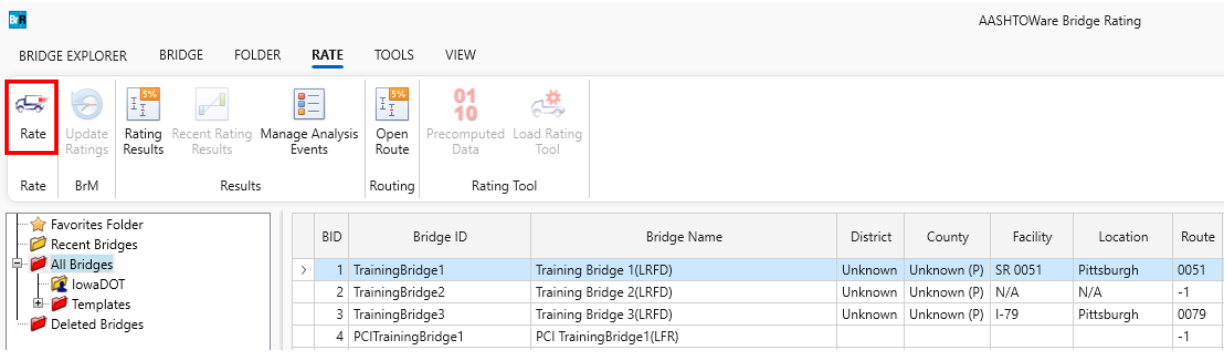
1. After logging into BrR, "AASHTOWare Bridge Rating" window is opened showing the Bridge Explorer.

2. In the left pane of Bridge Explorer, a tree view contains multiple folders and subfolders, select the approproate folder that contains the specific bridge for analysis.

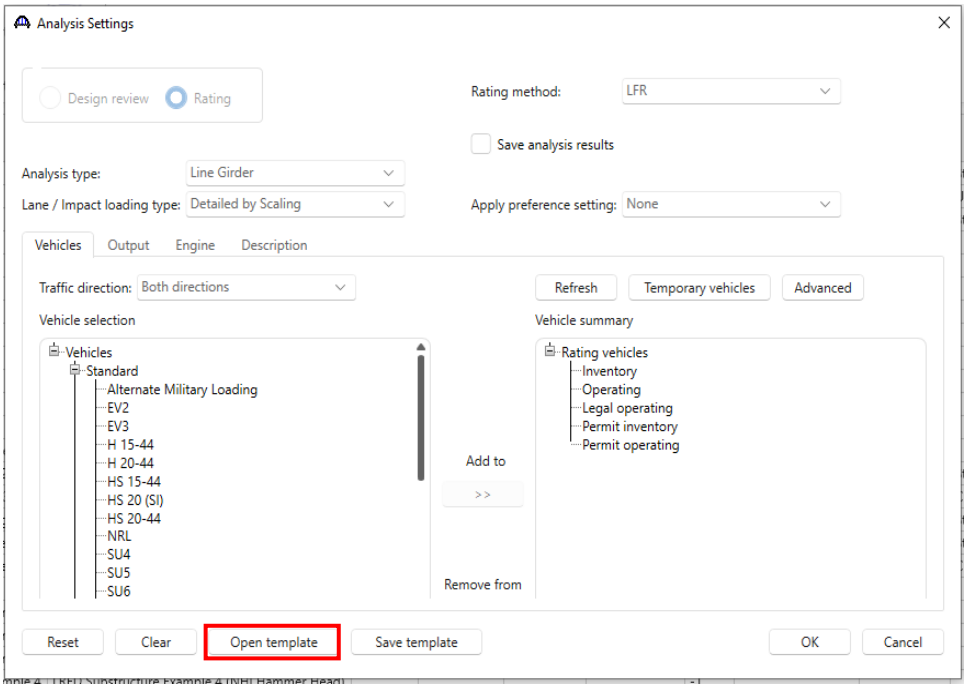
3. In the right pane of Bridge Explorer, click and highlight the specific bridge model.

4. In the top ribbon, select "RATE" and click on the "Rate" icon to bring up the "Analysis Settings" window.

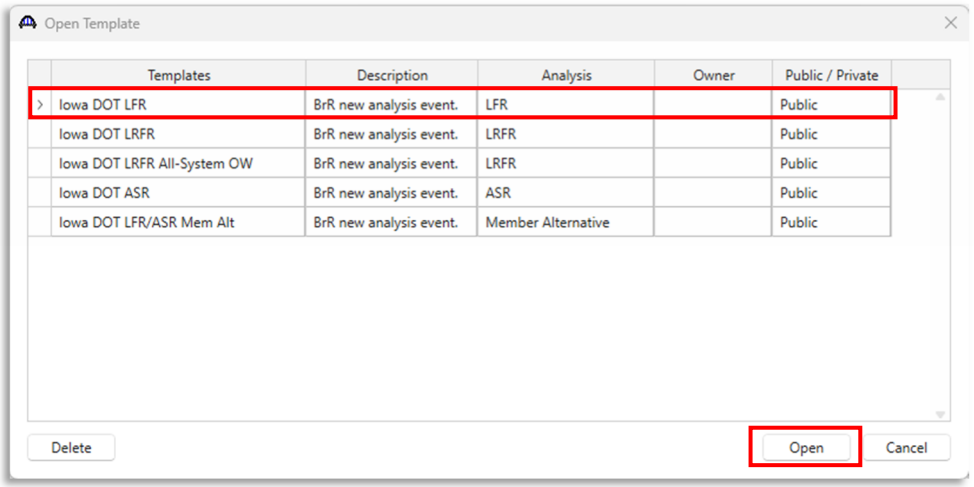




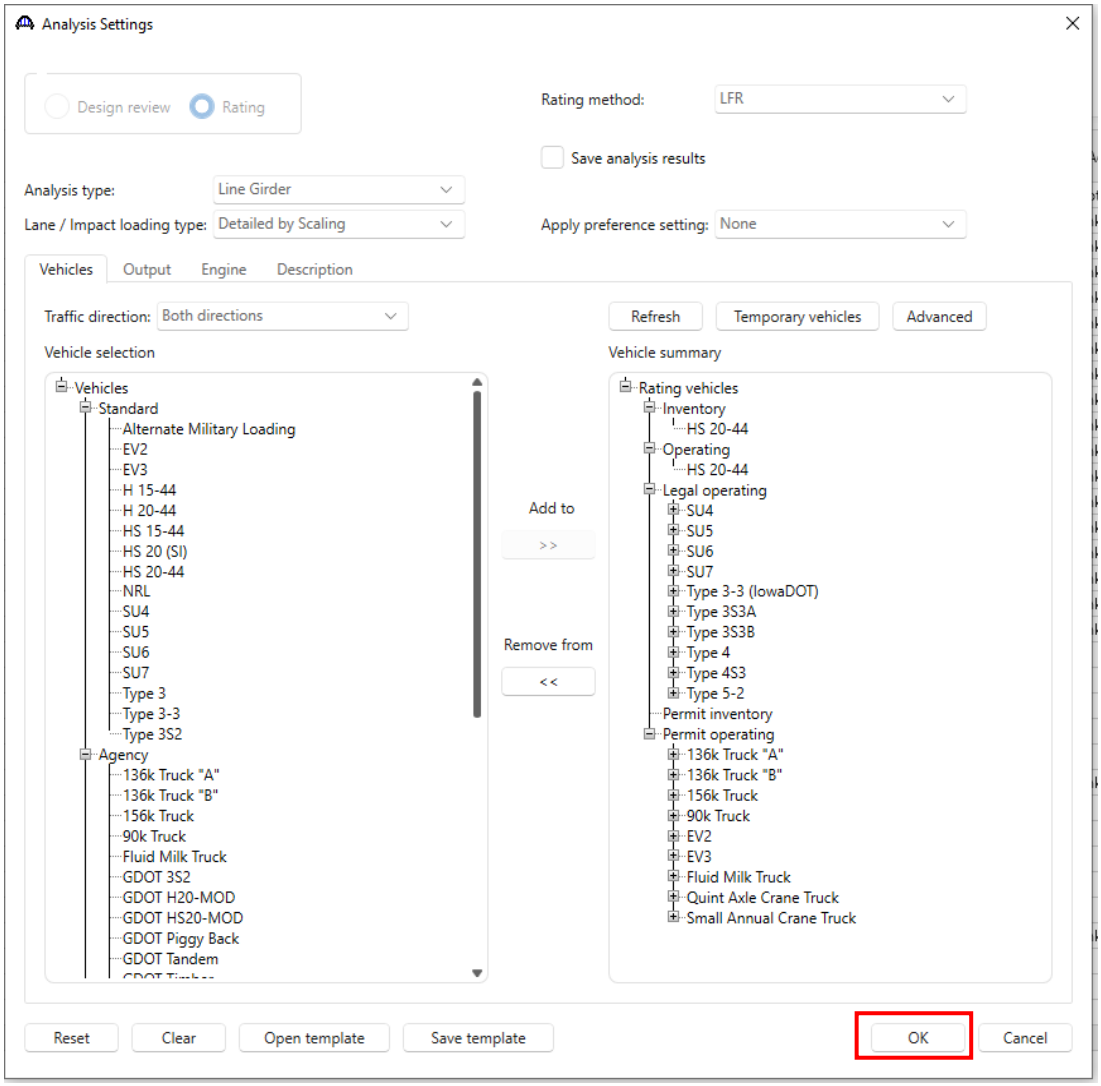
5. In the “Analysis Settings” window, click on “Open template” at the bottom.



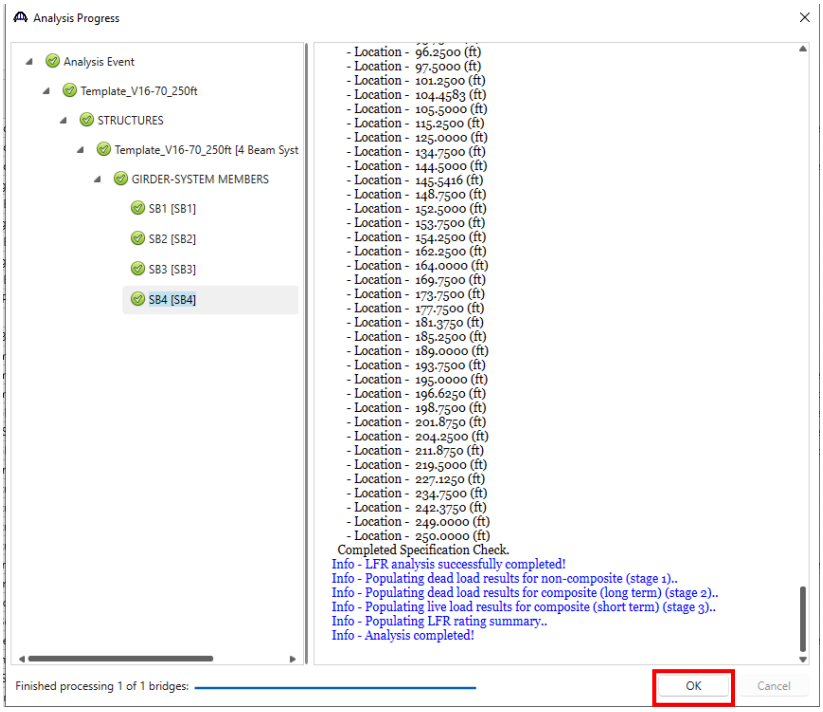
6. Select the analysis method to be used for the rating analysis and click “Open”. In this example, “Iowa DOT LFR” is selected.



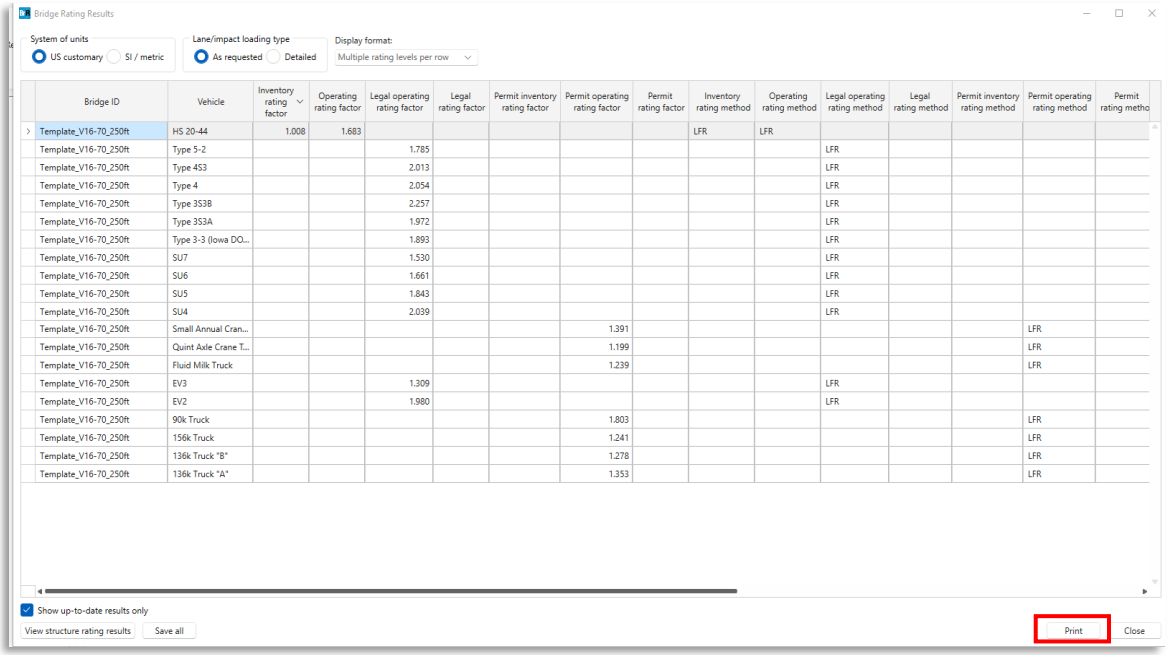
7. The “Vehicle Summary” pane on the”Analysis Settings” window will show all the rating vehicles under their respective rating levels. Click “OK” to begin load rating analysis.



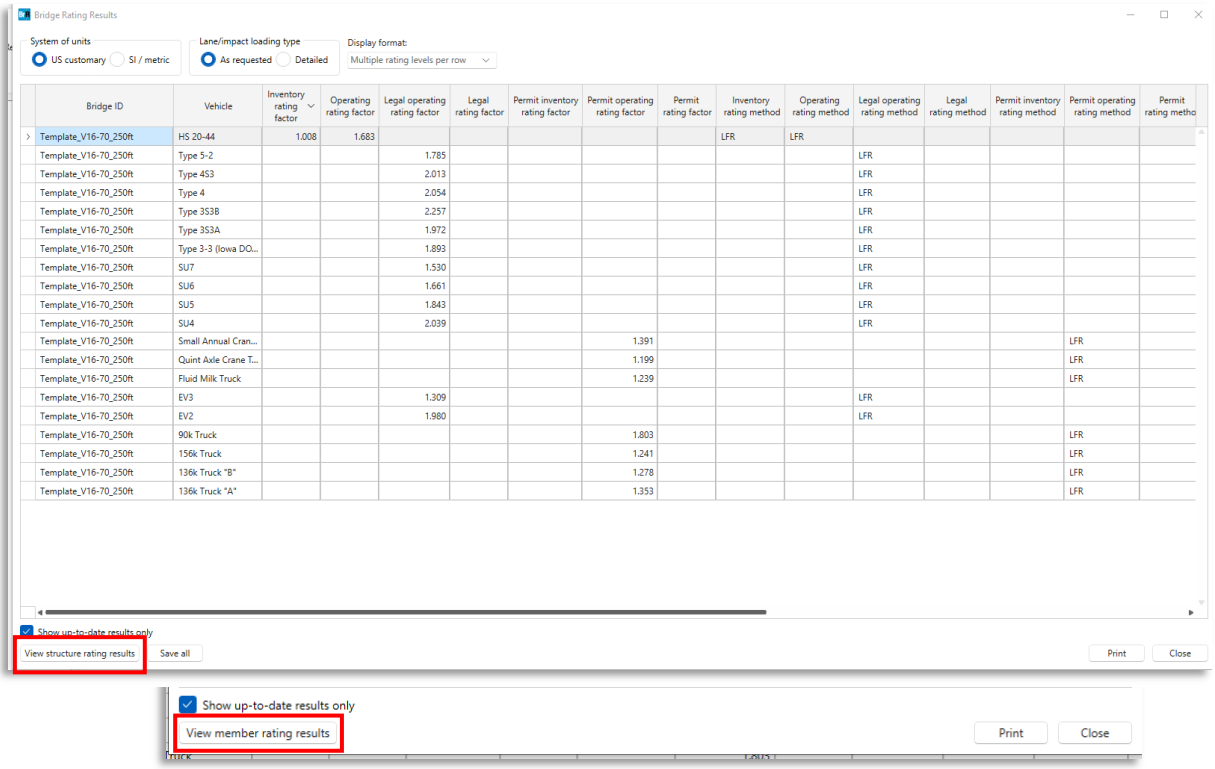
8. Once the analysis begins, a “Analysis Progress” window will appear. When the analysis is completed, select “Ok” on the bottom right of the window to bring up the “Bridge Rating Results” window.



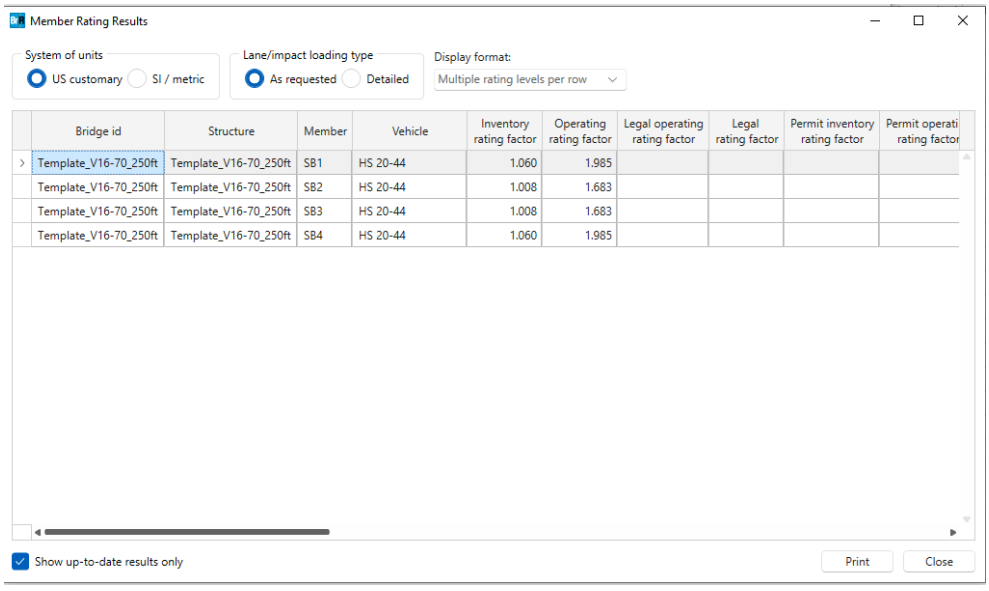
9. The “Bridge Rating Results” window provides the controlling rating results for the bidge model. The rating results can be copied out by highlighting the appropriate (or all) rows and using “Ctrl” + “C” command. Additionally, the rating results can be printed out by clicking on “Print” on the bottom right of the window.



10. To obtain additional rating results for each superstructure member, select the appropriate row and click on “View structure rating results” at the bottom left corner of the “Bridge rating Results Window” to bring up the “Structure Rating Results” Window. Select “View member rating results” at the bottom left corner of the window to bring up the “Member Rating Results” window.



11. The “Member Rating Results” window shows the rating results for each member of the selected truck from the “Bridge Rating Results” window.



2.4.2. PERFORM RATING ANALYSIS IN BRIDGE WORKSPACE

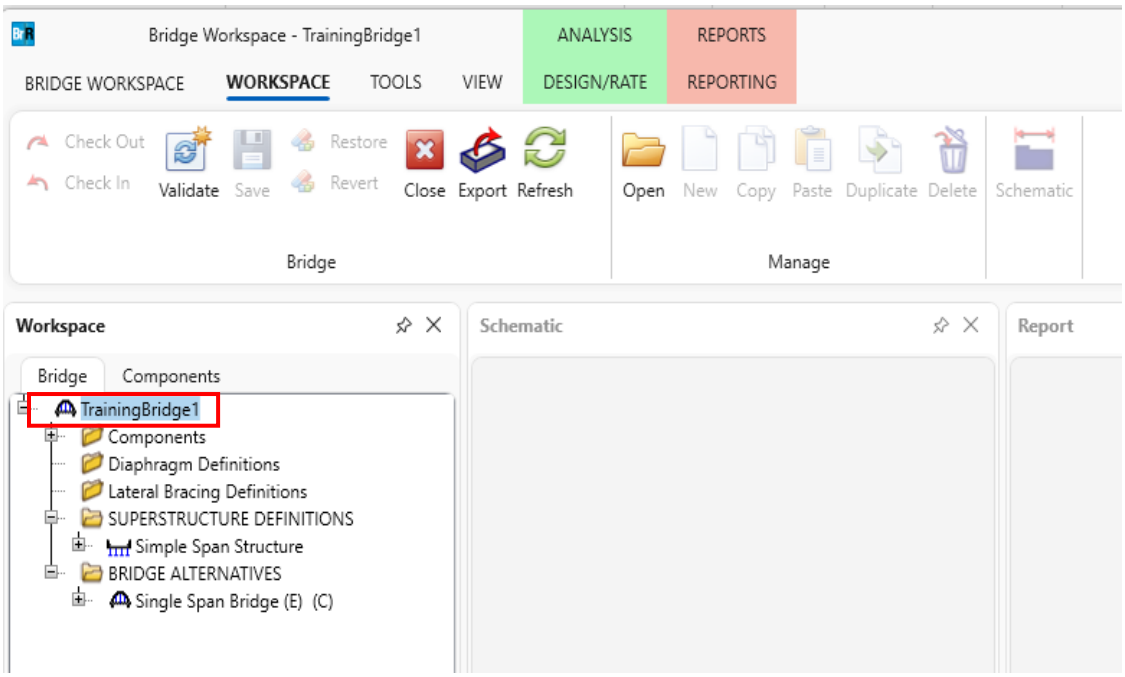
The analysis can also be performed within the Bridge Workspace. Additional specific details of the analysis can be retrieved such as controlling limit states and locations, Specification Check Detail, and Results Graph of each individual member.

1. After logging into BrR, "AASHTOWare Bridge Rating" window is opened showing the Bridge Explorer.

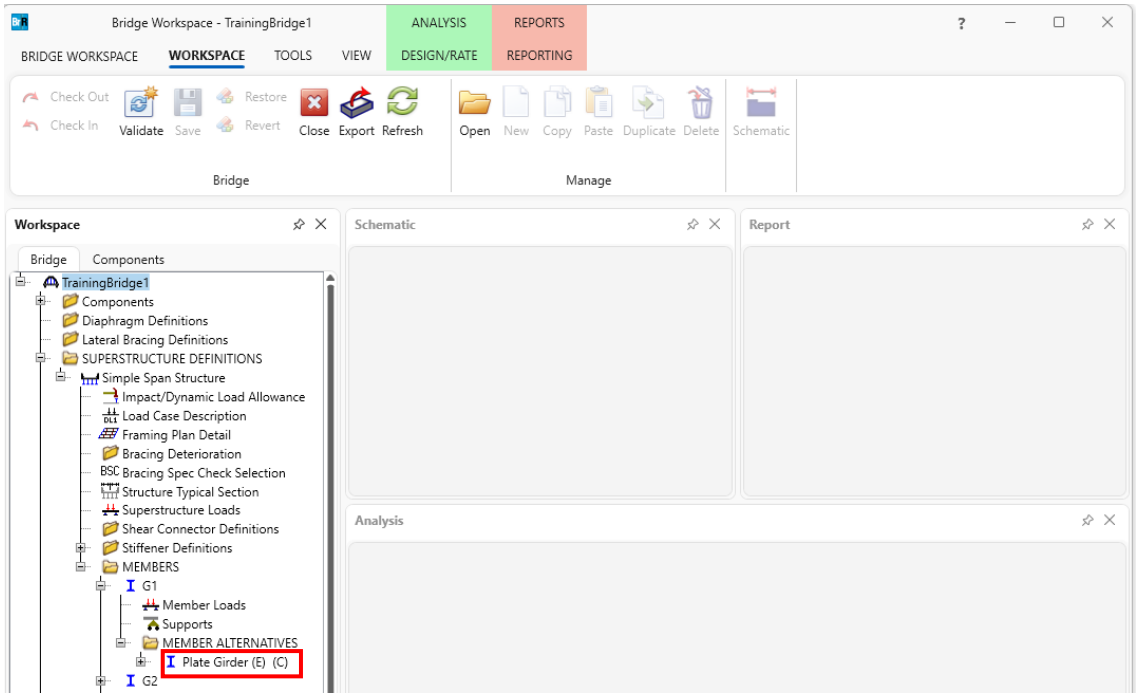
2. In the left pane of Bridge Explorer, a tree view contains multiple folders and subfolders, select the approproate folder that contains the specific bridge for analysis.

3. In the right pane of Bridge Explorer, double-click the specific bridge model to open the model in the Bridge Workspace window.

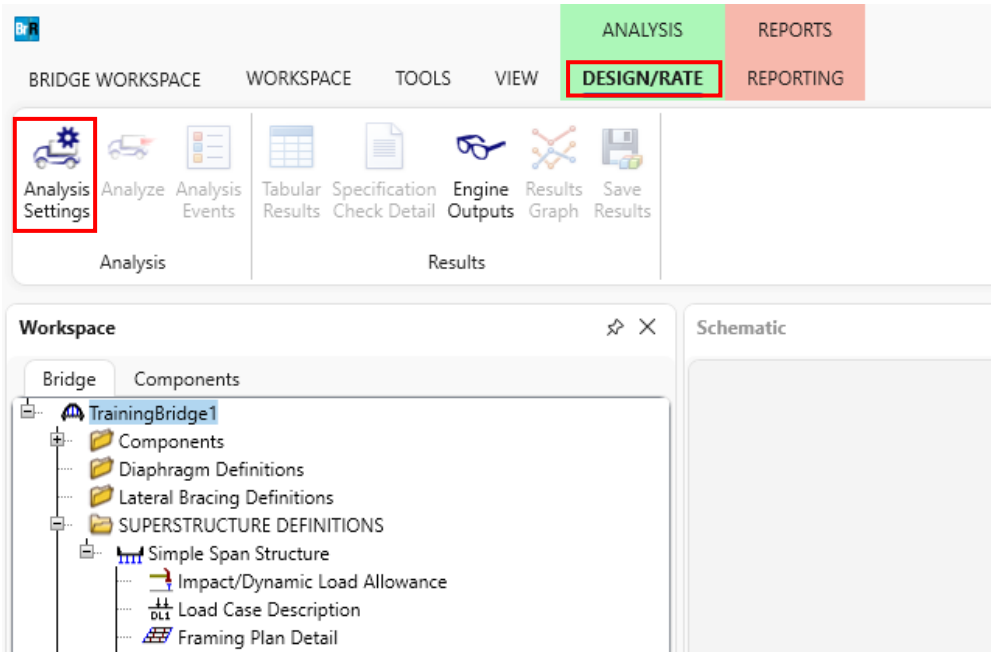
4. Click on the Model Name at the top of the workspace tree to highlight and select the entire model, including all members of the model, for analysis.



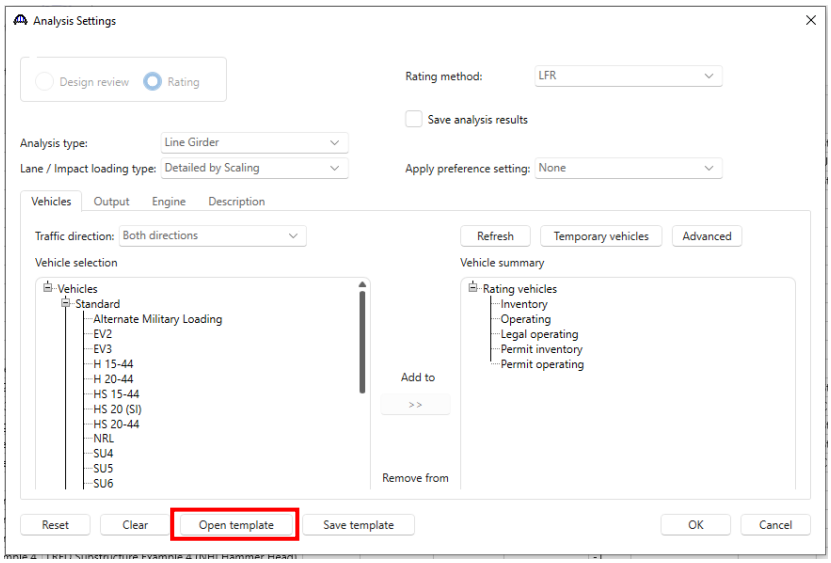
Or select a specific member under the Member Alternative tree to analyze one specific member. In this example, “G1” -> “Plate Girder” is selected for analysis.



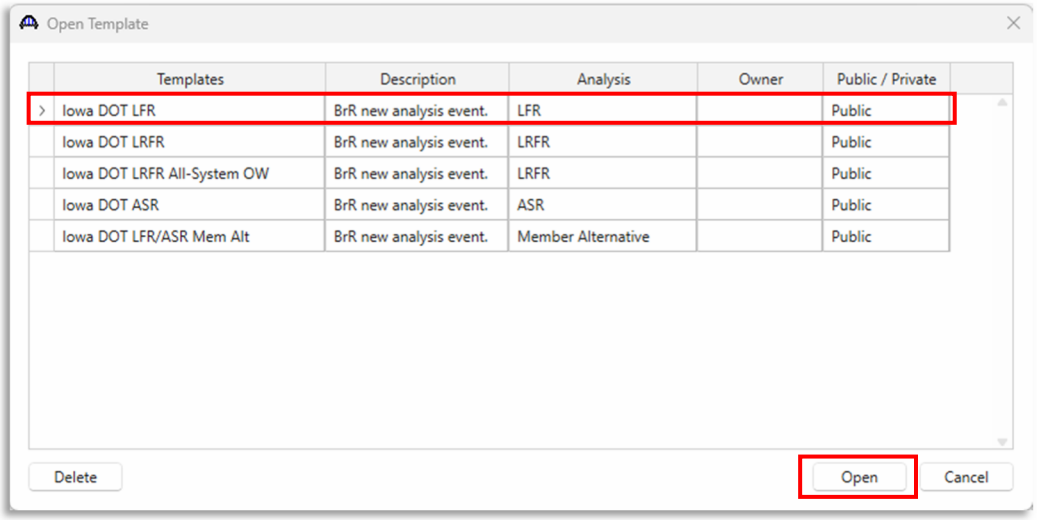
5. In the top ribbon, select “DESIGN/RATE” and click on the “Analysis Settings”. Note that the “Analyze” icon is greyed out.



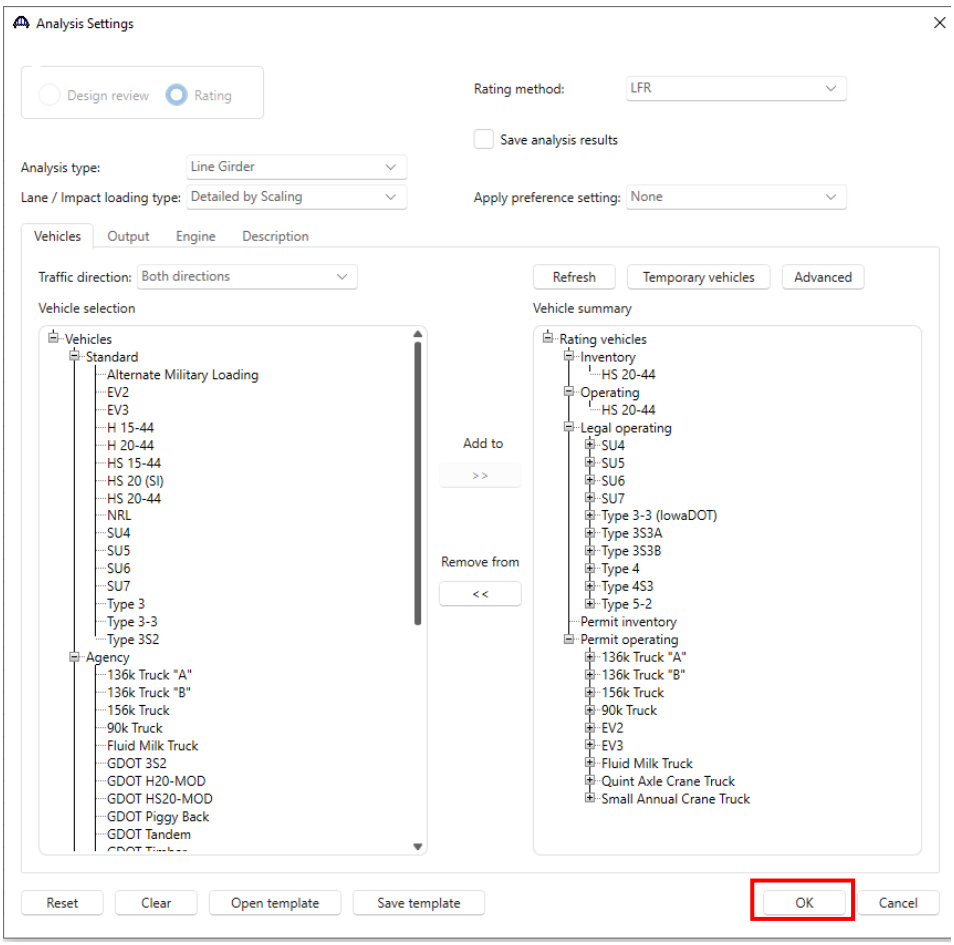
6. In the “Analysis Settings” window, click on “Open template” at the bottom.



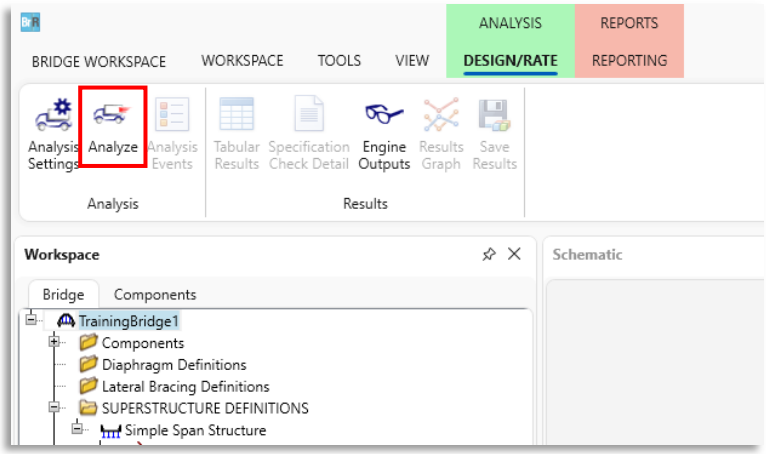
7. Select the appropriate analysis template and click “Open”. In this example, “Iowa DOT LFR” is selected.



8. In the “Analysis Settings” window, the “Vehicle Summary” pane will show all the rating vehicles under their respective rating levels. Click “OK”.

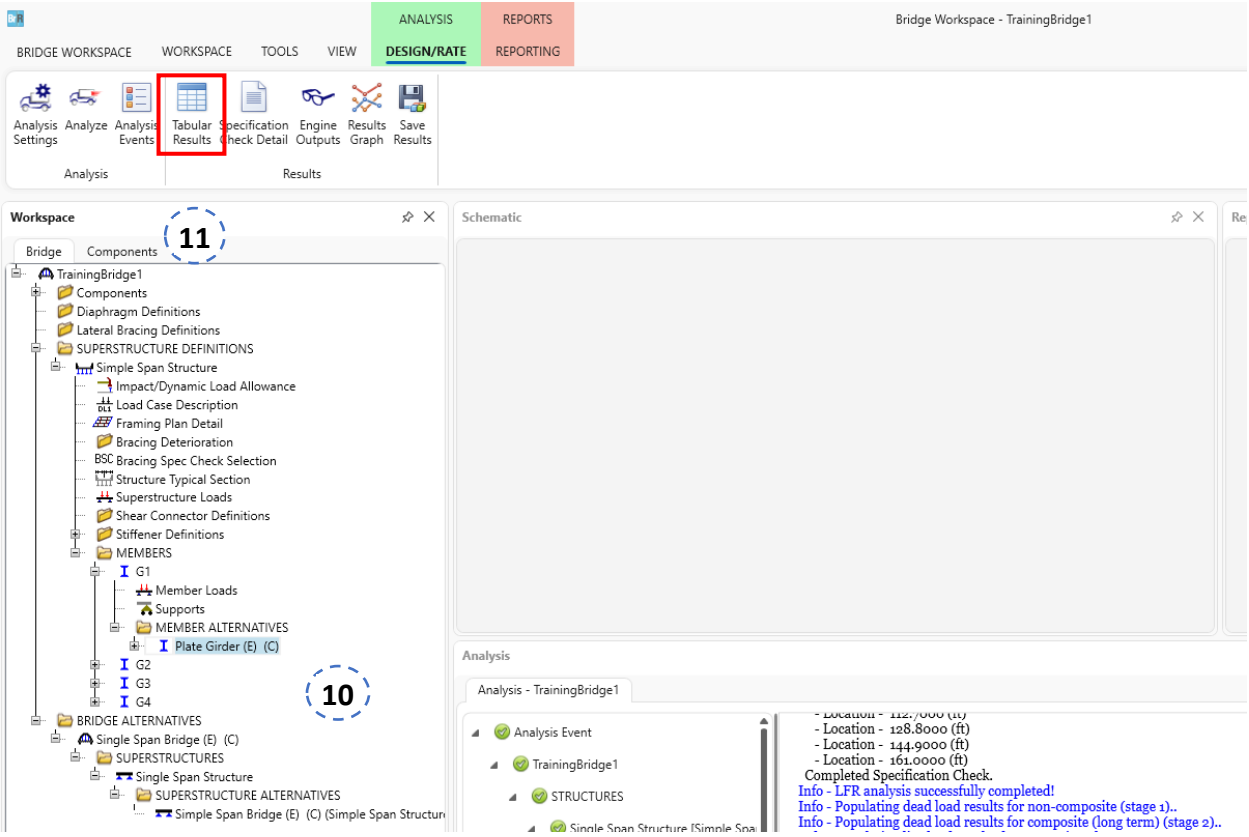


9. In the top ribbon, the “Analyze” icon is now activated, click on the icon to start the analysis.



10. Once the analysis has been completed, in the Bridge Workspace tree, navigate to the Member Alternatives and select the member to highlight it. In this example, “G1” -> “Plate Girder” member alternative is selected.

11. In the top ribbon, click on “Tabular Results” to bring up the “Analysis Results” of the selected member.



2.5. GENERAL PREFERENCES

The General Preferences feature in BrR is a usability enhancement that allows the user to perform the following:

- Create, save, export/import agency-wide and user-specific preferences
- Set preferences as system defaults
- Apply preferences anytime to the bridge in the bridge Workspace
- Apply preferences to a bridge or multiple bridges in the Bridge Explorer
- Apply preferences during the analysis

This feature enables settings like Control Options, Analysis Modules, Default Units and System Overrides. All of this can be pre-defined, saved and applied to bridge models, eliminating the need

for repetitive inputs and updates. The General Preferences can be applied to bridge models in the Bridge Explorer or within the Bridge Workspace.

The "IowaDOT_System_BrR_V750.brsx" file contains Control Options templates for the bridge types listed below. (NOTE: These Control Option templates were created to establish uniformity when creating Iowa's BrR standard templates. Load raters may choose to use different control options for their bridges.)

- Corrugated Metal Pipe
- Prestressed Concrete Beams
- Reinforced Concrete Box Culvert
- Reinforced Concrete Slab
- Steel Beams/Girders
- Non-Timber Deck Truss Floorbeam Stringer System
- Non-Timber Deck Truss Floorbeam System
- Timber Deck Truss Floorbeam Stringer System

2.5.1. LIMITATIONS

Due to BrR limitations, some Control Options settings are not applied appropriately for two of the templates above.

1. Reinforced Concrete Slab & Non-Timber Deck Truss Floorbeam System Templates
    a. Control Options – RC
        i. LRFR Pane – "Consider skew reduction factor" option is not checked when the template is applied. As such, the load rater will need to manually check this selection in the model.

2. Reinforced Concrete Box Culvert
    a. Control Options – RC Box
        i. LFR Pane – "Ignore effects from negligible LL" is not included in the list of available settings in the General Preferences window even though it is an option in the bridge model. As such, the load rater will need to manually check this setting in the model.

        ii. LRFR Pane - "Consider modified shear strain capacity" and "Ignore effects from negligible LL" are not included in the list of available settings in the General Preferences window even though it is an option in the bridge model. As such, the load rater will need to manually check these settings in the model.

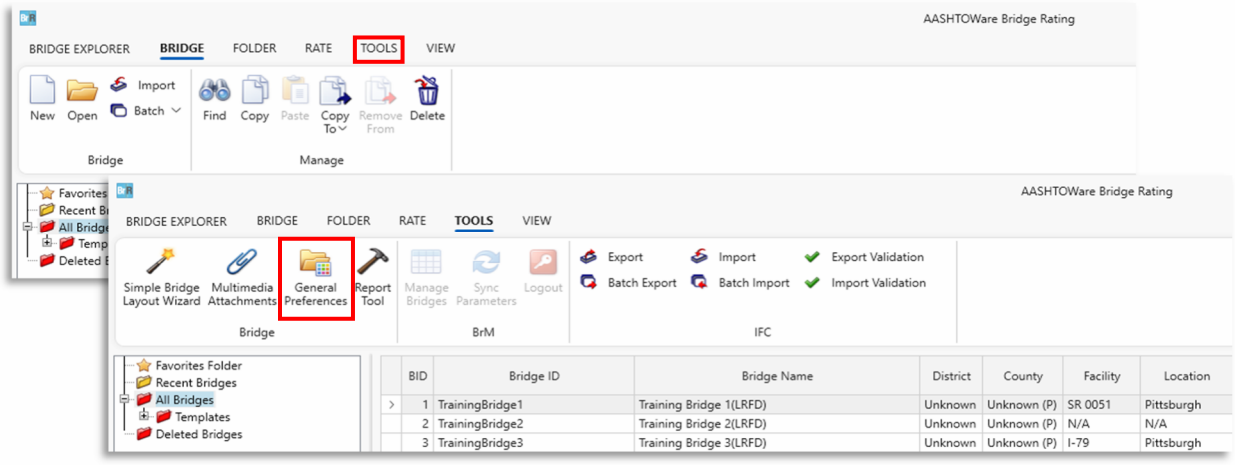
2.5.2. APPLY GENERAL PREFERENCES IN BRIDGE EXPLORER

1. After logging into BrR, “AASHTOWare Bridge Rating” window is opened showing the Bridge Explorer.

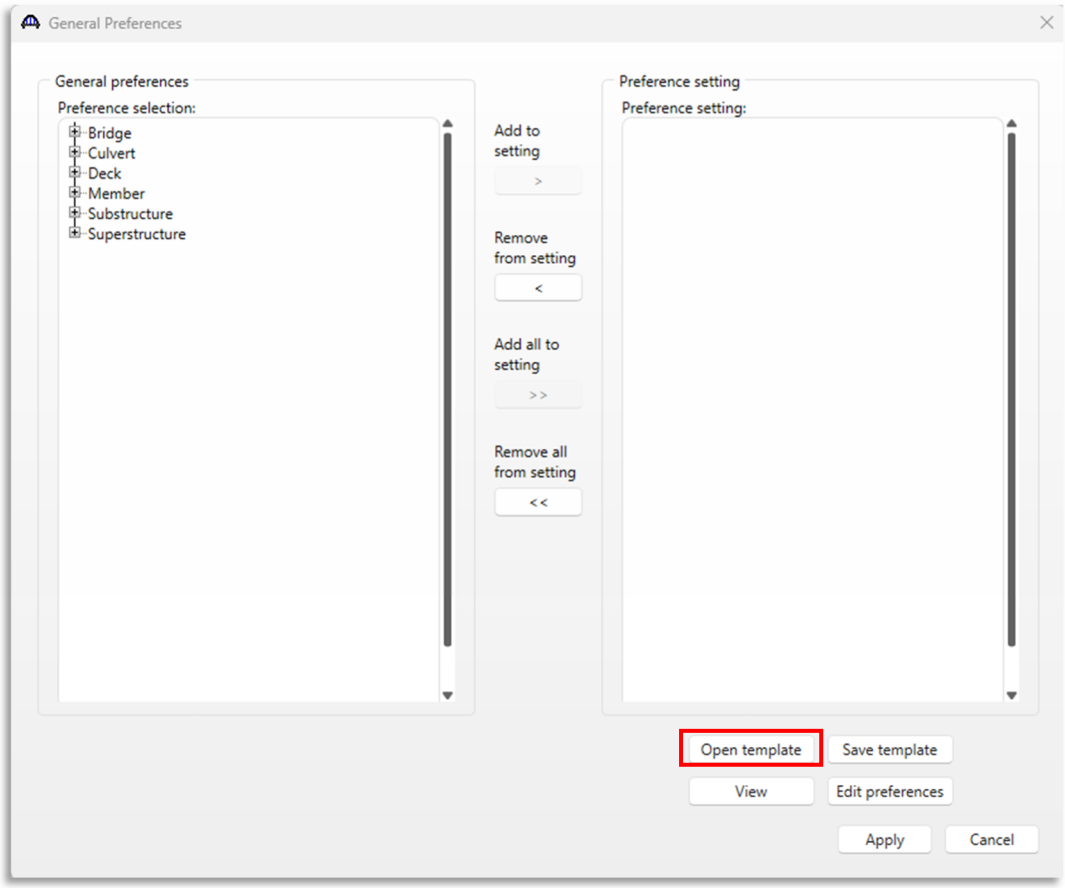
2. In the left pane of the Bridge Explorer, a tree view contains multiple folders and subfolders, select the approproate folder that contains the specific bridge for analysis.

3. In the right pane of Bridge Explorer, click and highlight the specific bridge model (or multiple bridge models of the same type).

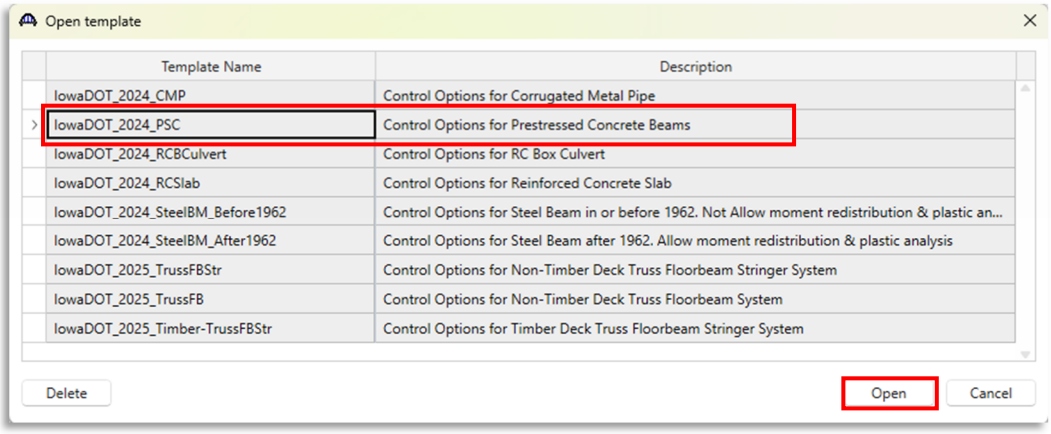
4. In the top ribbon, select “TOOLS” and click on the “General Preferences” icon to bring up the “General Preferences” window.



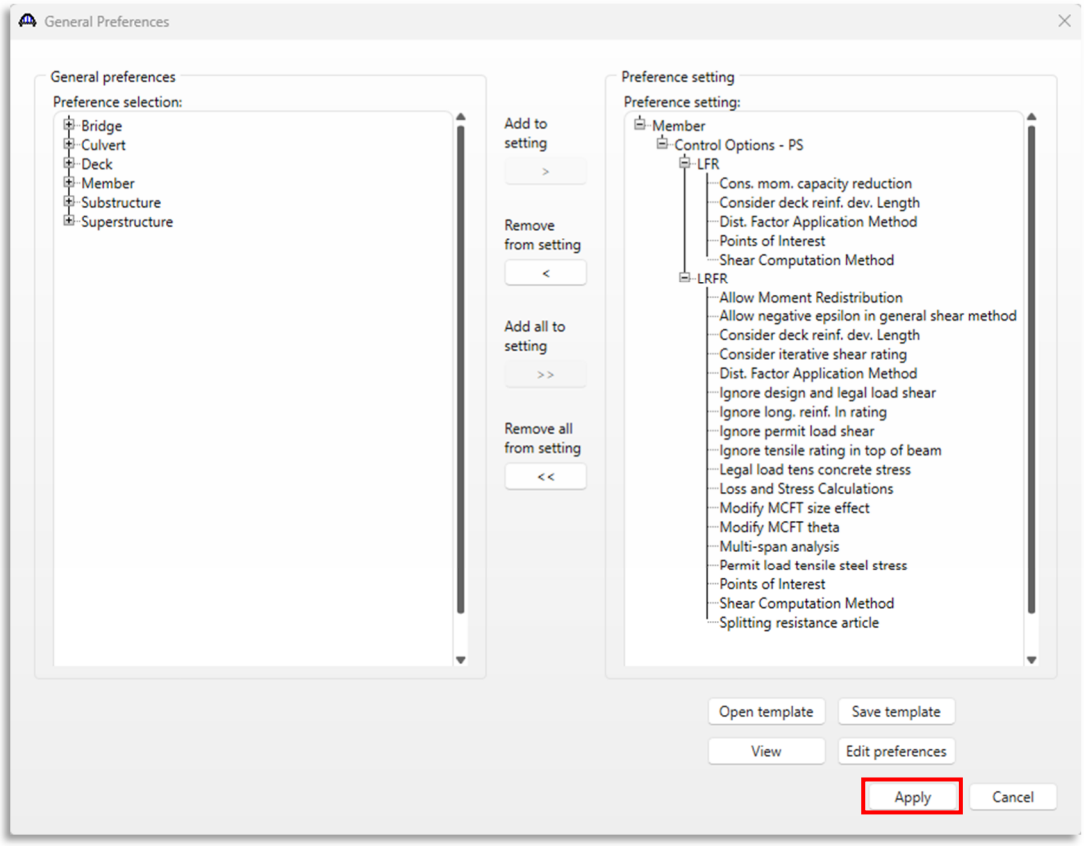
5. In the “General Preferences” Window, click on “Open template” at the bottom.



6. Select the template based on the bridge type and click “Open”. In this example, “IowaDOT_2024_PSC” is selcted.



7. The “Preference setting” pane on the right will now show the Control Options selections for the selected bridge type. Click “Apply” to apply the template to the selected bridge model.



8. The selected bridge model’s Member Alternative Control Options will now be updated to match the template for all members.

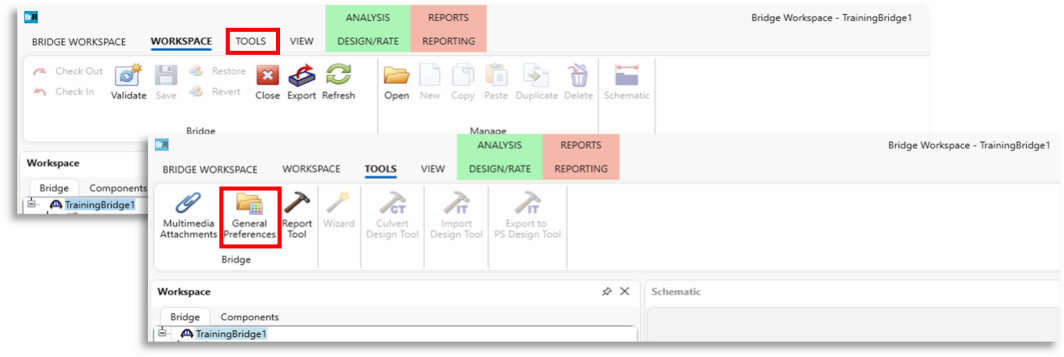
2.5.3. APPLY GENERAL PREFERENCES IN BRIDGE WORKSPACE

1. After logging into BrR, “AASHTOWare Bridge Rating” window is opened showing the Bridge Explorer.

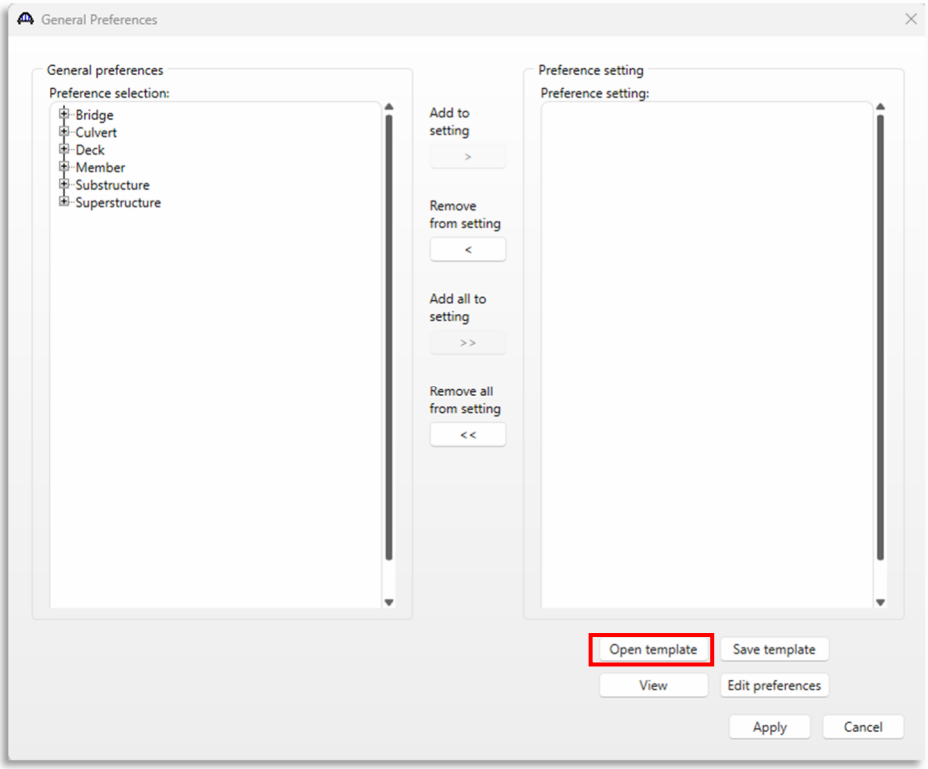
2. In the left pane of the Bridge Explorer, a tree view contains multiple folders and subfolders, select the approproate folder that contains the specific bridge for analysis.

3. In the right pane of Bridge Explorer, select and open the specific bridge model.

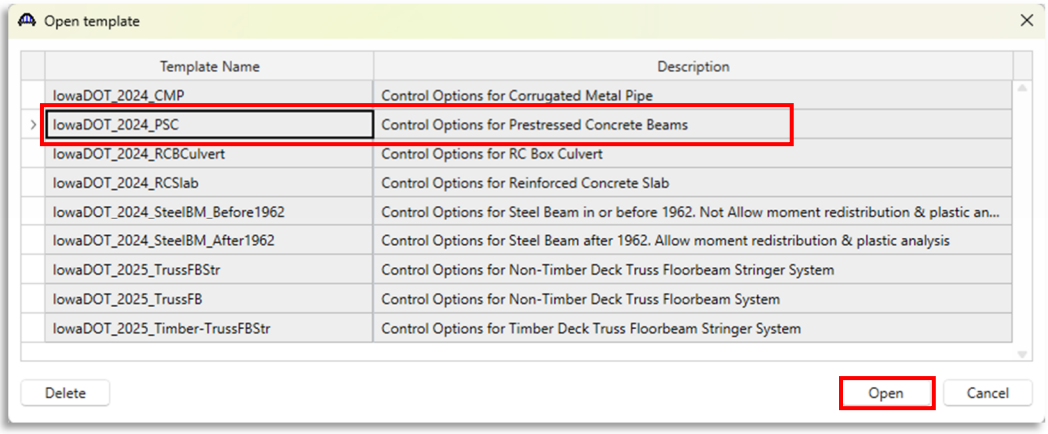
4. In the top ribbon, select “TOOLS” and click on the “General Preferences” icon to bring up the “General Preferences” window.



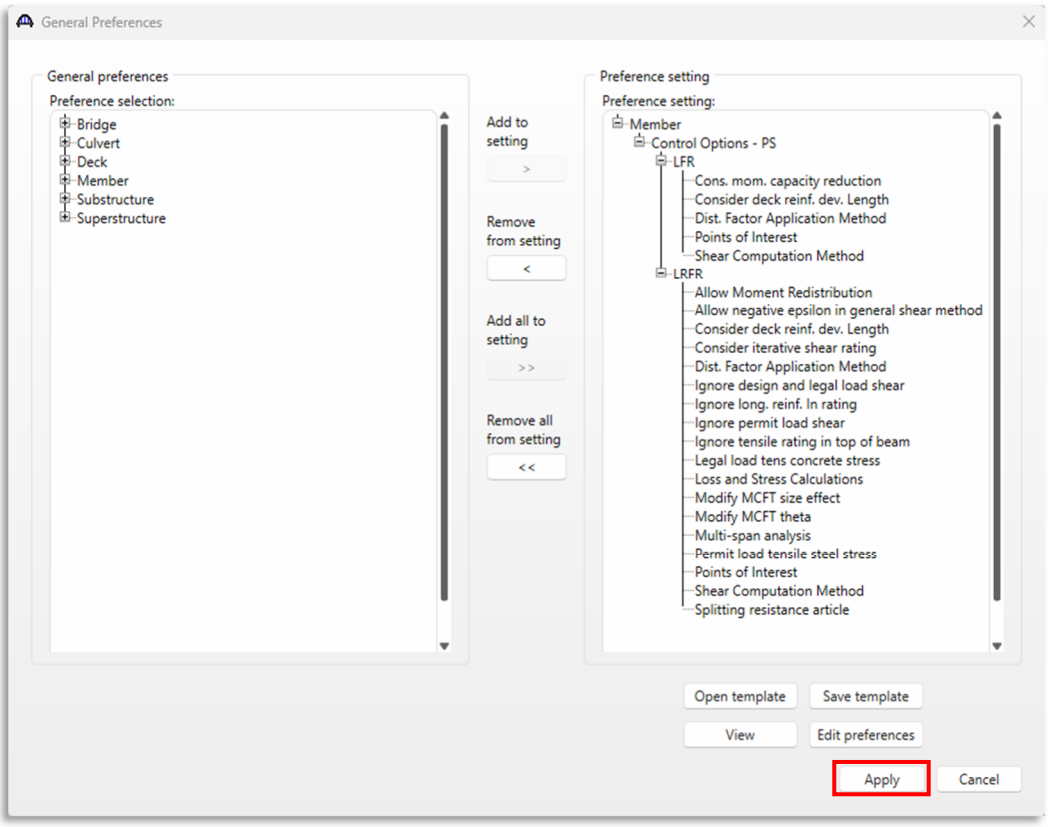
5. In the “General Preferences” Window, click on “Open template” at the bottom.



6. Select the template based on the bridge type and click “Open”. In this example, “IowaDOT_2024_PSC” is selcted.



7. The “Preference setting” pane on the right will now show the Control Options selections for the selected bridge type. Click “Apply” to apply the template to the bridge model.



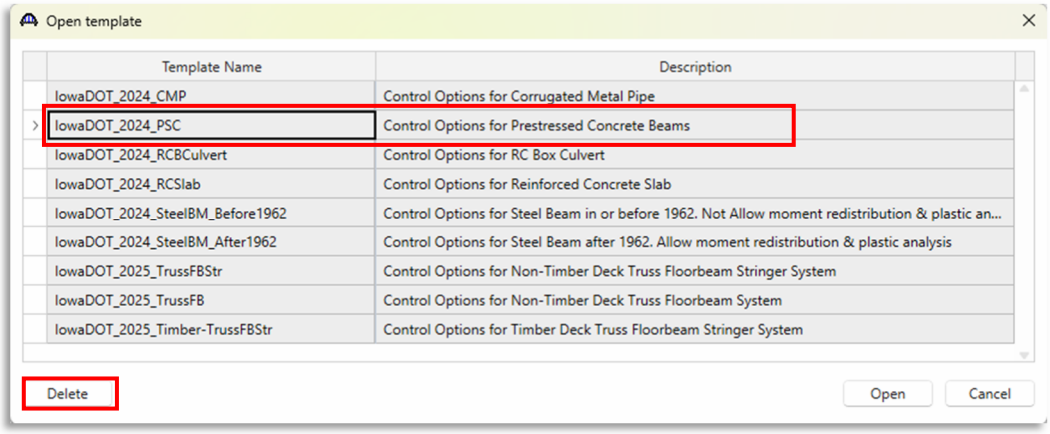
8. The bridge model’s Member Alternative Control Options will now be updated to match the template for all members.

2.5.4. DELETE GENERAL PREFERENCES

1. If there is an existing template in BrR that has an identical name to the one being imported, a duplicate may be created with " ~1" at the end of the name. Therefore, the existing template will need to be deleted before importing the new one.

2. Follow steps 1 to 5 from Section 2.5.2 or Section 2.5.3. to open the general preferences templates.

3. Select the template you want to delete and click "Delete". In this example, "IowaDOT_2024_PSC" is selcted.



4. After the analysis template is deleted, the updated template can be imported using the instructions from the previous section.

3. BrR TEMPLATE CREATION AND SUMMARY OF ASSUMPTIONS

All templates were created and ratings were conducted using AASHTOWare BrR Bridge Rating software, Version 7.5.0.3001. AASHTOWare BrR provides an option to model structures as templates which can then be used as a starting point for more specific bridge case scenarios. These templates (except for the truss templates) were created with multiple superstructure definitions for a given standard, typically to accommodate different skew options or to treat individual spans of prestressed pretensioned concrete beam standards as simple spans. For the truss standards, each template corresponds to one (1) truss standard and multiple superstructure definitions were created to model the various truss components accurately for some standards. The materials, shapes, sizes, dimensions, and rating circumstances were all selected and evaluated in accordance with AASHTO LRFD Bridge Design Specifications, 9th Edition, AASHTO Standard Specifications for Highway Bridges, 17th edition, and AASHTO Manual for Bridge Evaluation (MBE) 3rd edition, with Interim Specifications through 2022. Load ratings in this report are in compliance with the aforementioned codes using Load and Resistance Factor methodology and Load Factor/Allowable Stress methodology. The actual detailing of models for standards was done using standard plans provided by the Iowa DOT.

3.1. LRFD STANDARD TEMPLATES

The LRFD standards employed by the Iowa DOT included in this report consist of four bridge types and varying roadway widths and skews. The four bridge types are Pretensioned Prestressed Concrete Beam (H-series), Reinforced Concrete Slab (J-series), Rolled Steel Wide Flange Beam (RS-series), and Concrete Box Beam (B-series). The Reinforced Concrete Box Beams in the B-series were not found to be in-service, thus were not considered. These standards are shown below:

Prestress Beam	Reinforced Concrete Slab	Rolled Steel Beam	Concrete Box Beam
H24-06	J24-06	RS40-10/14 (Original)	B24-16
H30-06	J30-06	RS40-10/14 (2017 Revision)	B30-16
H30SI-12	J40-06/14		
H40-06/14	J44-06/14		
H44-07/14			

The RS40-10/14 standards listed below were revised in February 2017. These revisions included changes to the diaphragm spacing and the addition of a diaphragm to the center span in the exterior bays near the pier. The revision had a significant effect on the load ratings, and ratings for both the Original and Revised 2017 versions are presented in this report.

Standard	Length	Skews
RS40-10/14	160’-0	20- and 30-degrees
RS40-10/14	180’-0	0-, 20-, and 30-degrees
RS40-10/14	200’-0	20- and 30-degrees
RS40-10/14	220’-0	0-, 20-, and 30-degrees

The LRFD standards included in this report also consist of three Iowa DOT reinforced concrete box culvert models that were created as examples for culverts in BrR. The standards used were the following:

- TRRCB-12, 12ft x 10ft, 24-25ft fill
- TWRCB-12, 12ft x 10ft, 23-25ft fill
- PRCB-13, 12ft x 11ft, 12-15ft fill

Iowa DOT does not have a standard for the Corrugated Metal Pipe structures, but an example load rating was created as well based on the CMP Culvert Example provided by Iowa DOT. This example is attached at the end of the accompanying rating calculation file.

3.2. LFD/ASD STANDARD TEMPLATES

Previously employed standards by the Iowa DOT were rated, and the results were included in this report. These standards consisted of a variety of bridge types including Steel Beam (V-Series), Reinforced Concrete Beam (H1, H1A, and H2), Pretensioned Prestressed Concrete Beam (H-Series), Reinforced Concrete Slab (J-Series), and Truss Bridges (S-, T-, U-, W-, X-, Y-, and Z-Series). The list of all the LFD/ASD standards rated for this project is shown below:

Prestress Beam	Reinforced Concrete Slab	Steel Beam	
H10-54	J3-52	V1-15	V8-47
H11-58	J3A-60	V1A-28/31	V9-50
H12-60	J4-52	V1B-28/31/34	V9-64
H13-60	J4A-60	V1C-28/31/34	V9A-57
H14-60/67	J5-57	V2-15	V10-51
H14-79	J6-57	V2B-28/31/34	V10-64
H15-75/79	J7-60/67/79	V3-15	V10A-57
H16-69	J8-60/67/79	V3A-28/31/34	V11-57
H17-73	J15-75/79	V3B-28/31/34	V11-64
H24-84	J16-69	V4-15	V12-57
H24S-85	J24-84	V4B-28/31/34	V12-64
H24-87	J24-87	V5B-36	V13-60
H24S-87	J30C-79	V5B-47	V14-60
H24SI-05	J30C-87	V6-39	V14-64
H30M-79		V6-46	V15-75
H30-87		V7-39	V16-70
H30S-87		V7-46	V30C-79
H30-94		V8-41	
H30SI-05			

R/F Concrete Beam	
H1-16	H1-52
H1A-28	H2-52

Rolled Steel Beam
RS40-04

Truss Standards

S-25/28/31	X-14
T-15/16/17	Y-14/15/16/17
U-28/29/31/37	Z-27/30/45
W-24/25/28/31	

Note: Where multiple years are listed (e.g. V4B-28/31/34), the ratings for that standard (except the truss standards) are applicable to the original release and all subsequent revisions. For the truss standards, the standard year considered to create the model is noted in the truss calculations file.

3.3. SUMMARY OF ASSUMPTIONS

The following are assumptions made to create and analyze the Iowa standard BrR templates. They were chosen as conservative measures or to create uniformity between standards as much as possible. Load raters may modify models or the analysis options (change the barrier rail to open rail, rate vehicles for low impact or single lane, use bridge specific ADTT, etc) to modify the ratings if they choose. When changes are necessary to the template files, the engineers who have approved these templates are no longer accountable, and the user bears full responsibility for the results and their application.

3.3.1. GENERAL ASSUMPTIONS

- The ratings in this report apply only to those bridges which:

    a) are built according to the applicable bridge standard plans
    b) have no structural deterioration or damage
    c) have no added wearing surface in excess of the wearing surface (integral or additional) noted in the standards and in the rating calculations

- All standards were rated with full impact load for design, legal, permit, and emergency vehicles.
- All standards were rated as multilane, with the exception of standards with roadways less than eighteen feet wide curb-to-curb, which were treated as single-lane analyses.
- For all standards (except the truss standards) with the option of a barrier rail or open rail, only the barrier rail configuration was rated, but the additional weight of the overhang was based on the open rail to be conservative. The results of this analysis are applicable for both the open rail and barrier rail configurations.
- All standards (except the truss standards) with concrete decks were rated with a ½" integral wearing surface unless a thicker wearing surface was detailed. Specified wearing surfaces less than ½" were modeled as ½". If a slab thickening diagram was present in the standard plans, the dead load of the deck was modeled using the quarter-point average thickness. The nominal slab thickness was used in capacity calculations.
- Permit trucks (except the all-systems permit) were rated as Routine (Annual) permit vehicles with >5000 ADTT in accordance with MBE Table 6A.4.5.4.2a-1. This was a conservative measure to account for bridges exposed to a significant ADTT.

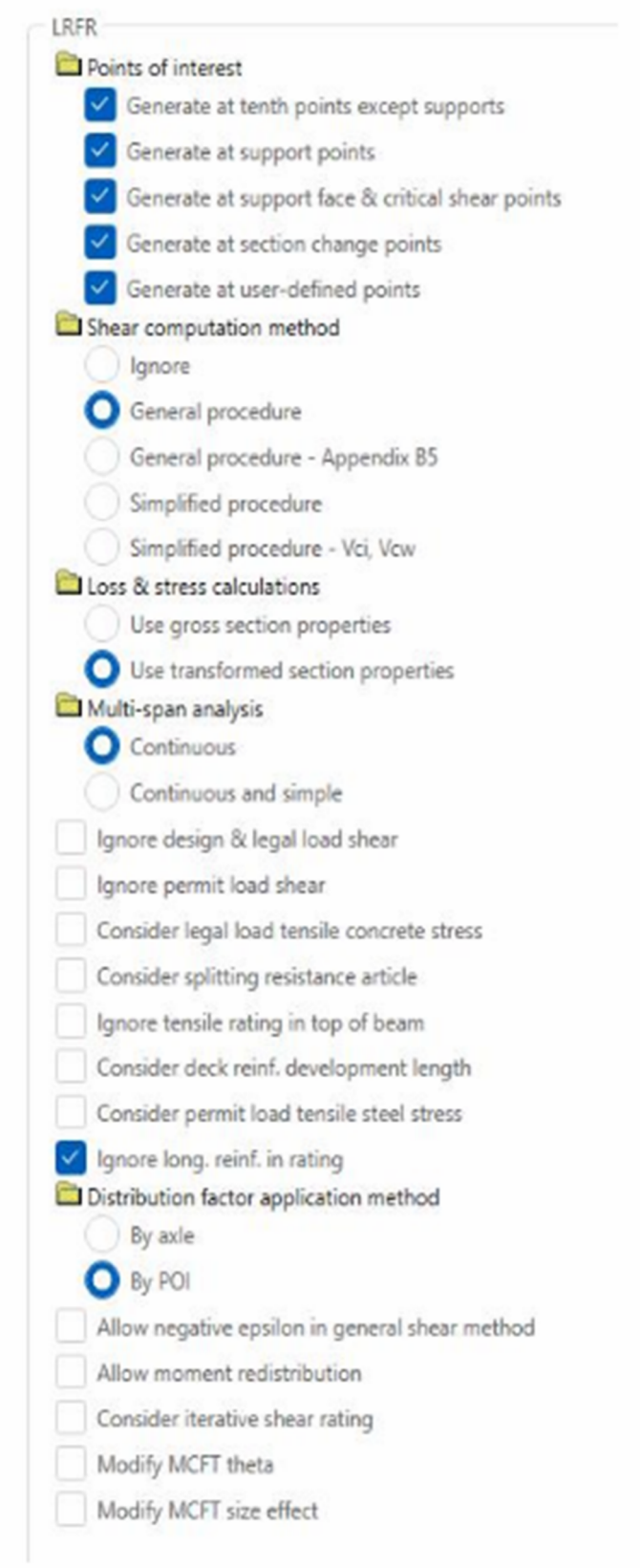
- All-system permits were rated using legal live load factors with ADTT >5000. This was a conservative measure to account for bridges exposed to a significant ADTT.
- Standard plans may indicate a future wearing surface allowance. However, this was not included in the rating calculations except for some specific truss standards. Any bridges with an additional wearing surface should be analyzed by the owner through modification of the BrR templates accompanying this report.
- Any standards detailing a timber deck were modeled with Grade No.1 Douglas Fir-Larch for the material properties and dead load.
- Concrete bridge decks on multi-girder systems were not rated.
- Substructures were not rated.
- Not all length and skew options were rated. Selections were based on the existing inventory of structures utilizing these standards.
- For steel beam standards which specified alternative beam options (e.g. the V3A standards specify a standard beam as well as Bethlehem and Carnegie alternates), the beam with the lowest elastic modulus was modeled.

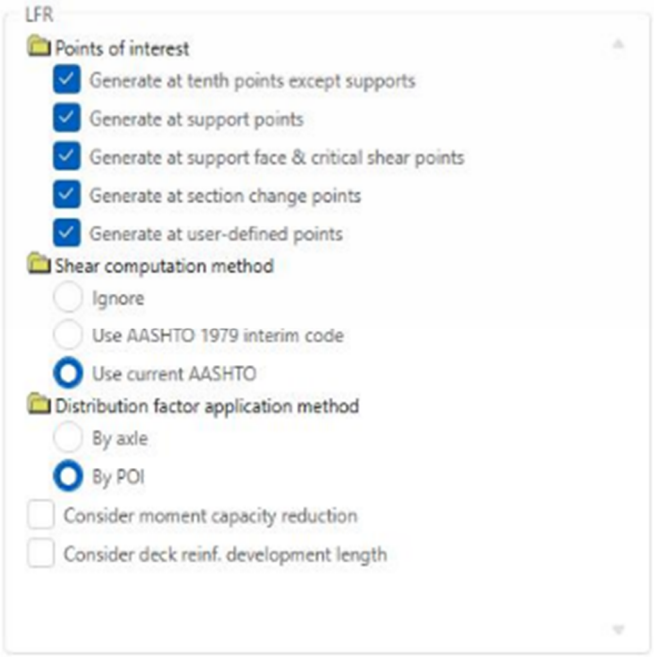
3.3.2. ASSUMPTIONS BY BRIDGE TYPE

3.3.2.1. Prestressed Pretensioned Concrete Beam (H-Series)

- H-series standards were rated as simple spans, with the exception of H2-52.
- For standards released before 1977 with no specification of jacking stress percentage, 70% was used per Iowa DOT Standards.
- Longitudinal deck reinforcement was not considered in capacity calculations.
- Abutment and pier diaphragms were modeled but were not considered for capacity or dead load.
- If a standard provided a weight for the steel diaphragms, this value was used as the dead load. Otherwise, the weight of the steel beam and angle connectors were calculated and applied as dead load.
- Due to variation in haunch depth for any given bridge, and therefore variation in composite properties, haunches in the H-series were set to 0.01” as a conservative measure so that haunches were not considered in the capacity calculations.
- The H1 standard was designed with 3” of earth fill. This fill was excluded from the model and the rating.
- Final age of the structure was assumed to be 75 years (27375 days) to determine the prestress properties.
- “AASHTO Approximate” method was assumed as the loss method to determine the prestress properties.
- The H40-06 and H40-14 Standards are the same, and the H44-06 and H44-14 Standards are the same except that the 2014 Standards include the option of stainless steel in bridge railing. This does not affect the load ratings, thus, the same model and the rating results can be used for both standards.

- Control Options used for the H-Series are as follows:

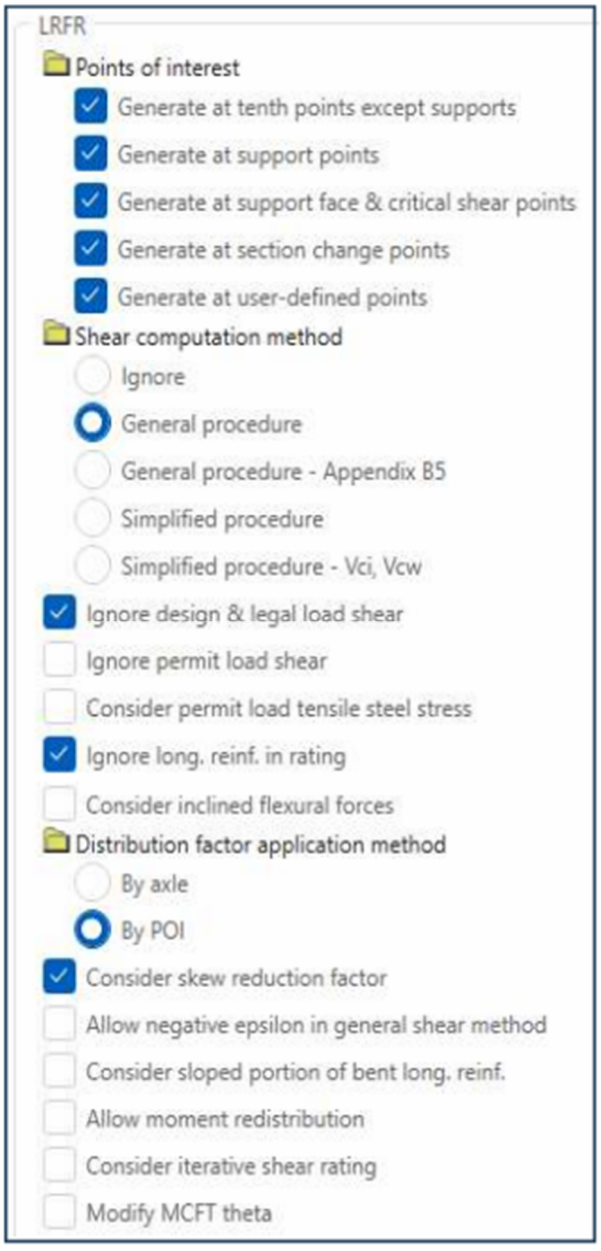


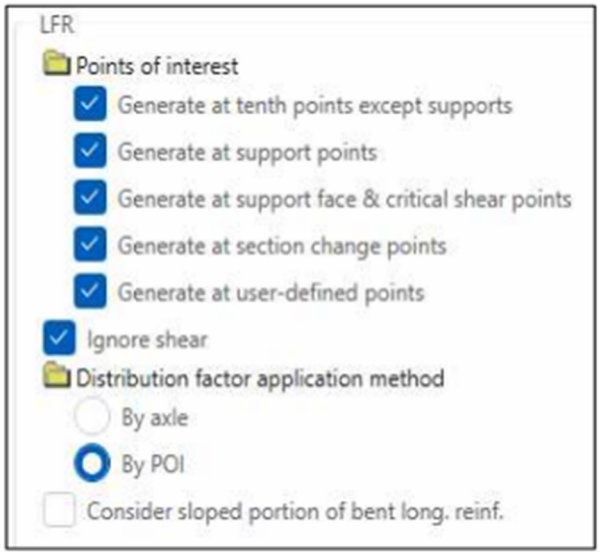


3.3.2.2. Concrete Slab (J-series)

- The J-series standards were rated with an interior and two exterior strips. These strips acted independent of one another in analysis, with the exterior strips accounting for the typical increase in reinforcement seen near the edge of a slab's cross section under the parapet/curb/rail/etc.
- The J30C-79, J30C-87, and J30-06 standards include an epoxy- and non-epoxy-coated reinforcement option. Only the epoxy coated option was rated, and the results of this analysis are applicable for both the epoxy and non-epoxy options.
- The J40-06 and J40-14 Standards are the same, and the J44-06 and J44-14 standards are the same except that the 2014 Standards include the option of stainless steel in bridge railing. This does not affect the load ratings, thus, the same model and the rating results can be used for both standards.
- Barrier rail loads were considered as DC2 load and distributed by the ratio of the width of the strip over the full width of the bridge among all strips.
- For standards with non-monolithic and monolithic pier cap options, the non-monolithic option was modeled. The ratings from these models are applicable for both options.
- Slab depth was constant along the bridge length.
- (LRFD) Multiple skews were modeled, and skew effects were considered.
- (LFD/ASD) Only 0-degree skew options were modeled, as skew does not have an effect on LFR/ASD load ratings.
- Bent bars were handled differently depending on the standard. Bars were either modeled with a 90-degree extension or as straight bars with full development. Shear was not considered except under permit vehicle loading.
- Some J-series standards have the option between a flat or sloped bottom. Sloped bottoms were modeled.

- (LFD) Some J-series standards have only a flat bottom with parabolic roadways. To account for this, the thickness at quarter points was modeled.
- (LRFD) The edge strips were modeled using the AASHTO LRFD Design Spec's equation for edge strip widths.
- (LFD) The edge strips were modeled with the following two methods, dependent on the standard:
    a) If a curb was detailed, the edge strips were modeled as the width of the curb with the thickness of the slab + curb. If a steel rail was detailed in addition to the curb, it was only added as dead load.
    b) If a rail was detailed without a curb, the cutoff of the edge strip was taken as halfway between the end of the edge reinforcing and the beginning of the regular slab reinforcing.
- Control Options used for the J-Series are as follows:





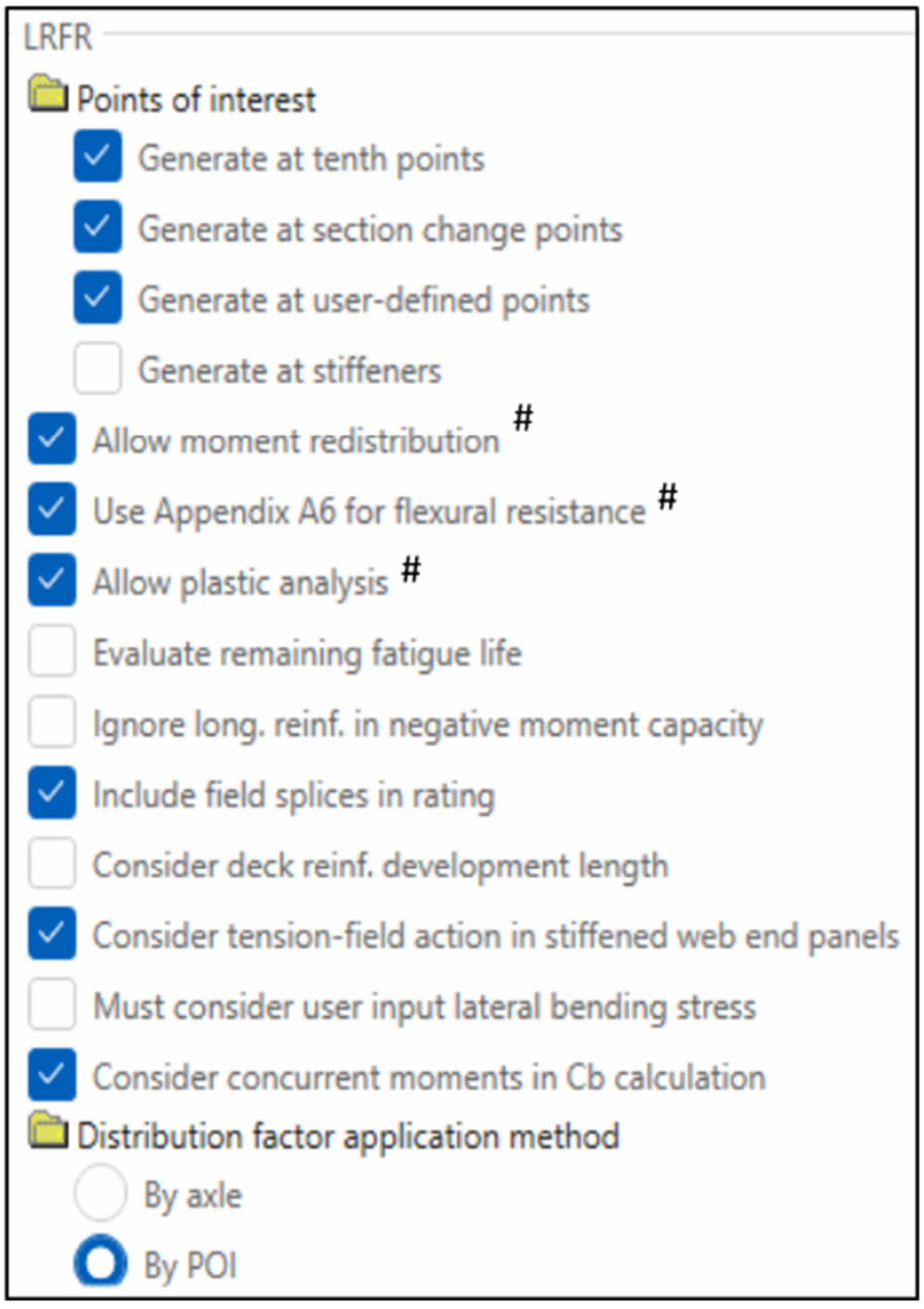
3.3.2.3. Steel Beam (RS- and V-series)

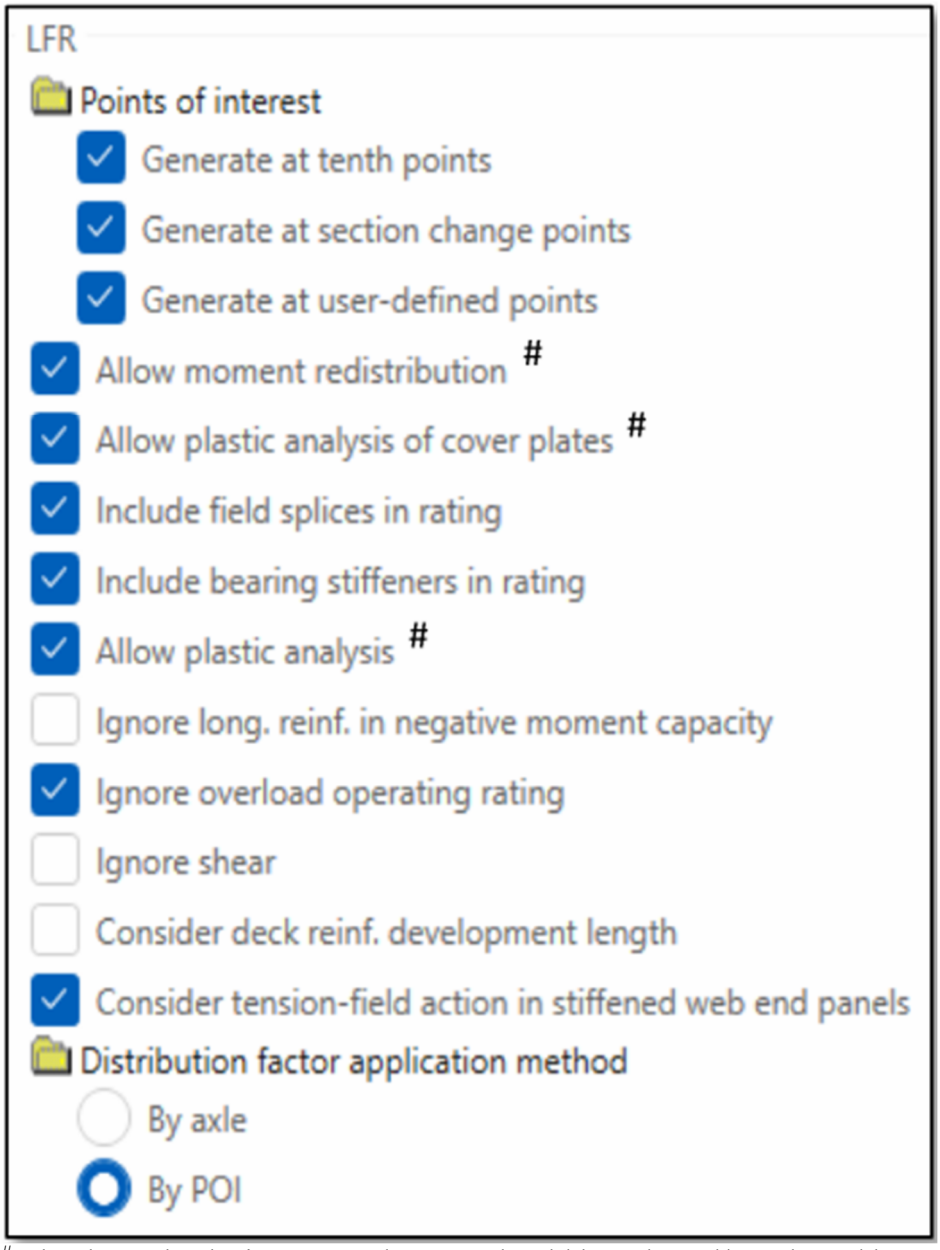
- RS- and V-series standards released after 1962 were rated with allowance for moment redistribution and plastic section analysis.
- Superstructures with shear connectors were generally modeled as fully composite except at gaps of varying length over the piers, which were dependent on the length of bridge. Below is the reasoning for alternative composite region modeling:

    a) RS-series standards were modeled as composite in the positive moment regions detailed in the plans.
    b) When angle shear connectors were used and gaps between connectors of greater than 8 feet over the piers were detailed, those gaps were excluded from composite action.
    c) When shear stud connectors were used and any gaps were detailed over the piers, those gaps were excluded from composite action.
    d) When no shear connectors were detailed, no composite section was modeled.

- Longitudinal deck reinforcement was not considered in capacity calculations.
- Abutment and pier diaphragms were modeled but were not considered for capacity or dead load.
- Splices were not analyzed.
- All beams were rated with a 5% self-load increase. This was to account for elements such as splice bolts, splice plates, and shear studs.
- Diaphragms which were not adequately detailed for a dead load calculation were computed with a 10% load increase as a conservative measure.
- Haunches were generally set to 0.01” for the V-series and RS-series, in accordance with the method used for the H-series. However, for older standards with embedded flanges, a negative haunch was modeled.

- The RS40-10 and RS40-14 Standards are the same except that the 2014 Standards include the option of stainless steel in bridge railing. This does not affect the load ratings, thus, the same model and the rating results can be used for both standards.
- Control Options used for the RS- and V-Series are as follows:



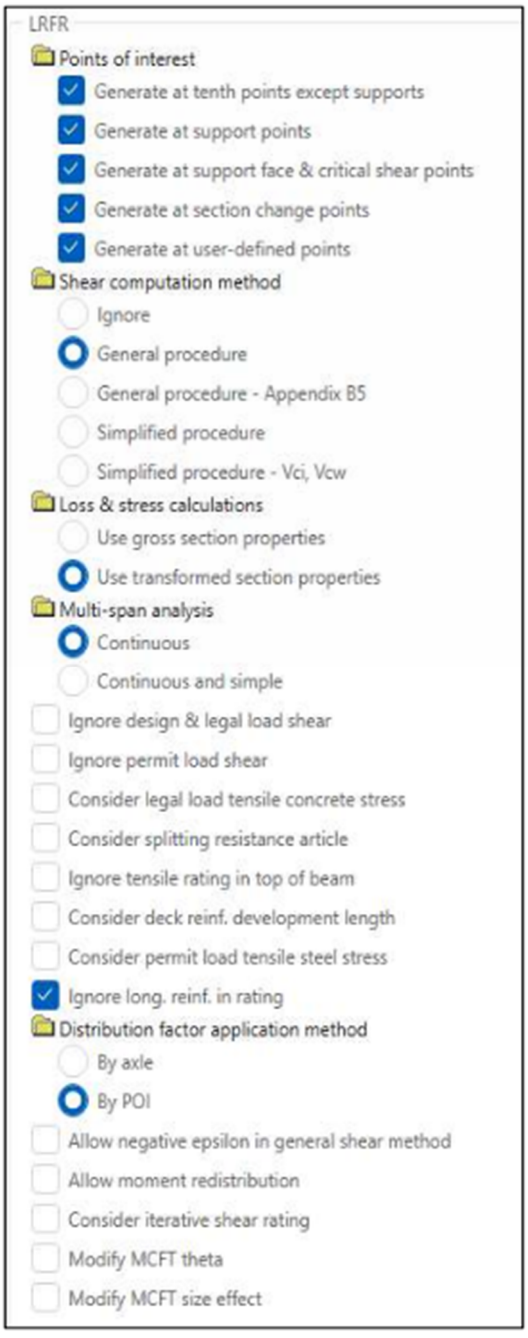


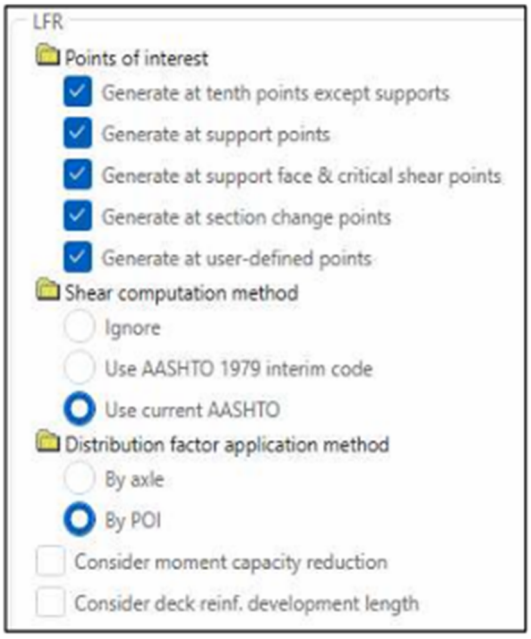
The three checks in LFR and LRFR should be selected/unselected based on year built.
- Selected for certain superstructures built after 1962
- Unselected for superstructures built in or or before 1962.

3.3.2.4. Prestressed Pretensioned Concrete Box Beam (B-series):

- Final age of the structure was assumed to be 75 years (27375 days) to determine the prestress properties.
- "AASHTO Refined" method was assumed as the loss method to determine the prestress properties as the structure is non-composite.

- The beam definition from the BrR library was updated to account for the ½" sacrificial wearing surface. The load due to the ½" sacrificial wearing surface was considered under Structure Typical Section – Wearing Surface in BrR.
- LRFD live load distribution factors (LLDFs) were calculated using AASHTOWare BrR's "Compute from Typical Section" option. If the calculated moment and shear LLDFs were less than 0.5, they were manually updated to 0.5 per Iowa DOT's recommendation.
- Control Options used for the B-Series are as follows:

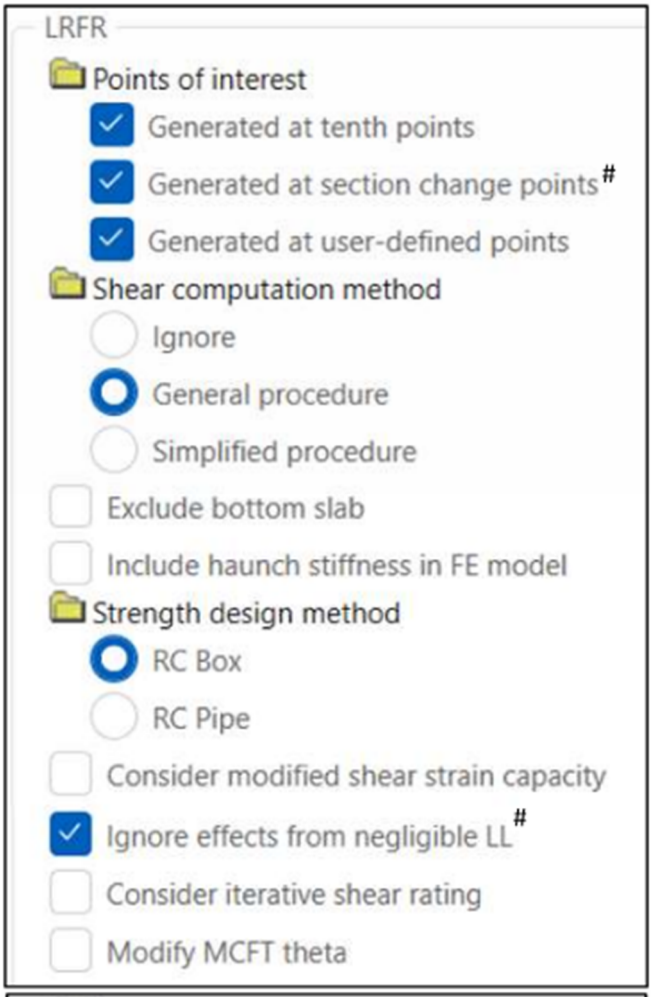


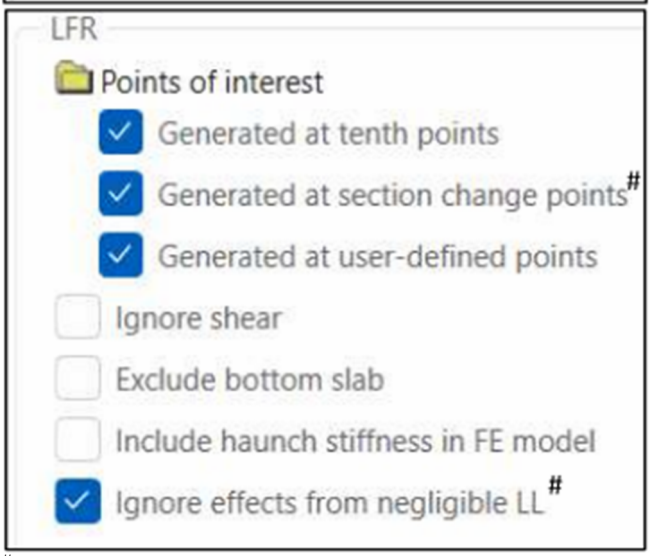


3.3.2.5. Reinforced Concrete Box Culvert Examples

- The following assumptions were used:
  - Soil definition was based on Iowa DOT Bridge Design Manual.
  - A six-inch wearing surface thickness with a density of 145 pcf was used.
  - A zero-feet water height was used.
- These templates were created using a 0 deg skew.
- Length was not entered in these examples, but will need to be entered by the rater although it will not affect the ratings.
- For the standard triple and twin box culvert examples, the bottom slab extends 3 inches beyond the external face of the exterior walls. Due to limitations in BrR about both slabs having the same length, the length of bottom slab bars m1 & m6 were assumed to be same as top slab bars k1 & k6.
- Live load surcharge height was not used in the analysis based on AASHTO MBE 6A.10.10.3c (2022 Interim Revisions). The Approaching Wheel Load is automatically computed by BrR if applicable depending on the fill depth input based on AASHTO MBE C6A.10.4 & C6A.10.10.3c.
- BrR default options for Installation method (Embankment) and Side fill condition (Compact) were assumed under Culvert Alternative Description. Rater can modify the installation method to Trench and input Soil-structure interaction factors if applicable based on the specific site conditions.

- Control Options used for the reinforced concrete box culvert standards are as follows:

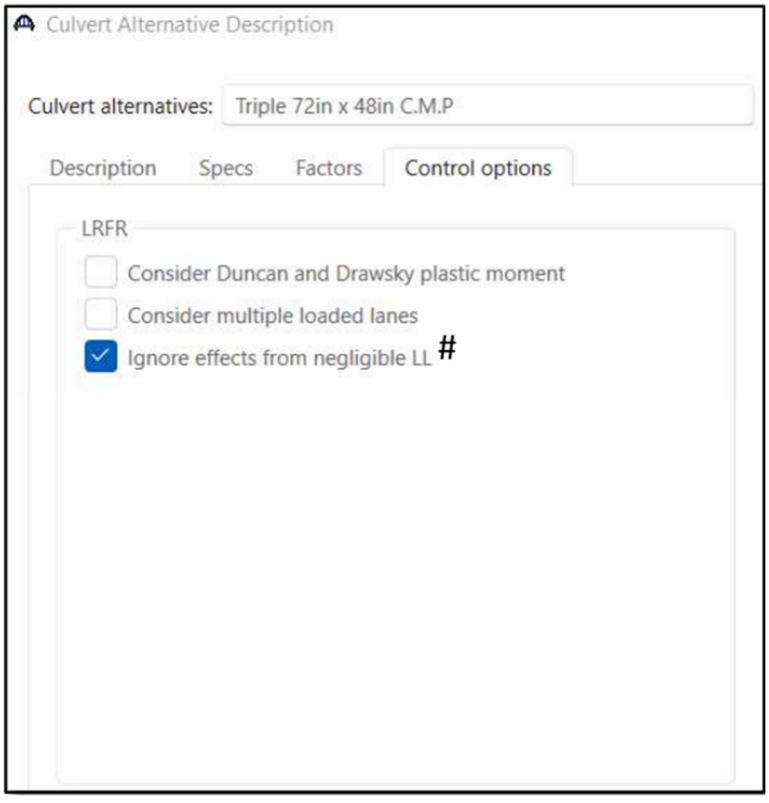


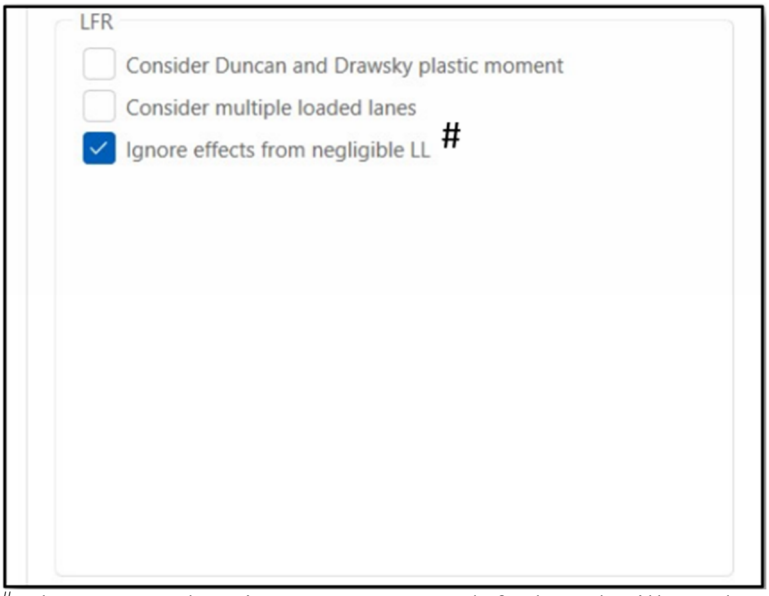


These control options are not BrR default and will need to be updated by the rater.

3.3.2.6. Corrugated Metal Pipe (Not a standard):

- The following assumptions were used and can be modified for site specific conditions:
  - Soil definition was based on Iowa DOT Bridge Design Manual.
  - BrR Standard Corrugated Steel (Fy=33 ksi) was assumed for CMP material.
  - A twenty-four-feet clear roadway width was used.
  - A six-inch flexible (asphalt) roadway pavement was used.
  - A six-inch wearing surface thickness with a density of 145 pcf as was used.
  - A zero-feet water height was used.
  - BrR default (Typical) for NCSPA structure category under Culvert Alternative Description was used.
- Only one CMP was modeled due to limitation of BrR. Minimum pipe spacing is satisfied per AASHTO LRFD BDS, Table C12.6.7-1, therefore, the effect of adjacent pipes due to unbalanced loading was not considered for the rating.
- This example was created for a 21 degree skew based on the example plans provided, but the skew has no effect on the rating so the template can be used for any skew.
- Control Options used for the CMP Example are as follows:





These control options are not BrR default and will need to be updated by the rater.

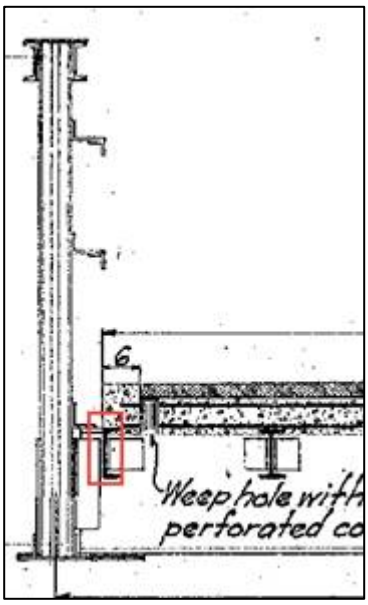
3.3.2.7. Steel Trusses

The truss standards include seven (7) series as noted above. The following statements encompass general assumptions for the truss standards. Not all assumptions apply to every standard. Please refer to the accompanying rating calculation documentation for which assumptions apply to that specific standard truss. The load ratings for the truss system and truss members were based on the standard plan attached at the end of the accompanying rating calculation for each standard. Standard plans did not provide adequate detail for gusset plates, sometimes referring to shop drawings no longer obtainable. Therefore, the load ratings for the gusset plates were based on the field pictures and measurements taken for a truss representing the standard. Please note that the in-service truss components and gusset plates might not match with the template and it is the responsibility of the user to verify and to make any necessary changes.

- All top chord and end post members were in compression, all bottom chord members were in tension, and all diagonal (except the end post) and vertical members were reversal members.
- For cases where the truss standards have multiple standard years, based on engineering judgment and assessment, only the controlling standard was modeled and rated.
  If plans for one or few of the standard years are not available, they were not considered in the rating.
- If the railing is only connected to the truss vertical members per the standard drawings, railing load was added as additional uniform load on the truss.
- If the railing load is carried by the exterior stringers/joists and truss verticals per the standard drawings, the total railing load was applied as a member load on the exterior stringers/joists.
- If exact member shapes are not available in the BrR library for some of the members, either the closest section available in the BrR library was used or a new section was created.

- For standards where the exterior stringers/joists are channels per the standard drawings, an equivalent I-section to match properties of the channel was created as a workaround for the BrR limitation, where BrR only allows defining I-sections for the stringers.
- Fastener type and size was based on the standard plans and not the gusset field pictures.
- Tensile strength (Fu) of 60 ksi was conservatively assumed for the "1936 to 1963" or "After 1963" structural steel definition, based on AISC Iron and Steel Beams 1873-1952.
- Tensile strength (Fu) of 46 ksi was conservatively assumed for rivets, based on MBE, 6A.6.12.5.2.
- For standards that only show a 3" fill, it was assumed that the fill had a density of 120 pcf.
- For standards that show a bituminous wearing surface, 140 pcf was used for the wearing surface density.
- For standards that show an area load (psf) for the future wearing surface in the loading notes, the future wearing surface thickness was calculated based on a 120 pcf density. For example, 1.2" with 120 pcf density was used for 12psf loading note in the standard.
- For trusses with concrete decks, the concrete deck provided top flange lateral support for the floorbeams and stringers (if present).
- Concrete deck only supported by floorbeams (no transverse support due to absence of stringers/joists) was rated as a continuous slab supported at the floorbeams. Full deck thickness was used as the structural deck thickness without sacrificial wearing surface since no information is available in the standard drawings. 7/8" was used as clear cover for the top and bottom longitudinal reinforcement.
- For trusses with timber decks:
    - BrR only allows concrete or corrugated decks for truss system superstructures, thus, for trusses with timber decks, a "dummy" concrete material definition with wood density was created to account for the deck load on supporting members in the truss system superstructure definition. The timber deck was rated in a separate girder system superstructure definition. Stringers were also rated in this superstructure definition to ensure BrR auto computes the LLDF to account for timber deck.
    - The timber deck was assumed not to provide lateral support to the top flanges of the floorbeams and stringers.
    - Douglas Fir-Larch, Grade 1, 2"-4" thick, 2" & wider (WWPA grading), from BrR Library, was used for timber deck material.
    - ASR method was used for the timber deck rating per Iowa DOT's recommendation.
    - "Ignore shear" was unchecked for the timber deck rating per Iowa DOT Bridge Rating Manual.
    - A 4"x12" deck plank was used for the timber deck if no information is provided in the standard.
    - A deck LL distribution width of 12" was used for the transverse timber deck per AASHTO Standard Specifications Article 3.25.1.1 and AASHTO LRFD Section 4.6.2.1.3.
    - "Wet" was used for moisture condition and BrR Auto Compute was used to determine ASD and LRFD Adjustment Factors for the timber deck.
- If the standards provide separate quantities for all steel members, the additional self-load for the truss, floorbeam, and stringer (if present) to account for any connector members, rivets, unknown attachments, etc. was calculated based on the respective quantities.

- If the standards only provide quantity for the truss, the additional self-load for the truss to account for any connector members, rivets, unknown attachments, etc. was calculated based on this quantity. It was assumed that the additional self-load for the floorbeams and stringers (if present) to account for any connector members, rivets, unknown attachments, etc. was 5%.
- If the standards only provide a total dead load for the truss, it was assumed that the additional self-load for the floorbeams and stringers (if present) to account for any connector members, rivets, unknown attachments, etc. was 5%. The additional self-load for the truss to account for any connector members, rivets, unknown attachments, etc. was then calculated using these amplified floorbeam and stringer (if present) loads.
- The exterior stringers were excluded from analysis by manually adjusting the LLDFs to 0.0001 for the following cases:
    - For certain pony trusses (in the W, Y, and Z series):
      If the exterior stringer/joist was located within 6" of the rail face and the first interior girder was within 3' of the same rail face as shown in the Figure below, the live load effect on the exterior stringers/joists is minimal. However, AASHTO Standard Specifications use the maximum of lever rule or section 3.23.2.3.1.5 to determine the controlling LLDFs for the exterior stringer/joist. Section 3.23.2.3.1.5 controls in cases where the wheel is placed close to the first interior stringer/joist and the exterior stringers are rated unreasonably low. Thus, the exterior stringers/joists were excluded from analysis by manually adjusting the LLDF to 0.0001 to model the in-service condition of these members more realistically.



    - For certain straight high trusses (in the S, T, U, and Z series):
      If the clear roadway width is less than 18', a striped lane in Structural Typical Section is defined because the vertical clearance is only available within the middle portion of the roadway. The LLDFs will be determined by BrR based on the defined striped lane, with the wheels of trucks placed on the edge of the striped lane. If the striped lane is between the first interior stringers/joists, BrR will auto-compute

Support Shear LLDFs as 0.00 based on lever rule per AASHTO Standard Specifications section 3.23.1.2 and will generate an error message for this. Rest of the LLDFs will be controlled by section 3.23.2.3.1.5. Thus, the exterior stringers/joists were excluded from analysis by manually adjusting the LLDFs to 0.0001 to avoid the error message and the unreasonably low ratings. This also models the in-service condition of these members more realistically as the live load effect on the exterior stringers/joists is minimal due to the striped lanes being close to CL roadway.

- For trusses that have a diagonal member connecting the 1st interior lower chord panel point to the middle of the End Post (Member L0U1 and symmetric member on the other end of the truss), this member was only considered as a dead load due to limitations of BrR and it being a zero-force member. It was also assumed that this member reduced the out of plane unbraced length for the End Post.
- For certain arched high trusses, horizontal members are located around mid-height of the truss. These members were not included in the truss definition as they were zero-force members. The dead load for these was added as additional load and the unbraced length for the connected vertical and diagonal members were reduced.
- For Pony trusses, an out-of-plane unbraced length for the upper chord members was defined as the length of the member between the splices, considering they were not laterally supported at the intermediate panel points.
- For trusses with lower chord members built-up of two inward and two outward angles, the exact orientation of the angles in the section could not be modeled in BrR. The section was modeled with two top-outward and two bottom-outward angles, which was sufficient since the lower chords were in axial tension and the section area remained the same.
- For trusses with lower chord members built-up with a channel section comprised of four outward angles, the exact orientation of the angles in the section could not be modeled in BrR. The section was modeled with two top-outward and two bottom-outward angles, which was sufficient since the lower chords were in axial tension and the section area remained the same.
- For trusses that consist single channel members, these members were modeled using a non-detailed cross-section with the channel's section properties due to limitations of BrR.
- For the LFD effective area deduction calculations where the fasteners vary or information for all fasteners was not available in the standards, it was assumed that all connections had the larger fastener and hole size for the varying fasteners and that it was 3/4" fastener with 7/8" hole size.
- The LFD effective area deduction for single angle section was not incorporated due to BrR limitations. This omission did not affect the rating, as the specified members were identified as zero-force members.
- Minimum thickness between the standard plan and the field measurement was conservatively used for the gusset plates where applicable.
- For trusses where the lower chord remained continuous at panel points, it was assumed that the vertical members at these locations function as hangers. As there was minimal load transfer through these gusset plates, load rating was not conducted for them.
- The option of “Field measured section properties” in the BrR Gusset Plate Definition window was not checked because field measurements were only conducted due to missing

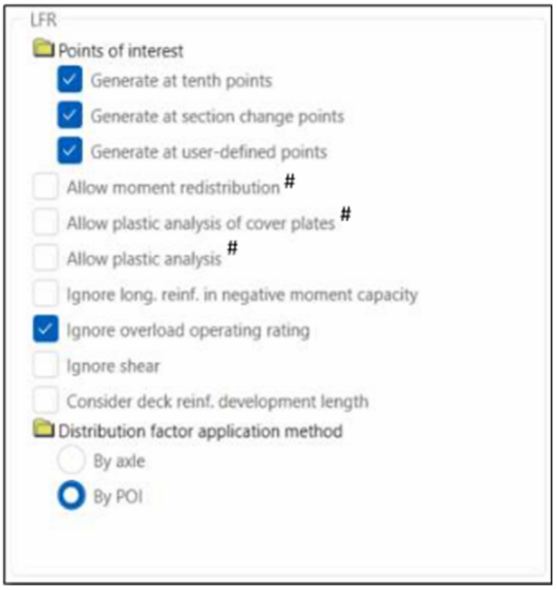
gusset plate information in the Standards, and the intent of this model was for pristine condition ratings.

- The block shear check was for gusset plates only, and member failure was not considered due to a limitation in BrR. For connections involving single rows of rivets between angle members and gusset plates, the block shear failure plane for evaluating the gusset plate was determined based on the L-shaped failure plane of the angles. This approach was adopted due to the improbability of failure along the gusset plate and the limitation in BrR regarding member block shear failure checks.
- For trusses where the chord splice was offset from the panel point, this offset was conservatively disregarded in the chord splice capacity check.
- For trusses where the inside gusset plate is not identical to the outside gusset plate, the inside gusset plate inputs were assumed based on the outside gusset plate picture and the field sketch, since pictures for the inside gusset plate were not available due to accessibility restrictions.
- For cases where the inside gusset plate is not identical to the outside gusset plate, and the height of the inside gusset plate equal to or exceeds that of the outside gusset plate by the sum of one rivet spacing and the minimum edge distance (one and a half of rivet diameter), an additional row of rivets was assumed for the inside gusset plate.
- For trusses where the web/vertical splice plate information was not available in the field sketches, the web/vertical splice plate dimensions were assumed based on the picture or the standards (if available).
- For cases where the overall truss rating was controlled by the gusset plates and produced unreasonably low ratings, these 3 strategies if applicable were implemented to improve the ratings
    - If there are additional fasteners connecting the member to the bottom splice plate, it was assumed there were sufficient number of fasteners connecting the splice plate to the horizontal angle leg at that panel point facilitating the horizontal leg to transfer its portion of load to the splice plate. It was assumed that these fasteners match the vertical leg fasteners.
    - If there is an angle connecting the member to the gusset plate and details of this angle or connecting fasteners are not available, It was assumed there are sufficient number of fasteners connecting the member to the horizontal angle leg at this panel point facilitating the angle to transfer its portion of load to the gusset plate. It was assumed that these fasteners match the member fasteners.

      If the rating was controlled by the block shear check at the bottom chord and a bottom splice plate is used to connect the member to the gusset plates, it was assumed that this splice plate has been sufficiently developed to transfer its portion of the load to the gusset plates, and that the horizontal leg of the bottom chord was accounted for in the length of the tension plane at this panel point.

- Control Options used for the Steel Truss standards are as follows:
  Floorbeam:

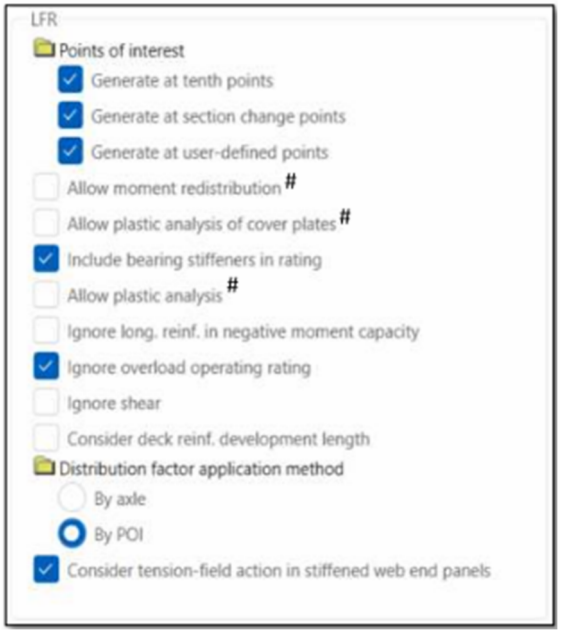




The three checks in LFR and LRFR should be selected/unselected based on year built.
  - Selected for certain superstructures built after 1962.
  - Unselected for superstructures built in or or before 1962.

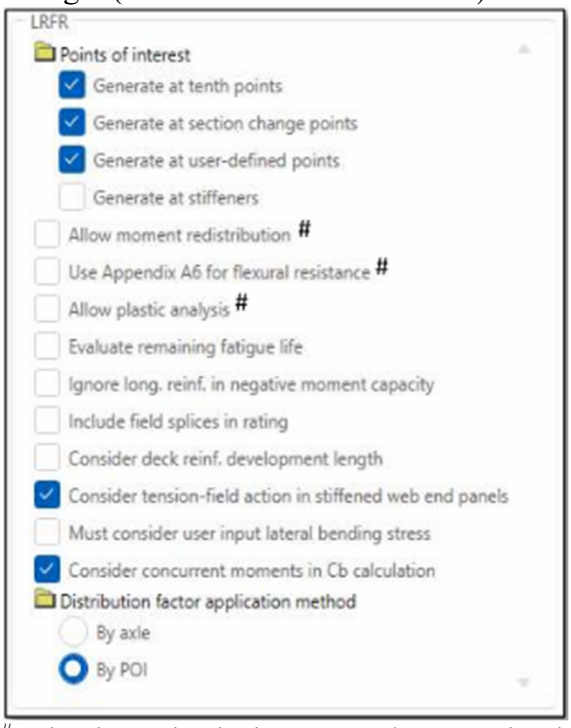
Stringer:

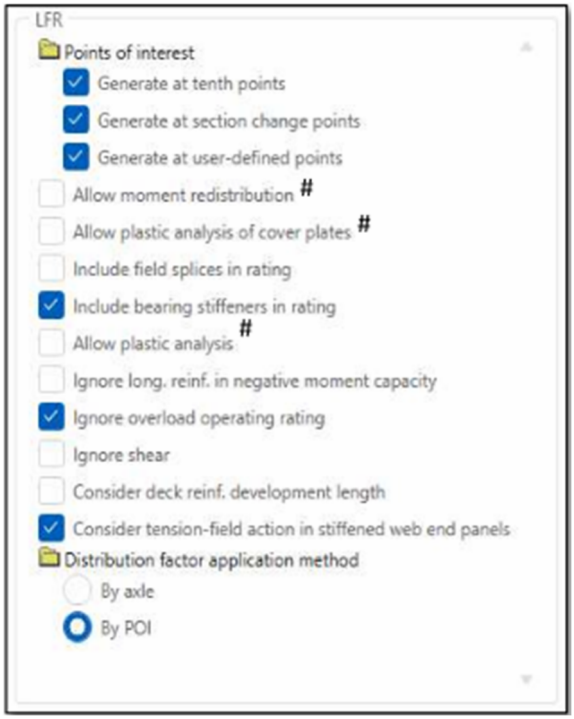




The three checks in LFR and LRFR should be selected/unselected based on year built.
  - Selected for certain superstructures built after 1962.
  - Unselected for superstructures built in or or before 1962.

Stringer (as Girder with Timber deck):

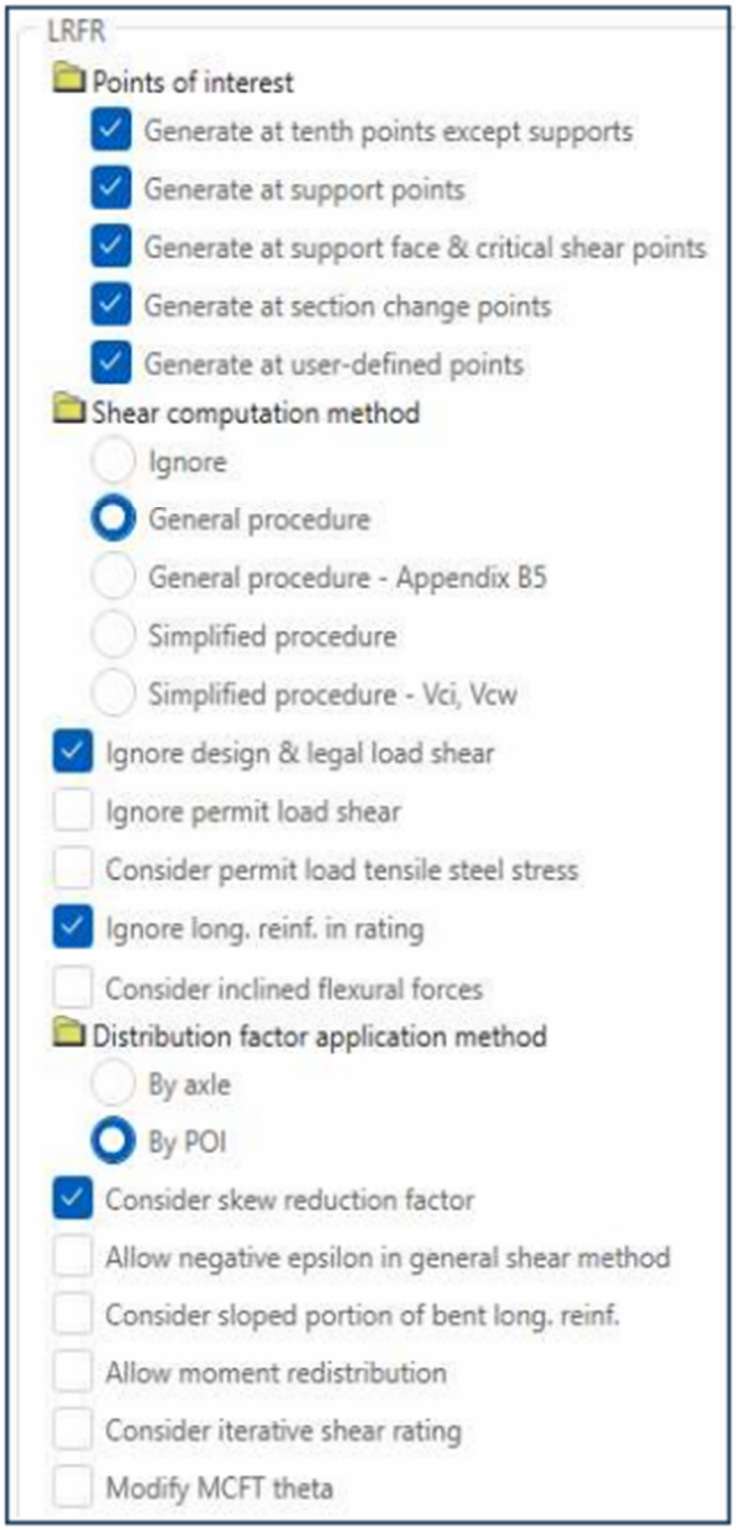


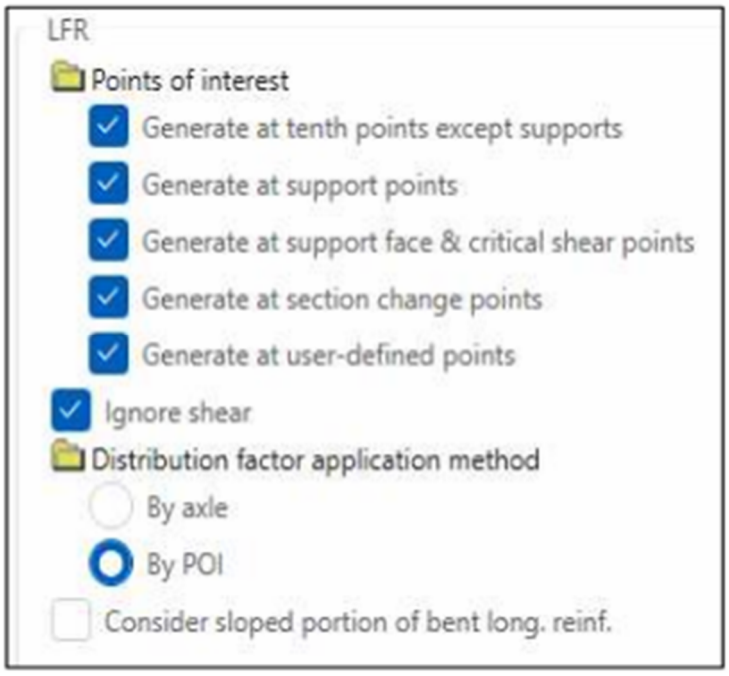


The three checks in LFR and LRFR should be selected/unselected based on year built.

- Selected for certain superstructures built after 1962.
- Unselected for superstructures built in or or before 1962.

Concrete Slabs:





Any assumptions not stated in this document can be found in the accompanying BrR template models and the rating calculation documentation.

4. SUMMARY RATINGS

4.1. PREFACE

Below are additional details pertaining to the proper use of the rating tables:

- The tables in this document include a "Y" or "N" next to the individual permit vehicle ratings to indicate the Permit Rating Adequacy to be entered on the SIIMS Load Rating Report for bridges in the as-built condition unless the user chooses to reanalyze with single lane or low impact restrictions.
- Effective July 1st, 2025, all primary (state) roads and secondary or municipal (county or city) roads are to allow for a 12.5% increase in the maximum load of legal vehicles, with the exception of roads with bridges of insufficient capacity to accommodate the load increase. The tables presented in this document include a “Yes” or “No” in the All Systems Permit row to identify whether that standard is capable of supporting the load increase. This Yes/No was determined with legal live load factors and >5000 ADTT for LRFD standards. If necessary, the analysis could be refined with permit live load factors and bridge specific ADTT’s to potentially improve the rating.
- The proper use and application of these bridge ratings requires due consideration and evaluation by a qualified engineer of all relevant factors affecting these ratings. Anyone using any part of these bridge ratings assumes sole responsibility for their proper application.
- The tables in this document are for standard bridges in the as-built condition. The accompanying BrR template models are available and can be modified at the discretion of the load rater for site and bridge specific considerations. However, should there be any changes made to the template files, the engineers who have approved these templates are no longer accountable, and the user bears full responsibility for the results and their application.
- The load ratings for the truss system and truss members were based on the standard plan attached at the end of the accompanying rating calculation for each truss and the load ratings for the gusset plates were based on the field pictures and measurements taken for a truss representing the standard. Please note that the in-service truss might not match with the template and it is the responsibility of the user to verify and to make any necessary changes.
- Differences between the results in this document and the results of previous Iowa DOT standard rating projects are attributed to updated codes, updated rating methodology, differences of project assumptions, and updated BrR software (**Version 7.5.0.3001**).
    - Future use of the templates may not reproduce the results in this document if BrR has been updated to a version beyond what is shown above.
- The vehicles listed in the summary rating tables are based on the truck configurations presented on subsequent pages and are Iowa DOT’s current legal and annual permit rating vehicles.
- The HL-93 where applicable was rated for three design configurations as described in AASHTO LRFD 9 Article 3.6.1.3.1 and diagramed in MBE Appendix C6A. The controlling case is presented in the tables. These three configurations are as follows:

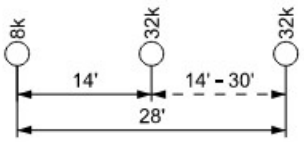
a) HL-93 truck with variable second and third axle spacing of 14 feet to 30 feet and a design lane load of 0.64 kips per linear foot.
b) Pair of HL-93 trucks with 14-foot spacing of second and third axles and a minimum vehicle separation of 50 feet from the front axle of one truck to the rear axle of the next truck. This truck pair, with the previously described design lane load, were factored by 90%.
c) HL-93 design tandem, which is a separate configuration altogether. It consists simply of two 25-kip axles spaced 4 feet apart and the previously described design lane load.

- The HS-20 was rated as a standalone vehicle for LFD/ASD designed bridges. A separate analysis for the HS-20 lane load was also rated. This lane load is identical to the HL-93 lane load, but it does not run concurrently with the HS-20 truck. There is an HS-20 alternate military loading similar to the tandem loading of the HL-93. This loading was not considered as part of this project.

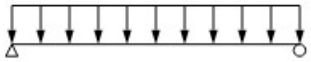
IOWA TRUCK DIAGRAMS

Design Trucks

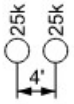
HL-93 (HS-20)
GVW = 72 Kips
(36 Tons)



Design Lane
Load = 0.64 klf

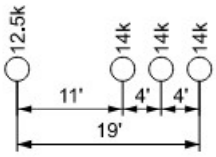


Tandem Axles
GVW = 50 Kips
(25 Tons)

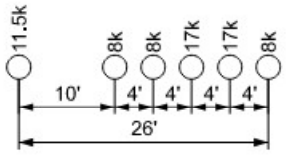


Straight Truck

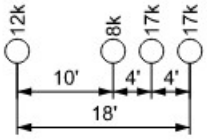
Type 4
GVW = 54.5 Kips
(27.25 Tons)



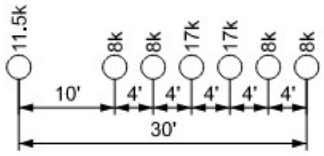
SU6
GVW = 69.5 Kips
(34.75 Tons)



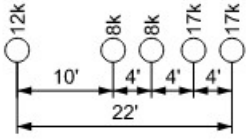
SU4
GVW = 54 Kips
(27 Tons)



SU7
GVW = 77.5 Kips
(38.75 Tons)



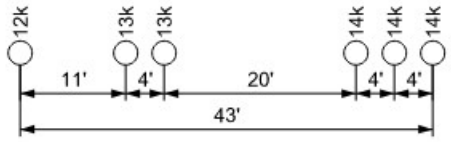
SU5
GVW = 62 Kips
(31 Tons)



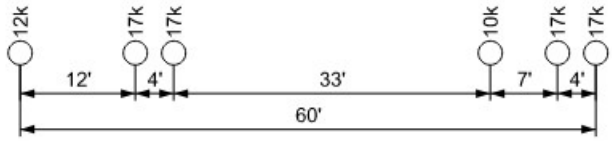
IOWA TRUCK DIAGRAMS

Truck + Semi Trailer

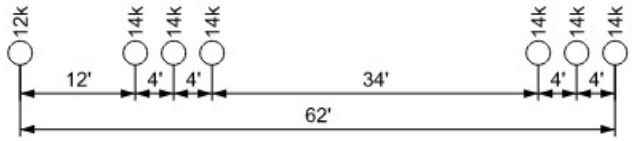
Type 3S3A
GVW = 80 Kips
(40 Tons)



Type 3S3B
GVW = 90 Kips
(45 Tons)

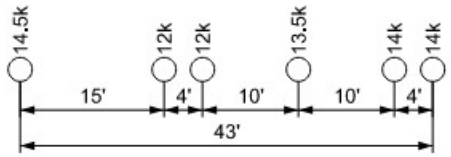


Type 4S3
GVW = 96 Kips
(48 Tons)

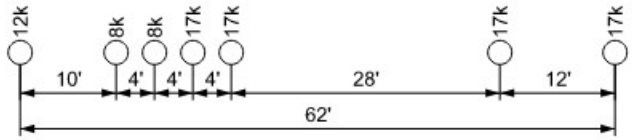


Truck + Full Trailer

Type 3-3
GVW = 80 Kips
(40 Tons)

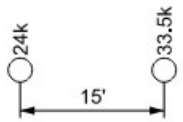


Type 5-2
GVW = 96 Kips
(48 Tons)

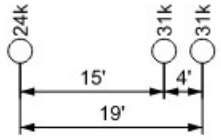


Emergency Vehicles

EV2
GVW = 57.5 Kips
(28.75 Tons)



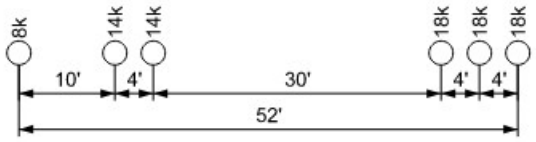
EV3
GVW = 86 Kips
(43 Tons)



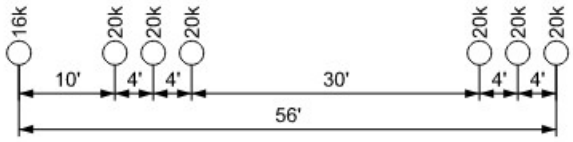
IOWA TRUCK DIAGRAMS

Annual Permit Trucks

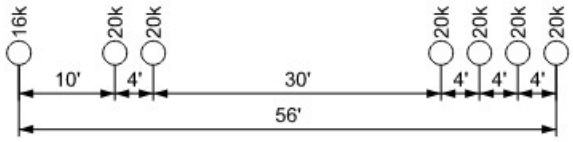
90k Truck
GVW = 90 Kips
(45 Tons)



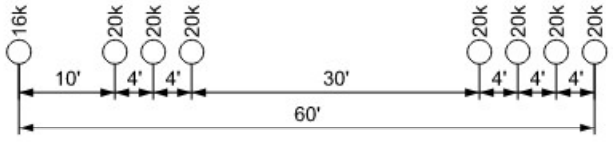
136k Truck "A"
GVW = 136 Kips
(68 Tons)



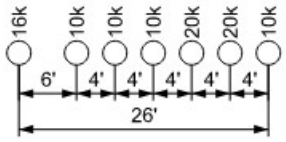
136k Truck "B"
GVW = 136 Kips
(68 Tons)



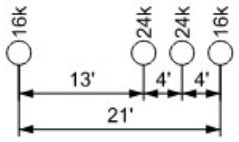
156k Truck
GVW = 156 Kips
(78 Tons)



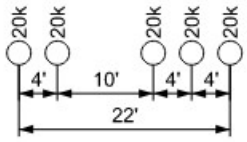
Fluid Milk Truck
GVW = 96 Kips
(48 Tons)



Small Annual Crane Truck
GVW = 80 Kips
(40 Tons)



Quint Axle Crane Truck
GVW = 100 Kips
(50 Tons)



All-Systems Permit: Oversize permit allowed to be up to 12.5% over legal loads.

4.2 LRFD RESULTS TABLES

4.2.1 H-Series

H Bridge Standards Load Rating Summary - LRFR Rating Method

H24-2006, 0 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.61	1.51	1.60	1.53	1.61	1.76	1.78	1.78	1.78
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP1 I	0.5L SP1 E	0.5L SP1 E	0.5L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP1 E
HL-93 Inv	0.95	0.94	0.97	0.91	1.18	1.34	1.31	1.35	1.35
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M
Location	0.2L SP1 I	0.1L SP1 I	0.2L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 E	0.5L SP1 E	0.5L SP2 E	0.5L SP1 E
IA Type 4	59.3	55.1	59.2	57.8	61.8	69.1	71.8	72.3	74.3
IA SU4	57.4	53.5	57.6	56.4	60.5	67.7	70.4	71.1	73.2
IA SU5	61.5	57.1	61.1	59.5	63.5	70.8	73.4	73.9	75.7
IA SU6	62.0	57.6	62.2	59.9	63.8	71.4	73.7	74.2	76.0
IA SU7	63.9	59.6	63.5	61.6	65.5	72.8	75.4	75.7	77.4
IA 3S3A	95.7	88.7	93.7	90.1	91.9	101.7	100.7	100.6	100.6
IA 3S3B	105.5	99.6	108.2	106.8	115.1	129.6	135.4	124.7	124.7
IA 4S3	106.3	98.7	105.9	103.4	110.5	123.4	128.2	129.1	129.8
IA 3-3	91.2	85.2	90.1	86.4	90.1	96.3	95.3	95.2	95.2
IA 5-2	95.3	88.5	94.6	92.2	98.3	109.6	109.8	110.1	110.1
IA EV2	61.4	57.3	61.5	59.9	63.8	71.2	73.7	74.2	76.0
IA EV3	47.9	51.5	55.0	57.2	62.1	69.4	72.1	72.6	74.6
90k	90.0 Y	82.7 Y	89.5 Y	88.6 Y	97.6 Y	107.6 Y	114.2 Y	109.7 Y	109.7 Y
Quint Axle Crane	72.3 Y	68.5 Y	72.2 Y	70.0 Y	75.9 Y	82.4 Y	86.4 Y	87.6 Y	92.2 Y
136k A	115.1 Y	104.1 Y	111.3 Y	109.2 Y	119.3 Y	130.5 Y	136.1 Y	132.5 Y	132.5 Y
136k B	102.7 Y	93.5 Y	100.5 Y	99.0 Y	108.7 Y	119.3 Y	126.2 Y	122.2 Y	122.2 Y
156k	117.8 Y	111.4 Y	119.7 Y	113.6 Y	124.6 Y	136.8 Y	144.2 Y	132.6 Y	132.6 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	74.0 Y	68.3 Y	72.1 Y	69.9 Y	75.8 Y	82.3 Y	86.3 Y	87.5 Y	92.1 Y
Small Annual Crane	65.8 Y	61.6 Y	65.7 Y	64.3 Y	70.2 Y	76.8 Y	80.9 Y	82.4 Y	87.4 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H24-2006, 15 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.61	1.51	1.60	1.53	1.61	1.76	1.78	1.78	1.78
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP1 I	0.5L SP1 E	0.5L SP1 E	0.5L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP1 E
HL-93 Inv	0.89	0.89	0.94	0.86	1.11	1.34	1.31	1.35	1.35
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M
Location	0.1L SP1 I	0.1L SP1 I	0.2L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 E	0.5L SP1 E	0.5L SP2 E	0.5L SP1 E
IA Type 4	59.3	55.1	59.2	57.8	61.8	69.1	71.8	72.3	74.3
IA SU4	57.4	53.5	57.6	56.5	60.5	67.7	70.4	71.1	73.2
IA SU5	61.5	57.1	61.1	59.5	63.5	70.8	73.4	73.9	75.7
IA SU6	62.0	57.6	62.2	59.9	63.8	71.4	73.7	74.2	76.0
IA SU7	63.9	59.7	63.5	61.6	65.5	72.9	75.4	75.7	77.4
IA 3S3A	93.6	87.7	93.7	90.1	89.2	101.7	100.7	100.1	100.1
IA 3S3B	105.5	99.6	108.2	106.8	113.8	129.6	135.5	120.4	120.4
IA 4S3	106.4	98.7	105.9	103.4	110.5	123.4	128.2	126.8	126.8
IA 3-3	91.2	85.2	90.1	86.5	90.1	96.3	95.3	95.2	95.2
IA 5-2	95.3	88.5	94.7	92.2	98.3	109.6	109.8	110.1	110.1
IA EV2	61.4	57.3	61.6	59.9	63.8	71.2	73.8	74.2	76.0
IA EV3	45.8	49.3	52.8	53.6	62.1	69.4	72.1	72.6	74.6
90k	90.0 Y	82.7 Y	89.5 Y	88.6 Y	95.4 Y	107.6 Y	114.2 Y	105.9 Y	105.9 Y
Quint Axle Crane	69.1 Y	68.5 Y	72.2 Y	70.1 Y	75.9 Y	82.4 Y	86.4 Y	87.6 Y	92.2 Y
136k A	115.2 Y	104.1 Y	111.3 Y	109.2 Y	119.3 Y	130.6 Y	136.1 Y	127.9 Y	127.9 Y
136k B	102.7 Y	93.5 Y	100.5 Y	99.1 Y	108.3 Y	119.3 Y	126.2 Y	117.9 Y	117.9 Y
156k	117.8 Y	111.4 Y	119.7 Y	113.6 Y	120.7 Y	136.9 Y	144.2 Y	128.0 Y	128.0 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	74.0 Y	68.3 Y	72.1 Y	69.9 Y	75.8 Y	82.3 Y	86.3 Y	87.5 Y	92.1 Y
Small Annual Crane	65.8 Y	61.6 Y	65.7 Y	64.3 Y	70.2 Y	76.8 Y	80.9 Y	82.4 Y	87.4 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H24-2006, 30 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.68	1.57	1.68	1.60	1.68	1.84	1.85	1.85	1.85
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP1 E
HL-93 Inv	0.86	0.86	0.95	0.84	1.08	1.40	1.37	1.40	1.40
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M
Location	0.1L SP1 I	0.1L SP1 I	0.2L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 E	0.5L SP1 E	0.5L SP2 E	0.5L SP1 E
IA Type 4	62.1	57.6	62.0	60.4	64.5	72.3	74.9	75.4	77.2
IA SU4	60.1	55.9	60.4	59.0	63.1	70.8	73.5	74.1	76.1
IA SU5	64.1	59.7	64.0	62.2	66.2	74.1	76.6	77.0	78.7
IA SU6	64.6	60.2	65.1	62.6	66.6	74.7	77.0	77.4	79.0
IA SU7	66.6	62.3	66.5	64.4	68.3	76.2	78.7	78.9	80.4
IA 3S3A	89.3	83.6	96.2	88.7	85.7	106.0	104.8	96.2	96.2
IA 3S3B	110.5	104.0	113.3	111.7	109.0	135.6	137.8	115.7	115.7
IA 4S3	111.1	103.1	110.9	108.1	115.2	129.2	133.8	121.9	121.9
IA 3-3	90.5	84.6	93.9	89.5	86.5	100.4	99.2	96.9	96.9
IA 5-2	99.3	92.4	99.1	96.4	102.5	114.7	114.3	114.4	114.4
IA EV2	62.1	59.9	64.5	62.6	64.5	74.5	77.0	77.4	78.6
IA EV3	45.7	49.2	53.4	52.0	64.8	72.6	75.3	75.7	77.5
90k	94.2 Y	86.4 Y	93.7 Y	92.7 Y	91.3 Y	112.6 Y	115.4 Y	101.9 Y	101.9 Y
Quint Axle Crane	67.5 Y	69.3 Y	75.6 Y	68.8 Y	78.8 Y	86.2 Y	90.2 Y	91.4 Y	93.6 Y
136k A	120.4 Y	108.8 Y	116.5 Y	114.1 Y	115.4 Y	136.6 Y	141.6 Y	123.0 Y	123.0 Y
136k B	107.5 Y	97.7 Y	105.3 Y	98.0 Y	103.7 Y	124.8 Y	131.1 Y	113.4 Y	113.4 Y
156k	123.4 Y	116.4 Y	125.4 Y	112.4 Y	115.6 Y	143.2 Y	146.1 Y	123.1 Y	123.1 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	77.5 Y	71.4 Y	75.5 Y	73.1 Y	79.0 Y	86.1 Y	90.1 Y	91.3 Y	95.7 Y
Small Annual Crane	68.8 Y	64.4 Y	68.8 Y	67.3 Y	73.2 Y	80.3 Y	84.5 Y	86.0 Y	89.8 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H24-2006, 45 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.59	1.51	1.75	1.64	1.61	1.96	1.95	1.83	1.83
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +M	STR1 +M	STR1 +V	STR1 +V
Location	0.1L SP2 I	0.1L SP2 I	0.2L SP1 I	0.1L SP1 I	0.1L SP2 I	0.5L SP1 I	0.5L SP2 E	0.1L SP2 I	0.1L SP1 I
HL-93 Inv	0.82	0.81	0.96	0.81	1.04	1.49	1.45	1.41	1.41
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V	SRV3 +M	SRV3 +M	STR1 +V	STR1 +V
Location	0.1L SP1 I	0.1L SP1 I	0.2L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 E	0.5L SP1 E	0.1L SP2 I	0.1L SP1 I
IA Type 4	60.2	58.3	65.2	64.2	63.3	76.8	79.4	76.0	76.0
IA SU4	58.7	56.9	63.3	62.7	62.0	75.3	77.9	74.9	74.9
IA SU5	61.0	59.0	66.2	66.0	64.0	78.7	81.2	76.6	76.6
IA SU6	65.4	62.8	69.3	66.5	67.7	79.4	81.6	79.8	79.8
IA SU7	70.4	66.1	70.8	68.4	71.8	81.0	83.4	83.2	83.2
IA 3S3A	84.0	78.6	92.2	83.9	81.0	110.5	104.2	91.4	91.4
IA 3S3B	111.3	104.1	120.6	108.1	103.0	140.4	132.5	110.0	110.0
IA 4S3	107.3	103.9	116.4	114.8	109.9	137.3	141.5	115.9	115.9
IA 3-3	85.1	79.5	93.4	84.7	81.7	106.2	104.7	92.0	92.0
IA 5-2	94.4	91.3	102.5	102.1	99.1	121.8	120.6	114.0	114.0
IA EV2	58.4	56.7	63.0	63.5	61.7	79.1	79.5	74.7	74.7
IA EV3	44.0	46.6	54.2	49.8	62.4	77.2	79.8	75.2	75.2
90k	89.0 Y	83.9 Y	98.1 Y	89.6 Y	86.3 Y	118.0 Y	111.0 Y	96.8 Y	96.8 Y
Quint Axle Crane	63.8 Y	65.8 Y	78.1 Y	65.9 Y	75.4 Y	91.7 Y	95.6 Y	88.9 Y	88.9 Y
136k A	114.2 Y	110.7 Y	123.6 Y	115.8 Y	109.1 Y	145.2 Y	140.4 Y	116.9 Y	116.9 Y
136k B	103.5 Y	96.8 Y	112.0 Y	93.9 Y	98.0 Y	132.7 Y	126.1 Y	107.7 Y	107.7 Y
156k	121.8 Y	111.0 Y	130.4 Y	107.8 Y	109.2 Y	149.1 Y	140.5 Y	117.0 Y	117.0 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	75.8 Y	72.6 Y	80.3 Y	77.6 Y	78.0 Y	91.5 Y	95.5 Y	91.0 Y	91.0 Y
Small Annual Crane	67.8 Y	65.6 Y	73.2 Y	71.4 Y	71.2 Y	85.4 Y	89.5 Y	85.3 Y	85.3 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H30-2006, 0 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.71	1.59	1.65	1.58	1.69	1.82	1.88	1.89	1.94
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HL-93 Inv	1.14	1.15	1.27	1.15	1.31	1.40	1.41	1.45	1.50
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +M	STR1 +M	SRV3 +M	STR1 +M	STR1 +M
Location	0.2L SP1 I	0.2L SP1 I	0.2L SP1 I	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	61.1	57.2	61.0	59.7	65.1	71.1	74.9	76.3	80.9
IA SU4	59.1	55.5	59.4	58.3	63.7	69.7	73.5	75.0	79.6
IA SU5	63.6	59.3	63.0	61.5	66.9	72.9	76.6	77.9	82.4
IA SU6	64.2	63.0	66.9	65.1	70.8	77.2	80.2	82.4	82.7
IA SU7	66.8	61.9	65.4	63.6	69.0	75.0	78.6	79.9	84.2
IA 3S3A	98.6	94.0	97.9	93.0	98.7	105.3	107.7	106.5	106.5
IA 3S3B	108.6	103.3	111.5	110.3	121.3	133.4	141.3	128.1	128.1
IA 4S3	109.5	102.4	109.1	106.8	116.4	127.1	133.7	135.0	135.0
IA 3-3	96.8	90.2	93.4	89.3	94.9	100.0	102.2	101.6	103.5
IA 5-2	98.5	91.8	97.5	95.2	103.5	112.8	116.6	116.6	119.8
IA EV2	63.2	59.4	63.4	61.9	67.3	73.3	77.0	78.3	82.7
IA EV3	57.6	57.6	61.4	60.1	65.5	71.5	75.2	76.6	81.2
90k	92.7 Y	85.2 Y	92.2 Y	91.3 Y	100.6 Y	110.8 Y	117.5 Y	112.8 Y	112.8 Y
Quint Axle Crane	76.4 Y	70.5 Y	74.4 Y	72.2 Y	78.2 Y	84.8 Y	88.9 Y	90.2 Y	94.9 Y
136k A	118.5 Y	107.2 Y	114.7 Y	112.5 Y	122.9 Y	134.4 Y	140.0 Y	136.2 Y	136.2 Y
136k B	105.7 Y	96.3 Y	103.6 Y	102.1 Y	111.9 Y	122.8 Y	129.8 Y	125.5 Y	125.5 Y
156k	121.3 Y	114.7 Y	123.4 Y	117.1 Y	128.4 Y	140.9 Y	148.3 Y	136.3 Y	136.3 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	76.2 Y	70.4 Y	74.2 Y	72.1 Y	78.0 Y	84.7 Y	88.8 Y	90.1 Y	94.8 Y
Small Annual Crane	67.7 Y	63.4 Y	67.7 Y	66.3 Y	72.3 Y	79.0 Y	83.2 Y	84.9 Y	89.9 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H30-2006, 15 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.71	1.59	1.65	1.58	1.69	1.82	1.88	1.89	1.94
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HL-93 Inv	1.10	1.10	1.22	1.08	1.31	1.40	1.41	1.45	1.50
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +M	STR1 +M	SRV3 +M	STR1 +M	STR1 +M
Location	0.2L SP1 I	0.2L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	61.1	57.2	61.0	59.7	65.1	71.1	74.9	76.3	80.9
IA SU4	59.1	55.5	59.4	58.3	63.7	69.7	73.5	75.0	79.6
IA SU5	63.6	59.3	63.0	61.5	66.9	72.9	76.6	77.9	82.4
IA SU6	65.8	63.0	66.9	65.1	70.8	77.2	80.2	82.4	82.7
IA SU7	66.8	61.9	65.4	63.7	69.0	75.0	78.6	79.9	84.2
IA 3S3A	98.6	94.0	97.9	93.0	98.7	105.3	107.7	102.8	102.8
IA 3S3B	108.6	103.3	111.5	110.3	121.3	133.4	141.3	123.7	123.7
IA 4S3	109.5	102.4	109.2	106.8	116.4	127.1	133.7	130.3	130.3
IA 3-3	96.9	90.2	93.4	89.3	94.9	100.0	102.2	101.7	103.5
IA 5-2	98.5	91.8	97.5	95.2	103.6	112.8	116.6	116.6	119.8
IA EV2	63.2	59.4	63.4	61.9	67.3	73.3	77.0	78.3	82.7
IA EV3	55.1	57.6	61.4	60.1	65.5	71.5	75.2	76.7	81.2
90k	92.7 Y	85.2 Y	92.2 Y	91.4 Y	100.6 Y	110.8 Y	117.5 Y	108.9 Y	108.9 Y
Quint Axle Crane	76.4 Y	70.5 Y	74.4 Y	72.2 Y	78.2 Y	84.8 Y	88.9 Y	90.2 Y	94.9 Y
136k A	118.6 Y	107.2 Y	114.7 Y	112.5 Y	122.9 Y	134.4 Y	140.0 Y	131.5 Y	131.5 Y
136k B	105.8 Y	96.3 Y	103.6 Y	102.1 Y	112.0 Y	122.8 Y	129.8 Y	121.2 Y	121.2 Y
156k	121.3 Y	114.8 Y	123.4 Y	117.1 Y	128.4 Y	140.9 Y	148.3 Y	131.6 Y	131.6 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	76.2 Y	70.4 Y	74.3 Y	72.1 Y	78.1 Y	84.7 Y	88.8 Y	90.1 Y	94.8 Y
Small Annual Crane	67.7 Y	63.4 Y	67.7 Y	66.3 Y	72.4 Y	79.0 Y	83.2 Y	84.9 Y	89.9 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H30-2006, 30 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.78	1.66	1.73	1.65	1.76	1.90	1.96	1.96	1.98
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +V
Location	0.5L SP2 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.1L SP1 I
HL-93 Inv	1.09	1.11	1.19	1.06	1.33	1.46	1.47	1.52	1.53
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +M	SRV3 +M	STR1 +M	STR1 +V
Location	0.1L SP2 I	0.1L SP2 I	0.1L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.1L SP1 I
IA Type 4	63.9	59.7	63.8	62.4	67.9	74.3	78.1	79.5	82.3
IA SU4	61.8	58.0	62.1	60.9	66.4	72.9	76.7	78.1	81.0
IA SU5	66.6	61.9	65.9	64.2	69.7	76.2	79.9	81.2	82.9
IA SU6	68.5	65.7	70.0	68.1	73.8	80.7	83.5	85.8	85.9
IA SU7	69.9	64.6	68.5	66.5	71.9	78.4	82.1	83.2	87.4
IA 3S3A	98.8	90.3	102.4	97.2	96.9	110.1	111.2	98.9	98.9
IA 3S3B	113.6	107.9	116.7	115.3	123.2	139.5	141.4	118.9	118.9
IA 4S3	114.5	106.9	114.2	111.6	121.3	132.9	139.5	125.3	125.3
IA 3-3	100.1	91.3	97.7	93.3	97.8	104.6	106.3	99.5	99.5
IA 5-2	103.1	95.8	102.0	99.5	107.9	118.0	121.6	121.5	123.3
IA EV2	66.1	62.0	66.4	64.6	70.1	76.6	80.3	80.8	80.8
IA EV3	55.0	58.8	64.2	62.8	68.2	74.7	78.5	79.9	81.4
90k	96.9 Y	88.9 Y	96.4 Y	95.4 Y	103.2 Y	115.8 Y	118.4 Y	104.7 Y	104.7 Y
Quint Axle Crane	79.9 Y	73.6 Y	77.8 Y	75.4 Y	81.5 Y	88.7 Y	92.7 Y	94.0 Y	96.2 Y
136k A	123.8 Y	112.0 Y	120.0 Y	117.6 Y	128.1 Y	140.5 Y	145.6 Y	126.4 Y	126.4 Y
136k B	110.6 Y	100.6 Y	108.4 Y	106.7 Y	116.7 Y	128.4 Y	134.6 Y	116.5 Y	116.5 Y
156k	126.9 Y	119.8 Y	129.1 Y	122.4 Y	130.7 Y	147.3 Y	150.0 Y	126.5 Y	126.5 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	79.7 Y	73.5 Y	77.7 Y	75.3 Y	81.3 Y	88.6 Y	92.6 Y	93.9 Y	98.4 Y
Small Annual Crane	70.8 Y	66.2 Y	70.8 Y	69.3 Y	75.4 Y	82.6 Y	86.8 Y	88.4 Y	92.3 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H30-2006, 45 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.75	1.63	1.84	1.75	1.82	2.01	2.08	1.88	1.88
Controlled by	STR1 +V	STR1 +V	STR1 +M	STR1 +M	STR1 +V	STR1 +M	STR1 +M	STR1 +V	STR1 +V
Location	0.1L SP2 I	0.1L SP2 I	0.5L SP1 I	0.5L SP1 I	0.1L SP2 I	0.5L SP1 I	0.5L SP1 I	0.1L SP2 I	0.1L SP1 I
HL-93 Inv	1.03	1.05	1.14	1.01	1.28	1.55	1.56	1.45	1.45
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +M	SRV3 +M	STR1 +V	STR1 +V
Location	0.1L SP2 I	0.1L SP2 I	0.1L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.1L SP2 I	0.1L SP1 I
IA Type 4	66.6	62.9	67.8	66.2	71.7	78.9	82.7	78.2	78.2
IA SU4	64.9	61.4	66.0	64.6	70.2	77.4	81.2	77.0	77.0
IA SU5	67.5	63.7	70.0	68.1	73.6	80.9	84.6	78.8	78.8
IA SU6	72.3	67.8	74.1	72.2	77.3	85.7	88.0	82.0	82.0
IA SU7	74.3	68.5	72.8	70.5	76.0	83.3	86.9	85.5	85.5
IA 3S3A	93.0	84.8	108.5	96.2	91.6	113.4	107.0	94.0	94.0
IA 3S3B	120.8	112.4	124.0	122.3	116.4	144.2	136.1	113.0	113.0
IA 4S3	118.8	112.2	121.4	118.4	124.3	141.1	145.2	119.1	119.1
IA 3-3	94.2	85.8	103.8	97.1	92.4	111.0	107.9	94.6	94.6
IA 5-2	104.5	98.6	108.4	105.5	114.0	125.3	128.7	117.1	117.1
IA EV2	64.6	61.2	70.5	68.6	71.4	81.3	81.6	76.8	76.8
IA EV3	54.8	58.9	66.9	60.9	72.0	79.3	82.5	77.3	77.3
90k	98.5 Y	90.6 Y	102.5 Y	101.2 Y	97.5 Y	121.1 Y	113.9 Y	99.5 Y	99.5 Y
Quint Axle Crane	80.5 Y	75.5 Y	82.7 Y	79.9 Y	86.1 Y	94.2 Y	98.2 Y	91.4 Y	91.4 Y
136k A	126.4 Y	118.6 Y	127.5 Y	124.7 Y	123.3 Y	149.2 Y	144.1 Y	120.1 Y	120.1 Y
136k B	114.6 Y	104.5 Y	115.2 Y	113.1 Y	110.8 Y	136.3 Y	129.4 Y	110.7 Y	110.7 Y
156k	134.8 Y	119.8 Y	137.2 Y	129.8 Y	123.5 Y	153.1 Y	144.3 Y	120.2 Y	120.2 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	83.9 Y	77.9 Y	82.6 Y	79.9 Y	86.0 Y	94.1 Y	98.0 Y	93.5 Y	93.5 Y
Small Annual Crane	75.0 Y	70.2 Y	75.3 Y	73.5 Y	79.7 Y	87.7 Y	91.9 Y	87.7 Y	87.7 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H40-2006-2014, 40' Roadway, 0 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.60	1.48	1.52	1.48	1.58	1.70	1.76	1.76	1.82
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HL-93 Inv	0.96	0.95	1.15	0.95	1.17	1.29	1.28	1.36	1.38
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.2L SP1 I	0.8L SP1 I	0.8L SP1 I	0.9L SP1 I	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 E
IA Type 4	57.0	53.4	56.2	55.7	60.8	66.5	70.1	71.4	75.8
IA SU4	55.2	51.9	54.7	54.4	59.5	65.2	68.8	70.2	74.7
IA SU5	59.4	55.4	58.0	57.4	62.5	68.2	71.7	73.0	77.3
IA SU6	59.9	55.8	58.4	57.7	62.8	68.5	72.1	73.3	77.6
IA SU7	62.4	57.8	60.3	59.4	64.5	70.2	73.7	74.8	78.9
IA 3S3A	92.1	87.8	90.2	86.8	92.2	98.6	100.9	99.9	99.9
IA 3S3B	101.5	96.5	102.7	102.9	113.4	124.8	132.4	120.1	120.2
IA 4S3	102.3	95.7	100.5	99.7	108.8	118.9	125.3	126.6	126.6
IA 3-3	90.6	84.3	86.0	83.3	88.7	93.6	95.7	95.1	97.1
IA 5-2	92.0	85.7	89.8	88.8	96.8	105.6	109.2	109.1	112.4
IA EV2	59.1	55.5	58.4	57.7	62.8	68.5	72.1	73.3	77.6
IA EV3	48.5	50.5	56.5	56.1	61.2	66.9	70.5	71.7	76.1
90k	86.6 Y	79.6 Y	84.9 Y	85.2 Y	94.0 Y	103.6 Y	110.0 Y	105.7 Y	105.8 Y
Quint Axle Crane	71.3 Y	65.9 Y	68.5 Y	67.4 Y	73.0 Y	79.4 Y	83.2 Y	84.4 Y	89.0 Y
136k A	110.7 Y	100.2 Y	105.6 Y	105.0 Y	114.8 Y	125.8 Y	131.2 Y	127.7 Y	127.7 Y
136k B	98.8 Y	90.0 Y	95.4 Y	95.3 Y	104.6 Y	114.9 Y	121.6 Y	117.7 Y	117.7 Y
156k	113.3 Y	107.2 Y	113.6 Y	109.3 Y	120.0 Y	131.8 Y	139.1 Y	127.8 Y	127.8 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	71.2 Y	65.7 Y	68.4 Y	67.3 Y	72.9 Y	79.3 Y	83.1 Y	84.3 Y	88.9 Y
Small Annual Crane	63.2 Y	59.3 Y	62.3 Y	61.9 Y	67.6 Y	73.9 Y	77.9 Y	79.4 Y	84.4 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H40-2006-2014, 40' Roadway, 15 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.60	1.48	1.52	1.48	1.58	1.70	1.76	1.76	1.82
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HL-93 Inv	0.93	0.92	1.10	0.90	1.10	1.29	1.28	1.36	1.38
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.1L SP1 I	0.8L SP1 I	0.1L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 E
IA Type 4	57.0	53.4	56.1	55.7	60.8	66.5	70.1	71.4	75.8
IA SU4	55.2	51.9	54.7	54.4	59.5	65.2	68.8	70.2	74.7
IA SU5	59.4	55.4	58.0	57.4	62.5	68.2	71.7	73.0	77.3
IA SU6	59.9	55.8	58.4	57.7	62.8	68.5	72.1	73.3	77.6
IA SU7	62.4	57.8	60.3	59.4	64.5	70.2	73.7	74.8	78.9
IA 3S3A	92.1	87.8	90.2	86.8	92.2	98.6	100.9	96.4	96.4
IA 3S3B	101.5	96.5	102.7	102.9	113.3	124.8	132.4	116.0	116.0
IA 4S3	102.3	95.7	100.5	99.7	108.8	118.9	125.2	122.2	122.2
IA 3-3	90.6	84.3	86.0	83.3	88.7	93.6	95.7	95.1	97.1
IA 5-2	92.0	85.7	89.8	88.8	96.8	105.6	109.2	109.1	112.4
IA EV2	59.1	55.5	58.4	57.7	62.8	68.5	72.1	73.3	77.6
IA EV3	46.4	48.4	56.5	54.8	61.2	66.9	70.4	71.7	76.1
90k	86.6 Y	79.6 Y	84.9 Y	85.2 Y	94.0 Y	103.6 Y	110.0 Y	102.1 Y	102.1 Y
Quint Axle Crane	69.3 Y	65.9 Y	68.5 Y	67.4 Y	73.0 Y	79.4 Y	83.2 Y	84.4 Y	89.0 Y
136k A	110.7 Y	100.2 Y	105.6 Y	105.0 Y	114.8 Y	125.7 Y	131.2 Y	123.3 Y	123.3 Y
136k B	98.8 Y	90.0 Y	95.4 Y	95.3 Y	104.6 Y	114.9 Y	121.6 Y	113.6 Y	113.6 Y
156k	113.3 Y	107.2 Y	113.6 Y	109.3 Y	120.0 Y	131.8 Y	139.0 Y	123.4 Y	123.4 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	71.2 Y	65.7 Y	68.4 Y	67.3 Y	72.9 Y	79.3 Y	83.1 Y	84.3 Y	88.9 Y
Small Annual Crane	63.2 Y	59.3 Y	62.3 Y	61.9 Y	67.6 Y	73.9 Y	77.9 Y	79.4 Y	84.4 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H40-2006-2014, 40' Roadway, 30 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.67	1.55	1.60	1.55	1.65	1.78	1.84	1.84	1.86
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.1L SP1 I
HL-93 Inv	0.90	0.89	1.08	0.88	1.08	1.35	1.34	1.42	1.43
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.1L SP1 I	0.9L SP1 I	0.1L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.1L SP1 I
IA Type 4	59.8	55.9	59.0	58.3	63.5	69.7	73.3	74.6	77.1
IA SU4	57.8	54.3	57.4	57.0	62.2	68.3	71.9	73.3	76.0
IA SU5	62.3	57.9	60.9	60.1	65.3	71.4	75.0	76.2	77.7
IA SU6	62.8	58.4	61.3	60.4	65.6	71.8	75.3	76.5	80.7
IA SU7	65.4	60.5	63.3	62.2	67.3	73.5	77.0	78.1	82.1
IA 3S3A	92.8	84.5	94.7	90.9	90.8	103.2	104.4	92.7	92.7
IA 3S3B	106.4	100.9	107.8	107.8	115.5	130.8	132.8	111.5	111.5
IA 4S3	107.2	100.1	105.5	104.3	113.6	124.6	130.9	117.5	117.5
IA 3-3	94.0	85.5	90.3	87.2	91.6	98.0	99.8	93.3	93.3
IA 5-2	96.5	89.7	94.3	93.0	101.0	110.6	114.1	113.9	115.6
IA EV2	61.9	58.1	61.3	60.4	65.6	71.8	75.3	75.7	75.7
IA EV3	46.3	48.4	59.3	53.1	63.9	70.1	73.6	74.9	76.3
90k	90.7 Y	83.3 Y	89.1 Y	89.2 Y	96.7 Y	108.6 Y	111.2 Y	98.2 Y	98.2 Y
Quint Axle Crane	69.4 Y	68.9 Y	71.9 Y	69.7 Y	76.3 Y	83.2 Y	87.0 Y	88.1 Y	90.2 Y
136k A	116.0 Y	104.8 Y	110.8 Y	109.9 Y	119.9 Y	131.7 Y	136.7 Y	118.5 Y	118.5 Y
136k B	103.5 Y	94.1 Y	100.1 Y	99.0 Y	109.2 Y	120.4 Y	126.4 Y	109.3 Y	109.3 Y
156k	118.8 Y	112.1 Y	119.3 Y	113.5 Y	122.4 Y	138.1 Y	140.8 Y	118.6 Y	118.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	74.6 Y	68.8 Y	71.8 Y	70.4 Y	76.2 Y	83.1 Y	86.9 Y	88.0 Y	92.3 Y
Small Annual Crane	66.3 Y	62.0 Y	65.4 Y	64.8 Y	70.6 Y	77.5 Y	81.5 Y	82.9 Y	86.5 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H40-2006-2014, 40' Roadway, 45 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.65	1.53	1.70	1.63	1.71	1.89	1.95	1.76	1.76
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.1L SP1 I	0.9L SP1 I	0.5L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.1L SP1 I	0.1L SP1 I
HL-93 Inv	0.85	0.84	1.04	0.84	1.04	1.44	1.42	1.36	1.36
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.1L SP1 I	0.9L SP1 I	0.1L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.1L SP1 I	0.1L SP1 I
IA Type 4	62.5	58.9	63.0	62.1	67.4	74.2	77.8	73.3	73.3
IA SU4	60.9	57.6	61.3	60.6	65.9	72.8	76.4	72.2	72.2
IA SU5	63.3	59.6	65.0	63.9	69.0	76.1	79.4	73.8	73.9
IA SU6	67.0	62.0	65.5	64.3	69.6	76.5	80.0	76.9	76.9
IA SU7	69.7	64.3	67.6	66.1	71.4	78.3	81.7	80.1	80.1
IA 3S3A	87.3	79.4	101.1	90.3	85.8	106.5	100.5	88.1	88.1
IA 3S3B	113.4	105.3	115.2	114.6	109.1	135.3	127.8	106.0	106.0
IA 4S3	111.5	105.1	112.7	111.0	116.5	132.7	136.4	111.6	111.7
IA 3-3	88.4	80.4	96.4	91.2	86.6	104.4	101.3	88.7	88.7
IA 5-2	98.1	92.3	100.7	98.9	106.8	117.8	121.1	109.8	109.8
IA EV2	60.7	57.3	65.5	64.3	66.9	76.5	76.7	72.0	72.0
IA EV3	46.2	48.4	61.5	50.9	67.5	74.6	77.4	72.5	72.5
90k	92.4 Y	84.9 Y	95.2 Y	94.9 Y	91.4 Y	113.7 Y	107.0 Y	93.3 Y	93.3 Y
Quint Axle Crane	69.5 Y	70.3 Y	76.8 Y	66.8 Y	80.7 Y	88.6 Y	92.4 Y	85.7 Y	85.7 Y
136k A	118.7 Y	111.4 Y	118.4 Y	116.9 Y	115.5 Y	140.3 Y	135.3 Y	112.6 Y	112.6 Y
136k B	107.5 Y	97.9 Y	106.9 Y	94.9 Y	103.8 Y	128.2 Y	121.6 Y	103.8 Y	103.8 Y
156k	124.5 Y	112.2 Y	127.4 Y	108.8 Y	115.7 Y	143.7 Y	135.5 Y	112.7 Y	112.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	78.8 Y	73.1 Y	76.7 Y	74.9 Y	80.7 Y	88.5 Y	92.3 Y	87.7 Y	87.7 Y
Small Annual Crane	70.4 Y	65.9 Y	69.9 Y	68.9 Y	74.8 Y	82.5 Y	86.5 Y	82.2 Y	82.2 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H44-2007-2014, 44' Roadway, 0 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.72	1.59	1.66	1.59	1.70	1.82	1.89	1.89	1.95
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HL-93 Inv	1.15	1.16	1.28	1.16	1.31	1.41	1.44	1.46	1.50
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.2L SP1 I	0.8L SP1 I	0.5L SP1 I	0.9L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	61.2	57.4	61.2	60.0	65.4	71.4	75.2	76.7	81.3
IA SU4	59.2	55.7	59.6	58.6	64.0	69.9	73.8	75.3	80.1
IA SU5	63.8	59.5	63.2	61.8	67.2	73.1	76.9	78.3	82.8
IA SU6	64.3	59.9	63.6	62.1	67.5	73.5	77.3	78.6	83.1
IA SU7	67.0	62.1	65.6	63.9	69.3	75.3	79.0	80.2	84.6
IA 3S3A	98.8	94.3	98.2	93.4	99.1	105.6	108.1	106.6	106.6
IA 3S3B	108.9	103.7	111.9	110.8	121.8	133.9	141.9	128.2	128.2
IA 4S3	109.7	102.8	109.5	107.3	116.9	127.5	134.3	135.1	135.1
IA 3-3	97.2	90.5	93.7	89.7	95.3	100.4	102.6	102.1	104.1
IA 5-2	98.7	92.1	97.8	95.6	104.0	113.2	117.0	117.1	120.4
IA EV2	63.3	59.6	63.6	62.1	67.5	73.5	77.3	78.6	83.1
IA EV3	58.2	57.8	61.6	60.3	65.7	71.7	75.5	77.0	81.6
90k	92.9 Y	85.5 Y	92.5 Y	91.7 Y	101.0 Y	111.2 Y	117.8 Y	112.9 Y	112.9 Y
Quint Axle Crane	76.5 Y	70.8 Y	74.6 Y	72.5 Y	78.5 Y	85.2 Y	89.2 Y	90.6 Y	95.4 Y
136k A	118.8 Y	107.6 Y	115.0 Y	113.0 Y	123.4 Y	134.9 Y	140.6 Y	136.3 Y	136.3 Y
136k B	106.0 Y	96.7 Y	103.9 Y	102.5 Y	112.4 Y	123.3 Y	130.3 Y	125.6 Y	125.6 Y
156k	121.6 Y	115.1 Y	123.8 Y	117.6 Y	128.9 Y	141.4 Y	149.0 Y	136.4 Y	136.4 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	76.4 Y	70.6 Y	74.5 Y	72.4 Y	78.4 Y	85.0 Y	89.1 Y	90.5 Y	95.3 Y
Small Annual Crane	67.8 Y	63.7 Y	67.9 Y	66.6 Y	72.6 Y	79.3 Y	83.6 Y	85.2 Y	90.4 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H44-2007-2014, 44' Roadway, 15 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.72	1.59	1.66	1.59	1.70	1.82	1.89	1.89	1.95
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HL-93 Inv	1.11	1.11	1.24	1.10	1.31	1.41	1.44	1.46	1.50
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.2L SP1 I	0.2L SP1 I	0.2L SP1 I	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	61.2	57.4	61.2	60.0	65.4	71.4	75.2	76.7	81.3
IA SU4	59.2	55.7	59.6	58.6	64.0	69.9	73.8	75.3	80.1
IA SU5	63.8	59.5	63.2	61.8	67.1	73.1	76.9	78.3	82.8
IA SU6	64.3	59.9	63.6	62.1	67.5	73.5	77.3	78.6	83.1
IA SU7	67.0	62.1	65.6	63.9	69.3	75.3	79.0	80.2	84.6
IA 3S3A	98.8	94.3	98.2	93.4	99.1	105.6	108.1	102.9	102.9
IA 3S3B	108.9	103.6	111.9	110.8	121.8	133.9	141.9	123.8	123.8
IA 4S3	109.7	102.8	109.5	107.3	116.9	127.5	134.3	130.4	130.4
IA 3-3	97.2	90.5	93.7	89.7	95.3	100.4	102.6	102.1	103.6
IA 5-2	98.7	92.1	97.8	95.6	104.0	113.2	117.0	117.1	120.4
IA EV2	63.3	59.6	63.6	62.1	67.5	73.5	77.3	78.6	83.1
IA EV3	55.6	57.8	61.6	60.3	65.7	71.7	75.5	77.0	81.6
90k	92.9 Y	85.5 Y	92.5 Y	91.7 Y	101.0 Y	111.2 Y	117.8 Y	109.0 Y	109.0 Y
Quint Axle Crane	76.5 Y	70.8 Y	74.6 Y	72.5 Y	78.5 Y	85.1 Y	89.2 Y	90.6 Y	95.4 Y
136k A	118.8 Y	107.6 Y	115.0 Y	113.0 Y	123.4 Y	134.9 Y	140.6 Y	131.6 Y	131.6 Y
136k B	106.0 Y	96.7 Y	103.9 Y	102.5 Y	112.4 Y	123.3 Y	130.3 Y	121.3 Y	121.3 Y
156k	121.6 Y	115.1 Y	123.8 Y	117.6 Y	128.9 Y	141.4 Y	149.0 Y	131.7 Y	131.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	76.4 Y	70.6 Y	74.5 Y	72.4 Y	78.4 Y	85.0 Y	89.1 Y	90.5 Y	95.3 Y
Small Annual Crane	67.8 Y	63.7 Y	67.9 Y	66.6 Y	72.6 Y	79.3 Y	83.6 Y	85.2 Y	90.4 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LRFR Rating Method

H44-2007-2014, 44' Roadway, 30 Degree Skew

	Bridge Length								
Truck	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HL-93 Oper	1.79	1.66	1.73	1.66	1.77	1.90	1.97	1.97	1.98
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.1L SP1 I
HL-93 Inv	1.11	1.12	1.21	1.07	1.36	1.47	1.50	1.52	1.53
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.2L SP1 I	0.2L SP1 I	0.1L SP1 I	0.1L SP1 I	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.1L SP1 I
IA Type 4	64.0	59.9	64.0	62.7	68.2	74.6	78.4	79.9	82.3
IA SU4	61.9	58.2	62.4	61.2	66.7	73.1	77.0	78.5	81.1
IA SU5	66.7	62.1	66.1	64.5	70.0	76.5	80.2	81.6	83.0
IA SU6	67.3	62.6	66.6	64.9	70.4	76.9	80.6	81.9	86.4
IA SU7	70.1	64.8	68.7	66.8	72.2	78.7	82.4	83.6	87.9
IA 3S3A	98.7	90.2	102.7	97.6	96.9	110.4	111.1	99.0	99.0
IA 3S3B	113.9	108.2	117.1	115.8	123.2	140.0	141.3	119.0	119.0
IA 4S3	114.8	107.3	114.6	112.1	121.8	133.4	140.1	125.4	125.4
IA 3-3	100.0	91.3	98.0	93.7	97.7	104.9	106.8	99.6	99.6
IA 5-2	103.3	96.2	102.4	99.9	108.4	118.4	122.1	122.0	123.4
IA EV2	66.3	62.2	66.6	64.9	70.4	76.9	80.6	80.8	80.8
IA EV3	55.5	59.5	64.4	63.1	68.5	75.0	78.8	80.2	81.4
90k	97.2 Y	89.3 Y	96.8 Y	95.9 Y	103.2 Y	116.3 Y	118.3 Y	104.8 Y	104.8 Y
Quint Axle Crane	80.1 Y	73.9 Y	78.1 Y	75.8 Y	81.8 Y	89.0 Y	93.1 Y	94.4 Y	96.2 Y
136k A	124.2 Y	112.4 Y	120.4 Y	118.1 Y	128.6 Y	141.1 Y	146.2 Y	126.5 Y	126.5 Y
136k B	110.9 Y	100.9 Y	108.7 Y	107.2 Y	117.2 Y	128.9 Y	134.4 Y	116.6 Y	116.6 Y
156k	127.2 Y	120.2 Y	129.5 Y	122.9 Y	130.6 Y	147.9 Y	149.8 Y	126.6 Y	126.6 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	79.9 Y	73.7 Y	77.9 Y	75.7 Y	81.7 Y	88.9 Y	93.0 Y	94.3 Y	98.5 Y
Small Annual Crane	71.0 Y	66.5 Y	71.1 Y	69.6 Y	75.7 Y	82.9 Y	87.2 Y	88.8 Y	92.3 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

4.2 LRFD RESULTS TABLES

4.2.2 J-Series

J Bridge Standards Load Rating Summary - LRFR Rating Method

J24-2006, 0 Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.60	1.44	1.44	1.40	1.39	1.39	1.38	1.61	1.50
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.5L SP2 E	0.4L SP1 E	0.4L SP3 I	0.5L SP2 E
HL-93 Inv	1.23	1.11	1.11	1.08	1.08	1.08	1.06	1.25	1.16
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.5L SP2 E	0.4L SP1 E	0.4L SP3 I	0.5L SP2 E
IA Type 4	60.4	53.6	52.3	50.2	50.0	49.2	48.5	56.7	55.5
IA SU4	57.0	50.8	49.9	48.0	48.1	47.5	47.1	55.1	54.0
IA SU5	63.1	56.1	54.6	52.2	52.0	51.0	50.4	58.7	57.3
IA SU6	65.8	58.0	56.1	53.4	53.0	51.8	51.9	60.3	57.9
IA SU7	72.0	62.8	60.0	56.7	55.8	54.3	55.1	63.8	60.1
IA 3S3A	85.6	82.1	82.3	81.0	78.6	79.2	78.4	92.7	89.6
IA 3S3B	98.5	88.9	92.5	90.9	87.8	88.1	87.0	101.4	94.9
IA 4S3	105.1	96.6	98.0	94.3	89.7	88.9	86.8	100.5	94.4
IA 3-3	95.0	101.5	96.6	101.1	94.9	88.3	86.7	95.9	87.3
IA 5-2	100.3	91.6	89.0	85.5	81.0	80.1	78.0	90.9	95.0
IA EV2	57.9	54.2	53.3	51.3	50.8	49.1	49.4	57.7	57.1
IA EV3	58.0	53.2	52.1	50.1	50.0	49.3	49.1	57.3	55.7
90k	79.8 Y	74.4 Y	74.6 Y	73.4 Y	71.2 Y	71.8 Y	71.1 Y	84.1 Y	90.2 Y
Quint Axle Crane	79.2 Y	76.8 Y	72.2 Y	67.1 Y	65.5 Y	63.4 Y	63.5 Y	73.0 Y	69.0 Y
136k A	112.8 Y	103.7 Y	101.6 Y	97.9 Y	93.4 Y	92.9 Y	90.8 Y	105.7 Y	100.1 Y
136k B	98.3 Y	88.6 Y	88.8 Y	86.2 Y	82.7 Y	82.6 Y	81.2 Y	95.5 Y	99.3 Y
156k	112.8 Y	101.6 Y	101.9 Y	98.9 Y	94.9 Y	94.8 Y	93.2 Y	108.0 Y	102.0 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	83.5 Y	72.6 Y	69.1 Y	65.1 Y	63.9 Y	62.0 Y	61.6 Y	71.2 Y	68.2 Y
Small Annual Crane	64.5 Y	57.8 Y	56.8 Y	54.7 Y	54.7 Y	54.0 Y	53.2 Y	62.4 Y	61.3 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J24-2006, 15 Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.62	1.47	1.46	1.42	1.42	1.42	1.40	1.64	1.53
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.5L SP2 E	0.4L SP1 E	0.4L SP3 I	0.5L SP2 E
HL-93 Inv	1.25	1.13	1.13	1.10	1.09	1.09	1.08	1.27	1.18
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.5L SP2 E	0.4L SP1 E	0.4L SP3 I	0.5L SP2 E
IA Type 4	61.4	54.6	53.2	51.1	50.9	50.1	49.4	57.7	56.5
IA SU4	58.0	51.7	50.8	48.8	48.9	48.4	47.9	56.1	54.9
IA SU5	64.2	57.0	55.5	53.1	52.9	51.9	51.2	59.7	58.3
IA SU6	66.9	59.0	57.0	54.3	53.9	52.7	52.8	61.3	58.9
IA SU7	73.2	63.9	61.1	57.7	56.8	55.3	56.1	64.9	61.1
IA 3S3A	87.1	83.5	83.7	82.4	79.9	80.6	79.8	94.3	91.1
IA 3S3B	100.2	90.4	94.1	92.5	89.3	89.7	88.5	103.1	96.6
IA 4S3	106.9	98.3	99.7	95.9	91.3	90.5	88.3	102.2	96.1
IA 3-3	96.7	103.2	98.2	102.8	96.5	89.9	88.2	97.5	88.8
IA 5-2	102.0	93.1	90.6	86.9	82.4	81.5	79.3	92.5	96.6
IA EV2	58.9	55.1	54.2	52.2	51.7	49.9	50.2	58.7	58.1
IA EV3	59.0	54.2	53.0	51.0	50.9	50.1	49.9	58.3	56.7
90k	81.2 Y	75.7 Y	75.9 Y	74.7 Y	72.4 Y	73.0 Y	72.3 Y	85.5 Y	91.7 Y
Quint Axle Crane	80.5 Y	78.1 Y	73.4 Y	68.3 Y	66.6 Y	64.5 Y	64.6 Y	74.3 Y	70.2 Y
136k A	114.7 Y	105.5 Y	103.3 Y	99.6 Y	95.1 Y	94.5 Y	92.4 Y	107.6 Y	101.9 Y
136k B	100.0 Y	90.1 Y	90.3 Y	87.7 Y	84.1 Y	84.1 Y	82.7 Y	97.2 Y	101.0 Y
156k	114.7 Y	103.4 Y	103.6 Y	100.6 Y	96.5 Y	96.4 Y	94.8 Y	109.9 Y	103.8 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	85.0 Y	73.8 Y	70.3 Y	66.2 Y	65.0 Y	63.1 Y	62.6 Y	72.4 Y	69.4 Y
Small Annual Crane	65.6 Y	58.8 Y	57.8 Y	55.7 Y	55.7 Y	55.0 Y	54.1 Y	63.4 Y	62.4 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J24-2006, 30 Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.76	1.59	1.59	1.54	1.54	1.54	1.52	1.78	1.66
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.5L SP2 E	0.4L SP1 E	0.4L SP3 I	0.5L SP2 E
HL-93 Inv	1.36	1.23	1.22	1.19	1.19	1.19	1.17	1.38	1.28
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.5L SP2 E	0.4L SP1 E	0.4L SP3 I	0.5L SP2 E
IA Type 4	66.7	59.2	57.8	55.4	55.2	54.4	53.6	62.6	61.3
IA SU4	62.9	56.1	55.1	53.0	53.1	52.5	52.0	60.9	59.6
IA SU5	69.6	61.9	60.3	57.6	57.4	56.3	55.6	64.8	63.2
IA SU6	72.6	64.0	61.9	59.0	58.5	57.2	57.3	66.5	64.0
IA SU7	79.5	69.3	66.3	62.6	61.7	60.0	60.9	70.5	66.3
IA 3S3A	94.5	90.7	90.9	89.4	86.8	87.4	86.6	102.4	98.9
IA 3S3B	108.7	98.1	102.1	100.4	96.9	97.3	96.0	111.9	104.8
IA 4S3	116.0	106.6	108.2	104.1	99.1	98.2	95.9	110.9	104.3
IA 3-3	104.9	112.0	106.6	111.6	104.7	97.5	95.7	105.9	96.3
IA 5-2	110.7	101.1	98.3	94.4	89.4	88.5	86.1	100.4	104.9
IA EV2	64.0	59.8	58.8	56.6	56.1	54.2	54.5	63.7	63.0
IA EV3	64.1	58.8	57.5	55.3	55.2	54.4	54.2	63.3	61.5
90k	88.1 Y	82.2 Y	82.4 Y	81.1 Y	78.6 Y	79.2 Y	78.5 Y	92.8 Y	99.6 Y
Quint Axle Crane	87.4 Y	84.8 Y	79.7 Y	74.1 Y	72.3 Y	70.0 Y	70.1 Y	80.6 Y	76.2 Y
136k A	124.5 Y	114.5 Y	112.2 Y	108.1 Y	103.2 Y	102.6 Y	100.3 Y	116.8 Y	110.6 Y
136k B	108.6 Y	97.8 Y	98.1 Y	95.2 Y	91.3 Y	91.3 Y	89.7 Y	105.5 Y	109.6 Y
156k	124.5 Y	112.2 Y	112.5 Y	109.2 Y	104.7 Y	104.7 Y	102.9 Y	119.3 Y	112.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	92.2 Y	80.1 Y	76.3 Y	71.8 Y	70.5 Y	68.5 Y	68.0 Y	78.6 Y	75.3 Y
Small Annual Crane	71.2 Y	63.8 Y	62.7 Y	60.4 Y	60.4 Y	59.6 Y	58.8 Y	68.9 Y	67.7 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J24-2006, 45 Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.99	1.81	1.80	1.75	1.74	1.74	1.72	2.02	1.88
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.5L SP2 E	0.4L SP1 E	0.4L SP3 I	0.5L SP2 E
HL-93 Inv	1.54	1.39	1.39	1.35	1.34	1.34	1.33	1.56	1.45
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.5L SP2 E	0.4L SP1 E	0.4L SP3 I	0.5L SP2 E
IA Type 4	75.5	67.1	65.4	62.7	62.5	61.5	60.6	70.8	69.4
IA SU4	71.3	63.5	62.4	60.0	60.1	59.4	58.8	68.9	67.5
IA SU5	78.8	70.1	68.2	65.2	65.0	63.7	62.9	73.4	71.6
IA SU6	82.2	72.5	70.1	66.8	66.2	64.8	64.8	75.3	72.4
IA SU7	90.0	78.5	75.0	70.9	69.8	67.9	68.9	79.8	75.1
IA 3S3A	107.0	102.6	102.9	101.3	98.2	99.0	98.0	115.9	112.0
IA 3S3B	123.1	111.1	115.6	113.6	109.7	110.2	108.7	126.7	118.7
IA 4S3	131.3	120.7	122.5	117.9	112.1	111.1	108.5	125.6	118.0
IA 3-3	118.8	126.8	120.7	126.3	118.6	110.4	108.3	119.9	109.1
IA 5-2	125.4	114.4	111.3	106.8	101.2	100.2	97.5	113.6	118.7
IA EV2	72.4	67.7	66.6	64.1	63.5	61.4	61.7	72.1	71.4
IA EV3	72.5	66.6	65.1	62.6	62.5	61.6	61.3	71.6	69.6
90k	99.8 Y	93.0 Y	93.2 Y	91.8 Y	89.0 Y	89.7 Y	88.8 Y	105.1 Y	112.7 Y
Quint Axle Crane	99.0 Y	96.0 Y	90.2 Y	83.9 Y	81.9 Y	79.2 Y	79.3 Y	91.3 Y	86.2 Y
136k A	141.0 Y	129.7 Y	127.0 Y	122.4 Y	116.8 Y	116.1 Y	113.5 Y	132.2 Y	125.2 Y
136k B	122.9 Y	110.7 Y	111.0 Y	107.7 Y	103.4 Y	103.3 Y	101.6 Y	119.4 Y	124.1 Y
156k	141.0 Y	127.0 Y	127.3 Y	123.6 Y	118.6 Y	118.5 Y	116.5 Y	135.0 Y	127.6 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	104.4 Y	90.7 Y	86.4 Y	81.3 Y	79.9 Y	77.5 Y	77.0 Y	88.9 Y	85.3 Y
Small Annual Crane	80.6 Y	72.2 Y	71.0 Y	68.4 Y	68.4 Y	67.5 Y	66.5 Y	78.0 Y	76.7 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J30-2006, 0 Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.63	1.53	1.54	1.54	1.50	1.52	1.53	1.59	1.47
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP3 E	0.5L SP2 E
HL-93 Inv	1.26	1.18	1.19	1.18	1.16	1.18	1.18	1.23	1.14
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP3 E	0.5L SP2 E
IA Type 4	63.2	57.3	56.2	55.2	54.1	54.2	54.0	55.8	54.4
IA SU4	59.1	54.3	53.6	52.8	52.2	52.4	52.4	54.3	52.9
IA SU5	66.3	59.9	58.6	57.4	56.4	56.4	56.1	57.8	56.1
IA SU6	69.2	61.9	60.2	58.7	57.8	57.7	57.7	59.4	56.7
IA SU7	75.7	67.0	64.5	62.4	60.9	60.5	61.3	62.9	58.8
IA 3S3A	87.6	85.9	78.6	87.9	84.8	86.3	87.3	91.4	87.7
IA 3S3B	102.2	94.9	97.6	99.9	94.7	96.1	96.8	91.3	89.1
IA 4S3	108.7	103.0	103.0	103.6	96.8	96.9	96.7	90.5	88.6
IA 3-3	97.2	105.4	91.7	102.5	103.5	98.3	95.5	94.4	85.4
IA 5-2	105.4	95.7	93.5	93.9	87.4	87.4	86.8	89.6	89.5
IA EV2	59.2	57.9	57.2	56.4	54.9	54.1	55.0	56.8	55.9
IA EV3	59.3	56.2	56.0	55.1	54.6	54.9	54.6	56.4	54.5
90k	83.9 Y	77.8 Y	78.4 Y	80.6 Y	76.8 Y	78.2 Y	79.1 Y	82.8 Y	88.3 Y
Quint Axle Crane	81.0 Y	82.0 Y	77.5 Y	73.8 Y	71.5 Y	70.6 Y	70.6 Y	71.9 Y	67.5 Y
136k A	118.5 Y	108.5 Y	105.8 Y	107.2 Y	100.8 Y	101.3 Y	101.1 Y	95.3 Y	94.0 Y
136k B	103.4 Y	94.2 Y	93.3 Y	94.7 Y	89.2 Y	90.1 Y	90.5 Y	94.1 Y	93.1 Y
156k	117.7 Y	108.1 Y	107.0 Y	108.6 Y	102.3 Y	103.4 Y	103.8 Y	97.3 Y	95.8 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	87.1 Y	77.5 Y	74.2 Y	71.6 Y	69.7 Y	69.0 Y	68.6 Y	70.1 Y	66.8 Y
Small Annual Crane	66.7 Y	61.7 Y	61.0 Y	60.2 Y	59.0 Y	59.3 Y	59.3 Y	61.4 Y	60.1 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J30-2006, 15 Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.64	1.55	1.57	1.56	1.53	1.55	1.56	1.62	1.50
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP3 E	0.5L SP2 E
HL-93 Inv	1.27	1.20	1.21	1.21	1.18	1.20	1.20	1.25	1.16
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP3 E	0.5L SP2 E
IA Type 4	63.4	58.3	57.2	56.2	55.0	55.1	54.9	56.8	55.3
IA SU4	59.3	55.2	54.5	53.7	53.1	53.4	53.3	55.3	53.8
IA SU5	66.5	60.9	59.6	58.4	57.4	57.4	57.0	58.8	57.1
IA SU6	69.3	63.0	61.3	59.8	58.8	58.7	58.7	60.4	57.7
IA SU7	75.9	68.2	65.6	63.4	62.0	61.5	62.3	64.0	59.8
IA 3S3A	87.9	87.3	79.9	89.4	86.2	87.8	88.8	92.9	89.2
IA 3S3B	102.8	96.6	99.3	101.6	96.3	97.7	98.5	92.9	90.6
IA 4S3	109.2	104.8	104.8	105.4	98.5	98.6	98.3	92.1	90.1
IA 3-3	97.6	107.2	93.2	104.3	105.3	100.0	97.2	96.0	86.9
IA 5-2	105.7	97.4	95.2	95.5	88.9	88.9	88.3	91.1	91.0
IA EV2	59.5	58.9	58.2	57.4	55.8	55.0	55.9	57.8	56.9
IA EV3	59.6	57.2	56.9	56.1	55.5	55.8	55.6	57.4	55.5
90k	84.2 Y	79.1 Y	79.7 Y	82.0 Y	78.2 Y	79.6 Y	80.5 Y	84.2 Y	89.8 Y
Quint Axle Crane	81.3 Y	83.4 Y	78.9 Y	75.1 Y	72.7 Y	71.8 Y	71.9 Y	73.2 Y	68.7 Y
136k A	118.9 Y	110.3 Y	107.6 Y	109.0 Y	102.6 Y	103.0 Y	102.9 Y	96.9 Y	95.6 Y
136k B	103.6 Y	95.8 Y	94.9 Y	96.3 Y	90.8 Y	91.7 Y	92.0 Y	95.7 Y	94.8 Y
156k	118.2 Y	109.9 Y	108.9 Y	110.5 Y	104.1 Y	105.1 Y	105.6 Y	99.0 Y	97.4 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	87.5 Y	78.9 Y	75.5 Y	72.8 Y	70.9 Y	70.2 Y	69.7 Y	71.3 Y	68.0 Y
Small Annual Crane	67.0 Y	62.8 Y	62.1 Y	61.2 Y	60.0 Y	60.3 Y	60.3 Y	62.5 Y	61.1 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J30-2006, 30 Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.78	1.69	1.70	1.70	1.66	1.68	1.69	1.76	1.63
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP3 E	0.5L SP2 E
HL-93 Inv	1.37	1.30	1.31	1.31	1.28	1.30	1.30	1.35	1.25
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP3 E	0.5L SP2 E
IA Type 4	68.8	63.3	62.0	60.9	59.7	59.8	59.6	61.7	60.1
IA SU4	64.4	59.9	59.2	58.3	57.6	57.9	57.9	60.0	58.4
IA SU5	72.2	66.1	64.7	63.4	62.3	62.3	61.9	63.9	61.9
IA SU6	75.3	68.4	66.5	64.9	63.8	63.7	63.7	65.5	62.6
IA SU7	82.4	74.0	71.2	68.9	67.3	66.8	67.7	69.4	65.0
IA 3S3A	95.4	94.8	86.8	97.0	93.6	95.3	96.4	100.9	96.8
IA 3S3B	111.5	104.8	107.8	110.3	104.6	106.1	106.9	100.9	98.4
IA 4S3	118.6	113.8	113.7	114.4	106.9	107.0	106.7	99.9	97.8
IA 3-3	105.9	116.4	101.2	113.2	114.3	108.5	105.5	104.2	94.3
IA 5-2	114.7	105.7	103.3	103.7	96.5	96.5	95.8	98.9	98.8
IA EV2	64.6	63.9	63.2	62.3	60.6	59.7	60.7	62.7	61.7
IA EV3	64.7	62.1	61.8	60.8	60.3	60.6	60.3	62.3	60.2
90k	91.3 Y	85.9 Y	86.5 Y	89.0 Y	84.8 Y	86.4 Y	87.3 Y	91.4 Y	97.5 Y
Quint Axle Crane	88.2 Y	90.5 Y	85.6 Y	81.5 Y	78.9 Y	77.9 Y	78.0 Y	79.4 Y	74.6 Y
136k A	129.0 Y	119.8 Y	116.8 Y	118.3 Y	111.3 Y	111.8 Y	111.6 Y	105.2 Y	103.8 Y
136k B	112.5 Y	104.0 Y	103.0 Y	104.5 Y	98.5 Y	99.5 Y	99.9 Y	103.9 Y	102.8 Y
156k	128.3 Y	119.3 Y	118.2 Y	119.9 Y	113.0 Y	114.1 Y	114.6 Y	107.5 Y	105.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	95.0 Y	85.6 Y	81.9 Y	79.0 Y	77.0 Y	76.2 Y	75.7 Y	77.4 Y	73.8 Y
Small Annual Crane	72.8 Y	68.1 Y	67.4 Y	66.4 Y	65.2 Y	65.5 Y	65.4 Y	67.8 Y	66.3 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J30-2006, 45 Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	2.02	1.91	1.93	1.92	1.88	1.90	1.91	1.99	1.84
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP3 E	0.5L SP2 E
HL-93 Inv	1.56	1.47	1.49	1.48	1.45	1.47	1.48	1.53	1.42
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP3 E	0.5L SP2 E
IA Type 4	77.9	71.6	70.2	69.0	67.6	67.7	67.5	69.8	68.0
IA SU4	72.9	67.8	67.0	66.0	65.2	65.6	65.5	67.9	66.1
IA SU5	81.7	74.8	73.3	71.8	70.6	70.5	70.1	72.3	70.1
IA SU6	85.2	77.4	75.3	73.4	72.2	72.1	72.2	74.2	70.9
IA SU7	93.2	83.8	80.6	78.0	76.2	75.6	76.6	78.6	73.5
IA 3S3A	108.0	107.3	98.2	109.8	106.0	107.9	109.1	114.2	109.6
IA 3S3B	126.3	118.7	122.0	124.8	118.4	120.1	121.0	114.2	111.4
IA 4S3	134.2	128.8	128.7	129.5	121.0	121.2	120.8	113.1	110.7
IA 3-3	119.9	131.7	114.6	128.1	129.4	122.9	119.4	118.0	106.8
IA 5-2	129.9	119.7	116.9	117.3	109.2	109.2	108.5	111.9	111.8
IA EV2	73.1	72.3	71.5	70.5	68.6	67.6	68.7	71.0	69.9
IA EV3	73.2	70.3	69.9	68.9	68.2	68.6	68.3	70.6	68.2
90k	103.4 Y	97.3 Y	98.0 Y	100.8 Y	96.0 Y	97.8 Y	98.9 Y	103.5 Y	110.4 Y
Quint Axle Crane	99.9 Y	102.5 Y	96.9 Y	92.2 Y	89.3 Y	88.2 Y	88.3 Y	89.9 Y	84.4 Y
136k A	146.1 Y	135.6 Y	132.3 Y	134.0 Y	126.0 Y	126.6 Y	126.4 Y	119.1 Y	117.5 Y
136k B	127.3 Y	117.8 Y	116.6 Y	118.3 Y	111.5 Y	112.6 Y	113.1 Y	117.6 Y	116.4 Y
156k	145.2 Y	135.1 Y	133.8 Y	135.7 Y	127.9 Y	129.2 Y	129.7 Y	121.6 Y	119.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	107.6 Y	96.9 Y	92.8 Y	89.4 Y	87.1 Y	86.3 Y	85.7 Y	87.6 Y	83.5 Y
Small Annual Crane	82.4 Y	77.1 Y	76.3 Y	75.2 Y	73.8 Y	74.1 Y	74.1 Y	76.8 Y	75.1 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J40-2006-2014, 40' Roadway, 0 Degree Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.72	1.62	1.59	1.54	1.53	1.55	1.53	1.76	1.69
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.7L SP1 E	0.4L SP1 E	0.6L SP3 E	0.5L SP2 E
HL-93 Inv	1.33	1.25	1.23	1.19	1.18	1.20	1.18	1.36	1.30
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.7L SP1 E	0.4L SP1 E	0.6L SP3 E	0.5L SP2 E
IA Type 4	66.5	60.1	58.1	55.5	54.9	55.0	54.0	62.0	62.4
IA SU4	62.2	56.9	55.4	53.1	53.0	53.1	52.4	60.3	60.7
IA SU5	69.9	62.8	60.6	57.7	57.4	57.0	56.1	64.2	64.4
IA SU6	72.9	64.9	62.2	59.0	59.4	57.9	57.7	65.9	65.1
IA SU7	79.7	70.3	66.6	62.7	62.7	60.7	61.4	69.8	67.5
IA 3S3A	92.7	91.2	81.5	89.2	86.2	88.6	87.3	97.7	100.7
IA 3S3B	107.6	99.6	102.7	100.1	96.2	98.6	96.8	93.9	96.8
IA 4S3	114.4	108.2	108.4	103.8	98.4	99.4	96.7	93.0	96.2
IA 3-3	102.8	112.5	95.0	107.3	105.8	98.7	95.9	103.7	98.1
IA 5-2	111.1	101.7	98.5	94.1	88.8	89.6	86.8	93.5	97.2
IA EV2	62.3	60.7	59.1	56.7	55.8	54.2	55.0	63.0	64.2
IA EV3	62.4	59.7	57.8	55.4	55.7	55.1	54.6	62.6	62.6
90k	88.4 Y	82.6 Y	82.5 Y	80.8 Y	78.1 Y	80.3 Y	79.1 Y	91.7 Y	96.7 Y
Quint Axle Crane	85.7 Y	86.0 Y	80.1 Y	74.2 Y	73.5 Y	70.8 Y	70.7 Y	79.8 Y	77.5 Y
136k A	124.7 Y	115.2 Y	109.7 Y	107.9 Y	102.5 Y	103.9 Y	101.1 Y	97.9 Y	102.1 Y
136k B	108.9 Y	99.2 Y	98.2 Y	94.9 Y	90.7 Y	92.4 Y	90.5 Y	97.0 Y	101.2 Y
156k	123.9 Y	113.8 Y	112.7 Y	108.9 Y	104.0 Y	106.0 Y	103.8 Y	100.0 Y	104.0 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	92.3 Y	81.3 Y	76.7 Y	71.9 Y	71.7 Y	69.3 Y	68.6 Y	77.8 Y	76.7 Y
Small Annual Crane	70.2 Y	64.7 Y	63.1 Y	60.5 Y	60.0 Y	60.4 Y	59.3 Y	68.2 Y	69.0 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J40-2006-2014, 40' Roadway, 15 Degree Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.75	1.65	1.62	1.57	1.55	1.58	1.56	1.80	1.72
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.7L SP1 E	0.4L SP1 E	0.4L SP1 E	0.5L SP2 E
HL-93 Inv	1.35	1.27	1.25	1.21	1.20	1.22	1.20	1.39	1.33
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.7L SP1 E	0.4L SP1 E	0.4L SP1 E	0.5L SP2 E
IA Type 4	67.6	61.1	59.1	56.4	55.9	56.0	54.9	63.0	63.5
IA SU4	63.3	57.9	56.4	54.0	54.0	54.0	53.3	61.3	61.8
IA SU5	71.1	63.9	61.6	58.7	58.4	58.0	57.0	65.3	65.5
IA SU6	74.1	66.1	63.3	60.1	60.5	58.9	58.7	67.0	66.2
IA SU7	81.1	71.5	67.8	63.8	63.7	61.8	62.5	71.0	68.7
IA 3S3A	94.3	92.8	82.9	90.7	87.6	90.1	88.8	99.4	102.4
IA 3S3B	109.5	101.3	104.4	101.8	97.9	100.3	98.5	95.5	98.4
IA 4S3	116.4	110.1	110.3	105.6	100.1	101.2	98.3	94.6	97.9
IA 3-3	104.6	114.5	96.6	109.1	107.6	100.4	97.5	105.5	99.8
IA 5-2	113.0	103.4	100.2	95.7	90.3	91.2	88.3	95.1	98.9
IA EV2	63.4	61.8	60.1	57.7	56.7	55.1	55.9	64.1	65.3
IA EV3	63.5	60.7	58.8	56.3	56.6	56.0	55.6	63.7	63.7
90k	90.0 Y	84.1 Y	83.9 Y	82.2 Y	79.4 Y	81.7 Y	80.5 Y	93.3 Y	98.3 Y
Quint Axle Crane	87.2 Y	87.5 Y	81.5 Y	75.5 Y	74.8 Y	72.1 Y	71.9 Y	81.2 Y	78.9 Y
136k A	126.9 Y	117.2 Y	111.6 Y	109.7 Y	104.2 Y	105.7 Y	102.9 Y	99.6 Y	103.8 Y
136k B	110.8 Y	101.0 Y	99.9 Y	96.6 Y	92.2 Y	94.0 Y	92.0 Y	98.7 Y	102.9 Y
156k	126.0 Y	115.8 Y	114.6 Y	110.7 Y	105.8 Y	107.9 Y	105.6 Y	101.8 Y	105.8 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	93.9 Y	82.7 Y	78.0 Y	73.2 Y	72.9 Y	70.5 Y	69.8 Y	79.1 Y	78.0 Y
Small Annual Crane	71.5 Y	65.9 Y	64.1 Y	61.5 Y	61.0 Y	61.4 Y	60.3 Y	69.4 Y	70.2 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J40-2006-2014, 40' Roadway, 30 Degree Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.90	1.79	1.76	1.70	1.69	1.71	1.69	1.95	1.87
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.7L SP1 E	0.4L SP1 E	0.6L SP3 E	0.5L SP2 E
HL-93 Inv	1.47	1.38	1.36	1.32	1.30	1.32	1.30	1.50	1.44
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.7L SP1 E	0.4L SP1 E	0.6L SP3 E	0.5L SP2 E
IA Type 4	73.4	66.4	64.1	61.3	60.7	60.7	59.6	68.4	68.9
IA SU4	68.7	62.9	61.2	58.6	58.6	58.7	57.9	66.5	67.0
IA SU5	77.1	69.3	66.9	63.7	63.3	62.9	61.9	70.9	71.1
IA SU6	80.4	71.7	68.7	65.2	65.6	63.9	63.8	72.7	71.9
IA SU7	88.0	77.7	73.6	69.2	69.2	67.0	67.8	77.0	74.6
IA 3S3A	102.3	100.7	90.0	98.5	95.1	97.8	96.4	107.8	111.2
IA 3S3B	118.8	110.0	113.4	110.5	106.3	108.8	106.9	103.7	106.8
IA 4S3	126.3	119.5	119.7	114.7	108.6	109.8	106.7	102.7	106.3
IA 3-3	113.6	124.3	104.9	118.4	116.8	109.0	105.8	114.5	108.3
IA 5-2	122.7	112.3	108.7	103.9	98.1	99.0	95.8	103.3	107.3
IA EV2	68.8	67.0	65.3	62.6	61.6	59.9	60.7	69.6	70.9
IA EV3	68.9	65.9	63.9	61.2	61.5	60.8	60.3	69.2	69.1
90k	97.6 Y	91.3 Y	91.1 Y	89.3 Y	86.2 Y	88.6 Y	87.4 Y	101.3 Y	106.7 Y
Quint Axle Crane	94.6 Y	95.0 Y	88.5 Y	81.9 Y	81.1 Y	78.2 Y	78.0 Y	88.1 Y	85.6 Y
136k A	137.7 Y	127.2 Y	121.1 Y	119.1 Y	113.1 Y	114.7 Y	111.7 Y	108.1 Y	112.7 Y
136k B	120.3 Y	109.6 Y	108.5 Y	104.8 Y	100.1 Y	102.1 Y	99.9 Y	107.1 Y	111.7 Y
156k	136.8 Y	125.7 Y	124.4 Y	120.2 Y	114.8 Y	117.1 Y	114.6 Y	110.4 Y	114.8 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	101.9 Y	89.8 Y	84.7 Y	79.4 Y	79.2 Y	76.5 Y	75.7 Y	85.9 Y	84.7 Y
Small Annual Crane	77.6 Y	71.5 Y	69.6 Y	66.8 Y	66.2 Y	66.7 Y	65.4 Y	75.3 Y	76.1 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J40-2006-2014, 40' Roadway, 45 Degree Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	2.15	2.02	1.99	1.93	1.91	1.94	1.91	2.21	2.11
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.7L SP1 E	0.4L SP1 E	0.4L SP1 E	0.5L SP2 E
HL-93 Inv	1.66	1.56	1.54	1.49	1.47	1.50	1.48	1.70	1.63
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E	0.7L SP1 E	0.4L SP1 E	0.4L SP1 E	0.5L SP2 E
IA Type 4	83.1	75.1	72.6	69.4	68.7	68.8	67.5	77.4	78.0
IA SU4	77.7	71.2	69.3	66.4	66.3	66.4	65.5	75.3	75.9
IA SU5	87.3	78.5	75.7	72.1	71.7	71.2	70.1	80.2	80.5
IA SU6	91.1	81.2	77.8	73.8	74.3	72.4	72.2	82.3	81.4
IA SU7	99.7	87.9	83.3	78.4	78.3	75.9	76.7	87.2	84.4
IA 3S3A	115.8	114.0	101.8	111.5	107.7	110.7	109.1	122.1	125.9
IA 3S3B	134.5	124.5	128.3	125.1	120.3	123.2	121.0	117.4	121.0
IA 4S3	143.0	135.3	135.5	129.8	123.0	124.3	120.8	116.3	120.3
IA 3-3	128.6	140.7	118.8	134.1	132.2	123.4	119.8	129.7	122.6
IA 5-2	138.9	127.1	123.1	117.6	111.0	112.0	108.5	116.9	121.5
IA EV2	77.9	75.9	73.9	70.9	69.7	67.8	68.7	78.8	80.2
IA EV3	78.1	74.6	72.3	69.2	69.6	68.8	68.3	78.3	78.3
90k	110.5 Y	103.3 Y	103.1 Y	101.1 Y	97.6 Y	100.3 Y	98.9 Y	114.7 Y	120.8 Y
Quint Axle Crane	107.1 Y	107.5 Y	100.2 Y	92.7 Y	91.9 Y	88.6 Y	88.3 Y	99.8 Y	96.9 Y
136k A	155.9 Y	144.0 Y	137.1 Y	134.8 Y	128.1 Y	129.8 Y	126.4 Y	122.4 Y	127.6 Y
136k B	136.1 Y	124.1 Y	122.8 Y	118.6 Y	113.3 Y	115.5 Y	113.1 Y	121.3 Y	126.5 Y
156k	154.8 Y	142.3 Y	140.8 Y	136.1 Y	130.0 Y	132.5 Y	129.7 Y	125.0 Y	130.0 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	115.3 Y	101.7 Y	95.9 Y	89.9 Y	89.6 Y	86.6 Y	85.7 Y	97.2 Y	95.9 Y
Small Annual Crane	87.8 Y	80.9 Y	78.8 Y	75.6 Y	75.0 Y	75.5 Y	74.1 Y	85.2 Y	86.2 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J44-2006-2014, 44' Roadway, 0 Degree Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.76	1.62	1.60	1.55	1.53	1.55	1.71	1.80	1.67
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.6L SP3 E	0.3L SP3 E	0.6L SP3 E	0.5L SP2 E	0.5L SP2 E
HL-93 Inv	1.35	1.25	1.23	1.19	1.18	1.20	1.32	1.39	1.29
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.6L SP3 E	0.3L SP3 E	0.6L SP3 E	0.5L SP2 E	0.5L SP2 E
IA Type 4	67.8	60.2	58.2	55.6	55.0	55.1	60.3	63.5	61.8
IA SU4	63.5	57.0	55.5	53.2	53.0	53.2	58.5	61.7	60.1
IA SU5	70.8	62.9	60.7	57.8	57.4	57.0	62.6	65.7	63.7
IA SU6	73.8	65.1	62.3	59.1	59.5	58.0	64.5	67.5	64.4
IA SU7	80.8	70.5	66.7	62.8	62.7	60.8	68.5	71.1	66.8
IA 3S3A	94.6	91.8	81.5	89.2	86.2	88.6	97.5	100.5	99.6
IA 3S3B	109.8	99.8	102.8	100.2	96.3	98.6	107.5	96.6	100.3
IA 4S3	116.7	108.4	108.5	103.9	98.4	99.4	106.6	95.7	99.7
IA 3-3	105.0	113.9	95.1	107.3	105.8	98.8	109.0	106.7	97.1
IA 5-2	112.5	102.3	98.6	94.2	88.8	89.6	96.9	96.2	100.7
IA EV2	63.6	60.8	59.2	56.8	55.8	54.2	61.4	64.6	63.5
IA EV3	63.7	59.8	57.9	55.5	55.7	55.1	61.0	64.2	62.0
90k	89.6 Y	83.2 Y	82.6 Y	80.9 Y	78.1 Y	80.3 Y	88.3 Y	94.1 Y	99.8 Y
Quint Axle Crane	87.5 Y	86.2 Y	80.3 Y	74.3 Y	73.6 Y	70.9 Y	78.9 Y	81.8 Y	76.7 Y
136k A	126.6 Y	115.9 Y	109.8 Y	107.9 Y	102.5 Y	103.9 Y	109.9 Y	100.7 Y	105.8 Y
136k B	110.3 Y	99.4 Y	98.3 Y	94.9 Y	90.7 Y	92.4 Y	101.0 Y	99.8 Y	104.9 Y
156k	126.4 Y	114.0 Y	112.8 Y	108.9 Y	104.0 Y	106.0 Y	113.7 Y	102.9 Y	107.8 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	93.7 Y	81.5 Y	76.8 Y	72.0 Y	71.8 Y	69.4 Y	76.5 Y	79.7 Y	75.9 Y
Small Annual Crane	71.7 Y	64.9 Y	63.2 Y	60.6 Y	60.0 Y	60.4 Y	66.2 Y	69.8 Y	68.2 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J44-2006-2014, 44' Roadway, 15 Degree Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.79	1.65	1.62	1.57	1.55	1.58	1.74	1.83	1.70
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.6L SP3 E	0.3L SP3 E	0.6L SP3 E	0.5L SP2 E	0.5L SP2 E
HL-93 Inv	1.38	1.27	1.25	1.21	1.20	1.22	1.34	1.41	1.31
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.6L SP3 E	0.3L SP3 E	0.6L SP3 E	0.5L SP2 E	0.5L SP2 E
IA Type 4	68.9	61.3	59.2	56.5	55.9	56.0	61.3	64.6	62.9
IA SU4	64.6	58.0	56.5	54.1	54.0	54.1	59.5	62.8	61.1
IA SU5	72.0	64.0	61.7	58.8	58.4	58.0	63.7	66.9	64.8
IA SU6	75.1	66.2	63.4	60.1	60.5	59.0	65.6	68.6	65.5
IA SU7	82.2	71.7	67.9	63.9	63.8	61.8	69.7	72.4	68.0
IA 3S3A	96.3	93.3	82.9	90.8	87.7	90.1	99.1	102.2	101.4
IA 3S3B	111.7	101.5	104.6	101.9	97.9	100.3	109.3	98.2	102.0
IA 4S3	118.7	110.3	110.4	105.7	100.1	101.1	108.4	97.4	101.5
IA 3-3	106.8	115.9	96.7	109.1	107.6	100.5	110.9	108.5	98.7
IA 5-2	114.5	104.1	100.3	95.8	90.4	91.2	98.6	97.9	102.5
IA EV2	64.7	61.9	60.2	57.8	56.8	55.2	62.4	65.7	64.6
IA EV3	64.8	60.8	58.9	56.4	56.6	56.1	62.0	65.3	63.0
90k	91.1 Y	84.6 Y	84.0 Y	82.3 Y	79.4 Y	81.6 Y	89.8 Y	95.7 Y	101.5 Y
Quint Axle Crane	89.0 Y	87.7 Y	81.7 Y	75.6 Y	74.8 Y	72.1 Y	80.2 Y	83.2 Y	78.1 Y
136k A	128.8 Y	117.9 Y	111.6 Y	109.8 Y	104.3 Y	105.7 Y	111.8 Y	102.5 Y	107.6 Y
136k B	112.2 Y	101.1 Y	100.0 Y	96.6 Y	92.3 Y	94.0 Y	102.7 Y	101.5 Y	106.7 Y
156k	128.6 Y	116.0 Y	114.7 Y	110.8 Y	105.8 Y	107.8 Y	115.6 Y	104.7 Y	109.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	95.4 Y	82.9 Y	78.2 Y	73.3 Y	73.0 Y	70.6 Y	77.9 Y	81.1 Y	77.2 Y
Small Annual Crane	72.9 Y	66.0 Y	64.2 Y	61.6 Y	61.0 Y	61.5 Y	67.3 Y	71.0 Y	69.4 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J44-2006-2014, 44' Roadway, 30 Degree Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	1.94	1.79	1.76	1.71	1.69	1.71	1.89	1.99	1.85
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.6L SP3 E	0.3L SP3 E	0.6L SP3 E	0.5L SP2 E	0.5L SP2 E
HL-93 Inv	1.50	1.38	1.36	1.32	1.30	1.32	1.46	1.53	1.42
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.6L SP3 E	0.3L SP3 E	0.6L SP3 E	0.5L SP2 E	0.5L SP2 E
IA Type 4	74.8	66.5	64.2	61.4	60.7	60.8	66.6	70.1	68.2
IA SU4	70.1	63.0	61.3	58.7	58.6	58.7	64.6	68.2	66.3
IA SU5	78.1	69.5	67.0	63.8	63.3	63.0	69.1	72.6	70.3
IA SU6	81.5	71.8	68.8	65.3	65.7	64.0	71.2	74.5	71.1
IA SU7	89.2	77.8	73.7	69.3	69.3	67.1	75.7	78.5	73.8
IA 3S3A	104.5	101.3	90.0	98.5	95.1	97.8	107.6	110.9	110.0
IA 3S3B	121.2	110.2	113.5	110.6	106.3	108.8	118.7	106.6	110.7
IA 4S3	128.9	119.7	119.8	114.7	108.6	109.8	117.7	105.7	110.1
IA 3-3	116.0	125.8	105.0	118.5	116.8	109.1	120.3	117.8	107.2
IA 5-2	124.3	113.0	108.8	104.0	98.1	98.9	107.0	106.2	111.2
IA EV2	70.2	67.1	65.4	62.7	61.6	59.9	67.7	71.3	70.1
IA EV3	70.4	66.0	64.0	61.2	61.5	60.9	67.3	70.8	68.4
90k	98.9 Y	91.8 Y	91.2 Y	89.3 Y	86.2 Y	88.6 Y	97.5 Y	103.9 Y	110.1 Y
Quint Axle Crane	96.6 Y	95.1 Y	88.6 Y	82.0 Y	81.2 Y	78.3 Y	87.1 Y	90.3 Y	84.7 Y
136k A	139.7 Y	128.0 Y	121.2 Y	119.1 Y	113.2 Y	114.7 Y	121.4 Y	111.2 Y	116.8 Y
136k B	121.8 Y	109.8 Y	108.5 Y	104.8 Y	100.1 Y	102.0 Y	111.5 Y	110.2 Y	115.8 Y
156k	139.6 Y	125.9 Y	124.5 Y	120.3 Y	114.9 Y	117.1 Y	125.5 Y	113.6 Y	119.0 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	103.5 Y	90.0 Y	84.8 Y	79.5 Y	79.3 Y	76.6 Y	84.5 Y	88.0 Y	83.8 Y
Small Annual Crane	79.2 Y	71.6 Y	69.7 Y	66.9 Y	66.2 Y	66.7 Y	73.1 Y	77.1 Y	75.4 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LRFR Rating Method

J44-2006-2014, 44' Roadway, 45 Degree Skew

	Bridge Length								
Truck	**70'-0**	**80'-0**	**90'-0**	**100'-0**	**110'-0**	**120'-0**	**130'-0**	**140'-0**	**150'-0**
HL-93 Oper	2.19	2.03	2.00	1.93	1.91	1.94	2.14	2.25	2.09
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.6L SP3 E	0.3L SP3 E	0.6L SP3 E	0.5L SP2 E	0.5L SP2 E
HL-93 Inv	1.69	1.56	1.54	1.49	1.47	1.50	1.65	1.74	1.61
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.4L SP1 I	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.6L SP3 E	0.3L SP3 E	0.6L SP3 E	0.5L SP2 E	0.5L SP2 E
IA Type 4	84.7	75.3	72.7	69.5	68.7	68.8	75.4	79.3	77.2
IA SU4	79.3	71.3	69.4	66.5	66.3	66.5	73.1	77.2	75.1
IA SU5	88.5	78.6	75.9	72.2	71.7	71.3	78.2	82.2	79.6
IA SU6	92.3	81.3	77.9	73.9	74.4	72.5	80.6	84.3	80.5
IA SU7	101.0	88.1	83.4	78.5	78.4	76.0	85.7	88.9	83.5
IA 3S3A	118.3	114.7	101.9	111.6	107.7	110.7	121.8	129.8	124.5
IA 3S3B	137.2	124.7	128.5	125.2	120.3	123.2	134.3	125.4	125.4
IA 4S3	145.9	135.5	135.6	129.9	123.0	124.3	133.2	124.7	124.7
IA 3-3	131.3	142.4	118.8	134.1	132.3	123.5	136.2	130.8	121.3
IA 5-2	140.7	127.9	123.2	117.7	111.0	112.0	121.1	125.9	125.9
IA EV2	79.5	76.0	74.0	71.0	69.7	67.8	76.7	80.7	79.4
IA EV3	79.7	74.7	72.4	69.3	69.6	68.9	76.2	80.2	77.5
90k	112.0 Y	104.0 Y	103.2 Y	101.1 Y	97.6 Y	100.3 Y	110.4 Y	117.6 Y	124.7 Y
Quint Axle Crane	109.4 Y	107.7 Y	100.3 Y	92.9 Y	92.0 Y	88.6 Y	98.6 Y	102.2 Y	95.9 Y
136k A	158.2 Y	144.9 Y	137.2 Y	134.9 Y	128.1 Y	129.8 Y	137.4 Y	132.2 Y	132.2 Y
136k B	137.9 Y	124.3 Y	122.9 Y	118.7 Y	113.4 Y	115.5 Y	126.2 Y	131.1 Y	131.1 Y
156k	158.0 Y	142.5 Y	141.0 Y	136.1 Y	130.0 Y	132.5 Y	142.1 Y	134.7 Y	134.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	117.2 Y	101.8 Y	96.0 Y	90.0 Y	89.7 Y	86.7 Y	95.7 Y	99.6 Y	94.9 Y
Small Annual Crane	89.6 Y	81.1 Y	78.9 Y	75.7 Y	75.0 Y	75.5 Y	82.7 Y	87.3 Y	85.3 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior strips.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

4.2 LRFD RESULTS TABLES

4.2.3 RS-Series

RS Bridge Standards Load Rating Summary - LRFR Rating Method

RS40-2010/2014, 0 Degree Skew

	Bridge Length									
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**	**320'-0**	**340'-0**
HL-93 Oper	1.73	0.77	1.60	0.59	1.55	1.64	1.58	1.60	1.64	1.56
Controlled by	SRV2 +M	STR1 -M	SRV2 +M	STR1 +M	SRV2 +M	SRV2 +M	SRV2 +M	SRV2 +M	SRV2 +M	SRV2 +M
Location	1.0L SP1 E	1.0L SP1 E	1.0L SP1 E	0.2L SP2 E	1.0L SP1 E	1.0L SP1 E	1.0L SP1 E	0.0L SP2 E	0.0L SP2 E	0.0L SP2 E
HL-93 Inv	1.33	0.59	1.23	0.46	1.20	1.26	1.21	1.23	1.26	1.20
Controlled by	SRV2 +M	STR1 -M	SRV2 +M	STR1 +M	SRV2 +M	SRV2 +M	SRV2 +M	SRV2 +M	SRV2 +M	SRV2 +M
Location	1.0L SP1 E	1.0L SP1 E	1.0L SP1 E	0.2L SP2 E	1.0L SP1 E	1.0L SP1 E	1.0L SP1 E	0.0L SP2 E	0.0L SP2 E	0.0L SP2 E
IA Type 4	59.0	41.1	59.2	37.6	72.7	69.5	70.1	71.8	73.8	76.8
IA SU4	57.6	41.0	58.0	37.6	71.6	68.5	69.2	70.9	72.9	76.0
IA SU5	60.6	41.6	60.5	37.9	74.1	70.7	71.3	72.9	74.8	77.8
IA SU6	61.1	41.9	60.9	38.1	74.5	71.1	71.6	73.1	75.1	78.1
IA SU7	62.9	42.3	62.4	38.4	75.9	72.3	72.7	74.3	76.2	79.1
IA 3S3A	76.5	49.3	84.1	42.5	97.0	90.7	89.7	90.3	91.4	93.8
IA 3S3B	75.1	46.7	90.2	44.5	104.0	116.8	113.3	112.1	111.8	113.3
IA 4S3	74.5	46.0	88.9	43.8	102.3	111.8	108.7	107.8	107.7	109.3
IA 3-3	78.4	48.3	80.6	41.9	93.3	87.5	86.7	87.4	88.7	91.2
IA 5-2	74.1	46.0	89.0	44.2	104.4	97.8	96.3	96.5	97.3	99.6
IA EV2	60.8	41.4	60.7	37.8	74.3	71.0	71.4	73.1	75.0	78.0
IA EV3	59.2	41.6	59.4	37.9	73.0	69.8	70.3	72.0	74.0	77.0
90k	93.5 Y	46.9 Y	111.1 Y	46.1 Y	128.4 Y	120.6 Y	116.5 Y	113.0 Y	111.9 Y	120.0 Y
Quint Axle Crane	83.1 Y	46.9 N	82.0 Y	42.7 N	99.6 Y	94.9 Y	95.4 Y	97.3 Y	97.8 Y	103.6 Y
136k A	95.2 Y	49.3 N	116.8 Y	47.9 N	137.0 Y	136.4 Y	132.7 Y	127.7 Y	125.6 Y	133.7 Y
136k B	94.7 Y	48.8 N	115.5 Y	47.4 N	135.8 Y	131.0 Y	128.3 Y	124.1 Y	122.4 Y	130.6 Y
156k	97.2 Y	50.1 N	118.3 Y	48.5 N	138.6 Y	145.9 Y	141.3 Y	135.5 Y	132.8 Y	138.4 Y
All Systems Permit	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	83.1 Y	46.9 N	82.0 Y	42.7 N	99.6 Y	94.9 Y	95.4 Y	97.3 Y	97.8 Y	103.6 Y
Small Annual Crane	76.2 Y	46.0 Y	76.5 Y	42.1 Y	94.2 Y	90.1 Y	90.9 Y	93.0 Y	93.7 Y	99.6 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

RS Bridge Standards Load Rating Summary - LRFR Rating Method

RS40-2010/2014, 10 Degree Skew

	Bridge Length									
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**	**320'-0**	**340'-0**
HL-93 Oper	1.60	0.89	0.86	0.75	1.44	1.52	1.46	1.48	1.51	1.44
Controlled by	STR1 +M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 +M	STR1 -M	STR1 -M
Location	0.2L SP2 E	1.0L SP1 E	0.0L SP2 E	1.0L SP1 E	0.1L SP2 E	0.2L SP2 E	0.0L SP2 E	0.8L SP1 E	0.1L SP2 E	0.0L SP2 E
HL-93 Inv	1.23	0.68	0.66	0.58	1.11	1.17	1.13	1.15	1.17	1.11
Controlled by	STR1 +M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 +M	STR1 -M	STR1 -M
Location	0.2L SP2 E	1.0L SP1 E	0.0L SP2 E	1.0L SP1 E	0.0L SP2 E	0.2L SP2 E	0.0L SP2 E	0.8L SP1 E	1.0L SP1 E	0.0L SP2 E
IA Type 4	59.0	47.7	50.4	48.2	72.7	69.5	70.1	71.8	73.8	76.8
IA SU4	57.6	47.5	50.3	48.1	71.6	68.5	69.2	70.9	72.9	76.0
IA SU5	60.6	48.2	50.9	48.5	74.1	70.7	71.3	72.9	74.8	77.8
IA SU6	61.1	48.5	51.2	48.8	74.5	71.1	71.6	73.1	75.1	78.1
IA SU7	62.9	49.0	51.6	49.1	75.9	72.3	72.7	74.3	76.2	79.1
IA 3S3A	76.5	57.1	58.5	54.3	97.0	90.7	89.7	90.3	91.4	93.8
IA 3S3B	75.0	54.1	58.5	57.0	103.9	116.8	113.3	112.1	111.8	113.2
IA 4S3	74.4	53.3	57.7	56.1	102.3	111.8	108.7	107.8	107.7	109.3
IA 3-3	78.3	56.0	57.6	53.6	93.3	87.5	86.6	87.4	88.7	91.2
IA 5-2	74.0	53.3	57.8	56.6	104.3	97.8	96.3	96.5	97.3	99.6
IA EV2	60.8	48.0	50.7	48.4	74.3	70.9	71.4	73.1	75.0	78.0
IA EV3	59.2	48.2	50.9	48.5	73.0	69.8	70.3	72.0	74.0	77.0
90k	83.4 Y	54.3 Y	59.9 Y	59.0 Y	119.6 Y	120.6 Y	116.5 Y	113.0 Y	111.9 Y	119.9 Y
Quint Axle Crane	83.1 Y	54.4 Y	57.3 Y	54.6 Y	99.6 Y	94.9 Y	95.4 Y	97.3 Y	97.8 Y	103.6 Y
136k A	88.1 Y	57.2 N	62.6 N	61.4 N	126.9 Y	136.4 Y	132.6 Y	127.7 Y	125.6 Y	133.7 Y
136k B	87.7 Y	56.6 N	61.9 N	60.8 N	125.7 Y	131.0 Y	128.3 Y	124.1 Y	122.4 Y	130.6 Y
156k	90.0 Y	58.1 N	63.4 N	62.2 N	128.3 Y	140.2 Y	135.1 Y	135.5 Y	132.8 Y	138.4 Y
All Systems Permit	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	83.1 Y	54.4 Y	57.3 Y	54.6 Y	99.6 Y	94.9 Y	95.4 Y	97.3 Y	97.8 Y	103.6 Y
Small Annual Crane	76.2 Y	53.3 Y	56.4 Y	53.8 Y	94.2 Y	90.1 Y	90.9 Y	93.0 Y	93.7 Y	99.6 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

RS Bridge Standards Load Rating Summary - LRFR Rating Method

RS40-2010/2014, 20 Degree Skew

	Bridge Length									
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**	**320'-0**	**340'-0**
HL-93 Oper	1.60	0.86	0.83	0.67	1.44	1.52	1.46	1.48	1.51	1.44
Controlled by	STR1 +M	STR1 -M	STR1 -M	STR1 -M	STR1 +M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.2L SP2 E	1.0L SP1 E	1.0L SP1 E	0.0L SP2 E	0.8L SP1 E	0.0L SP2 E	1.0L SP1 E	1.0L SP1 E	0.1L SP2 E	0.0L SP2 E
HL-93 Inv	1.23	0.66	0.64	0.51	1.11	1.17	1.13	1.14	1.17	1.11
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.0L SP3 E	1.0L SP1 E	1.0L SP1 E	0.0L SP2 E	0.0L SP2 E	0.0L SP2 E	1.0L SP1 E	1.0L SP1 E	1.0L SP1 E	0.0L SP2 E
IA Type 4	59.0	46.0	48.8	42.6	72.7	69.5	70.1	71.8	73.8	76.8
IA SU4	57.6	45.8	48.7	42.5	71.6	68.5	69.2	70.9	73.0	76.0
IA SU5	60.6	46.5	49.2	42.9	74.1	70.8	71.3	72.9	74.8	77.8
IA SU6	61.1	46.8	49.5	43.1	74.5	71.1	71.6	73.2	75.1	78.1
IA SU7	63.0	47.3	49.9	43.4	75.9	72.3	72.7	74.3	76.2	79.1
IA 3S3A	76.5	55.0	56.4	48.0	97.0	90.7	89.7	90.3	91.4	93.8
IA 3S3B	75.0	52.5	56.6	50.4	103.9	116.8	113.3	112.1	111.8	113.2
IA 4S3	74.4	51.4	55.8	49.6	102.4	111.8	108.6	107.8	107.7	109.3
IA 3-3	78.3	53.9	55.6	47.4	93.3	87.5	86.6	87.4	88.7	91.2
IA 5-2	74.0	51.3	55.9	50.0	104.3	97.8	96.3	96.5	97.3	99.6
IA EV2	60.8	46.2	49.0	42.8	74.3	70.9	71.4	73.1	75.0	78.0
IA EV3	59.3	46.4	49.4	43.1	73.0	69.8	70.3	72.0	74.0	77.0
90k	83.3 Y	52.4 Y	57.8 Y	53.1 Y	119.6 Y	120.6 Y	116.5 Y	113.1 Y	111.9 Y	119.9 Y
Quint Axle Crane	83.1 Y	52.4 Y	55.4 Y	48.2 N	99.6 Y	94.9 Y	95.4 Y	97.3 Y	97.8 Y	103.6 Y
136k A	88.0 Y	55.2 N	60.5 N	54.2 N	127.0 Y	136.4 Y	132.6 Y	127.7 Y	125.6 Y	133.7 Y
136k B	87.6 Y	54.6 N	59.8 N	53.7 N	125.7 Y	131.0 Y	128.3 Y	124.1 Y	122.4 Y	130.6 Y
156k	89.9 Y	56.1 N	61.3 N	55.0 N	127.8 Y	140.2 Y	135.1 Y	135.6 Y	132.8 Y	138.4 Y
All Systems Permit	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	83.1 Y	52.4 Y	55.4 Y	48.2 Y	99.6 Y	94.9 Y	95.4 Y	97.3 Y	97.8 Y	103.6 Y
Small Annual Crane	76.2 Y	51.5 Y	54.5 Y	47.6 Y	94.2 Y	90.1 Y	90.9 Y	93.0 Y	93.8 Y	99.6 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

RS Bridge Standards Load Rating Summary - LRFR Rating Method

RS40-2010/2014, 30 Degree Skew

	Bridge Length									
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**	**320'-0**	**340'-0**
HL-93 Oper	1.63	0.80	0.76	0.59	1.47	1.56	1.49	1.52	1.54	1.47
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 +M	STR1 -M	STR1 -M
Location	1.0L SP1 E	1.0L SP1 E	1.0L SP1 E	1.0L SP1 E	0.1L SP2 E	0.0L SP2 E	1.0L SP1 E	0.8L SP1 E	1.0L SP1 E	0.0L SP2 E
HL-93 Inv	1.26	0.62	0.58	0.46	1.13	1.20	1.15	1.17	1.19	1.14
Controlled by	STR1 -M	STR1 -M	STR1 -M	STR1 +M	STR1 -M	STR1 -M	STR1 -M	STR1 +M	STR1 -M	STR1 -M
Location	1.0L SP1 E	1.0L SP1 E	1.0L SP1 E	0.2L SP2 E	0.1L SP2 E	0.0L SP2 E	1.0L SP1 E	0.8L SP1 E	0.1L SP2 E	0.0L SP2 E
IA Type 4	60.7	43.2	44.8	37.7	74.7	71.3	71.9	73.6	75.6	78.7
IA SU4	59.3	43.0	44.6	37.6	73.5	70.3	70.9	72.6	74.7	77.8
IA SU5	62.4	43.6	45.1	37.9	76.1	72.6	73.0	74.6	76.6	79.7
IA SU6	62.9	43.8	45.4	38.1	76.5	72.9	73.4	74.9	76.9	79.9
IA SU7	64.8	44.3	45.7	38.4	77.9	74.2	74.6	76.1	78.0	81.0
IA 3S3A	78.2	51.5	51.7	42.4	99.6	93.0	91.9	92.5	93.5	96.0
IA 3S3B	76.8	48.8	51.9	44.5	106.2	119.8	116.0	114.8	114.4	115.9
IA 4S3	76.1	48.2	51.2	43.9	104.7	114.6	111.3	110.4	110.3	111.9
IA 3-3	80.1	51.2	51.0	41.9	95.7	89.7	88.8	89.5	90.8	93.4
IA 5-2	75.7	48.1	51.2	44.2	106.6	100.3	98.7	98.8	99.6	101.9
IA EV2	62.6	43.3	45.2	37.9	76.2	72.7	73.2	74.8	76.8	79.9
IA EV3	61.0	43.6	45.3	38.1	74.9	71.6	72.1	73.8	75.8	78.9
90k	85.3 Y	49.2 Y	53.0 Y	46.9 Y	122.2 Y	123.7 Y	119.4 Y	115.8 Y	114.6 Y	122.8 Y
Quint Axle Crane	85.5 Y	49.2 N	50.8 Y	42.6 N	102.3 Y	97.3 Y	97.8 Y	99.7 Y	100.1 Y	106.0 Y
136k A	90.1 Y	51.7 N	55.5 N	48.0 N	129.9 Y	139.8 Y	135.6 Y	130.8 Y	128.6 Y	136.8 Y
136k B	89.6 Y	51.2 N	54.9 N	47.5 N	128.5 Y	134.3 Y	131.4 Y	127.2 Y	125.3 Y	133.7 Y
156k	92.0 Y	52.6 N	56.3 N	48.6 N	130.6 Y	143.4 Y	138.1 Y	138.8 Y	135.9 Y	141.3 Y
All Systems Permit	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	85.5 Y	49.2 Y	50.8 Y	42.6 N	102.3 Y	97.3 Y	97.8 Y	99.7 Y	100.1 Y	106.0 Y
Small Annual Crane	78.4 Y	48.2 Y	50.0 Y	42.3 Y	96.7 Y	92.4 Y	93.2 Y	95.3 Y	96.0 Y	102.0 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

RS Bridge Standards Load Rating Summary - LRFR Rating Method

RS40-2010/2014, 45 Degree Skew

	Bridge Length									
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**	**320'-0**	**340'-0**
HL-93 Oper	1.71	1.58	1.55	1.54	1.51	1.60	1.53	1.55	1.59	1.52
Controlled by	STR1 -M	STR1 +M	STR1 +M	STR1 +M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.0L SP2 E	0.8L SP1 E	0.8L SP1 E	0.2L SP2 E	0.9L SP1 E	1.0L SP1 E	1.0L SP1 E	0.0L SP2 E	0.0L SP2 E	1.0L SP1 E
HL-93 Inv	1.32	1.22	1.20	1.19	1.17	1.23	1.18	1.20	1.22	1.17
Controlled by	STR1 -M	STR1 +M	STR1 +M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M	STR1 -M
Location	0.0L SP2 E	0.8L SP1 E	0.8L SP1 E	0.0L SP2 E	0.9L SP1 E	1.0L SP1 E	1.0L SP1 E	0.0L SP2 E	0.0L SP2 E	1.0L SP1 E
IA Type 4	63.1	60.4	63.0	67.8	77.3	73.7	74.3	76.0	77.9	81.2
IA SU4	61.5	59.1	61.8	66.6	76.1	72.7	73.3	75.0	77.0	80.2
IA SU5	64.8	61.9	64.4	69.2	78.8	75.0	75.5	77.1	79.0	82.2
IA SU6	65.3	62.3	64.8	69.6	79.2	75.3	75.8	77.4	79.3	82.5
IA SU7	67.3	63.9	66.3	71.0	80.7	76.7	77.0	78.6	80.4	83.6
IA 3S3A	80.5	89.1	89.4	93.1	102.7	96.1	95.0	95.5	96.4	99.0
IA 3S3B	79.0	86.2	95.1	104.2	109.4	123.8	119.9	118.3	118.0	119.6
IA 4S3	78.5	85.1	93.6	102.4	107.8	118.3	114.9	113.9	113.7	115.4
IA 3-3	82.8	85.2	85.6	89.2	99.1	92.7	91.7	92.4	93.6	96.3
IA 5-2	77.8	84.9	93.9	100.9	109.8	103.7	102.0	102.0	102.7	105.1
IA EV2	65.0	62.0	64.5	69.3	78.9	75.2	75.7	77.3	79.2	82.4
IA EV3	63.3	60.6	63.2	68.0	77.6	73.9	74.5	76.2	78.1	81.3
90k	87.7 Y	97.2 Y	108.9 Y	121.1 Y	126.0 Y	127.8 Y	123.3 Y	119.5 Y	118.2 Y	126.6 Y
Quint Axle Crane	88.8 Y	84.3 Y	87.3 Y	93.4 Y	105.9 Y	100.6 Y	101.0 Y	102.9 Y	103.2 Y	109.4 Y
136k A	92.7 Y	102.2 Y	113.9 Y	125.8 Y	133.7 Y	144.3 Y	139.5 Y	135.0 Y	132.5 Y	141.1 Y
136k B	92.2 Y	101.1 Y	112.7 Y	124.4 Y	132.2 Y	138.8 Y	135.8 Y	131.2 Y	129.2 Y	137.9 Y
156k	94.7 Y	103.9 Y	115.5 Y	127.3 Y	134.4 Y	147.2 Y	141.8 Y	143.2 Y	140.1 Y	145.3 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	88.8 Y	84.3 Y	87.3 Y	93.4 Y	105.9 Y	100.6 Y	101.0 Y	102.9 Y	103.2 Y	109.4 Y
Small Annual Crane	81.4 Y	78.0 Y	81.5 Y	87.8 Y	100.2 Y	95.5 Y	96.3 Y	98.4 Y	99.0 Y	105.2 Y

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

RS Bridge Standards Load Rating Summary - LRFR Rating Method

RS40-2010/2014-2017 Revision, 0 Degree Skew

	Bridge Length									
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**	**320'-0**	**340'-0**
HL-93 Oper		1.63		1.59						
Controlled by		SRV2 +M		SRV2 +M						
Location		1.0L SP1 E		1.0L SP1 E						
HL-93 Inv		1.26		1.22						
Controlled by		SRV2 +M		SRV2 +M						
Location		1.0L SP1 E		1.0L SP1 E						
IA Type 4		56.8		63.8						
IA SU4		55.5		62.7						
IA SU5		58.2		65.1						
IA SU6		58.6		65.5						
IA SU7		60.1		66.9						
IA 3S3A		83.9		87.7						
IA 3S3B		82.1		99.1						
IA 4S3		80.9		97.5						
IA 3-3		80.3		84.1						
IA 5-2		80.9		95.0						
IA EV2		58.4		65.3						
IA EV3		57.0		64.0						
90k		103.6 Y		116.6 Y						
Quint Axle Crane		79.3 Y		87.9 Y						
136k A		105.1 Y		129.1 Y						
136k B		104.1 Y		127.4 Y						
156k		106.9 Y		130.8 Y						
All Systems Permit		Yes		Yes						
Fluid Milk Truck		79.3 Y		87.9 Y						
Small Annual Crane		73.3 Y		82.6 Y						

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Ratings are applicable for all bridges built to this standard, including those using Stainless Steel reinforcing.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

RS Bridge Standards Load Rating Summary - LRFR Rating Method

RS40-2010/2014-2017 Revision, 10 Degree Skew

	Bridge Length									
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**	**320'-0**	**340'-0**
HL-93 Oper	1.60	1.51	1.48	1.47						
Controlled by	STR1 -M	STR1 -M	STR1 +M	STR1 +M						
Location	1.0L SP1 E	1.0L SP1 E	0.8L SP1 E	0.7L SP1 E						
HL-93 Inv	1.23	1.17	1.14	1.13						
Controlled by	STR1 +M	STR1 -M	STR1 +M	STR1 +M						
Location	0.7L SP1 E	1.0L SP1 E	0.8L SP1 E	0.7L SP1 E						
IA Type 4	59.1	56.7	59.2	63.8						
IA SU4	57.7	55.5	58.1	62.7						
IA SU5	60.7	58.2	60.6	65.1						
IA SU6	61.2	58.6	61.0	65.5						
IA SU7	63.1	60.1	62.4	66.9						
IA 3S3A	76.6	83.8	84.2	87.7						
IA 3S3B	75.2	82.1	90.3	99.0						
IA 4S3	74.5	80.9	89.0	97.5						
IA 3-3	78.5	80.2	80.6	84.1						
IA 5-2	74.2	80.9	89.2	95.0						
IA EV2	60.9	58.3	60.7	65.3						
IA EV3	59.3	57.0	59.5	64.0						
90k	83.5 Y	92.4 Y	103.5 Y	114.9 Y						
Quint Axle Crane	83.2 Y	79.2 Y	82.1 Y	87.9 Y						
136k A	88.2 Y	97.2 Y	108.2 Y	119.5 Y						
136k B	87.8 Y	96.3 Y	107.0 Y	118.3 Y						
156k	90.1 Y	98.9 Y	109.7 Y	121.0 Y						
All Systems Permit	Yes	Yes	Yes	Yes						
Fluid Milk Truck	83.2 Y	79.2 Y	82.1 Y	87.9 Y						
Small Annual Crane	76.3 Y	73.3 Y	76.6 Y	82.6 Y						

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Ratings are applicable for all bridges built to this standard, including those using Stainless Steel reinforcing.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

RS Bridge Standards Load Rating Summary - LRFR Rating Method

RS40-2010/2014-2017 Revision, 20 Degree Skew

	Bridge Length									
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**	**320'-0**	**340'-0**
HL-93 Oper	1.60	1.51	1.48	1.47						
Controlled by	STR1 -M	STR1 -M	STR1 +M	STR1 +M						
Location	1.0L SP1 E	1.0L SP1 E	0.8L SP1 E	0.7L SP1 E						
HL-93 Inv	1.23	1.16	1.14	1.13						
Controlled by	STR1 +M	STR1 -M	STR1 -M	STR1 +M						
Location	0.7L SP1 E	0.1L SP2 E	1.0L SP1 E	0.7L SP1 E						
IA Type 4	59.1	56.8	59.2	63.8						
IA SU4	57.7	55.5	58.1	62.7						
IA SU5	60.7	58.2	60.6	65.1						
IA SU6	61.2	58.6	61.0	65.5						
IA SU7	63.1	60.1	62.4	66.9						
IA 3S3A	76.6	83.8	84.2	87.7						
IA 3S3B	75.2	82.1	90.4	99.1						
IA 4S3	74.5	80.9	89.0	97.5						
IA 3-3	78.6	80.2	80.6	84.1						
IA 5-2	74.2	80.9	89.1	95.0						
IA EV2	60.9	58.3	60.7	65.3						
IA EV3	59.4	57.0	59.5	64.0						
90k	83.5 Y	92.5 Y	103.5 Y	115.1 Y						
Quint Axle Crane	83.2 Y	79.2 Y	82.1 Y	87.9 Y						
136k A	88.2 Y	97.2 Y	108.3 Y	119.5 Y						
136k B	87.8 Y	96.3 Y	107.1 Y	118.3 Y						
156k	90.1 Y	98.9 Y	109.7 Y	121.0 Y						
All Systems Permit	Yes	Yes	Yes	Yes						
Fluid Milk Truck	83.2 Y	79.2 Y	82.1 Y	87.9 Y						
Small Annual Crane	76.3 Y	73.3 Y	76.6 Y	82.6 Y						

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Ratings are applicable for all bridges built to this standard, including those using Stainless Steel reinforcing.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

RS Bridge Standards Load Rating Summary - LRFR Rating Method

RS40-2010/2014-2017 Revision, 30 Degree Skew

	Bridge Length									
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**	**320'-0**	**340'-0**
HL-93 Oper	1.64	1.54	1.51	1.50						
Controlled by	STR1 -M	STR1 +M	STR1 -M	STR1 +M						
Location	1.0L SP1 E	0.8L SP1 E	1.0L SP1 E	0.7L SP1 E						
HL-93 Inv	1.26	1.19	1.16	1.16						
Controlled by	STR1 -M	STR1 +M	STR1 -M	STR1 +M						
Location	1.0L SP1 E	0.8L SP1 E	1.0L SP1 E	0.7L SP1 E						
IA Type 4	60.8	58.3	60.8	65.5						
IA SU4	59.4	57.1	59.6	64.4						
IA SU5	62.5	59.7	62.2	66.9						
IA SU6	63.0	60.2	62.6	67.2						
IA SU7	64.9	61.7	64.1	68.6						
IA 3S3A	78.5	86.1	86.4	90.0						
IA 3S3B	76.9	83.9	92.5	101.4						
IA 4S3	76.3	82.8	91.0	99.8						
IA 3-3	80.5	82.3	82.7	86.3						
IA 5-2	75.8	82.7	91.2	97.5						
IA EV2	62.7	59.9	62.4	67.0						
IA EV3	61.1	58.5	61.0	65.7						
90k	85.4 Y	94.6 Y	105.9 Y	117.8 Y						
Quint Axle Crane	85.6 Y	81.4 Y	84.3 Y	90.2 Y						
136k A	90.1 Y	99.5 Y	110.8 Y	122.3 Y						
136k B	89.7 Y	98.6 Y	109.5 Y	121.0 Y						
156k	92.2 Y	101.1 Y	112.2 Y	123.9 Y						
All Systems Permit	Yes	Yes	Yes	Yes						
Fluid Milk Truck	85.6 Y	81.4 Y	84.3 Y	90.2 Y						
Small Annual Crane	78.5 Y	75.3 Y	78.7 Y	84.8 Y						

HL-93 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Ratings are applicable for all bridges built to this standard, including those using Stainless Steel reinforcing.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

4.3 LFD/ASD RESULTS TABLES

4.3.1 H-Series

H Bridge Standards Load Rating Summary - LFR Rating Method

H10-1954, 20' Roadway, 0 Degree Skew

	Bridge Length	
Truck	**30'-0**	**42'-6**
HS-20 Oper	1.59	1.47
Controlled by	STR1 +V	STR1 +V
Location	0.9L SP1 I	0.7L SP1 I
HS-20 Inv	0.95	0.83
Controlled by	STR1 +V	SRV3 +M
Location	0.9L SP1 I	0.5L SP1 I
IA Type 4	51.9	41.0
IA SU4	48.2	39.6
IA SU5	52.0	41.2
IA SU6	58.7	49.9
IA SU7	63.1	53.3
IA 3S3A	77.9	65.4
IA 3S3B	79.9	71.9
IA 4S3	92.9	73.1
IA 3-3	87.7	66.8
IA 5-2	80.5	63.8
IA EV2	49.0	45.9
IA EV3	49.9	40.2
90k	68.3 Y	58.9 Y
Quint Axle Crane	61.2 Y	48.6 N
136k A	90.1 Y	71.8 Y
136k B	82.0 Y	66.7 N
156k	94.0 Y	76.5 N
All Systems Permit	Yes	Yes
Fluid Milk Truck	63.7 Y	54.5 Y
Small Annual Crane	52.8 Y	43.5 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H10-1954, 24' Roadway, 0 Degree Skew

	Bridge Length	
Truck	**30'-0**	**42'-6**
HS-20 Oper	1.59	1.47
Controlled by	STR1 +V	STR1 +V
Location	0.9L SP1 I	0.7L SP1 I
HS-20 Inv	0.95	0.84
Controlled by	STR1 +V	SRV3 +M
Location	0.9L SP1 I	0.5L SP1 I
IA Type 4	52.0	41.2
IA SU4	48.3	39.7
IA SU5	52.1	41.3
IA SU6	58.9	50.0
IA SU7	63.3	53.5
IA 3S3A	78.0	65.6
IA 3S3B	80.1	72.1
IA 4S3	93.0	73.3
IA 3-3	87.8	67.1
IA 5-2	80.7	64.0
IA EV2	49.0	46.1
IA EV3	50.0	40.3
90k	68.4 Y	59.0 Y
Quint Axle Crane	61.2 Y	48.8 N
136k A	90.3 Y	72.1 Y
136k B	82.2 Y	66.9 N
156k	94.2 Y	76.8 N
All Systems Permit	Yes	Yes
Fluid Milk Truck	63.8 Y	54.7 Y
Small Annual Crane	52.9 Y	43.7 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H11-1958, 20' Roadway, 0 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0 (a)**	**55'-0 (b)**	**67'-6**
HS-20 Oper	1.56	1.35	1.25	1.41	1.39
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.94	0.75	0.52	0.73	0.55
Controlled by	STR +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	45.6	41.5	40.3	45.6	46.1
IA SU4	43.1	40.2	39.3	44.5	45.2
IA SU5	45.8	43.3	41.5	46.9	47.1
IA SU6	46.9	43.6	41.7	47.2	47.3
IA SU7	50.4	45.4	42.9	48.6	48.4
IA 3S3A	66.9	67.1	62.8	71.0	66.1
IA 3S3B	74.7	73.9	74.4	84.2	83.5
IA 4S3	80.2	74.5	72.0	81.5	82.3
IA 3-3	80.3	68.2	60.2	68.1	62.9
IA 5-2	70.9	67.0	64.2	72.7	71.7
IA EV2	46.9	43.4	41.7	47.2	47.4
IA EV3	46.2	41.9	40.5	45.8	46.3
90k	58.5 Y	58.7 Y	59.5 Y	67.3 Y	66.3 Y
Quint Axle Crane	55.5 Y	46.6 N	43.7 N	49.4 N	49.0 N
136k A	77.9 Y	72.3 Y	70.7 Y	79.9 Y	81.2 Y
136k B	66.9 N	64.5 N	64.1 N	72.5 Y	74.4 Y
156k	76.8 N	74.0 N	73.5 N	83.2 Y	80.4 Y
All Systems Permit	Yes	Yes	No	Yes	Yes
Fluid Milk Truck	52.0 Y	46.5 N	43.6 N	49.3 Y	49.0 Y
Small Annual Crane	43.3 Y	41.3 Y	40.1 Y	45.4 Y	45.9 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H11-1958, 20' Roadway, 15 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0 (a)**	**55'-0 (b)**	**67'-6**
HS-20 Oper	1.56	1.35	1.25	1.41	1.39
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.94	0.75	0.52	0.73	0.55
Controlled by	STR +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	45.6	41.6	40.3	45.6	46.1
IA SU4	43.2	40.2	39.4	44.5	45.2
IA SU5	45.9	43.3	41.5	46.9	47.1
IA SU6	46.9	43.7	41.8	47.2	47.4
IA SU7	50.4	45.5	43.0	48.6	48.4
IA 3S3A	66.9	67.1	62.8	71.0	66.1
IA 3S3B	74.7	73.9	74.5	84.2	83.5
IA 4S3	80.3	74.5	72.1	81.6	82.3
IA 3-3	80.4	68.2	60.3	68.2	62.9
IA 5-2	71.0	67.0	64.3	72.7	71.8
IA EV2	46.9	43.4	41.8	47.2	47.4
IA EV3	46.3	41.9	40.5	45.9	46.3
90k	58.6 Y	58.7 Y	59.5 Y	67.3 Y	66.3 Y
Quint Axle Crane	55.6 Y	46.6 N	43.7 N	49.4 N	49.0 N
136k A	78.0 Y	72.3 Y	70.7 Y	80.0 Y	81.2 Y
136k B	67.0 N	64.5 N	64.2 N	72.6 Y	74.4 Y
156k	76.8 N	74.0 N	73.6 N	83.3 Y	80.4 Y
All Systems Permit	Yes	Yes	No	Yes	Yes
Fluid Milk Truck	52.0 Y	46.5 N	43.6 N	49.3 Y	49.0 Y
Small Annual Crane	43.3 Y	41.3 Y	40.1 Y	45.4 Y	45.9 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H11-1958, 20' Roadway, 30 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0 (a)**	**55'-0 (b)**	**67'-6**
HS-20 Oper	1.56	1.35	1.25	1.41	1.39
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.94	0.75	0.52	0.73	0.55
Controlled by	STR +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	45.7	41.6	40.3	45.6	46.1
IA SU4	43.2	40.2	39.4	44.5	45.3
IA SU5	45.9	43.3	41.5	47.0	47.2
IA SU6	47.0	43.7	41.8	47.3	47.4
IA SU7	50.5	45.5	43.0	48.6	48.4
IA 3S3A	67.0	67.2	62.8	71.1	66.1
IA 3S3B	74.8	74.0	74.5	84.3	83.5
IA 4S3	80.4	74.6	72.1	81.6	82.4
IA 3-3	80.5	68.3	60.3	68.2	63.0
IA 5-2	71.1	67.1	64.3	72.7	71.8
IA EV2	46.9	43.4	41.8	47.3	47.4
IA EV3	46.3	41.9	40.6	45.9	46.3
90k	58.6 Y	58.8 Y	59.6 Y	67.4 Y	66.3 Y
Quint Axle Crane	55.6 Y	46.6 N	43.7 N	49.5 N	49.1 N
136k A	78.1 Y	72.4 Y	70.7 Y	80.0 Y	81.2 Y
136k B	67.1 N	64.6 N	64.2 N	72.6 Y	74.4 Y
156k	76.9 N	74.1 N	73.6 N	83.3 Y	80.4 Y
All Systems Permit	Yes	Yes	No	Yes	Yes
Fluid Milk Truck	52.1 Y	46.5 N	43.6 N	49.4 Y	49.0 Y
Small Annual Crane	43.4 Y	41.3 Y	40.2 Y	45.4 Y	46.0 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H11-1958, 20' Roadway, 45 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0 (a)**	**55'-0 (b)**	**67'-6**
HS-20 Oper	1.56	1.35	1.25	1.42	1.39
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.94	0.76	0.52	0.74	0.55
Controlled by	STR +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	45.7	41.6	40.4	45.7	46.1
IA SU4	43.3	40.3	39.4	44.6	45.3
IA SU5	46.0	43.4	41.6	47.0	47.2
IA SU6	47.1	43.8	41.8	47.3	47.4
IA SU7	50.6	45.6	43.0	48.7	48.5
IA 3S3A	67.1	67.2	62.9	71.1	66.1
IA 3S3B	74.9	74.1	74.6	84.4	83.4
IA 4S3	80.6	74.7	72.2	81.7	82.4
IA 3-3	80.6	68.3	60.3	68.3	63.0
IA 5-2	71.2	67.2	64.3	72.8	71.8
IA EV2	46.9	43.4	41.8	47.3	47.4
IA EV3	46.4	42.0	40.6	45.9	46.4
90k	58.7 Y	58.8 Y	59.6 Y	67.4 Y	66.3 Y
Quint Axle Crane	55.7 Y	46.7 N	43.7 N	49.5 N	49.1 N
136k A	78.2 Y	72.5 Y	70.8 Y	80.1 Y	81.3 Y
136k B	67.2 N	64.6 N	64.2 N	72.7 Y	74.5 Y
156k	77.1 N	74.2 N	73.7 N	83.4 Y	80.4 Y
All Systems Permit	Yes	Yes	No	Yes	Yes
Fluid Milk Truck	52.2 Y	46.6 N	43.7 N	49.4 Y	49.0 Y
Small Annual Crane	43.5 Y	41.4 Y	40.2 Y	45.5 Y	46.0 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H12-1960, 0 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.99	1.82	1.54	1.63	1.73
Controlled by	STR +V	STR +M	STR +V	STR +V	STR +V
Location	0.1L SP1 I	0.5L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I
HS-20 Inv	1.19	1.09	0.83	0.81	0.78
Controlled by	STR +V	STR +M	SRV +M	SRV +M	SRV +M
Location	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	59.0	51.1	44.6	48.1	52.1
IA SU4	55.9	48.8	42.8	46.2	50.8
IA SU5	59.3	51.3	44.7	48.0	52.0
IA SU6	60.7	58.8	53.9	56.6	60.0
IA SU7	65.3	61.2	56.9	58.2	61.0
IA 3S3A	86.6	81.4	66.6	67.2	68.6
IA 3S3B	96.7	87.6	88.2	83.7	84.1
IA 4S3	103.9	91.0	79.5	85.5	90.1
IA 3-3	104.0	83.2	67.1	67.9	69.2
IA 5-2	91.9	79.4	69.2	74.4	81.0
IA EV2	60.6	57.2	50.0	54.0	58.1
IA EV3	59.8	49.0	47.5	51.3	57.8
90k	75.8 Y	72.9 Y	65.0 Y	67.1 Y	69.2 Y
Quint Axle Crane	71.9 Y	60.5 Y	50.9 Y	53.6 Y	57.2 Y
136k A	100.9 Y	89.5 Y	78.6 Y	82.0 Y	84.7 Y
136k B	86.7 Y	83.1 Y	73.6 Y	77.8 Y	71.7 Y
156k	99.4 Y	95.3 Y	84.4 Y	80.1 Y	80.9 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	67.3 Y	62.6 Y	52.2 Y	53.9 Y	57.6 Y
Small Annual Crane	56.1 Y	54.3 Y	47.0 Y	50.4 Y	54.4 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H12-1960, 10 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.99	1.82	1.54	1.63	1.73
Controlled by	STR +V	STR +M	STR +V	STR +V	STR +V
Location	0.1L SP1 I	0.5L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I
HS-20 Inv	1.19	1.09	0.83	0.81	0.78
Controlled by	STR +V	STR +M	SRV +M	SRV +M	SRV +M
Location	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	59.1	51.1	44.6	48.1	52.1
IA SU4	55.9	48.8	42.9	46.3	51.0
IA SU5	59.4	51.3	44.7	48.0	52.0
IA SU6	60.8	58.8	53.9	56.6	60.0
IA SU7	65.3	61.3	56.9	58.2	61.0
IA 3S3A	86.7	81.4	66.6	67.2	68.6
IA 3S3B	96.8	87.6	88.2	83.7	84.1
IA 4S3	104.0	91.0	79.5	85.5	90.1
IA 3-3	104.1	83.2	67.1	67.9	69.2
IA 5-2	91.9	79.4	69.2	74.4	81.0
IA EV2	60.6	57.2	50.0	54.0	58.1
IA EV3	59.9	49.0	47.5	51.3	57.8
90k	75.8 Y	72.9 Y	65.0 Y	67.1 Y	69.2 Y
Quint Axle Crane	72.0 Y	60.5 Y	50.9 Y	53.6 Y	57.2 Y
136k A	101.0 Y	89.5 Y	78.6 Y	82.0 Y	84.7 Y
136k B	86.7 Y	83.1 Y	73.6 Y	77.8 Y	71.7 Y
156k	99.5 Y	95.3 Y	84.4 Y	80.1 Y	80.9 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	67.4 Y	62.6 Y	52.4 Y	54.1 Y	57.8 Y
Small Annual Crane	56.1 Y	54.3 Y	47.0 Y	50.4 Y	54.4 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H12-1960, 20 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.99	1.82	1.54	1.63	1.73
Controlled by	STR +V	STR +M	STR +V	STR +V	STR +V
Location	0.1L SP1 I	0.5L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I
HS-20 Inv	1.19	1.09	0.83	0.81	0.78
Controlled by	STR +V	STR +M	SRV +M	SRV +M	SRV +M
Location	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	59.1	51.1	44.6	48.1	52.1
IA SU4	56.0	48.8	42.9	46.3	51.0
IA SU5	59.4	51.3	44.7	48.0	52.0
IA SU6	60.8	58.9	53.9	56.6	60.0
IA SU7	65.4	61.3	56.9	58.2	61.0
IA 3S3A	86.8	81.4	66.6	67.2	68.6
IA 3S3B	96.9	87.6	88.2	83.7	84.1
IA 4S3	104.1	91.0	79.5	85.5	90.1
IA 3-3	104.1	83.2	67.1	67.9	69.2
IA 5-2	92.0	79.4	69.2	74.4	81.0
IA EV2	60.6	57.2	50.0	54.0	58.1
IA EV3	59.9	49.0	47.5	51.3	57.8
90k	75.9 Y	72.9 Y	65.0 Y	67.1 Y	69.2 Y
Quint Axle Crane	72.0 Y	60.5 Y	50.9 Y	53.6 Y	57.2 Y
136k A	101.0 Y	89.4 Y	78.6 Y	82.0 Y	84.7 Y
136k B	86.8 Y	83.1 Y	73.6 Y	77.8 Y	71.7 Y
156k	99.6 Y	95.3 Y	84.4 Y	80.1 Y	80.9 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	67.4 Y	62.7 Y	52.4 Y	54.1 Y	57.8 Y
Small Annual Crane	56.2 Y	54.3 Y	47.0 Y	50.4 Y	54.4 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H13-1960, 0 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.64	1.46	1.20	1.26	1.33
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.1L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I
HS-20 Inv	0.98	0.81	0.56	0.54	0.50
Controlled by	STR +V	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	47.9	41.0	35.1	37.6	40.6
IA SU4	45.3	39.6	33.9	36.4	40.0
IA SU5	48.1	41.2	35.2	37.7	40.6
IA SU6	49.3	47.4	42.2	44.0	46.5
IA SU7	52.9	49.3	44.6	45.5	47.4
IA 3S3A	70.3	65.4	52.4	52.6	53.4
IA 3S3B	78.4	71.9	72.4	65.8	65.6
IA 4S3	84.3	73.1	62.6	67.0	70.5
IA 3-3	84.4	66.9	52.9	53.1	53.9
IA 5-2	74.5	63.8	54.5	58.3	63.2
IA EV2	49.3	45.7	39.0	41.9	44.8
IA EV3	48.5	40.2	39.1	42.1	45.7
90k	61.5 Y	59.1 Y	51.3 Y	52.6 Y	54.0 Y
Quint Axle Crane	58.3 Y	48.6 N	40.0 N	41.9 N	44.5 N
136k A	81.8 Y	71.8 Y	61.9 N	64.4 N	66.2 N
136k B	70.3 Y	66.7 N	57.9 N	60.8 N	56.3 N
156k	80.7 Y	76.5 N	66.4 N	63.1 N	63.5 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	54.6 Y	50.5 Y	41.3 N	42.5 N	45.2 N
Small Annual Crane	45.5 Y	43.5 Y	36.9 N	39.4 N	42.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H13-1960, 10 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.64	1.46	1.20	1.26	1.33
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.1L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I
HS-20 Inv	0.98	0.81	0.56	0.54	0.50
Controlled by	STR +V	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	47.9	41.0	35.1	37.6	40.6
IA SU4	45.4	39.6	34.0	36.6	40.2
IA SU5	48.2	41.2	35.2	37.7	40.6
IA SU6	49.3	47.4	42.2	44.0	46.5
IA SU7	53.0	49.4	44.6	45.5	47.4
IA 3S3A	70.4	65.4	52.4	52.6	53.4
IA 3S3B	78.5	71.9	72.4	65.8	65.6
IA 4S3	84.4	73.1	62.6	67.0	70.5
IA 3-3	84.5	66.9	52.9	53.1	53.9
IA 5-2	74.6	63.8	54.5	58.3	63.2
IA EV2	49.3	45.7	39.0	41.9	44.8
IA EV3	48.6	40.2	39.1	42.1	45.7
90k	61.6 Y	59.1 Y	51.3 Y	52.6 Y	54.0 Y
Quint Axle Crane	58.4 Y	48.6 N	40.0 N	41.9 N	44.5 N
136k A	81.9 Y	71.8 Y	61.9 N	64.4 N	66.2 N
136k B	70.4 Y	66.7 N	57.9 N	60.8 N	56.3 N
156k	80.8 Y	76.5 N	66.4 N	63.1 N	63.5 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	54.7 Y	50.5 Y	41.6 N	42.7 N	45.5 N
Small Annual Crane	45.6 Y	43.5 Y	36.9 N	39.4 N	42.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H13-1960, 20 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.64	1.46	1.20	1.26	1.33
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.1L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I
HS-20 Inv	0.98	0.81	0.56	0.54	0.50
Controlled by	STR +V	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	48.0	41.0	35.1	37.6	40.6
IA SU4	45.4	39.6	34.1	36.6	40.2
IA SU5	48.3	41.2	35.2	37.7	40.6
IA SU6	49.4	47.5	42.2	44.0	46.5
IA SU7	53.1	49.4	44.6	45.5	47.4
IA 3S3A	70.4	65.4	52.4	52.6	53.4
IA 3S3B	78.6	71.9	72.4	65.8	65.6
IA 4S3	84.5	73.1	62.6	67.0	70.5
IA 3-3	84.6	66.9	52.9	53.1	53.9
IA 5-2	74.7	63.8	54.5	58.3	63.2
IA EV2	49.3	45.7	39.0	41.9	44.8
IA EV3	48.7	40.2	39.1	42.1	45.7
90k	61.6 Y	59.1 Y	51.3 Y	52.6 Y	54.0 Y
Quint Axle Crane	58.5 Y	48.6 N	40.0 N	41.9 N	44.5 N
136k A	82.1 Y	71.8 Y	61.9 N	64.4 N	66.2 N
136k B	70.5 Y	66.7 N	57.9 N	60.8 N	56.3 N
156k	80.9 Y	76.5 N	66.4 N	63.1 N	63.5 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	54.7 Y	50.5 Y	41.6 N	42.7 N	45.5 N
Small Annual Crane	45.6 Y	43.5 Y	36.9 N	39.4 N	42.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H14-1960-1967, 28' Roadway, 0 Degree Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.84	1.68	1.44	1.52	1.61
Controlled by	STR1 +V	STR1 +M	STR1 +V	STR1 +V	STR1 +V
Location	0.9L SP1 I	0.5L SP1 I	0.7L SP1 I	0.3L SP1 I	0.3L SP1 I
HS-20 Inv	1.10	0.98	0.74	0.73	0.69
Controlled by	STR1 +V	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M
Location	0.9L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	54.6	47.0	41.6	44.7	48.4
IA SU4	51.7	45.0	39.8	43.0	47.2
IA SU5	54.9	47.2	41.6	44.6	48.3
IA SU6	56.2	54.3	50.2	52.2	55.8
IA SU7	60.4	56.6	53.0	54.1	56.7
IA 3S3A	80.1	74.9	62.0	62.5	63.7
IA 3S3B	89.4	81.1	80.0	77.8	78.0
IA 4S3	96.1	83.7	74.0	79.5	83.6
IA 3-3	96.2	76.5	62.5	63.1	64.2
IA 5-2	85.0	73.1	64.4	69.1	75.2
IA EV2	56.1	52.6	46.6	50.2	54.0
IA EV3	55.3	45.3	43.1	46.5	52.2
90k	70.1 Y	67.2 Y	60.5 Y	62.3 Y	64.3 Y
Quint Axle Crane	66.5 Y	55.7 Y	47.4 N	49.9 N	53.1 Y
136k A	93.3 Y	82.3 Y	73.2 Y	76.2 Y	78.7 Y
136k B	80.2 Y	76.4 Y	68.5 Y	72.3 Y	66.6 N
156k	92.0 Y	87.6 Y	78.6 Y	74.4 N	75.1 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	62.2 Y	57.8 Y	48.6 Y	50.1 Y	53.5 Y
Small Annual Crane	51.9 Y	49.9 Y	43.8 Y	46.9 Y	50.5 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H14-1979, 28' Roadway, 0 Degree Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.85	1.68	1.43	1.50	1.58
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V
Location	0.1L SP1 I	0.3L SP1 I	0.7L SP1 I	0.3L SP1 I	0.3L SP1 I
HS-20 Inv	1.11	0.96	0.71	0.68	0.64
Controlled by	STR1 +V	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M
Location	0.1L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	55.0	47.1	41.6	44.4	47.9
IA SU4	52.1	45.2	39.7	42.8	46.8
IA SU5	55.3	47.3	41.7	44.4	47.8
IA SU6	56.6	54.7	50.2	52.1	55.1
IA SU7	60.8	56.9	53.0	53.7	56.0
IA 3S3A	80.7	75.1	62.1	62.0	63.0
IA 3S3B	90.1	81.9	80.6	77.4	77.4
IA 4S3	96.9	84.0	74.1	78.9	82.9
IA 3-3	96.9	76.8	62.6	62.7	63.6
IA 5-2	123.8	105.9	94.5	100.7	109.6
IA EV2	56.5	52.6	46.6	49.7	53.2
IA EV3	55.8	45.8	43.5	46.7	52.4
90k	70.7 Y	67.6 Y	60.7 Y	61.9 Y	63.6 Y
Quint Axle Crane	67.0 Y	55.8 Y	47.4 N	49.5 N	52.6 Y
136k A	94.1 Y	82.5 Y	73.3 Y	75.8 Y	78.0 Y
136k B	80.8 Y	76.6 Y	68.7 Y	71.8 Y	66.1 N
156k	92.7 Y	87.9 Y	78.8 Y	74.1 N	74.6 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	62.7 Y	58.2 Y	48.4 Y	49.9 Y	53.1 Y
Small Annual Crane	52.3 Y	50.0 Y	43.8 Y	46.5 Y	50.0 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H15-1975, 0 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.76	1.50	1.58	1.54	1.58
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I
HS-20 Inv	1.05	0.90	0.94	0.94	0.85
Controlled by	STR +V	STR +V	SRV +M	STR +V	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.3L SP1 I	0.5L SP1 I
IA Type 4	57.6	51.0	45.4	44.9	47.2
IA SU4	55.0	49.5	48.6	50.0	53.2
IA SU5	59.0	51.8	45.5	44.8	47.1
IA SU6	66.3	56.0	55.0	53.2	54.7
IA SU7	73.9	61.0	58.0	54.6	55.5
IA 3S3A	93.6	74.3	67.8	62.8	62.3
IA 3S3B	100.9	94.2	91.2	77.8	76.2
IA 4S3	103.0	91.0	80.8	79.8	81.5
IA 3-3	97.0	75.3	68.3	63.5	62.8
IA 5-2	91.3	80.2	70.4	69.4	73.4
IA EV2	54.6	49.3	51.2	51.0	53.2
IA EV3	55.8	50.0	49.1	50.5	54.4
90k	82.6 Y	75.5 Y	66.1 Y	62.6 Y	62.8 Y
Quint Axle Crane	66.9 Y	55.9 Y	51.8 Y	50.3 Y	52.0 Y
136k A	100.7 Y	90.0 Y	80.0 Y	76.4 Y	76.7 Y
136k B	91.7 Y	83.2 Y	75.0 Y	72.9 Y	64.7 N
156k	105.2 Y	95.4 Y	86.0 Y	74.2 N	73.0 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	70.1 Y	58.6 Y	58.4 Y	55.9 Y	57.1 Y
Small Annual Crane	58.6 Y	51.6 Y	47.9 Y	47.3 Y	49.5 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H15-1975, 15 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.76	1.50	1.58	1.54	1.58
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I
HS-20 Inv	1.05	0.90	0.94	0.93	0.86
Controlled by	STR +V	STR +V	SRV +M	STR +V	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.3L SP1 I	0.5L SP1 I
IA Type 4	57.6	51.0	45.4	44.9	47.2
IA SU4	55.0	49.5	48.6	50.0	53.2
IA SU5	59.0	51.8	45.5	44.8	47.1
IA SU6	66.3	56.0	55.0	53.2	54.7
IA SU7	73.9	61.0	58.0	54.6	55.5
IA 3S3A	93.6	74.3	67.8	62.8	62.3
IA 3S3B	100.9	94.2	91.2	77.8	76.2
IA 4S3	103.0	91.0	80.8	79.8	81.5
IA 3-3	97.0	75.3	68.3	63.5	62.8
IA 5-2	91.3	80.2	70.4	69.4	73.4
IA EV2	54.6	49.3	51.2	51.0	53.2
IA EV3	55.8	50.0	49.1	50.5	54.4
90k	82.6 Y	75.5 Y	66.1 Y	62.6 Y	62.8 Y
Quint Axle Crane	66.9 Y	55.9 Y	51.8 Y	50.2 Y	52.0 Y
136k A	100.7 Y	90.0 Y	80.0 Y	76.4 Y	76.7 Y
136k B	91.7 Y	83.2 Y	75.0 Y	72.9 Y	64.7 N
156k	105.2 Y	95.4 Y	86.0 Y	74.2 N	73.0 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	70.1 Y	58.6 Y	58.4 Y	55.9 Y	57.1 Y
Small Annual Crane	58.6 Y	51.6 Y	47.9 Y	47.3 Y	49.5 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H15-1975, 30 Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.76	1.50	1.58	1.54	1.58
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP1 I	0.3L SP1 I	0.3L SP1 I
HS-20 Inv	1.05	0.90	0.95	0.93	0.86
Controlled by	STR +V	STR +V	SRV +M	STR +V	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.3L SP1 I	0.5L SP1 I
IA Type 4	57.6	51.0	45.4	44.9	47.2
IA SU4	55.0	49.5	48.6	50.0	53.2
IA SU5	59.0	51.8	45.4	44.8	47.1
IA SU6	66.3	56.0	55.0	53.2	54.7
IA SU7	73.9	61.0	58.0	54.6	55.5
IA 3S3A	93.6	74.3	67.8	62.8	62.3
IA 3S3B	100.9	94.1	91.2	77.8	76.2
IA 4S3	103.0	91.0	80.8	79.8	81.5
IA 3-3	97.0	75.3	68.3	63.5	62.8
IA 5-2	91.3	80.1	70.4	69.4	73.4
IA EV2	54.6	49.3	51.2	51.0	53.2
IA EV3	55.8	50.0	49.1	50.5	54.4
90k	82.6 Y	75.5 Y	66.1 Y	62.6 Y	62.8 Y
Quint Axle Crane	66.9 Y	55.9 Y	51.8 Y	50.2 Y	52.0 Y
136k A	100.7 Y	90.0 Y	80.0 Y	76.3 Y	76.7 Y
136k B	91.7 Y	83.2 Y	75.0 Y	72.9 Y	64.7 N
156k	105.2 Y	95.4 Y	86.0 Y	74.2 N	73.0 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	70.1 Y	58.6 Y	58.4 Y	55.9 Y	57.1 Y
Small Annual Crane	58.6 Y	51.6 Y	47.9 Y	47.3 Y	49.5 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H24-1984, 0 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.47	1.52	1.48	1.60	1.67	1.43	1.53	1.60	1.48	1.48
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.88	0.91	0.82	0.97	1.01	0.83	0.83	0.90	0.74	0.74
Controlled by	STR +V	STR +V	SRV +M	STR +V	STR +V	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP2 I	0.3L SP2 I	0.3L SP1 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	49.4	49.8	43.0	45.9	47.7	42.3	45.3	46.2	44.6	44.6
IA SU4	48.1	50.0	48.1	47.6	49.3	47.6	48.6	47.4	49.3	49.6
IA SU5	49.6	49.9	43.1	45.8	47.7	42.3	45.3	46.1	44.6	44.6
IA SU6	55.3	56.6	51.8	53.8	57.2	49.8	53.0	53.0	51.3	51.3
IA SU7	61.1	61.6	54.7	57.6	59.7	51.3	54.2	56.4	52.2	52.2
IA 3S3A	74.9	75.1	64.2	67.3	69.4	59.2	61.9	64.8	58.7	58.7
IA 3S3B	87.7	92.1	89.3	87.6	84.1	73.8	76.9	79.7	72.2	72.2
IA 4S3	88.1	88.7	76.6	81.6	84.9	75.3	77.8	82.1	77.2	77.2
IA 3-3	75.6	76.0	64.7	68.1	70.2	59.8	62.5	65.4	59.2	59.2
IA 5-2	76.8	77.3	66.8	71.0	73.9	65.5	70.8	71.3	69.4	69.4
IA EV2	47.8	49.8	47.9	52.2	54.1	47.5	50.9	53.1	49.6	49.6
IA EV3	48.5	50.5	48.8	46.8	49.1	46.8	48.2	47.2	49.7	50.7
90k	74.2 Y	76.2 Y	62.8 Y	66.3 Y	68.5 Y	59.1 Y	62.3 Y	64.4 Y	59.3 Y	59.3 Y
Quint Axle Crane	55.2 Y	56.5 Y	49.0 N	52.1 Y	54.5 Y	47.3 N	50.3 Y	51.9 Y	49.0 N	49.0 N
136k A	86.9 Y	87.7 Y	75.9 Y	80.9 Y	81.5 Y	72.3 Y	77.7 Y	78.4 Y	72.6 Y	72.6 Y
136k B	80.5 Y	81.9 Y	71.0 Y	76.3 Y	78.8 Y	68.6 Y	71.7 Y	68.6 Y	61.5 N	61.5 N
156k	92.4 Y	93.9 Y	81.4 Y	87.5 Y	90.4 Y	70.6 N	74.1 N	75.9 N	69.4 N	69.4 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.4 Y	59.2 Y	54.9 Y	58.5 Y	61.0 Y	52.3 Y	55.5 Y	56.6 Y	53.5 Y	53.5 Y
Small Annual Crane	50.3 Y	52.1 Y	45.3 Y	48.5 Y	50.5 Y	44.4 Y	47.5 Y	48.9 Y	46.6 Y	46.6 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H24-1984, 15 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.47	1.52	1.48	1.60	1.67	1.43	1.53	1.60	1.48	1.48
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.88	0.91	0.82	0.97	1.01	0.83	0.83	0.90	0.74	0.74
Controlled by	STR +V	STR +V	SRV +M	STR +V	STR +V	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP2 I	0.3L SP2 I	0.3L SP1 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	49.4	49.8	43.0	45.9	47.7	42.3	45.3	46.2	44.6	44.6
IA SU4	48.1	50.0	48.1	47.6	49.3	47.6	48.6	47.4	49.3	49.6
IA SU5	49.6	49.9	43.1	45.8	47.7	42.3	45.3	46.1	44.6	44.6
IA SU6	55.3	56.6	51.8	53.8	57.2	49.8	53.0	53.0	51.3	51.3
IA SU7	61.1	61.6	54.7	57.6	59.7	51.3	54.2	56.4	52.2	52.2
IA 3S3A	74.9	75.1	64.2	67.3	69.4	59.2	61.9	64.8	58.7	58.7
IA 3S3B	87.7	92.1	89.3	87.6	84.1	73.8	76.9	79.7	72.2	72.2
IA 4S3	88.1	88.7	76.6	81.6	84.9	75.3	77.8	82.1	77.2	77.2
IA 3-3	75.6	76.0	64.7	68.1	70.2	59.8	62.5	65.4	59.2	59.2
IA 5-2	76.8	77.3	66.8	71.0	73.9	65.5	70.8	71.3	69.4	69.4
IA EV2	47.8	49.8	47.9	52.2	54.1	47.5	50.9	53.1	49.6	49.6
IA EV3	48.5	50.5	48.8	46.8	49.1	46.8	48.2	47.2	49.7	50.7
90k	74.2 Y	76.2 Y	62.8 Y	66.3 Y	68.5 Y	59.1 Y	62.3 Y	64.4 Y	59.3 Y	59.3 Y
Quint Axle Crane	55.2 Y	56.5 Y	49.0 N	52.1 Y	54.5 Y	47.3 N	50.3 Y	51.9 Y	49.0 N	49.0 N
136k A	86.9 Y	87.7 Y	75.9 Y	80.9 Y	81.5 Y	72.3 Y	77.7 Y	78.4 Y	72.6 Y	72.6 Y
136k B	80.5 Y	81.9 Y	71.0 Y	76.3 Y	78.8 Y	68.6 Y	71.7 Y	68.6 Y	61.5 N	61.5 N
156k	92.4 Y	93.9 Y	81.4 Y	87.5 Y	90.4 Y	70.6 N	74.1 N	75.9 N	69.4 N	69.4 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.4 Y	59.2 Y	54.9 Y	58.5 Y	61.0 Y	52.3 Y	55.5 Y	56.6 Y	53.5 Y	53.5 Y
Small Annual Crane	50.3 Y	52.1 Y	45.3 Y	48.5 Y	50.5 Y	44.4 Y	47.5 Y	48.9 Y	46.6 Y	46.6 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H24-1984, 30 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.47	1.52	1.48	1.60	1.67	1.43	1.53	1.60	1.48	1.48
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.88	0.91	0.82	0.97	1.01	0.83	0.83	0.90	0.74	0.74
Controlled by	STR +V	STR +V	SRV +M	STR +V	STR +V	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP2 I	0.3L SP2 I	0.3L SP1 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	49.4	49.8	43.0	45.9	47.7	42.3	45.3	46.2	44.6	44.6
IA SU4	48.1	50.0	48.1	47.6	49.3	47.6	48.6	47.4	49.3	49.6
IA SU5	49.6	49.9	43.1	45.8	47.7	42.3	45.3	46.1	44.6	44.6
IA SU6	55.3	56.6	51.8	53.8	57.2	49.8	53.0	53.0	51.3	51.3
IA SU7	61.1	61.6	54.7	57.6	59.7	51.3	54.2	56.4	52.2	52.2
IA 3S3A	74.9	75.1	64.2	67.3	69.4	59.2	61.9	64.8	58.7	58.7
IA 3S3B	87.7	92.1	89.3	87.6	84.1	73.8	76.9	79.7	72.2	72.2
IA 4S3	88.1	88.7	76.6	81.6	84.9	75.3	77.8	82.1	77.2	77.2
IA 3-3	75.6	76.0	64.7	68.1	70.2	59.8	62.5	65.4	59.2	59.2
IA 5-2	76.8	77.3	66.8	71.0	73.9	65.5	70.8	71.3	69.4	69.4
IA EV2	47.8	49.8	47.9	52.2	54.1	47.5	50.9	53.1	49.6	49.6
IA EV3	48.5	50.5	48.8	46.8	49.1	46.8	48.2	47.2	49.7	50.7
90k	74.2 Y	76.2 Y	62.8 Y	66.3 Y	68.5 Y	59.1 Y	62.3 Y	64.4 Y	59.3 Y	59.3 Y
Quint Axle Crane	55.2 Y	56.5 Y	49.0 N	52.1 Y	54.5 Y	47.3 N	50.3 Y	51.9 Y	49.0 N	49.0 N
136k A	86.9 Y	87.7 Y	75.9 Y	80.9 Y	81.5 Y	72.3 Y	77.7 Y	78.4 Y	72.6 Y	72.6 Y
136k B	80.5 Y	81.9 Y	71.0 Y	76.3 Y	78.8 Y	68.6 Y	71.7 Y	68.6 Y	61.5 N	61.5 N
156k	92.4 Y	93.9 Y	81.4 Y	87.5 Y	90.4 Y	70.6 N	74.1 N	75.9 N	69.4 N	69.4 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.4 Y	59.2 Y	54.9 Y	58.5 Y	61.0 Y	52.3 Y	55.5 Y	56.6 Y	53.5 Y	53.5 Y
Small Annual Crane	50.3 Y	52.1 Y	45.3 Y	48.5 Y	50.5 Y	44.4 Y	47.5 Y	48.9 Y	46.6 Y	46.6 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H24-1984, 45 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.47	1.52								
Controlled by	STR +V	STR +V								
Location	0.0L SP1 I	0.0L SP1 I								
HS-20 Inv	0.88	0.91								
Controlled by	STR +V	STR +V								
Location	0.0L SP1 I	0.0L SP1 I								
IA Type 4	49.4	49.8								
IA SU4	48.1	50.0								
IA SU5	49.6	49.9								
IA SU6	55.3	56.6								
IA SU7	61.1	61.6								
IA 3S3A	74.9	75.1								
IA 3S3B	87.7	92.1								
IA 4S3	88.1	88.7								
IA 3-3	75.6	76.0								
IA 5-2	76.8	77.3								
IA EV2	47.8	49.8								
IA EV3	48.5	50.5								
90k	74.2 Y	76.2 Y								
Quint Axle Crane	55.2 Y	56.5 Y								
136k A	86.9 Y	87.7 Y								
136k B	80.5 Y	81.9 Y								
156k	92.4 Y	93.9 Y								
All Systems Permit	Yes	Yes								
Fluid Milk Truck	58.4 Y	59.2 Y								
Small Annual Crane	50.3 Y	52.1 Y								

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H24-1987, 0 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.47	1.46	1.65	1.69	1.71	1.64	1.69	1.70	1.67	1.67
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.88	0.88	1.00	1.03	1.03	1.00	1.02	1.04	0.99	0.99
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	SRV +M	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.1L SP1 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	49.4	49.7	47.3	48.1	49.3	47.5	48.1	48.4	49.3	49.3
IA SU4	48.1	48.3	50.2	48.7	50.9	48.7	48.6	48.5	55.9	55.9
IA SU5	49.6	50.4	47.4	48.0	49.3	47.4	48.0	48.3	49.2	49.2
IA SU6	55.3	54.6	57.6	54.8	58.2	54.8	54.6	53.3	57.4	57.4
IA SU7	61.1	59.4	60.6	60.6	61.0	57.9	59.6	59.3	58.1	58.1
IA 3S3A	74.9	72.4	70.7	70.6	71.0	66.5	69.3	68.0	65.1	65.1
IA 3S3B	87.7	92.3	89.3	88.2	86.1	82.2	83.5	83.3	79.4	79.4
IA 4S3	88.1	88.7	84.3	85.5	87.8	84.5	85.6	86.1	84.9	84.9
IA 3-3	75.6	73.4	71.2	71.4	71.8	67.2	70.1	68.7	65.7	65.7
IA 5-2	76.8	78.1	73.3	74.3	76.3	73.4	74.3	74.7	76.6	76.6
IA EV2	47.8	48.0	53.6	55.2	56.2	54.2	55.5	56.3	55.9	55.9
IA EV3	48.5	48.7	48.8	47.2	49.3	47.2	48.2	47.0	57.3	57.3
90k	74.2 Y	73.5 Y	68.8 Y	69.4 Y	70.1 Y	66.2 Y	68.3 Y	67.4 Y	65.6 Y	65.6 Y
Quint Axle Crane	55.2 Y	54.5 Y	54.1 Y	54.7 Y	55.7 Y	53.3 Y	54.4 Y	54.6 Y	54.5 Y	54.5 Y
136k A	86.9 Y	87.7 Y	83.4 Y	84.8 Y	83.4 Y	80.7 Y	81.1 Y	82.0 Y	80.0 Y	80.0 Y
136k B	80.5 Y	81.0 Y	78.2 Y	80.1 Y	81.6 Y	77.2 Y	79.7 Y	74.7 Y	67.3 N	67.3 N
156k	92.4 Y	92.9 Y	89.7 Y	91.9 Y	93.6 Y	78.4 Y	87.5 Y	79.0 Y	76.0 N	76.0 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.4 Y	57.1 Y	61.1 Y	60.0 Y	62.3 Y	59.4 Y	58.9 Y	58.0 Y	59.9 Y	59.9 Y
Small Annual Crane	50.3 Y	50.2 Y	50.1 Y	51.0 Y	52.1 Y	50.1 Y	51.0 Y	51.4 Y	51.8 Y	51.8 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H24-1987, 15 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.47	1.46	1.65	1.69	1.71	1.64	1.69	1.70	1.67	1.67
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.88	0.88	1.00	1.03	1.03	1.00	1.02	1.04	0.99	0.99
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	SRV +M	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.1L SP1 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	49.4	49.7	47.3	48.1	49.3	47.5	48.1	48.4	49.3	49.3
IA SU4	48.1	48.3	50.2	48.7	50.9	48.7	48.6	48.5	55.9	55.9
IA SU5	49.6	50.4	47.4	48.0	49.3	47.4	48.0	48.3	49.2	49.2
IA SU6	55.3	54.6	57.6	54.8	58.2	54.8	54.6	53.3	57.4	57.4
IA SU7	61.1	59.4	60.6	60.6	61.0	57.9	59.6	59.3	58.1	58.1
IA 3S3A	74.9	72.4	70.7	70.6	71.0	66.5	69.3	68.0	65.1	65.1
IA 3S3B	87.7	92.3	89.3	88.2	86.1	82.2	83.5	83.3	79.4	79.4
IA 4S3	88.1	88.7	84.3	85.5	87.8	84.5	85.6	86.1	84.9	84.9
IA 3-3	75.6	73.4	71.2	71.4	71.8	67.2	70.1	68.7	65.7	65.7
IA 5-2	76.8	78.1	73.3	74.3	76.3	73.4	74.3	74.7	76.6	76.6
IA EV2	47.8	48.0	53.6	55.2	56.2	54.2	55.5	56.3	55.9	55.9
IA EV3	48.5	48.7	48.8	47.2	49.3	47.2	48.2	47.0	57.3	57.3
90k	74.2 Y	73.5 Y	68.8 Y	69.4 Y	70.1 Y	66.2 Y	68.3 Y	67.4 Y	65.6 Y	65.6 Y
Quint Axle Crane	55.2 Y	54.5 Y	54.1 Y	54.7 Y	55.7 Y	53.3 Y	54.4 Y	54.6 Y	54.5 Y	54.5 Y
136k A	86.9 Y	87.7 Y	83.4 Y	84.8 Y	83.4 Y	80.7 Y	81.1 Y	82.0 Y	80.0 Y	80.0 Y
136k B	80.5 Y	81.0 Y	78.2 Y	80.1 Y	81.6 Y	77.2 Y	79.7 Y	74.7 Y	67.3 N	67.3 N
156k	92.4 Y	92.9 Y	89.7 Y	91.9 Y	93.6 Y	78.4 Y	87.5 Y	79.0 Y	76.0 N	76.0 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.4 Y	57.1 Y	61.1 Y	60.0 Y	62.3 Y	59.4 Y	58.9 Y	58.0 Y	59.9 Y	59.9 Y
Small Annual Crane	50.3 Y	50.2 Y	50.1 Y	51.0 Y	52.1 Y	50.1 Y	51.0 Y	51.4 Y	51.8 Y	51.8 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H24-1987, 30 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.47	1.46	1.65	1.69	1.71	1.64	1.69	1.70	1.67	1.67
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.88	0.88	1.00	1.03	1.03	1.00	1.02	1.04	0.99	0.99
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	SRV +M	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.1L SP1 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	49.4	49.7	47.3	48.1	49.3	47.5	48.1	48.4	49.3	49.3
IA SU4	48.1	48.3	50.2	48.7	50.9	48.7	48.6	48.5	55.9	55.9
IA SU5	49.6	50.4	47.4	48.0	49.3	47.4	48.0	48.3	49.2	49.2
IA SU6	55.3	54.6	57.6	54.8	58.2	54.8	54.6	53.3	57.4	57.4
IA SU7	61.1	59.4	60.6	60.6	61.0	57.9	59.6	59.3	58.1	58.1
IA 3S3A	74.9	72.4	70.7	70.6	71.0	66.5	69.3	68.0	65.1	65.1
IA 3S3B	87.7	92.3	89.3	88.2	86.1	82.2	83.5	83.3	79.4	79.4
IA 4S3	88.1	88.7	84.3	85.5	87.8	84.5	85.6	86.1	84.9	84.9
IA 3-3	75.6	73.4	71.2	71.4	71.8	67.2	70.1	68.7	65.7	65.7
IA 5-2	76.8	78.1	73.3	74.3	76.3	73.4	74.3	74.7	76.6	76.6
IA EV2	47.8	48.0	53.6	55.2	56.2	54.2	55.5	56.3	55.9	55.9
IA EV3	48.5	48.7	48.8	47.2	49.3	47.2	48.2	47.0	57.3	57.3
90k	74.2 Y	73.5 Y	68.8 Y	69.4 Y	70.1 Y	66.2 Y	68.3 Y	67.4 Y	65.6 Y	65.6 Y
Quint Axle Crane	55.2 Y	54.5 Y	54.1 Y	54.7 Y	55.7 Y	53.3 Y	54.4 Y	54.6 Y	54.5 Y	54.5 Y
136k A	86.9 Y	87.7 Y	83.4 Y	84.8 Y	83.4 Y	80.7 Y	81.1 Y	82.0 Y	80.0 Y	80.0 Y
136k B	80.5 Y	81.0 Y	78.2 Y	80.1 Y	81.6 Y	77.2 Y	79.7 Y	74.7 Y	67.3 N	67.3 N
156k	92.4 Y	92.9 Y	89.7 Y	91.9 Y	93.6 Y	78.4 Y	87.5 Y	79.0 Y	76.0 N	76.0 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.4 Y	57.1 Y	61.1 Y	60.0 Y	62.3 Y	59.4 Y	58.9 Y	58.0 Y	59.9 Y	59.9 Y
Small Annual Crane	50.3 Y	50.2 Y	50.1 Y	51.0 Y	52.1 Y	50.1 Y	51.0 Y	51.4 Y	51.8 Y	51.8 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H24-1987, 45 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.47	1.46								
Controlled by	STR +V	STR +V								
Location	0.0L SP1 I	0.0L SP1 I								
HS-20 Inv	0.88	0.88								
Controlled by	STR +V	STR +V								
Location	0.0L SP1 I	0.0L SP1 I								
IA Type 4	49.4	49.7								
IA SU4	48.1	48.3								
IA SU5	49.6	50.4								
IA SU6	55.3	54.6								
IA SU7	61.1	59.4								
IA 3S3A	74.9	72.4								
IA 3S3B	87.7	92.3								
IA 4S3	88.1	88.7								
IA 3-3	75.6	73.4								
IA 5-2	76.8	78.1								
IA EV2	47.8	48.0								
IA EV3	48.5	48.7								
90k	74.2 Y	73.5 Y								
Quint Axle Crane	55.2 Y	54.5 Y								
136k A	86.9 Y	87.7 Y								
136k B	80.5 Y	81.0 Y								
156k	92.4 Y	92.9 Y								
All Systems Permit	Yes	Yes								
Fluid Milk Truck	58.4 Y	57.1 Y								
Small Annual Crane	50.3 Y	50.2 Y								

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H24SI-2005, 24' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**46'-8**	**55'-0**	**67'-6**	**80'-0**	**90'-0**	**100'-0**	**110'-0**
HS-20 Oper	1.52	1.99	2.01	2.07	2.11	2.36	2.45
Controlled by	STR1 +V	STR1 +M	STR1 +V	STR1 +V	STR1 +M	STR1 +M	STR1 +V
Location	0.0L SP1 I	0.5L SP1 I	0.3L SP1 I	0.7L SP1 I	0.5L SP1 I	0.5L SP1 I	0.7L SP1 I
HS-20 Inv	0.91	1.11	1.15	1.09	1.14	1.12	1.06
Controlled by	STR1 +V	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M
Location	0.0L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	52.1	60.2	59.8	63.1	71.7	77.7	77.1
IA SU4	50.7	62.8	66.7	69.7	70.7	79.5	83.7
IA SU5	52.8	60.3	59.8	63.1	72.8	77.7	77.0
IA SU6	56.6	66.6	70.0	72.3	73.1	81.8	85.5
IA SU7	61.0	68.5	72.3	73.7	74.2	83.0	86.1
IA 3S3A	73.0	89.7	83.5	81.8	92.8	96.4	93.6
IA 3S3B	96.5	118.7	104.4	97.8	112.5	113.0	105.5
IA 4S3	92.8	107.1	106.3	109.5	116.8	118.3	111.5
IA 3-3	74.0	90.5	84.4	82.4	88.6	96.9	94.1
IA 5-2	102.5	116.7	115.4	122.3	126.3	135.2	138.0
IA EV2	50.5	66.4	66.6	69.6	73.1	81.8	83.7
IA EV3	51.1	64.7	67.9	71.2	71.9	80.7	85.5
90k	74.6 Y	87.9 Y	83.5 Y	83.9 Y	98.5 Y	97.1 Y	94.2 Y
Quint Axle Crane	56.5 Y	68.4 Y	66.6 Y	69.3 Y	74.9 Y	83.6 Y	82.7 Y
136k A	92.0 Y	106.0 Y	102.3 Y	103.0 Y	108.4 Y	111.3 Y	105.9 Y
136k B	83.5 Y	99.1 Y	96.6 Y	87.5 Y	102.1 Y	99.2 Y	95.8 Y
156k	95.8 Y	113.7 Y	100.2 Y	98.7 Y	114.3 Y	109.5 Y	104.5 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.9 Y	69.6 Y	73.5 Y	75.3 Y	74.8 Y	83.6 Y	88.3 Y
Small Annual Crane	52.6 Y	63.2 Y	62.6 Y	65.8 Y	71.5 Y	80.3 Y	79.7 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H24SI-2005, 24' Roadway, 15 Degree Skew

	Bridge Length						
Truck	**46'-8**	**55'-0**	**67'-6**	**80'-0**	**90'-0**	**100'-0**	**110'-0**
HS-20 Oper	1.52	1.99	2.01	2.07	2.11	2.36	2.45
Controlled by	STR1 +V	STR1 +M	STR1 +V	STR1 +V	STR1 +M	STR1 +M	STR1 +V
Location	0.0L SP1 I	0.5L SP1 I	0.3L SP1 I	0.7L SP1 I	0.5L SP1 I	0.5L SP1 I	0.3L SP1 I
HS-20 Inv	0.91	1.11	1.15	1.09	1.14	1.12	1.06
Controlled by	STR1 +V	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M
Location	0.0L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	52.1	60.2	59.8	63.1	71.7	77.7	77.1
IA SU4	50.7	62.8	66.7	69.7	70.7	79.5	83.7
IA SU5	52.8	60.3	59.8	63.1	72.8	77.7	77.0
IA SU6	56.6	66.6	70.0	72.3	73.1	81.8	85.5
IA SU7	61.0	68.5	72.3	73.7	74.2	83.0	86.1
IA 3S3A	73.0	89.7	83.5	81.8	92.8	96.4	93.6
IA 3S3B	96.5	118.8	104.4	97.8	112.5	113.0	105.5
IA 4S3	92.8	107.1	106.3	109.5	116.8	118.3	111.5
IA 3-3	74.0	90.5	84.4	82.4	88.6	96.9	94.1
IA 5-2	102.5	116.7	115.4	122.3	126.3	135.2	138.0
IA EV2	50.5	66.4	66.6	69.6	73.1	81.8	83.7
IA EV3	51.1	64.7	67.9	71.2	71.9	80.7	85.5
90k	74.6 Y	87.9 Y	83.5 Y	83.9 Y	98.6 Y	97.1 Y	94.2 Y
Quint Axle Crane	56.5 Y	68.4 Y	66.6 Y	69.3 Y	74.9 Y	83.6 Y	82.7 Y
136k A	92.0 Y	106.0 Y	102.3 Y	103.0 Y	108.4 Y	111.3 Y	105.9 Y
136k B	83.5 Y	99.1 Y	96.6 Y	87.5 Y	102.1 Y	99.2 Y	95.8 Y
156k	95.8 Y	113.7 Y	100.2 Y	98.7 Y	114.3 Y	109.5 Y	104.5 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.9 Y	69.6 Y	73.5 Y	75.3 Y	74.8 Y	83.6 Y	88.3 Y
Small Annual Crane	52.6 Y	63.2 Y	62.6 Y	65.8 Y	71.5 Y	80.3 Y	79.7 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H24SI-2005, 24' Roadway, 30 Degree Skew

	Bridge Length						
Truck	**46'-8**	**55'-0**	**67'-6**	**80'-0**	**90'-0**	**100'-0**	**110'-0**
HS-20 Oper	1.52	1.99	2.01	2.07	2.11	2.36	2.45
Controlled by	STR1 +V	STR1 +M	STR1 +V	STR1 +V	STR1 +M	STR1 +M	STR1 +V
Location	0.0L SP1 I	0.5L SP1 I	0.3L SP1 I	0.7L SP1 I	0.5L SP1 I	0.5L SP1 I	0.3L SP1 I
HS-20 Inv	0.91	1.11	1.15	1.09	1.14	1.12	1.06
Controlled by	STR1 +V	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M	SRV3 +M
Location	0.0L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	52.1	60.2	59.8	63.1	71.7	77.7	77.1
IA SU4	50.7	62.8	66.7	69.7	70.7	79.5	83.7
IA SU5	52.8	60.3	59.8	63.1	72.9	77.7	77.0
IA SU6	56.6	66.6	70.0	72.3	73.1	81.9	85.5
IA SU7	61.0	68.5	72.3	73.7	74.2	83.0	86.1
IA 3S3A	73.0	89.7	83.5	81.8	92.8	96.4	93.6
IA 3S3B	96.5	118.8	104.4	97.8	112.5	113.0	105.5
IA 4S3	92.8	107.1	106.3	109.5	116.8	118.3	111.5
IA 3-3	73.9	90.5	84.4	82.4	88.7	96.9	94.1
IA 5-2	102.5	116.7	115.4	122.3	126.3	135.2	138.0
IA EV2	50.5	66.4	66.6	69.6	73.1	81.9	83.7
IA EV3	51.1	64.7	67.9	71.2	71.9	80.7	85.5
90k	74.6 Y	87.9 Y	83.5 Y	83.9 Y	98.6 Y	97.1 Y	94.2 Y
Quint Axle Crane	56.5 Y	68.4 Y	66.6 Y	69.3 Y	74.9 Y	83.7 Y	82.7 Y
136k A	92.0 Y	106.0 Y	102.3 Y	103.0 Y	108.4 Y	111.3 Y	105.9 Y
136k B	83.5 Y	99.1 Y	96.6 Y	87.5 Y	102.1 Y	99.2 Y	95.8 Y
156k	95.8 Y	113.7 Y	100.2 Y	98.7 Y	114.3 Y	109.5 Y	104.5 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.9 Y	69.6 Y	73.5 Y	75.3 Y	74.9 Y	83.6 Y	88.3 Y
Small Annual Crane	52.6 Y	63.2 Y	62.6 Y	65.8 Y	71.5 Y	80.3 Y	79.7 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H30-1987, 0 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.49	1.47	1.67	1.71	1.73	1.66	1.71	1.72	1.69	1.69
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.89	0.88	1.01	1.04	1.04	1.01	1.04	1.05	1.02	1.02
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	SRV +M	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.1L SP1 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	49.9	50.1	47.8	48.5	49.9	48.0	48.6	49.0	49.9	49.9
IA SU4	48.4	48.7	50.5	49.0	51.3	49.0	49.0	48.9	56.8	56.8
IA SU5	50.0	50.9	47.8	48.5	49.8	47.9	48.5	48.8	49.8	49.8
IA SU6	55.8	55.0	58.2	55.1	58.5	55.1	55.0	53.7	58.2	58.2
IA SU7	61.6	59.9	61.2	61.2	61.6	58.5	60.3	60.0	58.8	58.8
IA 3S3A	75.5	73.0	71.4	71.3	71.7	67.3	70.0	68.8	66.0	66.0
IA 3S3B	88.1	93.1	89.8	88.8	87.0	83.1	84.4	84.1	80.4	80.4
IA 4S3	88.8	89.4	85.1	86.4	88.7	85.4	86.5	87.1	86.0	86.0
IA 3-3	76.2	74.0	71.9	72.1	72.5	68.0	70.8	69.5	66.5	66.5
IA 5-2	77.4	78.8	74.0	75.0	77.1	74.2	75.1	75.5	77.6	77.6
IA EV2	48.2	48.4	54.2	55.8	56.9	54.9	56.2	57.0	56.7	56.7
IA EV3	48.9	49.1	49.1	47.5	49.6	47.5	48.4	47.4	58.1	58.1
90k	74.8 Y	74.2 Y	69.5 Y	70.1 Y	70.8 Y	67.0 Y	69.0 Y	68.2 Y	66.4 Y	66.4 Y
Quint Axle Crane	55.6 Y	54.9 Y	54.7 Y	53.4 Y	56.3 Y	53.4 Y	54.9 Y	55.2 Y	55.2 Y	55.2 Y
136k A	87.6 Y	88.4 Y	84.2 Y	85.7 Y	84.3 Y	81.6 Y	81.9 Y	82.8 Y	81.0 Y	81.0 Y
136k B	81.2 Y	81.7 Y	79.0 Y	80.9 Y	82.4 Y	78.1 Y	80.4 Y	75.4 Y	68.0 Y	68.0 Y
156k	93.1 Y	93.7 Y	90.6 Y	92.8 Y	94.6 Y	79.2 Y	88.3 Y	79.8 Y	76.9 N	76.9 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.8 Y	57.6 Y	61.8 Y	60.4 Y	63.0 Y	60.1 Y	59.3 Y	58.4 Y	60.8 Y	60.8 Y
Small Annual Crane	50.7 Y	50.7 Y	50.6 Y	51.5 Y	52.7 Y	50.7 Y	51.6 Y	52.0 Y	52.5 Y	52.5 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H30-1987, 15 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.49	1.47	1.67	1.71	1.73	1.66	1.71	1.72	1.69	1.69
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.89	0.88	1.01	1.04	1.04	1.01	1.04	1.05	1.02	1.02
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	SRV +M	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.1L SP1 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	49.9	50.1	47.8	48.5	49.9	48.0	48.6	49.0	49.9	49.9
IA SU4	48.4	48.7	50.5	49.0	51.3	49.0	49.0	48.9	56.8	56.8
IA SU5	50.0	50.9	47.8	48.5	49.8	47.9	48.5	48.8	49.8	49.8
IA SU6	55.8	55.0	58.2	55.1	58.5	55.1	55.0	53.7	58.2	58.2
IA SU7	61.6	59.9	61.2	61.2	61.6	58.5	60.3	60.0	58.8	58.8
IA 3S3A	75.5	73.0	71.3	71.3	71.7	67.3	70.0	68.8	66.0	66.0
IA 3S3B	88.1	93.1	89.8	88.8	87.0	83.1	84.4	84.1	80.4	80.4
IA 4S3	88.8	89.4	85.1	86.4	88.7	85.4	86.5	87.1	86.0	86.0
IA 3-3	76.2	74.0	71.9	72.1	72.5	68.0	70.8	69.5	66.5	66.5
IA 5-2	77.4	78.8	74.0	75.0	77.1	74.2	75.1	75.5	77.6	77.6
IA EV2	48.2	48.4	54.2	55.8	56.9	54.9	56.2	57.0	56.7	56.7
IA EV3	48.9	49.1	49.1	47.5	49.6	47.5	48.4	47.4	58.1	58.1
90k	74.8 Y	74.2 Y	69.5 Y	70.1 Y	70.8 Y	67.0 Y	69.0 Y	68.2 Y	66.4 Y	66.4 Y
Quint Axle Crane	55.6 Y	54.9 Y	54.7 Y	53.4 Y	56.3 Y	53.4 Y	54.9 Y	55.2 Y	55.2 Y	55.2 Y
136k A	87.6 Y	88.4 Y	84.2 Y	85.7 Y	84.3 Y	81.6 Y	81.9 Y	82.8 Y	81.0 Y	81.0 Y
136k B	81.2 Y	81.7 Y	79.0 Y	80.9 Y	82.4 Y	78.1 Y	80.4 Y	75.4 Y	68.0 Y	68.0 Y
156k	93.1 Y	93.7 Y	90.6 Y	92.8 Y	94.6 Y	79.2 Y	88.3 Y	79.8 Y	76.9 N	76.9 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.8 Y	57.6 Y	61.8 Y	60.4 Y	63.0 Y	60.1 Y	59.3 Y	58.4 Y	60.8 Y	60.8 Y
Small Annual Crane	50.7 Y	50.7 Y	50.6 Y	51.5 Y	52.7 Y	50.7 Y	51.6 Y	52.0 Y	52.5 Y	52.5 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H30-1987, 30 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.49	1.47	1.67	1.71	1.73	1.66	1.71	1.72	1.69	1.69
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.89	0.88	1.01	1.04	1.04	1.01	1.04	1.05	1.02	1.02
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	SRV +M	SRV +M
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP2 I	0.1L SP1 I	0.3L SP2 I	0.3L SP1 I	0.3L SP1 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	49.9	50.1	47.8	48.5	49.9	48.0	48.6	49.0	49.9	49.9
IA SU4	48.4	48.7	50.5	49.0	51.3	49.0	49.0	48.9	56.8	56.8
IA SU5	50.0	50.9	47.8	48.4	49.8	47.9	48.5	48.8	49.8	49.8
IA SU6	55.8	55.0	58.2	55.1	58.5	55.1	55.0	53.7	58.2	58.2
IA SU7	61.6	59.9	61.2	61.2	61.6	58.5	60.3	60.0	58.8	58.8
IA 3S3A	75.5	73.0	71.3	71.3	71.7	67.3	70.0	68.8	66.0	66.0
IA 3S3B	88.1	93.1	89.8	88.8	87.0	83.1	84.4	84.1	80.4	80.4
IA 4S3	88.8	89.4	85.1	86.4	88.7	85.4	86.5	87.1	86.0	86.0
IA 3-3	76.2	74.0	71.9	72.1	72.5	68.0	70.8	69.5	66.5	66.5
IA 5-2	77.4	78.8	74.0	75.0	77.1	74.2	75.1	75.5	77.6	77.6
IA EV2	48.2	48.4	54.2	55.8	56.9	54.9	56.2	57.0	56.7	56.7
IA EV3	48.9	49.1	49.1	47.5	49.6	47.5	48.4	47.4	58.1	58.1
90k	74.8 Y	74.2 Y	69.5 Y	70.1 Y	70.8 Y	67.0 Y	69.0 Y	68.2 Y	66.4 Y	66.4 Y
Quint Axle Crane	55.6 Y	54.9 Y	54.7 Y	53.4 Y	56.3 Y	53.4 Y	54.9 Y	55.2 Y	55.2 Y	55.2 Y
136k A	87.6 Y	88.4 Y	84.2 Y	85.7 Y	84.3 Y	81.6 Y	81.9 Y	82.8 Y	81.0 Y	81.0 Y
136k B	81.2 Y	81.7 Y	79.0 Y	80.9 Y	82.4 Y	78.1 Y	80.4 Y	75.4 Y	68.0 Y	68.0 Y
156k	93.1 Y	93.7 Y	90.6 Y	92.8 Y	94.6 Y	79.2 Y	88.3 Y	79.8 Y	76.9 N	76.9 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	58.8 Y	57.6 Y	61.8 Y	60.4 Y	63.0 Y	60.1 Y	59.3 Y	58.4 Y	60.8 Y	60.8 Y
Small Annual Crane	50.7 Y	50.7 Y	50.6 Y	51.5 Y	52.7 Y	50.7 Y	51.6 Y	52.0 Y	52.5 Y	52.5 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H30-1987, 45 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.49	1.47								
Controlled by	STR +V	STR +V								
Location	0.0L SP1 I	0.0L SP1 I								
HS-20 Inv	0.89	0.88								
Controlled by	STR +V	STR +V								
Location	0.0L SP1 I	0.0L SP1 I								
IA Type 4	49.9	50.1								
IA SU4	48.4	48.7								
IA SU5	50.0	50.9								
IA SU6	55.8	55.0								
IA SU7	61.6	59.9								
IA 3S3A	75.5	73.0								
IA 3S3B	88.1	93.1								
IA 4S3	88.8	89.4								
IA 3-3	76.2	74.0								
IA 5-2	77.4	78.8								
IA EV2	48.2	48.4								
IA EV3	48.9	49.1								
90k	74.8 Y	74.2 Y								
Quint Axle Crane	55.6 Y	54.9 Y								
136k A	87.6 Y	88.4 Y								
136k B	81.2 Y	81.7 Y								
156k	93.1 Y	93.7 Y								
All Systems Permit	Yes	Yes								
Fluid Milk Truck	58.8 Y	57.6 Y								
Small Annual Crane	50.7 Y	50.7 Y								

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H30S-1987, 30' Roadway, 0 Degree Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.75	1.48	1.69	1.67	1.70
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP1 I	0.3L SP1 I	0.7L SP1 I
HS-20 Inv	1.05	0.89	1.02	1.02	1.03
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP1 I	0.3L SP1 I	0.7L SP1 I
IA Type 4	57.3	50.3	48.2	48.3	50.1
IA SU4	54.8	48.9	51.2	54.1	57.0
IA SU5	58.7	51.1	48.2	48.2	50.0
IA SU6	66.0	55.3	58.7	57.5	58.5
IA SU7	73.6	60.2	61.7	58.9	59.1
IA 3S3A	93.2	73.3	71.9	67.7	66.3
IA 3S3B	101.1	93.5	96.1	83.5	80.7
IA 4S3	102.5	89.8	85.8	85.9	86.3
IA 3-3	96.5	74.3	72.5	68.4	66.8
IA 5-2	90.9	79.1	74.6	74.6	77.9
IA EV2	54.3	48.6	54.8	55.3	57.0
IA EV3	55.5	49.3	51.8	54.6	58.4
90k	82.2 Y	74.5 Y	70.0 Y	67.3 Y	66.6 Y
Quint Axle Crane	66.6 Y	55.2 Y	55.2 Y	54.2 Y	55.4 Y
136k A	100.2 Y	88.8 Y	85.0 Y	82.1 Y	81.3 Y
136k B	91.3 Y	82.1 Y	79.7 Y	78.6 Y	68.3 Y
156k	104.7 Y	94.1 Y	91.4 Y	79.6 Y	77.2 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	69.8 Y	57.9 Y	62.4 Y	60.5 Y	61.1 Y
Small Annual Crane	58.3 Y	50.9 Y	51.0 Y	51.0 Y	52.7 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H30S-1987, 30' Roadway, 15 Degree Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.75	1.48	1.69	1.67	1.70
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP1 I	0.3L SP1 I	0.7L SP1 I
HS-20 Inv	1.05	0.89	1.02	1.02	1.03
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP1 I	0.3L SP1 I	0.7L SP1 I
IA Type 4	57.3	50.3	48.2	48.3	50.1
IA SU4	54.8	48.9	51.2	54.1	57.0
IA SU5	58.7	51.1	48.2	48.2	50.0
IA SU6	66.0	55.3	58.7	57.5	58.5
IA SU7	73.6	60.2	61.7	58.9	59.1
IA 3S3A	93.2	73.3	71.9	67.7	66.3
IA 3S3B	101.1	93.5	96.1	83.5	80.7
IA 4S3	102.5	89.8	85.8	85.9	86.3
IA 3-3	96.5	74.3	72.5	68.4	66.8
IA 5-2	90.9	79.1	74.6	74.6	77.9
IA EV2	54.3	48.6	54.8	55.3	57.0
IA EV3	55.5	49.3	51.8	54.6	58.4
90k	82.2 Y	74.5 Y	70.0 Y	67.3 Y	66.6 Y
Quint Axle Crane	66.6 Y	55.2 Y	55.2 Y	54.2 Y	55.4 Y
136k A	100.2 Y	88.8 Y	85.0 Y	82.1 Y	81.3 Y
136k B	91.3 Y	82.1 Y	79.7 Y	78.6 Y	68.3 Y
156k	104.7 Y	94.1 Y	91.4 Y	79.6 Y	77.2 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	69.8 Y	57.9 Y	62.4 Y	60.5 Y	61.1 Y
Small Annual Crane	58.3 Y	50.9 Y	51.0 Y	51.0 Y	52.7 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H30S-1987, 30' Roadway, 30 Degree Skew

	Bridge Length				
Truck	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.75	1.48	1.69	1.67	1.70
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP1 I	0.3L SP1 I	0.7L SP1 I
HS-20 Inv	1.05	0.89	1.02	1.02	1.03
Controlled by	STR1 +V	STR1 +V	STR1 +V	STR1 +V	STR1 +V
Location	0.0L SP1 I	0.0L SP1 I	0.3L SP1 I	0.3L SP1 I	0.7L SP1 I
IA Type 4	57.3	50.3	48.2	48.3	50.1
IA SU4	54.8	48.9	51.2	54.1	57.0
IA SU5	58.7	51.1	48.2	48.2	50.0
IA SU6	66.0	55.3	58.7	57.5	58.5
IA SU7	73.6	60.2	61.7	58.9	59.1
IA 3S3A	93.2	73.3	71.9	67.7	66.3
IA 3S3B	101.1	93.5	96.1	83.5	80.7
IA 4S3	102.5	89.8	85.8	85.9	86.3
IA 3-3	96.5	74.3	72.5	68.4	66.8
IA 5-2	90.9	79.1	74.6	74.6	77.9
IA EV2	54.3	48.6	54.8	55.3	57.0
IA EV3	55.5	49.3	51.8	54.6	58.4
90k	82.2 Y	74.5 Y	70.0 Y	67.3 Y	66.6 Y
Quint Axle Crane	66.6 Y	55.2 Y	55.2 Y	54.2 Y	55.4 Y
136k A	100.2 Y	88.8 Y	85.0 Y	82.1 Y	81.3 Y
136k B	91.3 Y	82.1 Y	79.7 Y	78.6 Y	68.3 Y
156k	104.7 Y	94.1 Y	91.4 Y	79.6 Y	77.2 N
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	69.8 Y	57.9 Y	62.4 Y	60.5 Y	61.1 Y
Small Annual Crane	58.3 Y	50.9 Y	51.0 Y	51.0 Y	52.7 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H30-1994, 0 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.57	1.95	1.57	1.78	1.82	1.78	2.10	2.00	2.11	2.11
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +M	STR +V	STR +V	STR +V
Location	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.94	1.17	0.94	1.07	1.09	1.07	1.20	1.15	1.14	1.14
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.5L SP2 I	0.5L SP1 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	53.8	65.3	53.8	60.3	62.3	60.3	61.8	60.6	64.2	64.2
IA SU4	52.4	63.2	52.4	60.4	61.6	60.4	65.4	63.6	71.1	71.1
IA SU5	54.5	66.9	54.5	60.4	62.4	60.4	61.8	60.6	64.2	64.2
IA SU6	58.5	68.7	58.5	65.6	66.8	65.6	71.0	70.5	73.7	73.7
IA SU7	63.0	71.5	63.0	67.7	68.7	69.3	72.7	72.4	75.1	75.1
IA 3S3A	75.6	96.8	75.6	78.8	82.6	78.8	88.7	84.7	83.4	83.4
IA 3S3B	99.9	116.2	99.9	101.5	107.8	101.5	108.6	105.6	99.7	99.7
IA 4S3	95.9	117.1	95.9	107.4	110.9	107.4	109.9	107.8	111.3	111.3
IA 3-3	76.6	98.0	76.6	79.6	83.5	79.6	89.7	85.6	84.0	84.0
IA 5-2	84.3	103.6	84.3	93.6	96.6	93.6	95.7	93.8	99.9	99.9
IA EV2	52.1	64.2	52.1	60.2	61.4	60.2	69.3	67.9	71.0	71.0
IA EV3	52.8	65.1	52.8	60.8	62.0	60.8	63.9	62.3	72.6	72.6
90k	77.2 Y	92.3 Y	77.2 Y	81.3 Y	85.5 Y	81.3 Y	87.9 Y	84.6 Y	85.4 Y	85.4 Y
Quint Axle Crane	58.3 Y	72.8 Y	58.3 Y	65.5 Y	67.3 Y	65.5 Y	69.4 Y	67.6 Y	70.5 Y	70.5 Y
136k A	94.9 Y	113.7 Y	94.9 Y	101.1 Y	106.2 Y	101.1 Y	104.9 Y	103.5 Y	104.7 Y	104.7 Y
136k B	86.3 Y	101.4 Y	86.3 Y	89.8 Y	94.6 Y	89.8 Y	101.8 Y	95.2 Y	88.8 Y	88.8 Y
156k	99.0 Y	116.3 Y	99.0 Y	100.3 Y	107.0 Y	100.3 Y	113.8 Y	101.2 Y	100.2 Y	100.2 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	60.9 Y	73.1 Y	60.9 Y	67.6 Y	69.7 Y	67.6 Y	73.6 Y	73.3 Y	76.7 Y	76.7 Y
Small Annual Crane	54.3 Y	64.9 Y	54.3 Y	62.1 Y	63.5 Y	62.1 Y	64.9 Y	63.6 Y	67.0 Y	67.0 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H30-1994, 15 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.57	1.95	1.57	1.78	1.82	1.78	2.10	2.00	2.11	2.11
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +M	STR +V	STR +V	STR +V
Location	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.94	1.17	0.94	1.07	1.09	1.07	1.20	1.15	1.14	1.14
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.5L SP2 I	0.5L SP1 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	53.8	65.3	53.8	60.3	62.3	60.3	61.8	60.6	64.2	64.2
IA SU4	52.4	63.2	52.4	60.4	61.6	60.4	65.4	63.6	71.1	71.1
IA SU5	54.5	66.9	54.5	60.4	62.4	60.4	61.8	60.6	64.2	64.2
IA SU6	58.5	68.7	58.5	65.6	66.8	65.6	71.0	70.5	73.7	73.7
IA SU7	63.0	71.5	63.0	67.7	68.7	69.3	72.7	72.4	75.1	75.1
IA 3S3A	75.6	96.8	75.6	78.8	82.6	78.8	88.7	84.7	83.4	83.4
IA 3S3B	99.9	116.2	99.9	101.5	107.8	101.5	108.6	105.6	99.7	99.7
IA 4S3	95.9	117.1	95.9	107.4	110.9	107.4	109.9	107.8	111.3	111.3
IA 3-3	76.6	98.0	76.6	79.6	83.5	79.6	89.7	85.6	84.0	84.0
IA 5-2	84.3	103.6	84.3	93.6	96.6	93.6	95.7	93.8	99.9	99.9
IA EV2	52.1	64.2	52.1	60.2	61.4	60.2	69.3	67.9	71.0	71.0
IA EV3	52.8	65.1	52.8	60.8	62.0	60.8	63.9	62.3	72.6	72.6
90k	77.2 Y	92.3 Y	77.2 Y	81.3 Y	85.5 Y	81.3 Y	87.9 Y	84.6 Y	85.4 Y	85.4 Y
Quint Axle Crane	58.3 Y	72.8 Y	58.3 Y	65.5 Y	67.3 Y	65.5 Y	69.4 Y	67.6 Y	70.5 Y	70.5 Y
136k A	94.9 Y	113.7 Y	94.9 Y	101.1 Y	106.1 Y	101.1 Y	104.9 Y	103.5 Y	104.7 Y	104.7 Y
136k B	86.3 Y	101.4 Y	86.3 Y	89.8 Y	94.6 Y	89.8 Y	101.8 Y	95.2 Y	88.8 Y	88.8 Y
156k	99.0 Y	116.4 Y	99.0 Y	100.3 Y	107.0 Y	100.3 Y	113.8 Y	101.2 Y	100.2 Y	100.2 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	60.9 Y	73.1 Y	60.9 Y	67.6 Y	69.7 Y	67.6 Y	73.6 Y	73.3 Y	76.7 Y	76.7 Y
Small Annual Crane	54.3 Y	64.9 Y	54.3 Y	62.1 Y	63.5 Y	62.1 Y	64.9 Y	63.6 Y	67.0 Y	67.0 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H30-1994, 30 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.57	1.95	1.57	1.78	1.82	1.78	2.10	2.00	2.11	2.11
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	STR +M	STR +V	STR +V	STR +V
Location	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.0L SP1 I	0.3L SP2 I	0.3L SP1 I
HS-20 Inv	0.94	1.17	0.94	1.07	1.09	1.07	1.20	1.15	1.14	1.14
Controlled by	STR +V	STR +V	STR +V	STR +V	STR +V	STR +V	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.0L SP2 I	0.0L SP1 I	0.0L SP1 I	0.5L SP2 I	0.5L SP1 I	0.5L SP2 I	0.5L SP1 I
IA Type 4	53.8	65.3	53.8	60.3	62.3	60.3	61.8	60.6	64.2	64.2
IA SU4	52.4	63.2	52.4	60.4	61.6	60.4	65.4	63.6	71.1	71.1
IA SU5	54.5	66.9	54.5	60.4	62.4	60.4	61.8	60.6	64.2	64.2
IA SU6	58.5	68.7	58.5	65.6	66.8	65.6	71.0	70.5	73.7	73.7
IA SU7	63.0	71.5	63.0	67.8	68.7	69.3	72.7	72.4	75.1	75.1
IA 3S3A	75.6	96.8	75.6	78.8	82.6	78.8	88.7	84.7	83.4	83.4
IA 3S3B	99.9	116.3	99.9	101.5	107.8	101.5	108.6	105.6	99.7	99.7
IA 4S3	95.9	117.2	95.9	107.4	110.9	107.4	109.9	107.8	111.3	111.3
IA 3-3	76.6	98.0	76.6	79.6	83.5	79.6	89.7	85.6	84.0	84.0
IA 5-2	84.3	103.6	84.3	93.6	96.6	93.6	95.6	93.8	99.9	99.9
IA EV2	52.1	64.2	52.1	60.2	61.4	60.2	69.3	67.9	71.0	71.0
IA EV3	52.8	65.1	52.8	60.8	62.0	60.8	63.9	62.3	72.6	72.6
90k	77.2 Y	92.3 Y	77.2 Y	81.3 Y	85.5 Y	81.3 Y	87.9 Y	84.6 Y	85.4 Y	85.4 Y
Quint Axle Crane	58.3 Y	72.8 Y	58.3 Y	65.5 Y	67.3 Y	65.5 Y	69.4 Y	67.6 Y	70.5 Y	70.5 Y
136k A	94.9 Y	113.7 Y	94.9 Y	101.1 Y	106.1 Y	101.1 Y	104.9 Y	103.5 Y	104.7 Y	104.7 Y
136k B	86.3 Y	101.5 Y	86.3 Y	89.8 Y	94.6 Y	89.8 Y	101.8 Y	95.2 Y	88.8 Y	88.8 Y
156k	99.0 Y	116.4 Y	99.0 Y	100.3 Y	107.0 Y	100.3 Y	113.8 Y	101.2 Y	100.2 Y	100.2 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	60.9 Y	73.1 Y	60.9 Y	67.6 Y	69.7 Y	67.6 Y	73.6 Y	73.3 Y	76.7 Y	76.7 Y
Small Annual Crane	54.3 Y	65.0 Y	54.3 Y	62.1 Y	63.5 Y	62.1 Y	64.9 Y	63.6 Y	67.0 Y	67.0 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

H Bridge Standards Load Rating Summary - LFR Rating Method

H30-1994, 45 Degree Skew

	Bridge Length									
Truck	**126'-4**	**138'-10**	**151'-4**	**163'-10**	**176'-4**	**188'-10**	**201'-4**	**213'-10**	**226'-4**	**243'-0**
HS-20 Oper	1.57	1.95								
Controlled by	STR +V	STR +V								
Location	0.0L SP2 I	0.0L SP1 I								
HS-20 Inv	0.94	1.17								
Controlled by	STR +V	STR +V								
Location	0.0L SP2 I	0.0L SP1 I								
IA Type 4	53.8	65.4								
IA SU4	52.4	63.2								
IA SU5	54.5	66.9								
IA SU6	58.5	68.7								
IA SU7	63.0	71.5								
IA 3S3A	75.6	96.8								
IA 3S3B	99.9	116.3								
IA 4S3	95.9	117.2								
IA 3-3	76.6	98.0								
IA 5-2	84.3	103.6								
IA EV2	52.1	64.2								
IA EV3	52.8	65.1								
90k	77.2 Y	92.4 Y								
Quint Axle Crane	58.3 Y	72.8 Y								
136k A	94.9 Y	113.8 Y								
136k B	86.3 Y	101.5 Y								
156k	99.0 Y	116.4 Y								
All Systems Permit	Yes	Yes								
Fluid Milk Truck	60.9 Y	73.1 Y								
Small Annual Crane	54.3 Y	65.0 Y								

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

4.3 LFD/ASD RESULTS TABLES

4.3.2 J-Series

J Bridge Standards Load Rating Summary - LFR Rating Method

J3-1953, All Skews

	Bridge Length	
Truck	**23'-9**	**30'-0**
HS-20 Oper	0.98	1.04
Controlled by	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I
HS-20 Inv	0.59	0.62
Controlled by	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I
IA Type 4	26.2	30.0
IA SU4	25.2	28.4
IA SU5	26.8	30.2
IA SU6	28.0	30.9
IA SU7	31.3	33.2
IA 3S3A	38.4	44.1
IA 3S3B	43.5	49.2
IA 4S3	46.1	52.9
IA 3-3	49.3	52.9
IA 5-2	41.5	46.7
IA EV2	26.9	31.3
IA EV3	26.1	30.5
90k	33.6 N	38.6 N
Quint Axle Crane	33.6 N	36.6 N
136k A	45.8 N	51.3 N
136k B	40.1 N	44.1 N
156k	46.0 N	50.6 N
All Systems Permit	No	No
Fluid Milk Truck	32.4 N	34.2 N
Small Annual Crane	24.8 N	28.5 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J3A-1960, All Skews

	Bridge Length	
Truck	**24'-0**	**30'-0**
HS-20 Oper	0.98	1.07
Controlled by	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I
HS-20 Inv	0.59	0.64
Controlled by	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I
IA Type 4	26.2	30.7
IA SU4	25.2	29.0
IA SU5	26.8	30.8
IA SU6	28.0	31.6
IA SU7	31.2	33.9
IA 3S3A	38.5	45.0
IA 3S3B	43.5	50.3
IA 4S3	46.2	54.0
IA 3-3	49.1	54.0
IA 5-2	41.5	47.8
IA EV2	27.0	31.9
IA EV3	26.1	31.1
90k	33.7 N	39.4 N
Quint Axle Crane	33.7 N	37.4 N
136k A	45.8 N	52.4 N
136k B	40.1 N	45.0 N
156k	45.9 N	51.7 N
All Systems Permit	No	No
Fluid Milk Truck	32.3 N	35.0 N
Small Annual Crane	24.8 N	29.2 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J4-1952, All Skews

	Bridge Length		
Truck	**75'-0**	**100'-0**	**125'-0**
HS-20 Oper	1.03	0.92	1.02
Controlled by	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I
HS-20 Inv	0.61	0.55	0.61
Controlled by	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I
IA Type 4	29.1	27.5	31.5
IA SU4	27.5	26.4	30.4
IA SU5	30.4	28.6	32.6
IA SU6	31.6	29.3	33.1
IA SU7	34.5	31.1	34.6
IA 3S3A	44.8	46.2	54.4
IA 3S3B	47.7	51.8	62.6
IA 4S3	51.0	53.8	62.8
IA 3-3	58.3	55.8	55.0
IA 5-2	49.3	48.7	56.2
IA EV2	28.9	28.2	32.4
IA EV3	28.6	27.5	31.6
90k	38.0 N	40.4 N	49.3 Y
Quint Axle Crane	38.3 N	33.0 N	36.1 N
136k A	51.6 N	52.0 N	61.1 N
136k B	44.1 N	45.8 N	54.6 N
156k	50.6 N	52.5 N	62.6 N
All Systems Permit	No	No	No
Fluid Milk Truck	35.8 N	32.0 N	35.3 N
Small Annual Crane	28.0 N	26.9 N	31.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J4A-1960, 20' Roadway, All Skews

	Bridge Length		
Truck	**75'-0**	**100'-0**	**125'-0**
HS-20 Oper	1.04	0.93	1.03
Controlled by	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I
HS-20 Inv	0.62	0.56	0.61
Controlled by	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I
IA Type 4	29.6	27.9	31.8
IA SU4	27.9	26.7	30.7
IA SU5	30.9	29.0	32.9
IA SU6	32.1	29.7	33.4
IA SU7	35.0	31.5	34.9
IA 3S3A	45.5	46.8	54.9
IA 3S3B	48.4	52.5	63.2
IA 4S3	51.8	54.4	63.4
IA 3-3	59.2	56.5	55.6
IA 5-2	50.1	49.3	56.7
IA EV2	29.3	28.5	32.7
IA EV3	29.0	27.8	31.9
90k	38.5 N	40.9 N	49.8 Y
Quint Axle Crane	38.9 N	33.4 N	36.4 N
136k A	52.3 N	52.6 N	61.7 N
136k B	44.8 N	46.3 N	55.1 N
156k	51.4 N	53.1 N	63.2 N
All Systems Permit	No	No	No
Fluid Milk Truck	36.3 N	32.4 N	35.7 N
Small Annual Crane	28.4 N	27.3 N	31.3 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J5-1957, All Skews

	Bridge Length	
Truck	**24'-0**	**30'-0**
HS-20 Oper	1.09	1.19
Controlled by	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I
HS-20 Inv	0.65	0.71
Controlled by	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I
IA Type 4	29.2	34.3
IA SU4	28.1	32.5
IA SU5	29.9	34.5
IA SU6	31.2	35.3
IA SU7	34.8	37.9
IA 3S3A	42.8	50.3
IA 3S3B	48.4	56.2
IA 4S3	51.4	60.4
IA 3-3	54.7	60.4
IA 5-2	46.2	53.4
IA EV2	30.0	35.6
IA EV3	29.1	34.8
90k	37.5 N	44.0 N
Quint Axle Crane	37.5 N	41.8 N
136k A	51.0 N	58.6 N
136k B	44.6 N	50.4 N
156k	51.2 N	57.8 N
All Systems Permit	No	No
Fluid Milk Truck	36.0 N	39.1 N
Small Annual Crane	27.6 N	32.6 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J6-1957, All Skews

	Bridge Length		
Truck	**75'-0**	**100'-0**	**125'-0**
HS-20 Oper	1.16	1.12	1.20
Controlled by	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I
HS-20 Inv	0.70	0.67	0.72
Controlled by	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I
IA Type 4	33.0	33.6	37.3
IA SU4	31.2	32.2	36.1
IA SU5	34.5	35.0	38.6
IA SU6	35.8	35.8	39.2
IA SU7	39.1	38.0	41.0
IA 3S3A	50.8	56.1	64.4
IA 3S3B	54.1	62.9	70.5
IA 4S3	57.8	65.3	69.9
IA 3-3	64.1	68.2	65.2
IA 5-2	55.9	59.2	66.2
IA EV2	32.8	34.4	38.4
IA EV3	32.5	33.6	37.4
90k	43.1 N	49.1 Y	57.8 Y
Quint Axle Crane	43.5 N	40.3 N	42.8 N
136k A	58.5 N	63.1 N	66.2 N
136k B	50.0 N	55.6 N	63.9 N
156k	57.4 N	63.7 N	69.0 N
All Systems Permit	No	No	No
Fluid Milk Truck	40.6 N	39.1 N	41.9 N
Small Annual Crane	31.8 N	32.9 N	36.7 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J7-1960/1967/1979, All Skews

	Bridge Length	
Truck	**24'-0**	**30'-0**
HS-20 Oper	1.71	1.84
Controlled by	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I
HS-20 Inv	1.02	1.10
Controlled by	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I
IA Type 4	45.6	53.4
IA SU4	43.8	50.5
IA SU5	46.6	53.7
IA SU6	48.7	54.9
IA SU7	54.3	59.0
IA 3S3A	66.9	78.3
IA 3S3B	75.6	87.4
IA 4S3	80.3	94.0
IA 3-3	85.4	94.0
IA 5-2	72.2	83.1
IA EV2	46.9	55.1
IA EV3	45.5	54.1
90k	58.5 Y	68.5 Y
Quint Axle Crane	58.5 Y	65.0 Y
136k A	79.6 Y	91.2 Y
136k B	69.6 Y	78.4 Y
156k	79.9 Y	89.9 Y
All Systems Permit	Yes	Yes
Fluid Milk Truck	56.2 Y	60.9 Y
Small Annual Crane	43.1 Y	50.7 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J8-1960-1967-1979, 28' Roadway, All Skews

	Bridge Length		
Truck	**75'-0**	**100'-0**	**125'-0**
HS-20 Oper	1.53	1.67	1.71
Controlled by	STR1 +M	STR1 +M	STR1 +M
Location	0.3L SP3 I	0.5L SP2 I	0.6L SP1 I
HS-20 Inv	0.92	1.00	1.02
Controlled by	STR1 +M	STR1 +M	STR1 +M
Location	0.3L SP3 I	0.5L SP2 I	0.6L SP1 I
IA Type 4	44.6	49.4	55.1
IA SU4	42.6	47.5	53.2
IA SU5	47.1	51.7	56.9
IA SU6	48.5	53.4	57.8
IA SU7	52.4	56.7	60.4
IA 3S3A	66.0	75.9	87.8
IA 3S3B	75.1	85.2	99.6
IA 4S3	79.7	88.4	99.9
IA 3-3	74.9	92.6	82.8
IA 5-2	73.7	80.1	89.9
IA EV2	43.9	50.0	56.6
IA EV3	43.1	50.1	55.2
90k	58.1 Y	66.4 Y	78.5 Y
Quint Axle Crane	53.3 Y	58.5 Y	59.7 Y
136k A	77.1 Y	85.4 Y	95.0 Y
136k B	66.8 N	75.2 Y	86.8 Y
156k	76.6 N	86.2 Y	99.0 Y
All Systems Permit	Yes	Yes	Yes
Fluid Milk Truck	52.5 Y	58.3 Y	60.0 Y
Small Annual Crane	43.0 Y	48.1 Y	54.2 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J15-1975-1979, 30' Roadway, All Skews

	Bridge Length		
Truck	**18'-0**	**24'-0**	**30'-0**
HS-20 Oper	1.70	1.91	1.96
Controlled by	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I
HS-20 Inv	1.02	1.14	1.17
Controlled by	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I
IA Type 4	50.0	51.0	57.1
IA SU4	47.4	49.0	54.1
IA SU5	52.9	52.1	57.4
IA SU6	57.7	54.5	58.8
IA SU7	64.4	60.7	63.2
IA 3S3A	73.4	74.8	83.8
IA 3S3B	85.2	84.6	93.6
IA 4S3	88.1	89.8	100.6
IA 3-3	99.7	95.6	100.6
IA 5-2	82.0	80.7	88.9
IA EV2	46.6	52.5	58.8
IA EV3	48.4	50.9	57.9
90k	64.3 Y	65.5 Y	73.3 Y
Quint Axle Crane	64.3 Y	65.5 Y	69.6 Y
136k A	87.4 Y	89.1 Y	97.6 Y
136k B	83.0 Y	77.9 Y	83.9 Y
156k	95.2 Y	89.4 Y	96.2 Y
All Systems Permit	Yes	Yes	Yes
Fluid Milk Truck	67.0 Y	62.9 Y	65.1 Y
Small Annual Crane	47.0 Y	48.3 Y	54.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J16-1969, 30' Roadway, All Skews

	Bridge Length				
Truck	**75'-0**	**87'-6**	**100'-0**	**112'-6**	**125'-0**
HS-20 Oper	1.73	1.62	1.66	1.73	1.77
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I
HS-20 Inv	1.04	0.97	0.99	1.04	1.06
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I
IA Type 4	49.1	47.2	49.8	52.9	55.0
IA SU4	46.4	44.9	47.7	50.9	53.1
IA SU5	51.3	49.2	51.8	54.9	56.9
IA SU6	53.3	50.6	53.0	55.9	57.7
IA SU7	58.1	54.3	56.3	58.8	60.4
IA 3S3A	75.4	75.4	79.7	83.3	95.0
IA 3S3B	80.5	81.7	92.6	92.9	101.3
IA 4S3	86.0	88.2	96.1	94.6	100.5
IA 3-3	93.8	89.1	93.0	97.8	96.1
IA 5-2	83.2	81.5	87.1	85.4	96.6
IA EV2	48.7	47.9	50.9	53.7	56.6
IA EV3	48.3	46.9	49.7	52.9	55.1
90k	64.1 Y	66.0 Y	72.2 Y	72.8 Y	84.3 Y
Quint Axle Crane	64.7 Y	58.8 Y	59.7 Y	61.8 Y	63.0 Y
136k A	87.0 Y	87.1 Y	90.6 Y	91.9 Y	95.2 Y
136k B	74.4 Y	74.9 Y	81.8 Y	81.4 Y	93.3 Y
156k	85.4 Y	86.0 Y	93.8 Y	93.4 Y	99.2 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	60.4 Y	56.1 Y	57.9 Y	60.3 Y	61.7 Y
Small Annual Crane	47.3 Y	45.9 Y	48.7 Y	51.8 Y	54.1 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J24-1984, All Skews

	Bridge Length				
Truck	**75'-0**	**87'-6**	**100'-0**	**112'-6**	**125'-0**
HS-20 Oper	2.33	2.08	2.29	2.19	2.15
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.5L SP2 I	0.4L SP1 E
HS-20 Inv	1.39	1.25	1.37	1.31	1.28
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.5L SP2 I	0.4L SP1 E
IA Type 4	66.2	60.0	66.9	66.7	64.5
IA SU4	62.5	57.4	64.2	64.4	62.5
IA SU5	69.1	62.9	70.0	69.5	67.0
IA SU6	71.8	64.5	72.5	70.8	69.2
IA SU7	78.3	69.3	76.9	74.5	73.7
IA 3S3A	101.6	89.5	98.4	105.0	103.5
IA 3S3B	108.4	101.3	115.3	117.2	115.0
IA 4S3	115.9	107.4	119.6	119.3	115.4
IA 3-3	115.3	111.4	114.8	125.1	123.5
IA 5-2	112.1	97.5	108.4	107.7	103.8
IA EV2	65.6	60.2	67.7	67.7	65.6
IA EV3	65.0	59.3	67.8	66.9	65.3
90k	86.3 Y	78.3 Y	89.9 Y	91.9 Y	90.6 Y
Quint Axle Crane	87.1 Y	77.5 Y	82.7 Y	78.2 Y	76.3 Y
136k A	117.2 Y	103.4 Y	111.8 Y	113.9 Y	112.3 Y
136k B	100.2 Y	90.3 Y	101.8 Y	102.7 Y	100.2 Y
156k	115.0 Y	103.6 Y	116.7 Y	117.8 Y	114.9 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	81.4 Y	74.3 Y	80.1 Y	76.4 Y	73.9 Y
Small Annual Crane	63.6 Y	57.9 Y	65.1 Y	65.3 Y	63.4 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J24-1987, All Skews

	Bridge Length				
Truck	**75'-0**	**87'-6**	**100'-0**	**112'-6**	**125'-0**
HS-20 Oper	2.33	2.08	2.29	2.27	2.15
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E
HS-20 Inv	1.39	1.25	1.37	1.36	1.28
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP2 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E
IA Type 4	66.2	60.0	66.9	66.7	64.5
IA SU4	62.5	57.4	64.2	64.4	62.5
IA SU5	69.1	62.9	70.0	69.6	67.0
IA SU6	71.8	64.5	72.5	72.2	69.2
IA SU7	78.3	69.3	76.9	76.6	73.7
IA 3S3A	101.7	89.5	98.4	105.0	103.5
IA 3S3B	108.4	101.3	115.3	117.2	115.0
IA 4S3	115.9	107.4	119.6	119.3	115.4
IA 3-3	127.8	115.5	114.8	128.2	123.5
IA 5-2	112.1	97.5	108.4	107.7	103.8
IA EV2	65.6	60.2	67.7	67.7	65.6
IA EV3	65.0	59.3	67.8	67.5	65.3
90k	86.3 Y	78.3 Y	89.9 Y	91.9 Y	90.6 Y
Quint Axle Crane	87.1 Y	77.5 Y	83.0 Y	81.1 Y	76.3 Y
136k A	117.2 Y	103.4 Y	111.7 Y	115.9 Y	112.3 Y
136k B	100.2 Y	90.3 Y	101.8 Y	102.7 Y	100.2 Y
156k	115.0 Y	103.6 Y	116.7 Y	117.8 Y	114.9 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	81.4 Y	74.3 Y	80.1 Y	77.9 Y	73.9 Y
Small Annual Crane	63.6 Y	57.9 Y	65.1 Y	65.3 Y	63.4 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J30C-1987, 30' Roadway, All Skews

	Bridge Length				
Truck	**75'-0**	**87'-6**	**100'-0**	**112'-6**	**125'-0**
HS-20 Oper	2.34	2.09	2.31	2.29	2.16
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.6L SP3 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E
HS-20 Inv	1.40	1.25	1.38	1.37	1.29
Controlled by	STR1 +M	STR1 +M	STR1 +M	STR1 +M	STR1 +M
Location	0.5L SP2 E	0.6L SP3 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E
IA Type 4	66.5	60.3	67.2	67.1	64.9
IA SU4	62.8	57.7	64.6	64.8	62.9
IA SU5	69.4	63.2	70.4	70.0	67.5
IA SU6	72.1	64.8	72.8	72.6	69.6
IA SU7	78.6	69.6	77.3	77.1	74.2
IA 3S3A	102.1	90.0	102.1	105.6	104.2
IA 3S3B	108.9	101.8	115.9	117.9	115.7
IA 4S3	116.3	107.9	120.2	120.0	116.1
IA 3-3	128.6	116.0	119.1	129.0	124.3
IA 5-2	112.5	98.1	108.9	108.3	104.5
IA EV2	65.9	60.5	68.0	68.1	66.1
IA EV3	65.3	59.6	68.1	67.9	65.7
90k	86.6 Y	78.8 Y	90.4 Y	92.4 Y	91.2 Y
Quint Axle Crane	87.5 Y	77.9 Y	83.4 Y	81.6 Y	76.8 Y
136k A	117.6 Y	104.0 Y	115.9 Y	116.5 Y	113.0 Y
136k B	100.6 Y	90.8 Y	102.3 Y	103.3 Y	100.9 Y
156k	115.4 Y	104.1 Y	117.3 Y	118.4 Y	115.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	81.7 Y	74.7 Y	80.5 Y	78.3 Y	74.4 Y
Small Annual Crane	63.9 Y	58.2 Y	65.4 Y	65.7 Y	63.8 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

J Bridge Standards Load Rating Summary - LFR Rating Method

J30C-1979, All Skews

	Bridge Length				
Truck	**75'-0**	**87'-6**	**100'-0**	**112'-6**	**125'-0**
HS-20 Oper	1.72	1.67	1.38	1.59	1.68
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.0L SP1 I	0.5L SP2 E	0.2L SP2 I	0.5L SP2 I	0.5L SP2 I
HS-20 Inv	1.03	1.00	0.83	0.95	1.01
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.0L SP1 I	0.5L SP2 E	0.2L SP2 I	0.5L SP2 I	0.5L SP2 I
IA Type 4	49.3	48.7	44.8	48.5	52.2
IA SU4	46.5	46.4	42.9	46.7	50.4
IA SU5	51.5	50.9	46.8	50.4	54.0
IA SU6	53.5	52.3	48.3	51.3	54.8
IA SU7	58.3	56.2	53.9	54.0	57.3
IA 3S3A	72.7	70.5	60.6	67.2	86.6
IA 3S3B	80.7	84.4	73.2	76.4	90.7
IA 4S3	86.3	91.2	78.8	75.5	90.0
IA 3-3	82.5	82.1	70.7	77.7	91.2
IA 5-2	83.5	84.2	72.9	72.7	88.7
IA EV2	48.9	49.5	39.9	49.8	53.7
IA EV3	48.4	48.5	41.7	48.5	52.3
90k	64.2 Y	68.3 Y	59.5 Y	65.9 Y	80.1 Y
Quint Axle Crane	63.3 Y	60.8 Y	55.5 Y	56.4 Y	59.8 Y
136k A	87.2 Y	90.2 Y	68.8 Y	69.6 Y	85.2 Y
136k B	74.6 Y	77.5 Y	68.4 Y	69.6 Y	84.9 Y
156k	85.6 Y	88.8 Y	73.4 N	73.5 N	88.8 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	60.6 Y	58.0 Y	55.0 Y	55.4 Y	58.6 Y
Small Annual Crane	47.4 Y	47.4 Y	42.2 Y	47.7 Y	51.4 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior strips.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

4.3 LFD/ASD RESULTS TABLES

4.3.3 V- and RS-Series

V Bridge Standards Load Rating Summary - LFR Rating Method

V1-1915, 16' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**20'-0**	**22'-0**	**24'-0**	**26'-0**	**28'-0**	**30'-0**	**32'-0**
HS-20 Oper	0.30	0.53	0.44	0.29	0.73	0.66	0.46
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.5L SP1 E
HS-20 Inv	0.18	0.32	0.26	0.17	0.44	0.40	0.28
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.5L SP1 E
IA Type 4	8.4	14.3	11.6	7.9	21.0	19.2	13.3
IA SU4	8.0	13.7	11.2	7.6	20.0	18.2	12.7
IA SU5	8.7	14.7	11.8	8.0	21.2	19.5	13.7
IA SU6	9.2	15.4	12.3	8.2	21.7	19.9	14.0
IA SU7	10.3	17.1	13.5	8.9	23.4	21.3	14.8
IA 3S3A	12.3	21.0	17.0	11.5	30.8	28.6	20.2
IA 3S3B	14.1	23.8	19.2	12.9	34.5	31.9	22.4
IA 4S3	14.8	25.2	20.4	13.8	37.0	34.3	23.9
IA 3-3	16.5	27.1	21.4	14.2	37.2	34.0	23.7
IA 5-2	13.5	22.7	18.3	12.3	32.8	30.3	21.3
IA EV2	8.3	14.6	12.1	8.4	21.9	19.9	14.1
IA EV3	8.3	14.2	11.6	7.9	21.3	19.5	13.4
90k	10.8 N	18.4 N	14.9 N	10.1 N	27.0 N	25.0 N	17.7 N
Quint Axle Crane	10.8 N	18.4 N	14.9 N	10.1 N	26.1 N	23.1 N	15.7 N
136k A	14.7 N	25.0 N	20.2 N	13.7 N	36.2 N	32.9 N	22.9 N
136k B	13.2 N	22.0 N	17.5 N	11.7 N	31.0 N	28.4 N	19.9 N
156k	15.2 N	25.2 N	20.1 N	13.4 N	35.5 N	32.6 N	22.8 N
All Systems Permit	No	No	No	No	No	No	No
Fluid Milk Truck	10.7 N	17.7 N	14.0 N	9.2 N	24.1 N	22.0 N	15.3 N
Small Annual Crane	7.9 N	13.5 N	11.0 N	7.5 N	20.0 N	18.5 N	13.1 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1-1915, 18' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**20'-0**	**22'-0**	**24'-0**	**26'-0**	**28'-0**	**30'-0**	**32'-0**
HS-20 Oper	0.31	0.54	0.45	0.30	0.75	0.67	0.47
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 E	0.4L SP1 E	0.6L SP1 E	0.5L SP1 E
HS-20 Inv	0.19	0.32	0.27	0.18	0.45	0.40	0.28
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 E	0.4L SP1 E	0.6L SP1 E	0.5L SP1 E
IA Type 4	8.6	14.6	11.8	8.0	21.4	19.6	13.5
IA SU4	8.2	14.0	11.4	7.8	20.4	18.6	12.9
IA SU5	8.9	14.9	12.0	8.1	21.5	19.9	14.0
IA SU6	9.4	15.7	12.5	8.4	22.1	20.3	14.2
IA SU7	10.5	17.5	13.8	9.1	23.8	21.7	15.1
IA 3S3A	12.6	21.4	17.4	11.8	31.4	29.1	20.5
IA 3S3B	14.4	24.2	19.6	13.2	35.1	32.5	22.8
IA 4S3	15.1	25.7	20.8	14.1	37.7	35.0	24.3
IA 3-3	16.9	27.6	21.8	14.5	37.9	34.7	24.1
IA 5-2	13.8	23.1	18.6	12.6	33.4	30.8	21.6
IA EV2	8.5	14.9	12.3	8.5	22.3	20.3	14.3
IA EV3	8.5	14.5	11.8	8.1	21.7	19.8	13.7
90k	11.0 N	18.7 N	15.2 N	10.3 N	27.5 N	25.5 N	17.9 N
Quint Axle Crane	11.0 N	18.7 N	15.2 N	10.3 N	26.6 N	23.5 N	15.9 N
136k A	15.0 N	25.4 N	20.7 N	14.0 N	36.9 N	33.6 N	23.2 N
136k B	13.5 N	22.4 N	17.9 N	12.0 N	31.5 N	29.0 N	20.2 N
156k	15.5 N	25.7 N	20.5 N	13.7 N	36.2 N	33.3 N	23.2 N
All Systems Permit	No	No	No	No	No	No	No
Fluid Milk Truck	10.9 N	18.1 N	14.3 N	9.4 N	24.6 N	22.4 N	15.5 N
Small Annual Crane	8.1 N	13.8 N	11.2 N	7.6 N	20.3 N	18.9 N	13.3 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1-1915, 20' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**20'-0**	**22'-0**	**24'-0**	**26'-0**	**28'-0**	**30'-0**	**32'-0**
HS-20 Oper	0.31	0.55	0.45	0.31	0.76	0.68	0.58
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 E	0.4L SP1 E	0.6L SP1 E	0.4L SP1 E
HS-20 Inv	0.19	0.33	0.27	0.19	0.45	0.41	0.35
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 E	0.4L SP1 E	0.6L SP1 E	0.4L SP1 E
IA Type 4	8.7	14.8	12.0	8.5	21.7	19.9	16.9
IA SU4	8.4	14.2	11.6	8.2	20.7	18.9	16.1
IA SU5	9.0	15.2	12.2	8.6	21.9	20.2	17.5
IA SU6	9.6	15.9	12.7	8.9	22.4	20.6	17.8
IA SU7	10.7	17.7	14.0	9.7	24.2	22.0	18.8
IA 3S3A	12.8	21.7	17.6	12.5	31.8	29.6	25.7
IA 3S3B	14.6	24.6	19.9	14.0	35.6	33.0	28.5
IA 4S3	15.4	26.1	21.2	15.0	38.2	35.5	30.4
IA 3-3	17.1	28.0	22.1	15.3	38.5	35.2	30.1
IA 5-2	14.0	23.5	18.9	13.3	33.8	31.3	27.1
IA EV2	8.7	15.1	12.5	9.0	22.6	20.6	17.6
IA EV3	8.6	14.7	12.0	8.6	22.0	20.1	17.1
90k	11.2 N	19.0 N	15.4 N	10.9 N	27.9 N	25.9 N	22.5 N
Quint Axle Crane	11.2 N	19.0 N	15.4 N	10.9 N	26.9 N	23.9 N	20.0 N
136k A	15.2 N	25.8 N	21.0 N	14.8 N	37.4 N	34.1 N	29.1 N
136k B	13.7 N	22.8 N	18.2 N	12.7 N	32.0 N	29.4 N	25.3 N
156k	15.8 N	26.1 N	20.8 N	14.5 N	36.7 N	33.7 N	29.0 N
All Systems Permit	No	No	No	No	No	No	No
Fluid Milk Truck	11.1 N	18.4 N	14.5 N	10.0 N	24.9 N	22.7 N	19.4 N
Small Annual Crane	8.2 N	14.0 N	11.4 N	8.1 N	20.6 N	19.2 N	16.6 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1A-1928/1931, 0 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.30	1.08	1.17	1.11	1.09	1.10	0.93
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.4L SP1 E	0.6L SP1 E	0.6L SP1 E	0.6L SP1 E	0.5L SP1 I
HS-20 Inv	0.78	0.65	0.70	0.67	0.65	0.66	0.56
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.4L SP1 E	0.6L SP1 E	0.6L SP1 E	0.6L SP1 E	0.5L SP1 I
IA Type 4	38.9	30.0	31.6	32.4	32.0	32.9	28.4
IA SU4	36.8	28.7	30.4	30.9	30.6	31.6	27.5
IA SU5	41.4	31.0	32.1	32.6	33.2	34.6	29.7
IA SU6	45.4	32.8	33.4	33.4	33.7	34.9	29.9
IA SU7	50.6	36.6	36.8	36.0	35.7	36.7	31.2
IA 3S3A	57.1	44.0	46.4	47.6	48.7	51.6	45.7
IA 3S3B	66.5	50.2	52.2	53.1	54.1	57.1	50.4
IA 4S3	68.5	52.8	55.6	57.1	57.6	59.1	51.0
IA 3-3	77.0	58.6	58.1	57.4	57.2	57.8	47.3
IA 5-2	64.0	48.0	49.8	50.5	51.4	53.5	45.9
IA EV2	35.7	29.8	33.0	33.3	32.9	34.1	29.7
IA EV3	37.4	29.6	31.7	32.8	32.4	33.2	28.7
90k	50.0 Y	38.5 N	40.6 N	41.6 N	42.6 N	45.2 Y	40.0 N
Quint Axle Crane	50.0 N	38.5 N	40.6 N	40.0 N	37.8 N	37.8 N	32.0 N
136k A	67.9 N	52.4 N	55.2 N	55.7 N	55.1 N	57.0 N	49.4 N
136k B	65.0 N	47.1 N	47.7 N	47.7 N	48.0 N	50.2 N	44.0 N
156k	74.6 N	54.0 N	54.7 N	54.8 N	55.1 N	57.6 N	50.5 N
All Systems Permit	Yes	No	No	No	No	No	No
Fluid Milk Truck	52.7 Y	38.0 N	38.1 N	37.2 N	36.8 N	37.7 N	31.9 N
Small Annual Crane	36.5 N	28.3 N	29.9 N	30.8 N	31.6 N	32.7 N	28.3 N

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1B-1928-1931-1934, 18' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.94	1.03	0.89	0.87	1.00	0.89
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.56	0.62	0.53	0.52	0.60	0.53
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	25.9	27.7	25.7	25.5	29.8	27.2
IA SU4	24.8	26.7	24.5	24.4	28.7	26.2
IA SU5	26.8	28.2	25.9	26.4	31.3	28.3
IA SU6	28.3	29.3	26.6	26.9	31.7	28.6
IA SU7	31.6	32.3	28.6	28.5	33.3	29.8
IA 3S3A	38.0	40.7	37.8	38.9	46.8	43.6
IA 3S3B	43.3	45.9	42.2	43.2	51.8	48.1
IA 4S3	45.6	48.9	45.3	46.0	53.6	48.7
IA 3-3	50.6	51.0	45.6	45.6	52.4	45.1
IA 5-2	41.4	43.7	40.1	40.9	48.5	43.9
IA EV2	25.7	29.0	26.7	26.5	31.0	28.4
IA EV3	25.5	27.8	26.1	25.8	30.1	27.4
90k	33.2 N	35.6 N	33.1 N	34.0 N	41.0 N	38.2 N
Quint Axle Crane	33.2 N	35.6 N	31.8 N	30.1 N	34.3 N	30.6 N
136k A	45.2 N	48.5 N	44.3 N	44.0 N	51.7 N	47.2 N
136k B	40.6 N	41.9 N	37.9 N	38.3 N	45.6 N	42.0 N
156k	46.6 N	48.1 N	43.5 N	43.9 N	52.3 N	48.2 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	32.8 N	33.4 N	29.5 N	29.4 N	34.2 N	30.5 N
Small Annual Crane	24.4 N	26.3 N	24.5 N	25.2 N	29.6 N	27.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1B-1928-1931-1934, 18' Roadway, 20 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.94	1.03	0.89	0.87	1.00	0.89
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.56	0.62	0.53	0.52	0.60	0.53
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	25.9	27.7	25.7	25.5	29.8	27.2
IA SU4	24.8	26.7	24.5	24.4	28.7	26.2
IA SU5	26.8	28.2	25.9	26.4	31.3	28.3
IA SU6	28.3	29.3	26.6	26.9	31.7	28.6
IA SU7	31.6	32.3	28.6	28.5	33.3	29.8
IA 3S3A	38.0	40.7	37.8	38.9	46.8	43.6
IA 3S3B	43.3	45.9	42.2	43.2	51.8	48.1
IA 4S3	45.6	48.9	45.3	46.0	53.6	48.7
IA 3-3	50.6	51.0	45.6	45.6	52.4	45.1
IA 5-2	41.4	43.7	40.1	41.0	48.5	43.9
IA EV2	25.7	29.0	26.7	26.5	31.0	28.4
IA EV3	25.5	27.8	26.1	25.8	30.1	27.4
90k	33.2 N	35.6 N	33.1 N	34.0 N	41.0 N	38.2 N
Quint Axle Crane	33.2 N	35.6 N	31.8 N	30.1 N	34.3 N	30.6 N
136k A	45.2 N	48.5 N	44.3 N	44.0 N	51.7 N	47.2 N
136k B	40.6 N	41.9 N	37.9 N	38.3 N	45.6 N	42.0 N
156k	46.6 N	48.1 N	43.5 N	43.9 N	52.3 N	48.2 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	32.8 N	33.4 N	29.5 N	29.4 N	34.2 N	30.5 N
Small Annual Crane	24.4 N	26.3 N	24.5 N	25.2 N	29.6 N	27.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1B-1928-1931-1934, 18' Roadway, 30 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.94	1.03	0.89	0.87	1.00	0.89
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.56	0.62	0.53	0.52	0.60	0.53
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	25.9	27.7	25.7	25.5	29.8	27.2
IA SU4	24.8	26.7	24.5	24.4	28.7	26.2
IA SU5	26.8	28.2	25.9	26.4	31.3	28.3
IA SU6	28.3	29.3	26.6	26.9	31.7	28.6
IA SU7	31.6	32.3	28.6	28.5	33.3	29.8
IA 3S3A	38.0	40.7	37.8	38.9	46.8	43.6
IA 3S3B	43.3	45.9	42.2	43.2	51.8	48.1
IA 4S3	45.6	48.9	45.3	46.0	53.6	48.7
IA 3-3	50.6	51.0	45.6	45.6	52.4	45.1
IA 5-2	41.4	43.7	40.1	40.9	48.5	43.9
IA EV2	25.7	29.0	26.7	26.5	31.0	28.4
IA EV3	25.5	27.8	26.1	25.8	30.1	27.4
90k	33.2 N	35.6 N	33.1 N	34.0 N	41.0 N	38.2 N
Quint Axle Crane	33.2 N	35.6 N	31.8 N	30.1 N	34.3 N	30.6 N
136k A	45.2 N	48.5 N	44.3 N	44.0 N	51.7 N	47.2 N
136k B	40.6 N	41.9 N	37.9 N	38.3 N	45.6 N	42.0 N
156k	46.6 N	48.1 N	43.5 N	43.9 N	52.3 N	48.2 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	32.8 N	33.4 N	29.5 N	29.4 N	34.2 N	30.5 N
Small Annual Crane	24.4 N	26.3 N	24.5 N	25.2 N	29.6 N	27.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1B-1928-1931-1934, 18' Roadway, 45 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.94	1.03	0.89	0.87	1.00	0.89
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.56	0.62	0.53	0.52	0.60	0.53
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	25.9	27.7	25.7	25.5	29.8	27.2
IA SU4	24.8	26.7	24.5	24.4	28.7	26.2
IA SU5	26.8	28.2	25.9	26.4	31.3	28.3
IA SU6	28.3	29.3	26.6	26.9	31.7	28.6
IA SU7	31.6	32.3	28.6	28.5	33.3	29.8
IA 3S3A	38.0	40.7	37.8	38.9	46.8	43.6
IA 3S3B	43.3	45.9	42.2	43.2	51.8	48.1
IA 4S3	45.6	48.9	45.3	46.0	53.6	48.7
IA 3-3	50.6	51.0	45.6	45.6	52.4	45.1
IA 5-2	41.4	43.7	40.1	40.9	48.5	43.9
IA EV2	25.7	29.0	26.7	26.5	31.0	28.4
IA EV3	25.5	27.8	26.1	25.8	30.1	27.4
90k	33.2 N	35.6 N	33.1 N	34.0 N	41.0 N	38.2 N
Quint Axle Crane	33.2 N	35.6 N	31.8 N	30.1 N	34.3 N	30.6 N
136k A	45.2 N	48.5 N	44.3 N	44.0 N	51.7 N	47.2 N
136k B	40.6 N	41.9 N	37.9 N	38.3 N	45.6 N	42.0 N
156k	46.6 N	48.1 N	43.5 N	43.9 N	52.3 N	48.2 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	32.8 N	33.4 N	29.5 N	29.4 N	34.2 N	30.5 N
Small Annual Crane	24.4 N	26.3 N	24.5 N	25.2 N	29.6 N	27.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1B-1928-1931-1934, 20' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.96	1.02	0.92	0.91	0.94	0.91
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.57	0.61	0.55	0.55	0.56	0.54
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	26.5	27.4	26.6	26.7	27.9	27.8
IA SU4	25.4	26.4	25.4	25.5	26.8	26.9
IA SU5	27.4	27.9	26.8	27.6	29.3	29.0
IA SU6	29.1	29.0	27.5	28.1	29.6	29.3
IA SU7	32.4	31.9	29.6	29.8	31.0	30.5
IA 3S3A	38.9	40.2	39.1	40.6	43.7	44.6
IA 3S3B	44.4	45.3	43.7	45.1	48.3	49.2
IA 4S3	46.7	48.3	46.9	48.0	50.0	49.9
IA 3-3	51.9	50.5	47.1	47.7	48.9	46.2
IA 5-2	42.5	43.2	41.5	42.8	45.3	44.9
IA EV2	26.4	28.7	27.6	27.6	28.9	29.0
IA EV3	26.2	27.5	27.0	27.0	28.1	28.0
90k	34.1 N	35.2 N	34.2 N	35.5 N	38.2 N	39.1 N
Quint Axle Crane	34.1 N	35.2 N	32.9 N	31.5 N	32.0 N	31.3 N
136k A	46.3 N	47.9 N	45.8 N	45.9 N	48.2 N	48.3 N
136k B	41.7 N	41.4 N	39.2 N	40.0 N	42.5 N	43.0 N
156k	47.8 N	47.5 N	45.0 N	45.9 N	48.8 N	49.4 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	33.6 N	33.0 N	30.5 N	30.7 N	31.9 N	31.2 N
Small Annual Crane	25.0 N	26.0 N	25.3 N	26.3 N	27.7 N	27.6 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1B-1928-1931-1934, 20' Roadway, 20 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.96	1.02	0.92	0.91	0.94	0.91
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.57	0.61	0.55	0.55	0.56	0.54
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	26.5	27.4	26.6	26.7	27.9	27.8
IA SU4	25.4	26.4	25.3	25.5	26.8	26.9
IA SU5	27.4	27.9	26.8	27.6	29.3	29.0
IA SU6	29.1	29.0	27.5	28.1	29.6	29.3
IA SU7	32.4	31.9	29.6	29.8	31.1	30.5
IA 3S3A	38.9	40.2	39.1	40.6	43.7	44.6
IA 3S3B	44.4	45.3	43.7	45.1	48.4	49.2
IA 4S3	46.7	48.3	46.9	48.0	50.0	49.9
IA 3-3	51.9	50.4	47.1	47.6	49.0	46.2
IA 5-2	42.5	43.2	41.5	42.8	45.3	44.9
IA EV2	26.3	28.6	27.6	27.6	29.0	29.0
IA EV3	26.2	27.5	27.0	27.0	28.1	28.0
90k	34.1 N	35.2 N	34.2 N	35.5 N	38.2 N	39.1 N
Quint Axle Crane	34.1 N	35.2 N	32.9 N	31.5 N	32.0 N	31.3 N
136k A	46.3 N	47.9 N	45.8 N	45.9 N	48.2 N	48.3 N
136k B	41.6 N	41.4 N	39.2 N	40.0 N	42.5 N	43.0 N
156k	47.8 N	47.5 N	45.0 N	45.9 N	48.8 N	49.4 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	33.6 N	33.0 N	30.5 N	30.7 N	31.9 N	31.2 N
Small Annual Crane	25.0 N	26.0 N	25.3 N	26.3 N	27.7 N	27.6 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1B-1928-1931-1934, 20' Roadway, 30 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.96	1.02	0.92	0.91	0.94	0.91
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.57	0.61	0.55	0.55	0.56	0.54
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	26.5	27.4	26.6	26.7	27.9	27.8
IA SU4	25.4	26.4	25.3	25.5	26.8	26.9
IA SU5	27.4	27.9	26.8	27.6	29.3	29.0
IA SU6	29.1	29.0	27.5	28.1	29.6	29.3
IA SU7	32.4	31.9	29.6	29.8	31.0	30.5
IA 3S3A	38.9	40.2	39.1	40.6	43.7	44.6
IA 3S3B	44.4	45.3	43.7	45.1	48.3	49.2
IA 4S3	46.7	48.3	46.9	48.0	50.0	49.9
IA 3-3	51.9	50.4	47.1	47.6	48.9	46.2
IA 5-2	42.5	43.2	41.5	42.8	45.3	44.9
IA EV2	26.3	28.6	27.6	27.6	28.9	29.0
IA EV3	26.2	27.5	27.0	27.0	28.1	28.0
90k	34.1 N	35.2 N	34.2 N	35.5 N	38.2 N	39.1 N
Quint Axle Crane	34.1 N	35.2 N	32.9 N	31.5 N	32.0 N	31.3 N
136k A	46.3 N	47.9 N	45.8 N	45.9 N	48.2 N	48.3 N
136k B	41.6 N	41.4 N	39.2 N	40.0 N	42.5 N	43.0 N
156k	47.8 N	47.5 N	45.0 N	45.9 N	48.8 N	49.4 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	33.6 N	33.0 N	30.5 N	30.7 N	31.9 N	31.2 N
Small Annual Crane	25.0 N	26.0 N	25.3 N	26.3 N	27.7 N	27.6 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1B-1928-1931-1934, 20' Roadway, 45 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.96	1.02	0.92	0.91	0.94	0.91
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.57	0.61	0.55	0.55	0.56	0.54
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	26.5	27.4	26.6	26.7	27.9	27.8
IA SU4	25.4	26.4	25.3	25.5	26.8	26.9
IA SU5	27.4	27.9	26.8	27.6	29.3	29.0
IA SU6	29.1	29.0	27.5	28.1	29.6	29.3
IA SU7	32.4	31.9	29.6	29.8	31.0	30.5
IA 3S3A	38.9	40.2	39.1	40.6	43.7	44.6
IA 3S3B	44.4	45.3	43.7	45.1	48.3	49.2
IA 4S3	46.7	48.3	46.9	48.0	50.0	49.9
IA 3-3	51.9	50.4	47.1	47.6	48.9	46.2
IA 5-2	42.5	43.2	41.5	42.8	45.3	44.9
IA EV2	26.3	28.6	27.6	27.6	28.9	29.0
IA EV3	26.2	27.5	27.0	27.0	28.1	28.0
90k	34.1 N	35.2 N	34.2 N	35.5 N	38.2 N	39.1 N
Quint Axle Crane	34.1 N	35.2 N	32.9 N	31.5 N	32.0 N	31.3 N
136k A	46.3 N	47.9 N	45.8 N	45.9 N	48.2 N	48.3 N
136k B	41.6 N	41.4 N	39.2 N	40.0 N	42.5 N	43.0 N
156k	47.8 N	47.5 N	45.0 N	45.9 N	48.8 N	49.4 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	33.6 N	33.0 N	30.5 N	30.7 N	31.9 N	31.2 N
Small Annual Crane	25.0 N	26.0 N	25.3 N	26.3 N	27.7 N	27.6 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V1C-1928, 0 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.76	0.66	0.71	0.61	0.58	0.55	0.59
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.4L SP1 I	0.4L SP1 I	0.6L SP1 I
HS-20 Inv	0.46	0.40	0.43	0.36	0.35	0.33	0.36
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.4L SP1 I	0.4L SP1 I	0.6L SP1 I
IA Type 4	23.0	18.4	19.2	17.6	17.0	16.4	18.2
IA SU4	21.7	17.6	18.5	16.8	16.3	15.8	17.5
IA SU5	24.6	19.1	19.6	17.7	17.6	17.3	19.0
IA SU6	27.1	20.3	20.3	18.2	17.9	17.4	19.1
IA SU7	30.2	22.6	22.5	19.6	19.0	18.3	20.0
IA 3S3A	33.8	27.1	28.2	25.8	25.8	25.7	29.1
IA 3S3B	39.4	30.9	31.8	28.9	28.7	28.4	32.1
IA 4S3	40.5	32.5	33.8	31.0	30.7	29.5	32.6
IA 3-3	45.2	36.4	35.5	31.2	30.4	29.1	30.3
IA 5-2	38.0	29.6	30.3	27.4	27.2	26.7	29.4
IA EV2	20.9	18.2	20.0	18.1	17.4	16.9	18.7
IA EV3	21.9	18.2	19.2	17.8	17.3	16.6	18.3
90k	29.5 N	23.7 N	24.7 N	22.6 N	22.6 N	22.5 N	25.5 N
Quint Axle Crane	29.5 N	23.7 N	24.7 N	22.0 N	20.2 N	18.9 N	20.5 N
136k A	40.2 N	32.2 N	33.5 N	30.4 N	29.3 N	28.4 N	31.6 N
136k B	38.7 N	29.1 N	29.1 N	26.0 N	25.5 N	25.0 N	28.1 N
156k	44.4 N	33.4 N	33.4 N	29.8 N	29.3 N	28.7 N	32.2 N
All Systems Permit	No	No	No	No	No	No	No
Fluid Milk Truck	31.5 N	23.5 N	23.3 N	20.3 N	19.6 N	18.8 N	20.4 N
Small Annual Crane	21.5 N	17.4 N	18.2 N	16.7 N	16.8 N	16.3 N	18.1 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.
Bridge rated as single lane.

V Bridge Standards Load Rating Summary - LFR Rating Method

V2-1915, 0 Degree Skew

	Bridge Length								
Truck	**16'-0**	**18'-0**	**20'-0**	**22'-0**	**24'-0**	**26'-0**	**28'-0**	**30'-0**	**32'-0**
HS-20 Oper	0.67	0.78	0.69	0.94	0.84	0.72	1.06	0.94	0.84
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I
HS-20 Inv	0.40	0.47	0.42	0.56	0.50	0.43	0.63	0.56	0.50
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I
IA Type 4	20.1	22.4	19.3	25.4	22.5	20.1	30.8	27.6	24.9
IA SU4	19.0	21.3	18.4	24.4	21.7	19.4	29.4	26.3	23.7
IA SU5	21.5	23.6	20.0	26.1	22.9	20.4	31.0	28.1	25.7
IA SU6	23.7	25.4	21.2	27.4	23.9	21.0	31.8	28.7	26.1
IA SU7	26.5	28.4	23.7	30.5	26.4	23.0	34.4	30.7	27.7
IA 3S3A	29.5	32.9	28.3	37.3	33.0	29.5	45.2	41.2	37.7
IA 3S3B	34.5	38.0	32.3	42.3	37.3	33.2	50.5	45.9	41.9
IA 4S3	35.4	39.5	34.0	44.8	39.7	35.5	54.2	49.4	44.7
IA 3-3	39.5	45.0	38.1	48.3	41.6	36.4	54.7	49.1	44.3
IA 5-2	33.3	36.5	31.0	40.4	35.5	31.6	48.0	43.6	39.7
IA EV2	18.3	21.4	19.0	25.8	23.4	21.2	31.6	28.2	25.4
IA EV3	19.2	21.9	19.0	25.3	22.5	20.3	31.2	28.1	25.2
90k	25.8 N	28.8 N	24.8 N	32.6 N	28.9 N	25.9 N	39.5 N	36.0 N	33.0 N
Quint Axle Crane	25.8 N	28.8 N	24.8 N	32.6 N	28.9 N	25.9 N	38.5 N	33.4 N	29.4 N
136k A	35.1 N	39.2 N	33.7 N	44.4 N	39.3 N	35.2 N	53.2 N	47.5 N	42.8 N
136k B	33.8 N	36.5 N	30.4 N	39.2 N	34.1 N	30.1 N	45.5 N	41.0 N	37.2 N
156k	38.8 N	41.9 N	34.9 N	45.0 N	39.1 N	34.5 N	52.1 N	47.0 N	42.7 N
All Systems Permit	No	No	No	No	No	No	No	No	No
Fluid Milk Truck	27.6 N	29.5 N	24.6 N	31.6 N	27.3 N	23.7 N	35.5 N	31.7 N	28.6 N
Small Annual Crane	18.8 N	21.1 N	18.2 N	24.0 N	21.3 N	19.1 N	29.2 N	26.7 N	24.4 N

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Bridge rated as single lane.

V Bridge Standards Load Rating Summary - LFR Rating Method

V2B-1928, 0 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.11	0.90	1.04	0.85	0.83	0.98	0.84
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.66	0.54	0.62	0.51	0.50	0.59	0.50
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	33.2	25.0	28.0	24.6	24.3	29.1	25.6
IA SU4	31.4	23.9	27.0	23.4	23.2	28.0	24.7
IA SU5	35.3	25.8	28.5	24.7	25.1	30.6	26.7
IA SU6	38.8	27.4	29.6	25.4	25.5	30.9	26.9
IA SU7	43.2	30.5	32.7	27.3	27.1	32.4	28.1
IA 3S3A	48.7	36.7	41.1	36.1	36.9	45.7	41.1
IA 3S3B	56.7	41.8	46.3	40.3	41.0	50.5	45.3
IA 4S3	58.5	44.0	49.4	43.3	43.6	52.3	45.9
IA 3-3	65.8	48.8	51.6	43.5	43.3	51.2	42.5
IA 5-2	54.7	40.0	44.2	38.3	38.9	47.3	41.3
IA EV2	30.5	24.8	29.3	25.5	25.2	30.3	26.8
IA EV3	32.0	24.6	28.1	24.9	24.5	29.4	25.8
90k	42.6 N	32.1 N	36.0 N	31.6 N	32.3 N	40.0 N	35.9 N
Quint Axle Crane	42.6 N	32.1 N	36.0 N	30.4 N	28.6 N	33.4 N	28.8 N
136k A	58.0 N	43.6 N	49.0 N	42.3 N	41.8 N	50.4 N	44.5 N
136k B	55.8 N	39.2 N	42.3 N	36.2 N	36.4 N	44.5 N	39.6 N
156k	64.0 N	45.0 N	48.6 N	41.5 N	41.7 N	51.0 N	45.4 N
All Systems Permit	No	No	No	No	No	No	No
Fluid Milk Truck	45.0 N	31.6 N	33.8 N	28.2 N	27.9 N	33.3 N	28.7 N
Small Annual Crane	31.1 N	23.6 N	26.6 N	23.3 N	23.9 N	28.9 N	25.4 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.
Ratings are for bridges with an 18'-0 Roadway. Bridge rated as two-lane.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3-1915, 16' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**20'-0**	**22'-0**	**24'-0**	**26'-0**	**28'-0**	**30'-0**	**32'-0**
HS-20 Oper	0.51	0.70	0.55	0.40	0.77	0.60	0.45
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.6L SP1 E	0.6L SP1 E	0.5L SP1 E
HS-20 Inv	0.31	0.42	0.33	0.24	0.46	0.36	0.27
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.6L SP1 E	0.6L SP1 E	0.5L SP1 E
IA Type 4	14.1	19.0	14.5	10.7	21.7	17.0	13.0
IA SU4	13.5	18.2	14.0	10.3	20.7	16.2	12.4
IA SU5	14.6	19.5	14.8	10.8	21.8	17.3	13.4
IA SU6	15.5	20.4	15.4	11.2	22.4	17.7	13.7
IA SU7	17.3	22.8	17.0	12.2	24.1	18.9	14.5
IA 3S3A	20.8	27.9	21.3	15.7	31.8	25.3	19.7
IA 3S3B	23.7	31.6	24.0	17.6	35.6	28.2	21.9
IA 4S3	24.9	33.4	25.6	18.8	38.2	30.4	23.4
IA 3-3	27.8	36.0	26.8	19.3	38.4	30.1	23.2
IA 5-2	22.7	30.1	22.9	16.8	33.8	26.8	20.8
IA EV2	14.0	19.3	15.2	11.4	23.0	18.1	14.0
IA EV3	13.9	18.9	14.6	10.8	21.9	17.2	13.2
90k	18.2 N	24.4 N	18.7 N	13.7 N	27.8 N	22.2 N	17.3 N
Quint Axle Crane	18.2 N	24.4 N	18.7 N	13.7 N	26.9 N	20.5 N	15.4 N
136k A	24.7 N	33.2 N	25.4 N	18.7 N	37.3 N	29.2 N	22.4 N
136k B	22.2 N	29.2 N	22.0 N	16.0 N	31.9 N	25.2 N	19.5 N
156k	25.5 N	33.5 N	25.2 N	18.3 N	36.6 N	28.9 N	22.3 N
All Systems Permit	No	No	No	No	No	No	No
Fluid Milk Truck	18.0 N	23.6 N	17.5 N	12.6 N	24.9 N	19.5 N	14.9 N
Small Annual Crane	13.3 N	18.0 N	13.8 N	10.1 N	20.6 N	16.4 N	12.8 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3-1915, 18' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**20'-0**	**22'-0**	**24'-0**	**26'-0**	**28'-0**	**30'-0**	**32'-0**
HS-20 Oper	0.49	0.73	0.58	0.43	0.80	0.63	0.48
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.6L SP1 E	0.6L SP1 E	0.5L SP1 E
HS-20 Inv	0.29	0.44	0.35	0.26	0.48	0.38	0.29
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.6L SP1 E	0.6L SP1 E	0.5L SP1 E
IA Type 4	13.6	19.8	15.3	11.4	22.6	17.9	13.7
IA SU4	13.0	19.0	14.7	11.0	21.6	17.0	13.0
IA SU5	14.1	20.3	15.5	11.5	22.8	18.2	14.1
IA SU6	14.9	21.3	16.2	11.9	23.4	18.6	14.4
IA SU7	16.6	23.7	17.8	12.9	25.2	19.9	15.2
IA 3S3A	19.9	29.1	22.4	16.7	33.2	26.6	20.7
IA 3S3B	22.7	32.9	25.3	18.7	37.1	29.7	23.1
IA 4S3	23.9	34.9	26.9	20.0	39.9	32.0	24.6
IA 3-3	26.6	37.5	28.2	20.5	40.1	31.7	24.4
IA 5-2	21.8	31.5	24.1	17.8	35.3	28.2	21.9
IA EV2	13.4	20.2	15.9	12.1	23.9	19.0	14.7
IA EV3	13.4	19.7	15.3	11.5	22.9	18.1	13.8
90k	17.4 N	25.4 N	19.6 N	14.6 N	29.1 N	23.3 N	18.2 N
Quint Axle Crane	17.4 N	25.4 N	19.6 N	14.6 N	28.1 N	21.5 N	16.1 N
136k A	23.7 N	34.6 N	26.7 N	19.9 N	39.0 N	30.7 N	23.5 N
136k B	21.4 N	30.5 N	23.1 N	17.0 N	33.4 N	26.5 N	20.5 N
156k	24.5 N	35.0 N	26.5 N	19.5 N	38.3 N	30.4 N	23.5 N
All Systems Permit	No	No	No	No	No	No	No
Fluid Milk Truck	17.2 N	24.6 N	18.4 N	13.4 N	26.0 N	20.5 N	15.7 N
Small Annual Crane	12.8 N	18.7 N	14.5 N	10.8 N	21.5 N	17.3 N	13.5 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3-1915, 20' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**20'-0**	**22'-0**	**24'-0**	**26'-0**	**28'-0**	**30'-0**	**32'-0**
HS-20 Oper	0.51	0.76	0.60	0.44	0.83	0.65	0.50
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.6L SP1 E	0.6L SP1 E	0.5L SP1 E
HS-20 Inv	0.30	0.45	0.36	0.27	0.49	0.39	0.30
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.6L SP1 E	0.6L SP1 E	0.5L SP1 E
IA Type 4	14.1	20.4	15.8	11.9	23.4	18.5	14.3
IA SU4	13.5	19.6	15.3	11.5	22.3	17.6	13.6
IA SU5	14.6	21.0	16.1	12.0	23.5	18.9	14.7
IA SU6	15.4	22.0	16.8	12.4	24.1	19.3	15.0
IA SU7	17.2	24.5	18.5	13.5	26.0	20.6	15.9
IA 3S3A	20.6	30.0	23.2	17.5	34.3	27.6	21.7
IA 3S3B	23.6	34.0	26.2	19.6	38.3	30.8	24.1
IA 4S3	24.8	36.0	27.9	20.9	41.1	33.1	25.7
IA 3-3	27.6	38.7	29.2	21.5	41.4	32.9	25.4
IA 5-2	22.5	32.5	25.0	18.6	36.4	29.2	22.8
IA EV2	13.9	20.8	16.5	12.7	24.7	19.7	15.3
IA EV3	13.9	20.3	15.9	12.0	23.7	18.8	14.4
90k	18.1 N	26.2 N	20.3 N	15.3 N	30.0 N	24.2 N	19.0 N
Quint Axle Crane	18.1 N	26.2 N	20.3 N	15.3 N	29.0 N	22.3 N	16.8 N
136k A	24.6 N	35.7 N	27.7 N	20.8 N	40.2 N	31.8 N	24.5 N
136k B	22.1 N	31.5 N	24.0 N	17.7 N	34.4 N	27.5 N	21.4 N
156k	25.4 N	36.1 N	27.5 N	20.3 N	39.5 N	31.5 N	24.5 N
All Systems Permit	No	No	No	No	No	No	No
Fluid Milk Truck	17.9 N	25.4 N	19.1 N	14.0 N	26.8 N	21.2 N	16.4 N
Small Annual Crane	13.3 N	19.3 N	15.0 N	11.3 N	22.2 N	17.9 N	14.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3A-1928/1931, 0 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.22	1.25	1.27	1.20	1.13	1.11	1.12
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.73	0.75	0.76	0.72	0.68	0.67	0.67
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	36.6	34.7	34.1	34.5	33.0	33.2	34.1
IA SU4	34.6	33.2	32.8	32.9	31.4	31.9	33.0
IA SU5	39.0	35.9	34.7	34.7	34.1	34.8	35.6
IA SU6	42.9	38.1	36.1	35.6	34.6	35.2	35.9
IA SU7	47.8	42.5	39.8	38.4	36.8	37.0	37.5
IA 3S3A	53.7	51.0	50.1	50.6	50.0	52.0	54.8
IA 3S3B	62.6	58.1	56.4	56.6	55.6	57.5	60.4
IA 4S3	64.4	61.1	60.1	60.7	59.3	59.5	61.2
IA 3-3	72.4	68.1	62.9	61.1	58.8	58.4	56.7
IA 5-2	60.3	55.6	53.8	53.8	52.8	53.9	55.1
IA EV2	33.4	34.4	35.6	35.8	34.1	34.5	35.7
IA EV3	35.2	34.2	34.2	34.9	33.4	33.5	34.4
90k	47.0 Y	44.6 N	43.8 N	44.3 N	43.8 N	45.5 Y	48.0 Y
Quint Axle Crane	47.0 N	44.6 N	43.8 N	42.8 N	38.9 N	38.1 N	38.4 N
136k A	63.9 N	60.6 N	59.6 N	59.4 N	56.7 N	57.4 N	59.3 N
136k B	61.6 N	54.6 N	51.6 N	50.8 N	49.4 N	50.6 N	52.8 N
156k	70.7 N	62.7 N	59.2 N	58.3 N	56.6 N	58.0 N	60.6 N
All Systems Permit	Yes	No	No	No	No	No	No
Fluid Milk Truck	49.8 Y	44.1 N	41.2 N	39.6 N	37.9 N	38.0 N	38.3 N
Small Annual Crane	34.3 N	32.8 N	32.3 N	32.8 N	32.5 N	32.9 N	33.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3A-1928/1931, 20 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.22	1.25	1.27	1.20	1.13	1.11	1.12
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.73	0.75	0.76	0.72	0.68	0.67	0.67
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	36.6	34.7	34.1	34.5	33.0	33.2	34.1
IA SU4	34.6	33.2	32.9	32.9	31.5	31.9	33.0
IA SU5	39.0	35.9	34.7	34.7	34.1	34.8	35.6
IA SU6	42.9	38.1	36.1	35.6	34.6	35.2	35.9
IA SU7	47.8	42.5	39.8	38.4	36.8	37.0	37.5
IA 3S3A	53.7	51.0	50.1	50.6	50.1	52.0	54.8
IA 3S3B	62.6	58.2	56.4	56.6	55.6	57.5	60.4
IA 4S3	64.4	61.1	60.1	60.7	59.3	59.6	61.2
IA 3-3	72.4	68.1	62.9	61.1	58.8	58.4	56.7
IA 5-2	60.3	55.7	53.8	53.8	52.8	53.9	55.1
IA EV2	33.4	34.4	35.6	35.8	34.1	34.5	35.7
IA EV3	35.2	34.2	34.2	34.9	33.4	33.5	34.4
90k	47.0 Y	44.6 N	43.8 N	44.3 N	43.8 N	45.5 Y	48.0 Y
Quint Axle Crane	47.0 N	44.6 N	43.8 N	42.8 N	38.9 N	38.1 N	38.4 N
136k A	63.9 N	60.6 N	59.6 N	59.4 N	56.7 N	57.4 N	59.4 N
136k B	61.7 N	54.6 N	51.6 N	50.8 N	49.4 N	50.6 N	52.8 N
156k	70.7 N	62.7 N	59.2 N	58.3 N	56.7 N	58.0 N	60.6 N
All Systems Permit	Yes	No	No	No	No	No	No
Fluid Milk Truck	49.8 Y	44.1 N	41.2 N	39.6 N	37.9 N	38.0 N	38.3 N
Small Annual Crane	34.3 N	32.8 N	32.3 N	32.8 N	32.5 N	32.9 N	33.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3A-1928/1931, 30 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.22	1.25	1.27	1.20	1.13	1.11	1.12
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.73	0.75	0.76	0.72	0.68	0.67	0.67
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	36.6	34.7	34.1	34.5	33.0	33.2	34.1
IA SU4	34.6	33.2	32.9	32.9	31.5	31.9	33.0
IA SU5	39.0	35.9	34.7	34.7	34.1	34.8	35.6
IA SU6	42.9	38.1	36.1	35.6	34.6	35.2	35.9
IA SU7	47.8	42.5	39.8	38.4	36.8	37.0	37.5
IA 3S3A	53.7	51.0	50.1	50.6	50.1	52.0	54.8
IA 3S3B	62.6	58.2	56.4	56.6	55.6	57.5	60.4
IA 4S3	64.4	61.1	60.1	60.7	59.3	59.6	61.2
IA 3-3	72.4	68.1	62.9	61.1	58.8	58.4	56.7
IA 5-2	60.3	55.7	53.8	53.8	52.8	53.9	55.1
IA EV2	33.4	34.4	35.6	35.8	34.1	34.5	35.7
IA EV3	35.2	34.2	34.2	34.9	33.4	33.5	34.4
90k	47.0 Y	44.6 N	43.8 N	44.3 N	43.8 N	45.5 Y	48.0 Y
Quint Axle Crane	47.0 N	44.6 N	43.8 N	42.8 N	38.9 N	38.1 N	38.4 N
136k A	63.9 N	60.6 N	59.6 N	59.4 N	56.7 N	57.4 N	59.3 N
136k B	61.6 N	54.6 N	51.6 N	50.8 N	49.4 N	50.6 N	52.8 N
156k	70.7 N	62.7 N	59.2 N	58.3 N	56.6 N	58.0 N	60.6 N
All Systems Permit	Yes	No	No	No	No	No	No
Fluid Milk Truck	49.8 Y	44.1 N	41.2 N	39.6 N	37.9 N	38.0 N	38.3 N
Small Annual Crane	34.3 N	32.8 N	32.3 N	32.8 N	32.5 N	32.9 N	33.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3A-1928/1931, 45 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.22	1.25	1.27	1.20	1.13	1.11	1.11
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.73	0.75	0.76	0.72	0.68	0.67	0.67
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	36.6	34.7	34.1	34.5	33.0	33.2	34.1
IA SU4	34.6	33.2	32.8	32.9	31.5	31.9	32.9
IA SU5	39.0	35.9	34.7	34.7	34.1	34.8	35.6
IA SU6	42.9	38.1	36.1	35.6	34.6	35.2	35.9
IA SU7	47.8	42.5	39.8	38.4	36.8	37.0	37.4
IA 3S3A	53.7	51.0	50.1	50.6	50.0	52.0	54.8
IA 3S3B	62.6	58.1	56.4	56.6	55.6	57.5	60.4
IA 4S3	64.4	61.1	60.1	60.7	59.3	59.5	61.2
IA 3-3	72.4	68.1	62.9	61.1	58.8	58.4	56.7
IA 5-2	60.3	55.6	53.8	53.8	52.8	53.9	55.1
IA EV2	33.4	34.4	35.6	35.8	34.1	34.5	35.7
IA EV3	35.2	34.2	34.2	34.9	33.4	33.5	34.4
90k	47.0 Y	44.6 N	43.8 N	44.3 N	43.8 N	45.5 Y	47.9 Y
Quint Axle Crane	47.0 N	44.6 N	43.8 N	42.8 N	38.9 N	38.1 N	38.4 N
136k A	63.9 N	60.6 N	59.6 N	59.4 N	56.7 N	57.4 N	59.3 N
136k B	61.7 N	54.6 N	51.6 N	50.8 N	49.4 N	50.6 N	52.8 N
156k	70.7 N	62.7 N	59.2 N	58.3 N	56.6 N	58.0 N	60.5 N
All Systems Permit	Yes	No	No	No	No	No	No
Fluid Milk Truck	49.8 Y	44.1 N	41.2 N	39.6 N	37.9 N	38.0 N	38.3 N
Small Annual Crane	34.3 N	32.8 N	32.3 N	32.8 N	32.5 N	32.9 N	33.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1928-1931, 18' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.98	0.85	0.90	0.89	0.74	0.59
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.59	0.51	0.54	0.53	0.44	0.35
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	27.2	22.6	25.7	25.9	22.0	17.9
IA SU4	26.0	21.8	24.6	24.7	21.1	17.3
IA SU5	28.2	23.0	25.9	26.8	23.1	18.7
IA SU6	29.9	23.9	26.6	27.2	23.3	18.9
IA SU7	33.3	26.4	28.7	28.9	24.5	19.7
IA 3S3A	39.9	33.2	37.8	39.3	34.4	28.8
IA 3S3B	45.6	37.4	42.2	43.7	38.1	31.7
IA 4S3	47.9	39.8	45.3	46.6	39.5	32.2
IA 3-3	53.4	41.7	45.6	46.2	38.7	29.8
IA 5-2	43.6	35.7	40.1	41.5	35.7	29.0
IA EV2	27.0	23.6	26.9	27.0	23.1	18.9
IA EV3	26.8	22.7	26.1	26.2	22.2	18.1
90k	34.9 N	29.0 N	33.1 N	34.4 N	30.1 N	25.2 N
Quint Axle Crane	34.9 N	29.0 N	31.9 N	30.6 N	25.2 N	20.2 N
136k A	47.5 N	39.5 N	44.3 N	44.6 N	38.0 N	31.2 N
136k B	42.8 N	34.2 N	38.0 N	38.8 N	33.5 N	27.7 N
156k	49.1 N	39.2 N	43.5 N	44.5 N	38.5 N	31.8 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	34.5 N	27.3 N	29.6 N	29.8 N	25.2 N	20.2 N
Small Annual Crane	25.7 N	21.4 N	24.5 N	25.5 N	21.8 N	17.8 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1928-1931, 18' Roadway, 20 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.98	0.85	0.90	0.89	0.74	0.59
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.59	0.51	0.54	0.53	0.44	0.35
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	27.2	22.6	25.7	25.9	22.0	17.9
IA SU4	26.0	21.8	24.6	24.7	21.1	17.3
IA SU5	28.2	23.0	25.9	26.8	23.1	18.7
IA SU6	29.9	23.9	26.6	27.2	23.3	18.9
IA SU7	33.3	26.4	28.7	28.9	24.5	19.7
IA 3S3A	39.9	33.2	37.8	39.3	34.4	28.8
IA 3S3B	45.6	37.4	42.2	43.7	38.1	31.7
IA 4S3	47.9	39.8	45.3	46.6	39.5	32.2
IA 3-3	53.4	41.7	45.6	46.2	38.7	29.8
IA 5-2	43.6	35.7	40.1	41.5	35.7	29.0
IA EV2	27.0	23.6	26.9	27.0	23.1	18.9
IA EV3	26.8	22.7	26.1	26.2	22.2	18.1
90k	34.9 N	29.0 N	33.1 N	34.4 N	30.1 N	25.2 N
Quint Axle Crane	34.9 N	29.0 N	31.9 N	30.6 N	25.2 N	20.2 N
136k A	47.5 N	39.5 N	44.3 N	44.6 N	38.0 N	31.2 N
136k B	42.8 N	34.2 N	38.0 N	38.8 N	33.5 N	27.7 N
156k	49.1 N	39.2 N	43.5 N	44.5 N	38.5 N	31.8 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	34.5 N	27.3 N	29.6 N	29.8 N	25.2 N	20.2 N
Small Annual Crane	25.7 N	21.4 N	24.5 N	25.5 N	21.8 N	17.8 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1928-1931, 18' Roadway, 30 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.98	0.85	0.90	0.89	0.74	0.59
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.59	0.51	0.54	0.53	0.44	0.35
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	27.2	22.6	25.7	25.9	22.0	17.9
IA SU4	26.0	21.8	24.6	24.7	21.1	17.3
IA SU5	28.2	23.0	25.9	26.8	23.1	18.7
IA SU6	29.9	23.9	26.6	27.2	23.3	18.9
IA SU7	33.3	26.4	28.7	28.9	24.5	19.7
IA 3S3A	39.9	33.2	37.8	39.3	34.4	28.8
IA 3S3B	45.6	37.4	42.2	43.7	38.1	31.7
IA 4S3	47.9	39.8	45.3	46.6	39.5	32.2
IA 3-3	53.4	41.7	45.6	46.2	38.7	29.8
IA 5-2	43.6	35.7	40.1	41.5	35.7	29.0
IA EV2	27.0	23.6	26.9	27.0	23.1	18.9
IA EV3	26.8	22.7	26.1	26.2	22.2	18.1
90k	34.9 N	29.0 N	33.1 N	34.4 N	30.1 N	25.2 N
Quint Axle Crane	34.9 N	29.0 N	31.9 N	30.6 N	25.2 N	20.2 N
136k A	47.5 N	39.5 N	44.3 N	44.6 N	38.0 N	31.2 N
136k B	42.8 N	34.2 N	38.0 N	38.8 N	33.5 N	27.7 N
156k	49.1 N	39.2 N	43.5 N	44.5 N	38.5 N	31.8 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	34.5 N	27.3 N	29.6 N	29.8 N	25.2 N	20.2 N
Small Annual Crane	25.7 N	21.4 N	24.5 N	25.5 N	21.8 N	17.8 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1928-1931, 18' Roadway, 45 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.98	0.85	0.90	0.89	0.74	0.59
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.59	0.51	0.54	0.53	0.44	0.35
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	27.2	22.6	25.7	25.9	22.0	17.9
IA SU4	26.0	21.8	24.6	24.7	21.1	17.3
IA SU5	28.2	23.0	25.9	26.8	23.1	18.7
IA SU6	29.9	23.9	26.6	27.2	23.3	18.9
IA SU7	33.3	26.4	28.7	28.9	24.5	19.7
IA 3S3A	39.9	33.2	37.8	39.3	34.4	28.8
IA 3S3B	45.6	37.4	42.2	43.7	38.1	31.7
IA 4S3	47.9	39.8	45.3	46.6	39.5	32.2
IA 3-3	53.4	41.7	45.6	46.2	38.7	29.8
IA 5-2	43.6	35.7	40.1	41.5	35.7	29.0
IA EV2	27.0	23.6	26.9	27.0	23.1	18.9
IA EV3	26.8	22.7	26.1	26.2	22.2	18.1
90k	34.9 N	29.0 N	33.1 N	34.4 N	30.1 N	25.2 N
Quint Axle Crane	34.9 N	29.0 N	31.9 N	30.6 N	25.2 N	20.2 N
136k A	47.5 N	39.5 N	44.3 N	44.6 N	38.0 N	31.2 N
136k B	42.8 N	34.2 N	38.0 N	38.8 N	33.5 N	27.7 N
156k	49.1 N	39.2 N	43.5 N	44.5 N	38.5 N	31.8 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	34.5 N	27.3 N	29.6 N	29.8 N	25.2 N	20.2 N
Small Annual Crane	25.7 N	21.4 N	24.5 N	25.5 N	21.8 N	17.8 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1928-1931, 20' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.85	1.04	0.97	0.77	0.78	0.75
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 E
HS-20 Inv	0.51	0.62	0.58	0.46	0.47	0.45
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 E
IA Type 4	23.7	27.7	27.9	22.2	23.3	23.0
IA SU4	22.7	26.6	26.6	21.2	22.4	22.2
IA SU5	24.5	28.2	28.1	23.0	24.4	24.0
IA SU6	26.0	29.3	28.8	23.3	24.7	24.2
IA SU7	29.0	32.3	31.1	24.8	25.9	25.3
IA 3S3A	34.8	40.6	41.0	33.8	36.4	36.9
IA 3S3B	39.7	45.7	45.8	37.5	40.3	40.7
IA 4S3	41.7	48.7	49.2	40.0	41.8	41.3
IA 3-3	46.5	51.0	49.5	39.7	41.0	38.3
IA 5-2	38.0	43.6	43.5	35.6	37.8	37.2
IA EV2	23.5	28.9	29.1	23.3	24.4	24.2
IA EV3	23.4	27.7	28.3	22.5	23.5	23.2
90k	30.4 N	35.5 N	35.9 N	29.5 N	31.9 N	32.3 N
Quint Axle Crane	30.4 N	35.5 N	34.7 N	26.2 N	26.7 N	25.9 N
136k A	41.4 N	48.3 N	48.1 N	38.2 N	40.3 N	40.0 N
136k B	37.3 N	41.8 N	41.2 N	33.3 N	35.5 N	35.6 N
156k	42.8 N	48.0 N	47.2 N	38.2 N	40.7 N	40.9 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	30.1 N	33.4 N	32.1 N	25.5 N	26.6 N	25.9 N
Small Annual Crane	22.4 N	26.2 N	26.5 N	21.9 N	23.1 N	22.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1928-1931, 20' Roadway, 20 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.85	1.04	0.97	0.77	0.78	0.75
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 E
HS-20 Inv	0.51	0.62	0.58	0.46	0.47	0.45
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 E
IA Type 4	23.7	27.7	27.9	22.2	23.3	23.0
IA SU4	22.7	26.6	26.6	21.2	22.4	22.2
IA SU5	24.5	28.2	28.1	23.0	24.4	24.0
IA SU6	26.0	29.3	28.8	23.3	24.7	24.2
IA SU7	29.0	32.3	31.1	24.8	25.9	25.3
IA 3S3A	34.8	40.6	41.0	33.8	36.4	36.9
IA 3S3B	39.7	45.7	45.8	37.5	40.3	40.7
IA 4S3	41.7	48.7	49.2	40.0	41.8	41.3
IA 3-3	46.5	51.0	49.5	39.7	41.0	38.3
IA 5-2	38.0	43.6	43.5	35.6	37.8	37.2
IA EV2	23.5	28.9	29.1	23.3	24.4	24.2
IA EV3	23.4	27.7	28.3	22.5	23.5	23.2
90k	30.4 N	35.5 N	35.9 N	29.5 N	31.9 N	32.3 N
Quint Axle Crane	30.4 N	35.5 N	34.7 N	26.2 N	26.7 N	25.9 N
136k A	41.4 N	48.3 N	48.1 N	38.2 N	40.3 N	40.0 N
136k B	37.3 N	41.8 N	41.2 N	33.3 N	35.5 N	35.6 N
156k	42.8 N	48.0 N	47.2 N	38.2 N	40.7 N	40.9 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	30.1 N	33.4 N	32.1 N	25.5 N	26.6 N	25.9 N
Small Annual Crane	22.4 N	26.2 N	26.5 N	21.9 N	23.1 N	22.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1928-1931, 20' Roadway, 30 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.85	1.04	0.97	0.77	0.78	0.75
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 E
HS-20 Inv	0.51	0.62	0.58	0.46	0.47	0.45
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 E
IA Type 4	23.7	27.7	27.9	22.2	23.3	23.0
IA SU4	22.7	26.6	26.6	21.2	22.4	22.2
IA SU5	24.5	28.2	28.1	23.0	24.4	24.0
IA SU6	26.0	29.3	28.8	23.3	24.7	24.2
IA SU7	29.0	32.3	31.1	24.8	25.9	25.3
IA 3S3A	34.8	40.6	41.0	33.8	36.4	36.9
IA 3S3B	39.7	45.7	45.8	37.5	40.3	40.7
IA 4S3	41.7	48.7	49.2	40.0	41.8	41.3
IA 3-3	46.5	51.0	49.5	39.7	41.0	38.3
IA 5-2	38.0	43.6	43.5	35.6	37.8	37.2
IA EV2	23.5	28.9	29.1	23.3	24.4	24.2
IA EV3	23.4	27.7	28.3	22.5	23.5	23.2
90k	30.4 N	35.5 N	35.9 N	29.5 N	31.9 N	32.3 N
Quint Axle Crane	30.4 N	35.5 N	34.7 N	26.2 N	26.7 N	25.9 N
136k A	41.4 N	48.3 N	48.1 N	38.2 N	40.3 N	40.0 N
136k B	37.3 N	41.8 N	41.2 N	33.3 N	35.5 N	35.6 N
156k	42.8 N	48.0 N	47.2 N	38.2 N	40.7 N	40.9 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	30.1 N	33.4 N	32.1 N	25.5 N	26.6 N	25.9 N
Small Annual Crane	22.4 N	26.2 N	26.5 N	21.9 N	23.1 N	22.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1928-1931, 20' Roadway, 45 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.85	1.04	0.97	0.77	0.78	0.75
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 E
HS-20 Inv	0.51	0.62	0.58	0.46	0.47	0.45
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 E
IA Type 4	23.7	27.7	27.9	22.2	23.3	23.0
IA SU4	22.7	26.6	26.6	21.2	22.4	22.2
IA SU5	24.5	28.2	28.1	23.0	24.4	24.0
IA SU6	26.0	29.3	28.8	23.3	24.7	24.2
IA SU7	29.0	32.3	31.1	24.8	25.9	25.3
IA 3S3A	34.8	40.6	41.0	33.8	36.4	36.9
IA 3S3B	39.7	45.7	45.8	37.5	40.3	40.7
IA 4S3	41.7	48.7	49.2	40.0	41.8	41.3
IA 3-3	46.5	51.0	49.5	39.7	41.0	38.3
IA 5-2	38.0	43.6	43.5	35.6	37.8	37.2
IA EV2	23.5	28.9	29.1	23.3	24.4	24.2
IA EV3	23.4	27.7	28.3	22.5	23.5	23.2
90k	30.4 N	35.5 N	35.9 N	29.5 N	31.9 N	32.3 N
Quint Axle Crane	30.4 N	35.5 N	34.7 N	26.2 N	26.7 N	25.9 N
136k A	41.4 N	48.3 N	48.1 N	38.2 N	40.3 N	40.0 N
136k B	37.3 N	41.8 N	41.2 N	33.3 N	35.5 N	35.6 N
156k	42.8 N	48.0 N	47.2 N	38.2 N	40.7 N	40.9 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	30.1 N	33.4 N	32.1 N	25.5 N	26.6 N	25.9 N
Small Annual Crane	22.4 N	26.2 N	26.5 N	21.9 N	23.1 N	22.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1934, 18' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.97	0.92	0.93	0.86	0.84	0.72
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.58	0.55	0.56	0.51	0.50	0.43
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	27.0	24.5	26.7	24.9	24.9	22.1
IA SU4	25.8	23.6	25.5	23.7	23.9	21.4
IA SU5	27.9	24.9	26.9	25.7	26.1	23.1
IA SU6	29.6	25.9	27.6	26.1	26.4	23.3
IA SU7	33.0	28.6	29.8	27.7	27.7	24.3
IA 3S3A	39.6	35.9	39.2	37.8	38.9	35.5
IA 3S3B	45.2	40.5	43.8	42.0	43.1	39.2
IA 4S3	47.5	43.1	47.1	44.7	44.6	39.7
IA 3-3	52.9	45.1	47.4	44.4	43.8	36.9
IA 5-2	43.2	38.6	41.7	39.8	40.4	35.8
IA EV2	26.7	25.5	27.9	25.9	26.0	23.3
IA EV3	26.6	24.5	27.1	25.2	25.1	22.3
90k	34.6 N	31.4 N	34.3 N	33.0 N	34.1 N	31.1 N
Quint Axle Crane	34.6 N	31.4 N	33.2 N	29.4 N	28.6 N	24.9 N
136k A	47.1 N	42.7 N	46.0 N	42.8 N	43.0 N	38.5 N
136k B	42.4 N	37.0 N	39.4 N	37.3 N	37.9 N	34.2 N
156k	48.7 N	42.5 N	45.2 N	42.7 N	43.5 N	39.3 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	34.2 N	29.6 N	30.7 N	28.6 N	28.5 N	24.9 N
Small Annual Crane	25.4 N	23.2 N	25.4 N	24.5 N	24.7 N	22.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1934, 18' Roadway, 20 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.97	0.92	0.93	0.86	0.84	0.72
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.58	0.55	0.56	0.51	0.50	0.43
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.4L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	27.0	24.5	26.7	24.9	24.9	22.1
IA SU4	25.8	23.6	25.5	23.7	23.9	21.4
IA SU5	27.9	24.9	26.9	25.7	26.1	23.1
IA SU6	29.6	25.9	27.6	26.1	26.4	23.3
IA SU7	33.0	28.6	29.8	27.7	27.7	24.3
IA 3S3A	39.6	35.9	39.2	37.8	38.9	35.5
IA 3S3B	45.2	40.5	43.8	42.0	43.1	39.2
IA 4S3	47.5	43.1	47.1	44.7	44.6	39.7
IA 3-3	52.9	45.1	47.4	44.4	43.8	36.9
IA 5-2	43.2	38.6	41.7	39.8	40.4	35.8
IA EV2	26.7	25.5	27.9	25.9	26.0	23.3
IA EV3	26.6	24.5	27.1	25.2	25.1	22.3
90k	34.6 N	31.4 N	34.3 N	33.0 N	34.1 N	31.1 N
Quint Axle Crane	34.6 N	31.4 N	33.2 N	29.4 N	28.6 N	24.9 N
136k A	47.1 N	42.7 N	46.0 N	42.8 N	43.0 N	38.5 N
136k B	42.4 N	37.0 N	39.4 N	37.3 N	37.9 N	34.2 N
156k	48.7 N	42.5 N	45.2 N	42.7 N	43.5 N	39.3 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	34.2 N	29.6 N	30.7 N	28.6 N	28.5 N	24.9 N
Small Annual Crane	25.4 N	23.2 N	25.4 N	24.5 N	24.7 N	22.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1934, 18' Roadway, 30 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.97	0.92	0.93	0.86	0.84	0.72
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.58	0.55	0.56	0.51	0.50	0.43
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	27.0	24.5	26.7	24.9	24.9	22.1
IA SU4	25.8	23.6	25.5	23.7	23.9	21.4
IA SU5	27.9	24.9	26.9	25.7	26.1	23.1
IA SU6	29.6	25.9	27.6	26.1	26.4	23.3
IA SU7	33.0	28.6	29.8	27.7	27.7	24.3
IA 3S3A	39.6	35.9	39.2	37.8	38.9	35.5
IA 3S3B	45.2	40.5	43.8	42.0	43.1	39.2
IA 4S3	47.5	43.1	47.1	44.7	44.6	39.7
IA 3-3	52.9	45.1	47.4	44.4	43.8	36.9
IA 5-2	43.2	38.6	41.7	39.8	40.4	35.8
IA EV2	26.7	25.5	27.9	25.9	26.0	23.3
IA EV3	26.6	24.5	27.1	25.2	25.1	22.3
90k	34.6 N	31.4 N	34.3 N	33.0 N	34.1 N	31.1 N
Quint Axle Crane	34.6 N	31.4 N	33.2 N	29.4 N	28.6 N	24.9 N
136k A	47.1 N	42.7 N	46.0 N	42.8 N	43.0 N	38.5 N
136k B	42.4 N	37.0 N	39.4 N	37.3 N	37.9 N	34.2 N
156k	48.7 N	42.5 N	45.2 N	42.7 N	43.5 N	39.3 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	34.2 N	29.6 N	30.7 N	28.6 N	28.5 N	24.9 N
Small Annual Crane	25.4 N	23.2 N	25.4 N	24.5 N	24.7 N	22.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1934, 18' Roadway, 45 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.97	0.92	0.93	0.86	0.84	0.72
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.58	0.55	0.56	0.51	0.50	0.43
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	27.0	24.5	26.7	24.9	24.9	22.1
IA SU4	25.8	23.6	25.5	23.7	23.9	21.4
IA SU5	27.9	24.9	26.9	25.7	26.1	23.1
IA SU6	29.6	25.9	27.6	26.1	26.4	23.3
IA SU7	33.0	28.6	29.8	27.7	27.7	24.3
IA 3S3A	39.6	35.9	39.2	37.8	38.9	35.5
IA 3S3B	45.2	40.5	43.8	42.0	43.1	39.2
IA 4S3	47.5	43.1	47.1	44.7	44.6	39.7
IA 3-3	52.9	45.1	47.4	44.4	43.8	36.9
IA 5-2	43.2	38.6	41.7	39.8	40.4	35.8
IA EV2	26.7	25.5	27.9	25.9	26.1	23.3
IA EV3	26.6	24.5	27.1	25.2	25.1	22.3
90k	34.6 N	31.4 N	34.3 N	33.0 N	34.1 N	31.1 N
Quint Axle Crane	34.6 N	31.4 N	33.2 N	29.4 N	28.6 N	24.9 N
136k A	47.1 N	42.7 N	46.0 N	42.8 N	43.0 N	38.5 N
136k B	42.4 N	37.0 N	39.4 N	37.3 N	37.9 N	34.2 N
156k	48.7 N	42.5 N	45.2 N	42.7 N	43.5 N	39.3 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	34.2 N	29.6 N	30.7 N	28.6 N	28.5 N	24.9 N
Small Annual Crane	25.4 N	23.2 N	25.4 N	24.5 N	24.7 N	22.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1934, 20' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.90	1.02	0.81	0.81	0.87	0.77
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.54	0.61	0.48	0.49	0.52	0.46
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	24.9	27.2	23.0	23.5	25.8	23.6
IA SU4	23.8	26.2	22.0	22.5	24.8	22.8
IA SU5	25.7	27.7	23.2	24.4	27.1	24.7
IA SU6	27.3	28.8	23.8	24.7	27.4	24.9
IA SU7	30.4	31.8	25.7	26.3	28.7	26.0
IA 3S3A	36.5	39.9	33.8	35.8	40.4	37.9
IA 3S3B	41.6	45.0	37.8	39.7	44.7	41.8
IA 4S3	43.8	47.9	40.6	42.4	46.3	42.4
IA 3-3	48.8	50.2	40.8	42.0	45.4	39.4
IA 5-2	39.9	42.9	35.9	37.7	41.9	38.2
IA EV2	24.6	28.4	24.1	24.6	27.0	24.9
IA EV3	24.5	27.3	23.3	23.8	26.0	23.8
90k	31.9 N	34.9 N	29.6 N	31.3 N	35.3 N	33.2 N
Quint Axle Crane	31.9 N	34.9 N	28.6 N	27.8 N	29.6 N	26.6 N
136k A	43.4 N	47.5 N	39.7 N	40.5 N	44.6 N	41.1 N
136k B	39.1 N	41.1 N	34.0 N	35.3 N	39.3 N	36.6 N
156k	44.9 N	47.2 N	39.0 N	40.5 N	45.1 N	41.9 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	31.6 N	32.9 N	26.5 N	27.1 N	29.5 N	26.6 N
Small Annual Crane	23.5 N	25.8 N	21.9 N	23.2 N	25.6 N	23.5 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1934, 20' Roadway, 20 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.90	1.02	0.81	0.81	0.87	0.77
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.54	0.61	0.48	0.49	0.52	0.46
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	24.9	27.2	23.1	23.5	25.8	23.6
IA SU4	23.8	26.2	22.0	22.5	24.8	22.8
IA SU5	25.7	27.7	23.2	24.4	27.1	24.7
IA SU6	27.3	28.8	23.8	24.7	27.4	24.9
IA SU7	30.4	31.8	25.7	26.3	28.7	26.0
IA 3S3A	36.5	40.0	33.9	35.8	40.4	37.9
IA 3S3B	41.6	45.0	37.9	39.7	44.7	41.8
IA 4S3	43.8	48.0	40.6	42.4	46.3	42.4
IA 3-3	48.8	50.2	40.9	42.0	45.4	39.4
IA 5-2	39.9	42.9	36.0	37.7	41.9	38.2
IA EV2	24.6	28.4	24.1	24.6	27.0	24.9
IA EV3	24.5	27.3	23.4	23.8	26.0	23.8
90k	31.9 N	35.0 N	29.6 N	31.3 N	35.3 N	33.2 N
Quint Axle Crane	31.9 N	35.0 N	28.6 N	27.8 N	29.6 N	26.6 N
136k A	43.4 N	47.6 N	39.7 N	40.5 N	44.6 N	41.1 N
136k B	39.1 N	41.2 N	34.0 N	35.3 N	39.3 N	36.6 N
156k	44.9 N	47.2 N	39.0 N	40.5 N	45.1 N	41.9 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	31.6 N	32.9 N	26.5 N	27.1 N	29.5 N	26.6 N
Small Annual Crane	23.5 N	25.8 N	21.9 N	23.2 N	25.6 N	23.5 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1934, 20' Roadway, 30 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.90	1.02	0.81	0.81	0.87	0.77
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.54	0.61	0.48	0.49	0.52	0.46
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	24.9	27.2	23.1	23.5	25.8	23.6
IA SU4	23.8	26.2	22.0	22.5	24.8	22.8
IA SU5	25.7	27.7	23.2	24.4	27.1	24.7
IA SU6	27.3	28.8	23.8	24.7	27.4	24.9
IA SU7	30.4	31.8	25.7	26.3	28.7	26.0
IA 3S3A	36.5	40.0	33.9	35.8	40.4	37.9
IA 3S3B	41.6	45.0	37.9	39.7	44.7	41.8
IA 4S3	43.8	48.0	40.6	42.4	46.3	42.4
IA 3-3	48.8	50.2	40.9	42.0	45.4	39.4
IA 5-2	39.8	42.9	36.0	37.7	41.9	38.2
IA EV2	24.6	28.4	24.1	24.6	27.0	24.9
IA EV3	24.5	27.3	23.4	23.8	26.0	23.8
90k	31.9 N	35.0 N	29.6 N	31.3 N	35.3 N	33.2 N
Quint Axle Crane	31.9 N	35.0 N	28.6 N	27.8 N	29.6 N	26.6 N
136k A	43.4 N	47.6 N	39.7 N	40.5 N	44.6 N	41.1 N
136k B	39.1 N	41.2 N	34.0 N	35.3 N	39.3 N	36.6 N
156k	44.9 N	47.2 N	39.0 N	40.5 N	45.1 N	41.9 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	31.6 N	32.9 N	26.5 N	27.1 N	29.5 N	26.6 N
Small Annual Crane	23.5 N	25.8 N	21.9 N	23.2 N	25.6 N	23.5 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V3B-1934, 20' Roadway, 45 Degree Skew

	Bridge Length					
Truck	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.90	1.02	0.81	0.81	0.87	0.77
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.54	0.61	0.48	0.49	0.52	0.46
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	24.9	27.2	23.1	23.5	25.8	23.6
IA SU4	23.8	26.2	22.0	22.5	24.8	22.8
IA SU5	25.7	27.7	23.2	24.4	27.1	24.7
IA SU6	27.3	28.8	23.8	24.7	27.4	24.9
IA SU7	30.4	31.8	25.7	26.3	28.7	26.0
IA 3S3A	36.5	40.0	33.9	35.8	40.4	37.9
IA 3S3B	41.6	45.0	37.9	39.7	44.7	41.8
IA 4S3	43.8	48.0	40.6	42.4	46.3	42.4
IA 3-3	48.8	50.2	40.9	42.0	45.4	39.4
IA 5-2	39.9	42.9	36.0	37.7	41.9	38.2
IA EV2	24.6	28.4	24.1	24.6	27.0	24.9
IA EV3	24.5	27.3	23.4	23.8	26.0	23.8
90k	31.9 N	35.0 N	29.6 N	31.3 N	35.3 N	33.2 N
Quint Axle Crane	31.9 N	35.0 N	28.6 N	27.8 N	29.6 N	26.6 N
136k A	43.4 N	47.6 N	39.7 N	40.5 N	44.6 N	41.1 N
136k B	39.1 N	41.2 N	34.0 N	35.3 N	39.3 N	36.6 N
156k	44.9 N	47.2 N	39.0 N	40.5 N	45.1 N	41.9 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	31.6 N	32.9 N	26.5 N	27.1 N	29.5 N	26.6 N
Small Annual Crane	23.5 N	25.8 N	21.9 N	23.2 N	25.6 N	23.5 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V4-1915, 16' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**20'-0**	**22'-0**	**24'-0**	**26'-0**	**28'-0**	**30'-0**	**32'-0**
HS-20 Oper	0.26	0.48	0.39	0.30	0.72	0.60	0.50
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E
HS-20 Inv	0.16	0.29	0.23	0.18	0.43	0.36	0.30
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E
IA Type 4	7.3	12.9	10.3	8.0	20.6	17.4	14.5
IA SU4	7.0	12.4	9.9	7.7	19.6	16.5	13.9
IA SU5	7.6	13.2	10.4	8.1	20.7	17.7	15.0
IA SU6	8.0	13.8	10.9	8.4	21.2	18.0	15.3
IA SU7	9.0	15.4	12.0	9.1	22.9	19.3	16.2
IA 3S3A	10.7	18.9	15.1	11.8	30.2	25.9	22.1
IA 3S3B	12.3	21.4	17.0	13.2	33.7	28.8	24.5
IA 4S3	12.9	22.7	18.1	14.1	36.2	31.0	26.2
IA 3-3	14.4	24.4	18.9	14.5	36.4	30.8	25.9
IA 5-2	11.7	20.4	16.2	12.6	32.1	27.4	23.3
IA EV2	7.3	13.1	10.7	8.5	21.4	18.1	15.2
IA EV3	7.2	12.8	10.3	8.1	20.8	17.6	14.7
90k	9.4 N	16.5 N	13.2 N	10.3 N	26.4 N	22.6 N	19.3 N
Quint Axle Crane	9.4 N	16.5 N	13.2 N	10.3 N	25.5 N	20.9 N	17.2 N
136k A	12.8 N	22.5 N	17.9 N	14.0 N	35.4 N	29.8 N	25.0 N
136k B	11.5 N	19.8 N	15.5 N	12.0 N	30.3 N	25.7 N	21.8 N
156k	13.2 N	22.7 N	17.8 N	13.7 N	34.8 N	29.5 N	25.0 N
All Systems Permit	No	No	No	No	No	No	No
Fluid Milk Truck	9.3 N	16.0 N	12.4 N	9.4 N	23.6 N	19.9 N	16.7 N
Small Annual Crane	6.9 N	12.2 N	9.7 N	7.6 N	19.5 N	16.8 N	14.3 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V4-1915, 18' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**20'-0**	**22'-0**	**24'-0**	**26'-0**	**28'-0**	**30'-0**	**32'-0**
HS-20 Oper	0.27	0.49	0.40	0.30	0.73	0.61	0.52
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E
HS-20 Inv	0.16	0.29	0.24	0.18	0.44	0.37	0.31
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E
IA Type 4	7.5	13.2	10.5	8.3	21.1	17.8	14.9
IA SU4	7.2	12.7	10.1	8.0	20.1	16.9	14.2
IA SU5	7.8	13.5	10.7	8.4	21.2	18.1	15.4
IA SU6	8.3	14.2	11.1	8.6	21.8	18.5	15.7
IA SU7	9.2	15.8	12.3	9.4	23.5	19.8	16.6
IA 3S3A	11.0	19.4	15.5	12.1	30.9	26.5	22.7
IA 3S3B	12.6	22.0	17.4	13.6	34.6	29.6	25.2
IA 4S3	13.3	23.3	18.6	14.5	37.1	31.8	26.8
IA 3-3	14.8	25.0	19.4	14.9	37.3	31.6	26.6
IA 5-2	12.1	21.0	16.6	12.9	32.9	28.1	23.9
IA EV2	7.5	13.5	11.0	8.8	21.9	18.5	15.6
IA EV3	7.4	13.1	10.6	8.3	21.3	18.1	15.1
90k	9.7 N	17.0 N	13.5 N	10.6 N	27.1 N	23.2 N	19.8 N
Quint Axle Crane	9.7 N	17.0 N	13.5 N	10.6 N	26.1 N	21.4 N	17.6 N
136k A	13.1 N	23.1 N	18.4 N	14.4 N	36.3 N	30.6 N	25.7 N
136k B	11.8 N	20.3 N	15.9 N	12.3 N	31.1 N	26.4 N	22.4 N
156k	13.6 N	23.3 N	18.3 N	14.1 N	35.6 N	30.3 N	25.6 N
All Systems Permit	No	No	No	No	No	No	No
Fluid Milk Truck	9.6 N	16.4 N	12.7 N	9.7 N	24.2 N	20.4 N	17.1 N
Small Annual Crane	7.1 N	12.5 N	10.0 N	7.8 N	20.0 N	17.2 N	14.7 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V4B-1928/1931/1934, Concrete Deck, 0 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.37	1.00	1.27	1.12	1.14	1.25	1.12
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I
HS-20 Inv	0.82	0.60	0.76	0.67	0.68	0.75	0.67
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 I	0.4L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.5L SP1 I
IA Type 4	41.1	27.8	34.1	32.5	33.4	37.2	34.3
IA SU4	38.9	26.6	32.8	30.9	31.9	35.7	33.1
IA SU5	43.7	28.7	34.7	32.7	34.6	39.0	35.8
IA SU6	48.0	30.4	36.0	33.5	35.2	39.4	36.1
IA SU7	53.5	33.9	39.7	36.1	37.3	41.4	37.6
IA 3S3A	60.3	40.8	50.0	47.7	50.9	58.3	55.0
IA 3S3B	70.2	46.5	56.4	53.3	56.5	64.5	60.7
IA 4S3	72.3	48.9	60.1	57.2	60.2	66.8	61.5
IA 3-3	81.4	54.4	62.7	57.5	59.7	65.3	56.9
IA 5-2	67.6	44.5	53.7	50.6	53.6	60.4	55.4
IA EV2	37.7	27.6	35.6	33.6	34.5	38.5	35.7
IA EV3	39.5	27.4	34.2	32.9	33.8	37.5	34.6
90k	52.7 Y	35.7 N	43.8 N	41.7 N	44.5 N	51.0 Y	48.2 Y
Quint Axle Crane	52.7 Y	35.7 N	43.8 N	40.1 N	39.4 N	42.7 N	38.6 N
136k A	71.7 Y	48.5 N	59.6 N	55.8 N	57.6 N	64.4 N	59.6 N
136k B	68.8 Y	43.6 N	51.5 N	47.8 N	50.2 N	56.8 N	53.0 N
156k	78.9 Y	50.0 N	59.1 N	54.9 N	57.5 N	65.1 N	60.8 N
All Systems Permit	Yes	No	No	No	No	No	No
Fluid Milk Truck	55.7 Y	35.2 N	41.1 N	37.2 N	38.4 N	42.6 N	38.5 N
Small Annual Crane	38.5 N	26.2 N	32.3 N	30.9 N	33.0 N	36.9 N	34.1 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.
Bridge rated as two-lane.

V Bridge Standards Load Rating Summary - LFR Rating Method

V4B-1928/1931/1934, Timber Deck, 0 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.08	0.85	1.05	0.95	0.98	1.06	0.99
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I
HS-20 Inv	0.65	0.51	0.63	0.57	0.59	0.63	0.59
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I
IA Type 4	32.3	23.6	40.4	39.6	41.1	45.3	43.0
IA SU4	43.3	32.0	38.9	37.7	39.2	43.5	41.6
IA SU5	48.7	34.6	41.1	39.9	42.6	47.5	44.9
IA SU6	53.5	36.6	42.6	40.9	43.2	48.0	45.3
IA SU7	59.6	40.8	47.0	44.1	45.9	50.4	47.3
IA 3S3A	67.2	49.0	59.2	58.2	62.5	71.0	69.1
IA 3S3B	78.2	55.9	66.7	65.0	69.5	78.5	76.2
IA 4S3	80.6	58.8	71.1	69.8	74.0	81.3	77.2
IA 3-3	90.3	65.4	74.3	70.1	73.4	79.5	71.5
IA 5-2	75.4	53.5	63.6	61.8	65.9	73.6	69.5
IA EV2	42.0	33.2	42.2	40.5	42.0	46.4	44.3
IA EV3	43.8	33.0	40.5	40.1	41.6	45.7	43.4
90k	58.8 Y	42.9 N	51.8 Y	50.9 Y	54.7 Y	62.1 Y	60.5 Y
Quint Axle Crane	58.8 Y	42.9 N	51.8 Y	49.0 N	48.5 N	52.0 Y	48.5 N
136k A	79.9 Y	58.4 N	70.5 Y	68.1 Y	70.8 Y	78.4 Y	74.8 Y
136k B	76.3 Y	52.5 N	61.0 N	58.4 N	61.7 N	69.1 Y	66.6 N
156k	87.5 Y	60.2 N	69.9 N	67.0 N	70.7 N	79.3 Y	76.4 N
All Systems Permit	Yes	No	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	62.1 Y	42.3 N	48.6 Y	45.4 N	47.2 N	51.8 Y	48.3 Y
Small Annual Crane	42.9 Y	31.5 N	38.2 N	37.6 N	40.6 Y	44.9 Y	42.8 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.
Bridge rated as two-lane.

V Bridge Standards Load Rating Summary - LFR Rating Method

V5B-1936, 18' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.38	1.15	1.27	1.08	1.08	1.33	1.11
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 I	0.6L SP1 E	0.6L SP1 E	0.5L SP1 E
HS-20 Inv	0.83	0.69	0.76	0.65	0.65	0.80	0.66
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.6L SP1 E	0.4L SP1 I	0.6L SP1 E	0.6L SP1 E	0.5L SP1 E
IA Type 4	41.4	31.8	34.1	31.2	31.7	39.7	33.9
IA SU4	39.2	30.4	32.9	29.8	30.2	38.2	32.8
IA SU5	44.1	33.0	34.8	31.4	32.8	41.7	35.4
IA SU6	48.6	34.9	36.1	32.2	33.3	42.2	35.7
IA SU7	54.1	39.0	39.9	34.8	35.3	44.3	37.3
IA 3S3A	60.8	46.7	50.1	45.8	48.1	62.2	54.4
IA 3S3B	70.9	53.3	56.5	51.2	53.5	68.9	60.0
IA 4S3	73.0	56.1	60.1	55.0	57.0	71.3	60.9
IA 3-3	82.0	62.5	62.9	55.3	56.5	70.0	56.5
IA 5-2	68.3	51.0	53.8	48.7	50.7	64.6	54.8
IA EV2	37.9	31.5	35.6	32.4	32.7	41.1	35.3
IA EV3	39.8	31.4	34.2	31.6	32.1	40.1	34.2
90k	53.2 Y	40.9 N	43.8 N	40.1 N	42.1 N	54.5 Y	47.6 Y
Quint Axle Crane	53.2 Y	40.9 N	43.8 N	38.7 N	37.4 N	45.6 N	38.2 N
136k A	72.4 Y	55.6 N	59.6 N	53.8 N	54.5 N	68.7 Y	59.0 N
136k B	69.6 Y	50.1 N	51.6 N	46.0 N	47.5 N	60.6 N	52.5 N
156k	79.8 Y	57.5 N	59.2 N	52.8 N	54.5 N	69.5 N	60.2 N
All Systems Permit	Yes	No	No	No	No	Yes	No
Fluid Milk Truck	56.4 Y	40.4 N	41.2 N	35.9 N	36.4 N	45.5 N	38.1 N
Small Annual Crane	38.8 N	30.0 N	32.3 N	29.7 N	31.2 N	39.4 N	33.7 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.
Bridge rated as two-lane.

V Bridge Standards Load Rating Summary - LFR Rating Method

V5B-1936, 20' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.56	1.15	1.11	1.11	1.19	1.16	1.18
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.4L SP1 E	0.6L SP1 E	0.6L SP1 E	0.4L SP1 E	0.5L SP1 E
HS-20 Inv	0.93	0.69	0.67	0.66	0.71	0.70	0.71
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.5L SP1 E	0.4L SP1 E	0.6L SP1 E	0.6L SP1 E	0.4L SP1 E	0.5L SP1 E
IA Type 4	46.8	31.8	29.9	32.0	35.0	34.6	36.2
IA SU4	44.3	30.4	28.8	30.5	33.4	33.3	35.0
IA SU5	49.9	32.9	30.4	32.2	36.2	36.4	37.8
IA SU6	54.9	34.9	31.6	33.0	36.7	36.8	38.1
IA SU7	61.2	38.9	34.9	35.6	39.0	38.6	39.7
IA 3S3A	68.7	46.7	43.8	46.9	53.1	54.3	58.1
IA 3S3B	80.1	53.3	49.4	52.4	59.0	60.1	64.0
IA 4S3	82.4	56.0	52.6	56.3	62.9	62.2	64.9
IA 3-3	92.6	62.4	55.1	56.6	62.4	61.0	60.2
IA 5-2	77.2	51.0	47.1	49.8	56.0	56.3	58.5
IA EV2	42.8	31.5	31.2	33.1	36.1	35.9	37.7
IA EV3	44.9	31.4	29.9	32.4	35.4	35.0	36.5
90k	60.1 Y	40.8 N	38.3 N	41.0 N	46.5 Y	47.5 Y	50.8 Y
Quint Axle Crane	60.1 Y	40.8 N	38.3 N	39.7 N	41.3 N	39.8 N	40.8 N
136k A	81.8 Y	55.6 N	52.1 N	55.0 N	60.2 N	60.0 N	62.9 N
136k B	78.6 Y	50.1 N	45.2 N	47.1 N	52.4 N	52.9 N	56.0 N
156k	90.2 Y	57.4 N	51.8 N	54.0 N	60.1 N	60.6 N	64.2 N
All Systems Permit	Yes	No	No	No	No	No	No
Fluid Milk Truck	63.7 Y	40.4 N	36.1 N	36.7 N	40.2 N	39.7 N	40.7 N
Small Annual Crane	43.9 Y	30.0 N	28.3 N	30.4 N	34.4 N	34.4 N	36.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V5B-1947, 18' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.37	1.11	1.37	1.08	1.08	1.36	1.05
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I
HS-20 Inv	0.82	0.66	0.82	0.65	0.64	0.81	0.63
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.4L SP1 I	0.4L SP1 I	0.6L SP1 I	0.5L SP1 I
IA Type 4	41.0	30.7	36.7	31.1	31.5	40.4	32.1
IA SU4	38.8	29.3	35.3	29.7	30.0	38.8	31.0
IA SU5	43.7	31.8	37.4	31.4	32.6	42.5	33.5
IA SU6	48.1	33.7	38.8	32.2	33.1	42.9	33.8
IA SU7	53.6	37.6	42.8	34.7	35.1	45.1	35.2
IA 3S3A	60.2	45.0	53.8	45.7	47.8	63.3	51.5
IA 3S3B	70.2	51.4	60.7	51.1	53.1	70.1	56.7
IA 4S3	72.3	54.0	64.6	54.8	56.7	72.6	57.5
IA 3-3	81.2	60.2	67.6	55.2	56.2	71.2	53.4
IA 5-2	67.7	49.2	57.8	48.6	50.4	65.8	51.8
IA EV2	37.5	30.4	38.3	32.3	32.5	41.8	33.4
IA EV3	39.4	30.3	36.7	31.5	31.9	40.8	32.4
90k	52.7 Y	39.4 N	47.1 Y	40.0 N	41.8 N	55.4 Y	45.0 Y
Quint Axle Crane	52.7 Y	39.4 N	47.1 N	38.6 N	37.2 N	46.5 N	36.1 N
136k A	71.7 Y	53.6 N	64.1 N	53.6 N	54.2 N	70.0 Y	55.8 N
136k B	69.0 Y	48.3 N	55.5 N	45.9 N	47.2 N	61.7 N	49.6 N
156k	79.1 Y	55.4 N	63.6 N	52.7 N	54.1 N	70.8 N	56.9 N
All Systems Permit	Yes	No	No	No	No	Yes	No
Fluid Milk Truck	55.9 Y	39.0 N	44.3 N	35.8 N	36.2 N	46.3 N	36.1 N
Small Annual Crane	38.5 N	29.0 N	34.8 N	29.6 N	31.0 N	40.1 Y	31.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.
Bridge rated as two-lane.

V Bridge Standards Load Rating Summary - LFR Rating Method

V5B-1947, 20' Roadway, 0 Degree Skew

	Bridge Length						
Truck	**16'-0**	**20'-0**	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	1.56	1.15	1.13	1.11	1.20	1.17	1.21
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I
HS-20 Inv	0.93	0.69	0.67	0.67	0.72	0.70	0.73
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 I	0.5L SP1 I	0.6L SP1 I	0.6L SP1 I	0.6L SP1 I	0.4L SP1 I	0.5L SP1 I
IA Type 4	46.9	32.0	30.2	32.1	35.2	34.9	37.1
IA SU4	44.4	30.6	29.1	30.6	33.5	33.5	35.8
IA SU5	50.0	33.1	30.7	32.3	36.4	36.6	38.7
IA SU6	55.0	35.1	31.9	33.1	36.9	37.0	39.1
IA SU7	61.3	39.1	35.2	35.7	39.2	38.9	40.8
IA 3S3A	68.9	46.9	44.3	47.1	53.4	54.6	59.5
IA 3S3B	80.3	53.5	49.9	52.6	59.3	60.4	65.7
IA 4S3	82.6	56.3	53.2	56.5	63.3	62.6	66.6
IA 3-3	92.8	62.7	55.6	56.8	62.7	61.4	61.8
IA 5-2	77.4	51.2	47.6	50.0	56.3	56.7	60.0
IA EV2	42.9	31.7	31.5	33.2	36.3	36.1	38.6
IA EV3	45.0	31.5	30.2	32.5	35.6	35.2	37.4
90k	60.3 Y	41.0 N	38.8 N	41.2 N	46.7 Y	47.8 Y	52.1 Y
Quint Axle Crane	60.3 Y	41.0 N	38.8 N	39.8 N	41.5 N	40.1 N	41.8 N
136k A	82.0 Y	55.8 N	52.7 N	55.2 N	60.5 N	60.3 N	64.5 N
136k B	78.8 Y	50.3 N	45.6 N	47.3 N	52.7 N	53.2 N	57.4 N
156k	90.4 Y	57.7 N	52.4 N	54.2 N	60.4 N	61.0 N	65.8 N
All Systems Permit	Yes	No	No	No	No	No	No
Fluid Milk Truck	63.9 Y	40.6 N	36.4 N	36.8 N	40.4 N	39.9 N	41.7 N
Small Annual Crane	44.0 Y	30.1 N	28.6 N	30.5 N	34.6 N	34.6 N	36.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V6-1939, 20' Roadway, 0 Degree Skew

	Bridge Length				
Truck	**120'-0**	**150'-0**	**180'-0**	**210'-0**	**240'-0**
HS-20 Oper	0.75	0.76	0.82	0.58	0.91
Controlled by	STR +M	STR +M	STR +M	STR -M	STR +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	1.0L SP2 E	0.6L SP3 E
HS-20 Inv	0.45	0.45	0.49	0.35	0.54
Controlled by	STR +M	STR +M	STR +M	STR -M	STR +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	1.0L SP2 E	0.6L SP3 E
IA Type 4	23.1	24.0	26.4	25.0	30.1
IA SU4	22.3	23.3	25.7	24.5	29.6
IA SU5	24.0	24.7	27.1	25.6	30.7
IA SU6	24.4	25.0	27.3	25.8	31.1
IA SU7	25.6	26.0	28.1	26.5	32.0
IA 3S3A	38.2	38.9	39.7	31.7	41.7
IA 3S3B	39.4	40.5	48.1	29.5	54.9
IA 4S3	38.3	39.6	47.2	29.3	52.1
IA 3-3	40.1	38.1	38.5	31.2	40.7
IA 5-2	37.0	39.3	42.0	30.6	45.1
IA EV2	23.7	24.7	26.9	25.6	30.6
IA EV3	23.1	24.1	26.4	25.1	30.3
90k	33.5 N	35.6 N	39.1 N	30.6 N	43.2 N
Quint Axle Crane	26.8 N	26.8 N	28.8 N	26.9 N	32.4 N
136k A	36.6 N	40.0 N	46.4 N	30.3 N	49.1 N
136k B	35.8 N	38.8 N	42.1 N	30.1 N	46.4 N
156k	38.0 N	40.8 N	48.3 N	30.1 N	52.8 N
All Systems Permit	No	No	No	No	No
Fluid Milk Truck	26.2 N	26.4 N	28.6 N	26.7 N	32.0 N
Small Annual Crane	22.7 N	23.7 N	26.1 N	24.9 N	29.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V6-1946, 20' Roadway, 0 Degree Skew

	Bridge Length				
Truck	**120'-0**	**150'-0**	**180'-0**	**210'-0**	**240'-0**
HS-20 Oper	0.81	0.79	0.86	0.83	0.97
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E
HS-20 Inv	0.49	0.47	0.51	0.50	0.58
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E
IA Type 4	24.9	24.9	27.7	27.4	32.2
IA SU4	24.1	24.2	27.1	26.9	31.7
IA SU5	25.9	25.7	28.5	28.1	32.9
IA SU6	26.3	26.0	28.7	28.3	33.3
IA SU7	27.6	27.0	29.6	29.0	34.2
IA 3S3A	41.3	40.4	41.8	39.1	44.4
IA 3S3B	43.1	42.4	50.4	52.1	58.1
IA 4S3	42.0	41.5	49.7	49.4	55.1
IA 3-3	44.0	39.5	40.6	37.7	43.0
IA 5-2	40.6	40.9	44.2	42.1	47.7
IA EV2	25.6	25.6	28.3	28.1	32.7
IA EV3	25.0	25.0	27.8	27.5	32.5
90k	36.1 N	37.0 N	41.2 N	40.1 N	45.9 Y
Quint Axle Crane	28.9 N	27.8 N	30.4 N	29.6 N	34.7 N
136k A	40.1 N	41.9 N	48.9 N	46.4 N	52.0 N
136k B	39.2 N	40.3 N	44.4 N	43.3 N	49.0 N
156k	41.7 N	42.7 N	50.9 N	50.2 N	55.9 N
All Systems Permit	No	No	No	No	No
Fluid Milk Truck	28.3 N	27.5 N	30.1 N	29.4 N	34.3 N
Small Annual Crane	24.5 N	24.6 N	27.5 N	27.3 N	32.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V7-1939, 22' Roadway, 0 Degree Skew

	Bridge Length				
Truck	**120'-0**	**150'-0**	**180'-0**	**210'-0**	**240'-0**
HS-20 Oper	0.70	0.70	0.76	0.78	0.83
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.6L SP3 E
HS-20 Inv	0.42	0.42	0.45	0.46	0.50
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.6L SP3 E
IA Type 4	21.3	22.2	24.4	25.5	27.6
IA SU4	20.6	21.6	23.8	25.0	27.2
IA SU5	22.1	22.9	25.0	26.1	28.2
IA SU6	22.5	23.2	25.3	26.3	28.5
IA SU7	23.6	24.0	26.1	27.0	29.4
IA 3S3A	35.1	36.0	36.8	36.3	38.3
IA 3S3B	35.9	36.4	45.3	48.1	50.2
IA 4S3	34.9	35.6	43.5	45.6	47.6
IA 3-3	36.6	35.3	35.7	35.1	37.2
IA 5-2	33.8	35.4	38.7	39.1	41.2
IA EV2	21.9	22.9	24.8	25.9	28.0
IA EV3	21.4	22.3	24.5	25.6	27.8
90k	30.9 N	32.9 N	36.1 N	37.2 N	39.7 N
Quint Axle Crane	24.8 N	24.8 N	26.7 N	27.5 N	29.7 N
136k A	33.4 N	36.0 N	42.8 N	43.1 N	44.9 N
136k B	32.6 N	35.0 N	38.9 N	40.2 N	42.4 N
156k	34.7 N	36.7 N	44.6 N	46.6 N	48.3 N
All Systems Permit	No	No	No	No	No
Fluid Milk Truck	24.2 N	24.5 N	26.5 N	27.3 N	29.4 N
Small Annual Crane	21.0 N	22.0 N	24.1 N	25.3 N	27.4 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V7-1946, 22' Roadway, 0 Degree Skew

	Bridge Length				
Truck	**120'-0**	**150'-0**	**180'-0**	**210'-0**	**240'-0**
HS-20 Oper	0.75	0.73	0.79	0.77	0.90
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E
HS-20 Inv	0.45	0.44	0.48	0.46	0.54
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.5L SP2 E	0.4L SP1 E
IA Type 4	22.9	23.0	25.6	25.4	29.7
IA SU4	22.1	22.4	25.0	24.9	29.2
IA SU5	23.7	23.7	26.3	26.0	30.3
IA SU6	24.2	24.0	26.5	26.2	30.6
IA SU7	25.3	24.9	27.4	26.9	31.6
IA 3S3A	37.9	37.3	38.6	36.2	41.1
IA 3S3B	39.1	38.0	47.6	48.0	53.8
IA 4S3	38.0	37.2	45.7	45.4	51.0
IA 3-3	39.8	36.5	37.5	35.0	39.8
IA 5-2	36.8	37.0	40.7	39.0	44.2
IA EV2	23.5	23.7	26.1	25.9	30.1
IA EV3	22.9	23.1	25.7	25.5	29.9
90k	33.2 N	34.1 N	37.9 N	37.1 N	42.5 N
Quint Axle Crane	26.6 N	25.7 N	28.0 N	27.4 N	31.9 N
136k A	36.3 N	37.6 N	44.9 N	43.0 N	48.1 N
136k B	35.5 N	36.5 N	40.8 N	40.1 N	45.4 N
156k	37.8 N	38.3 N	46.8 N	46.5 N	51.8 N
All Systems Permit	No	No	No	No	No
Fluid Milk Truck	25.9 N	25.4 N	27.8 N	27.2 N	31.6 N
Small Annual Crane	22.5 N	22.7 N	25.4 N	25.2 N	29.5 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V8-1941, 22' Roadway, 0 Degree Skew

	Bridge Length				
Truck	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.67	0.77	0.62	0.70	0.59
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.6L SP1 E	0.6L SP1 E	0.4L SP1 E	0.5L SP1 E	0.5L SP1 E
HS-20 Inv	0.40	0.46	0.37	0.42	0.36
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.6L SP1 E	0.6L SP1 E	0.4L SP1 E	0.5L SP1 E	0.5L SP1 E
IA Type 4	18.0	22.4	17.9	20.8	18.2
IA SU4	17.4	21.3	17.1	20.0	17.5
IA SU5	18.3	22.5	18.6	21.8	18.9
IA SU6	19.0	23.1	18.8	22.1	19.1
IA SU7	21.0	24.9	20.0	23.2	19.9
IA 3S3A	26.4	32.9	27.3	32.6	29.2
IA 3S3B	29.8	36.7	30.3	36.1	32.2
IA 4S3	31.7	39.4	32.2	37.3	32.6
IA 3-3	33.1	39.6	32.0	36.5	30.1
IA 5-2	28.4	34.9	28.7	33.8	29.3
IA EV2	18.8	23.2	18.7	21.7	19.1
IA EV3	18.1	22.7	18.1	21.0	18.3
90k	23.1 N	28.7 N	23.9 N	28.5 N	25.5 N
Quint Axle Crane	23.1 N	27.6 N	21.1 N	23.9 N	20.4 N
136k A	31.5 N	38.5 N	30.8 N	36.0 N	31.6 N
136k B	27.2 N	33.0 N	26.9 N	31.8 N	28.1 N
156k	31.2 N	37.8 N	30.8 N	36.4 N	32.2 N
All Systems Permit	No	No	No	No	No
Fluid Milk Truck	21.7 N	25.7 N	20.6 N	23.8 N	20.4 N
Small Annual Crane	17.1 N	21.3 N	17.7 N	20.6 N	18.0 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V8-1947, 22' Roadway, 0 Degree Skew

	Bridge Length				
Truck	**24'-0**	**28'-0**	**32'-0**	**36'-0**	**40'-0**
HS-20 Oper	0.73	0.77	0.58	0.70	0.62
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.6L SP1 E	0.6L SP1 E	0.4L SP1 E	0.5L SP1 E	0.5L SP1 E
HS-20 Inv	0.44	0.46	0.35	0.42	0.37
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.6L SP1 E	0.6L SP1 E	0.4L SP1 E	0.5L SP1 E	0.5L SP1 E
IA Type 4	19.5	22.3	16.8	20.9	19.0
IA SU4	18.8	21.2	16.1	20.1	18.3
IA SU5	19.9	22.4	17.4	21.9	19.8
IA SU6	20.6	23.0	17.7	22.2	20.0
IA SU7	22.7	24.7	18.8	23.3	20.8
IA 3S3A	28.7	32.7	25.6	32.8	30.5
IA 3S3B	32.3	36.5	28.5	36.2	33.6
IA 4S3	34.4	39.2	30.3	37.5	34.0
IA 3-3	35.9	39.4	30.1	36.6	31.5
IA 5-2	30.8	34.7	27.0	33.9	30.7
IA EV2	20.4	23.2	17.6	21.8	20.0
IA EV3	19.6	22.6	17.0	21.1	19.1
90k	25.1 N	28.6 N	22.4 N	28.7 N	26.7 N
Quint Axle Crane	25.1 N	27.5 N	19.8 N	24.0 N	21.4 N
136k A	34.1 N	38.3 N	29.0 N	36.1 N	33.0 N
136k B	29.5 N	32.8 N	25.3 N	31.9 N	29.4 N
156k	33.8 N	37.6 N	29.0 N	36.6 N	33.7 N
All Systems Permit	No	No	No	No	No
Fluid Milk Truck	23.5 N	25.5 N	19.3 N	23.9 N	21.3 N
Small Annual Crane	18.5 N	21.2 N	16.6 N	20.7 N	18.9 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V9-1950, 20' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.02	0.85	0.89	0.93	1.03	1.15
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.3L SP1 I	0.4L SP1 I	0.2L SP1 I	0.3L SP1 E	0.4L SP1 E	0.8L SP1 I
HS-20 Inv	0.61	0.51	0.53	0.55	0.62	0.69
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.3L SP1 I	0.4L SP1 I	0.2L SP1 I	0.3L SP1 E	0.4L SP1 E	0.8L SP1 I
IA Type 4	27.9	25.9	28.0	30.6	34.5	39.8
IA SU4	26.8	25.2	27.0	30.3	34.1	39.2
IA SU5	28.6	27.3	29.1	31.3	35.1	40.5
IA SU6	29.9	28.0	29.4	31.8	35.8	40.7
IA SU7	33.3	29.9	30.6	32.9	36.6	41.4
IA 3S3A	41.0	41.2	45.2	44.1	47.1	49.1
IA 3S3B	46.3	44.9	49.7	57.3	63.4	61.7
IA 4S3	49.1	46.5	50.1	54.7	61.5	62.6
IA 3-3	52.5	47.6	45.9	44.7	47.2	49.5
IA 5-2	44.2	42.3	45.1	48.5	54.2	58.2
IA EV2	28.6	25.6	28.2	30.1	34.5	39.3
IA EV3	27.8	26.6	28.2	30.6	34.9	39.6
90k	35.8 N	36.0 N	39.5 N	45.8 Y	49.2 Y	50.9 Y
Quint Axle Crane	35.8 N	31.4 N	31.4 N	32.9 N	36.8 N	41.9 N
136k A	48.7 N	44.8 N	48.7 N	54.0 N	58.4 N	58.1 N
136k B	42.7 N	39.4 N	43.4 N	49.4 N	53.5 N	54.1 N
156k	49.0 N	45.2 N	49.8 N	56.6 N	60.3 N	59.2 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	34.5 N	31.1 N	31.3 N	33.2 N	36.6 N	41.8 N
Small Annual Crane	26.4 N	25.3 N	27.8 N	30.2 N	34.2 N	39.7 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V9-1950, 20' Roadway, 30 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.02	0.85	0.89	0.93	1.03	1.15
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.3L SP1 I	0.7L SP1 I	0.2L SP1 I	0.8L SP1 I	0.6L SP1 E	0.8L SP1 I
HS-20 Inv	0.61	0.51	0.53	0.56	0.62	0.69
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.3L SP1 I	0.7L SP1 I	0.2L SP1 I	0.8L SP1 I	0.6L SP1 E	0.8L SP1 I
IA Type 4	27.9	25.9	28.0	30.7	34.5	39.9
IA SU4	26.8	25.2	27.0	30.3	34.1	39.3
IA SU5	28.6	27.3	29.1	31.4	35.1	40.5
IA SU6	29.9	28.0	29.4	31.9	35.9	40.8
IA SU7	33.3	29.9	30.6	33.0	36.6	41.5
IA 3S3A	40.9	41.2	45.2	44.1	47.1	49.1
IA 3S3B	46.3	44.9	49.7	57.4	63.4	61.8
IA 4S3	49.1	46.5	50.1	54.8	61.5	62.7
IA 3-3	52.5	47.6	45.9	44.7	47.2	49.5
IA 5-2	44.2	42.3	45.1	48.6	54.3	58.2
IA EV2	28.6	25.6	28.2	30.2	34.5	39.3
IA EV3	27.8	26.6	28.2	30.7	34.9	39.6
90k	35.8 N	36.0 N	39.5 N	45.9 Y	49.2 Y	50.9 Y
Quint Axle Crane	35.8 N	31.4 N	31.4 N	33.0 N	36.8 N	41.9 N
136k A	48.7 N	44.8 N	48.7 N	54.2 N	58.4 N	58.1 N
136k B	42.7 N	39.4 N	43.4 N	49.5 N	53.6 N	54.1 N
156k	49.0 N	45.2 N	49.8 N	56.7 N	60.3 N	59.2 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	34.5 N	31.1 N	31.3 N	33.2 N	36.6 N	41.9 N
Small Annual Crane	26.4 N	25.3 N	27.8 N	30.3 N	34.2 N	39.8 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V9-1964, 20' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.38	1.53	1.51	1.45	1.55	1.57
Controlled by	STR +V	STR +V	STR +M	STR +M	STR +M	STR +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.83	0.76	0.73	0.69	0.78	0.82
Controlled by	STR +V	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	45.5	48.9	46.6	46.6	51.3	52.8
IA SU4	42.9	46.4	45.1	45.5	50.4	52.0
IA SU5	46.9	49.2	48.6	48.0	52.5	53.8
IA SU6	52.7	50.4	49.0	48.3	52.8	54.0
IA SU7	58.7	54.1	51.0	49.7	53.9	55.0
IA 3S3A	71.6	71.8	75.3	72.7	73.9	71.5
IA 3S3B	77.1	80.2	82.9	86.2	96.9	96.4
IA 4S3	81.5	86.2	83.6	83.4	91.7	92.4
IA 3-3	80.2	82.9	76.5	69.7	70.1	67.7
IA 5-2	72.7	76.2	75.2	74.4	79.9	78.3
IA EV2	42.4	47.8	48.3	48.3	52.8	54.0
IA EV3	43.7	48.8	47.0	46.9	51.6	53.1
90k	62.6 Y	62.9 Y	65.9 Y	68.9 Y	77.8 Y	75.7 Y
Quint Axle Crane	55.6 Y	57.9 Y	52.3 Y	50.6 Y	54.6 Y	55.6 Y
136k A	79.1 Y	83.7 Y	81.1 Y	81.8 Y	90.5 Y	85.2 Y
136k B	71.1 Y	71.9 Y	72.4 Y	74.2 Y	82.9 Y	81.5 Y
156k	81.6 Y	82.5 Y	83.0 Y	85.2 Y	95.1 Y	90.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	57.0 Y	55.8 Y	52.2 Y	50.5 Y	54.6 Y	55.5 Y
Small Annual Crane	45.8 Y	46.5 Y	46.3 Y	46.4 Y	51.2 Y	52.7 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V9-1964, 20' Roadway, 15 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.38	1.53	1.51	1.45	1.55	1.57
Controlled by	STR +V	STR +V	STR +M	STR +M	STR +M	STR +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.83	0.76	0.73	0.69	0.78	0.82
Controlled by	STR +V	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	45.5	48.9	46.6	46.6	51.3	52.8
IA SU4	42.9	46.4	45.1	45.5	50.4	52.0
IA SU5	46.9	49.2	48.6	48.0	52.5	53.8
IA SU6	52.7	50.4	49.0	48.3	52.8	54.0
IA SU7	58.7	54.1	51.0	49.7	53.9	55.0
IA 3S3A	71.6	71.8	75.3	72.7	73.9	71.5
IA 3S3B	77.1	80.2	82.9	86.2	96.9	96.4
IA 4S3	81.5	86.2	83.6	83.4	91.7	92.4
IA 3-3	80.2	82.9	76.5	69.7	70.1	67.7
IA 5-2	72.7	76.2	75.2	74.4	79.9	78.3
IA EV2	42.4	47.8	48.3	48.3	52.8	54.0
IA EV3	43.7	48.8	47.0	46.9	51.6	53.1
90k	62.6 Y	62.9 Y	65.9 Y	68.9 Y	77.8 Y	75.7 Y
Quint Axle Crane	55.6 Y	57.9 Y	52.3 Y	50.6 Y	54.6 Y	55.6 Y
136k A	79.1 Y	83.7 Y	81.1 Y	81.8 Y	90.5 Y	85.2 Y
136k B	71.1 Y	71.9 Y	72.4 Y	74.2 Y	82.9 Y	81.5 Y
156k	81.6 Y	82.5 Y	83.0 Y	85.2 Y	95.1 Y	90.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	57.0 Y	55.8 Y	52.2 Y	50.5 Y	54.6 Y	55.5 Y
Small Annual Crane	45.8 Y	46.5 Y	46.3 Y	46.4 Y	51.2 Y	52.7 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V9-1964, 20' Roadway, 30 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.38	1.53	1.51	1.45	1.55	1.57
Controlled by	STR +V	STR +V	STR +M	STR +M	STR +M	STR +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	0.83	0.76	0.73	0.69	0.78	0.82
Controlled by	STR +V	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP1 I	0.4L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
IA Type 4	45.5	48.9	46.6	46.6	51.3	52.8
IA SU4	42.9	46.4	45.1	45.5	50.4	52.0
IA SU5	46.9	49.2	48.6	48.0	52.5	53.8
IA SU6	52.7	50.4	49.0	48.3	52.8	54.0
IA SU7	58.7	54.1	51.0	49.7	53.9	55.0
IA 3S3A	71.6	71.8	75.3	72.7	73.9	71.5
IA 3S3B	77.1	80.2	82.9	86.2	96.9	96.4
IA 4S3	81.5	86.2	83.6	83.4	91.7	92.4
IA 3-3	80.2	82.9	76.5	69.7	70.1	67.7
IA 5-2	72.7	76.2	75.2	74.4	79.9	78.3
IA EV2	42.4	47.8	48.3	48.3	52.8	54.0
IA EV3	43.7	48.8	47.0	46.9	51.6	53.1
90k	62.6 Y	62.9 Y	65.9 Y	68.9 Y	77.8 Y	75.7 Y
Quint Axle Crane	55.6 Y	57.9 Y	52.3 Y	50.6 Y	54.6 Y	55.6 Y
136k A	79.1 Y	83.7 Y	81.1 Y	81.8 Y	90.5 Y	85.2 Y
136k B	71.1 Y	71.9 Y	72.4 Y	74.2 Y	82.9 Y	81.5 Y
156k	81.6 Y	82.5 Y	83.0 Y	85.2 Y	95.1 Y	90.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	57.0 Y	55.8 Y	52.2 Y	50.5 Y	54.6 Y	55.5 Y
Small Annual Crane	45.8 Y	46.5 Y	46.3 Y	46.4 Y	51.2 Y	52.7 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V9A-1957, 20' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.01	0.84	0.86	0.84	0.95	1.15
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.4L SP1 I	0.2L SP1 E	0.3L SP1 E	0.4L SP1 E	0.8L SP1 I
HS-20 Inv	0.61	0.50	0.51	0.50	0.57	0.69
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.4L SP1 I	0.2L SP1 E	0.3L SP1 E	0.4L SP1 E	0.8L SP1 I
IA Type 4	27.1	25.6	26.8	27.8	31.6	39.4
IA SU4	26.0	25.0	25.9	27.5	31.3	38.8
IA SU5	27.7	27.0	27.9	28.4	32.2	40.1
IA SU6	29.0	27.7	28.1	28.9	32.9	40.3
IA SU7	32.3	29.6	29.3	29.9	33.6	41.0
IA 3S3A	39.8	40.8	43.2	40.2	43.2	49.0
IA 3S3B	45.0	44.4	47.6	52.3	59.7	61.6
IA 4S3	47.7	46.0	48.0	49.6	56.4	62.5
IA 3-3	51.0	47.1	43.9	40.8	43.3	49.3
IA 5-2	42.9	41.8	43.2	44.0	49.8	58.1
IA EV2	27.8	25.4	27.2	27.3	31.6	39.2
IA EV3	27.0	26.3	27.0	27.8	32.0	39.5
90k	34.8 N	35.7 N	37.8 N	41.6 N	45.1 Y	50.8 Y
Quint Axle Crane	34.8 N	31.1 N	30.0 N	29.9 N	33.8 N	41.4 N
136k A	47.3 N	44.4 N	46.6 N	49.1 N	53.6 N	58.0 N
136k B	41.5 N	39.0 N	41.5 N	45.0 N	49.1 N	54.0 N
156k	47.6 N	44.7 N	47.6 N	51.6 N	56.1 N	59.0 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	33.5 N	30.8 N	29.9 N	30.1 N	33.6 N	41.4 N
Small Annual Crane	25.6 N	25.0 N	26.6 N	27.4 N	31.4 N	39.3 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V9A-1957, 20' Roadway, 20 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.01	0.84	0.86	0.84	0.95	1.15
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.4L SP1 I	0.8L SP1 E	0.3L SP1 E	0.4L SP1 E	0.8L SP1 I
HS-20 Inv	0.61	0.50	0.51	0.50	0.57	0.69
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.4L SP1 I	0.8L SP1 E	0.3L SP1 E	0.4L SP1 E	0.8L SP1 I
IA Type 4	27.1	25.6	26.8	27.8	31.6	38.9
IA SU4	26.0	25.0	25.9	27.5	31.3	38.4
IA SU5	27.7	27.0	27.9	28.5	32.2	39.7
IA SU6	29.0	27.7	28.2	28.9	32.9	39.8
IA SU7	32.3	29.6	29.3	29.9	33.6	40.5
IA 3S3A	39.8	40.8	43.3	40.3	43.2	49.0
IA 3S3B	45.0	44.4	47.7	52.3	59.7	61.6
IA 4S3	47.7	46.0	48.0	49.7	56.4	62.5
IA 3-3	51.0	47.1	44.0	40.9	43.3	49.3
IA 5-2	42.9	41.8	43.2	44.1	49.8	57.7
IA EV2	27.8	25.4	27.2	27.4	31.6	39.2
IA EV3	27.0	26.3	27.0	27.8	32.0	39.1
90k	34.8 N	35.7 N	37.9 N	41.7 N	45.2 Y	50.8 Y
Quint Axle Crane	34.8 N	31.1 N	30.0 N	29.9 N	33.8 N	41.0 N
136k A	47.3 N	44.4 N	46.6 N	49.1 N	53.6 N	58.0 N
136k B	41.5 N	39.0 N	41.6 N	45.1 N	49.1 N	54.0 N
156k	47.6 N	44.7 N	47.7 N	51.7 N	56.1 N	59.0 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	33.5 N	30.8 N	30.0 N	30.1 N	33.6 N	40.9 N
Small Annual Crane	25.6 N	25.0 N	26.6 N	27.5 N	31.4 N	38.8 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V9A-1957, 20' Roadway, 30 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.01	0.84	0.86	0.84	0.94	1.15
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.4L SP1 I	0.8L SP1 E	0.3L SP1 E	0.4L SP1 E	0.8L SP1 I
HS-20 Inv	0.61	0.50	0.51	0.50	0.56	0.69
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.4L SP1 I	0.8L SP1 E	0.3L SP1 E	0.4L SP1 E	0.8L SP1 I
IA Type 4	27.1	25.6	26.8	27.8	31.2	39.4
IA SU4	26.0	25.0	25.9	27.6	30.9	38.8
IA SU5	27.7	27.0	27.9	28.5	31.8	40.2
IA SU6	29.0	27.7	28.2	28.9	32.5	40.3
IA SU7	32.3	29.6	29.3	30.0	33.2	41.1
IA 3S3A	39.8	40.8	43.3	40.3	42.7	49.0
IA 3S3B	45.0	44.4	47.7	52.4	59.0	61.6
IA 4S3	47.7	46.0	48.1	49.7	55.8	62.5
IA 3-3	51.0	47.1	44.0	40.9	42.8	49.3
IA 5-2	42.9	41.8	43.3	44.1	49.2	58.1
IA EV2	27.8	25.4	27.1	27.4	31.3	39.2
IA EV3	27.0	26.3	27.0	27.8	31.6	39.5
90k	34.8 N	35.7 N	37.9 N	41.7 N	44.6 N	50.8 Y
Quint Axle Crane	34.8 N	31.1 N	30.1 N	30.0 N	33.4 N	41.5 N
136k A	47.3 N	44.4 N	46.7 N	49.2 N	53.0 N	58.0 N
136k B	41.5 N	39.0 N	41.6 N	45.1 N	48.5 N	54.0 N
156k	47.6 N	44.7 N	47.8 N	51.7 N	55.4 N	59.0 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	33.5 N	30.8 N	30.0 N	30.2 N	33.2 N	41.4 N
Small Annual Crane	25.6 N	25.0 N	26.7 N	27.5 N	31.0 N	39.3 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V9A-1957, 20' Roadway, 45 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.00	0.84	0.85	0.84	0.95	1.15
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.3L SP1 I	0.4L SP1 I	0.8L SP1 E	0.3L SP1 E	0.4L SP1 E	0.8L SP1 I
HS-20 Inv	0.60	0.50	0.51	0.51	0.57	0.69
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.3L SP1 I	0.4L SP1 I	0.8L SP1 E	0.3L SP1 E	0.4L SP1 E	0.8L SP1 I
IA Type 4	27.1	25.6	26.9	27.9	31.7	39.5
IA SU4	26.0	25.0	26.0	27.6	31.4	38.9
IA SU5	27.7	27.0	28.0	28.5	32.3	40.2
IA SU6	29.0	27.7	28.2	29.0	33.0	40.4
IA SU7	32.3	29.6	29.4	30.0	33.6	41.1
IA 3S3A	39.8	40.8	43.4	40.3	43.3	49.0
IA 3S3B	45.0	44.4	47.8	52.5	59.9	61.6
IA 4S3	47.7	46.0	48.2	49.8	56.6	62.5
IA 3-3	51.0	47.1	44.1	41.0	43.4	49.3
IA 5-2	42.9	41.8	43.3	44.2	49.9	58.1
IA EV2	27.8	25.4	27.1	27.4	31.7	39.2
IA EV3	27.0	26.3	27.1	27.9	32.1	39.5
90k	34.8 N	35.7 N	38.0 N	41.8 N	45.3 Y	50.8 Y
Quint Axle Crane	34.8 N	31.1 N	30.1 N	30.0 N	33.9 N	41.5 N
136k A	47.3 N	44.4 N	46.8 N	49.2 N	53.7 N	58.0 N
136k B	41.5 N	39.0 N	41.7 N	45.2 N	49.3 N	54.0 N
156k	47.6 N	44.7 N	47.8 N	51.8 N	56.2 N	59.0 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	33.5 N	30.8 N	30.1 N	30.2 N	33.7 N	41.5 N
Small Annual Crane	25.6 N	25.0 N	26.7 N	27.5 N	31.5 N	39.4 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V10-1951, 20' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**250'-0**	**300'-0**
HS-20 Oper	0.80	0.59	0.93	0.93	1.00	1.26
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.8L SP1 E	0.2L SP3 E	0.4L SP1 I	0.4L SP1 I	0.6L SP3 I	0.6L SP3 E
HS-20 Inv	0.48	0.36	0.56	0.56	0.60	0.75
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.8L SP1 E	0.2L SP3 E	0.4L SP1 I	0.4L SP1 I	0.6L SP3 I	0.6L SP3 E
IA Type 4	26.3	25.4	29.6	30.2	33.1	42.5
IA SU4	26.0	25.3	28.9	29.6	32.6	41.9
IA SU5	27.0	20.4	30.4	30.9	33.8	43.2
IA SU6	27.3	20.6	30.9	31.4	34.2	43.6
IA SU7	28.1	21.0	32.4	32.6	35.2	44.6
IA 3S3A	42.7	42.0	46.2	44.6	45.3	54.9
IA 3S3B	46.4	51.1	54.4	56.5	61.0	70.0
IA 4S3	46.0	50.2	52.8	53.9	57.7	67.1
IA 3-3	40.5	33.8	44.9	43.7	44.5	53.9
IA 5-2	44.2	44.9	47.0	47.9	49.8	59.6
IA EV2	26.7	25.8	30.1	30.7	33.7	43.0
IA EV3	26.8	20.3	29.8	30.4	33.3	42.7
90k	38.5 N	40.5 N	43.5 N	45.1 Y	46.9 Y	57.1 Y
Quint Axle Crane	27.8 N	20.8 N	32.9 N	33.1 N	35.5 N	44.9 N
136k A	43.7 N	49.2 N	51.9 N	53.1 N	53.8 N	63.4 N
136k B	42.8 N	44.3 N	47.1 N	48.4 N	50.5 N	60.5 N
156k	45.4 N	50.8 N	54.0 N	55.6 N	57.7 N	67.3 N
All Systems Permit	No	No	No	No	No	Yes
Fluid Milk Truck	27.9 N	20.9 N	32.4 N	32.6 N	35.2 N	44.6 N
Small Annual Crane	26.3 N	20.0 N	29.2 N	29.9 N	32.9 N	42.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V10-1964, 20' Roadway, 0 Degree Skew

	Bridge Length											
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**	**300'-0**	**347'-6**	**417'-0**	**445'-0**	**534'-0**
HS-20 Oper	1.09	0.73	1.14	1.25	1.26	1.39	1.24	1.53	1.32		1.28	1.37
Controlled by	STR +M	STR +M	STR -M	STR +M	STR -M	STR +M	STR +M	STR -M	STR -M		STR -M	STR -M
Location	0.8L SP1 I	0.8L SP1 I	1.0L SP1 I	0.8L SP1 I	1.0L SP1 E	0.8L SP1 I	0.8L SP1 I	1.0L SP2 I	1.0L SP2 I		1.0L SP3 I	1.0L SP2 I
HS-20 Inv	0.62	0.44	0.68	0.70	0.70	0.81	0.65	0.74	0.79		0.77	0.66
Controlled by	STR +M	STR +M	STR -M	STR -M	STR -M	SRV +M	STR -M	STR -M	STR -M		STR -M	STR -M
Location	0.8L SP1 I	0.8L SP1 I	1.0L SP1 I	1.0L SP1 I	1.0L SP1 I	0.4L SP1 I	1.0L SP2 I	1.0L SP2 I	1.0L SP2 I		1.0L SP3 I	1.0L SP2 I
IA Type 4	36.0	24.7	41.3	43.5	45.4	49.0	43.0	55.6	48.3		48.3	55.4
IA SU4	35.6	24.5	41.1	43.5	45.3	49.0	42.9	54.9	48.3		48.3	55.0
IA SU5	35.1	25.2	41.9	44.1	45.9	49.5	43.5	56.6	48.8		48.8	55.8
IA SU6	35.3	25.4	42.3	44.3	46.1	49.7	43.8	56.8	49.0		49.0	56.0
IA SU7	36.4	25.9	42.9	44.8	46.4	50.1	44.2	57.1	49.3		49.4	56.3
IA 3S3A	42.9	48.6	52.8	52.5	52.6	55.5	51.7	61.3	54.7		54.7	60.4
IA 3S3B	44.1	46.3	50.7	69.2	67.1	67.4	68.8	70.1	66.3		66.3	69.0
IA 4S3	43.8	46.2	50.6	69.0	63.9	66.8	68.6	69.8	65.7		65.8	68.7
IA 3-3	49.0	33.0	51.3	51.3	51.7	54.7	50.6	60.7	53.9		53.9	59.8
IA 5-2	43.6	47.3	52.5	59.7	60.0	61.8	59.3	66.3	60.8		60.9	65.3
IA EV2	36.5	25.0	41.6	43.7	45.6	49.3	43.1	56.4	48.6		48.6	55.6
IA EV3	34.8	25.0	41.8	44.1	45.9	49.4	43.5	55.9	48.7		48.8	55.8
90k	40.1 N	45.2 Y	51.4 Y	57.6 Y	56.9 Y	59.3 Y	56.8 Y	64.3 Y	58.3 Y		58.4 Y	63.3 Y
Quint Axle Crane	36.0 N	25.7 N	42.6 N	44.5 N	46.2 N	49.8 N	43.9 N	56.9 Y	49.0 N		49.1 N	56.0 Y
136k A	41.6 N	45.8 N	51.6 N	59.5 N	61.2 N	62.7 N	59.2 N	66.7 N	61.7 N		61.7 N	65.6 N
136k B	41.5 N	45.5 N	51.0 N	58.9 N	59.6 N	61.6 N	58.6 N	66.2 N	60.6 N		60.7 N	65.1 N
156k	43.2 N	46.5 N	51.6 N	59.4 N	63.4 N	64.5 N	58.9 N	68.1 N	63.5 N		63.5 N	67.1 N
All Systems Permit	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Fluid Milk Truck	36.2 N	25.8 N	42.7 N	44.6 N	46.3 N	49.9 Y	44.0 N	56.9 Y	49.2 Y		49.2 Y	56.1 Y
Small Annual Crane	34.2 N	24.7 N	41.3 Y	43.6 Y	45.5 Y	49.1 Y	43.0 Y	55.4 Y	48.4 Y		48.5 Y	55.5 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V10-1964, 20' Roadway, 15 Degree Skew

	Bridge Length											
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**	**300'-0**	**347'-6**	**417'-0**	**445'-0**	**534'-0**
HS-20 Oper										1.40		
Controlled by										STR -M		
Location										0.0L SP4 E		
HS-20 Inv										0.70		
Controlled by										STR -M		
Location										1.0L SP3 I		
IA Type 4										54.9		
IA SU4										54.6		
IA SU5										55.3		
IA SU6										55.5		
IA SU7										55.9		
IA 3S3A										60.0		
IA 3S3B										68.7		
IA 4S3										68.1		
IA 3-3										59.5		
IA 5-2										64.8		
IA EV2										55.2		
IA EV3										55.2		
90k										62.8 Y		
Quint Axle Crane										55.6 Y		
136k A										65.1 N		
136k B										64.7 N		
156k										66.8 N		
All Systems Permit										Yes		
Fluid Milk Truck										55.6 Y		
Small Annual Crane										55.0 Y		

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V10-1964, 20' Roadway, 30 Degree Skew

	Bridge Length											
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**	**300'-0**	**347'-6**	**417'-0**	**445'-0**	**534'-0**
HS-20 Oper			1.20	1.25								
Controlled by			STR +M	STR +M								
Location			0.2L SP3 I	0.2L SP3 I								
HS-20 Inv			0.72	0.57								
Controlled by			STR +M	STR +M								
Location			0.2L SP3 I	0.8L SP1 E								
IA Type 4			41.3	43.6								
IA SU4			41.2	43.5								
IA SU5			42.0	44.1								
IA SU6			42.3	44.4								
IA SU7			42.9	44.9								
IA 3S3A			52.7	52.6								
IA 3S3B			60.0	67.1								
IA 4S3			59.8	66.8								
IA 3-3			51.2	51.4								
IA 5-2			61.9	61.6								
IA EV2			41.5	43.7								
IA EV3			41.9	44.1								
90k			58.9 Y	57.8 Y								
Quint Axle Crane			42.6 N	44.7 N								
136k A			60.9 N	59.7 N								
136k B			60.2 N	59.1 N								
156k			60.9 N	59.5 N								
All Systems Permit			No	Yes								
Fluid Milk Truck			42.6 N	44.6 N								
Small Annual Crane			41.4 Y	43.7 Y								

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V10A-1957, 20' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**250'-0**	**300'-0**
HS-20 Oper	0.71	0.54	0.93	0.93	1.00	1.26
Controlled by	STR -M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	1.0L SP1 E	0.2L SP3 E	0.6L SP3 I	0.6L SP3 I	0.6L SP3 I	0.6L SP3 E
HS-20 Inv	0.43	0.33	0.56	0.56	0.60	0.76
Controlled by	STR -M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	1.0L SP1 E	0.2L SP3 E	0.6L SP3 I	0.6L SP3 I	0.6L SP3 I	0.6L SP3 E
IA Type 4	25.5	28.1	29.7	30.2	33.2	42.5
IA SU4	25.3	27.4	29.0	29.6	32.7	42.0
IA SU5	26.2	24.9	30.5	31.0	33.8	43.2
IA SU6	26.5	18.9	31.1	31.4	34.2	43.6
IA SU7	27.3	19.2	32.5	32.7	35.2	44.6
IA 3S3A	27.7	40.4	43.9	43.0	45.4	53.1
IA 3S3B	28.7	45.0	50.9	56.4	57.8	60.4
IA 4S3	28.4	44.9	50.8	54.0	57.2	60.2
IA 3-3	31.5	38.9	42.6	42.1	44.6	52.6
IA 5-2	28.3	44.9	47.3	48.0	49.9	57.2
IA EV2	25.9	28.6	30.2	30.7	33.7	43.1
IA EV3	26.1	18.6	30.0	30.5	33.4	42.7
90k	26.0 N	40.5 N	43.7 N	45.2 Y	47.0 Y	55.6 Y
Quint Axle Crane	27.0 N	19.1 N	33.1 N	33.1 N	35.6 N	45.0 N
136k A	27.0 N	44.4 N	51.7 N	52.1 N	53.7 N	57.5 N
136k B	27.0 N	44.1 N	47.3 N	48.5 N	50.6 N	57.1 N
156k	28.1 N	45.1 N	51.8 N	54.4 N	55.3 N	58.7 N
All Systems Permit	No	No	No	No	No	Yes
Fluid Milk Truck	27.1 N	19.1 N	32.5 N	32.7 N	35.3 N	44.7 N
Small Annual Crane	25.5 N	18.3 N	29.4 N	30.0 N	33.0 N	42.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V10A-1957, 20' Roadway, 15 Degree Skew

	Bridge Length					
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**250'-0**	**300'-0**
HS-20 Oper		0.72			1.00	1.26
Controlled by		STR +M			STR +M	STR +M
Location		0.2L SP3 I			0.6L SP3 I	0.6L SP3 E
HS-20 Inv		0.24			0.60	0.76
Controlled by		STR +M			STR +M	STR +M
Location		0.2L SP3 E			0.6L SP3 I	0.6L SP3 E
IA Type 4		25.1			33.3	42.6
IA SU4		24.8			32.8	42.0
IA SU5		24.9			33.9	43.3
IA SU6		25.1			34.3	43.7
IA SU7		25.6			35.3	44.7
IA 3S3A		34.7			45.5	52.8
IA 3S3B		44.9			57.9	60.2
IA 4S3		44.9			57.3	59.9
IA 3-3		33.3			44.7	52.3
IA 5-2		44.9			50.0	56.9
IA EV2		25.4			33.8	43.1
IA EV3		24.8			33.5	42.8
90k		40.5 N			47.1 Y	55.3 Y
Quint Axle Crane		14.0 N			35.7 N	45.0 N
136k A		44.4 N			53.9 N	57.3 N
136k B		44.1 N			50.7 N	56.9 N
156k		45.1 N			55.4 N	58.5 N
All Systems Permit		No			No	Yes
Fluid Milk Truck		14.1 N			35.4 N	44.8 N
Small Annual Crane		24.4 N			33.1 N	42.4 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V10A-1957, 20' Roadway, 30 Degree Skew

	Bridge Length					
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**250'-0**	**300'-0**
HS-20 Oper	0.71	0.70		0.93		
Controlled by	STR -M	STR +M		STR +M		
Location	0.0L SP3 E	0.2L SP3 E		0.6L SP3 I		
HS-20 Inv	0.43	0.42		0.56		
Controlled by	STR -M	STR +M		STR +M		
Location	0.0L SP3 E	0.2L SP3 E		0.6L SP3 I		
IA Type 4	25.5	23.8		30.2		
IA SU4	25.3	23.6		29.7		
IA SU5	26.2	24.3		31.0		
IA SU6	26.5	24.4		31.5		
IA SU7	27.3	24.9		32.7		
IA 3S3A	27.7	40.3		43.0		
IA 3S3B	28.7	44.9		56.5		
IA 4S3	28.5	44.7		54.0		
IA 3-3	31.6	31.5		42.1		
IA 5-2	28.2	44.8		48.0		
IA EV2	26.0	24.0		30.7		
IA EV3	26.2	24.2		30.5		
90k	26.0 N	40.4 N		45.2 Y		
Quint Axle Crane	27.0 N	24.7 N		33.1 N		
136k A	27.0 N	44.2 N		52.1 N		
136k B	27.0 N	43.9 N		48.5 N		
156k	28.1 N	44.9 N		54.4 N		
All Systems Permit	No	No		No		
Fluid Milk Truck	27.1 N	24.8 N		32.7 N		
Small Annual Crane	25.6 N	23.8 N		30.0 N		

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V11-1957, 0 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	0.85	0.82	0.62	0.59	0.71	0.74
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.4L SP1 E	0.7L SP1 E	0.5L SP1 E	0.7L SP1 E	0.7L SP1 E
HS-20 Inv	0.51	0.49	0.37	0.36	0.43	0.44
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.4L SP1 E	0.7L SP1 E	0.5L SP1 E	0.7L SP1 E	0.7L SP1 E
IA Type 4	22.7	23.8	20.0	19.2	24.3	25.6
IA SU4	21.8	22.6	19.6	18.7	23.9	25.2
IA SU5	23.2	24.0	20.6	19.7	24.8	26.0
IA SU6	24.3	24.5	21.0	19.8	24.9	26.1
IA SU7	27.0	26.4	22.1	20.4	25.8	26.8
IA 3S3A	33.3	35.0	31.5	29.8	31.7	31.6
IA 3S3B	37.6	39.1	36.4	35.4	42.8	40.6
IA 4S3	39.9	42.0	35.7	34.3	43.4	40.3
IA 3-3	42.6	42.0	31.6	28.6	32.1	31.8
IA 5-2	35.9	37.1	31.9	30.5	38.4	36.6
IA EV2	23.2	24.6	19.4	19.8	23.8	25.1
IA EV3	22.6	24.2	19.9	19.3	24.1	25.4
90k	29.1 N	30.6 N	29.6 N	28.3 N	33.3 N	32.8 N
Quint Axle Crane	29.1 N	29.0 N	22.1 N	20.8 N	25.7 N	26.7 N
136k A	39.6 N	40.8 N	35.1 N	33.6 N	39.6 N	37.4 N
136k B	34.7 N	35.0 N	31.8 N	30.5 N	36.2 N	35.2 N
156k	39.8 N	40.2 N	36.5 N	35.0 N	41.0 N	38.8 N
All Systems Permit	No	No	No	No	No	No
Fluid Milk Truck	28.0 N	27.2 N	22.3 N	20.7 N	25.7 N	26.7 N
Small Annual Crane	21.4 N	22.7 N	19.6 N	19.1 N	24.1 N	25.4 N

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V11-1964, 0 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.91	1.87	1.54	1.38	1.58	1.62
Controlled by	STR +V	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.0L SP1 I	0.6L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E
HS-20 Inv	1.10	0.98	0.84	0.82	0.89	0.95
Controlled by	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.5L SP1 E	0.6L SP1 E	0.5L SP1 I	0.5L SP1 E	0.5L SP1 I	0.5L SP1 E
IA Type 4	57.0	54.9	47.5	44.6	52.4	54.4
IA SU4	54.8	52.1	46.0	43.5	51.5	53.5
IA SU5	58.4	55.4	49.5	45.9	53.7	55.4
IA SU6	61.0	56.6	50.0	46.2	53.9	55.6
IA SU7	68.0	60.9	52.0	47.5	55.1	56.6
IA 3S3A	83.7	80.8	76.8	69.4	75.2	73.3
IA 3S3B	94.7	90.2	84.6	82.3	99.0	98.6
IA 4S3	100.4	97.0	85.2	79.7	93.7	94.6
IA 3-3	107.2	97.0	78.0	66.6	71.6	69.6
IA 5-2	90.4	85.7	76.7	71.1	81.7	80.5
IA EV2	58.5	56.1	49.1	46.2	53.9	55.6
IA EV3	56.8	55.8	47.9	44.8	52.7	54.6
90k	73.2 Y	70.7 Y	67.2 Y	65.8 Y	79.1 Y	77.9 Y
Quint Axle Crane	73.2 Y	67.1 Y	53.3 Y	48.3 N	55.8 Y	57.2 Y
136k A	99.6 Y	94.1 Y	82.7 Y	78.2 Y	92.4 Y	87.2 Y
136k B	87.3 Y	80.9 Y	73.8 Y	70.9 Y	84.7 Y	83.4 Y
156k	100.2 Y	92.8 Y	84.7 Y	81.4 Y	97.1 Y	92.8 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	70.4 Y	62.8 Y	53.2 Y	48.2 Y	55.7 Y	57.1 Y
Small Annual Crane	53.9 Y	52.3 Y	47.3 Y	44.4 Y	52.3 Y	54.2 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V11-1964, 15 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.91	1.87	1.54	1.38	1.58	1.62
Controlled by	STR +V	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.0L SP1 I	0.6L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E
HS-20 Inv	1.10	0.98	0.84	0.82	0.89	0.95
Controlled by	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.5L SP1 E	0.6L SP1 E	0.5L SP1 I	0.5L SP1 E	0.5L SP1 I	0.5L SP1 E
IA Type 4	57.0	54.9	47.6	44.6	52.4	54.4
IA SU4	54.8	52.2	46.0	43.5	51.5	53.6
IA SU5	58.4	55.4	49.5	45.9	53.7	55.4
IA SU6	61.0	56.7	50.0	46.2	53.9	55.6
IA SU7	68.0	60.9	52.0	47.5	55.1	56.6
IA 3S3A	83.7	80.8	76.8	69.4	75.2	73.3
IA 3S3B	94.7	90.2	84.6	82.3	99.0	98.6
IA 4S3	100.4	97.0	85.3	79.7	93.7	94.6
IA 3-3	107.2	97.0	78.0	66.6	71.6	69.6
IA 5-2	90.4	85.7	76.7	71.1	81.7	80.6
IA EV2	58.5	56.1	49.1	46.2	53.9	55.6
IA EV3	56.8	55.9	48.0	44.8	52.7	54.6
90k	73.2 Y	70.7 Y	67.2 Y	65.8 Y	79.1 Y	77.9 Y
Quint Axle Crane	73.2 Y	67.1 Y	53.3 Y	48.3 N	55.8 Y	57.2 Y
136k A	99.6 Y	94.2 Y	82.8 Y	78.2 Y	92.4 Y	87.2 Y
136k B	87.3 Y	80.9 Y	73.8 Y	70.9 Y	84.7 Y	83.4 Y
156k	100.2 Y	92.8 Y	84.7 Y	81.4 Y	97.1 Y	92.8 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	70.4 Y	62.8 Y	53.2 Y	48.2 Y	55.7 Y	57.2 Y
Small Annual Crane	53.9 Y	52.3 Y	47.3 Y	44.4 Y	52.3 Y	54.2 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V11-1964, 30 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**	**80'-0**
HS-20 Oper	1.91	1.87	1.55	1.38	1.58	1.62
Controlled by	STR +V	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.0L SP1 I	0.6L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E
HS-20 Inv	1.10	0.98	0.84	0.82	0.89	0.95
Controlled by	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.5L SP1 E	0.6L SP1 E	0.5L SP1 I	0.5L SP1 E	0.5L SP1 I	0.5L SP1 E
IA Type 4	57.0	54.9	47.6	44.6	52.4	54.4
IA SU4	54.8	52.2	46.0	43.5	51.5	53.6
IA SU5	58.4	55.4	49.6	45.9	53.7	55.4
IA SU6	61.0	56.7	50.0	46.2	53.9	55.6
IA SU7	68.0	60.9	52.0	47.5	55.1	56.6
IA 3S3A	83.7	80.9	76.8	69.4	75.2	73.3
IA 3S3B	94.7	90.3	84.6	82.3	99.0	98.6
IA 4S3	100.4	97.0	85.3	79.7	93.7	94.6
IA 3-3	107.2	97.1	78.1	66.6	71.6	69.7
IA 5-2	90.4	85.8	76.7	71.1	81.7	80.6
IA EV2	58.5	56.1	49.1	46.2	53.9	55.6
IA EV3	56.8	55.9	48.0	44.8	52.7	54.6
90k	73.2 Y	70.8 Y	67.2 Y	65.8 Y	79.1 Y	77.9 Y
Quint Axle Crane	73.2 Y	67.1 Y	53.3 Y	48.3 N	55.8 Y	57.2 Y
136k A	99.6 Y	94.2 Y	82.8 Y	78.2 Y	92.4 Y	87.2 Y
136k B	87.3 Y	80.9 Y	73.9 Y	70.9 Y	84.7 Y	83.4 Y
156k	100.2 Y	92.8 Y	84.7 Y	81.4 Y	97.1 Y	92.8 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	70.4 Y	62.8 Y	53.2 Y	48.2 Y	55.7 Y	57.2 Y
Small Annual Crane	53.9 Y	52.4 Y	47.3 Y	44.4 Y	52.3 Y	54.2 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V12-1957, 0 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**	**300'-0**	**347'-6**	**417'-0**	**445'-0**
HS-20 Oper	0.70	0.80	0.84	0.76		0.81		0.82		0.82	0.81
Controlled by	STR +M	STR +M	STR +M	STR +M		STR +M		STR +M		STR +M	STR -M
Location	0.8L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E		0.4L SP1 E		0.4L SP1 E		0.4L SP1 E	0.0L SP3 E
HS-20 Inv	0.36	0.31	0.51	0.45		0.49		0.49		0.49	0.48
Controlled by	STR +M	STR +M	STR +M	STR +M		STR +M		STR +M		STR +M	STR -M
Location	0.8L SP1 E	0.8L SP1 E	0.4L SP1 E	0.4L SP1 E		0.4L SP1 E		0.4L SP1 E		0.4L SP1 E	0.0L SP3 E
IA Type 4	23.0	24.9	26.9	24.7		27.1		27.6		27.6	27.3
IA SU4	22.8	24.3	26.4	24.2		26.6		27.3		27.3	26.8
IA SU5	20.2	25.7	27.7	25.3		27.6		28.1		28.1	27.8
IA SU6	20.4	26.3	28.2	25.7		27.9		28.3		28.4	28.1
IA SU7	21.0	27.8	29.5	26.6		28.7		29.0		29.0	28.9
IA 3S3A	32.1	37.5	39.8	36.2		37.0		35.7		35.7	37.2
IA 3S3B	33.4	34.3	41.2	44.1		48.3		45.5		45.5	48.0
IA 4S3	33.1	34.2	41.1	43.9		47.1		43.6		43.6	47.4
IA 3-3	33.9	36.2	38.8	35.4		36.4		35.1		35.1	36.6
IA 5-2	32.8	34.8	42.4	39.1		40.7		38.7		38.7	41.0
IA EV2	23.4	25.3	27.4	25.1		27.5		28.0		28.0	27.7
IA EV3	20.1	25.1	27.2	24.8		27.2		27.8		27.8	27.4
90k	30.3 N	33.3 N	39.7 N	36.9 N		38.3 N		37.1 N		37.1 N	38.6 N
Quint Axle Crane	20.8 N	18.2 N	30.0 N	27.0 N		29.0 N		29.2 N		29.2 N	29.2 N
136k A	31.4 N	33.8 N	41.7 N	43.4 N		43.9 N		41.2 N		41.2 N	44.2 N
136k B	31.3 N	33.6 N	41.3 N	39.6 N		41.3 N		39.3 N		39.3 N	41.5 N
156k	32.7 N	34.4 N	41.8 N	45.3 N		46.2 N		43.8 N		43.8 N	45.9 N
All Systems Permit	No	No	No	No		No		No		No	No
Fluid Milk Truck	20.8 N	18.2 N	29.5 N	26.7 N		28.7 N		29.0 N		29.0 N	28.9 N
Small Annual Crane	19.6 N	24.6 N	26.7 N	24.4 N		26.9 N		27.5 N		27.5 N	27.1 N

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V12-1957, 15 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**	**300'-0**	**347'-6**	**417'-0**	**445'-0**
HS-20 Oper		0.80	0.84					0.82			
Controlled by		STR +M	STR +M					STR +M			
Location		0.4L SP1 E	0.4L SP1 E					0.4L SP1 E			
HS-20 Inv		0.48	0.50					0.49			
Controlled by		STR +M	STR +M					STR +M			
Location		0.4L SP1 E	0.4L SP1 E					0.4L SP1 E			
IA Type 4		24.8	26.9					27.6			
IA SU4		24.2	26.3					27.2			
IA SU5		25.6	27.7					28.1			
IA SU6		26.2	28.2					28.3			
IA SU7		27.7	29.5					29.0			
IA 3S3A		37.4	37.3					35.7			
IA 3S3B		34.3	41.2					45.4			
IA 4S3		34.2	41.1					43.6			
IA 3-3		36.2	36.3					35.0			
IA 5-2		34.8	42.3					38.6			
IA EV2		25.3	27.4					28.0			
IA EV3		25.1	27.1					27.7			
90k		33.3 N	39.7 N					37.1 N			
Quint Axle Crane		28.3 N	30.0 N					29.2 N			
136k A		33.8 N	41.7 N					41.1 N			
136k B		33.6 N	41.3 N					39.3 N			
156k		34.4 N	41.8 N					43.7 N			
All Systems Permit		No	No					No			
Fluid Milk Truck		27.7 N	29.5 N					29.0 N			
Small Annual Crane		24.5 N	26.7 N					27.5 N			

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V12-1957, 30 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**	**300'-0**	**347'-6**	**417'-0**	**445'-0**
HS-20 Oper	0.63	0.80	0.84	0.59		0.81		0.82			
Controlled by	STR +M	STR +M	STR +M	STR +M		STR +M		STR +M			
Location	0.8L SP1 E	0.4L SP1 E	0.4L SP1 E	0.8L SP1 E		0.4L SP1 E		0.4L SP1 E			
HS-20 Inv	0.33	0.34	0.35	0.35		0.49		0.49			
Controlled by	STR +M	STR +M	STR +M	STR +M		STR +M		STR +M			
Location	0.8L SP1 E	0.8L SP1 E	0.8L SP1 E	0.8L SP1 E		0.4L SP1 E		0.4L SP1 E			
IA Type 4	21.8	24.8	26.9	20.6		27.1		27.6			
IA SU4	21.7	24.2	26.3	20.6		26.7		27.3			
IA SU5	21.8	25.7	27.7	20.9		27.6		28.1			
IA SU6	21.3	26.2	28.2	21.0		27.9		28.3			
IA SU7	21.5	27.7	29.5	21.3		28.7		29.0			
IA 3S3A	32.1	37.5	39.8	24.8		37.0		35.7			
IA 3S3B	33.4	34.3	41.2	44.3		48.3		45.5			
IA 4S3	33.2	34.3	41.1	44.0		47.1		43.6			
IA 3-3	32.3	36.2	38.7	24.3		36.3		35.0			
IA 5-2	32.8	34.9	42.3	29.0		40.7		38.7			
IA EV2	21.9	25.3	27.4	20.7		27.5		28.0			
IA EV3	19.8	19.8	20.4	20.9		27.2		27.8			
90k	30.3 N	33.4 N	39.7 N	27.3 N		38.3 N		37.1 N			
Quint Axle Crane	19.9 N	20.2 N	20.7 N	21.1 N		29.0 N		29.2 N			
136k A	31.4 N	33.9 N	41.7 N	30.1 N		43.9 N		41.2 N			
136k B	31.4 N	33.7 N	41.3 N	28.9 N		41.3 N		39.3 N			
156k	32.7 N	34.4 N	41.8 N	31.3 N		45.9 N		43.7 N			
All Systems Permit	No	No	No	No		No		No			
Fluid Milk Truck	20.2 N	20.3 N	20.7 N	21.1 N		28.8 N		29.0 N			
Small Annual Crane	19.7 N	19.5 N	26.7 N	20.7 N		26.9 N		27.5 N			

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V12-1957, 45 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**	**300'-0**	**347'-6**	**417'-0**	**445'-0**
HS-20 Oper	0.70	0.80	0.84						0.79		
Controlled by	STR +M	STR +M	STR +M						STR +M		
Location	0.8L SP1 E	0.4L SP1 E	0.4L SP1 E						0.8L SP1 E		
HS-20 Inv	0.42	0.31	0.50						0.47		
Controlled by	STR +M	STR +M	STR +M						STR +M		
Location	0.8L SP1 E	0.8L SP1 E	0.4L SP1 E						0.8L SP1 E		
IA Type 4	23.1	24.9	26.9						27.3		
IA SU4	22.9	24.2	26.3						26.9		
IA SU5	23.7	25.7	27.7						27.8		
IA SU6	23.9	26.3	28.2						28.1		
IA SU7	24.6	27.8	29.5						28.4		
IA 3S3A	32.2	37.5	39.8						31.4		
IA 3S3B	33.3	34.3	41.2						38.0		
IA 4S3	33.1	34.2	41.1						37.5		
IA 3-3	34.0	36.2	38.7						31.0		
IA 5-2	32.8	34.8	42.3						34.9		
IA EV2	23.4	25.3	27.4						27.7		
IA EV3	23.6	25.1	27.2						27.5		
90k	30.3 N	33.3 N	39.7 N						33.4 N		
Quint Axle Crane	24.4 N	18.4 N	30.0 N						28.2 N		
136k A	31.4 N	33.8 N	41.7 N						35.3 N		
136k B	31.3 N	33.6 N	41.3 N						34.7 N		
156k	32.7 N	34.4 N	41.8 N						36.4 N		
All Systems Permit	No	No	No						No		
Fluid Milk Truck	24.5 N	18.4 N	29.5 N						28.3 N		
Small Annual Crane	23.1 N	24.6 N	26.7 N						27.1 N		

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V12-1964, 0 Degree Skew

	Bridge Length						
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**
HS-20 Oper	1.28	0.85	1.29	1.44	1.30	1.57	
Controlled by	STR +M	STR +M	STR -M	STR +M	STR -M	STR -M	
Location	0.8L SP1 I	0.8L SP1 I	0.0L SP2 I	0.8L SP1 I	1.0L SP1 I	1.0L SP1 I	
HS-20 Inv	0.68	0.51	0.77	0.78	0.78	0.94	
Controlled by	STR +M	STR +M	STR -M	STR -M	STR -M	STR -M	
Location	0.8L SP1 I	0.8L SP1 I	0.0L SP2 I	0.0L SP2 I	1.0L SP1 I	1.0L SP1 I	
IA Type 4	42.2	43.7	45.9	50.0	53.6	57.5	
IA SU4	41.8	43.5	45.7	49.9	53.5	56.6	
IA SU5	43.4	44.7	46.6	50.6	54.2	58.6	
IA SU6	39.0	29.6	47.0	50.9	54.4	58.9	
IA SU7	40.2	30.1	47.6	51.5	54.8	59.3	
IA 3S3A	50.5	60.5	58.6	60.1	62.0	65.6	
IA 3S3B	51.9	55.2	57.2	75.8	71.3	79.5	
IA 4S3	51.6	55.1	57.1	65.2	71.0	78.9	
IA 3-3	57.6	58.1	57.0	58.8	60.9	64.8	
IA 5-2	51.3	56.3	59.1	65.9	70.7	73.1	
IA EV2	42.8	44.3	46.3	50.2	53.9	58.4	
IA EV3	38.4	29.2	46.5	50.6	54.1	57.9	
90k	47.3 Y	53.8 Y	57.9 Y	66.0 Y	67.0 Y	70.1 Y	
Quint Axle Crane	39.7 N	29.9 N	47.4 N	51.1 Y	54.6 Y	59.0 Y	
136k A	49.0 N	54.6 N	58.1 N	65.7 N	72.1 Y	74.0 Y	
136k B	48.9 N	54.2 N	57.5 N	65.1 N	70.2 Y	72.8 Y	
156k	51.0 N	55.5 N	58.2 N	65.7 N	74.1 N	76.1 N	
All Systems Permit	No	No	Yes	Yes	Yes	Yes	
Fluid Milk Truck	39.9 N	30.0 N	47.4 N	51.2 Y	54.6 Y	59.1 Y	
Small Annual Crane	37.6 N	28.8 N	45.9 Y	50.1 Y	53.7 Y	57.1 Y	

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V12-1964, 15 Degree Skew

	Bridge Length						
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**
HS-20 Oper	1.28	1.29	1.29		1.53	1.57	
Controlled by	STR +M	STR +M	STR -M		STR +M	STR -M	
Location	0.8L SP1 I	0.8L SP1 E	1.0L SP1 I		0.8L SP1 I	0.0L SP2 I	
HS-20 Inv	0.62	0.77	0.77		0.91	0.83	
Controlled by	STR +M	STR +M	STR -M		SRV +M	STR -M	
Location	0.8L SP1 I	0.8L SP1 E	1.0L SP1 I		0.4L SP1 I	0.0L SP2 E	
IA Type 4	42.0	43.8	45.9		53.5	57.5	
IA SU4	41.6	43.6	45.7		53.4	56.6	
IA SU5	42.7	44.7	46.6		54.1	58.3	
IA SU6	43.1	45.1	47.0		54.4	58.7	
IA SU7	44.4	46.0	47.7		54.8	59.1	
IA 3S3A	50.3	60.6	58.7		62.3	65.6	
IA 3S3B	51.8	55.2	57.2		79.1	79.5	
IA 4S3	51.4	55.1	57.1		78.1	78.7	
IA 3-3	57.4	58.1	57.0		61.1	64.7	
IA 5-2	51.2	56.2	59.1		70.7	72.8	
IA EV2	42.6	44.3	46.2		53.9	58.1	
IA EV3	34.6	44.5	46.5		54.1	57.9	
90k	47.1 Y	53.7 Y	57.9 Y		67.4 Y	69.9 Y	
Quint Axle Crane	35.8 N	45.6 N	47.4 N		54.5 Y	58.8 Y	
136k A	48.8 N	54.5 N	58.2 N		72.3 Y	73.8 Y	
136k B	48.8 N	54.1 N	57.6 N		70.5 Y	72.6 Y	
156k	50.8 N	55.4 N	58.2 N		75.0 N	76.2 N	
All Systems Permit	No	Yes	Yes		Yes	Yes	
Fluid Milk Truck	36.0 N	45.7 N	47.4 N		54.7 Y	58.9 Y	
Small Annual Crane	33.9 N	43.9 Y	46.0 Y		53.6 Y	57.1 Y	

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V12-1964, 30 Degree Skew

	Bridge Length						
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**
HS-20 Oper		0.85	1.33	1.33	1.42	1.46	1.22
Controlled by		STR +M	STR +M	STR -M	STR +M	STR +M	STR -M
Location		0.8L SP1 E	0.8L SP1 I	0.0L SP2 E	0.8L SP1 E	0.8L SP1 E	0.0L SP2 E
HS-20 Inv		0.51	0.65	0.67	0.85	0.83	0.66
Controlled by		STR +M	STR +M	STR +M	STR +M	STR -M	STR +M
Location		0.8L SP1 E	0.8L SP1 E	0.8L SP1 E	0.8L SP1 E	0.0L SP2 E	0.8L SP1 E
IA Type 4		43.7	45.9	50.0	49.8	51.8	49.4
IA SU4		43.5	45.8	49.9	49.8	51.7	49.4
IA SU5		44.7	46.6	50.6	50.3	52.2	50.0
IA SU6		29.6	47.0	50.9	50.6	52.4	50.4
IA SU7		30.1	47.7	51.5	51.0	52.8	50.9
IA 3S3A		60.3	58.6	60.2	57.8	58.4	59.5
IA 3S3B		55.2	63.6	65.8	73.4	70.8	64.7
IA 4S3		55.1	63.4	63.7	72.6	70.3	63.5
IA 3-3		58.1	56.8	58.8	56.8	57.6	58.1
IA 5-2		56.1	65.4	66.1	65.8	65.1	65.8
IA EV2		44.3	46.1	50.2	50.0	51.7	49.7
IA EV3		29.2	37.7	50.2	50.4	52.3	49.5
90k		53.7 Y	64.3 Y	66.1 Y	62.5 Y	62.4 Y	65.3 Y
Quint Axle Crane		29.9 N	38.4 N	39.8 N	50.7 Y	52.4 Y	39.4 N
136k A		54.5 N	58.2 N	56.9 N	67.2 N	65.9 N	56.2 N
136k B		54.2 N	57.6 N	54.7 N	65.4 N	64.8 N	54.1 N
156k		55.4 N	58.2 N	59.5 N	69.6 N	67.8 N	58.8 N
All Systems Permit		No	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck		30.0 N	38.4 N	39.9 N	50.8 Y	52.6 Y	39.5 N
Small Annual Crane		28.8 N	37.3 N	50.1 Y	50.0 Y	51.9 Y	49.6 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V12-1964, 45 Degree Skew

	Bridge Length						
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**
HS-20 Oper	0.98		1.34		1.39		
Controlled by	STR +M		STR +M		STR -M		
Location	0.8L SP2 I		0.8L SP1 I		1.0L SP1 E		
HS-20 Inv	0.53		0.80		0.83		
Controlled by	STR +M		STR +M		STR -M		
Location	0.8L SP2 I		0.8L SP1 I		1.0L SP1 E		
IA Type 4	30.6		46.0		51.1		
IA SU4	30.1		45.8		51.0		
IA SU5	31.0		46.7		51.6		
IA SU6	30.6		47.0		51.9		
IA SU7	31.7		47.7		52.3		
IA 3S3A	54.0		58.6		59.3		
IA 3S3B	55.7		63.4		75.3		
IA 4S3	54.2		63.3		74.5		
IA 3-3	51.2		56.8		58.3		
IA 5-2	51.2		65.3		67.5		
IA EV2	31.2		46.2		51.3		
IA EV3	27.9		46.6		51.6		
90k	45.6 Y		64.1 Y		64.2 Y		
Quint Axle Crane	28.7 N		47.3 N		52.0 Y		
136k A	50.1 N		64.4 N		69.0 Y		
136k B	43.2 N		63.8 N		67.2 N		
156k	48.9 N		64.6 N		71.4 N		
All Systems Permit	No		Yes		Yes		
Fluid Milk Truck	29.1 N		47.4 N		52.1 Y		
Small Annual Crane	27.5 N		46.1 Y		51.2 Y		

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V13-1960, 0 Degree Skew

	Bridge Length				
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**
HS-20 Oper	1.49	1.41	1.27	1.20	1.28
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.4L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E
HS-20 Inv	0.89	0.85	0.76	0.72	0.77
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.4L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E
IA Type 4	40.0	41.3	39.2	38.8	42.5
IA SU4	38.4	39.1	38.0	37.9	41.7
IA SU5	40.9	41.5	40.9	40.0	43.4
IA SU6	42.8	42.5	41.2	40.2	43.6
IA SU7	47.7	45.6	42.9	41.3	44.6
IA 3S3A	58.7	60.6	63.4	60.4	61.5
IA 3S3B	66.4	67.6	69.8	71.7	80.2
IA 4S3	70.4	72.7	70.4	69.4	75.8
IA 3-3	75.2	72.7	64.4	58.0	58.0
IA 5-2	63.4	64.3	63.3	61.9	66.1
IA EV2	41.0	42.4	40.9	40.2	43.6
IA EV3	39.9	41.9	39.6	39.0	42.7
90k	51.4 Y	53.0 Y	55.4 Y	57.3 Y	64.3 Y
Quint Axle Crane	51.4 Y	50.3 Y	44.0 N	42.1 N	45.2 N
136k A	69.8 Y	70.6 Y	68.3 Y	68.1 Y	74.8 Y
136k B	61.3 N	60.6 N	60.9 N	61.8 N	68.6 Y
156k	70.3 N	69.5 N	69.9 N	70.8 N	78.6 Y
All Systems Permit	Yes	Yes	No	No	Yes
Fluid Milk Truck	49.4 Y	47.1 N	43.9 N	42.0 N	45.1 N
Small Annual Crane	37.8 N	39.2 N	39.0 N	38.6 N	42.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V13-1960, 15 Degree Skew

	Bridge Length				
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**
HS-20 Oper	1.49	1.41	1.28	1.20	1.28
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.6L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E
HS-20 Inv	0.89	0.85	0.76	0.72	0.77
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.6L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E
IA Type 4	40.0	41.3	39.3	38.8	42.5
IA SU4	38.4	39.1	38.0	37.9	41.7
IA SU5	40.9	41.6	40.9	40.0	43.4
IA SU6	42.8	42.5	41.3	40.2	43.6
IA SU7	47.7	45.7	43.0	41.3	44.6
IA 3S3A	58.7	60.7	63.4	60.4	61.5
IA 3S3B	66.4	67.7	69.9	71.7	80.2
IA 4S3	70.4	72.8	70.4	69.4	75.8
IA 3-3	75.2	72.8	64.4	58.0	58.0
IA 5-2	63.4	64.3	63.3	61.9	66.1
IA EV2	41.0	42.3	40.9	40.2	43.6
IA EV3	39.9	41.9	39.6	39.0	42.7
90k	51.4 Y	53.1 Y	55.5 Y	57.3 Y	64.3 Y
Quint Axle Crane	51.4 Y	50.3 Y	44.0 N	42.1 N	45.2 N
136k A	69.8 Y	70.6 Y	68.3 Y	68.1 Y	74.8 Y
136k B	61.3 N	60.7 N	61.0 N	61.8 N	68.6 Y
156k	70.3 N	69.6 N	69.9 N	70.8 N	78.6 Y
All Systems Permit	Yes	Yes	No	No	Yes
Fluid Milk Truck	49.4 Y	47.1 N	43.9 N	42.0 N	45.1 N
Small Annual Crane	37.8 N	39.3 N	39.0 N	38.6 N	42.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V13-1960, 30 Degree Skew

	Bridge Length				
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**
HS-20 Oper	1.49	1.41	1.28	1.20	1.28
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.6L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E
HS-20 Inv	0.89	0.85	0.76	0.72	0.77
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.6L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E
IA Type 4	40.0	41.4	39.3	38.8	42.5
IA SU4	38.4	39.2	38.0	37.9	41.7
IA SU5	40.9	41.6	40.9	40.0	43.4
IA SU6	42.8	42.6	41.3	40.2	43.6
IA SU7	47.7	45.8	43.0	41.3	44.6
IA 3S3A	58.7	60.7	63.5	60.4	61.5
IA 3S3B	66.4	67.8	69.9	71.7	80.2
IA 4S3	70.4	72.9	70.5	69.4	75.8
IA 3-3	75.2	72.9	64.5	58.0	58.0
IA 5-2	63.4	64.4	63.4	61.9	66.1
IA EV2	41.0	42.4	40.9	40.2	43.6
IA EV3	39.9	42.0	39.6	39.0	42.7
90k	51.4 Y	53.1 Y	55.5 Y	57.3 Y	64.3 Y
Quint Axle Crane	51.4 Y	50.4 Y	44.1 N	42.1 N	45.2 N
136k A	69.8 Y	70.7 Y	68.4 Y	68.1 Y	74.8 Y
136k B	61.3 N	60.8 N	61.0 N	61.8 N	68.6 Y
156k	70.3 N	69.7 N	70.0 N	70.8 N	78.6 Y
All Systems Permit	Yes	Yes	No	No	Yes
Fluid Milk Truck	49.4 Y	47.2 N	44.0 N	42.0 N	45.1 N
Small Annual Crane	37.8 N	39.3 N	39.1 N	38.6 N	42.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V13-1960, 45 Degree Skew

	Bridge Length				
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-6**
HS-20 Oper	1.49	1.42	1.28	1.20	1.28
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.6L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E
HS-20 Inv	0.89	0.85	0.77	0.72	0.77
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.5L SP1 E	0.6L SP1 E	0.5L SP1 E	0.5L SP1 E	0.5L SP1 E
IA Type 4	40.0	41.4	39.3	38.8	42.5
IA SU4	38.4	39.2	38.1	37.9	41.7
IA SU5	40.9	41.7	41.0	40.0	43.5
IA SU6	42.8	42.6	41.3	40.2	43.7
IA SU7	47.7	45.8	43.0	41.4	44.6
IA 3S3A	58.7	60.8	63.5	60.5	61.5
IA 3S3B	66.4	67.9	70.0	71.8	80.2
IA 4S3	70.4	73.0	70.5	69.5	75.9
IA 3-3	75.2	73.0	64.6	58.1	58.0
IA 5-2	63.4	64.5	63.5	61.9	66.1
IA EV2	41.0	42.5	40.9	40.2	43.7
IA EV3	39.9	42.0	39.7	39.1	42.7
90k	51.4 Y	53.2 Y	55.6 Y	57.4 Y	64.4 Y
Quint Axle Crane	51.4 Y	50.5 Y	44.1 N	42.1 N	45.2 N
136k A	69.8 Y	70.9 Y	68.5 Y	68.1 Y	74.9 Y
136k B	61.3 N	60.9 N	61.1 N	61.8 N	68.6 Y
156k	70.3 N	69.8 N	70.1 N	70.9 N	78.7 Y
All Systems Permit	Yes	Yes	No	No	Yes
Fluid Milk Truck	49.4 Y	47.3 N	44.0 N	42.0 N	45.2 N
Small Annual Crane	37.8 N	39.4 N	39.1 N	38.7 N	42.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V14-1960, 0 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**243'-0**	**250'-0**	**347'-6**	**356'-0**	**401'-0**	**445'-0**
HS-20 Oper	1.27	1.09	1.27	1.28	1.31	1.27	1.38	1.38	1.27	1.31	1.38
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.8L SP1 E	0.8L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E
HS-20 Inv	0.76	0.66	0.76	0.76	0.79	0.76	0.83	0.83	0.76	0.79	0.83
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M	STR +M
Location	0.8L SP1 E	0.8L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E	0.4L SP1 E
IA Type 4	40.1	36.9	40.4	41.4	43.1	40.5	45.9	45.9	41.4	43.2	45.9
IA SU4	38.8	36.6	39.5	40.6	42.4	39.6	45.1	45.2	40.6	42.4	45.2
IA SU5	41.6	37.6	41.5	42.4	44.1	41.6	46.8	46.8	42.4	44.1	46.8
IA SU6	43.0	37.9	42.3	43.1	44.7	42.4	47.3	47.3	43.1	44.7	47.4
IA SU7	44.5	38.7	44.2	44.7	46.2	44.3	48.7	48.7	44.7	46.2	48.7
IA 3S3A	61.3	59.6	63.9	61.7	61.3	63.1	62.6	62.7	61.6	61.3	62.7
IA 3S3B	63.4	66.5	72.5	77.6	81.6	71.2	84.3	84.4	77.5	81.7	84.0
IA 4S3	62.8	66.4	72.2	74.0	77.0	71.6	79.8	79.9	73.9	77.0	79.8
IA 3-3	61.9	49.0	62.1	61.0	60.3	61.3	61.6	61.7	60.8	60.4	61.7
IA 5-2	62.5	61.0	64.3	65.7	68.0	64.4	68.9	69.0	65.7	67.3	69.0
IA EV2	40.7	37.3	41.2	42.1	43.8	41.2	46.6	46.6	42.1	43.9	46.6
IA EV3	40.5	37.4	40.8	41.7	43.4	40.8	46.1	46.2	41.7	43.5	46.2
90k	56.2 Y	55.0 Y	59.5 Y	61.9 Y	63.2 Y	59.6 Y	64.9 Y	65.0 Y	61.9 Y	63.2 Y	65.0 Y
Quint Axle Crane	44.1 N	38.4 N	45.1 N	45.4 N	46.7 N	45.1 N	49.2 N	49.2 N	45.4 N	46.7 N	49.2 N
136k A	59.7 N	65.7 N	71.0 Y	72.8 Y	74.2 Y	71.1 Y	74.3 Y	74.4 Y	72.8 Y	73.4 Y	74.4 Y
136k B	59.6 N	60.2 N	64.4 N	66.4 N	68.8 Y	64.5 N	69.8 Y	69.9 Y	66.4 N	68.8 Y	69.9 Y
156k	62.0 N	66.8 N	73.7 N	76.2 N	78.6 Y	72.5 N	79.7 Y	79.8 Y	76.2 N	77.6 N	79.8 Y
All Systems Permit	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	44.3 N	38.5 N	44.2 N	44.8 N	46.2 N	44.3 N	48.7 Y	48.8 Y	44.8 N	46.2 N	48.8 Y
Small Annual Crane	39.3 N	36.9 N	40.0 N	41.1 Y	42.8 Y	40.1 Y	45.6 Y	45.6 Y	41.0 Y	42.9 Y	45.6 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V14-1960, 15 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**243'-0**	**250'-0**	**347'-6**	**356'-0**	**401'-0**	**445'-0**
HS-20 Oper		1.22			1.31						
Controlled by		STR +M			STR +M						
Location		0.4L SP1 E			0.4L SP1 E						
HS-20 Inv		0.73			0.79						
Controlled by		STR +M			STR +M						
Location		0.4L SP1 E			0.4L SP1 E						
IA Type 4		38.1			43.1						
IA SU4		37.1			42.3						
IA SU5		39.3			44.0						
IA SU6		40.2			44.6						
IA SU7		42.5			46.1						
IA 3S3A		59.6			61.2						
IA 3S3B		66.6			81.6						
IA 4S3		66.3			76.9						
IA 3-3		57.2			60.3						
IA 5-2		60.9			67.9						
IA EV2		38.7			43.8						
IA EV3		38.4			43.4						
90k		54.9 Y			63.1 Y						
Quint Axle Crane		43.5 N			46.6 N						
136k A		65.7 N			74.1 Y						
136k B		60.0 N			68.7 Y						
156k		66.7 N			78.7 Y						
All Systems Permit		No			Yes						
Fluid Milk Truck		42.5 N			46.1 N						
Small Annual Crane		37.6 N			42.8 Y						

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V14-1960, 30 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**243'-0**	**250'-0**	**347'-6**	**356'-0**	**401'-0**	**445'-0**
HS-20 Oper		1.09	1.27	1.27			1.38		1.27		
Controlled by		STR +M	STR +M	STR +M			STR +M		STR +M		
Location		0.8L SP1 E	0.4L SP1 E	0.4L SP1 E			0.4L SP1 E		0.4L SP1 E		
HS-20 Inv		0.66	0.76	0.76			0.83		0.76		
Controlled by		STR +M	STR +M	STR +M			STR +M		STR +M		
Location		0.8L SP1 E	0.4L SP1 E	0.4L SP1 E			0.4L SP1 E		0.4L SP1 E		
IA Type 4		38.1	40.4	41.3			45.9		41.3		
IA SU4		37.1	39.5	40.5			45.1		40.5		
IA SU5		39.4	41.5	42.4			46.8		42.4		
IA SU6		37.9	42.3	43.0			47.3		43.0		
IA SU7		38.7	44.2	44.7			48.6		44.7		
IA 3S3A		59.6	63.8	61.6			62.6		61.5		
IA 3S3B		66.5	72.5	77.4			84.3		77.4		
IA 4S3		66.3	72.2	73.8			79.8		73.8		
IA 3-3		57.2	62.0	60.9			61.6		60.8		
IA 5-2		61.0	64.3	65.6			68.9		65.6		
IA EV2		38.8	41.1	42.1			46.6		42.0		
IA EV3		37.4	40.8	41.7			46.1		41.6		
90k		55.0 Y	59.5 Y	61.8 Y			64.9 Y		61.8 Y		
Quint Axle Crane		38.4 N	45.0 N	45.3 N			49.2 N		45.3 N		
136k A		65.7 N	70.9 Y	72.7 Y			74.3 Y		72.7 Y		
136k B		60.1 N	64.4 N	66.3 N			69.8 Y		66.3 N		
156k		66.7 N	73.7 N	76.1 N			79.7 Y		76.1 N		
All Systems Permit		No	Yes	Yes			Yes		Yes		
Fluid Milk Truck		38.5 N	44.2 N	44.7 N			48.7 Y		44.7 N		
Small Annual Crane		37.0 N	40.0 N	41.0 Y			45.6 Y		41.0 Y		

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V14-1960, 45 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**243'-0**	**250'-0**	**347'-6**	**356'-0**	**401'-0**	**445'-0**
HS-20 Oper		1.09		1.27	1.31		1.38				
Controlled by		STR +M		STR +M	STR +M		STR +M				
Location		0.8L SP1 E		0.4L SP1 E	0.4L SP1 E		0.4L SP1 E				
HS-20 Inv		0.65		0.76	0.79		0.83				
Controlled by		STR +M		STR +M	STR +M		STR +M				
Location		0.8L SP1 E		0.4L SP1 E	0.4L SP1 E		0.4L SP1 E				
IA Type 4		36.9		41.4	43.1		45.8				
IA SU4		36.6		40.6	42.4		45.1				
IA SU5		37.7		42.4	44.1		46.7				
IA SU6		37.9		43.1	44.7		47.3				
IA SU7		38.7		44.7	46.1		48.6				
IA 3S3A		59.6		61.7	61.3		62.6				
IA 3S3B		66.6		77.6	81.6		84.3				
IA 4S3		66.3		73.9	77.0		79.7				
IA 3-3		49.0		61.0	60.4		61.5				
IA 5-2		60.9		65.7	68.0		68.8				
IA EV2		37.3		42.1	43.8		46.5				
IA EV3		37.5		41.7	43.4		46.1				
90k		55.0 Y		61.9 Y	63.2 Y		64.8 Y				
Quint Axle Crane		38.4 N		45.4 N	46.7 N		49.1 N				
136k A		65.6 N		72.8 Y	74.1 Y		74.3 Y				
136k B		60.1 N		66.4 N	68.8 Y		69.8 Y				
156k		66.7 N		76.2 N	78.6 Y		79.7 Y				
All Systems Permit		No		Yes	Yes		Yes				
Fluid Milk Truck		38.5 N		44.8 N	46.2 N		48.7 Y				
Small Annual Crane		37.0 N		41.0 Y	42.8 Y		45.5 Y				

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V14-1964, 28' Roadway, 0 Degree Skew

	Bridge Length								
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**	**347'-6**	**401'-0**
HS-20 Oper	1.55	1.44	1.59	1.79	1.91	1.23	1.77	1.09	1.38
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR -M	STR +M	STR -M	STR +M
Location	0.8L SP1 E	0.8L SP1 I	0.8L SP1 E	0.8L SP1 E	0.8L SP1 E	1.0L SP1 I	0.2L SP4 E	1.0L SP2 I	0.6L SP5 I
HS-20 Inv	0.89	0.78	0.95	1.07	1.07	0.59	0.99	0.52	0.72
Controlled by	STR +M	STR +M	STR +M	STR +M	STR -M	STR -M	STR -M	STR -M	SRV +M
Location	0.8L SP1 E	0.2L SP3 E	0.8L SP1 E	0.8L SP1 E	1.0L SP2 E	1.0L SP1 I	1.0L SP2 E	1.0L SP2 I	0.6L SP5 I
IA Type 4	51.2	55.2	54.7	62.2	66.8	61.4	61.5	61.3	45.3
IA SU4	50.7	54.8	54.5	62.1	66.0	61.3	61.4	61.2	44.5
IA SU5	50.3	56.3	55.5	63.0	67.6	61.9	62.3	61.8	46.3
IA SU6	50.8	49.8	56.0	63.3	67.9	62.3	62.6	62.2	46.9
IA SU7	52.3	46.3	56.8	64.0	68.4	62.7	63.3	62.6	48.4
IA 3S3A	68.3	76.3	70.0	74.8	77.3	69.1	73.9	68.9	64.4
IA 3S3B	70.3	73.2	75.4	101.9	98.3	76.0	100.6	73.4	85.5
IA 4S3	69.9	73.1	75.2	99.6	97.0	74.9	98.3	73.5	80.8
IA 3-3	75.8	73.3	68.0	73.2	76.0	68.3	72.3	68.1	63.4
IA 5-2	69.5	74.8	78.0	87.7	88.1	76.9	86.6	76.7	71.2
IA EV2	51.9	55.8	55.1	62.4	67.2	61.8	61.8	61.6	46.0
IA EV3	50.0	44.8	55.4	63.0	67.5	61.9	62.3	61.8	45.6
90k	64.0 Y	71.4 Y	76.5 Y	82.1 Y	83.5 Y	73.7 Y	81.2 Y	73.5 Y	66.2 Y
Quint Axle Crane	51.8 Y	46.0 N	56.5 Y	63.6 Y	68.1 Y	49.8 N	62.9 Y	49.8 N	49.0 N
136k A	66.3 N	72.5 Y	76.7 Y	90.7 Y	89.8 Y	62.2 N	89.5 Y	61.7 N	77.7 Y
136k B	66.2 N	72.0 Y	75.9 Y	87.2 Y	87.5 Y	61.2 N	86.1 Y	61.1 N	72.1 Y
156k	69.0 N	73.6 N	76.7 N	91.4 Y	93.0 Y	62.5 N	89.9 Y	60.3 N	83.8 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	52.0 Y	46.1 N	56.5 Y	63.7 Y	68.1 Y	49.9 Y	63.0 Y	49.9 Y	48.5 Y
Small Annual Crane	49.1 Y	44.2 Y	54.7 Y	62.3 Y	66.7 Y	61.6 Y	61.6 Y	61.4 Y	44.9 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V14-1964, 28' Roadway, 15 Degree Skew

	Bridge Length								
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**	**347'-6**	**401'-0**
HS-20 Oper	1.54	1.63	1.59	1.78	1.90	1.23		1.09	
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR -M		STR -M	
Location	0.2L SP3 E	0.2L SP3 E	0.2L SP3 E	0.2L SP3 E	0.8L SP1 E	1.0L SP2 I		1.0L SP2 I	
HS-20 Inv	0.92	0.97	0.85	1.07	1.14	0.74		0.58	
Controlled by	STR +M	STR +M	STR +M	STR +M	STR +M	STR -M		STR -M	
Location	0.2L SP3 E	0.2L SP3 E	0.2L SP2 E	0.2L SP3 E	0.8L SP1 E	1.0L SP2 I		1.0L SP3 I	
IA Type 4	51.0	55.2	54.7	62.2	66.5	61.2		61.1	
IA SU4	50.6	55.0	54.6	62.1	66.0	61.2		61.1	
IA SU5	52.3	56.3	55.6	62.9	67.1	61.8		61.7	
IA SU6	52.9	56.9	56.0	63.4	67.6	62.1		62.0	
IA SU7	54.5	58.0	56.9	64.1	68.2	62.6		62.5	
IA 3S3A	68.1	76.4	69.8	75.0	77.4	69.1		69.0	
IA 3S3B	70.3	74.6	75.5	89.0	98.3	75.8		73.4	
IA 4S3	69.7	74.5	75.3	88.7	96.9	74.9		73.5	
IA 3-3	75.7	73.3	67.7	73.4	76.1	68.2		68.0	
IA 5-2	69.4	75.9	77.9	87.9	87.9	76.7		76.5	
IA EV2	51.8	55.9	55.1	62.4	66.9	61.8		61.7	
IA EV3	52.2	56.2	48.0	63.0	67.1	61.8		61.7	
90k	63.9 Y	72.6 Y	76.4 Y	82.6 Y	83.6 Y	73.7 Y		73.5 Y	
Quint Axle Crane	37.0 N	57.5 Y	49.0 N	63.7 Y	67.8 Y	62.2 Y		62.1 Y	
136k A	66.2 N	73.8 Y	76.7 Y	90.9 Y	89.8 Y	62.1 N		61.7 N	
136k B	66.2 N	73.2 Y	75.9 Y	87.4 Y	87.6 Y	61.2 N		61.1 N	
156k	68.9 N	74.9 N	76.7 N	91.4 Y	93.1 Y	62.5 N		60.3 N	
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes		Yes	
Fluid Milk Truck	54.0 Y	57.6 Y	49.2 Y	63.7 Y	67.9 Y	62.4 Y		62.3 Y	
Small Annual Crane	51.1 Y	55.3 Y	47.3 Y	62.3 Y	66.6 Y	61.4 Y		61.3 Y	

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V14-1964, 28' Roadway, 30 Degree Skew

	Bridge Length								
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**	**347'-6**	**401'-0**
HS-20 Oper	1.55	1.64		1.79	1.90	1.23		1.10	1.38
Controlled by	STR +M	STR +M		STR +M	STR +M	STR -M		STR -M	STR +M
Location	0.8L SP1 E	0.2L SP3 E		0.8L SP1 E	0.8L SP1 E	1.0L SP1 I		0.0L SP3 I	0.6L SP5 I
HS-20 Inv	0.89	0.78		1.07	1.14	0.74		0.66	0.72
Controlled by	STR +M	STR +M		STR +M	STR +M	STR -M		STR -M	SRV +M
Location	0.8L SP1 E	0.2L SP3 E		0.8L SP1 E	0.8L SP1 E	1.0L SP1 I		0.0L SP3 I	0.6L SP5 I
IA Type 4	51.2	55.2		62.1	66.8	61.2		61.1	45.2
IA SU4	50.7	54.6		62.0	66.0	61.1		61.0	44.4
IA SU5	50.3	56.3		62.9	67.5	61.8		61.7	46.2
IA SU6	50.8	56.6		63.3	67.9	62.1		62.0	46.8
IA SU7	52.3	46.3		64.1	68.4	62.6		62.5	48.4
IA 3S3A	68.3	76.4		74.9	77.3	69.2		69.1	64.3
IA 3S3B	70.3	74.6		102.0	98.3	76.3		73.5	85.5
IA 4S3	69.9	74.3		99.7	97.2	75.1		73.6	80.7
IA 3-3	75.8	73.2		73.3	76.1	68.3		68.1	63.4
IA 5-2	69.5	75.9		87.8	88.2	76.8		76.5	71.3
IA EV2	51.9	55.8		62.4	67.0	61.6		61.5	46.0
IA EV3	50.0	44.6		62.9	67.5	61.7		61.6	45.5
90k	64.0 Y	72.5 Y		82.2 Y	83.7 Y	73.8 Y		73.6 Y	66.2 Y
Quint Axle Crane	51.8 Y	45.9 N		63.6 Y	68.0 Y	62.3 Y		62.1 Y	49.0 N
136k A	66.3 N	73.7 Y		90.7 Y	90.0 Y	77.8 Y		77.5 Y	77.7 Y
136k B	66.2 N	73.1 Y		87.3 Y	87.7 Y	76.6 Y		76.3 Y	72.1 Y
156k	69.0 N	74.8 N		91.5 Y	93.1 Y	78.3 Y		76.0 N	83.8 Y
All Systems Permit	Yes	Yes		Yes	Yes	Yes		Yes	Yes
Fluid Milk Truck	52.0 Y	46.0 N		63.7 Y	68.1 Y	62.4 Y		62.3 Y	48.5 Y
Small Annual Crane	49.1 Y	44.2 Y		62.3 Y	66.6 Y	61.4 Y		61.3 Y	44.9 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V14-1964, 28' Roadway, 45 Degree Skew

	Bridge Length								
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**	**278'-0**	**347'-6**	**401'-0**
HS-20 Oper		1.62			1.91	1.23			
Controlled by		STR +M			STR +M	STR -M			
Location		0.2L SP3 E			0.8L SP1 E	1.0L SP2 I			
HS-20 Inv		0.78			1.07	0.74			
Controlled by		STR +M			STR -M	STR -M			
Location		0.8L SP1 E			1.0L SP1 E	1.0L SP2 I			
IA Type 4		55.2			66.6	61.0			
IA SU4		54.9			66.0	60.9			
IA SU5		56.4			67.4	61.6			
IA SU6		56.8			67.8	61.8			
IA SU7		46.4			68.4	62.4			
IA 3S3A		76.4			77.4	68.7			
IA 3S3B		74.7			98.4	75.5			
IA 4S3		74.5			97.2	74.5			
IA 3-3		73.2			76.2	67.8			
IA 5-2		75.9			88.1	76.6			
IA EV2		55.7			67.0	61.2			
IA EV3		44.9			67.3	61.5			
90k		72.6 Y			83.8 Y	73.2 Y			
Quint Axle Crane		46.0 N			68.0 Y	61.9 Y			
136k A		73.8 Y			90.0 Y	61.8 N			
136k B		73.2 Y			87.7 Y	60.8 N			
156k		74.8 N			93.1 Y	62.2 N			
All Systems Permit		Yes			Yes	Yes			
Fluid Milk Truck		46.1 N			68.1 Y	62.1 Y			
Small Annual Crane		44.3 Y			66.6 Y	61.1 Y			

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V15-1975, 0 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-0**	**80'-0**
HS-20 Oper	2.17	2.73	2.71	2.30	2.29	2.40
Controlled by	STR +V	STR +V	STR +M	STR +M	STR +M	STR +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	1.30	1.48	1.27	1.07	1.07	1.28
Controlled by	STR +V	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP1 I	0.4L SP1 I	0.5L SP1 I	0.2L SP1 I	0.2L SP1 E	0.2L SP1 I
IA Type 4	71.2	90.1	83.4	74.3	74.3	80.5
IA SU4	67.1	86.3	80.7	72.5	72.5	79.3
IA SU5	73.4	92.2	86.9	76.5	76.5	82.0
IA SU6	82.4	94.3	87.7	77.0	77.0	82.3
IA SU7	91.9	101.4	91.3	79.2	79.2	83.8
IA 3S3A	112.0	134.5	134.7	112.4	106.9	108.6
IA 3S3B	120.6	150.2	148.4	137.3	137.3	135.8
IA 4S3	127.5	161.1	149.6	132.9	132.9	139.0
IA 3-3	125.5	148.4	137.0	111.1	103.7	103.1
IA 5-2	113.7	142.7	134.6	118.5	118.2	119.3
IA EV2	66.4	85.7	86.1	77.0	77.0	82.4
IA EV3	68.3	87.4	84.2	74.8	74.8	80.8
90k	98.0 Y	117.7 Y	117.9 Y	109.7 Y	109.7 Y	112.3 Y
Quint Axle Crane	87.0 Y	103.7 Y	93.6 Y	80.5 Y	80.5 Y	84.7 Y
136k A	123.7 Y	156.7 Y	145.2 Y	130.3 Y	130.3 Y	128.7 Y
136k B	111.2 Y	134.6 Y	129.6 Y	118.3 Y	118.3 Y	119.3 Y
156k	127.6 Y	154.4 Y	148.6 Y	135.7 Y	135.3 Y	129.9 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	89.2 Y	104.5 Y	93.3 Y	80.4 Y	80.4 Y	84.6 Y
Small Annual Crane	71.7 Y	87.1 Y	82.9 Y	74.0 Y	74.0 Y	80.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V15-1975, 15 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-0**	**80'-0**
HS-20 Oper	2.17	2.73	2.71	2.30	2.29	2.40
Controlled by	STR +V	STR +V	STR +M	STR +M	STR +M	STR +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	1.30	1.48	1.27	1.07	1.14	1.28
Controlled by	STR +V	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP1 I	0.4L SP1 I	0.5L SP1 I	0.2L SP1 I	0.8L SP1 I	0.2L SP1 I
IA Type 4	71.2	90.1	83.5	74.3	75.9	80.5
IA SU4	67.1	86.3	80.7	72.5	74.5	79.3
IA SU5	73.4	92.2	87.0	76.5	77.7	82.0
IA SU6	82.4	94.3	87.7	77.0	78.0	82.4
IA SU7	91.9	101.4	91.3	79.2	79.8	83.8
IA 3S3A	112.0	134.6	134.8	112.4	106.9	108.6
IA 3S3B	120.6	150.2	148.5	137.3	142.6	135.8
IA 4S3	127.5	161.1	149.6	132.9	135.6	139.0
IA 3-3	125.5	148.4	137.0	111.1	103.7	103.1
IA 5-2	113.7	142.7	134.6	118.5	118.2	119.3
IA EV2	66.4	85.7	86.1	77.0	78.0	82.4
IA EV3	68.3	87.4	84.2	74.8	76.3	80.8
90k	98.0 Y	117.8 Y	117.9 Y	109.7 Y	112.0 Y	112.3 Y
Quint Axle Crane	87.0 Y	103.7 Y	93.6 Y	80.5 Y	80.8 Y	84.7 Y
136k A	123.7 Y	156.8 Y	145.3 Y	130.3 Y	133.3 Y	128.7 Y
136k B	111.2 Y	134.7 Y	129.6 Y	118.3 Y	121.4 Y	119.3 Y
156k	127.6 Y	154.5 Y	148.6 Y	135.7 Y	135.3 Y	129.9 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	89.2 Y	104.6 Y	93.4 Y	80.4 Y	80.7 Y	84.6 Y
Small Annual Crane	71.7 Y	87.1 Y	83.0 Y	74.0 Y	75.7 Y	80.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V15-1975, 30 Degree Skew

	Bridge Length					
Truck	**23'-9**	**30'-0**	**42'-6**	**55'-0**	**67'-0**	**80'-0**
HS-20 Oper	2.17	2.73	2.71	2.30	2.29	2.40
Controlled by	STR +V	STR +V	STR +M	STR +M	STR +M	STR +M
Location	0.0L SP1 I	0.0L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I	0.5L SP1 I
HS-20 Inv	1.30	1.48	1.27	1.07	1.14	1.28
Controlled by	STR +V	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M
Location	0.0L SP1 I	0.4L SP1 I	0.5L SP1 I	0.2L SP1 I	0.8L SP1 I	0.2L SP1 I
IA Type 4	71.2	90.1	83.5	74.3	75.9	80.5
IA SU4	67.1	86.3	80.7	72.5	74.5	79.3
IA SU5	73.4	92.2	87.0	76.5	77.7	82.0
IA SU6	82.4	94.4	87.7	77.0	78.0	82.4
IA SU7	91.9	101.4	91.3	79.2	79.8	83.8
IA 3S3A	112.0	134.6	134.8	112.4	106.9	108.6
IA 3S3B	120.6	150.3	148.5	137.3	142.6	135.8
IA 4S3	127.5	161.1	149.7	132.9	135.6	139.0
IA 3-3	125.5	148.4	137.0	111.1	103.7	103.1
IA 5-2	113.7	142.7	134.7	118.5	118.2	119.3
IA EV2	66.4	85.7	86.1	77.0	78.0	82.4
IA EV3	68.3	87.4	84.2	74.8	76.3	80.8
90k	98.0 Y	117.8 Y	117.9 Y	109.7 Y	112.0 Y	112.3 Y
Quint Axle Crane	87.0 Y	103.7 Y	93.6 Y	80.5 Y	80.8 Y	84.7 Y
136k A	123.7 Y	156.8 Y	145.3 Y	130.3 Y	133.3 Y	128.7 Y
136k B	111.2 Y	134.7 Y	129.6 Y	118.3 Y	121.4 Y	119.3 Y
156k	127.6 Y	154.5 Y	148.7 Y	135.7 Y	135.3 Y	129.9 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	89.2 Y	104.6 Y	93.4 Y	80.4 Y	80.7 Y	84.6 Y
Small Annual Crane	71.7 Y	87.2 Y	83.0 Y	74.0 Y	75.7 Y	80.3 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMs field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V16-1970, 0 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**223'-0**	**225'-0**	**250'-0**	**278'-0**	**313'-0**	**347'-6**	**401'-0**
HS-20 Oper	3.11	2.51	2.59	2.36	2.68	2.31	1.67		1.60	1.65	
Controlled by	STR -M	STR -M	STR -M	STR +M	STR -M	STR +M	STR +M		STR +M	STR +M	
Location	1.0L SP2 E	0.1L SP3 I	1.0L SP1 I	0.5L SP2 I	0.0L SP2 E	0.4L SP1 E	0.5L SP1 I		0.5L SP4 I	0.5L SP1 I	
HS-20 Inv	1.79	1.36	1.34	1.16	1.61	1.16	1.00		0.96	0.99	
Controlled by	SRV +M	SRV +M	SRV +M	SRV +M	STR -M	SRV +M	STR +M		STR +M	STR +M	
Location	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.0L SP2 E	0.4L SP1 I	0.5L SP1 I		0.5L SP4 I	0.5L SP1 I	
IA Type 4	109.2	85.2	86.6	77.4	108.7	76.2	55.5		52.6	55.0	
IA SU4	106.4	84.7	84.6	75.8	105.8	74.9	54.6		51.6	54.1	
IA SU5	112.0	86.8	88.8	79.2	111.4	77.8	56.7		53.8	56.1	
IA SU6	113.1	87.5	89.6	79.8	112.4	78.9	57.2		54.3	56.6	
IA SU7	116.2	89.1	92.2	81.9	115.6	81.5	58.6		55.9	58.1	
IA 3S3A	121.4	114.1	126.8	104.6	112.3	106.7	77.6		74.4	76.0	
IA 3S3B	127.6	112.8	116.1	136.6	111.4	135.7	97.9		95.8	95.9	
IA 4S3	126.4	112.2	115.3	135.1	111.7	133.5	93.5		90.8	91.5	
IA 3-3	132.8	109.7	123.3	102.5	128.1	104.2	74.7		74.0	74.0	
IA 5-2	123.8	112.2	117.1	120.4	113.9	116.1	83.3		80.2	81.6	
IA EV2	110.6	86.3	89.0	79.4	110.0	77.3	56.6		53.7	56.1	
IA EV3	110.4	85.1	86.9	77.7	109.8	76.7	55.8		52.9	55.3	
90k	115.2 Y	107.8 Y	114.9 Y	114.7 Y	105.8 Y	111.2 Y	79.0 Y		75.2 Y	77.4 Y	
Quint Axle Crane	114.7 Y	88.2 Y	94.3 Y	83.5 Y	114.0 Y	77.3 Y	59.3 Y		56.7 Y	58.8 Y	
136k A	119.9 Y	110.1 Y	116.0 Y	125.5 Y	108.4 Y	101.7 Y	88.8 Y		85.9 Y	86.9 Y	
136k B	119.2 Y	109.2 Y	115.0 Y	122.0 Y	108.0 Y	99.3 Y	84.2 Y		80.9 Y	82.5 Y	
156k	124.9 Y	112.5 Y	117.1 Y	131.6 Y	109.6 Y	105.5 Y	93.6 Y		90.9 Y	91.7 Y	
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Fluid Milk Truck	115.3 Y	88.4 Y	93.6 Y	82.9 Y	114.6 Y	77.4 Y	59.0 Y		56.3 Y	58.4 Y	
Small Annual Crane	108.6 Y	83.0 Y	86.0 Y	76.9 Y	108.1 Y	75.6 Y	55.2 Y		52.2 Y	54.7 Y	

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

445'-0 Length bridge not shown on this skew was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V16-1970, 15 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**223'-0**	**225'-0**	**250'-0**	**278'-0**	**313'-0**	**347'-6**	**401'-0**
HS-20 Oper		2.73	2.44		2.68	2.31	1.67	2.34			
Controlled by		STR +M	STR -M		STR -M	STR +M	STR +M	STR +M			
Location		0.5L SP2 I	0.9L SP1 I		0.0L SP2 E	0.4L SP1 E	0.5L SP3 I	0.5L SP2 I			
HS-20 Inv		1.36	1.34		1.60	1.16	1.00	1.16			
Controlled by		SRV +M	SRV +M		STR -M	SRV +M	STR +M	SRV +M			
Location		0.5L SP2 I	0.5L SP2 I		0.0L SP2 E	0.4L SP1 I	0.5L SP1 I	0.5L SP2 I			
IA Type 4		87.1	86.6		108.3	76.2	55.5	76.9			
IA SU4		84.7	84.6		105.9	74.9	54.6	75.3			
IA SU5		89.8	88.8		110.9	77.8	56.7	78.6			
IA SU6		90.7	85.7		112.2	78.9	57.2	79.3			
IA SU7		93.8	86.8		115.3	81.5	58.6	81.3			
IA 3S3A		124.1	104.4		111.8	99.1	77.7	110.2			
IA 3S3B		118.7	116.1		111.0	126.1	98.1	139.6			
IA 4S3		117.9	115.4		111.4	123.8	93.6	140.0			
IA 3-3		127.9	101.7		127.8	97.4	74.7	106.0			
IA 5-2		118.0	117.1		113.3	112.5	83.4	119.5			
IA EV2		89.8	89.0		109.6	77.3	56.6	78.8			
IA EV3		87.4	85.1		109.8	76.7	55.8	77.1			
90k		113.6 Y	114.9 Y		105.5 Y	107.1 Y	79.0 Y	114.0 Y			
Quint Axle Crane		96.2 Y	86.2 Y		113.7 Y	82.4 Y	59.3 Y	82.8 Y			
136k A		115.9 Y	116.1 Y		108.1 Y	114.7 Y	88.9 Y	132.7 Y			
136k B		115.0 Y	115.0 Y		107.7 Y	112.2 Y	84.3 Y	123.1 Y			
156k		118.5 Y	117.1 Y		109.3 Y	119.3 Y	93.7 Y	142.6 Y			
All Systems Permit		Yes	Yes		Yes	Yes	Yes	Yes			
Fluid Milk Truck		95.5 Y	86.4 Y		114.1 Y	81.5 Y	59.0 Y	82.3 Y			
Small Annual Crane		86.4 Y	84.2 Y		108.1 Y	75.6 Y	55.2 Y	76.4 Y			

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

445'-0 Length bridge not shown on this skew was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V16-1970, 30 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**223'-0**	**225'-0**	**250'-0**	**278'-0**	**313'-0**	**347'-6**	**445'-0**
HS-20 Oper		2.49		2.36	2.68	2.31	1.67	2.34			1.66
Controlled by		STR -M		STR +M	STR -M	STR +M	STR +M	STR +M			STR +M
Location		0.9L SP1 I		0.5L SP2 I	0.0L SP2 R	0.4L SP1 E	0.5L SP2 I	0.5L SP2 I			0.5L SP1 I
HS-20 Inv		1.35		1.17	1.61	1.16	1.00	1.16			0.99
Controlled by		SRV +M		SRV +M	STR -M	SRV +M	STR +M	SRV +M			STR +M
Location		0.5L SP2 I		0.5L SP2 I	0.0L SP2 E	0.4L SP1 I	0.5L SP2 I	0.5L SP2 I			0.5L SP1 I
IA Type 4		85.0		77.5	108.7	76.2	55.6	76.8			55.1
IA SU4		84.6		75.9	105.9	74.9	54.6	75.2			54.1
IA SU5		86.7		79.3	111.4	77.9	56.7	78.6			56.2
IA SU6		87.3		79.9	112.4	78.9	57.2	79.2			56.7
IA SU7		88.9		82.0	115.6	77.5	58.7	81.3			58.1
IA 3S3A		113.6		111.2	112.3	99.2	77.8	110.1			75.6
IA 3S3B		112.9		141.3	111.4	126.3	98.1	135.1			95.3
IA 4S3		112.2		139.6	111.7	124.2	93.6	134.9			91.0
IA 3-3		109.5		107.1	128.1	97.6	74.8	106.0			74.1
IA 5-2		112.0		120.4	113.9	113.2	83.5	119.4			81.2
IA EV2		85.7		79.4	110.0	77.3	56.7	78.7			56.1
IA EV3		85.0		77.7	109.8	76.4	55.9	77.1			55.3
90k		107.7 Y		114.8 Y	105.8 Y	107.3 Y	79.1 Y	113.9 Y			77.0 Y
Quint Axle Crane		87.9 Y		83.5 Y	114.0 Y	77.1 Y	59.4 Y	82.7 Y			58.9 Y
136k A		109.9 Y		133.8 Y	108.4 Y	101.4 Y	88.9 Y	132.7 Y			86.4 Y
136k B		109.1 Y		124.1 Y	108.0 Y	99.2 Y	84.3 Y	123.1 Y			82.0 Y
156k		112.4 Y		139.1 Y	109.6 Y	105.3 Y	93.8 Y	133.2 Y			91.1 Y
All Systems Permit		Yes		Yes	Yes	Yes	Yes	Yes			Yes
Fluid Milk Truck		88.2 Y		83.0 Y	114.6 Y	77.2 Y	59.0 Y	82.2 Y			58.5 Y
Small Annual Crane		83.0 Y		77.0 Y	108.2 Y	75.6 Y	55.3 Y	76.4 Y			54.8 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

401'-0 Length bridge not shown on this skew was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V16-1970, 45 Degree Skew

	Bridge Length										
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**223'-0**	**225'-0**	**250'-0**	**278'-0**	**313'-0**	**347'-6**	**401'-0**
HS-20 Oper	3.11	2.72	2.67	2.36	2.68		1.76		1.46		
Controlled by	STR -M	STR +M	STR +M	STR +M	STR -M		STR +M		STR +M		
Location	1.0L SP2 E	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	1.0L SP2 E		0.4L SP1 I		0.4L SP1 I		
HS-20 Inv	1.80	1.35	1.34	1.17	1.60		1.06		0.87		
Controlled by	SRV +M	SRV +M	SRV +M	SRV +M	STR -M		STR +M		STR +M		
Location	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	1.0L SP2 E		0.4L SP1 I		0.4L SP1 I		
IA Type 4	109.0	86.9	86.6	77.6	108.4		59.0		47.9		
IA SU4	106.4	84.6	84.6	76.0	105.9		58.2		47.2		
IA SU5	111.7	89.6	88.8	79.4	111.1		60.1		49.0		
IA SU6	112.7	90.5	89.5	80.0	112.1		60.8		49.6		
IA SU7	115.9	88.8	92.1	82.0	115.3		62.5		51.3		
IA 3S3A	121.0	125.4	126.6	104.7	111.9		77.9		67.9		
IA 3S3B	127.3	118.6	127.0	126.3	110.9		98.2		91.0		
IA 4S3	126.0	117.9	126.1	125.3	111.3		93.8		85.6		
IA 3-3	132.2	127.6	123.1	102.5	127.7		77.3		66.8		
IA 5-2	123.5	118.1	128.1	120.6	113.4		83.6		75.6		
IA EV2	110.3	89.6	89.0	79.5	109.8		59.7		48.6		
IA EV3	110.4	86.7	84.9	77.8	109.8		59.3		48.3		
90k	114.8 Y	113.7 Y	126.1 Y	115.0 Y	105.5 Y		79.3 Y		70.3 Y		
Quint Axle Crane	114.4 Y	88.2 Y	86.1 Y	83.6 Y	113.8 Y		63.2 Y		51.9 Y		
136k A	119.5 Y	116.1 Y	127.2 Y	125.6 Y	108.1 Y		89.1 Y		82.6 Y		
136k B	118.8 Y	114.9 Y	125.1 Y	122.0 Y	107.7 Y		84.5 Y		76.5 Y		
156k	124.5 Y	118.5 Y	128.3 Y	128.8 Y	109.2 Y		93.9 Y		88.9 Y		
All Systems Permit	Yes	Yes	Yes	Yes	Yes		Yes		Yes		
Fluid Milk Truck	114.9 Y	88.4 Y	86.2 Y	83.1 Y	114.3 Y		62.5 Y		51.3 Y		
Small Annual Crane	108.7 Y	85.5 Y	84.1 Y	77.1 Y	108.1 Y		58.7 Y		47.6 Y		

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

445'-0 Length bridge not shown on this skew was not rated based on SIIMs query of current inventory.

V Bridge Standards Load Rating Summary - LFR Rating Method

V30C-1979, 30' Roadway, 0 Degree Skew

	Bridge Length					
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**
HS-20 Oper	3.29	2.44	2.61	2.27	2.22	1.63
Controlled by	STR -M	STR -M	STR +M	STR +M	STR +M	STR +M
Location	1.0L SP2 I	0.9L SP1 I	0.5L SP2 I	0.5L SP2 I	0.6L SP3 I	0.5L SP3 I
HS-20 Inv	1.75	1.34	1.33	1.14	1.14	0.98
Controlled by	SRV +M	SRV +M	SRV +M	SRV +M	SRV +M	STR +M
Location	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.5L SP2 I	0.6L SP3 I	0.5L SP3 I
IA Type 4	106.0	82.8	84.4	74.6	73.2	54.2
IA SU4	102.5	82.1	82.5	73.1	72.0	53.3
IA SU5	109.7	84.4	86.7	76.4	74.8	55.4
IA SU6	111.1	85.0	87.4	77.0	75.8	55.9
IA SU7	115.9	86.6	90.0	79.0	78.3	57.3
IA 3S3A	127.6	111.6	122.2	103.8	103.7	76.3
IA 3S3B	135.8	110.1	121.8	139.3	134.6	96.5
IA 4S3	134.6	109.5	121.0	135.4	130.7	92.0
IA 3-3	139.4	107.2	118.9	101.7	101.1	73.1
IA 5-2	131.4	109.7	123.1	116.1	112.5	82.0
IA EV2	109.6	83.8	86.8	76.5	74.3	55.3
IA EV3	106.4	83.9	84.8	74.9	73.7	54.5
90k	122.1 Y	105.4 Y	120.8 Y	110.5 Y	107.4 Y	77.7 Y
Quint Axle Crane	112.9 Y	85.8 Y	92.1 Y	80.5 Y	76.8 Y	58.0 Y
136k A	127.3 Y	107.6 Y	121.8 Y	124.6 Y	101.1 Y	87.5 Y
136k B	126.5 Y	106.7 Y	120.7 Y	119.5 Y	98.6 Y	82.9 Y
156k	132.7 Y	109.9 Y	122.9 Y	130.7 Y	104.8 Y	92.2 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	113.4 Y	85.9 Y	91.3 Y	80.0 Y	76.9 Y	57.6 Y
Small Annual Crane	104.7 Y	81.9 Y	83.8 Y	74.2 Y	72.7 Y	53.9 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V30C-1979, 30' Roadway, 15 Degree Skew

	Bridge Length					
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**
HS-20 Oper		2.65		2.26		
Controlled by		STR +M		STR +M		
Location		0.5L SP2 I		0.5L SP2 I		
HS-20 Inv		1.34		1.13		
Controlled by		SRV +M		SRV +M		
Location		0.5L SP2 I		0.5L SP2 I		
IA Type 4		84.4		74.3		
IA SU4		82.1		72.7		
IA SU5		87.0		76.0		
IA SU6		87.9		76.6		
IA SU7		91.0		78.5		
IA 3S3A		133.9		106.7		
IA 3S3B		128.6		139.8		
IA 4S3		127.9		134.3		
IA 3-3		128.7		102.7		
IA 5-2		128.1		115.5		
IA EV2		87.0		76.1		
IA EV3		84.7		74.5		
90k		123.0 Y		110.0 Y		
Quint Axle Crane		93.4 Y		80.1 Y		
136k A		125.7 Y		128.2 Y		
136k B		124.5 Y		118.9 Y		
156k		128.3 Y		138.4 Y		
All Systems Permit		Yes		Yes		
Fluid Milk Truck		92.6 Y		79.6 Y		
Small Annual Crane		83.7 Y		73.8 Y		

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V30C-1979, 30' Roadway, 30 Degree Skew

	Bridge Length					
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**
HS-20 Oper					2.23	
Controlled by					STR +M	
Location					0.4L SP1 I	
HS-20 Inv					1.14	
Controlled by					SRV +M	
Location					0.4L SP1 I	
IA Type 4					73.3	
IA SU4					72.1	
IA SU5					74.9	
IA SU6					75.9	
IA SU7					76.9	
IA 3S3A					103.7	
IA 3S3B					134.5	
IA 4S3					130.8	
IA 3-3					101.2	
IA 5-2					98.9	
IA EV2					74.4	
IA EV3					73.8	
90k					107.5 Y	
Quint Axle Crane					76.5 Y	
136k A					100.8 Y	
136k B					98.5 Y	
156k					104.7 Y	
All Systems Permit					Yes	
Fluid Milk Truck					76.6 Y	
Small Annual Crane					72.8 Y	

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

V Bridge Standards Load Rating Summary - LFR Rating Method

V30C-1979, 30' Roadway, 45 Degree Skew

	Bridge Length					
Truck	**125'-0**	**150'-0**	**175'-0**	**200'-0**	**225'-0**	**250'-0**
HS-20 Oper		2.64				
Controlled by		STR +M				
Location		0.5L SP2 I				
HS-20 Inv		1.33				
Controlled by		SRV +M				
Location		0.5L SP2 I				
IA Type 4		84.3				
IA SU4		82.0				
IA SU5		86.9				
IA SU6		87.8				
IA SU7		86.5				
IA 3S3A		133.4				
IA 3S3B		128.5				
IA 4S3		127.8				
IA 3-3		128.5				
IA 5-2		128.0				
IA EV2		86.8				
IA EV3		84.3				
90k		123.1 Y				
Quint Axle Crane		85.8 Y				
136k A		125.6 Y				
136k B		124.6 Y				
156k		128.3 Y				
All Systems Permit		Yes				
Fluid Milk Truck		86.0 Y				
Small Annual Crane		83.1 Y				

HS-20 ratings are reported as Rating Factors, all others are Tons.
E and I designation in the location cells refer to Exterior and Interior beams.
Y/N for permit vehicles denotes equivalent SIIMS field entry.

RS Bridge Standards Load Rating Summary - LFR Rating Method

RS40-2004, 0 Degree Skew

	Bridge Length							
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**
HS-20 Oper	2.11	2.04	2.08	1.88	1.92	2.07	2.00	1.91
Controlled by	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M
Location	1.0L SP1 I	1.0L SP1 I	0.0L SP2 I	0.0L SP2 I	1.0L SP1 I	1.0L SP1 I	1.0L SP1 I	0.0L SP2 I
HS-20 Inv	1.26	1.22	1.25	1.13	1.15	1.24	1.20	1.14
Controlled by	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M
Location	1.0L SP1 I	1.0L SP1 I	0.0L SP2 I	0.0L SP2 I	1.0L SP1 I	1.0L SP1 I	1.0L SP1 I	0.0L SP2 I
IA Type 4	81.8	83.7	86.7	86.2	89.9	88.5	89.3	89.1
IA SU4	81.5	82.2	85.0	85.4	88.5	87.2	88.1	88.0
IA SU5	82.9	84.7	88.6	86.6	91.6	90.0	90.7	90.5
IA SU6	83.3	85.1	89.2	87.1	92.1	90.4	91.1	90.8
IA SU7	84.5	85.9	90.5	87.7	92.8	92.1	92.6	92.2
IA 3S3A	93.8	100.6	102.2	96.6	100.5	109.2	110.7	110.2
IA 3S3B	91.5	93.2	100.5	97.3	106.6	125.5	125.9	122.3
IA 4S3	90.6	92.1	99.3	96.1	105.0	123.1	124.8	122.0
IA 3-3	95.2	98.2	101.0	95.6	99.7	108.1	109.6	108.2
IA 5-2	89.9	92.4	99.6	97.9	107.5	119.1	118.9	117.4
IA EV2	82.8	84.6	88.9	86.6	91.6	90.3	91.0	90.7
IA EV3	81.6	84.3	87.0	86.7	90.2	88.8	89.6	89.4
90k	87.3 Y	90.8 Y	99.4 Y	97.8 Y	106.1 Y	114.8 Y	115.6 Y	114.6 Y
Quint Axle Crane	80.0 Y	85.4 Y	90.0 Y	87.3 Y	92.4 Y	93.2 Y	93.6 Y	93.1 Y
136k A	88.4 Y	92.0 Y	100.1 Y	97.7 Y	108.6 Y	119.7 Y	119.5 Y	117.7 Y
136k B	86.5 Y	91.2 Y	99.3 Y	97.1 Y	107.5 Y	118.1 Y	118.3 Y	116.9 Y
156k	88.7 Y	93.4 Y	101.5 Y	98.7 Y	109.2 Y	122.2 Y	121.7 Y	119.7 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	80.9 Y	85.5 Y	90.0 Y	87.3 Y	92.4 Y	92.9 Y	93.4 Y	92.9 Y
Small Annual Crane	81.7 Y	83.4 Y	86.3 Y	86.3 Y	89.6 Y	88.2 Y	89.0 Y	88.9 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

RS Bridge Standards Load Rating Summary - LFR Rating Method

RS40-2004, 10 Degree Skew

	Bridge Length							
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**
HS-20 Oper	2.11	2.04	2.08	1.88	1.92	2.07		1.91
Controlled by	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M		STR -M
Location	0.0L SP2 I	1.0L SP1 I	0.0L SP2 I	1.0L SP1 I	1.0L SP1 I	1.0L SP1 I		1.0L SP1 I
HS-20 Inv	1.26	1.22	1.25	1.13	1.15	1.24		1.14
Controlled by	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M		STR -M
Location	0.0L SP2 I	1.0L SP1 I	0.0L SP2 I	1.0L SP1 I	1.0L SP1 I	1.0L SP1 I		1.0L SP1 I
IA Type 4	81.8	83.7	86.7	86.2	90.0	88.5		89.2
IA SU4	81.5	82.2	85.0	85.4	88.5	87.2		88.1
IA SU5	82.8	84.7	88.7	86.6	91.7	90.0		90.5
IA SU6	83.3	85.1	89.2	87.1	92.1	90.4		90.8
IA SU7	84.5	85.8	90.5	87.7	92.7	92.1		92.2
IA 3S3A	93.9	100.6	102.2	96.5	100.4	109.2		110.1
IA 3S3B	91.4	93.2	100.4	97.2	106.6	125.5		123.0
IA 4S3	90.5	92.1	99.2	96.1	105.0	123.0		122.0
IA 3-3	95.2	98.1	100.9	95.5	99.6	108.1		108.3
IA 5-2	89.8	92.4	99.5	97.8	107.5	119.0		117.3
IA EV2	82.8	84.6	88.9	86.5	91.6	90.3		90.8
IA EV3	82.8	84.3	87.0	86.6	90.3	88.8		89.4
90k	87.2 Y	90.8 Y	99.4 Y	97.7 Y	106.0 Y	114.8 Y		114.5 Y
Quint Axle Crane	82.9 Y	85.4 Y	90.0 Y	87.2 Y	92.3 Y	93.2 Y		93.1 Y
136k A	89.1 Y	91.9 Y	100.0 Y	97.6 Y	108.6 Y	119.6 Y		117.7 Y
136k B	88.5 Y	91.2 Y	99.3 Y	97.0 Y	107.4 Y	118.1 Y		116.9 Y
156k	91.0 Y	93.4 Y	101.4 Y	98.7 Y	109.2 Y	122.1 Y		119.6 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes		Yes
Fluid Milk Truck	83.8 Y	85.5 Y	90.0 Y	87.2 Y	92.4 Y	92.9 Y		92.9 Y
Small Annual Crane	81.9 Y	83.4 Y	86.3 Y	86.2 Y	89.6 Y	88.2 Y		88.9 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

Greyed out column for this bridge skew/length combination was not rated based on SIIMs query of current inventory.

RS Bridge Standards Load Rating Summary - LFR Rating Method

RS40-2004, 20 Degree Skew

	Bridge Length							
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**
HS-20 Oper	2.11	2.04	2.08	1.88	1.92	2.07	2.00	1.91
Controlled by	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M
Location	0.0L SP2 I	0.0L SP2 I	0.0L SP2 I	1.0L SP1 I	1.0L SP1 I	0.0L SP2 I	0.0L SP2 I	1.0L SP1 I
HS-20 Inv	1.23	1.22	1.25	1.13	1.15	1.24	1.20	1.14
Controlled by	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M
Location	1.0L SP1 E	1.0L SP1 I	0.0L SP2 I	1.0L SP1 I	1.0L SP1 I	0.0L SP2 I	0.0L SP2 I	1.0L SP1 I
IA Type 4	81.7	83.7	86.7	86.2	90.0	88.5	89.3	89.2
IA SU4	81.5	82.2	85.1	85.4	88.6	87.2	88.1	88.1
IA SU5	82.8	84.6	88.7	86.6	91.7	90.0	90.8	90.5
IA SU6	83.3	85.1	89.2	87.0	92.1	90.4	91.1	90.9
IA SU7	83.2	85.8	90.4	87.7	92.7	92.1	92.6	92.2
IA 3S3A	93.9	100.6	102.2	96.4	100.4	109.2	110.6	110.1
IA 3S3B	91.4	93.1	100.5	97.1	106.6	125.5	125.8	122.9
IA 4S3	90.5	92.0	99.2	96.1	105.0	123.1	124.7	121.9
IA 3-3	95.2	98.2	100.8	95.4	99.5	108.0	109.5	108.3
IA 5-2	89.8	92.4	99.5	97.8	107.4	118.9	118.8	117.2
IA EV2	82.6	84.3	88.9	86.4	91.5	90.3	91.0	90.8
IA EV3	79.4	84.3	87.1	86.6	90.3	88.8	89.6	89.5
90k	87.2 Y	90.7 Y	99.3 Y	97.7 Y	106.0 Y	114.8 Y	115.6 Y	114.5 Y
Quint Axle Crane	77.9 Y	85.4 Y	89.9 Y	87.2 Y	92.3 Y	93.2 Y	93.6 Y	93.2 Y
136k A	85.8 Y	91.9 Y	100.0 Y	97.6 Y	108.6 Y	119.6 Y	119.4 Y	117.6 Y
136k B	84.0 Y	91.1 Y	99.3 Y	97.0 Y	107.4 Y	118.1 Y	118.3 Y	116.9 Y
156k	86.1 Y	93.3 Y	101.4 Y	98.7 Y	109.1 Y	122.0 Y	121.6 Y	119.6 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	78.7 Y	85.5 Y	90.0 Y	87.2 Y	92.3 Y	92.9 Y	93.4 Y	93.0 Y
Small Annual Crane	79.7 Y	83.4 Y	86.3 Y	86.2 Y	89.7 Y	88.2 Y	89.1 Y	88.9 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

Y/N for permit vehicles denotes equivalent SIIMs field entry.

RS Bridge Standards Load Rating Summary - LFR Rating Method

RS40-2004, 30 Degree Skew

	Bridge Length							
Truck	**160'-0**	**180'-0**	**200'-0**	**220'-0**	**240'-0**	**260'-0**	**280'-0**	**300'-0**
HS-20 Oper	2.09	2.04	2.08	1.88	1.92	2.07	2.00	1.91
Controlled by	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M
Location	0.0L SP2 E	1.0L SP1 I	0.0L SP2 I	0.0L SP2 I	1.0L SP1 I	0.0L SP2 I	0.0L SP2 I	0.0L SP2 I
HS-20 Inv	1.14	1.22	1.25	1.13	1.15	1.24	1.20	1.14
Controlled by	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M	STR -M
Location	0.0L SP2 E	1.0L SP1 I	0.0L SP2 I	0.0L SP2 I	1.0L SP1 I	0.0L SP2 I	0.0L SP2 I	0.0L SP2 I
IA Type 4	80.4	83.7	86.8	86.2	90.0	88.5	89.4	89.2
IA SU4	80.2	82.2	85.1	85.5	88.6	87.2	88.2	88.1
IA SU5	79.5	84.6	88.7	86.7	91.7	90.0	90.8	90.6
IA SU6	78.2	85.1	89.3	87.0	92.1	90.5	91.2	90.9
IA SU7	77.7	85.8	90.4	87.7	92.7	92.1	92.7	92.3
IA 3S3A	89.2	100.7	102.2	96.4	100.4	109.2	110.5	110.1
IA 3S3B	89.8	93.2	100.5	97.1	106.7	125.5	124.6	122.9
IA 4S3	87.9	92.1	99.2	96.1	105.0	123.1	124.6	122.0
IA 3-3	90.1	98.2	100.8	95.4	99.5	108.0	109.5	108.3
IA 5-2	85.0	92.4	99.5	97.8	107.4	119.0	118.8	117.1
IA EV2	80.3	84.3	88.8	86.4	91.5	90.4	91.0	90.8
IA EV3	74.1	84.3	87.1	86.6	90.3	88.8	89.6	89.5
90k	82.2 Y	90.7 Y	99.3 Y	97.7 Y	106.0 Y	114.8 Y	115.5 Y	114.5 Y
Quint Axle Crane	72.6 Y	85.4 Y	89.8 Y	87.1 Y	92.3 Y	93.2 Y	93.7 Y	93.2 Y
136k A	79.9 Y	91.9 Y	100.0 Y	97.7 Y	108.6 Y	119.6 Y	119.5 Y	117.6 Y
136k B	78.1 Y	91.2 Y	99.2 Y	97.0 Y	107.4 Y	118.1 Y	118.3 Y	116.8 Y
156k	80.0 Y	93.3 Y	101.4 Y	98.7 Y	109.1 Y	122.1 Y	121.6 Y	119.5 Y
All Systems Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid Milk Truck	73.5 Y	85.5 Y	90.0 Y	87.3 Y	92.3 Y	92.9 Y	93.5 Y	93.0 Y
Small Annual Crane	74.3 Y	83.4 Y	86.4 Y	86.3 Y	89.7 Y	88.2 Y	89.1 Y	89.0 Y

HS-20 ratings are reported as Rating Factors, all others are Tons.

E and I designation in the location cells refer to Exterior and Interior beams.

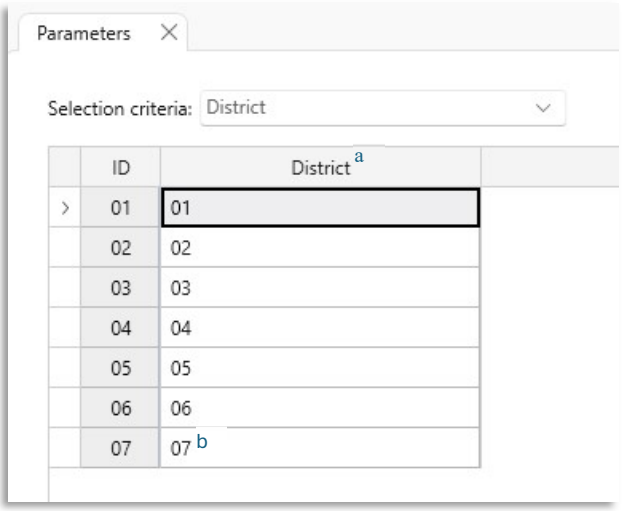
Y/N for permit vehicles denotes equivalent SIIMs field entry.

4.3 LFD/ASD RESULTS TABLES

4.3.4 Truss Standards

APPENDIX A
Iowa DOT BrR System Data File Settings

BrR System Data: Parameters – Districts

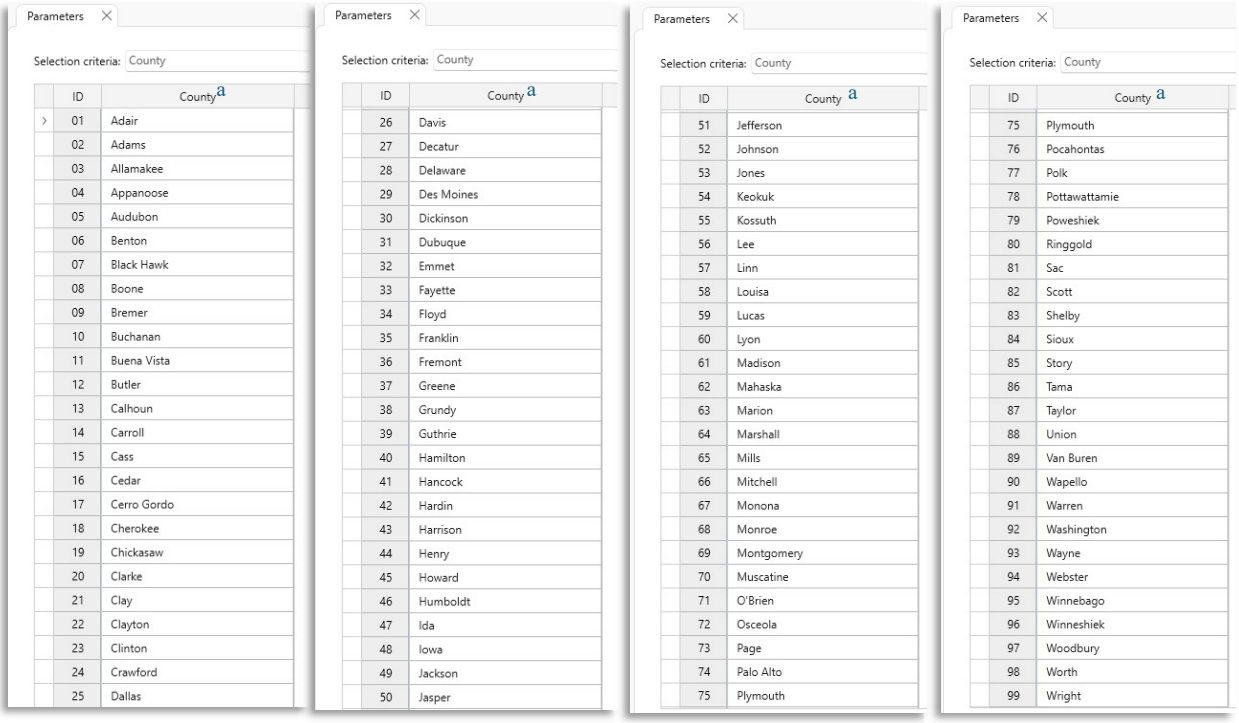


Parameters

Selection criteria: District

ID	District [a]
01	01
02	02
03	03
04	04
05	05
06	06
07	07 [b]

BrR System Data: Parameters – Counties



Parameters

Selection criteria: County

ID	County [a]
01	Adair
02	Adams
03	Allamakee
04	Appanoose
05	Audubon
06	Benton
07	Black Hawk
08	Boone
09	Bremer
10	Buchanan
11	Buena Vista
12	Butler
13	Calhoun
14	Carroll
15	Cass
16	Cedar
17	Cerro Gordo
18	Cherokee
19	Chickasaw
20	Clarke
21	Clay
22	Clayton
23	Clinton
24	Crawford
25	Dallas

Parameters

Selection criteria: County

ID	County [a]
26	Davis
27	Decatur
28	Delaware
29	Des Moines
30	Dickinson
31	Dubuque
32	Emmet
33	Fayette
34	Floyd
35	Franklin
36	Fremont
37	Greene
38	Grundy
39	Guthrie
40	Hamilton
41	Hancock
42	Hardin
43	Harrison
44	Henry
45	Howard
46	Humboldt
47	Ida
48	Iowa
49	Jackson
50	Jasper

Parameters

Selection criteria: County

ID	County [a]
51	Jefferson
52	Johnson
53	Jones
54	Keokuk
55	Kossuth
56	Lee
57	Linn
58	Louisa
59	Lucas
60	Lyon
61	Madison
62	Mahaska
63	Marion
64	Marshall
65	Mills
66	Mitchell
67	Monona
68	Monroe
69	Montgomery
70	Muscatine
71	O'Brien
72	Osceola
73	Page
74	Palo Alto
75	Plymouth

Parameters

Selection criteria: County

ID	County [a]
75	Plymouth
76	Pocahontas
77	Polk
78	Pottawattamie
79	Poweshiek
80	Ringgold
81	Sac
82	Scott
83	Shelby
84	Sioux
85	Story
86	Tama
87	Taylor
88	Union
89	Van Buren
90	Wapello
91	Warren
92	Washington
93	Wayne
94	Webster
95	Winnebago
96	Winneshiek
97	Woodbury
98	Worth
99	Wright

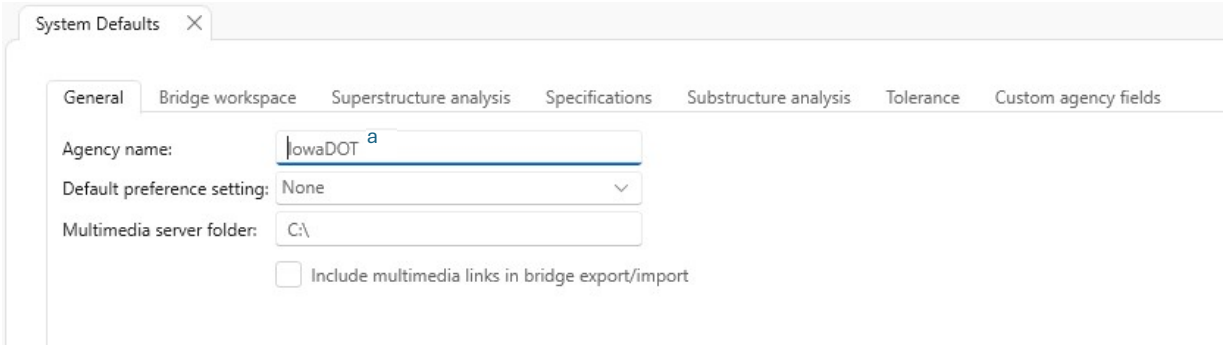
Notes:

[a] Item modified or added for Iowa DOT BrR System File. Otherwise, they are BrR default values or items.

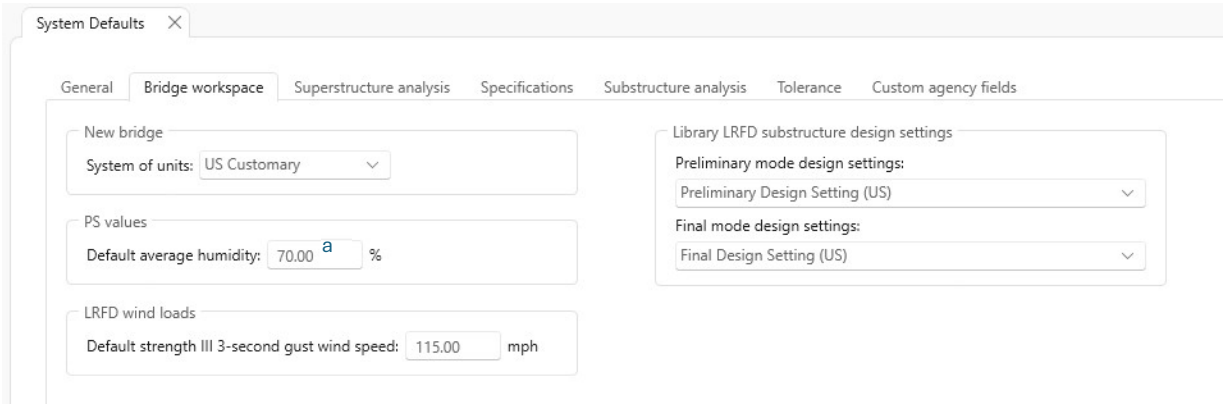
[b] District 7 is for Local Public Agencies (LPA)

BrR System Data: System Defaults

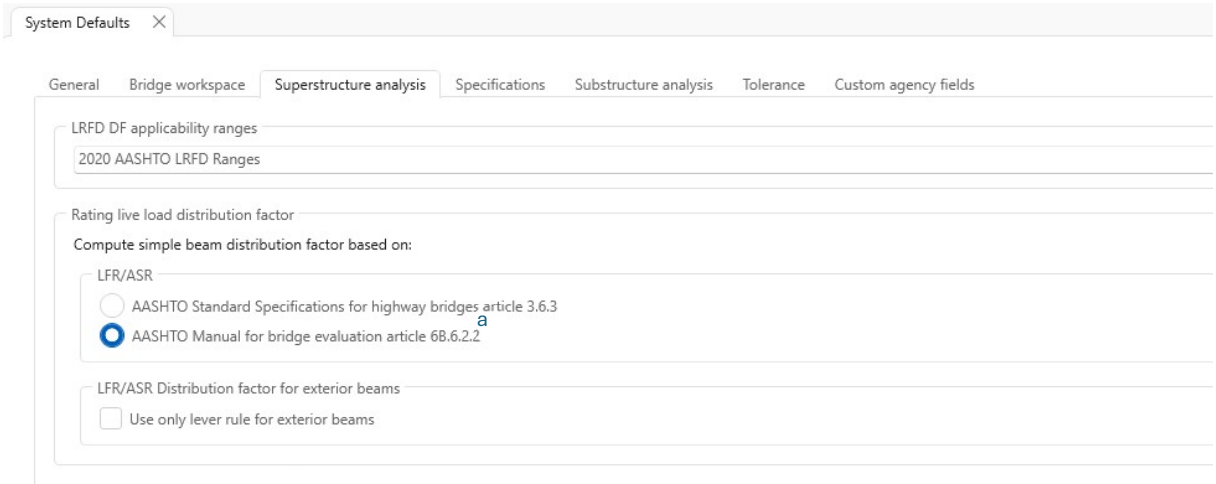
General



Bridge workspace



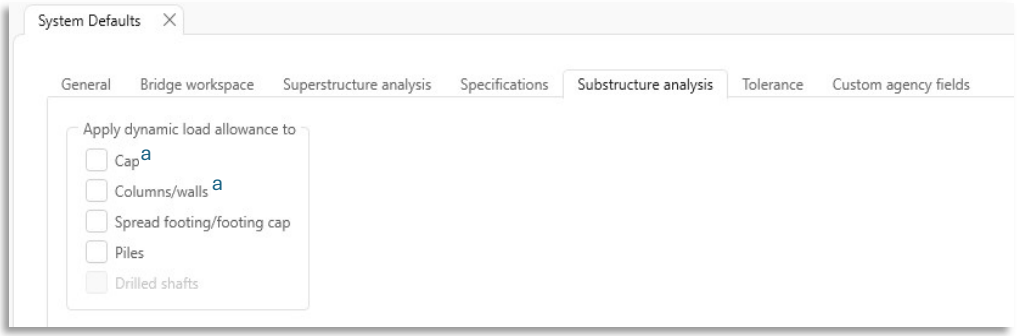
Superstructure analysis



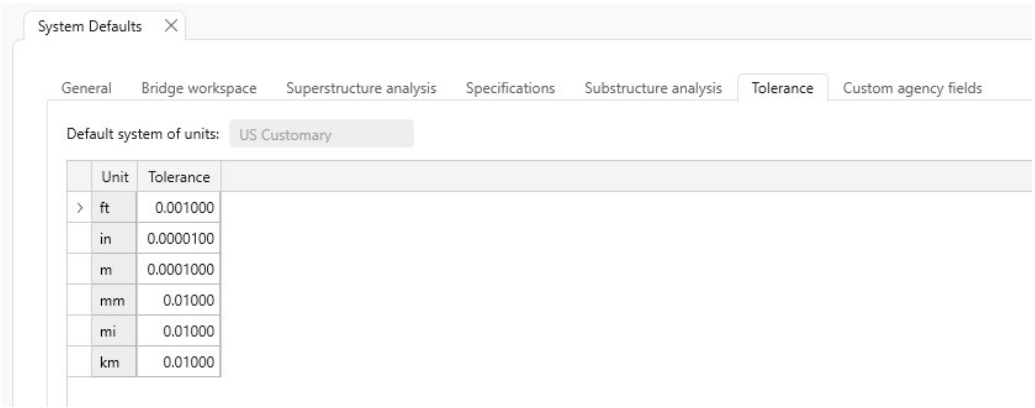
Notes:

[a] Item modified or added for Iowa DOT BrR System File. Otherwise, they are BrR default values or items.

Substructure analysis

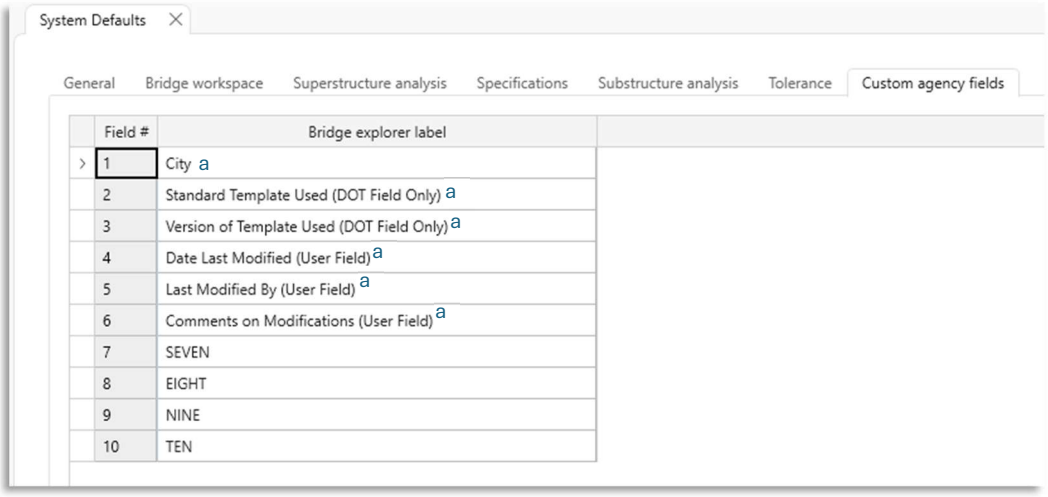


Tolerance



Unit	Tolerance
ft	0.001000
in	0.0000100
m	0.0001000
mm	0.01000
mi	0.01000
km	0.01000

Custom agency fields

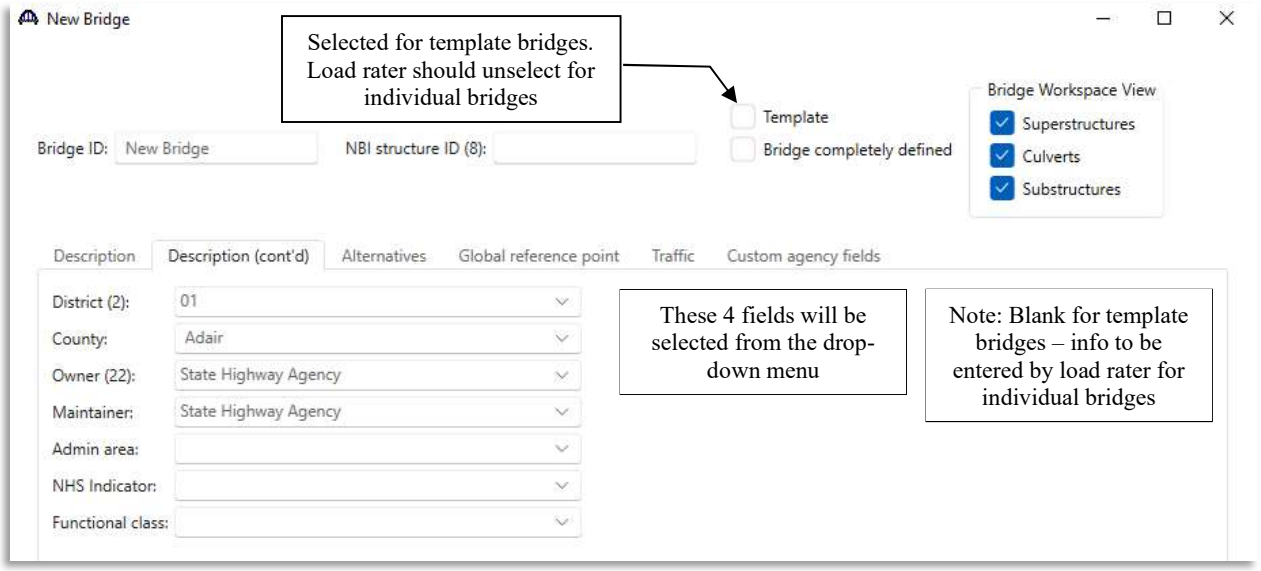


Field #	Bridge explorer label
1	City a
2	Standard Template Used (DOT Field Only) a
3	Version of Template Used (DOT Field Only) a
4	Date Last Modified (User Field) a
5	Last Modified By (User Field) a
6	Comments on Modifications (User Field) a
7	SEVEN
8	EIGHT
9	NINE
10	TEN

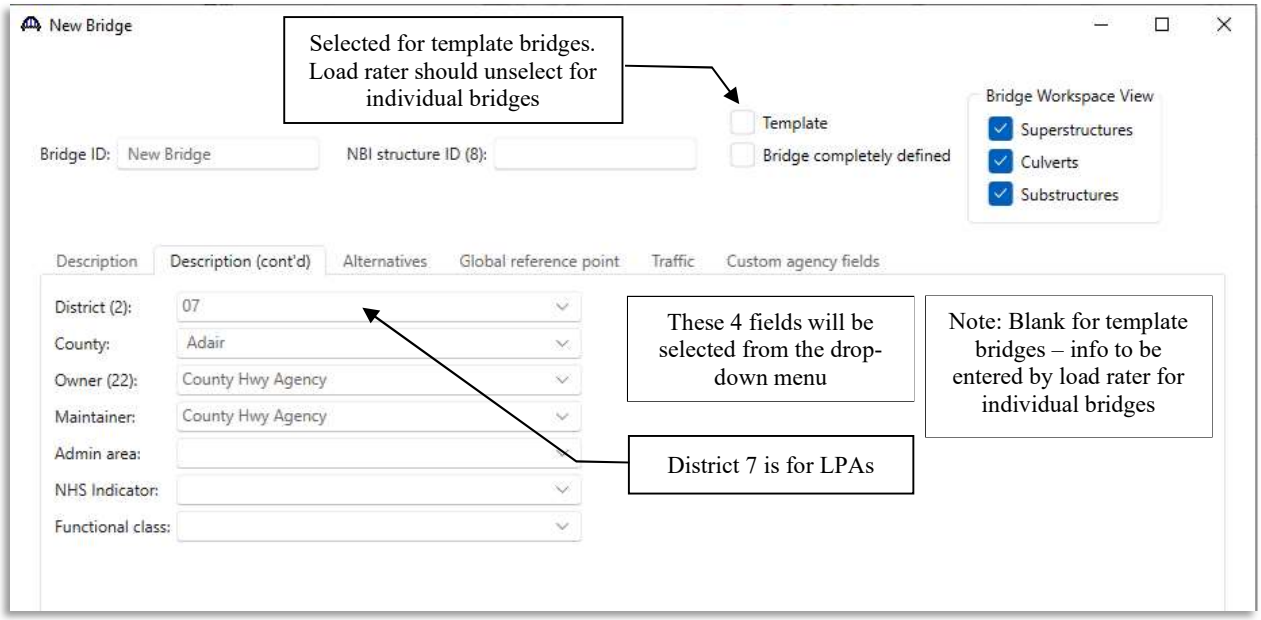
Notes:
[a] Item modified or added for Iowa DOT BrR System File. Otherwise, they are BrR default values or items.

Example of BrR Bridge Model Description Window

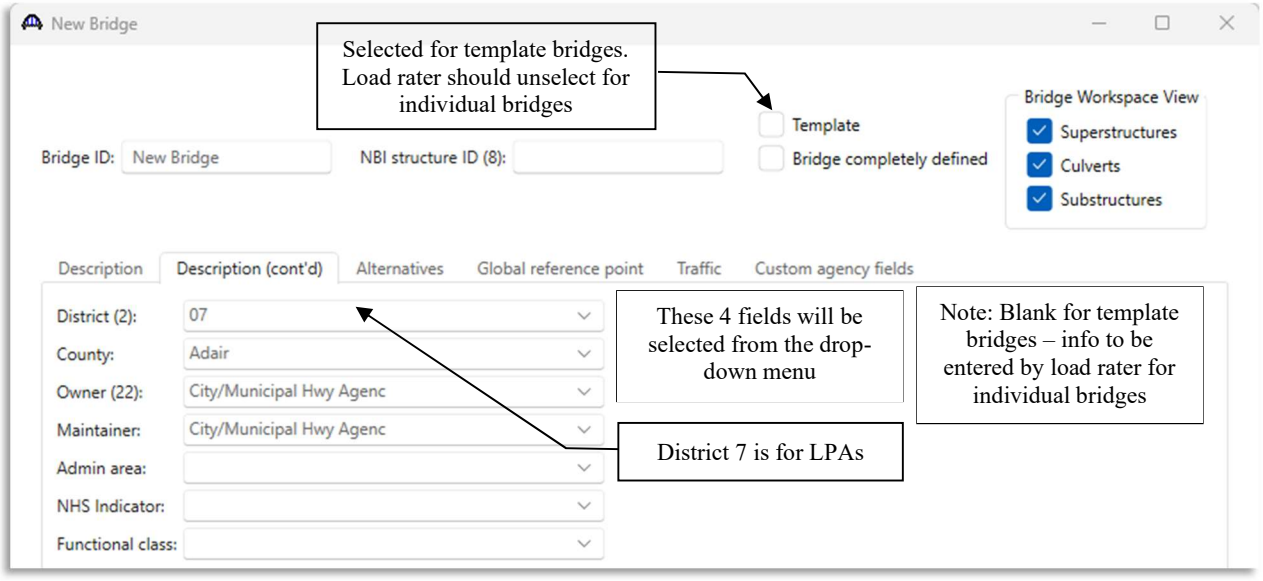
State Bridges

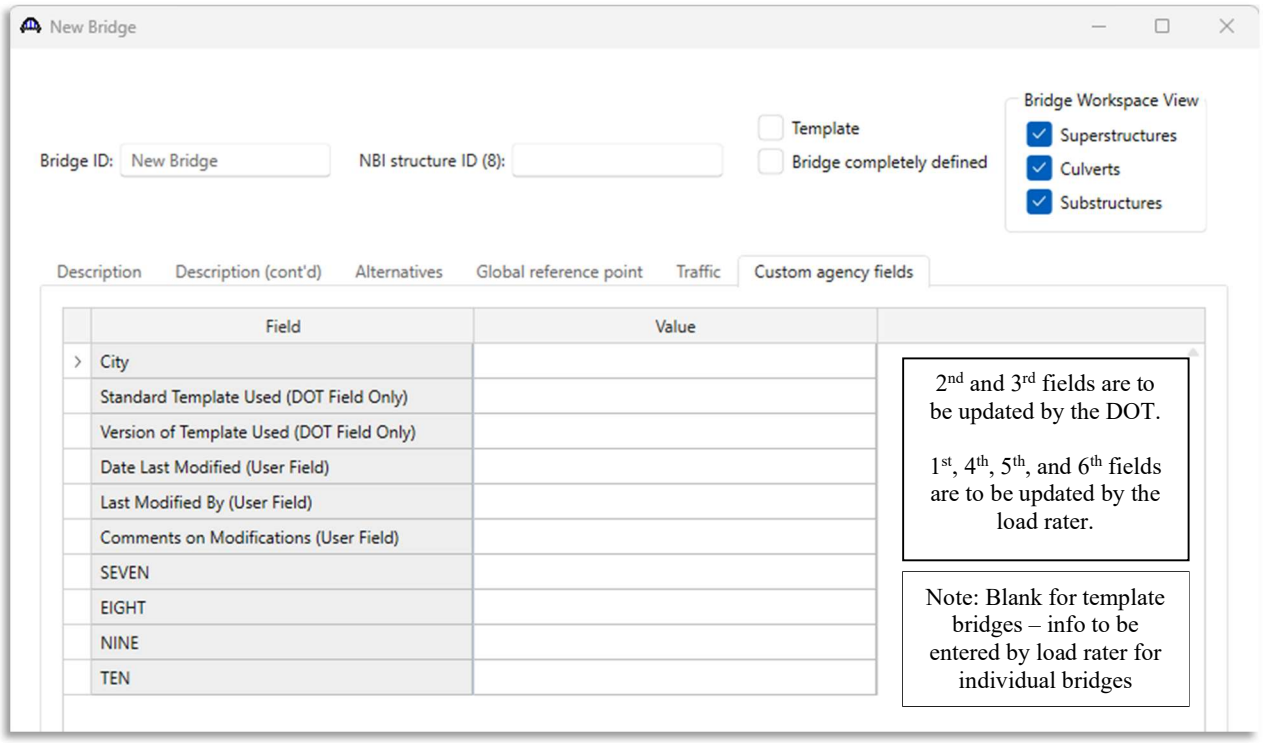


County Bridges



City Bidges


New Bridge
Selected for template bridges. Load rater should unselect for individual bridges
Bridge ID: New Bridge
NBI structure ID (8):
Template
Bridge completely defined
Bridge Workspace View
Superstructures
Culverts
Substructures
Description
Description (cont'd)
Alternatives
Global reference point
Traffic
Custom agency fields
District (2): 07
County: Adair
Owner (22): City/Municipal Hwy Agenc
Maintainer: City/Municipal Hwy Agenc
Admin area:
NHS Indicator:
Functional class:
These 4 fields will be selected from the drop-down menu
Note: Blank for template bridges – info to be entered by load rater for individual bridges
District 7 is for LPAs


New Bridge
Bridge ID: New Bridge
NBI structure ID (8):
Template
Bridge completely defined
Bridge Workspace View
Superstructures
Culverts
Substructures
Description
Description (cont'd)
Alternatives
Global reference point
Traffic
Custom agency fields
Field
Value
City
Standard Template Used (DOT Field Only)
Version of Template Used (DOT Field Only)
Date Last Modified (User Field)
Last Modified By (User Field)
Comments on Modifications (User Field)
SEVEN
EIGHT
NINE
TEN
2nd and 3rd fields are to be updated by the DOT.
1st, 4th, 5th, and 6th fields are to be updated by the load rater.
Note: Blank for template bridges – info to be entered by load rater for individual bridges

APPENDIX B
Iowa DOT BrR Library Data File Settings

BrR Library Data: Appurtenances

Generic

Library	Units	Name	Description
Agency Defined	US Customary	Curb_8" H x 2'-1.5" W (6" Overhang)	Iowa DOT Standard curb with 6" overhang (Area 231.7 sq.in.)
Agency Defined	US Customary	ConcRail_3'-2" Aesthetic	Iowa DOT Aesthetic concrete railing
Agency Defined	US Customary	ConcRail_2'-8" Open (20" Block) C	Iowa DOT Standard Open Rail w/ 1'-8" top rail block height
Agency Defined	US Customary	ConcRail_2'-8" Open (19" Block) C	Iowa DOT Standard Open Rail w/ 1'-7" top rail block height
Agency Defined	US Customary	ConcRail_2'-5" Open (15" Block) C	Iowa DOT Standard Open Rail w/ 1'-3" top rail block height
Agency Defined	US Customary	ConcRail_2'-5" Open (19" Block) C	Iowa DOT Standard Open Rail w/ 1'-7" top rail block height
Agency Defined	US Customary	ConcRail_3'-6" Median Barrier	Iowa DOT Standard Median Rail
Agency Defined	US Customary	ConcRail_2'-10" Separation Barrier	Iowa DOT Standard Separation Barrier
Agency Defined	US Customary	ConcRail_2'-10" Aesthetic	Iowa DOT Aesthetic concrete railing w/ 3/4" panels
Agency Defined	US Customary	ConcRail_3'-6" Open (1'-1" Window)	Iowa DOT Standard Open Rail w/ 1'-1" windows

Median

Library	Units	Name	Description
Agency Defined	US Customary	ConcRail_2'-5" Temporary Barrier Rail	Iowa DOT Standard Temporary Barrier Rail

Parapet

Library	Units	Name	Description
Agency Defined	US Customary	Curb_10" H x 1'-3.5" W	Iowa DOT Standard curb
Agency Defined	US Customary	Curb_10" H x 1'-3" W	Iowa DOT Standard curb
Agency Defined	US Customary	Curb_10" H x 1'-1.5" W	Iowa DOT Standard curb
Agency Defined	US Customary	Curb_10" H x 1'-0" W (1.25" Slope Width)	Iowa DOT Standard curb
Agency Defined	US Customary	Curb_10" H x 1'-0" W (7/8" Slope Width)	Iowa DOT Standard curb
Agency Defined	US Customary	Curb_12" H x 1'-0" W (1.25" Slope Width)	Iowa DOT Standard curb
Agency Defined	US Customary	Curb_12" H x 1'-0" W (1.5" Slope Width)	Iowa DOT Standard curb
Agency Defined	US Customary	Curb_18" H x 1'-0" W	Iowa DOT Standard curb
Agency Defined	US Customary	Curb_18" H x 1'-1.5" W	Iowa DOT Standard curb
Agency Defined	US Customary	Curb_8" H x 9.5" W	Iowa DOT Standard curb
Agency Defined	US Customary	Curb_10" H x 11.25" W (3" Back Ext.)	Iowa DOT Standard curb with 6" x 3" back extension
Agency Defined	US Customary	Curb_11" H x 9.5" W (1" Back Ext.)	Iowa DOT Standard curb with 7" x 1" back extension
Agency Defined	US Customary	Curb_12" H x 9.5" W (1" Back Ext.)	Iowa DOT Standard curb with 7" x 1" back extension
Agency Defined	US Customary	Curb_9.5" H x 1'-11" W (11" Back Ext.)	Iowa DOT Standard curb with 9" x 11" back extension
Agency Defined	US Customary	Curb_10" H x 2'-0" W (9" Back Ext.)	Iowa DOT Standard curb with 9" x 9" back extension
Agency Defined	US Customary	ConcRail_2'-8" F-Shaped (8" W)	Iowa DOT Standard F-Shaped Barrier Rail w/ 8" top width
Agency Defined	US Customary	ConcRail_2'-10" F-Shaped (9.5" W)	Iowa DOT Standard F-Shaped Barrier Rail w/ 9.5" top width
Agency Defined	US Customary	ConcRail_2'-10" F-Shaped (7.75" W)	Iowa DOT Standard F-Shaped Barrier Rail w/ 7.75" top width
Agency Defined	US Customary	Curb_10" H x 2'-6.75" W (3" Back Ext.)	Iowa DOT Standard curb with 8" x 3" back extension
Agency Defined	US Customary	Curb_10" H x 3'-0.75" W (3" Back Ext.)	Iowa DOT Standard curb wtih 8" x 3" back extenstion
Agency Defined	US Customary	ConcRail_3'-8" F-Shaped (8.5" W)	Iowa DOT Standard F-Shaped Barrier Rail w/ 8.5" top width
Agency Defined	US Customary	ConcRail_2'-10" F-Shaped (3" Back Ext.)	Iowa DOT Standard F-Shaped Barrier Rail with 6" x 3" Back Extension
Agency Defined	US Customary	ConcRail_3'-6" F-Shaped (7" W)	Iowa DOT Standard F-Shaped Barrier Rail w/ 7" top width
Agency Defined	US Customary	ConcRail_3'-8" F-Shaped (6" Back Ribs)	Iowa DOT Standard Barrier Rail w/ 9.5" top width and three 6" ribs as additional load
Agency Defined	US Customary	Curb_10" H x 1'-0" W (3" Back Ext.)	Iowa DOT Standard curb with 6" x 3" back extension

Railing

Library	Units	Name	Description
Agency Defined	US Customary	SteelRail_Pedestrian Hand Rail	Iowa DOT Standard Pedestrian Hand Rail
Agency Defined	US Customary	MetalRail_Steel Railing	Iowa DOT generic steel railing [d]
Agency Defined	US Customary	ConcRail_1'-11" W-Beam Railing	Iowa DOT Side mounted concrete post with W-beam railing 6'-3" spacing
Agency Defined	US Customary	MetalRail_Aluminum Railing	Iowa DOT generic aluminum railing [d]

Notes:

[c] Concrete Open Rail loads are calculated using the most conservative post spacing. See Appendix C for additional details.

[d] Steel and aluminum bridge railings are defined as generic railings with a conservative railing load of 0.05 kip/ft and 0.03 kip/ft, respectively. Actual railing load can be calculated and keyed in for a more refined analysis if needed.

BrR Library Data: Materials

Concrete

Library	Units	Name	Description
Agency Defined	US Customary	PS Concrete (f'c=9ksi & f'ci=8ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=9ksi & f'ci=7.5ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=9.5ksi & f'ci=8ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=9.5ksi & f'ci=7.5ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=8ksi & f'ci=7ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=8.5ksi & f'ci=7.5ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=7ksi & f'ci=6ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=7.5ksi & f'ci=6ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=7.5ksi & f'ci=6.5ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=6ksi & f'ci=5ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=6ksi & f'ci=5.5ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=6.5ksi & f'ci=5.5ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=5ksi & f'ci=4.5ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=5.5ksi & f'ci=5ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=10ksi & f'ci=8ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=10ksi & f'ci=8.5ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	PS Concrete (f'c=10.5ksi & f'ci=8ksi)	Iowa DOT Prestressed concrete
Agency Defined	US Customary	f'c= 3000 psi	Iowa DOT 3000 psi Cement Concrete

Notes:

1. For other PS concrete strength combinations, the user can select any of the PS Concrete library items while in the Bridge Workspace, update the name, f'c & f'ci values, and click the "Compute" button to auto populate other material parameters. Updating the library item in the Bridge Workspace will not change the original properties of the library item.
2. Library item "f'c = 3000 psi" can also be updated as needed within the Bridge Workspace.

Reinforcing Steel

Library	Units	Name	Description
Agency Defined	US Customary	Up to 1905	Iowa DOT reinforcing steel built up to year 1905
Agency Defined	US Customary	1906 to 1944	Iowa DOT reinforcing steel built between year 1906 to year 1944
Agency Defined	US Customary	1945 to 1980	Iowa DOT reinforcing steel built between year 1945 to year 1980
Agency Defined	US Customary	Unknown Grade, After 1980 - 40 ksi	Iowa DOT reinforcing steel unknown grade built after year 1980 - 40 ksi
Agency Defined	US Customary	After 1980 - 60 ksi	Iowa DOT reinforcing steel built after year 1980 - 60 ksi

Structural Steel

Library	Units	Name	Description
Agency Defined	US Customary	ASTM A7 Steel (Up to 1934)	Iowa DOT ASTM A7 Steel built up to year 1934
Agency Defined	US Customary	ASTM A7 Steel (After 1934)	IowaDOT ASTM A7 Steel built after year 1934

BrR Library Data: Prestress Shapes

Box Beams – Rectangular Void

Library	Units	Name	Description	Year
Agency Defined	US Customary	IowaDOT_PPCBB_21Hx48W	IowaDOT Standards B24-16.pdf & B30-16.pdf Height: 21" Width: 48"	2016
Agency Defined	US Customary	IowaDOT_PPCBB_27Hx48W	IowaDOT Standards B24-16.pdf & B30-16.pdf Height: 27" Width: 48"	2016
Agency Defined	US Customary	IowaDOT_PPCBB_33Hx48W	IowaDOT Standards B24-16.pdf & B30-16.pdf Height: 33" Width: 48"	2016

I Beams – Narrow Top Flange

Library	Units	Name	Description	Year
Agency Defined	US Customary	IowaDOT_PPCIB_25Hx9TF	IowaDOT Standard H10 standards .pdf Height: 25" Width: Top flange: 9", Bottom flange: 16"	1954
Agency Defined	US Customary	IowaDOT_PPCIB_28Hx12TF	IowaDOT Standards H11 standards .pdf & PC_S.pdf Height: 28" Width: Top flange: 12", Bottom flange: 16"	1956
Agency Defined	US Customary	IowaDOT_PPCIB_35Hx12TF	IowaDOT Standards H11 standards .pdf & PC_S.pdf Height: 35" Width: Top flange: 12", Bottom flange: 16"	1956
Agency Defined	US Customary	IowaDOT_PPCIB_BeamA_32Hx13TF	IowaDOT Standards H12 standards .pdf, H13 standards .pdf, H14 standards .pdf, H15 sta... Height: 32" Width: Top flange: 13", Bottom flange: 17"	1960
Agency Defined	US Customary	IowaDOT_PPCIB_BeamB_39Hx13TF	IowaDOT Standards H12 standards .pdf, H13 standards .pdf, H14 standards .pdf, H15 sta... Height: 39" Width: Top flange: 13", Bottom flange: 17"	1960
Agency Defined	US Customary	IowaDOT_PPCIB_BeamC_45Hx13TF	IowaDOT Standards H12 standards .pdf, H13 standards .pdf, H14 standards .pdf, H15 sta... Height: 45" Width: Top flange: 13", Bottom flange: 17"	1960
Agency Defined	US Customary	IowaDOT_PPCIB_BeamA_32Hx15TF	IowaDOT Standards H15 standards .pdf, H16 standards .pdf, H24-84 standards .pdf, H24... Height: 32" Width: Top flange: 15", Bottom flange: 19"	1969
Agency Defined	US Customary	IowaDOT_PPCIB_BeamB_39Hx15TF	IowaDOT Standards H15 standards .pdf, H16 standards .pdf, H24-84 standards .pdf, H24... Height: 39" Width: Top flange: 15", Bottom flange: 19"	1969
Agency Defined	US Customary	IowaDOT_PPCIB_BeamC_45Hx15TF	IowaDOT Standards H15 standards .pdf, H16 standards .pdf, H24-84 standards .pdf, H24... Height: 45" Width: Top flange: 15", Bottom flange: 19"	1969
Agency Defined	US Customary	IowaDOT_PPCIB_BeamC_45Hx16TF	IowaDOT Standards H24-06 standards .pdf, H24-87 standards .pdf, , H24S-87 standards .... Height: 45" Width: Top flange: 16", Bottom flange: 20"	1987
Agency Defined	US Customary	IowaDOT_PPCIB_BeamA_32Hx16TF	IowaDOT Standards H24-87 standards .pdf, H24S-87 standards .pdf, H24SI-05 standards... Height: 32" Width: Top flange: 16", Bottom flange: 20"	1987
Agency Defined	US Customary	IowaDOT_PPCIB_BeamB_39Hx16TF	IowaDOT Standards H24-87 standards .pdf, H24S-87 standards .pdf, H24SI-05 standards... Height: 39" Width: Top flange: 16", Bottom flange: 20"	1987
Agency Defined	US Customary	IowaDOT_PPCIB_BeamD_54Hx20TF	IowaDOT Standards H24SI-05 standards .pdf, H30SI-05 standards .pdf, and H30SI-12 sta... Height: 54" Width: Top flange: 20", Bottom flange: 22"	2005

I Beams – Wide Top Flange

Library	Units	Name	Description	Year
Agency Defined	US Customary	IowaDOT_PPCBT_BeamC_45Hx34TF	Iowa DOT Bulb Tee "C" Beam Standard - Beams.pdf Height: 45" Width: Top Flange: 34", Bottom Flange: 30"	2025
Agency Defined	US Customary	IowaDOT_PPCBT_BeamD_54Hx34TF	Iowa DOT Bulb Tee "D" Beam Standard - Beams.pdf Height: 54" Width: Top Flange: 34", Bottom Flange: 30"	2025
Agency Defined	US Customary	IowaDOT_PPCBT_BeamB_36Hx34TF	Iowa DOT Bulb Tee "B" Beam Standard - Beams.pdf Height: 36" Width: Top Flange: 34", Bottom Flange: 30"	2025
Agency Defined	US Customary	IowaDOT_PPCBT_BeamE_63Hx34TF	Iowa DOT Bulb Tee "E" Beam Standard - Beams.pdf Height: 63" Width: Top Flange: 34", Bottom Flange: 30"	2025

Tee Beams

Library	Units	Name	Description	Year
Agency Defined	US Customary	IowaDOT_PPCDTB_25Hx96TF	IowaDOT Standard H17 standards .pdf Height: 25" Top Width: 96"	1973

BrR Library Data: Vehicles – Standard Gage

Library	Units	Name	Description
Agency Defined	US Customary	Type 4	Iowa DOT Legal Load - Straight Truck 54.5 Kips
Agency Defined	US Customary	Type 3S3A	Iowa DOT Legal Load - Truck + Semi Trailer 80 Kips
Agency Defined	US Customary	Type 3S3B	Iowa DOT Legal Load - Truck + Semi Trailer 90 Kips
Agency Defined	US Customary	Type 4S3	Iowa DOT Legal Load - Truck + Semi Trailer 96 Kips
Agency Defined	US Customary	Type 3-3 (Iowa DOT)	Iowa DOT Legal Load - Truck + Full Trailer 80 Kips
Agency Defined	US Customary	Type 5-2	Iowa DOT Legal Load - Truck + Full Trailer 96 Kips
Agency Defined	US Customary	90k Truck	Iowa DOT Annual Permit Truck 90 Kips - 6-Axle Vehicle
Agency Defined	US Customary	136k Truck "A"	Iowa DOT Annual Permit Truck 136 Kips - 7-Axle Truck with a Triple-Axle Configuration
Agency Defined	US Customary	136k Truck "B"	Iowa DOT Annual Permit Truck 136 Kips - 7-Axle Truck with a Quad-Axle Configuration
Agency Defined	US Customary	156k Truck	Iowa DOT Annual Permit Truck 156 Kips - 8-Axle Truck with a Quad-Axle Configuration
Agency Defined	US Customary	Quint Axle Crane Truck	Iowa DOT Annual Permit Truck 100 Kips - 5-Axle Truck with a Triple-Axle Configuration
Agency Defined	US Customary	Fluid Milk Truck	Iowa DOT Annual Permit Truck 96 Kips - 7-Axle Truck with a Six-Axle Configuration
Agency Defined	US Customary	Small Annual Crane Truck	Iowa DOT Annual Permit Truck 80 Kips - Triple-Axle Configuration
Agency Defined	US Customary	Type 4 Lane-Type [e]	Iowa DOT Legal Load Lane-Type - Straight Truck 40.875 Kips (0.75 Reduction)
Agency Defined	US Customary	Type 3S3A Lane-Type [e]	Iowa DOT Legal Load Lane-Type- Truck + Semi Trailer 60 Kips (0.75 Reduction)
Agency Defined	US Customary	Type 3-3 Lane-Type (Iowa DOT) [e]	Iowa DOT Legal Load Lane Type - Truck + Full Trailer 60 Kips (0.75 Reduction)
Agency Defined	US Customary	Type 3S3B Lane-Type [e]	Iowa DOT Legal Load Lane-Type - Truck + Semi Trailer 67.5 Kips (0.75 Reduction)
Agency Defined	US Customary	Type 4S3 Lane-Type [e]	Iowa DOT Legal Load Lane-Type - Truck + Semi Trailer 72 Kips (0.75 Reduction)
Agency Defined	US Customary	Type 5-2 Lane-Type [e]	Iowa DOT Legal Load Lane-Type - Truck + Full Trailer 72 Kips (0.75 Reduction)
Agency Defined	US Customary	Type 3 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 56.3 Kips
Agency Defined	US Customary	Type 4 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 61.3 Kips
Agency Defined	US Customary	SU4 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 60.8 Kips
Agency Defined	US Customary	SU5 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 69.8 Kips
Agency Defined	US Customary	SU6 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 78.2 Kips
Agency Defined	US Customary	SU7 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 87.2 Kips
Agency Defined	US Customary	Type 3S2 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 81 Kips
Agency Defined	US Customary	Type 3S3A OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 90 Kips
Agency Defined	US Customary	Type 3S3B OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 101.3 Kips
Agency Defined	US Customary	Type 4S3 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 108 Kips
Agency Defined	US Customary	Type 3-3 OW (Iowa DOT)	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 90 Kips
Agency Defined	US Customary	Type 5-2 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12.5% OW 108 Kips

Assumptions:

- Wheel contact width = P/0.8, where P = Wheel Load
- All added trucks have standard gage distance of 6 ft.

Notes:

[e] Vehicles for negative moments and reactions at interior supports, per AASHTO MBE 3rd Ed. 6A.4.4.2.1a.

APPENDIX C
Iowa DOT BrR Library Data: Curb and Railing

BrR Library File: Curb And Railing List

Total Items: 40 Items

Category	Name in BrR	BrR Status
Generic	Curb_8" H x 2'-1.5" W (6" Overhang)	Created
Generic	ConcRail_2'-10" Aesthetic	Created
Generic	ConcRail_3'-2" Aesthetic	Created
Generic	ConcRail_2'-8" Open (20" Block)	Created
Generic	ConcRail_2'-8" Open (19" Block)	Created
Generic	ConcRail_2'-5" Open (15" Block)	Created
Generic	ConcRail_2'-5" Open (19" Block)	Created
Generic	ConcRail_3'-6" Open (1'-1" Window)	Created
Generic	ConcRail_3'-6" Median Barrier	Created
Generic	ConcRail_2'-10" Separation Barrier	Created
Median	ConcRail_2'-5" Temporary Barrier Rail	Created
Parapet	Curb_10" H x 1'-3.5" W	Created
Parapet	Curb_10" H x 1'-3" W	Created
Parapet	Curb_10" H x 1'-1.5" W	Created
Parapet	Curb_10" H x 1'-0" W (1.25" Slope Width)	Created
Parapet	Curb_10" H x 1'-0" W (7/8" Slope Width)	Created
Parapet	Curb_12" H x 1'-0" W (1.25" Slope Width)	Created
Parapet	Curb_12" H x 1'-0" W (1.5" Slope Width)	Created
Parapet	Curb_18" H x 1'-0" W	Created
Parapet	Curb_18" H x 1'-1.5" W	Created
Parapet	Curb_8" H x 9.5" W	Created
Parapet	Curb_10" H x 11.25" W (3" Back Ext.)	Created
Parapet	Curb_11" H x 9.5" W (1" Back Ext.)	Created
Parapet	Curb_12" H x 9.5" W (1" Back Ext.)	Created
Parapet	Curb_10" H x 1'-0" W (3" Back Ext.)	Created
Parapet	Curb_9.5" H x 1'-11" W (11" Back Ext.)	Created
Parapet	Curb_10" H x 2'-0" W (9" Back Ext.)	Created
Parapet	Curb_10" H x 2'-6.75" W (3" Back Ext.)	Created
Parapet	Curb_10" H x 3'-0.75" W (3" Back Ext.)	Created
Parapet	ConcRail_2'-8" F-Shaped (8" W)	Created
Parapet	ConcRail_2'-10" F-Shaped (9.5" W)	Created
Parapet	ConcRail_2'-10" F-Shaped (7.75" W)	Created
Parapet	ConcRail_3'-8" F-Shaped (8.5" W)	Created
Parapet	ConcRail_2'-10" F-Shaped (3" Back Ext.)	Created
Parapet	ConcRail_3'-6" F-Shaped (7" W)	Created
Parapet	ConcRail_3'-8" F-Shaped (6" Back Ribs)	Created
Railing	SteelRail_Pedestrian Hand Rail	Created
Railing	MetalRail_Steel Railing	Created
Railing	MetalRail_Aluminum Railing	Created
Railing	ConcRail_1'-11" W-Beam Railing	Created

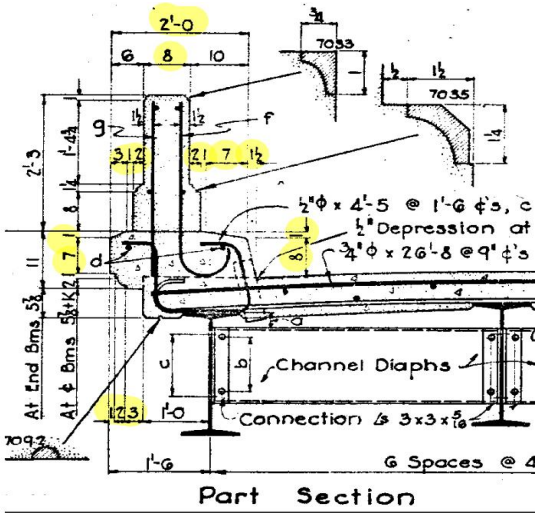
Name:	Curb_8" H x 2'-1.5" W (6" Overhang)	Category:	Generic	Page:	1 of 1

BrR Library Entry Name and Description

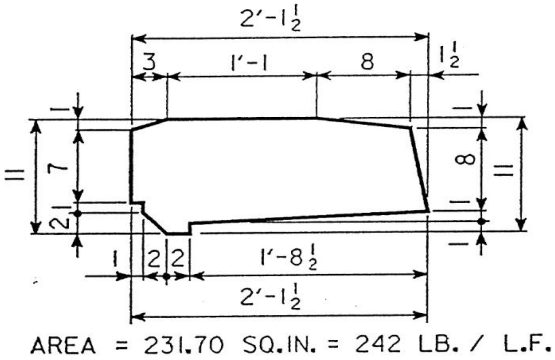
Agency Defined	US Customary	Curb_8" H x 2'-1.5" W (6" Overhang)	Iowa DOT Standard curb with 6" overhang (Area 231.7 sq.in.)

Iowa DOT Bridge Std:	H1A	J1A	J1B	V3

Clip from Bridge Standard V3



Provided by Iowa DOT



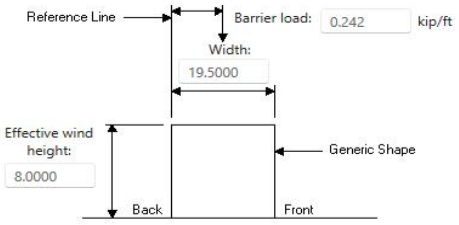
MBI Proposed BrR Library Entry

Name: Curb_8" H x 2'-1.5" W (6" Overhang)

Description: Iowa DOT Standard curb with 6" overhang (Area 231.7 sq.in.)

All dimensions are in inches

Distance from edge to centroid: 9.7500



Barrier Load Calculation

Provided by Iowa DOT

Area:	**231.7000**	sq. in
Barrier Load:	**0.2420**	k/ft

Comment: Railing load is not considered as part of the curb load calculations.

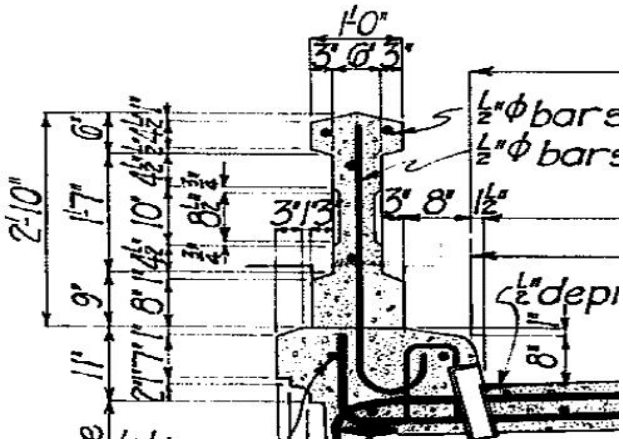
Name:	ConcRail_2'-10" Aesthetic	Category:	Generic	Page:	1 of 2

BrR Library Entry Name and Description

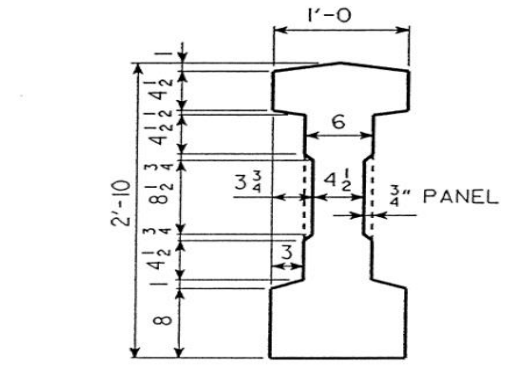
	Agency Defined	US Customary	ConcRail_2'-10" Aesthetic	Iowa DOT Aesthetic concrete railing w/ 3/4" panels

Iowa DOT Bridge Std:	J1-A	J1-B	V3	H1A

Clip from Bridge Standard J1



Provided by Iowa DOT



AREA = 269.83 SQ.IN. = 281 LB. / L.F.
WITH ¾" PANELS.

AREA = 283.56 SQ.IN. = 295 LB. / L.F.
WITH SOLID 6" WEB - NO ¾" PANELS.

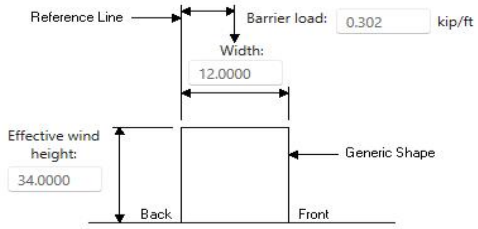
MBI Proposed BrR Library Entry

Name: ConcRail_2'-10" Aesthetic

Description: Iowa DOT Aesthetic concrete railing w/ 3/4" panels

All dimensions are in inches

Distance from edge to centroid: 6.0000



Name:	ConcRail_2'-10" Aesthetic	Category:	Generic	Page:	2 of 2

Barrier Load Calculation

From V3 Standards, for 16'-0" Clear Span

Conc. Unit Weight:	**0.1500**	kcf	
Barrier Load:	**0.2810**	k/ft	*w/ 3/4" Panels at web. Provided by Iowa DOT*
Length of Panel "A":	**3.6667**	ft	
Length of Panel "B":	**4.6667**	ft	
Barrier Load:	**0.2950**	k/ft	*6" solid web. Provided by Iowa DOT*
Length of Solid Barrier:	**1.0000**	ft	
Volume of Post:	**4.1967**	cft	*1'-2"x1'-2"x3'-1"*
Load of Post:	0.6295	kips	
Total Length:	18.1668	ft	
Total Load:	**0.3015**	**k/ft**	

Comment: Curb load is not considered as part of the railing load calculations. Concrete rail load is calculated based on V3 Standard, 16'-0" Clear Span. The layout and dimensions of panels and posts vary for different standards. The calculation of load can be modified as necessary for different standards.

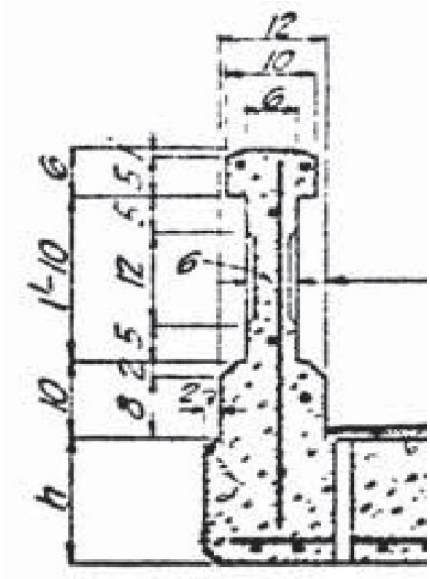
Name:	ConcRail_3'-2" Aesthetic	Category:	Generic	Page:	1 of 2

BrR Library Entry Name and Description

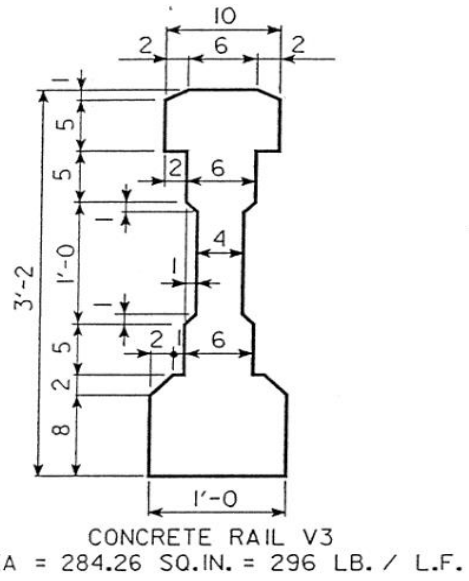
Agency Defined	US Customary	ConcRail_3'-2" Aesthetic	Iowa DOT Aesthetic concrete railing

Iowa DOT Bridge Std:	J1 V3

Clip from Bridge Standard J1

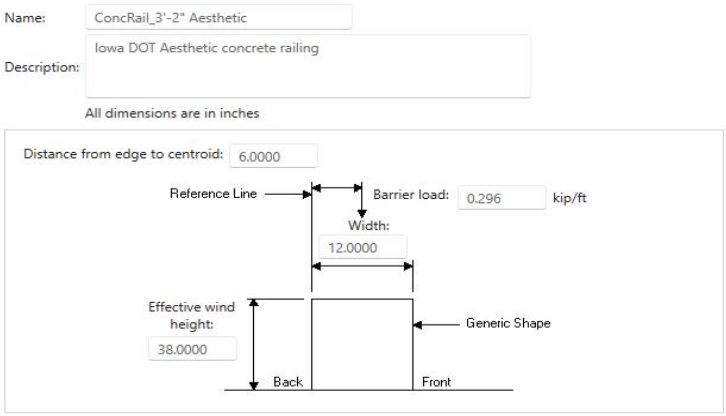


Provided by Iowa DOT



CONCRETE RAIL V3
AREA = 284.26 SQ.IN. = 296 LB. / L.F.

MBI Proposed BrR Library Entry



Name:	ConcRail_3'-2" Aesthetic	Category:	Generic	Page:	2 of 2

Barrier Load Calculation
Provided by Iowa DOT

Area:	**284.2600**	sq. in
Barrier Load:	**0.2960**	k/ft

Comment: Curb load is not considered as part of the railing load calculations.

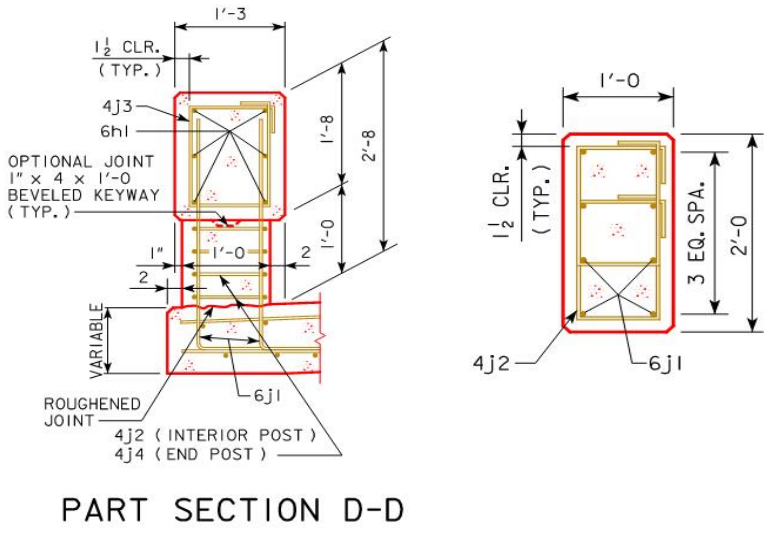
Name:	ConcRail_2'-8" Open (20" Block)	Category:	Generic	Page:	1 of 2

BrR Library Entry Name and Description

Agency Defined	US Customary	ConcRail_2'-8" Open (20" Block)	Iowa DOT Standard Open Rail w/ 1'-8" top rail block height

Iowa DOT Bridge Std:	H30-06	H30SI-12	H40-06	H40-14	H44-07	H44-14	J24-06	J30-06
	J40-06	J40-14	J44-06	J44-14				

Clip from Bridge Standard J40-06



PART SECTION D-D

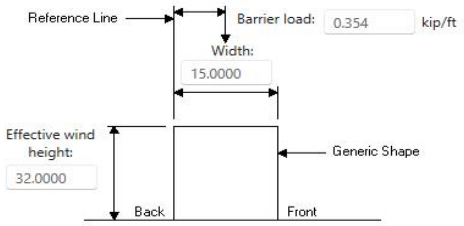
MBI Proposed BrR Library Entry

Name: ConcRail_2'-8" Open (20" Block)

Description: Iowa DOT Standard Open Rail w/ 1'-8" top rail block height

All dimensions are in inches

Distance from edge to centroid: 7.5000



Name:	ConcRail_2'-8" Open (20" Block)	Category:	Generic	Page:	2 of 2

Barrier Load Calculation

Conc. Unit Weight:	**0.1500**	kcf	
Top Rail block:			
Width:	**15.0000**	in	
Height:	**20.0000**	in	
Area:	2.083	sft	
Bottom Post block:			
Width:	**12.0000**	in	
Height:	**12.0000**	in	
Length:	**24.0000**	in	
Volume:	2.000	cft	
Post Spacing:	**7.3021**	ft	*Most conservative post spacing; J24-06*
Total Load:	**0.3536**	**klf**	

Comment: Concrete rail load is conservatively calculated based on J24-06 Standard, 7'-3 5/8" post spacing. The calculation of load can be modified as necessary for refined analysis.

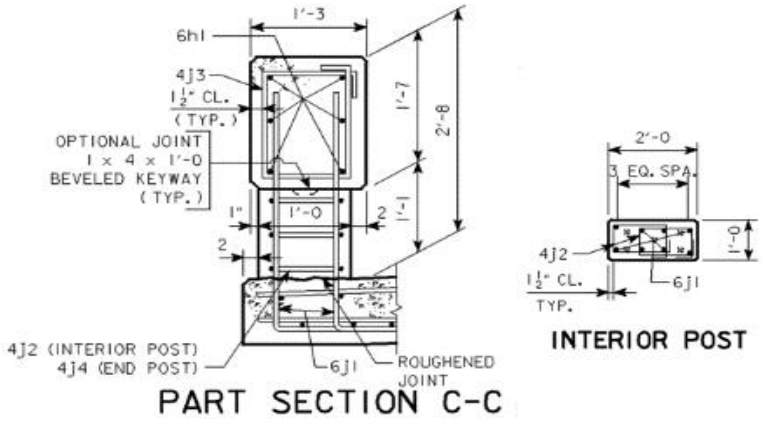
Name:	ConcRail_2'-8" Open (19" Block)	Category:	Generic	Page:	1 of 2

BrR Library Entry Name and Description

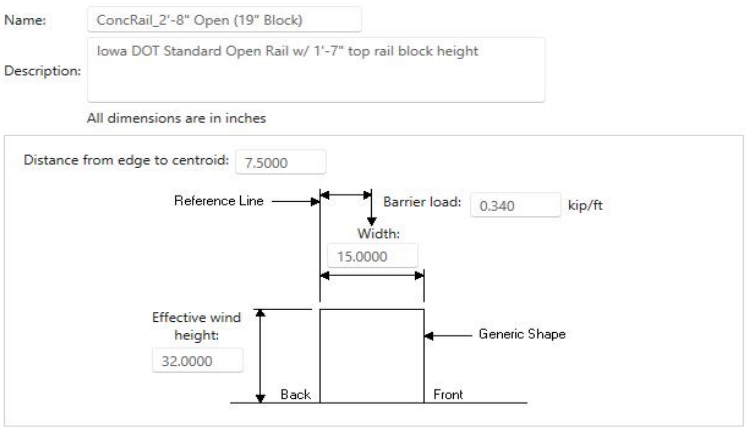
Agency Defined	US Customary	ConcRail_2'-8" Open (19" Block)	Iowa DOT Standard Open Rail w/ 1'-7" top rail block height

Iowa DOT Bridge Std:	H24-06

Clip from Bridge Standard H24-06



MBI Proposed BrR Library Entry



Name:	ConcRail_2'-8" Open (19" Block)	Category:	Generic	Page:	2 of 2

Barrier Load Calculation

Conc. Unit Weight:	**0.1500**	kcf	
Top Rail block:			
Width:	**15.0000**	in	
Height:	**19.0000**	in	
Area:	1.979	sft	
Bottom Post block:			
Width:	**12.0000**	in	
Height:	**13.0000**	in	
Length:	**24.0000**	in	
Volume:	2.167	cft	
Post Spacing:	**7.6250**	ft	*Most conservative post spacing; H24-06*
Total Load:	**0.3395**	**klf**	

Comment: Concrete rail load is conservatively calculated based on H24-06 Standard, 7'-7 1/2" post spacing. The calculation of load can be modified as necessary for refined analysis.

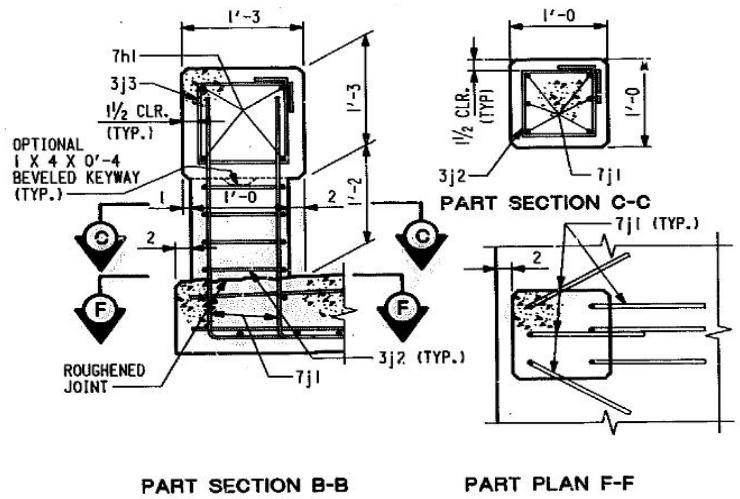
Name:	ConcRail 2'-5" Open (15" Block)	Category:	Generic	Page:	1 of 2

BrR Library Entry Name and Description

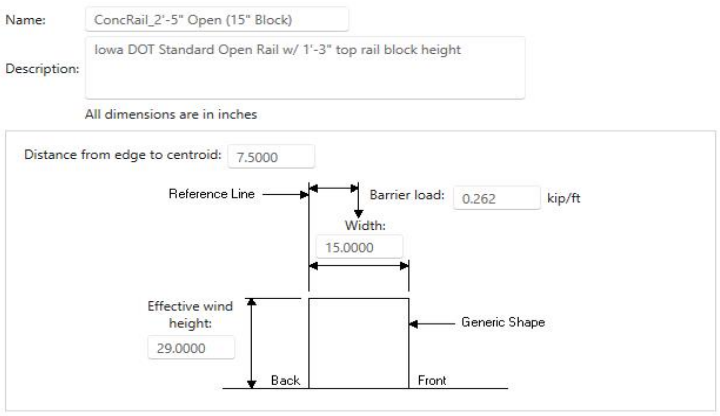
	Agency Defined	US Customary	ConcRail_2'-5" Open (15" Block)	Iowa DOT Standard Open Rail w/ 1'-3" top rail block height

Iowa DOT Bridge Std:	H24-84 H24S-85 J24-84

Clip from Bridge Standard H24-84



MBI Proposed BrR Library Entry



Name:	ConcRail 2'-5" Open (15" Block)	Category:	Generic	Page:	2 of 2

Barrier Load Calculation

Conc. Unit Weight:	**0.1500**	kcf	
Top Rail block:			
Width:	**15.0000**	in	
Height:	**15.0000**	in	
Area:	1.563	sft	
Bottom Post block:			
Width:	**12.0000**	in	
Height:	**14.0000**	in	
Length:	**12.0000**	in	
Volume:	1.167	cft	
Post Spacing:	**6.2917**	ft	*Most conservative post spacing; H24S-85*
Total Load:	**0.2622**	**klf**	

Comment: Concrete rail load is conservatively calculated based on H24S-85 Standard, 6'-3 1/2" post spacing. The calculation of load can be modified as necessary for refined analysis.

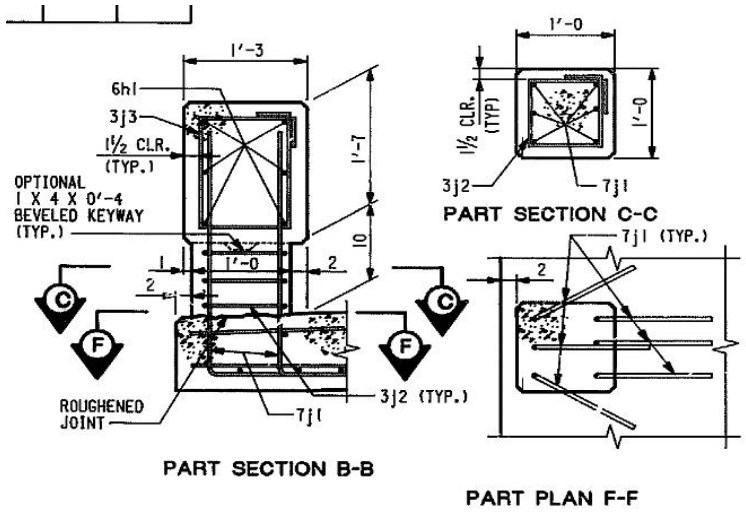
Name:	ConcRail 2'-5" Open (19" Block)	Category:	Generic	Page:	1 of 2

BrR Library Entry Name and Description

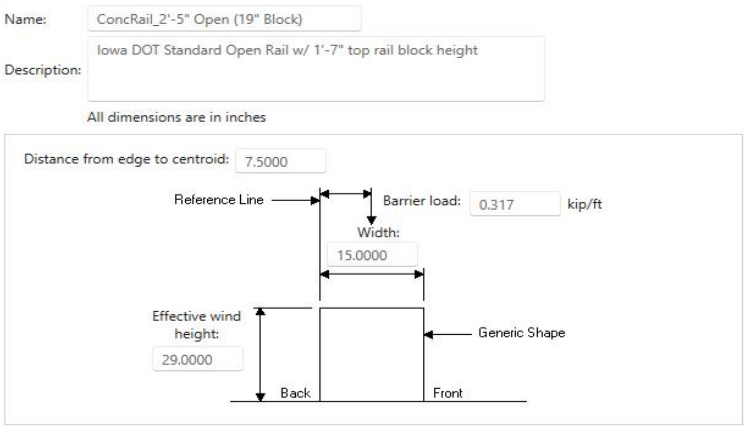
	Agency Defined	US Customary	ConcRail_2'-5" Open (19" Block)	Iowa DOT Standard Open Rail w/ 1'-7" top rail block height

Iowa DOT Bridge Std:	H24S-87	H24SI-05	H30-87	H30-94	H30SI-05	J30C-87

Clip from Bridge Standard H24S-87



MBI Proposed BrR Library Entry



Name:	ConcRail 2'-5" Open (19" Block)	Category:	Generic	Page:	2 of 2

Barrier Load Calculation

Conc. Unit Weight:	**0.1500**	kcf	
Top Rail block:			
Width:	**15.0000**	in	
Height:	**19.0000**	in	
Area:	1.979	sft	
Bottom Post block:			
Width:	**12.0000**	in	
Height:	**10.0000**	in	
Length:	**12.0000**	in	
Volume:	0.833	cft	
Post Spacing:	**6.2917**	ft	*Most conservative post spacing; H24S-87*
Total Load:	**0.3167**	**klf**	

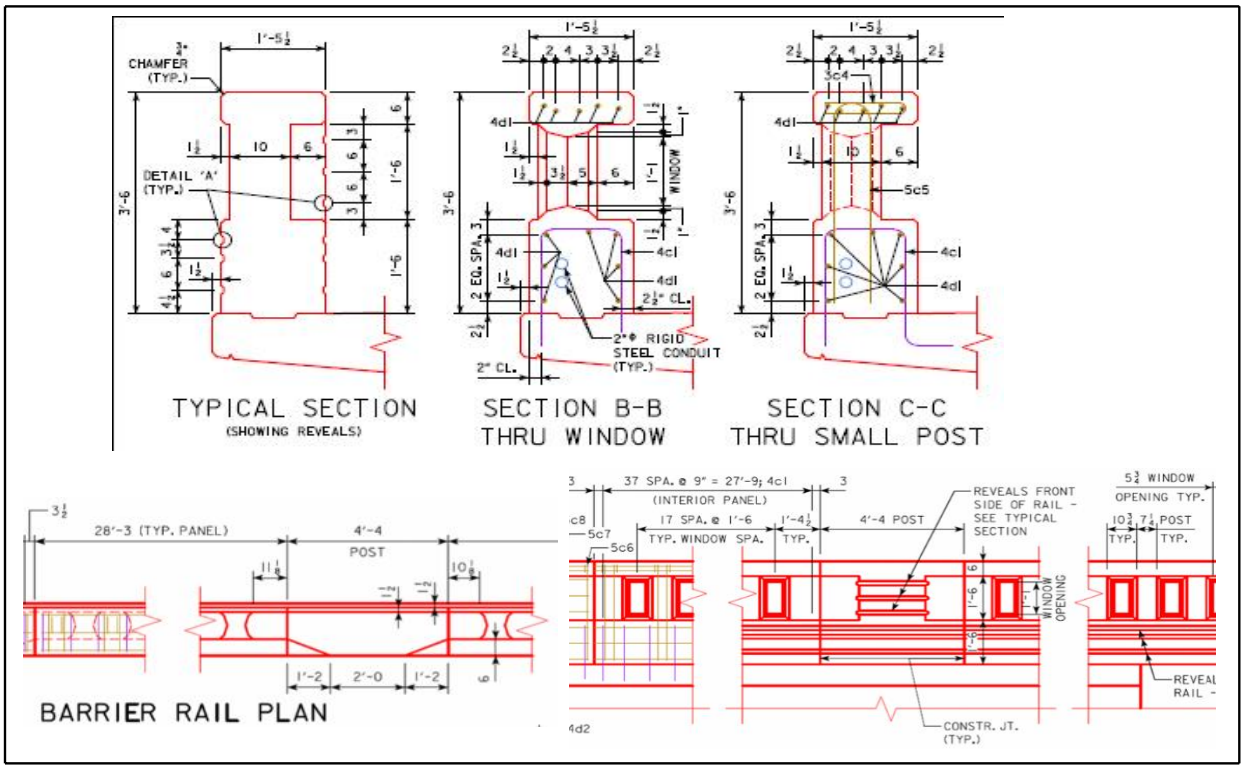
Comment: Concrete rail load is conservatively calculated based on H24S-85 Standard, 6'-3 1/2" post spacing. The calculation of load can be modified as necessary for refined analysis.

Name:	ConcRail 3'-6" Open (1'-1" Window)	Category:	Generic	Page:	1 of 2

BrR Library Entry Name and Description

	Agency Defined	US Customary	ConcRail_3'-6" Open (1'-1" Window)	Iowa DOT Standard Open Rail w/ 1'-1" windows

Iowa DOT Bridge Std:	



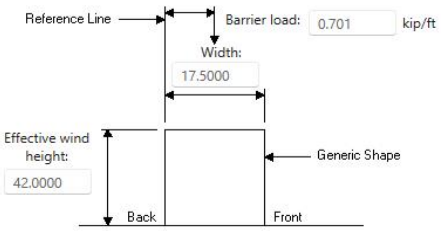
MBI Proposed BrR Library Entry

Name: ConcRail_3'-6" Open (1'-1" Window)

Description: Iowa DOT Standard Open Rail w/ 1'-1" windows

All dimensions are in inches

Distance from edge to centroid: 8.7500



Name:	ConcRail 3'-6" Open (1'-1" Window)	Category:	Generic	Page:	2 of 2

Barrier Load Calculation

Conc. Unit Weight:	**0.1500**	kcf	
Thru Small Post			
Top Rail Area:	**0.7292**	sft	
Mid Stem Area:	**1.2500**	sft	
Base Block Area:	**2.1875**	sft	
Length of Small Post:	**7.2500**	in	*Between windows*
Length of Small Post:	**1.3750**	ft	*At ends of panel*
Total Volume:	3.472	cft	
No. of Post:	**17.0000**	each	*Interior panel*
Small Post Load:	8.854	kips	
Thru Window			
Top Rail Area:	0.7292	sft	
Mid Stem Area:	1.2500	sft	
Window Area:	**0.9028**	sft	
Base Block Area:	2.1875	sft	
Length of Window:	**10.7500**	in	
Total Volume:	2.924	cft	
No. of Window Sections:	**18.0000**	each	*Interior panel*
Window Section Load:	7.895	kips	
Thru Post			
Top Rail Area:	0.7292	sft	
Narrow Section Stem Area:	1.2500	sft	*At ends*
Length:	**1.1667**	ft	
Full Section Stem Area:	**2.0000**	sft	*At center*
Length:	**2.0000**	ft	
Base Block Area:	2.1875	sft	
Length:	**1.1667**	ft	
Post Length:	4.3333	ft	*Interior panel Spacing*
Total Volume:	20.431	cft	
Post Load:	3.0646	kips	
Post Spacing:	**28.2500**	ft	
Total Load:	**0.7014**	**klf**	

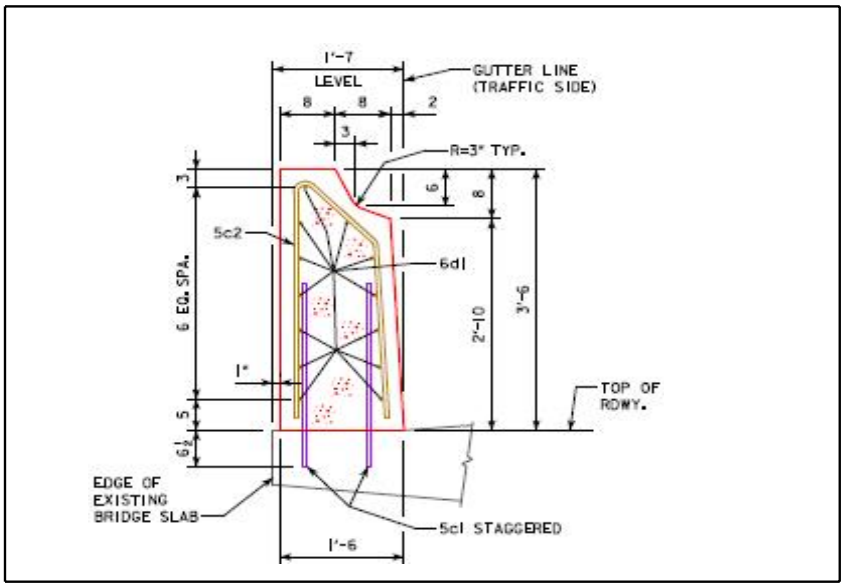
Comment: No associated standard found. Concrete rail details are provided by Iowa DOT.

Name:	ConcRail 3'-6" Median Barrier	Category:	Generic	Page:	1 of 2

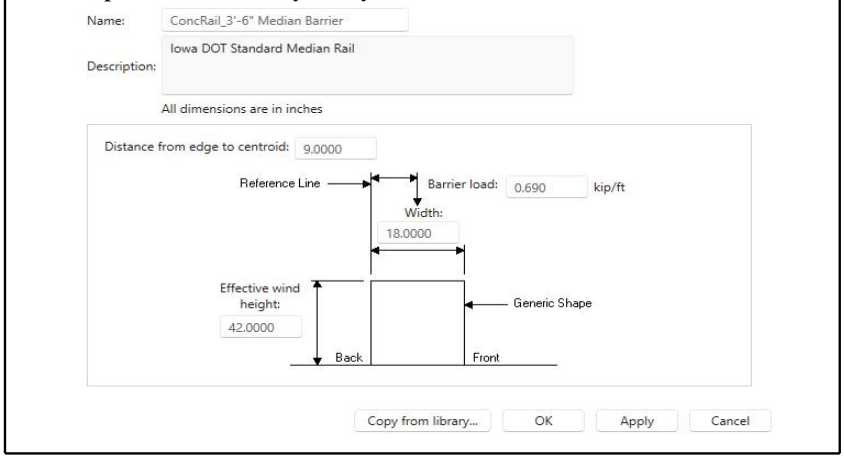
BrR Library Entry Name and Description

	Agency Defined	US Customary	ConcRail_3'-6" Median Barrier	Iowa DOT Standard Median Rail

Iowa DOT Bridge Std:	



MBI Proposed BrR Library Entry



Name:	ConcRail 3'-6" Median Barrier	Category:	Generic	Page:	2 of 2

Barrier Load Calculation

Area calculated using CAD

Conc. Unit Weight:	**0.1500**	kcf
Xsection Area:	**4.5972**	sft
Total Load:	**0.6896**	**klf**

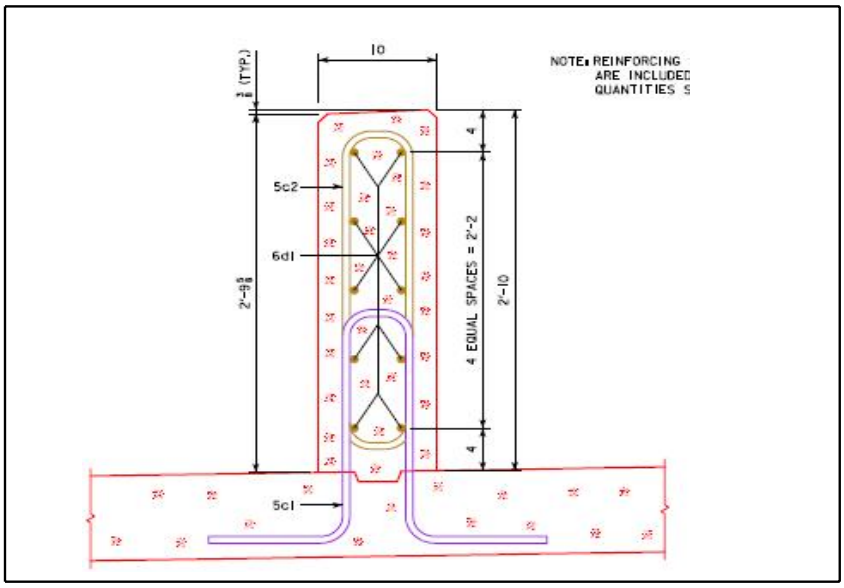
Comment: No associated standard found. Concrete rail details are provided by Iowa DOT.

Name:	ConcRail 2'-10" Separation Barrier	Category:	Generic	Page:	1 of 2

BrR Library Entry Name and Description

	Agency Defined	US Customary	ConcRail_2'-10" Separation Barrier	Iowa DOT Standard Separation Barrier

Iowa DOT Bridge Std:	



MBI Proposed BrR Library Entry

Name: ConcRail_2'-10" Separation Barrier

Description: Iowa DOT Standard Separation Barrier

All dimensions are in inches

Distance from edge to centroid: 5.0000

Reference Line

Barrier load: 0.354 kip/ft

Width: 10.0000

Effective wind height: 34.0000

Generic Shape

Back

Front

Name:	ConcRail 2'-10" Separation Barrier	Category:	Generic	Page:	2 of 2

Barrier Load Calculation

Conc. Unit Weight:	**0.1500**	kcf
Height:	**2.8333**	ft
Width:	**0.8333**	ft
Area:	2.3610	sft
Total Load:	**0.3541**	**klf**

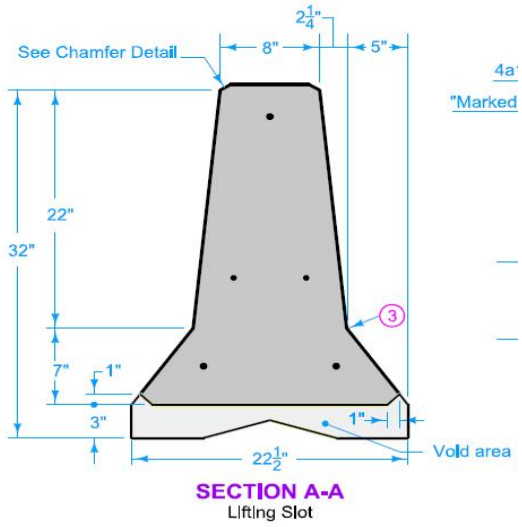
Comment: No associated standard found. Concrete rail details are provided by Iowa DOT.

Name:	ConcRail 2'-5" Temporary Barrier Rail	Category:	Median	Page:	1 of 1

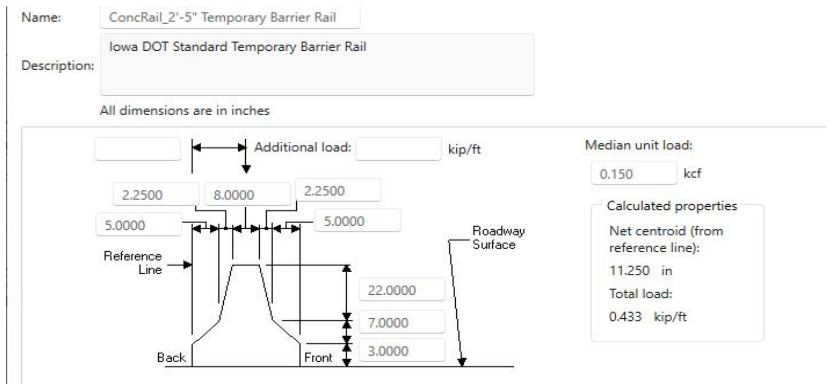
BrR Library Entry Name and Description

	Agency Defined	US Customary	ConcRail_2'-5" Temporary Barrier Rail	Iowa DOT Standard Temporary Barrier Rail

Iowa DOT Bridge Std:	



MBI Proposed BrR Library Entry



Barrier Load Calculation

Load calculated in BrR

Comment: No associated standard found. Concrete rail details are provided by Iowa DOT. Void area is calculated as solid per Iowa DOT.

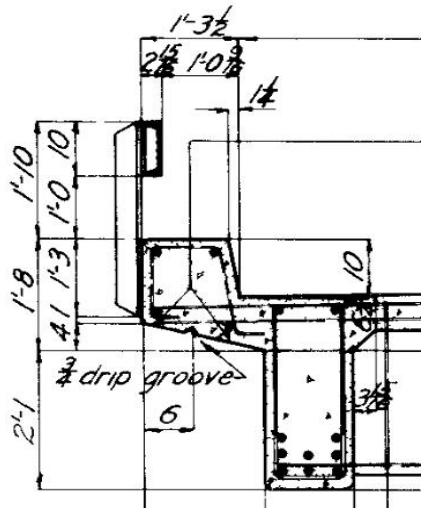
Name:	Curb_10" H x 1'-3.5" W	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

Agency Defined	US Customary	Curb_10" H x 1'-3.5" W	Iowa DOT Standard curb

Iowa DOT Bridge Std:	H1 H2

Clip from Bridge Standard H2

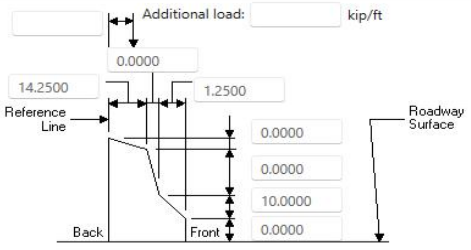


MBI Proposed BrR Library Entry

Name: Curb_10" H x 1'-3.5" W

Description: Iowa DOT Standard curb

All dimensions are in inches



Parapet unit load: 0.150 kcf

Calculated properties

Net centroid (from reference line): 7.442 in

Total load: 0.155 kip/ft

Barrier Load Calculation

Load calculated in BrR

Comment: Railing load is not considered as part of the curb load calculations.

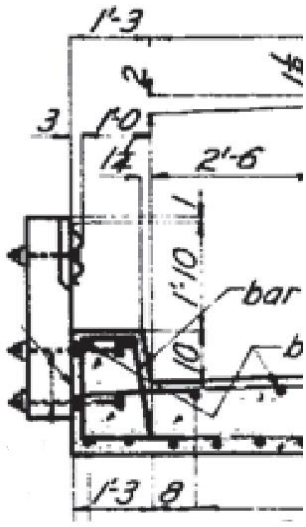
Name:	Curb_10" H x 1'-3" W	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

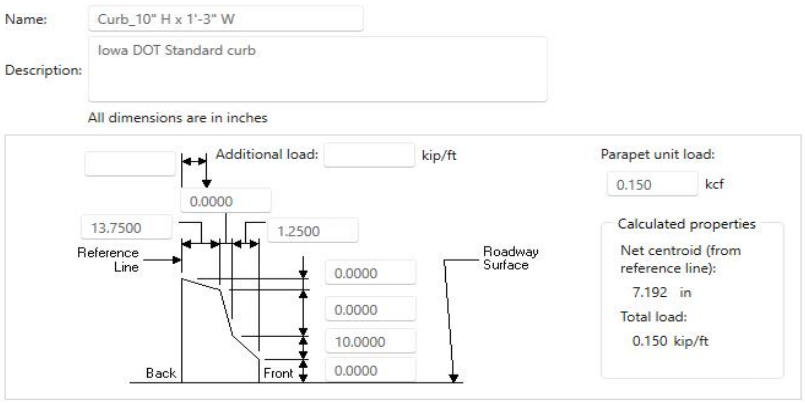
Agency Defined	US Customary	Curb_10" H x 1'-3" W	Iowa DOT Standard curb

Iowa DOT Bridge Std:	J3

Clip from Bridge Standard J3



MBI Proposed BrR Library Entry



Barrier Load Calculation
Load calculated in BrR

Comment: Railing load is not considered as part of the curb load calculations.

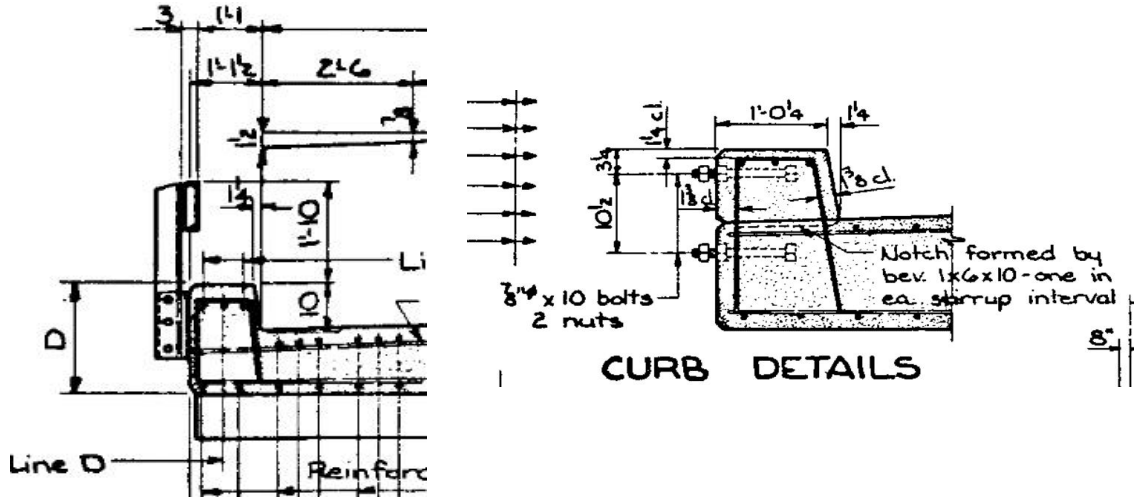
Name:	Curb_10" H x 1'-1.5" W	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

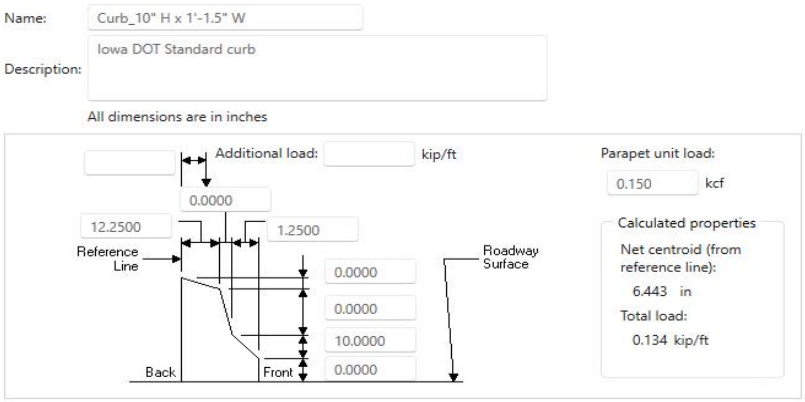
Agency Defined	US Customary	Curb_10" H x 1'-1.5" W	Iowa DOT Standard curb

Iowa DOT Bridge Std:	J3A	J4A	J5	J6

Clip from Bridge Standard J4A



MBI Proposed BrR Library Entry



Barrier Load Calculation
Load calculated in BrR

Comment: Railing load is not considered as part of the curb load calculations.

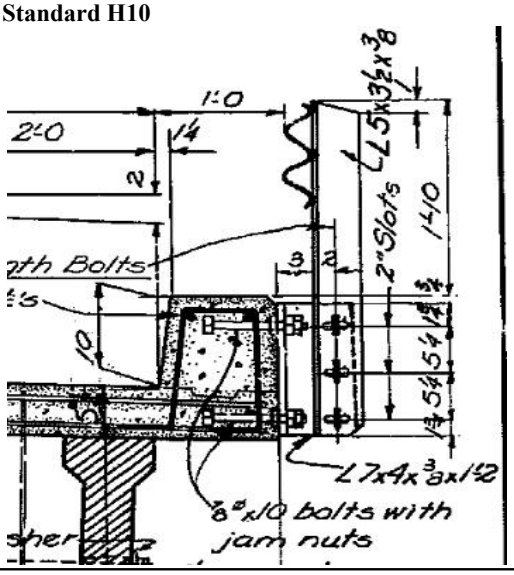
Name:	Curb_10" H x 1'-0" W (1.25" Slope Width)	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

Agency Defined	US Customary	Curb_10" H x 1'-0" W (1.25" Slope Width)	Iowa DOT Standard curb

Iowa DOT Bridge Std:	H10	H11	H12	H16	J10	PC-S	V10 & V10A
	V11	V12	V9 & V9A				

Clip from Bridge Standard H10

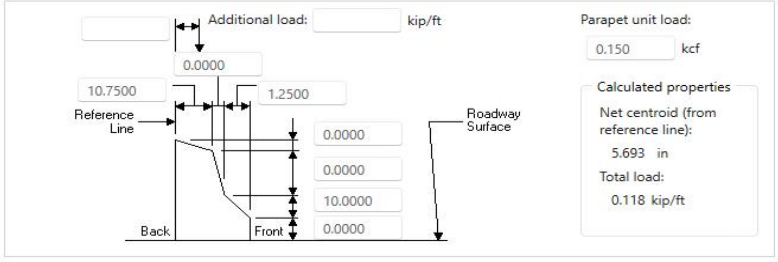


MBI Proposed BrR Library Entry

Name: Curb_10" H x 1'-0" W (1.25" Slope Width

Description: Iowa DOT Standard curb

All dimensions are in inches



Barrier Load Calculation

Load calculated in BrR

Comment: Railing load is not considered as part of the curb load calculations.

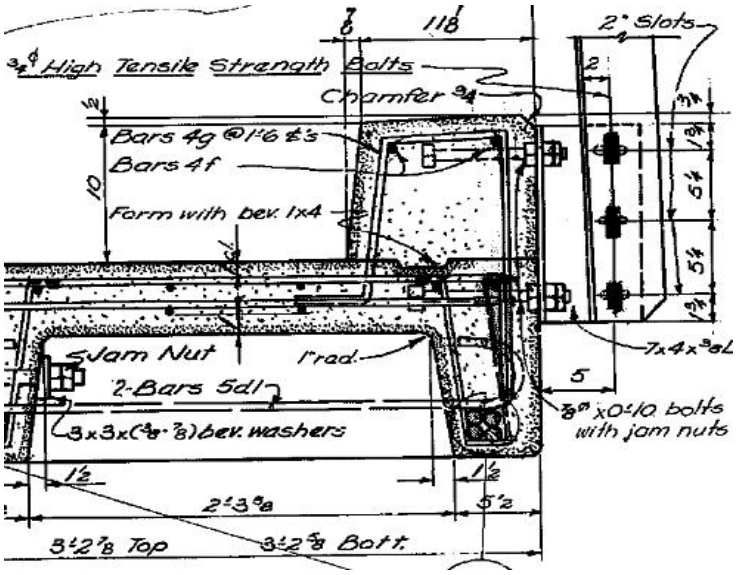
Name:	Curb_10" H x 1'-0" W (7/8" Slope Width)	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

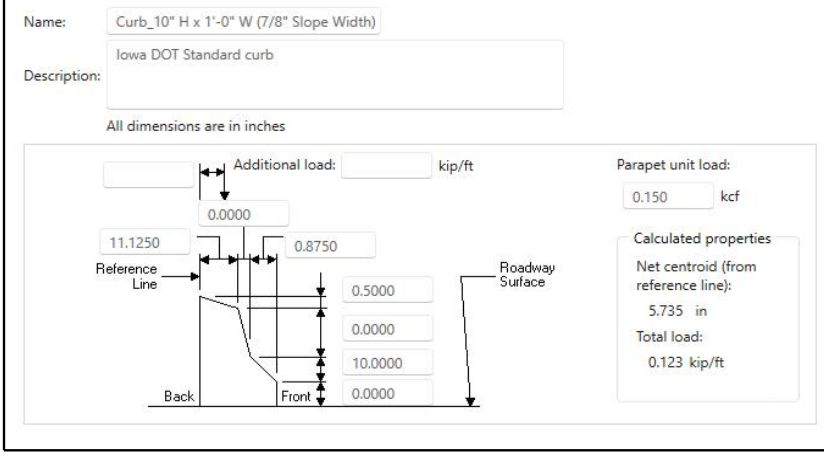
Agency Defined	US Customary	Curb_10" H x 1'-0" W (7/8" Slope Width)	Iowa DOT Standard curb

Iowa DOT Bridge Std:	J10

Clip from Bridge Standard J10



MBI Proposed BrR Library Entry



Barrier Load Calculation
Load calculated in BrR

Comment: Railing load is not considered as part of the curb load calculations.

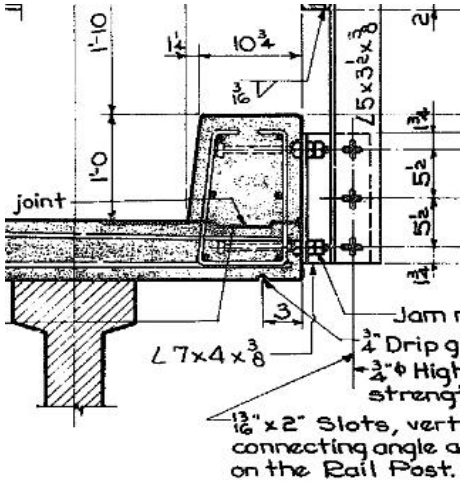
Name:	Curb_12" H x 1'-0" W (1.25" Slope Width)	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

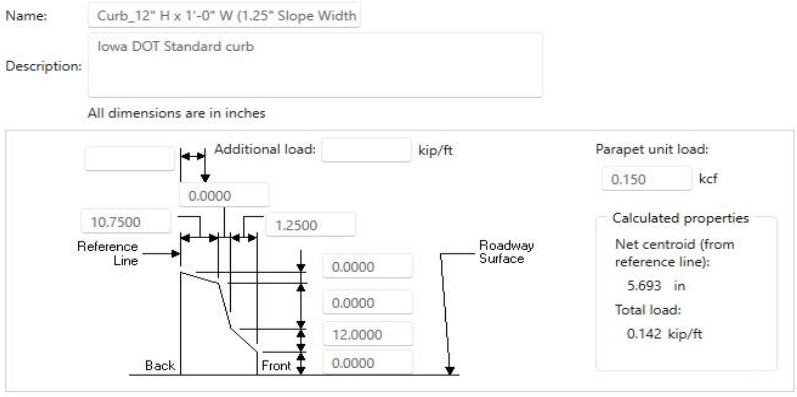
Agency Defined	US Customary	Curb_12" H x 1'-0" W (1.25" Slope Width)	Iowa DOT Standard curb

Iowa DOT Bridge Std:							
H12	H13	H14	H15	H16	H17	J15	J16
J7	J8	V10 & V10A		V11	V12	V13	V14
V16	V9 & V9A						

Clip from Bridge Standard J3A



MBI Proposed BrR Library Entry



Barrier Load Calculation
Load calculated in BrR

Comment: Railing load is not considered as part of the curb load calculations.

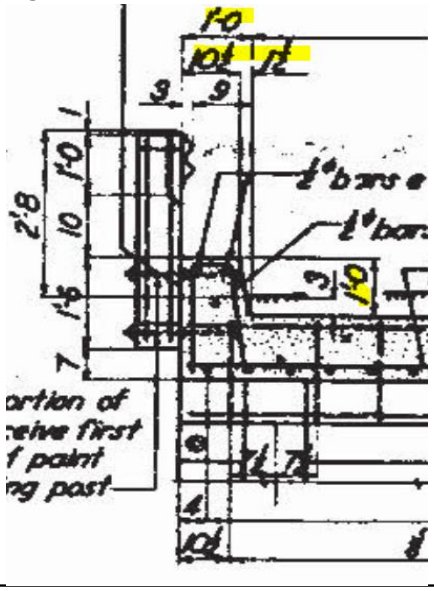
Name:	Curb_12" H x 1'-0" W (1.5" Slope Width)	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

Agency Defined	US Customary	Curb_12" H x 1'-0" W (1.5" Slope Width)	Iowa DOT Standard curb

Iowa DOT Bridge Std:	J2

Clip from Bridge Standard J2

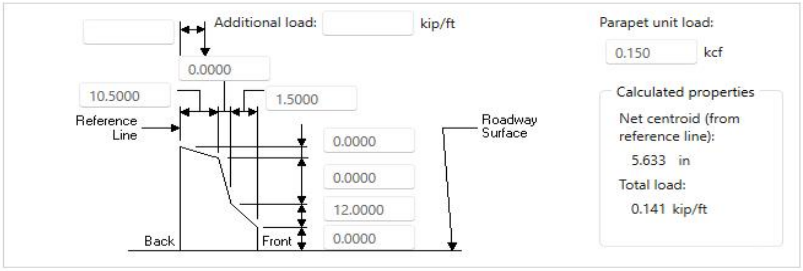


MBI Proposed BrR Library Entry

Name: Curb_12" H x 1'-0" W (1.5" Slope Width)

Description: Iowa DOT Standard curb

All dimensions are in inches



Barrier Load Calculation

Load calculated in BrR

Comment: Railing load is not considered as part of the curb load calculations.

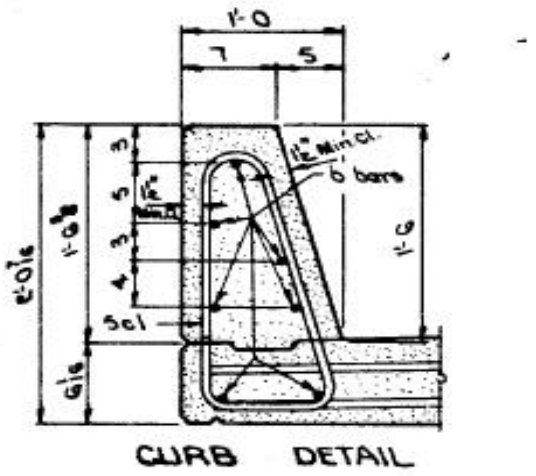
Name:	Curb_18" H x 1'-0" W	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

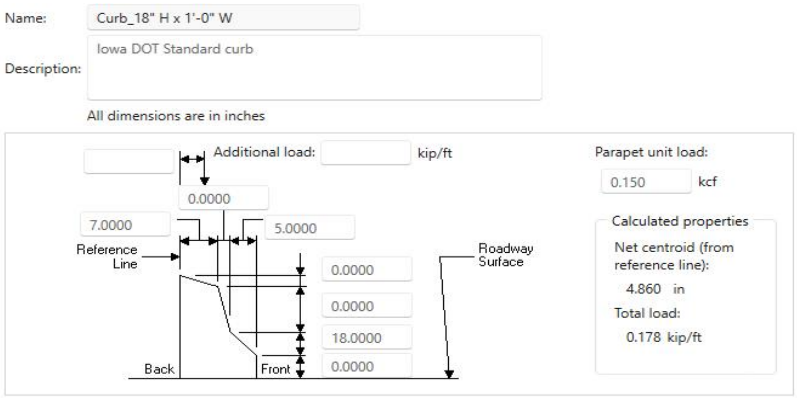
Agency Defined	US Customary	Curb_18" H x 1'-0" W	Iowa DOT Standard curb

Iowa DOT Bridge Std:	H13	H14	H15	J7	J8	J15	V12	V14

Clip from Bridge Standard H13



MBI Proposed BrR Library Entry



Barrier Load Calculation
Load calculated in BrR

Comment:

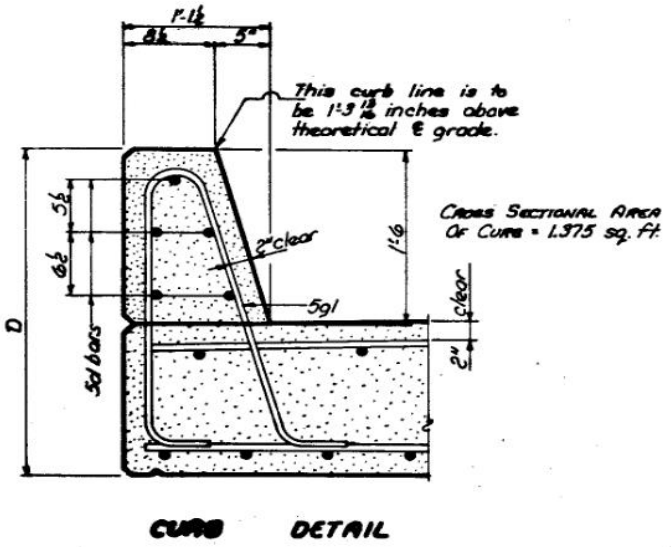
Name:	Curb_18" H x 1'-1.5" W	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

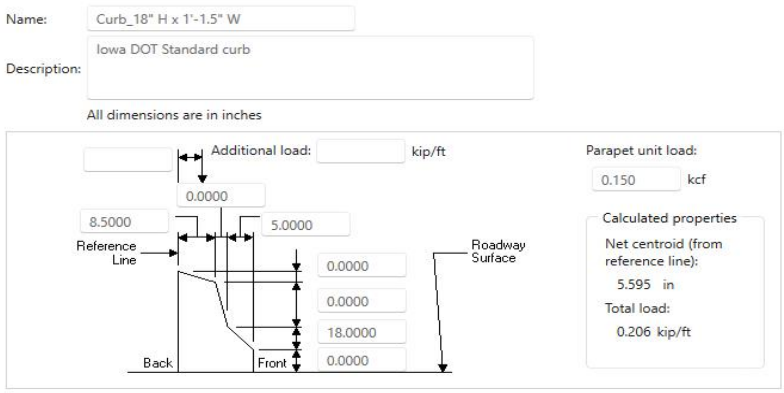
	Agency Defined	US Customary	Curb_18" H x 1'-1.5" W	Iowa DOT Standard curb

Iowa DOT Bridge Std:	J5 J6

Clip from Bridge Standard J5



MBI Proposed BrR Library Entry



Barrier Load Calculation
Load calculated in BrR

Comment:

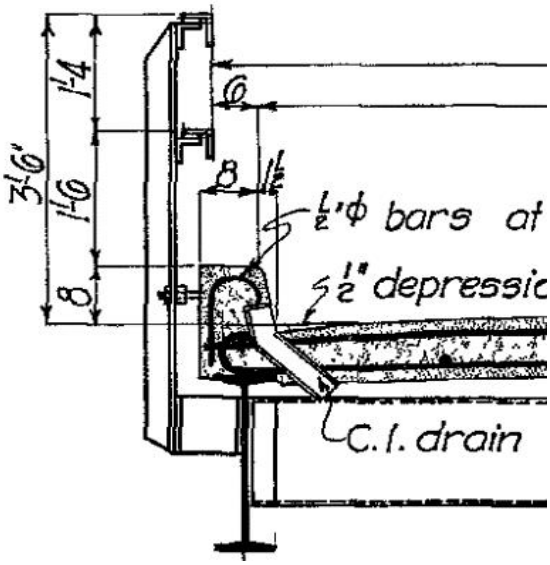
Name:	Curb_8" H x 9.5" W	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

Agency Defined	US Customary	Curb_8" H x 9.5" W	Iowa DOT Standard curb

Iowa DOT Bridge Std:	V1B V2B V4B U Series

Clip from Bridge Standard V1

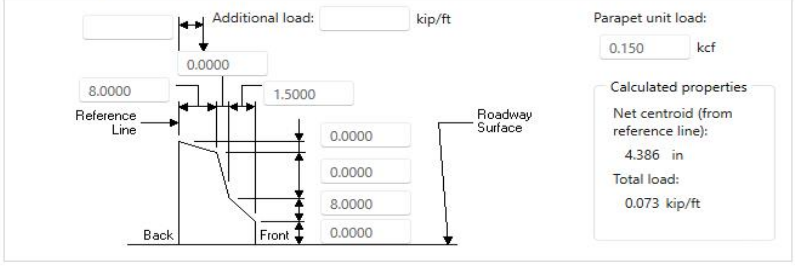


MBI Proposed BrR Library Entry

Name: Curb_8" H x 9.5" W

Description: Iowa DOT Standard curb

All dimensions are in inches



Barrier Load Calculation
Load calculated in BrR

Comment: Railing load is not considered as part of the curb load calculations.

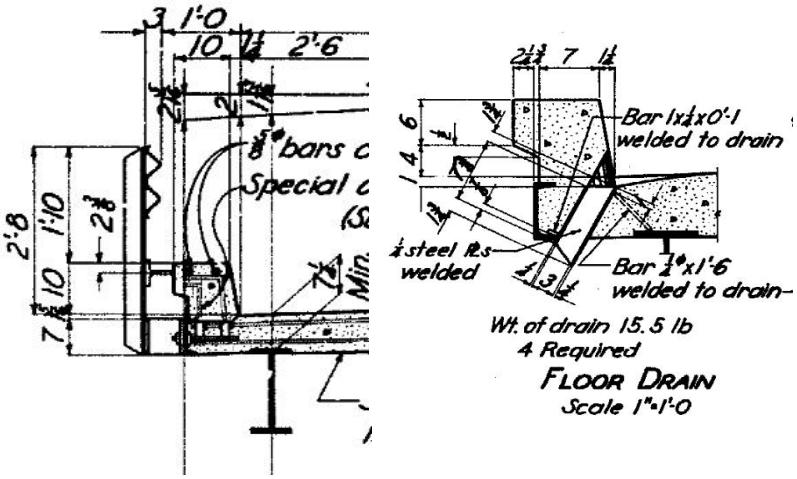
Name:	Curb_10" H x 11.25" W (3" Back Ext.)	Category:	Parapet	Page:	1 of 2

BrR Library Entry Name and Description

Agency Defined	US Customary	Curb_10" H x 11.25" W (3" Back Ext.)	Iowa DOT Standard curb with 6" x 3" back extension

Iowa DOT Bridge Std:	V7	V9 & V9A	V10 & V10A

Clip from Bridge Standard V9

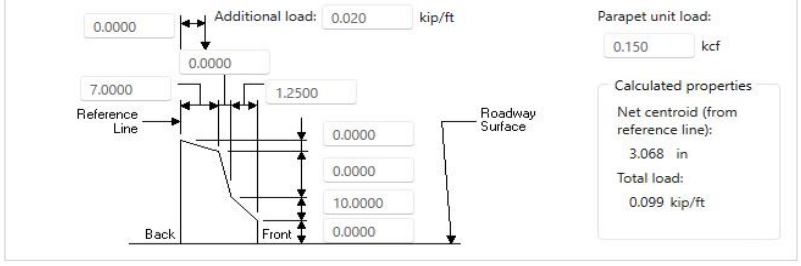


MBI Proposed BrR Library Entry

Name: Curb_10" H x 11.25" W (3" Back Ext.)

Description: Iowa DOT Standard curb with 6" x 3" back extension

All dimensions are in inches



Name:	Curb_10" H x 11.25" W (3" Back Ext.)	Category:	Parapet	Page:	2 of 2

Barrier Load Calculation

Back Extension load calculation:

Conc. Unit Weight:	**0.1500**	kcf
Width:	**3.0000**	in
Height:	**6.0000**	in
Chamfer Height:	**0.5000**	in
Area:	0.1302	sft
Additional Load:	**0.0195**	**klf**

Comment: Railing load is not considered as part of the curb load calculations.

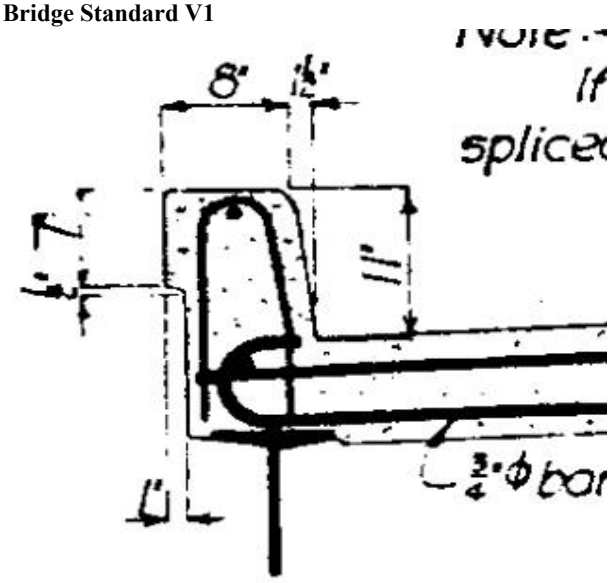
Name:	Curb_11" H x 9.5" W (1" Back Ext.)	Category:	Parapet	Page:	1 of 2

BrR Library Entry Name and Description

	Agency Defined	US Customary	Curb_11" H x 9.5" W (1" Back Ext.)	Iowa DOT Standard curb with 7" x 1" back extension

Iowa DOT Bridge Std:	V1A S Series W Series

Clip from Bridge Standard V1

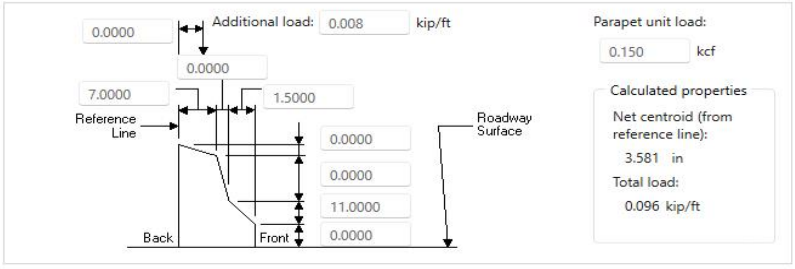


MBI Proposed BrR Library Entry

Name: Curb_11" H x 9.5" W (1" Back Ext.)

Description: Iowa DOT Standard curb with 7" x 1" back extension

All dimensions are in inches



Name:	Curb_11" H x 9.5" W (1" Back Ext.)	Category:	Parapet	Page:	2 of 2

Barrier Load Calculation

Back Extension load calculation:

Conc. Unit Weight:	**0.1500**	kcf
Width:	**1.0000**	in
Height:	**7.0000**	in
Chamfer Height:	**0.5000**	in
Area:	0.0503	sft
Additional Load:	**0.0076**	**klf**

Comment:

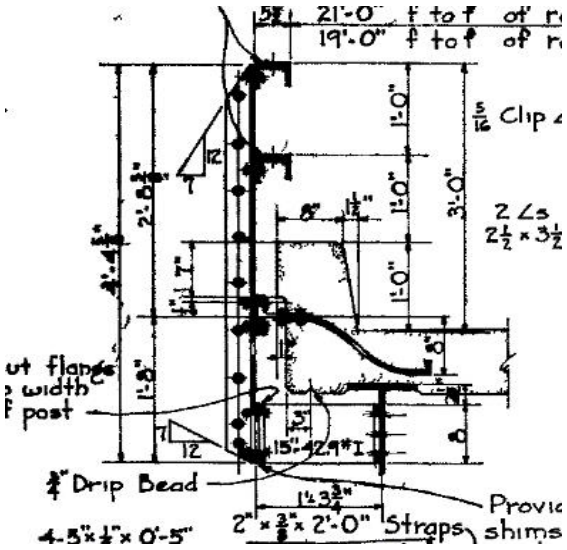
Name:	Curb_12" H x 9.5" W (1" Back Ext.)	Category:	Parapet	Page:	1 of 2

BrR Library Entry Name and Description

Agency Defined	US Customary	Curb_12" H x 9.5" W (1" Back Ext.)	Iowa DOT Standard curb with 7" x 1" back extension

Iowa DOT Bridge Std:	V5B	V6	V7	V8

Clip from Bridge Standard V5B

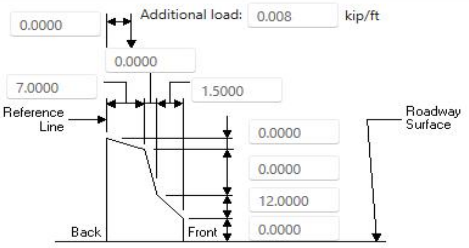


MBI Proposed BrR Library Entry

Name: Curb_12" H x 9.5" W (1" Back Ext.)

Description: Iowa DOT Standard curb with 7" x 1" back extension

All dimensions are in inches



Parapet unit load: 0.150 kcf

Calculated properties

Net centroid (from reference line): 3.604 in

Total load: 0.104 kip/ft

Name:	Curb_12" H x 9.5" W (1" Back Ext.)	Category:	Parapet	Page:	2 of 2

Barrier Load Calculation

Back Extension load calculation:

Conc. Unit Weight:	**0.1500**	kcf
Width:	**1.0000**	in
Height:	**7.0000**	in
Chamfer Height:	**0.5000**	in
Area:	0.0503	sft
Additional Load:	**0.0076**	**klf**

Comment: Railing load is not considered as part of the curb load calculations.

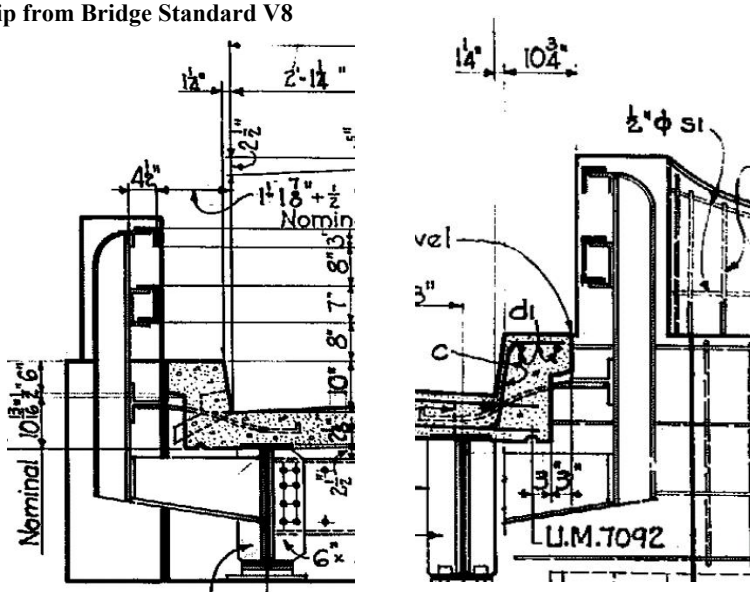
Name:	Curb_10" H x 1'-0" W (3" Back Ext.)	Category:	Parapet	Page:	1 of 2

BrR Library Entry Name and Description

	Agency Defined	US Customary	Curb_10" H x 1'-0" W (3" Back Ext.)	Iowa DOT Standard curb with 6" x 3" back extension

Iowa DOT Bridge Std:	V8

Clip from Bridge Standard V8

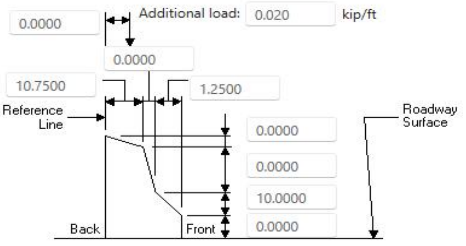


MBI Proposed BrR Library Entry

Name: Curb_10" H x 1'-0" W (3" Back Ext.)

Description: Iowa DOT Standard curb with 6" x 3" back extension

All dimensions are in inches



Parapet unit load: 0.150 kcf

Calculated properties

Net centroid (from reference line): 4.889 in

Total load: 0.138 kip/ft

Name:	Curb_10" H x 1'-0" W (3" Back Ext.)	Category:	Parapet	Page:	2 of 2

Barrier Load Calculation

Back Extension load calculation:

Conc. Unit Weight:	**0.1500**	kcf
Width:	**3.0000**	in
Height:	**6.0000**	in
Chamfer Height:	**0.5000**	in
Area:	0.1302	sft
Additional Load:	**0.0195**	**klf**

Comment: Railing load is not considered as part of the curb load calculations.

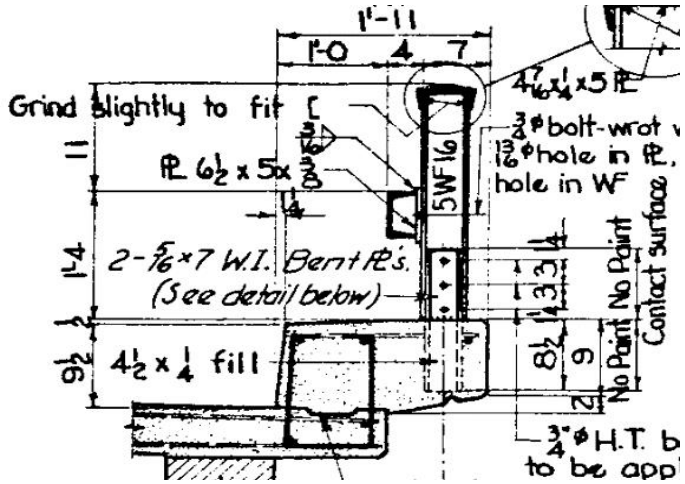
Name:	Curb_9.5" H x 1'-11" W (11" Back Ext.)	Category:	Parapet	Page:	1 of 2

BrR Library Entry Name and Description

Agency Defined	US Customary	Curb_9.5" H x 1'-11" W (11" Back Ext.)	Iowa DOT Standard curb with 9" x 11" back extension

Iowa DOT Bridge Std:	H11

Clip from Bridge Standard H11

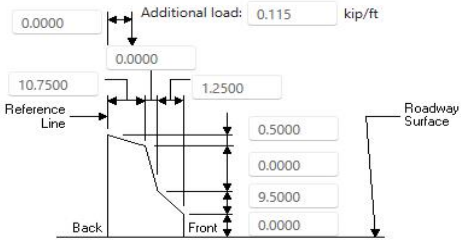


MBI Proposed BrR Library Entry

Name: Curb_9.5" H x 1'-11" W (11" Back Ext.)

Description: Iowa DOT Standard curb with 9" x 11" back extension

All dimensions are in inches



Parapet unit load: 0.150 kcf

Calculated properties

Net centroid (from reference line): 2.830 in

Total load: 0.230 kip/ft

Name:	Curb_9.5" H x 1'-11" W (11" Back Ext.)	Category:	Parapet	Page:	2 of 2

Barrier Load Calculation

Back Extension load calculation:

Conc. Unit Weight:	**0.1500**	kcf
Width:	**11.0000**	in
Height:	**9.0000**	in
Chamfer Height:	**2.0000**	in
Area:	0.7639	sft
Additional Load:	**0.1146**	**klf**

Comment: Railing load is not considered as part of the curb load calculations.

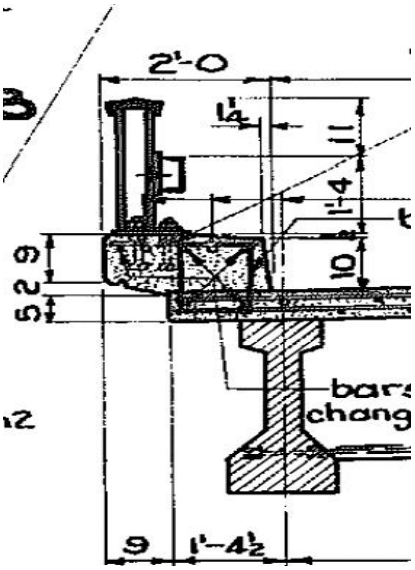
Name:	Curb_10" H x 2'-0" W (9" Back Ext.)	Category:	Parapet	Page:	1 of 2

BrR Library Entry Name and Description

Agency Defined	US Customary	Curb_10" H x 2'-0" W (9" Back Ext.)	Iowa DOT Standard curb with 9" x 9" back extension

Iowa DOT Bridge Std:	PC_S

Clip from Bridge Standard PC_S

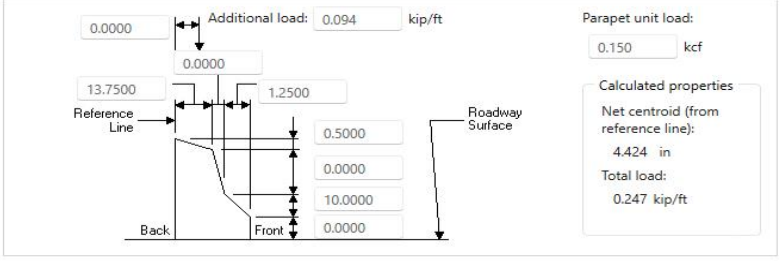


MBI Proposed BrR Library Entry

Name: Curb_10" H x 2'-0" W (9" Back Ext.)

Description: Iowa DOT Standard curb with 9" x 9" back extension

All dimensions are in inches



Name:	Curb_10" H x 2'-0" W (9" Back Ext.)	Category:	Parapet	Page:	2 of 2

Barrier Load Calculation

Back Extension load calculation:

Conc. Unit Weight:	**0.1500**	kcf
Width:	**9.0000**	in
Height:	**9.0000**	in
Chamfer Height:	**2.0000**	in
Area:	0.6250	sft
Additional Load:	**0.0938**	**klf**

Comment: Railing load is not considered as part of the curb load calculations.

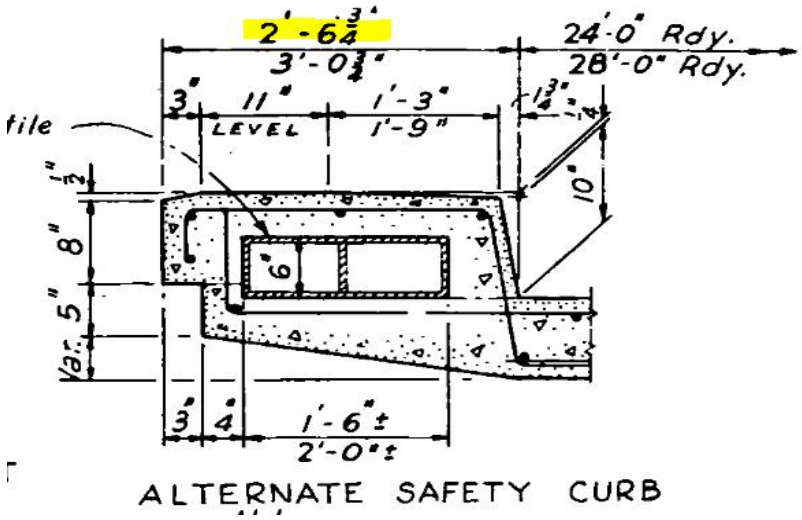
Name:	Curb_10" H x 2'-6.75" W (3" Back Ext.)	Category:	Parapet	Page:	1 of 2

BrR Library Entry Name and Description

	Agency Defined	US Customary	Curb_10" H x 2'-6.75" W (3" Back Ext.)	Iowa DOT Standard curb with 8" x 3" back extension

Iowa DOT Bridge Std:	Z Series

Clip from Bridge Standard Z Series

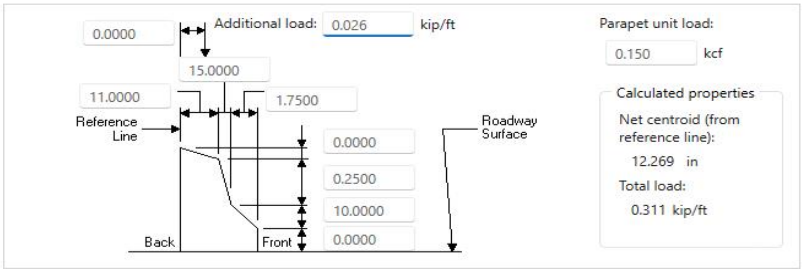


MBI Proposed BrR Library Entry

Name: Curb_10" H x 2'-6.75" W (3" Back Ext.)

Description: Iowa DOT Standard curb with 8" x 3" back extension

All dimensions are in inches



Name:	Curb_10" H x 2'-6.75" W (3" Back Ext.)	Category:	Parapet	Page:	2 of 2

Barrier Load Calculation

Back Extension load calculation:

Conc. Unit Weight:	**0.1500**	kcf
Width:	**3.0000**	in
Height:	**8.0000**	in
Chamfer Height:	**0.5000**	in
Area:	0.1719	sft
Additional Load:	**0.0258**	**klf**

Comment:

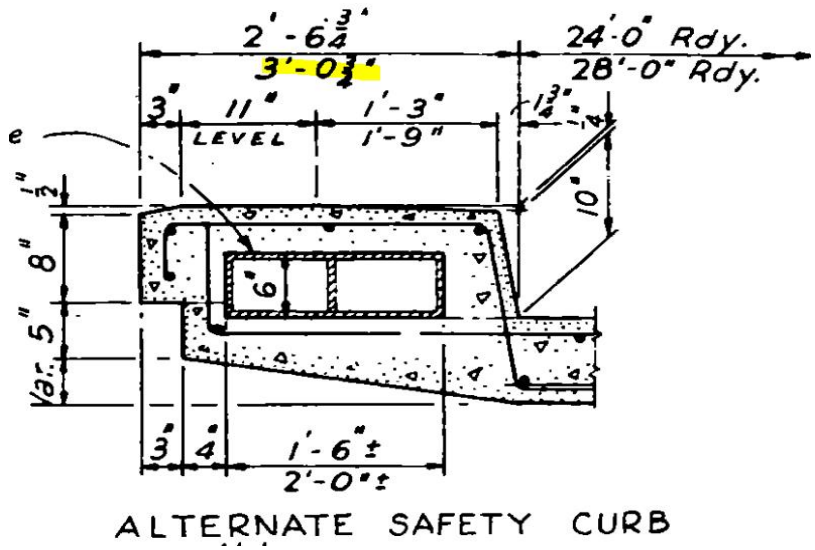
Name:	Curb_10" H x 3'-0.75" W (3" Back Ext.)	Category:	Parapet	Page:	1 of 2

BrR Library Entry Name and Description

Agency Defined	US Customary	Curb_10" H x 3'-0.75" W (3" Back Ext.)	Iowa DOT Standard curb wtih 8" x 3" back extenstion

Iowa DOT Bridge Std:	Z Series

Clip from Bridge Standard Z Series



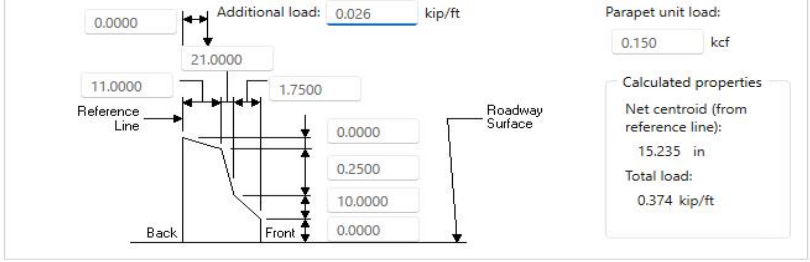
ALTERNATE SAFETY CURB

MBI Proposed BrR Library Entry

Name: Curb_10" H x 3'-0.75" W (3" Back Ext.)

Description: Iowa DOT Standard curb wtih 8" x 3" back extenstion

All dimensions are in inches



Name:	Curb_10" H x 3'-0.75" W (3" Back Ext.)	Category:	Parapet	Page:	2 of 2

Barrier Load Calculation

Back Extension load calculation:

Conc. Unit Weight:	**0.1500**	kcf
Width:	**3.0000**	in
Height:	**8.0000**	in
Chamfer Height:	**0.5000**	in
Area:	0.1719	sft
Additional Load:	**0.0258**	**klf**

Comment:

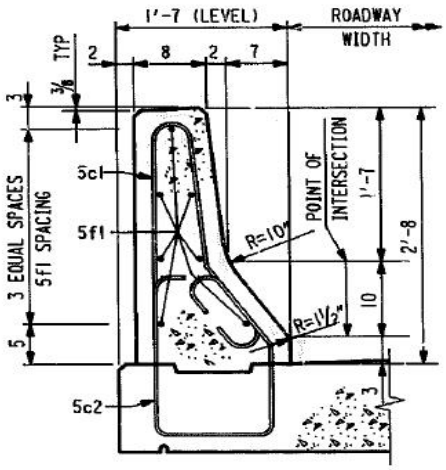
Name:	ConcRail_2'-8" F-Shaped (8" W)	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

Agency Defined	US Customary	ConcRail_2'-8" F-Shaped (8" W)	Iowa DOT Standard F-Shaped Barrier Rail w/ 8" top width

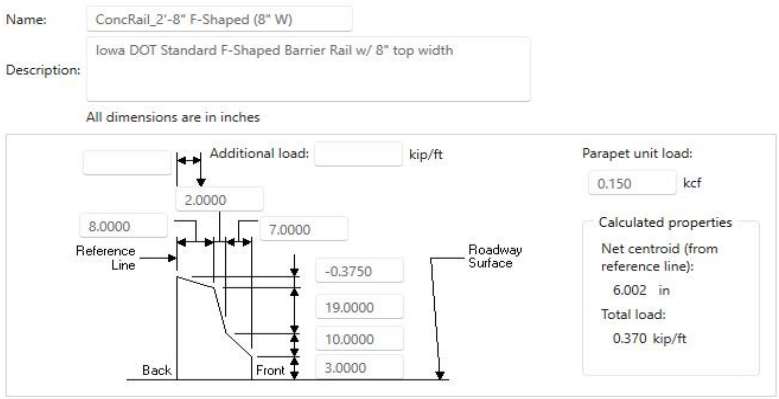
Iowa DOT Bridge Std:	H24-84 J24-84	H24-87 J24-87	H24S-85 J30C-79	H24S-87 J30C-87	H30-87 V30C-79	H30-94	H30M-79	H30S-87

Clip from Bridge Standard H24-84



PART SECTION D-D

MBI Proposed BrR Library Entry



Barrier Load Calculation
Load calculated in BrR

Comment:

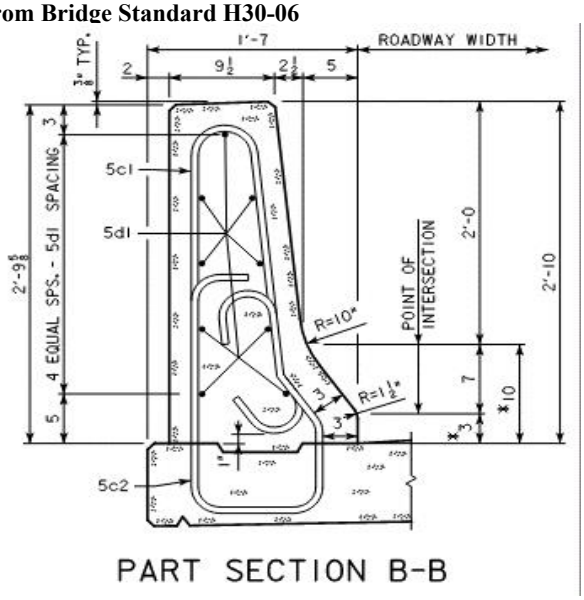
Name:	ConcRail_2'-10" F-Shaped (9.5" W)	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

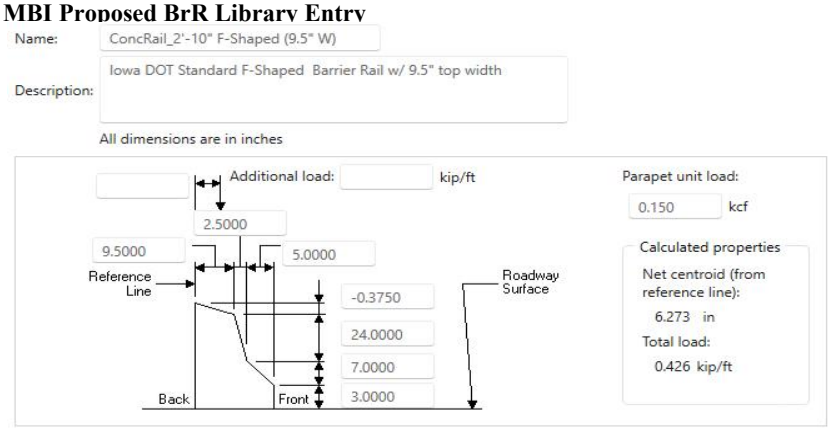
Agency Defined	US Customary	ConcRail_2'-10" F-Shaped (9.5" W)	Iowa DOT Standard F-Shaped Barrier Rail w/ 9.5" top width

Iowa DOT Bridge Std:								
	H24SI-05	H30-06	H30SI-05	H30SI-12	H40-06	H40-14	H44-07	H44-14
	J30-06	J40-06	J40-14	J44-06	J44-14	RS40-10	RS40-14	

Clip from Bridge Standard H30-06



MBI Proposed BrR Library Entry



Barrier Load Calculation

Load calculated in BrR

Comment:

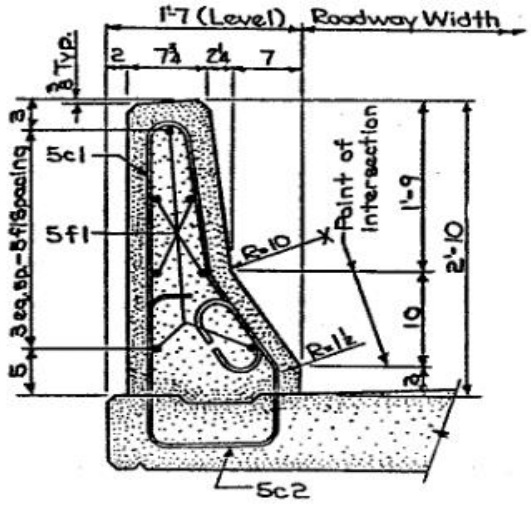
Name:	ConcRail_2'-10" F-Shaped (7.75" W)	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

Agency Defined	US Customary	ConcRail_2'-10" F-Shaped (7.75" W)	Iowa DOT Standard F-Shaped Barrier Rail w/ 7.75" top width

Iowa DOT Bridge Std:	H30M-79 V30C-79

Clip from Bridge Standard H30M-79-05



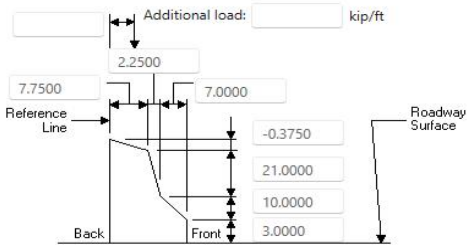
PART SECTION C-C

MBI Proposed BrR Library Entry

Name: ConcRail_2'-10" F-Shaped (7.75" W)

Description: Iowa DOT Standard F-Shaped Barrier Rail w/ 7.75" top width

All dimensions are in inches



Parapet unit load: 0.150 kcf

Calculated properties

Net centroid (from reference line): 5.912 in

Total load: 0.386 kip/ft

Barrier Load Calculation

Load calculated in BrR

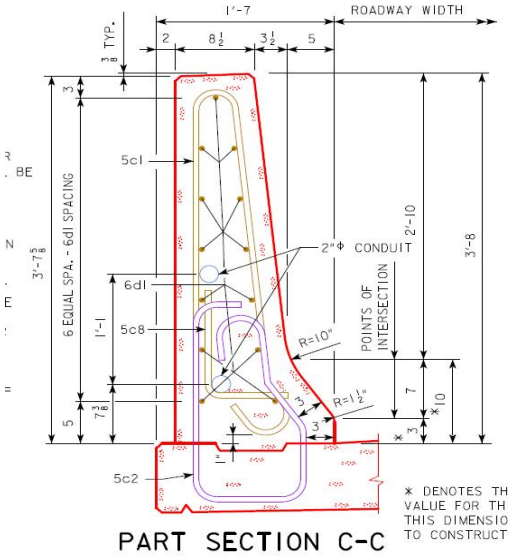
Comment:

Name:	ConcRail_3'-8" F-Shaped (8.5" W)	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

Agency Defined	US Customary	ConcRail_3'-8" F-Shaped (8.5" Width)	Iowa DOT Standard F-Shaped Barrier Rail w/ 8.5" top width

Iowa DOT Bridge Std:	



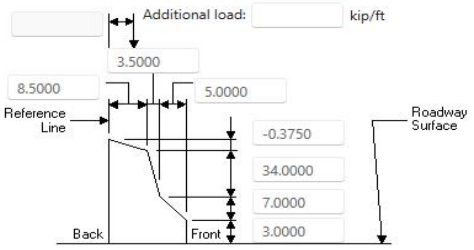
PART SECTION C-C

MBI Proposed BrR Library Entry

Name: ConcRail_3'-8" F-Shaped (8.5" W)

Description: Iowa DOT Standard F-Shaped Barrier Rail w/ 8.5" top width

All dimensions are in inches



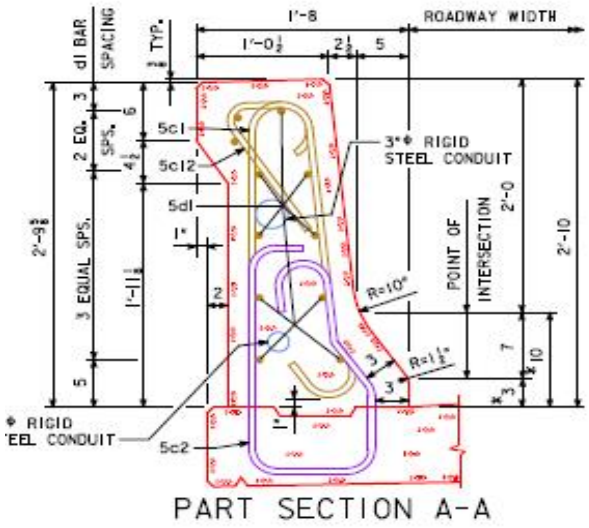
Comment: No associated standard found. Concrete rail details are provided by Iowa DOT.

Name:	ConcRail_2'-10" F-Shaped (3" Back Ext.)	Category:	Parapet	Page:	1 of 2

BrR Library Entry Name and Description

	Agency Defined	US Customary	ConcRail_2'-10" F-Shaped (3" Back Ext.)	Iowa DOT Standard F-Shaped Barrier Rail with 6" x 3" Back Extension

Iowa DOT Bridge Std:	

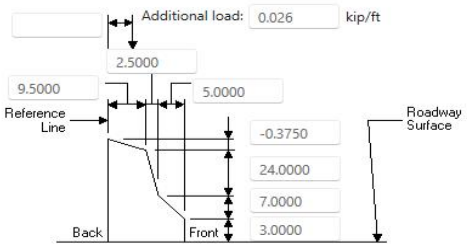


MBI Proposed BrR Library Entry

Name: ConcRail_2'-10" F-Shaped (3" Back Ext.)

Description: Iowa DOT Standard F-Shaped Barrier Rail with 6" x 3" Back Extension

All dimensions are in inches



Parapet unit load: 0.150 kcf

Calculated properties

Net centroid (from reference line): 5.915 in

Total load: 0.452 kip/ft

Name:	ConcRail_2'-10" F-Shaped (3" Back Ext.)	Category:	Parapet	Page:	2 of 2

Barrier Load Calculation

Back Extension load calculation:

Conc. Unit Weight:	**0.1500**	kcf
Width:	**3.0000**	in
Height:	**6.0000**	in
Chamfer Height:	**4.5000**	in
Area:	0.1719	sft
Additional Load:	**0.0258**	**klf**

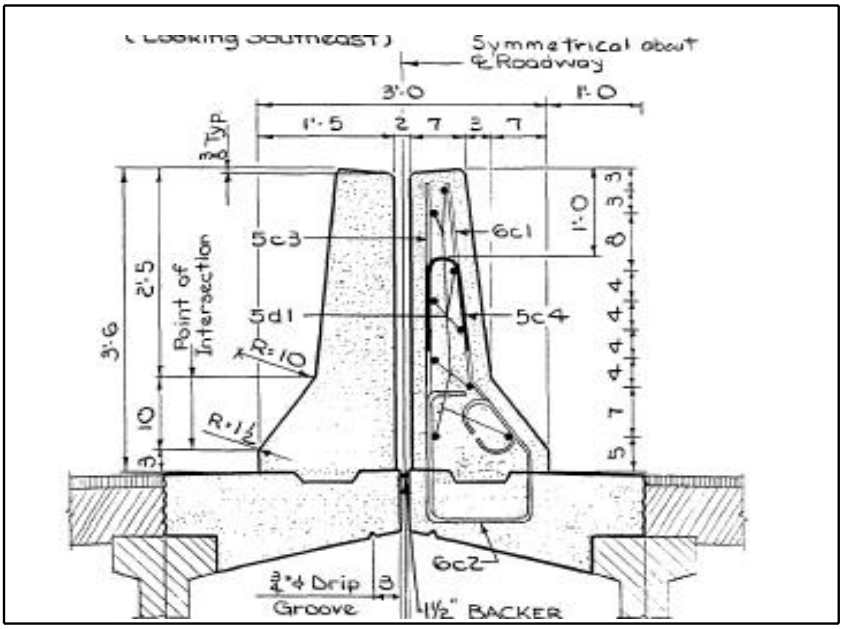
Comment: No associated standard found. Concrete rail details are provided by Iowa DOT.

Name:	ConcRail_3'-6" F-Shaped (7" W)	Category:	Parapet	Page:	1 of 1

BrR Library Entry Name and Description

Agency Defined	US Customary	ConcRail_3'-6" F-Shaped (7" W)	Iowa DOT Standard F-Shaped Barrier Rail w/ 7" top width

Iowa DOT Bridge Std:	

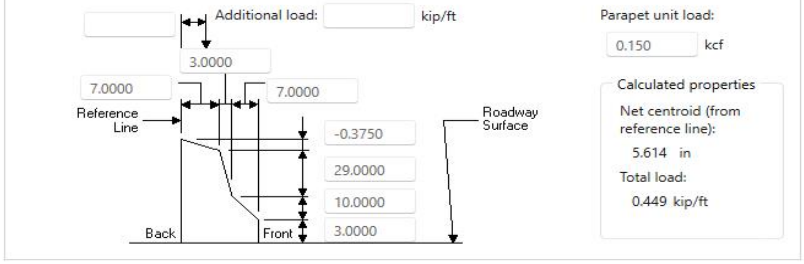


MBI Proposed BrR Library Entry

Name: ConcRail_3'-6" F-Shaped (7" W)

Description: Iowa DOT Standard F-Shaped Barrier Rail w/ 7" top width

All dimensions are in inches



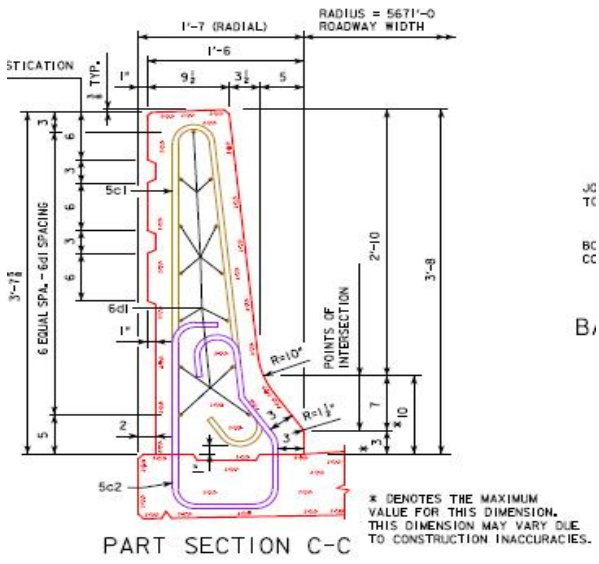
Comment: No associated standard found. Concrete rail details are provided by Iowa DOT.

Name:	ConcRail_3'-8" F-Shaped (6" Back Ribs)	Category:	Parapet	Page:	1 of 2

BrR Library Entry Name and Description

Agency Defined	US Customary	ConcRail_3'-8" F-Shaped (6" Back Ribs)	Iowa DOT Standard Barrier Rail w/ 9.5" top width and three 6" ribs as additional load

Iowa DOT Bridge Std:	



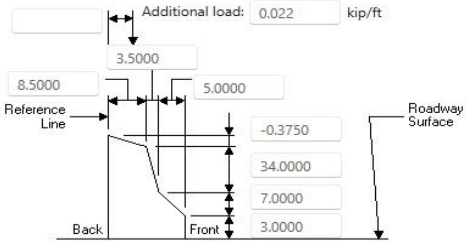
PART SECTION C-C

MBI Proposed BrR Library Entry

Name: ConcRail_3'-8" F-Shaped (6" Back Ribs)

Description: Iowa DOT Standard Barrier Rail w/ 9.5" top width and three 6" ribs as additional load

All dimensions are in inches



Parapet unit load: 0.150 kcf

Calculated properties

Net centroid (from reference line): 5.720 in

Total load: 0.542 kip/ft

Name:	ConcRail_3’-8” F-Shaped (6" Back Ribs)	Category:	Parapet	Page:	2 of 2

Barrier Load Calculation

Back Extension load calculation:

Conc. Unit Weight:	**0.1500**	kcf	
Top Rib Area:	**0.0473**	in	*Measure w/ CAD*
Mid Rib Area:	**0.0486**	in	*Measure w/ CAD*
Bottom Rib Area:	**0.0486**	in	*Measure w/ CAD*
Area:	0.1445	sft	
Additional Load:	**0.0217**	**klf**	

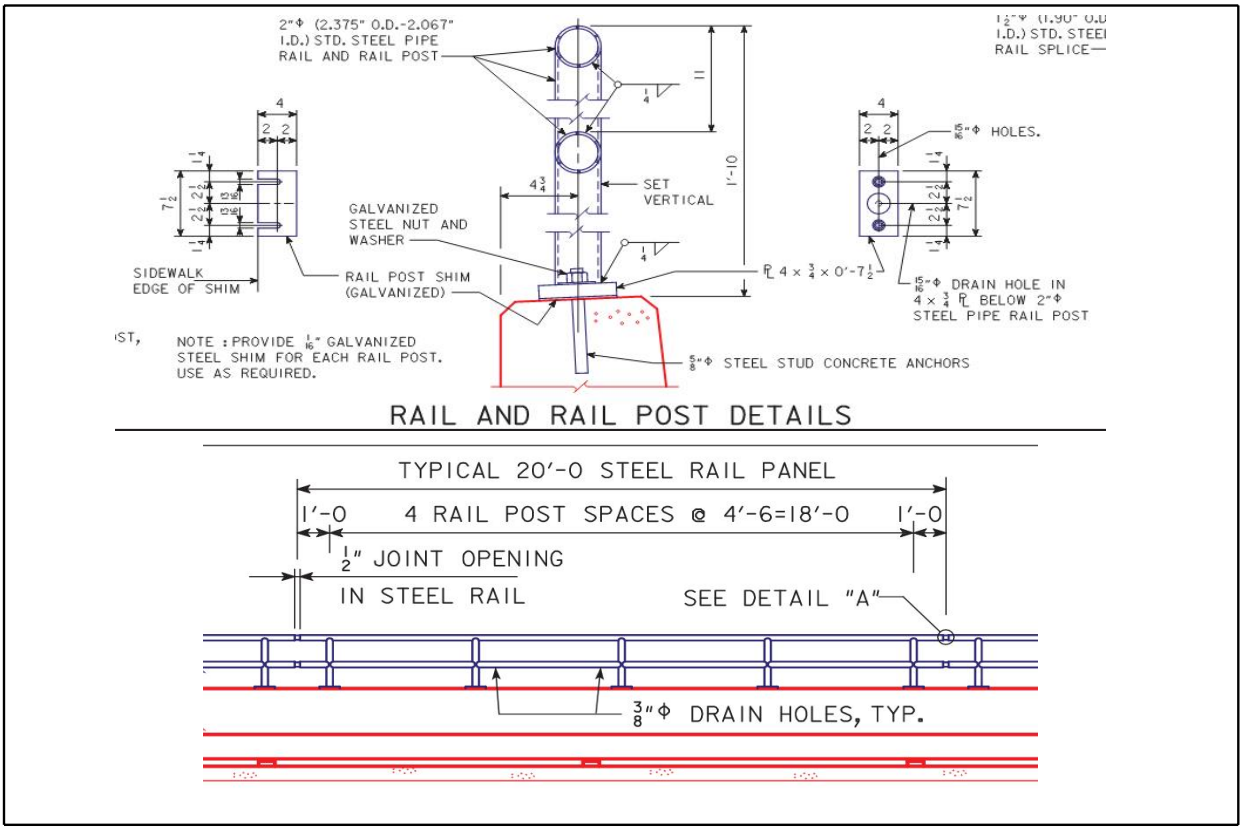
Comment: No associated standard found. Concrete rail details are provided by Iowa DOT.

Name:	SteelRail_Pedestrian Hand Rail	Category:	Railing	Page:	1 of 2

BrR Library Entry Name and Description

	Agency Defined	US Customary	SteelRail_Pedestrian Hand Rail	IowaDOT Standard Pedestrian Hand Rail

Iowa DOT Bridge Std:	

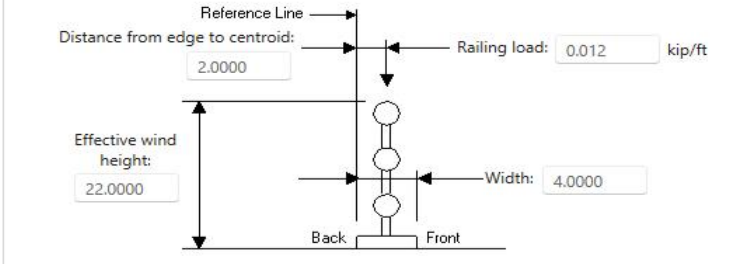


MBI Proposed BrR Library Entry

Name: SteelRail_Pedestrian Hand Rail

Description: Iowa DOT Standard Pedestrian Hand Rail

All dimensions are in inches



Name:	SteelRail_Pedestrian Hand Rail	Category:	Railing	Page:	2 of 2

Barrier Load Calculation

Pipe Material:	**Steel**		
Unit weight:	**0.4900**	kcf	
Outside Diameter:	**2.3750**	in	
Inside Diameter:	**2.0670**	in	
Xsec Area:	0.007	sft	
Height of Post:	**1.8333**	ft	
Weight of Post:	**6.7033**	lbs	
# of Post in Steel Rail Panel:	**5.0000**	each	
Total Post Load in Rail Panel:	33.5163	lbs	
Base Plate Width:	**4.0000**	in	
Length:	**7.5000**	in	
Thickness:	**0.7500**	in	
Volume:	0.0130	cft	
Load:	6.3802	lbs	
# of Plates:	**5.0000**	each	
Total Base Plate Load:	31.9010	lbs	
Length of Typ. Panel:	**20.0000**	ft	
Load of Rail:	73.1278	lbs	
# of Rail:	**2.0000**	each	
Total Rail Load:	146.2557	lbs	
Total Rail Panel Load:	0.2328	kips	*Increased by 10% for misc steel*
Load/Ft:	**0.0116**	**klf**	

Comment: No associated standard found. Handrail details are provided by Iowa DOT.

Name:	MetalRail_Steel Railing	Category:	Railing	Page:	1 of 1

BrR Library Entry Name and Description

	Agency Defined	US Customary	MetalRail_Steel Railing	Iowa DOT generic steel railing

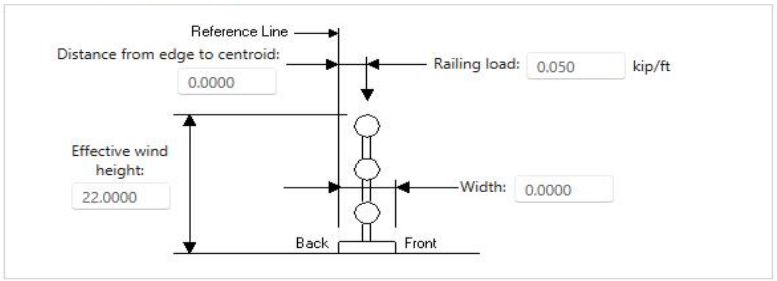
Iowa DOT Bridge Std:	

MBI Proposed BrR Library Entry

Name: MetalRail_Steel Railing

Description: Iowa DOT generic steel railing

All dimensions are in inches



Barrier Load Calculation

Conservatively assumed steel railings to be 50lbs/ft

Comment: Used conservative load of 50 lbs/ft. Actual load can be calculated based on specific railing for refined analysis.

Name:	MetalRail_Aluminum Railing	Category:	Railing	Page:	1 of 1

BrR Library Entry Name and Description

Agency Defined	US Customary	MetalRail_Aluminum Railing	Iowa DOT generic aluminum railing

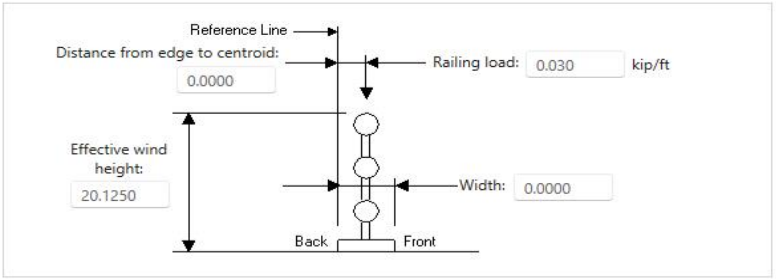
Iowa DOT Bridge Std:	

MBI Proposed BrR Library Entry

Name: MetalRail_Aluminum Railing

Description: Iowa DOT generic aluminum railing

All dimensions are in inches



Barrier Load Calculation

Conservatively assumed aluminum railings to be 30 lbs/ft

Comment: Used conservative load of 30 lbs/ft. Actual load can be calculated based on specific railing for refined analysis.

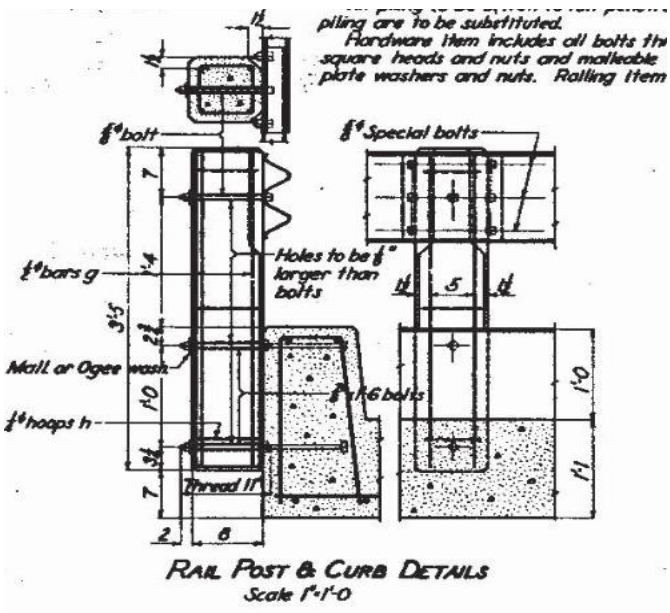
Name:	ConcRail_1'-11" W-Beam Railing	Category:	Railing	Page:	1 of 2

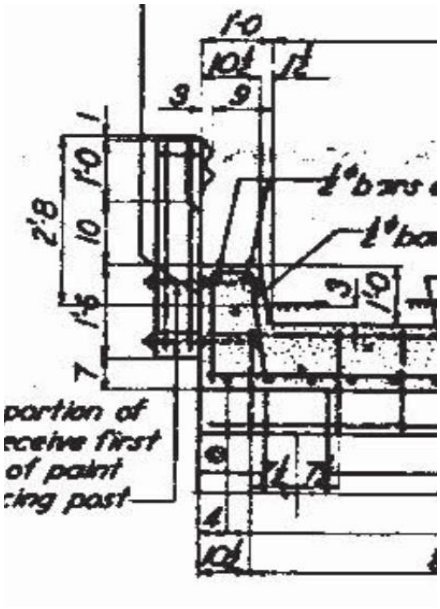
BrR Library Entry Name and Description

Agency Defined	US Customary	ConcRail_1'-11" W-Beam Railing	Iowa DOT Side mounted concrete post with W-beam railing 6'-3" spacing

Iowa DOT Bridge Std:	J2 J3

Clip from Bridge Standard J2



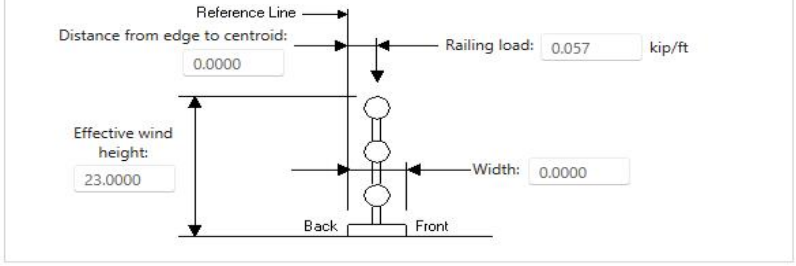


MBI Proposed BrR Library Entry

Name: ConcRail_1'-11" W-Beam Railing

Description: Iowa DOT Side mounted concrete post with W-beam railing 6'-3" spacing

All dimensions are in inches



Name:	ConcRail_1'-11" W-Beam Railing	Category:	Median	Page:	2 of 2

Barrier Load Calculation

Post Type:	**Concrete**		
Unit Weight:	**0.1500**	kcf	
Height of Post:	**3.4167**	ft	
Xsec Area:	**0.4444**	sft	
Post Load:	227.78	lbs	
Rail Type:	**W-Beam**	Steel	
Rail Unit Weight:	**15.0000**	lbs/ft	*Estimated*
Post Spacing:	**6.2500**	ft	
Rail Load:	93.75	lbs	
Total Load:	321.530	lbs	
Load/ft:	**0.0566**	**kips**	*Increased by 10% for misc steel*

Comment: Curb load is not considered as part of the railing load calculations.

APPENDIX D
Guidance/Documentation for API Tool

APPENDIX E
List of Standard Templates

B Standards

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	PPCBB or RCBB	Modeled as Part of TR-832	Comments
B24-16	2016	30	24	0, 15, 30	PPCBB	NO	This standard was not found to be in-service and was not modeled.
B24-16	2016	40	24	0, 15, 30	PPCBB	NO	This standard was not found to be in-service and was not modeled.
B24-16	2016	50	24	0, 15, 30	PPCBB	YES	Only modeled 0° skew. 15° & 30° skews for this standards were not found to be in service and was not modeled.
B24-16	2016	60	24	0, 15, 30	PPCBB	YES	Only modeled 15° skew. 0° & 30° skews for this standards were not found to be in service and was not modeled.
B24-16	2016	70	24	0, 15, 30	PPCBB	NO	This standard was not found to be in-service and was not modeled.
B24-16	2016	30	24	0, 15, 30	RCBB	NO	This standard was not found to be in-service and was not modeled.
B24-16	2016	40	24	0, 15, 30	RCBB	NO	This standard was not found to be in-service and was not modeled.
B24-16	2016	50	24	0, 15, 30	RCBB	NO	This standard was not found to be in-service and was not modeled.
B30-16	2016	30	30	0, 15, 30	PPCBB	NO	This standard was not found to be in-service and was not modeled.
B30-16	2016	40	30	0, 15, 30	PPCBB	NO	This standard was not found to be in-service and was not modeled.
B30-16	2016	50	30	0, 15, 30	PPCBB	YES	Only modeled 0° skew. 15° & 30° skews for this standards were not found to be in service and was not modeled.
B30-16	2016	60	30	0, 15, 30	PPCBB	NO	This standard was not found to be in-service and was not modeled.
B30-16	2016	70	40	0, 15, 30	PPCBB	YES	
B30-16	2016	30	40	0, 15, 30	RCBB	NO	This standard was not found to be in-service and was not modeled.
B30-16	2016	40	40	0, 15, 30	RCBB	NO	This standard was not found to be in-service and was not modeled.
B30-16	2016	50	40	0, 15, 30	RCBB	NO	This standard was not found to be in-service and was not modeled.

H Standards

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	Spans	Modeled as Part of TR-832	Comments
H1	1916	24	16	0	1	YES	
H1	1916	26	16	0	1	YES	
H1	1916	28	16	0	1	YES	
H1	1916	30	16	0	1	YES	
H1	1916	32	16	0	1	YES	
H1	1916	34	16	0	1	YES	
H1	1916	36	16	0	1	YES	
H1	1916	38	16	0	1	YES	
H1	1916	40	16	0	1	YES	
H1	1916	24	18	0	1	YES	
H1	1916	26	18	0	1	YES	
H1	1916	28	18	0	1	YES	
H1	1916	30	18	0	1	YES	
H1	1916	32	18	0	1	YES	
H1	1916	34	18	0	1	YES	
H1	1916	36	18	0	1	YES	
H1	1916	38	18	0	1	YES	
H1	1916	40	18	0	1	YES	
H1	1916	24	20	0	1	YES	
H1	1916	26	20	0	1	YES	
H1	1916	28	20	0	1	YES	
H1	1916	30	20	0	1	YES	
H1	1916	32	20	0	1	YES	
H1	1916	34	20	0	1	YES	
H1	1916	36	20	0	1	YES	
H1	1916	38	20	0	1	YES	
H1	1916	40	20	0	1	YES	
H1	1952	42.5	20	0	1	YES	
H1	1952	55	20	0	1	YES	
H1	1952	67.5	20	0	1	YES	
H1A	1928	24	24	0, 20, 30, 45	1	YES	
H1A	1928	28	24	0, 20, 30, 45	1	YES	
H1A	1928	32	24	0, 20, 30, 45	1	YES	
H1A	1928	36	24	0, 20, 30, 45	1	YES	
H1A	1928	40	24	0, 20, 30, 45	1	YES	
H1A	1928	44	24	0, 20, 30, 45	1	YES	
H2	1952	150	20	0	3	YES	
H2	1952	175	20	0	3	YES	
H2	1952	200	20	0	3	YES	
H2	1952	250	20	0	3	YES	
H10	1954	30	20	0	1	YES	
H10	1954	42.5	20	0	1	YES	
H10	1954	30	24	0	1	YES	
H10	1954	42.5	24	0	1	YES	
H11	1958	30	20	0, 15, 30 , 45	1	YES	
H11	1958	42.5	20	0, 15, 30 , 45	1	YES	
H11	1958	55(a)	20	0, 15, 30 , 45	1	YES	
H11	1958	55(b)	20	0, 15, 30 , 45	1	YES	
H11	1958	67.67	20	0, 15, 30 , 45	1	YES	
H11	1958	92.5	20	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Multiple spans based on H11 single span beams
H11	1958	105	20	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Multiple spans based on H11 single span beams
H11	1958	130	20	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Multiple spans based on H11 single span beams
H11	1958	142.5	20	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Multiple spans based on H11 single span beams
H11	1958	167.67	20	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Multiple spans based on H11 single span beams
H11	1958	180	20	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Multiple spans based on H11 single span beams
H11	1958	205	20	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Multiple spans based on H11 single span beams
H11	1958	30	24	0, 15, 30 , 45	1	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H11	1958	42.5	24	0, 15, 30 , 45	1	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H11	1958	55(a)	24	0, 15, 30 , 45	1	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H11	1958	55(b)	24	0, 15, 30 , 45	1	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H11	1958	67.5	24	0, 15, 30 , 45	1	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H11	1958	92.5	24	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H11	1958	105	24	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H11	1958	130	24	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H11	1958	142.5	24	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H11	1958	167.67	24	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H11	1958	180	24	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H11	1958	205	24	0, 15, 30 , 45	3	NO	Was not modeled as part of TR-832. Similar to H11 20' Rdwy but extra beam and different overhangs
H12	1960	30	20	0, 10, 20	1	YES	
H12	1960	42.5	20	0, 10, 20	1	YES	
H12	1960	55	20	0, 10, 20	1	YES	
H12	1960	67.5	20	0, 10, 20	1	YES	
H12	1960	80	20	0, 10, 20	1	YES	

H Standards cont.

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	Spans	Modeled as Part of TR-832	Comments
H12	1960	92.5	20	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H12 single span beams
H12	1960	105	20	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H12 single span beams
H12	1960	130	20	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H12 single span beams
H12	1960	142.5	20	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H12 single span beams
H12	1960	167.5	20	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H12 single span beams
H12	1960	180	20	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H12 single span beams
H12	1960	205	20	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H12 single span beams
H12	1960	217.5	20	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H12 single span beams
H12	1960	242.5	20	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H12 single span beams
H13	1960	30	24	0, 10, 20	1	YES	
H13	1960	42.5	24	0, 10, 20	1	YES	
H13	1960	55	24	0, 10, 20	1	YES	
H13	1960	67.5	24	0, 10, 20	1	YES	
H13	1960	80	24	0, 10, 20	1	YES	
H13	1960	92.5	24	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H13 single span beams
H13	1960	105	24	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H13 single span beams
H13	1960	130	24	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H13 single span beams
H13	1960	142.5	24	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H13 single span beams
H13	1960	167.5	24	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H13 single span beams
H13	1960	180	24	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H13 single span beams
H13	1960	205	24	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H13 single span beams
H13	1960	217.5	24	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H13 single span beams
H13	1960	242.5	24	0, 10, 20	3	NO	Was not modeled as part of TR-832. Multiple spans based on H13 single span beams
H14	1960 & 1967	30	28	0	1	YES	Modeled 1960 with 1967 revisions as one, using the most conservative.
H14	1960 & 1967	42.5	28	0	1	YES	Modeled 1960 with 1967 revisions as one, using the most conservative.
H14	1960 & 1967	55	28	0	1	YES	Modeled 1960 with 1967 revisions as one, using the most conservative.
H14	1960 & 1967	67.5	28	0	1	YES	Modeled 1960 with 1967 revisions as one, using the most conservative.
H14	1960 & 1967	80	28	0	1	YES	Modeled 1960 with 1967 revisions as one, using the most conservative.
H14	1960 & 1967	92.5	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1960 & 1967	105	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1960 & 1967	130	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1960 & 1967	142.5	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1960 & 1967	167.5	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1960 & 1967	180	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1960 & 1967	205	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1960 & 1967	217.5	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1960 & 1967	242.5	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1979	30	28	0	1	YES	
H14	1979	42.5	28	0	1	YES	
H14	1979	55	28	0	1	YES	
H14	1979	67.5	28	0	1	YES	
H14	1979	80	28	0	1	YES	
H14	1979	92.5	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1979	105	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1979	130	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1979	142.5	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1979	167.5	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1979	180	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1979	205	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1979	217.5	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H14	1979	242.5	28	0	3	NO	Was not modeled as part of TR-832. Multiple spans based on H14 single span beams
H15	1975 & 1979	30	30	0,15,30	1	YES	Modeled 1975 with 1979 revision as one, using the most conservative.
H15	1975 & 1979	42.5	30	0,15,30	1	YES	Modeled 1975 with 1979 revision as one, using the most conservative.
H15	1975 & 1979	55	30	0,15,30	1	YES	Modeled 1975 with 1979 revision as one, using the most conservative.
H15	1975 & 1979	67.5	30	0,15,30	1	YES	Modeled 1975 with 1979 revision as one, using the most conservative.
H15	1975 & 1979	80	30	0,15,30	1	YES	Modeled 1975 with 1979 revision as one, using the most conservative.
H16	1969	93	30	0,15,30	3	YES	
H16	1969	101.333	30	0,15,30	3	YES	
H16	1969	113.833	30	0,15,30	3	YES	
H16	1969	126.333	30	0,15,30	3	YES	
H16	1969	138.833	30	0,15,30	3	YES	
H16	1969	151.333	30	0,15,30	3	YES	
H16	1969	163.833	30	0,15,30	3	YES	
H16	1969	176.333	30	0,15,30	3	YES	
H16	1969	188.833	30	0,15,30	3	YES	
H16	1969	201.333	30	0,15,30	3	YES	
H16	1969	213.833	30	0,15,30	3	YES	
H16	1969	226.333	30	0,15,30	3	YES	
H16	1969	243	30	0,15,30	3	YES	
H17	1973	75	30	0,15,30	3	YES	
H17	1973	87.5	30	0,15,30	3	YES	
H17	1973	100	30	0,15,30	3	YES	
H17	1973	112.5	30	0,15,30	3	YES	
H17	1973	125	30	0,15,30	3	YES	
H24-84	1984	126.333	24	0, 15, 30, 45	3	YES	
H24-84	1984	138.833	24	0, 15, 30, 45	3	YES	
H24-84	1984	151.333	24	0,15,30	3	YES	
H24-84	1984	163.833	24	0,15,30	3	YES	
H24-84	1984	176.333	24	0,15,30	3	YES	
H24-84	1984	188.833	24	0,15,30	3	YES	
H24-84	1984	201.333	24	0,15,30	3	YES	
H24-84	1984	213.833	24	0,15,30	3	YES	
H24-84	1984	226.333	24	0,15,30	3	YES	
H24-84	1984	243	24	0,15,30	3	YES	
H24S-85	1985	30	24	0,15,30	1	YES	
H24S-85	1985	42.5	24	0,15,30	1	YES	
H24S-85	1985	55	24	0,15,30	1	YES	
H24S-85	1985	67.5	24	0,15,30	1	YES	
H24S-85	1985	80	24	0,15,30	1	YES	
H24-87	1987	126.33	24	0, 15, 30, 45	3	YES	
H24-87	1987	138.83	24	0, 15, 30, 45	3	YES	
H24-87	1987	151.33	24	0,15,30	3	YES	
H24-87	1987	163.83	24	0,15,30	3	YES	
H24-87	1987	176.33	24	0,15,30	3	YES	
H24-87	1987	188.83	24	0,15,30	3	YES	
H24-87	1987	201.33	24	0,15,30	3	YES	
H24-87	1987	213.83	24	0,15,30	3	YES	
H24-87	1987	226.33	24	0,15,30	3	YES	
H24-87	1987	243	24	0,15,30	3	YES	

H Standards cont.

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	Spans	Modeled as Part of TR-832	Comments
H24S-87	1987	30	24	0,15,30	1	YES	
H24S-87	1987	42.5	24	0,15,30	1	YES	
H24S-87	1987	55	24	0,15,30	1	YES	
H24S-87	1987	67.5	24	0,15,30	1	YES	
H24S-87	1987	80	24	0,15,30	1	YES	
H24SI-05	2005	46.67	24	0,15,30	1	YES	
H24SI-05	2005	55	24	0,15,30	1	YES	
H24SI-05	2005	67.5	24	0,15,30	1	YES	
H24SI-05	2005	80	24	0,15,30	1	YES	
H24SI-05	2005	90	24	0,15,30	1	YES	
H24SI-05	2005	100	24	0,15,30	1	YES	
H24SI-05	2005	110	24	0,15,30	1	YES	
H24-06	2006	138.83	24	0, 15, 30, 45	3	YES	
H24-06	2006	151.33	24	0, 15, 30, 45	3	YES	
H24-06	2006	163.83	24	0, 15, 30, 45	3	YES	
H24-06	2006	176.33	24	0, 15, 30, 45	3	YES	
H24-06	2006	188.83	24	0, 15, 30, 45	3	YES	
H24-06	2006	201.33	24	0, 15, 30, 45	3	YES	
H24-06	2006	213.83	24	0, 15, 30, 45	3	YES	
H24-06	2006	226.33	24	0, 15, 30, 45	3	YES	
H24-06	2006	243	24	0, 15, 30, 45	3	YES	
H30M-79	1979 & 1982	126.33	30	0, 15, 30, 45	3	YES	Modeled 1979 with 1982 revision as one, using the most conservative.
H30M-79	1979 & 1982	138.83	30	0, 15, 30, 45	3	YES	Modeled 1979 with 1982 revision as one, using the most conservative.
H30M-79	1979 & 1982	151.33	30	0, 15, 30, 45	3	YES	Modeled 1979 with 1982 revision as one, using the most conservative.
H30M-79	1979 & 1982	163.83	30	0, 15, 30, 45	3	YES	Modeled 1979 with 1982 revision as one, using the most conservative.
H30M-79	1979 & 1982	176.33	30	0, 15, 30, 45	3	YES	Modeled 1979 with 1982 revision as one, using the most conservative.
H30M-79	1979 & 1982	188.83	30	0, 15, 30, 45	3	YES	Modeled 1979 with 1982 revision as one, using the most conservative.
H30M-79	1979 & 1982	201.33	30	0, 15, 30, 45	3	YES	Modeled 1979 with 1982 revision as one, using the most conservative.
H30M-79	1979 & 1982	213.83	30	0, 15, 30, 45	3	YES	Modeled 1979 with 1982 revision as one, using the most conservative.
H30M-79	1979 & 1982	226.33	30	0, 15, 30, 45	3	YES	Modeled 1979 with 1982 revision as one, using the most conservative.
H30M-79	1979 & 1982	243	30	0, 15, 30, 45	3	YES	Modeled 1979 with 1982 revision as one, using the most conservative.
H30M-79	1984	138.83	30	0, 15, 30, 45	3	YES	The 1984 revision has a different A42 beam strand.
H30-87	1987	126.33	30	0, 15, 30, 45	3	YES	
H30-87	1987	138.83	30	0, 15, 30, 45	3	YES	
H30-87	1987	151.33	30	0, 15, 30	3	YES	
H30-87	1987	163.83	30	0, 15, 30	3	YES	
H30-87	1987	176.33	30	0, 15, 30	3	YES	
H30-87	1987	188.83	30	0, 15, 30	3	YES	
H30-87	1987	201.33	30	0, 15, 30	3	YES	
H30-87	1987	213.83	30	0, 15, 30	3	YES	
H30-87	1987	226.33	30	0, 15, 30	3	YES	
H30-87	1987	243	30	0, 15, 30	3	YES	
H30S-87	1987	30	30	0,15,30	1	YES	
H30S-87	1987	42.5	30	0,15,30	1	YES	
H30S-87	1987	55	30	0,15,30	1	YES	
H30S-87	1987	67.5	30	0,15,30	1	YES	
H30S-87	1987	80	30	0,15,30	1	YES	
H30-94	1994	126.33	30	0, 15, 30, 45	3	YES	
H30-94	1994	138.83	30	0, 15, 30, 45	3	YES	
H30-94	1994	151.33	30	0, 15, 30	3	YES	
H30-94	1994	163.83	30	0, 15, 30	3	YES	
H30-94	1994	176.33	30	0, 15, 30	3	YES	
H30-94	1994	188.83	30	0, 15, 30	3	YES	
H30-94	1994	201.33	30	0, 15, 30	3	YES	
H30-94	1994	213.83	30	0, 15, 30	3	YES	
H30-94	1994	226.33	30	0, 15, 30	3	YES	
H30-94	1994	243	30	0, 15, 30	3	YES	
H30SI-05	2005	46.67	30	0,15,30	1	YES	
H30SI-05	2005	55	30	0,15,30	1	YES	
H30SI-05	2005	67.5	30	0,15,30	1	YES	
H30SI-05	2005	80	30	0,15,30	1	YES	
H30SI-05	2005	90	30	0,15,30	1	YES	
H30SI-05	2005	100	30	0,15,30	1	YES	
H30SI-05	2005	110	30	0,15,30	1	YES	
H30SI-12	2012	46.67	30	0,15,30	1	YES	
H30SI-12	2012	55	30	0,15,30	1	YES	
H30SI-12	2012	67.5	30	0,15,30	1	YES	
H30SI-12	2012	80	30	0,15,30	1	YES	
H30SI-12	2012	90	30	0,15,30	1	YES	
H30SI-12	2012	100	30	0,15,30	1	YES	
H30SI-12	2012	110	30	0,15,30	1	YES	
H30-06	2006	138.83	30	0, 15, 30, 45	3	YES	
H30-06	2006	151.33	30	0, 15, 30, 45	3	YES	
H30-06	2006	163.83	30	0, 15, 30, 45	3	YES	
H30-06	2006	176.33	30	0, 15, 30, 45	3	YES	
H30-06	2006	188.83	30	0, 15, 30, 45	3	YES	
H30-06	2006	201.33	30	0, 15, 30, 45	3	YES	
H30-06	2006	213.83	30	0, 15, 30, 45	3	YES	
H30-06	2006	226.33	30	0, 15, 30, 45	3	YES	
H30-06	2006	243	30	0, 15, 30, 45	3	YES	
H40-06 & H40-14	2009	138.83	40	0, 15, 30, 45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H40-06 & H40-14	2009	151.33	40	0, 15, 30, 45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H40-06 & H40-14	2009	163.83	40	0, 15, 30, 45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H40-06 & H40-14	2009	176.33	40	0, 15, 30, 45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H40-06 & H40-14	2009	188.83	40	0, 15, 30, 45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H40-06 & H40-14	2009	201.33	40	0, 15, 30, 45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H40-06 & H40-14	2009	213.83	40	0, 15, 30, 45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H40-06 & H40-14	2009	226.33	40	0, 15, 30, 45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H40-06 & H40-14	2009	243	40	0, 15, 30, 45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H44-07 & H44-14	2007	138.83	44	0,15,30	3	YES	2007 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H44-07 & H44-14	2007	151.33	44	0,15,30	3	YES	2007 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H44-07 & H44-14	2007	163.83	44	0,15,30	3	YES	2007 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H44-07 & H44-14	2007	176.33	44	0,15,30	3	YES	2007 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H44-07 & H44-14	2007	188.83	44	0,15,30	3	YES	2007 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H44-07 & H44-14	2007	201.33	44	0,15,30	3	YES	2007 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H44-07 & H44-14	2007	213.83	44	0,15,30	3	YES	2007 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H44-07 & H44-14	2007	226.33	44	0,15,30	3	YES	2007 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
H44-07 & H44-14	2007	243	44	0,15,30	3	YES	2007 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.

J Standards

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	Spans	Modeled as Part of TR-832	Comments
J1	1915	14	18	0	1	NO	Was not modeled as part of TR-832
J1	1915	16	18	0	1	NO	Was not modeled as part of TR-832
J1	1915	18	18	0	1	NO	Was not modeled as part of TR-832
J1	1915	20	18	0	1	NO	Was not modeled as part of TR-832
J1	1915	22	18	0	1	NO	Was not modeled as part of TR-832
J1	1915	24	18	0	1	NO	Was not modeled as part of TR-832
J1-A	1927	16	24	0, 20, 30, 45	1	NO	Was not modeled as part of TR-832
J1-A	1927	20	24	0, 20, 30, 45	1	NO	Was not modeled as part of TR-832
J1-A	1927	24	24	0, 20, 30, 45	1	NO	Was not modeled as part of TR-832
J1-B	1927	16	20	0, 20, 30, 45	1	NO	Was not modeled as part of TR-832
J1-B	1927	20	20	0, 20, 30, 45	1	NO	Was not modeled as part of TR-832
J1-B	1927	24	20	0, 20, 30, 45	1	NO	Was not modeled as part of TR-832
J2	1950	18	24	0	1	NO	Was not modeled as part of TR-832
J3	1952	23.75	20	0	1	YES	
J3	1952	30	20	0	1	YES	
J3A	1960	24	20	0, 20,30,45	1	YES	Only 0° skew was modeled for J standards rated in LFR.
J3A	1960	30	20	0, 20,30,45	1	YES	Only 0° skew was modeled for J standards rated in LFR.
J4	1952	75	20	0	3	YES	
J4	1952	100	20	0	3	YES	
J4	1952	125	20	0	3	YES	
J4A	1960	75	20	0, 20,30,45	3	YES	Only 0° skew was modeled for J standards rated in LFR.
J4A	1960	100	20	0, 20,30,45	3	YES	Only 0° skew was modeled for J standards rated in LFR.
J4A	1960	125	20	0, 20,30,45	3	YES	Only 0° skew was modeled for J standards rated in LFR.
J5	1957	24	24	0, 20,30,45	1	YES	Only 0° skew was modeled for J standards rated in LFR.
J5	1957	30	24	0, 20,30,45	1	YES	Only 0° skew was modeled for J standards rated in LFR.
J6	1957	75	24	0,20,30,45	3	YES	Only 0° skew was modeled for J standards rated in LFR.
J6	1957	100	24	0,20,30,45	3	YES	Only 0° skew was modeled for J standards rated in LFR.
J6	1957	125	24	0,20,30,45	3	YES	Only 0° skew was modeled for J standards rated in LFR.
J7	1960/1967/1979	18	28	0, 15, 30	1	NO	Was not modeled as part of TR-832
J7	1960/1967/1979	24	28	0, 15, 30	1	YES	Modeled 1960 with 1967 & 1979 revisions as one, using the most conservative. Only modeled 0° skew for J standards rated in LFR.
J7	1960/1967/1979	30	28	0, 15, 30	1	YES	Modeled 1960 with 1967 & 1979 revisions as one, using the most conservative. Only modeled 0° skew for J standards rated in LFR.
J8	1960/1967/1979	75	28	0,15,30,45	3	YES	Modeled 1960 with 1967 & 1979 revisions as one, using the most conservative. Only modeled 0° skew for J standards rated in LFR.
J8	1960/1967/1979	100	28	0,15,30,45	3	YES	Modeled 1960 with 1967 & 1979 revisions as one, using the most conservative. Only modeled 0° skew for J standards rated in LFR.
J8	1960/1967/1979	125	28	0,15,30,45	3	YES	Modeled 1960 with 1967 & 1979 revisions as one, using the most conservative. Only modeled 0° skew for J standards rated in LFR.
J10	1954	18	20.75	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J10	1954	24	20.75	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J10	1954	30	20.75	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J10	1954	18	24	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J10	1954	24	24	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J10	1954	30	24	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J10	1960	18	20.75	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J10	1960	24	20.75	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J10	1960	30	20.75	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J10	1960	18	24	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J10	1960	24	24	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J10	1960	30	24	0	1	NO	Was not modeled as part of TR-832 because BrR does not have reinforced concrete channel beams as of version 7.5.0.
J15	1975/1979	18	30	0,15,30	1	YES	Modeled 1975 with 1979 revision as one, using the most conservative. Only modeled 0° skew for J standards rated in LFR.
J15	1975/1979	24	30	0,15,30	1	YES	Modeled 1975 with 1979 revision as one, using the most conservative. Only modeled 0° skew for J standards rated in LFR.
J15	1975/1979	30	30	0,15,30	1	YES	Modeled 1975 with 1979 revision as one, using the most conservative. Only modeled 0° skew for J standards rated in LFR.
J16	1969	75	30	0,15,30	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J16	1969	87.5	30	0,15,30	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J16	1969	100	30	0,15,30	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J16	1969	112.5	30	0,15,30	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J16	1969	125	30	0,15,30	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J16	1969	75	30	0,15,30	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J16	1969	87.5	30	0,15,30	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J16	1969	100	30	0,15,30	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J16	1969	112.5	30	0,15,30	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J16	1969	125	30	0,15,30	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J24-84	1984	75	24	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J24-84	1984	87.5	24	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J24-84	1984	100	24	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J24-84	1984	112.5	24	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J24-84	1984	125	24	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J24-84	1984	75	24	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J24-84	1984	87.5	24	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J24-84	1984	100	24	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J24-84	1984	112.5	24	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J24-84	1984	125	24	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J24-87	1987	75	24	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J24-87	1987	87.5	24	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J24-87	1987	100	24	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J24-87	1987	112.5	24	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J24-87	1987	125	24	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J24-87	1987	75	24	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J24-87	1987	87.5	24	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J24-87	1987	100	24	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J24-87	1987	112.5	24	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J24-87	1987	125	24	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J24-06	2006	70	24	0,15,30,45	3	YES	
J24-06	2006	80	24	0,15,30,45	3	YES	
J24-06	2006	90	24	0,15,30,45	3	YES	
J24-06	2006	100	24	0,15,30,45	3	YES	
J24-06	2006	110	24	0,15,30,45	3	YES	
J24-06	2006	120	24	0,15,30,45	3	YES	
J24-06	2006	130	24	0,15,30,45	3	YES	
J24-06	2006	140	24	0,15,30,45	3	YES	
J24-06	2006	150	24	0,15,30,45	3	YES	
J30C-79	1979	75	30	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J30C-79	1979	87.5	30	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J30C-79	1979	100	30	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J30C-79	1979	112.5	30	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J30C-79	1979	125	30	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J30C-79	1979	75	30	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J30C-79	1979	87.5	30	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J30C-79	1979	100	30	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J30C-79	1979	112.5	30	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J30C-79	1979	125	30	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.

J Standards cont.

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	Spans	Modeled as Part of TR-832	Comments
J30C-87	1987	75	30	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J30C-87	1987	87.5	30	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J30C-87	1987	100	30	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J30C-87	1987	112.5	30	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J30C-87	1987	125	30	0,15,30,45	3	NO	Flat bottom - was not modeled. Only modeled the sloped bottom option.
J30C-87	1987	75	30	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J30C-87	1987	87.5	30	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J30C-87	1987	100	30	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J30C-87	1987	112.5	30	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J30C-87	1987	125	30	0,15,30,45	3	YES	Sloped bottom - only modeled 0° skew for J standards rated in LFR.
J30-06	2006	70	30	0,15,30,45	3	YES	
J30-06	2006	80	30	0,15,30,45	3	YES	
J30-06	2006	90	30	0,15,30,45	3	YES	
J30-06	2006	100	30	0,15,30,45	3	YES	
J30-06	2006	110	30	0,15,30,45	3	YES	
J30-06	2006	120	30	0,15,30,45	3	YES	
J30-06	2006	130	30	0,15,30,45	3	YES	
J30-06	2006	140	30	0,15,30,45	3	YES	
J30-06	2006	150	30	0,15,30,45	3	YES	
J40-06 & J40-14	2006 & 2014	70	40	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J40-06 & J40-14	2006 & 2014	80	40	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J40-06 & J40-14	2006 & 2014	90	40	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J40-06 & J40-14	2006 & 2014	100	40	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J40-06 & J40-14	2006 & 2014	110	40	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J40-06 & J40-14	2006 & 2014	120	40	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J40-06 & J40-14	2006 & 2014	130	40	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J40-06 & J40-14	2006 & 2014	140	40	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J40-06 & J40-14	2006 & 2014	150	40	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J44-06 & J44-14	2006 & 2014	70	44	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J44-06 & J44-14	2006 & 2014	80	44	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J44-06 & J44-14	2006 & 2014	90	44	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J44-06 & J44-14	2006 & 2014	100	44	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J44-06 & J44-14	2006 & 2014	110	44	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J44-06 & J44-14	2006 & 2014	120	44	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J44-06 & J44-14	2006 & 2014	130	44	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J44-06 & J44-14	2006 & 2014	140	44	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
J44-06 & J44-14	2006 & 2014	150	44	0,15,30,45	3	YES	2006 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.

RS Standards

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	Spans	Modeled as Part of TR-832	Comments
RS40-04	2004	160	40	0,10,20,30	3	YES	
RS40-04	2004	180	40	0,10,20,30	3	YES	
RS40-04	2004	200	40	0,10,20,30	3	YES	
RS40-04	2004	220	40	0,10,20,30	3	YES	
RS40-04	2004	240	40	0,10,20,30	3	YES	
RS40-04	2004	260	40	0,10,20,30	3	YES	
RS40-04	2004	280	40	0,10,20,30	3	YES	
RS40-04	2004	300	40	0,10,20,30	3	YES	
RS40-10 & RS40-14	2010 & 2014	160	40	0,10,20,30,45	3	YES	2010 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
RS40-10 & RS40-14	2010 & 2014	180	40	0,10,20,30,45	3	YES	2010 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
RS40-10 & RS40-14	2010 & 2014	200	40	0,10,20,30,45	3	YES	2010 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
RS40-10 & RS40-14	2010 & 2014	220	40	0,10,20,30,45	3	YES	2010 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
RS40-10 & RS40-14	2010 & 2014	240	40	0,10,20,30,45	3	YES	2010 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
RS40-10 & RS40-14	2010 & 2014	260	40	0,10,20,30,45	3	YES	2010 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
RS40-10 & RS40-14	2010 & 2014	280	40	0,10,20,30,45	3	YES	2010 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
RS40-10 & RS40-14	2010 & 2014	300	40	0,10,20,30,45	3	YES	2010 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
RS40-10 & RS40-14	2010 & 2014	320	40	0,10,20,30,45	3	YES	2010 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
RS40-10 & RS40-14	2010 & 2014	340	40	0,10,20,30,45	3	YES	2010 & 2014 were modeled as one. They are the same except 2014 uses stainless steel in the barrier rails.
RS40-10 & RS40-14	2017	160	40	10, 20, 30	3	YES	Diaphragm spacings were adjusted.
RS40-10 & RS40-14	2017	180	40	0, 10, 20, 30	3	YES	Diaphragm spacings were adjusted.
RS40-10 & RS40-14	2017	200	40	10, 20, 30	3	YES	Diaphragm spacings were adjusted.
RS40-10 & RS40-14	2017	220	40	0, 10, 20, 30	3	YES	Diaphragm spacings were adjusted.

V Standards

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	Spans	Modeled as Part of TR-832	Comments
V1	1915	16	16	0	1	NO	Was not modeled as part of TR-832
V1	1915	18	16	0	1	NO	Was not modeled as part of TR-832
V1	1915	20	16	0	1	YES	
V1	1915	22	16	0	1	YES	
V1	1915	24	16	0	1	YES	
V1	1915	26	16	0	1	YES	
V1	1915	28	16	0	1	YES	
V1	1915	30	16	0	1	YES	
V1	1915	32	16	0	1	YES	
V1	1915	16	18	0	1	NO	Was not modeled as part of TR-832
V1	1915	18	18	0	1	NO	Was not modeled as part of TR-832
V1	1915	20	18	0	1	YES	
V1	1915	22	18	0	1	YES	
V1	1915	24	18	0	1	YES	
V1	1915	26	18	0	1	YES	
V1	1915	28	18	0	1	YES	
V1	1915	30	18	0	1	YES	
V1	1915	32	18	0	1	YES	
V1	1915	16	20	0	1	NO	Was not modeled as part of TR-832
V1	1915	18	20	0	1	NO	Was not modeled as part of TR-832
V1	1915	20	20	0	1	YES	
V1	1915	22	20	0	1	YES	
V1	1915	24	20	0	1	YES	
V1	1915	26	20	0	1	YES	
V1	1915	28	20	0	1	YES	
V1	1915	30	20	0	1	YES	
V1	1915	32	20	0	1	YES	

V Standards cont.

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	Spans	Modeled as Part of TR-832	Comments
V1A	1928/1931	16	20	0	1	NO	Was not modeled as part of TR-832
V1A	1928/1931	20	20	0	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V1A	1928/1931	24	20	0	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V1A	1928/1931	28	20	0	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V1A	1928/1931	32	20	0	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V1A	1928/1931	36	20	0	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V1A	1928/1931	50	20	0	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V1B	1928/1931/1934	16	18	0, 20, 30 , 45	1	NO	Was not modeled as part of TR-832
V1B	1928/1931/1934	20	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1B	1928/1931/1934	24	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1B	1928/1931/1934	28	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1B	1928/1931/1934	32	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1B	1928/1931/1934	36	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1B	1928/1931/1934	40	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1B	1928/1931/1934	16	20	0, 20, 30 , 45	1	NO	Was not modeled as part of TR-832
V1B	1928/1931/1934	20	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1B	1928/1931/1934	24	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1B	1928/1931/1934	28	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1B	1928/1931/1934	32	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1B	1928/1931/1934	36	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1B	1928/1931/1934	40	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1C	1928/1931/1934	16	16	0	1	NO	Was not modeled as part of TR-832
V1C	1928/1931/1934	20	16	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1C	1928/1931/1934	24	16	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1C	1928/1931/1934	28	16	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1C	1928/1931/1934	32	16	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1C	1928/1931/1934	36	16	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V1C	1928/1931/1934	40	16	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V2	1915	16	16	0	1	YES	
V2	1915	18	16	0	1	YES	
V2	1915	20	16	0	1	YES	
V2	1915	22	16	0	1	YES	
V2	1915	24	16	0	1	YES	
V2	1915	26	16	0	1	YES	
V2	1915	28	16	0	1	YES	
V2	1915	30	16	0	1	YES	
V2	1915	32	16	0	1	YES	
V2B	1928/1931/1934	16	18	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V2B	1928/1931/1934	20	18	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V2B	1928/1931/1934	24	18	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V2B	1928/1931/1934	28	18	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V2B	1928/1931/1934	32	18	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V2B	1928/1931/1934	38	18	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V2B	1928/1931/1934	40	18	0	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V3	1915	16	16	0	1	NO	Was not modeled as part of TR-832
V3	1915	18	16	0	1	NO	Was not modeled as part of TR-832
V3	1915	20	16	0	1	YES	
V3	1915	22	16	0	1	YES	
V3	1915	24	16	0	1	YES	
V3	1915	26	16	0	1	YES	
V3	1915	28	16	0	1	YES	
V3	1915	30	16	0	1	YES	
V3	1915	32	16	0	1	YES	
V3	1915	16	18	0	1	NO	Was not modeled as part of TR-832
V3	1915	18	18	0	1	NO	Was not modeled as part of TR-832
V3	1915	20	18	0	1	YES	
V3	1915	22	18	0	1	YES	
V3	1915	24	18	0	1	YES	
V3	1915	26	18	0	1	YES	
V3	1915	28	18	0	1	YES	
V3	1915	30	18	0	1	YES	
V3	1915	32	18	0	1	YES	
V3	1915	16	20	0	1	NO	Was not modeled as part of TR-832
V3	1915	18	20	0	1	NO	Was not modeled as part of TR-832
V3	1915	20	20	0	1	YES	
V3	1915	22	20	0	1	YES	
V3	1915	24	20	0	1	YES	
V3	1915	26	20	0	1	YES	
V3	1915	28	20	0	1	YES	
V3	1915	30	20	0	1	YES	
V3	1915	32	20	0	1	YES	
V3A	1928/1931/1934	16	24	0, 15, 30, 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V3A	1928/1931/1934	20	24	0, 15, 30, 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V3A	1928/1931/1934	24	24	0, 15, 30, 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V3A	1928/1931/1934	28	24	0, 15, 30, 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V3A	1928/1931/1934	32	24	0, 15, 30, 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V3A	1928/1931/1934	36	24	0, 15, 30, 45	1	YES	Modeled 1928 with 1931 & 1934 revisions as one, used the most conservative beam.
V3A	1928/1931	40	24	0, 15, 30, 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3A	1934	40	24	0, 15, 30, 45	1	YES	The 1928 standard has 40' spans with cover plates while 1934 does not.
V3B	1928/1931	16	18	0, 20, 30 , 45	1	NO	Was not modeled as part of TR-832
V3B	1928/1931	20	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3B	1928/1931	24	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3B	1928/1931	28	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3B	1928/1931	32	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3B	1928/1931	36	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3B	1928/1931	40	18	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3B	1928/1931	16	20	0, 20, 30 , 45	1	NO	Was not modeled as part of TR-832
V3B	1928/1931	20	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3B	1928/1931	24	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3B	1928/1931	28	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3B	1928/1931	32	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3B	1928/1931	36	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.
V3B	1928/1931	40	20	0, 20, 30 , 45	1	YES	Modeled 1928 with 1931 revision as one, used the most conservative beam.

V Standards cont.

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	Spans	Modeled as Part of TR-832	Comments
V3B	1934	16	18	0, 20, 30 , 45	1	NO	Was not modeled as part of TR-832
V3B	1934	20	18	0, 20, 30 , 45	1	YES	
V3B	1934	24	18	0, 20, 30 , 45	1	YES	
V3B	1934	28	18	0, 20, 30 , 45	1	YES	
V3B	1934	32	18	0, 20, 30 , 45	1	YES	
V3B	1934	36	18	0, 20, 30 , 45	1	YES	
V3B	1934	40	18	0, 20, 30 , 45	1	YES	
V3B	1934	16	20	0, 20, 30 , 45	1	NO	Was not modeled as part of TR-832
V3B	1934	20	20	0, 20, 30 , 45	1	YES	
V3B	1934	24	20	0, 20, 30 , 45	1	YES	
V3B	1934	28	20	0, 20, 30 , 45	1	YES	
V3B	1934	32	20	0, 20, 30 , 45	1	YES	
V3B	1934	36	20	0, 20, 30 , 45	1	YES	
V3B	1934	40	20	0, 20, 30 , 45	1	YES	
V4	1915	16	16	0	1	NO	Was not modeled as part of TR-832
V4	1915	18	16	0	1	NO	Was not modeled as part of TR-832
V4	1915	20	16	0	1	YES	
V4	1915	22	16	0	1	YES	
V4	1915	24	16	0	1	YES	
V4	1915	26	16	0	1	YES	
V4	1915	28	16	0	1	YES	
V4	1915	30	16	0	1	YES	
V4	1915	32	16	0	1	YES	
V4	1915	16	18	0	1	NO	Was not modeled as part of TR-832
V4	1915	18	18	0	1	NO	Was not modeled as part of TR-832
V4	1915	20	18	0	1	YES	
V4	1915	22	18	0	1	YES	
V4	1915	24	18	0	1	YES	
V4	1915	26	18	0	1	YES	
V4	1915	28	18	0	1	YES	
V4	1915	30	18	0	1	YES	
V4	1915	32	18	0	1	YES	
V4B	1928/1931/1934	16	18	0	1	YES	wood deck
V4B	1928/1931/1934	20	18	0	1	YES	wood deck
V4B	1928/1931/1934	24	18	0	1	YES	wood deck
V4B	1928/1931/1934	28	18	0	1	YES	wood deck
V4B	1928/1931/1934	32	18	0	1	YES	wood deck
V4B	1928/1931/1934	36	18	0	1	YES	wood deck
V4B	1928/1931/1934	40	18	0	1	YES	wood deck
V4B	1928/1931/1934	16	18	0	1	YES	concrete deck
V4B	1928/1931/1934	20	18	0	1	YES	concrete deck
V4B	1928/1931/1934	24	18	0	1	YES	concrete deck
V4B	1928/1931/1934	28	18	0	1	YES	concrete deck
V4B	1928/1931/1934	32	18	0	1	YES	concrete deck
V4B	1928/1931/1934	36	18	0	1	YES	concrete deck
V4B	1928/1931/1934	40	18	0	1	YES	concrete deck
V5B	1936	16	18	0	1	YES	
V5B	1936	20	18	0	1	YES	
V5B	1936	24	18	0	1	YES	
V5B	1936	28	18	0	1	YES	
V5B	1936	32	18	0	1	YES	
V5B	1936	36	18	0	1	YES	
V5B	1936	40	18	0	1	YES	
V5B	1936	16	20	0	1	YES	
V5B	1936	20	20	0	1	YES	
V5B	1936	24	20	0	1	YES	
V5B	1936	28	20	0	1	YES	
V5B	1936	32	20	0	1	YES	
V5B	1936	36	20	0	1	YES	
V5B	1936	40	20	0	1	YES	
V5B	1947	16	18	0	1	YES	
V5B	1947	20	18	0	1	YES	
V5B	1947	24	18	0	1	YES	
V5B	1947	28	18	0	1	YES	
V5B	1947	32	18	0	1	YES	
V5B	1947	36	18	0	1	YES	
V5B	1947	40	18	0	1	YES	
V5B	1947	16	20	0	1	YES	
V5B	1947	20	20	0	1	YES	
V5B	1947	24	20	0	1	YES	
V5B	1947	28	20	0	1	YES	
V5B	1947	32	20	0	1	YES	
V5B	1947	36	20	0	1	YES	
V5B	1947	40	20	0	1	YES	
V6	1939	120	20	0	3	YES	
V6	1939	150	20	0	3	YES	
V6	1939	180	20	0	3	YES	
V6	1939	210	20	0	3	YES	
V6	1939	240	20	0	3	YES	
V6	1946	120	20	0	3	YES	
V6	1946	150	20	0	3	YES	
V6	1946	180	20	0	3	YES	
V6	1946	210	20	0	3	YES	
V6	1946	240	20	0	3	YES	
V7	1939	120	22	0	3	YES	
V7	1939	150	22	0	3	YES	
V7	1939	180	22	0	3	YES	
V7	1939	210	22	0	3	YES	
V7	1939	240	22	0	3	YES	
V7	1946	120	22	0	3	YES	
V7	1946	150	22	0	3	YES	
V7	1946	180	22	0	3	YES	
V7	1946	210	22	0	3	YES	
V7	1946	240	22	0	3	YES	
V8	1941	24	22	0	1	YES	
V8	1941	28	22	0	1	YES	
V8	1941	32	22	0	1	YES	
V8	1941	36	22	0	1	YES	
V8	1941	40	22	0	1	YES	

V Standards cont.

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	Spans	Modeled as Part of TR-832	Comments
V8	1947	24	22	0	1	YES	
V8	1947	28	22	0	1	YES	
V8	1947	32	22	0	1	YES	
V8	1947	36	22	0	1	YES	
V8	1947	40	22	0	1	YES	
V9	1950	23.75	20	0,15,30	1	YES	Only modeled simple span but can be combined into two and three span bridges.
V9	1950	30	20	0,15,30	1	YES	Only modeled simple span but can be combined into two and three span bridges.
V9	1950	42.5	20	0,15,30	1	YES	Only modeled simple span but can be combined into two and three span bridges.
V9	1950	55	20	0,15,30	1	YES	Only modeled simple span but can be combined into two and three span bridges.
V9	1950	67.5	20	0,15,30	1	YES	Only modeled simple span but can be combined into two and three span bridges.
V9	1950	80	20	0,15,30	1	YES	Only modeled simple span but can be combined into two and three span bridges.
V9	1964	23.75	20	0,15,30	1	YES	
V9	1964	30	20	0,15,30	1	YES	
V9	1964	42.5	20	0,15,30	1	YES	
V9	1964	55	20	0,15,30	1	YES	
V9	1964	67.5	20	0,15,30	1	YES	
V9	1964	80	20	0,15,30	1	YES	
V9A	1957	23.75	20	0, 20, 30, 45	1	YES	
V9A	1957	30	20	0, 20, 30, 45	1	YES	
V9A	1957	42.5	20	0, 20, 30, 45	1	YES	
V9A	1957	55	20	0, 20, 30, 45	1	YES	
V9A	1957	67.5	20	0, 20, 30, 45	1	YES	
V9A	1957	80	20	0, 20, 30, 45	1	YES	
V10	1951	125	20	0,15,30,45	3	YES	Only modeled 0°, 30°, & 45° skews. 15° skew for this standards was not found to be in-service and was not modeled.
V10	1951	150	20	0,15,30,45	3	YES	Only modeled 0°, 15°, & 30° skews. 45° skew for this standards was not found to be in-service and was not modeled.
V10	1951	175	20	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V10	1951	200	20	0,15,30,45	3	YES	
V10	1951	250	20	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V10	1951	300	20	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V10	1964	125	20	0,15,30,45	3	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V10	1964	150	20	0,15,30,45	3	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V10	1964	175	20	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V10	1964	200	20	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V10	1964	225	20	0,15,30,45	3	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V10	1964	250	20	0,15,30,45	3	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V10	1964	300	20	0,15,30,45	3	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V10	1964	174	20	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V10	1964	208.5	20	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V10	1964	243	20	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V10	1964	278	20	0,15,30,45	4	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V10	1964	313	20	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V10	1964	347.5	20	0,15,30,45	4	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V10	1964	417	20	0,15,30,45	4	YES	Only modeled 15° skew. 0°, 30°, & 45° skews for this standards were not found to be in-service and was not modeled.
V10	1964	223	20	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V10	1964	267	20	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V10	1964	311	20	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V10	1964	356	20	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V10	1964	401	20	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V10	1964	445	20	0,15,30,45	5	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V10	1964	534	20	0,15,30,45	5	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V10A	1957	125	20	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V10A	1957	150	20	0,15,30,45	3	YES	Only modeled 0°, 15°, & 30° skews. 45° skew for this standards was not found to be in-service and was not modeled.
V10A	1957	175	20	0,15,30,45	3	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V10A	1957	200	20	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V10A	1957	250	20	0,15,30,45	3	YES	Only modeled 0° & 15° skews. 30° & 45° skews for this standards were not found to be in-service and was not modeled.
V10A	1957	300	20	0,15,30,45	3	YES	Only modeled 0° & 15° skews. 30° & 45° skews for this standards were not found to be in-service and was not modeled.
V11	1957	23.75	24	0	1	YES	
V11	1957	30	24	0	1	YES	
V11	1957	42.5	24	0	1	YES	
V11	1957	55	24	0	1	YES	
V11	1957	67.5	24	0	1	YES	
V11	1957	80	24	0	1	YES	
V11	1964	23.75	24	0,15,30	1	YES	
V11	1964	30	24	0,15,30	1	YES	
V11	1964	42.5	24	0,15,30	1	YES	
V11	1964	55	24	0,15,30	1	YES	
V11	1964	67.5	24	0,15,30	1	YES	
V11	1964	80	24	0,15,30	1	YES	
V12	1957	125	24	0,15,30,45	3	YES	Only modeled 0°, 30°, & 45° skews. 15° skew for this standards was not found to be in-service and was not modeled.
V12	1957	150	24	0,15,30,45	3	YES	
V12	1957	175	24	0,15,30,45	3	YES	
V12	1957	200	24	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V12	1957	250	24	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V12	1957	300	24	0,15,30,45	3	YES	Only modeled 0°, 15°, & 30° skews. 45° skew for this standards was not found to be in-service and was not modeled.
V12	1957	174	24	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V12	1957	208.5	24	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V12	1957	243	24	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V12	1957	278	24	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V12	1957	313	24	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V12	1957	347.5	24	0,15,30,45	4	YES	Only modeled 45° skew. 0°, 15°, & 30° skews for this standards were not found to be in-service and was not modeled.
V12	1957	417	24	0,15,30,45	4	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V12	1957	223	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V12	1957	267	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V12	1957	311	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V12	1957	356	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V12	1957	401	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V12	1957	445	24	0,15,30,45	5	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V12	1957	534	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V12	1964	125	24	0,15,30,45	3	YES	Only modeled 0°, 15°, & 45° skews. 30° skew for this standards was not found to be in-service and was not modeled.
V12	1964	150	24	0,15,30,45	3	YES	Only modeled 0°, 15°, & 30° skews. 45° skew for this standards was not found to be in-service and was not modeled.
V12	1964	175	24	0,15,30,45	3	YES	
V12	1964	200	24	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V12	1964	225	24	0,15,30,45	3	YES	
V12	1964	250	24	0,15,30,45	3	YES	Only modeled 0°, 15°, & 30° skews. 45° skew for this standards was not found to be in-service and was not modeled.
V12	1964	174	24	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V12	1964	208.5	24	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V12	1964	243	24	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V12	1964	278	24	0,15,30,45	4	YES	Only modeled 0°, 15°, & 45° skews. 30° skew for this standards was not found to be in-service and was not modeled.
V12	1964	313	24	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V12	1964	347.5	24	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.

V Standards cont.

Standard	Year	Lengths (ft)	Roadway (ft)	Skew (degree)	Spans	Modeled as Part of TR-832	Comments
V12	1964	223	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V12	1964	267	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V12	1964	311	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V12	1964	356	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V12	1964	401	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V12	1964	445	24	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V13	1960	23.75	28	0,15,30,45	1	YES	
V13	1960	30	28	0,15,30,45	1	YES	
V13	1960	42.5	28	0,15,30,45	1	YES	
V13	1960	55	28	0,15,30,45	1	YES	
V13	1960	67.5	28	0,15,30,45	1	YES	
V14	1960	125	28	0,15,30,45	3	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V14	1960	150	28	0,15,30,45	3	YES	
V14	1960	175	28	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V14	1960	200	28	0,15,30,45	3	YES	Only modeled 0°, 30°, & 45° skews. 15° skew for this standards was not found to be in-service and was not modeled.
V14	1960	225	28	0,15,30,45	3	YES	Only modeled 0°, 15°, & 45° skews. 30° skew for this standards was not found to be in-service and was not modeled.
V14	1960	250	28	0,15,30,45	3	YES	Only modeled 0°, 30°, & 45° skews. 15° skew for this standards was not found to be in-service and was not modeled.
V14	1960	174	28	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V14	1960	208.5	28	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V14	1960	243	28	0,15,30,45	4	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V14	1960	278	28	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V14	1960	313	28	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V14	1960	347.5	28	0,15,30,45	4	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V14	1960	223	28	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V14	1960	267	28	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V14	1960	311	28	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V14	1960	356	28	0,15,30,45	5	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V14	1960	401	28	0,15,30,45	5	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V14	1960	445	28	0,15,30,45	5	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V14	1964	125	28	0,15,30,45	3	YES	Only modeled 0°, 15°, & 30° skews. 45° skew for this standards was not found to be in-service and was not modeled.
V14	1964	150	28	0,15,30,45	3	YES	
V14	1964	175	28	0,15,30,45	3	YES	Only modeled 0°, 15°, & 30° skews. 45° skew for this standards was not found to be in-service and was not modeled.
V14	1964	200	28	0,15,30,45	3	YES	Only modeled 0°, 15°, & 30° skews. 45° skew for this standards was not found to be in-service and was not modeled.
V14	1964	225	28	0,15,30,45	3	YES	
V14	1964	250	28	0,15,30,45	3	YES	
V14	1964	174	28	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V14	1964	208.5	28	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V14	1964	243	28	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V14	1964	278	28	0,15,30,45	4	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V14	1964	313	28	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V14	1964	347.5	28	0,15,30,45	4	YES	Only modeled 0°, 15°, & 30° skews. 45° skew for this standards was not found to be in-service and was not modeled.
V14	1964	223	28	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V14	1964	267	28	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V14	1964	311	28	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V14	1964	356	28	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V14	1964	401	28	0,15,30,45	5	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V14	1964	445	28	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V15-75	1975	23.75	30	0,15,30	1	YES	
V15-75	1975	30	30	0,15,30	1	YES	
V15-75	1975	42.5	30	0,15,30	1	YES	
V15-75	1975	55	30	0,15,30	1	YES	
V15-75	1975	67	30	0,15,30	1	YES	
V15-75	1975	80	30	0,15,30	1	YES	
V16-70	1970	125	30	0,15,30,45	3	YES	Only modeled 0° & 45° skews. 15° & 30° skews for this standards were not found to be in-service and was not modeled.
V16-70	1970	150	30	0,15,30,45	3	YES	
V16-70	1970	175	30	0,15,30,45	3	YES	Only modeled 0°, 15°, & 45° skews. 30° skew for this standards was not found to be in-service and was not modeled.
V16-70	1970	200	30	0,15,30,45	3	YES	Only modeled 0°, 30°, & 45° skews. 15° skew for this standards was not found to be in-service and was not modeled.
V16-70	1970	225	30	0,15,30,45	3	YES	Only modeled 0°, 15°, & 30° skews. 45° skew for this standards was not found to be in-service and was not modeled.
V16-70	1970	250	30	0,15,30,45	3	YES	
V16-70	1970	174	30	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V16-70	1970	208.5	30	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V16-70	1970	243	30	0,15,30,45	4	NO	This standards was not found to be in-service and was not modeled.
V16-70	1970	278	30	0,15,30,45	4	YES	Only modeled 0° & 15° skews. 30° & 45° skews for this standards were not found to be in-service and was not modeled.
V16-70	1970	313	30	0,15,30,45	4	YES	Only modeled 0° & 45° skews. 15° & 30° skews for this standards were not found to be in-service and was not modeled.
V16-70	1970	347.5	30	0,15,30,45	4	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V16-70	1970	223	30	0,15,30,45	5	YES	
V16-70	1970	267	30	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V16-70	1970	311	30	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V16-70	1970	356	30	0,15,30,45	5	NO	This standards was not found to be in-service and was not modeled.
V16-70	1970	401	30	0,15,30,45	5	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V16-70	1970	445	30	0,15,30,45	5	YES	Only modeled 30° skew. 0°, 15°, & 45° skews for this standards were not found to be in-service and was not modeled.
V30C-79	1979	125	30	0,15,30,45	3	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V30C-79	1979	150	30	0,15,30,45	3	YES	Only modeled 0°, 15°, & 45° skews. 30° skew for this standards was not found to be in-service and was not modeled.
V30C-79	1979	175	30	0,15,30,45	3	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.
V30C-79	1979	200	30	0,15,30,45	3	YES	Only modeled 0° & 15° skews. 30° & 45° skews for this standards were not found to be in-service and was not modeled.
V30C-79	1979	225	30	0,15,30,45	3	YES	Only modeled 0° & 30° skews. 15° & 45° skews for this standards were not found to be in-service and was not modeled.
V30C-79	1979	250	30	0,15,30,45	3	YES	Only modeled 0° skew. 15°, 30°, & 45° skews for this standards were not found to be in service and was not modeled.

Truss Standards

Standard	Year	Length (ft)	Roadway (ft)	Deck	Pony or High Truss	Modeled as Part of TR-832	Comments
S1	1925/1928/1931	100	20	Concrete	High	YES	Modeled 1928 & 1931 revisions as one using the most conservative. 1925 plans could not be found and were not considered.
S2	1925/1928/1931	110	20	Concrete	High	YES	Modeled 1928 & 1931 revisions as one using the most conservative. 1925 plans could not be found and were not considered.
S3	1925/1928/1931	120	20	Concrete	High	YES	Modeled 1928 & 1931 revisions as one using the most conservative. 1925 plans could not be found and were not considered.
S4	1925/1928/1931	130	20	Concrete	High	YES	Modeled 1928 & 1931 revisions as one using the most conservative. 1925 plans could not be found and were not considered.
S5	1925/1928/1931	140	20	Concrete	High	NO	This standard was not found to be in-service and was not modeled.
S6	1925/1928/1931	150	20	Concrete	High	YES	Modeled 1928 & 1931 revisions as one using the most conservative. 1925 plans could not be found and were not considered.
S8	1930/1931	160	20	Concrete	High	NO	This standard was not found to be in-service and was not modeled.

Truss Standards cont.

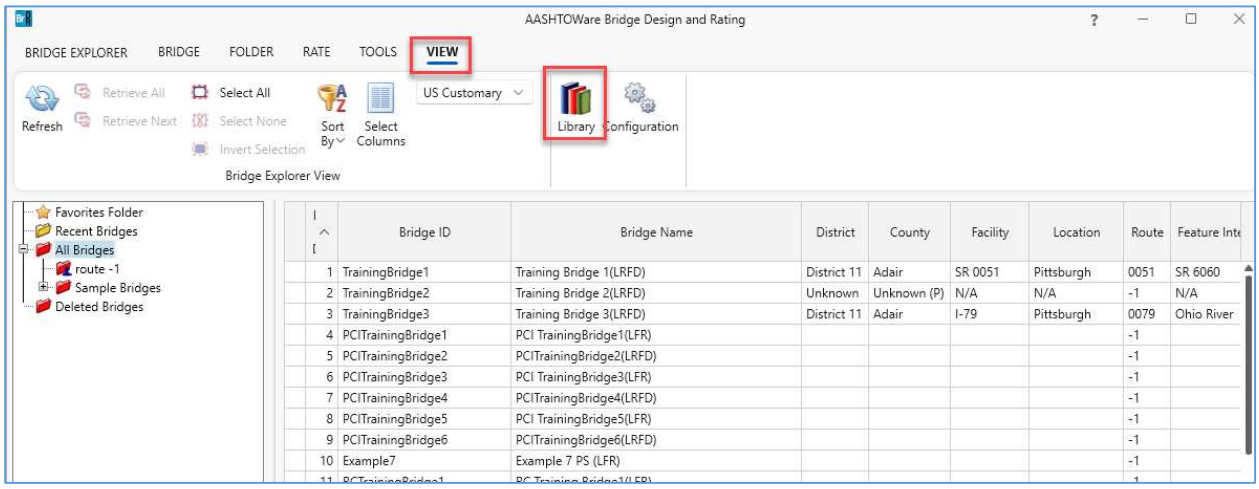
Standard	Year	Length (ft)	Roadway (ft)	Deck	Pony or High Truss	Modeled as Part of TR-832	Comments
T1	1915	90	16	Concrete + Fill	High	YES	
T2	1916	90	18	Concrete + Fill	High	NO	This standard was not found to be in-service and was not modeled.
T3	1915	100	16	Concrete + Fill	High	YES	
T4	1915	100	18	Concrete + Fill	High	YES	
T5	1916	110	16	Concrete + Fill	High	YES	
T6	1916	110	18	Concrete + Fill	High	NO	This standard was not found to be in-service and was not modeled.
T7	1916	120	16	Concrete + Fill	High	NO	This standard was not found to be in-service and was not modeled.
T8	1916	120	18	Concrete + Fill	High	YES	
T9	1917	130	16	Concrete + Fill	High	NO	This standard was not found to be in-service and was not modeled.
T10	1916	130	18	Concrete + Fill	High	YES	
T11	1915	140	16	Concrete + Fill	High	YES	
T12	1915	140	18	Concrete + Fill	High	YES	
T13	1917	150	16	Concrete + Fill	High	NO	This standard was not found to be in-service and was not modeled.
T14	1917	150	18	Concrete + Fill	High	YES	
U1	1928/1929/1931/1937	50	18	Wood	Pony	NO	This standard was not found to be in-service and was not modeled.
U2	1928/1929/1931/1937	60	18	Wood	Pony	NO	This standard was not found to be in-service and was not modeled.
U3	1928/1929/1931/1937	70	18	Wood	Pony	YES	Modeled 1929, 1931, & 1937 revisions as one using the most conservative. 1928 plans could not be found and were not considered.
U4	1928/1929/1931/1937	80	18	Wood	Pony	YES	Modeled 1929, 1931, & 1937 revisions as one using the most conservative. 1928 plans could not be found and were not considered.
U5	1928/1929/1931/1937	90	18	Wood	Pony	YES	Modeled 1929, 1931, & 1937 revisions as one using the most conservative. 1928 plans could not be found and were not considered.
U6	1928/1929/1931/1937	108	18	Wood	High	NO	This standard was not found to be in-service and was not modeled.
U7	1928/1929/1931/1937	126	18	Wood	High	YES	Modeled 1929, 1931, & 1937 revisions as one using the most conservative. 1928 plans could not be found and were not considered.
U8	1928/1929/1931/1937	144	18	Wood	High	NO	This standard was not found to be in-service and was not modeled.
U9	1928/1929/1931/1937	162	18	Wood	High	YES	Modeled 1931 & 1937 revisions as one using the most conservative. 1928 & 1929 plans could not be found and were not considered.
U1	1928/1929/1931/1937	50	18	Concrete	Pony	YES	Modeled 1929, 1931, & 1937 revisions as one using the most conservative. 1928 plans could not be found and were not considered.
U2	1928/1929/1931/1937	60	18	Concrete	Pony	YES	Modeled 1929, 1931, & 1937 revisions as one using the most conservative. 1928 plans could not be found and were not considered.
U3	1928/1929/1931/1937	70	18	Concrete	Pony	YES	Modeled 1929, 1931, & 1937 revisions as one using the most conservative. 1928 plans could not be found and were not considered.
U4	1928/1929/1931/1937	80	18	Concrete	Pony	YES	Modeled 1929, 1931, & 1937 revisions as one using the most conservative. 1928 plans could not be found and were not considered.
U5	1928/1929/1931/1937	90	18	Concrete	Pony	YES	Modeled 1929, 1931, & 1937 revisions as one using the most conservative. 1928 plans could not be found and were not considered.
U6	1928/1929/1931/1937	108	18	Concrete	High	NO	This standard was not found to be in-service and was not modeled.
U7	1928/1929/1931/1937	126	18	Concrete	High	NO	This standard was not found to be in-service and was not modeled.
U8	1928/1929/1931/1937	144	18	Concrete	High	NO	This standard was not found to be in-service and was not modeled.
U9	1928/1929/1931/1937	162	18	Concrete	High	NO	This standard was not found to be in-service and was not modeled.
W1	1924/1925/1928/1931	50	20	Concrete	Pony	YES	Modeled 1928 with 1931 revisions as one using the most conservative. 1924 & 1925 plans could not be found and were not considered.
W2	1924/1925/1928/1931	60	20	Concrete	Pony	YES	Modeled 1928 with 1931 revisions as one using the most conservative. 1924 & 1925 plans could not be found and were not considered.
W3	1924/1925/1928/1931	70	20	Concrete	Pony	YES	Modeled 1928 with 1931 revisions as one using the most conservative. 1924 & 1925 plans could not be found and were not considered.
W4	1924/1925/1928	80	20	Concrete	Pony	YES	Modeled 1928 plans. 1924 & 1925 plans could not be found and were not considered.
W4	1931	80	20	Concrete	Pony	YES	Modeled 1931 revision separate due to variations in the standard.
W5	1924/1925/1928/1931	90	20	Concrete	Pony	YES	Modeled 1928 with 1931 revisions as one using the most conservative. 1924 & 1925 plans could not be found and were not considered.
X1	1914	35	16	Concrete	Pony	YES	
X2	1914	35	18	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
X3	1914	40	16	Concrete	Pony	YES	
X4	1914	40	18	Concrete	Pony	YES	
X5	1914	45	16	Concrete	Pony	YES	
X6	1914	45	18	Concrete	Pony	YES	
X7	1914	50	16	Concrete	Pony	YES	
X8	1914	50	18	Concrete	Pony	YES	
X9	1914	55	16	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
X10	1914	55	18	Concrete	Pony	YES	
X11	1914	60	16	Concrete	Pony	YES	
X12	1914	60	18	Concrete	Pony	YES	
X13	1914	65	16	Concrete	Pony	YES	
X14	1914	65	18	Concrete	Pony	YES	
X15	1914	70	16	Concrete	Pony	YES	
X16	1914	70	18	Concrete	Pony	YES	
X17	1914	75	16	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
X18	1914	75	18	Concrete	Pony	YES	
X19	1914	80	16	Concrete	Pony	YES	
X20	1914	80	18	Concrete	Pony	YES	
X21	1914	85	16	Concrete	Pony	YES	
X22	1914	85	18	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
X23	1914	90	16	Concrete	Pony	YES	
X24	1914	90	18	Concrete	Pony	YES	
X25	1914	95	16	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
X26	1914	95	18	Concrete	Pony	YES	
X27	1914	100	16	Concrete	Pony	YES	
X28	1914	100	18	Concrete	Pony	YES	
Y1	1914	40	16	Concrete	Pony	YES	
Y2	1914	40	18	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
Y3	1914	45	16	Concrete	Pony	YES	
Y4	1914	45	18	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
Y5	1914	50	16	Concrete	Pony	YES	
Y6	1914	50	18	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
Y7	1914	55	16	Concrete	Pony	YES	
Y8	1914	55	18	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
Y9	1914	60	16	Concrete	Pony	YES	
Y10	1914	60	18	Concrete	Pony	YES	
Y11	1914	65	16	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
Y12	1914	65	18	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
Y13	1914	70	16	Concrete	Pony	YES	
Y14	1914	70	18	Concrete	Pony	YES	
Y15	1914	75	16	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
Y16	1914	75	18	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
Y17	1914	80	16	Concrete	Pony	YES	
Y18	1914	80	18	Concrete	Pony	YES	
Y19	1914	85	16	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
Y20	1914	85	18	Concrete	Pony	NO	This standard was not found to be in-service and was not modeled.
Z1	1927/1945	45	16	Wood	Pony	YES	Modeled 1945 revisions. 1927 plans could not be found and were not considered.
Z2	1927/1945	60	16	Wood	Pony	YES	Modeled 1927 with 1945 revisions as one using the most conservative.
Z3	1927/1945	75	16	Wood	Pony	YES	Modeled 1927 with 1945 revisions as one using the most conservative.
Z4	1927/1945	90	16	Wood	Pony	YES	Modeled 1927 with 1945 revisions as one using the most conservative.
Z5	1927/1945	105	16	Wood	High	YES	Modeled 1927 with 1945 revisions as one using the most conservative.
Z6	1927/1945	122.5	16	Wood	High	YES	Modeled 1927 with 1945 revisions as one using the most conservative.
Z7	1927/1945	140	16	Wood	High	YES	Modeled 1927 with 1945 revisions as one using the most conservative.
Z9	1930/1945	157.5	16	Wood	High	YES	Modeled 1945 revisions. 1930 plans could not be found and were not considered.

Iowa DOT Bridge Template Tutorial

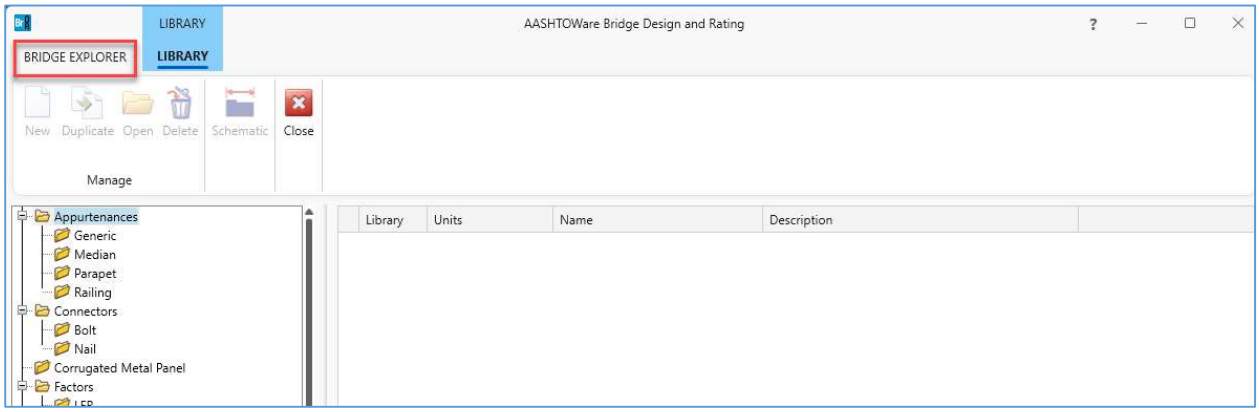
Libraries and System Defaults Quick Start Guide

Library Data

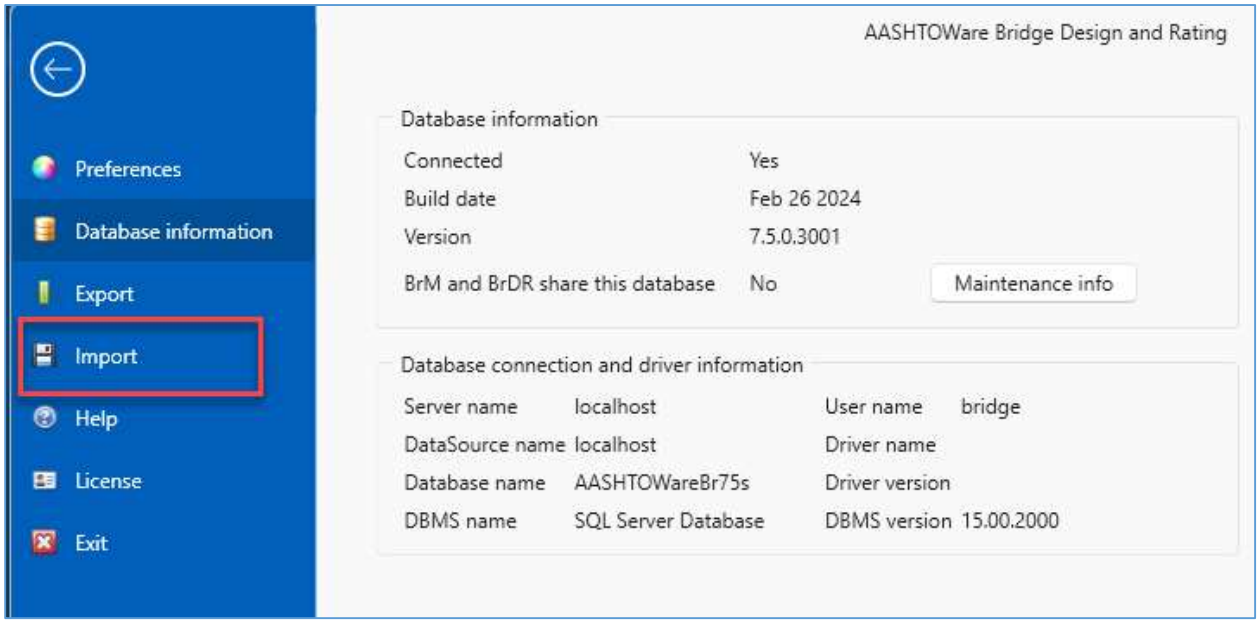
In the Bridge Explorer, click the VIEW tab and then click Library.



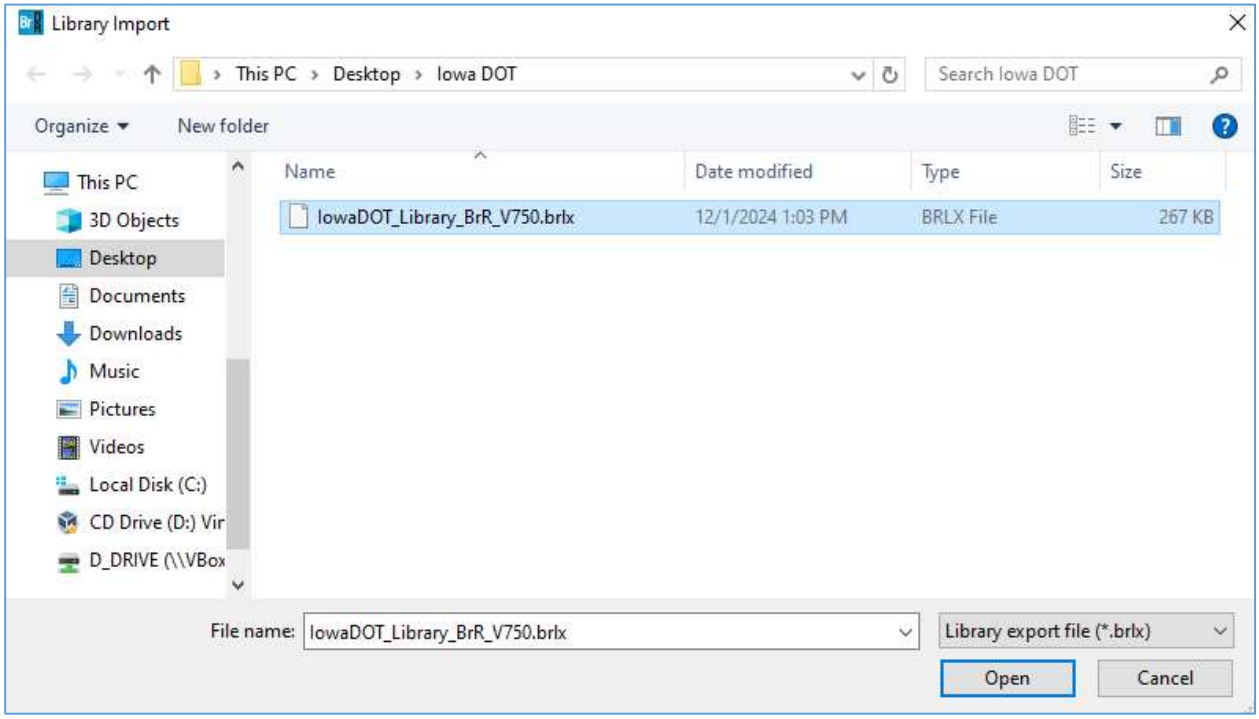
Click BRIDGE EXPLORER in the upper left corner.



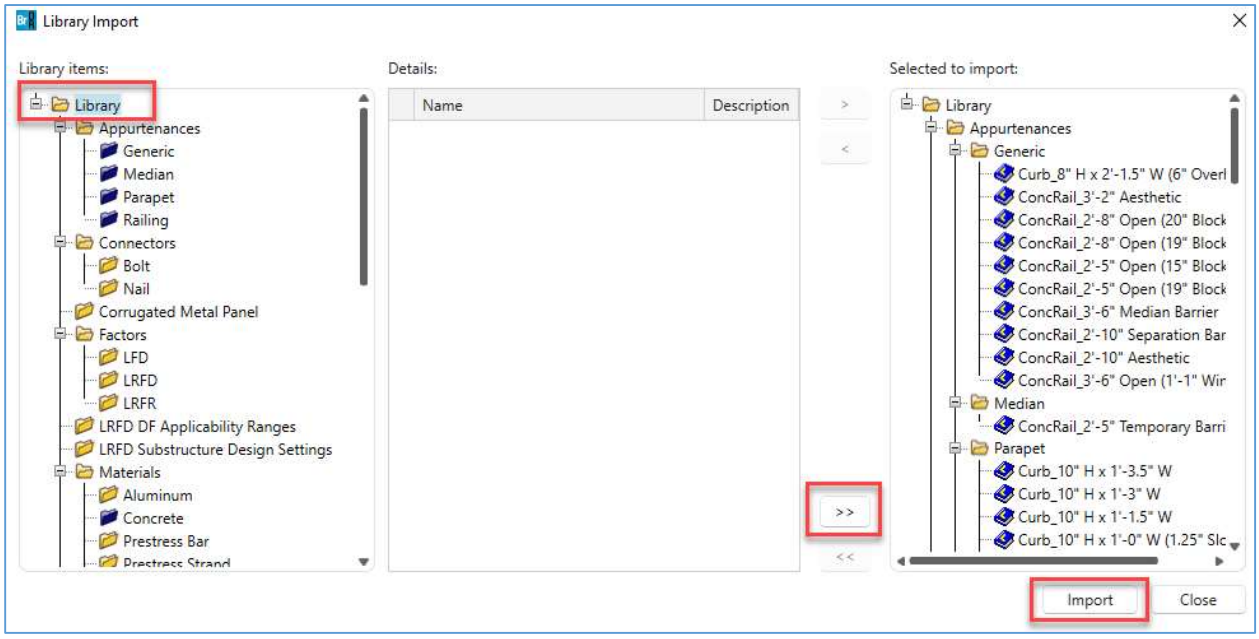
In the tab that opens, click Import.



A file explorer window will open. Navigate to the location where the Library import file is stored. Click the file to select it, and then click Open.

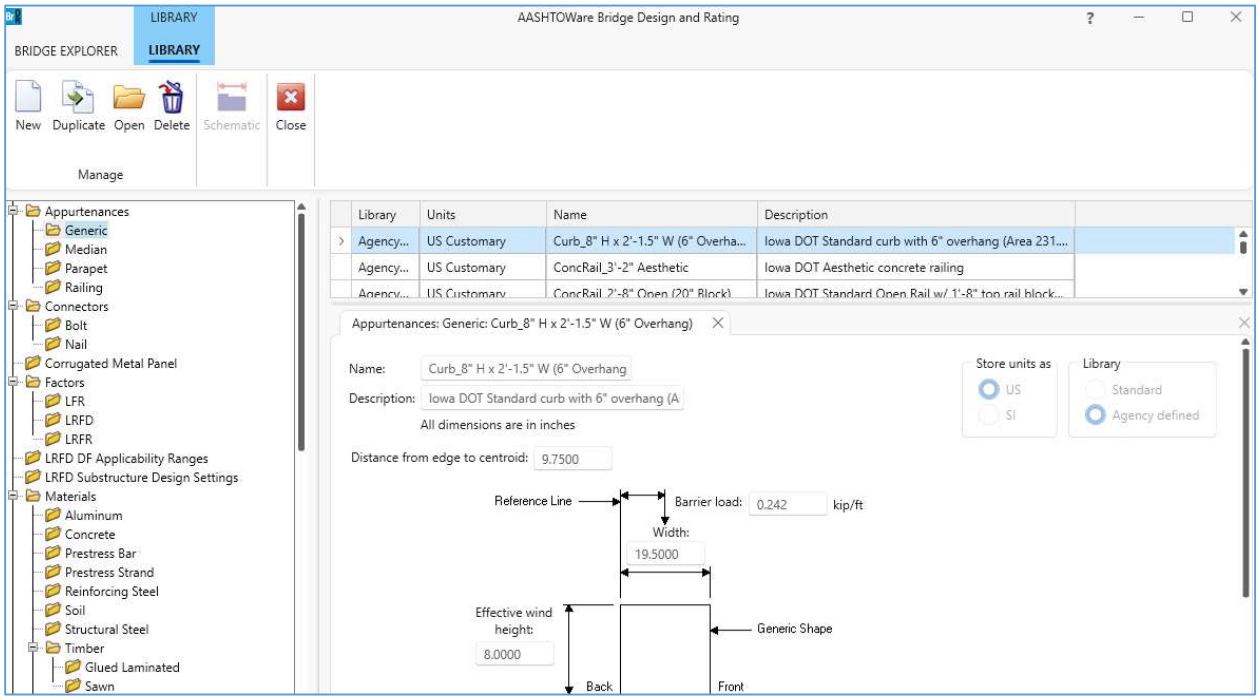


The Library Import window will open. You can click each folder on the left side to view details of the library data that can be imported.



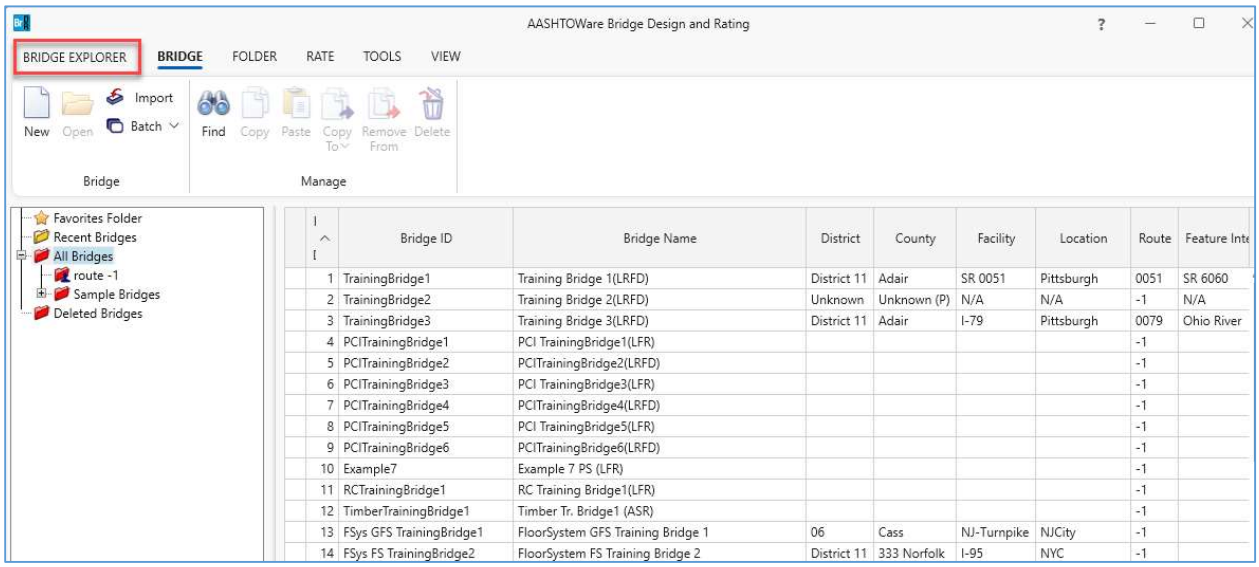
To import all, click the main System Data folder to select all. Then click the >> button. The system data to be imported will populate in the panel on the right side of the window. Click Import.

A message will appear indicating a successful import or providing information about items that were already in the library so did not import. Click OK and then close the Library Import window. The imported items can be viewed in the Library tab.

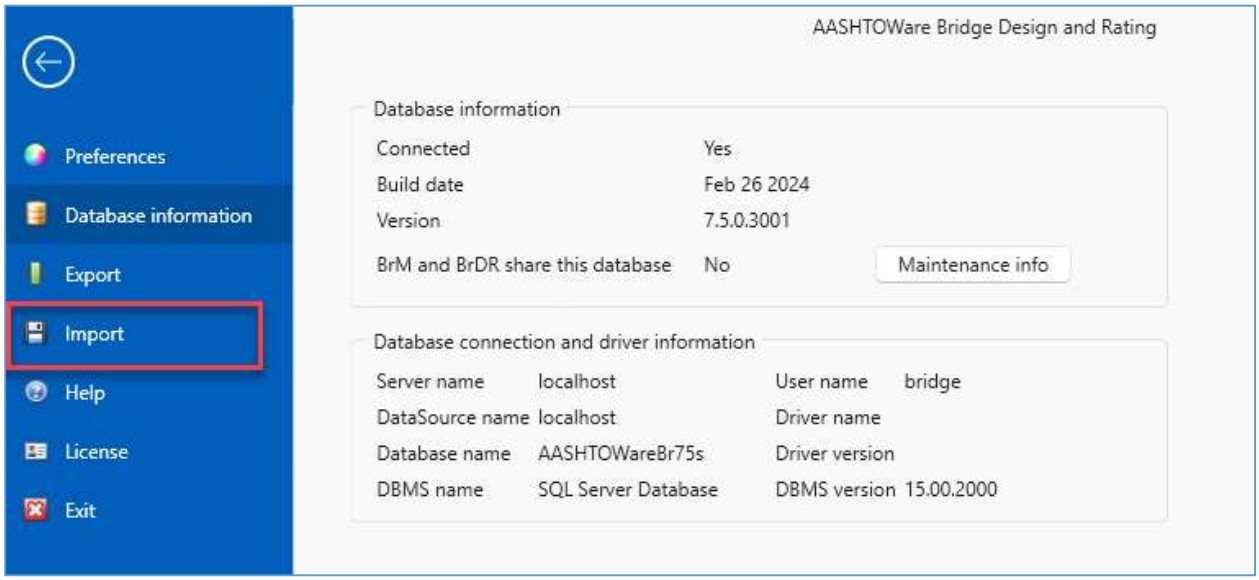


System Data

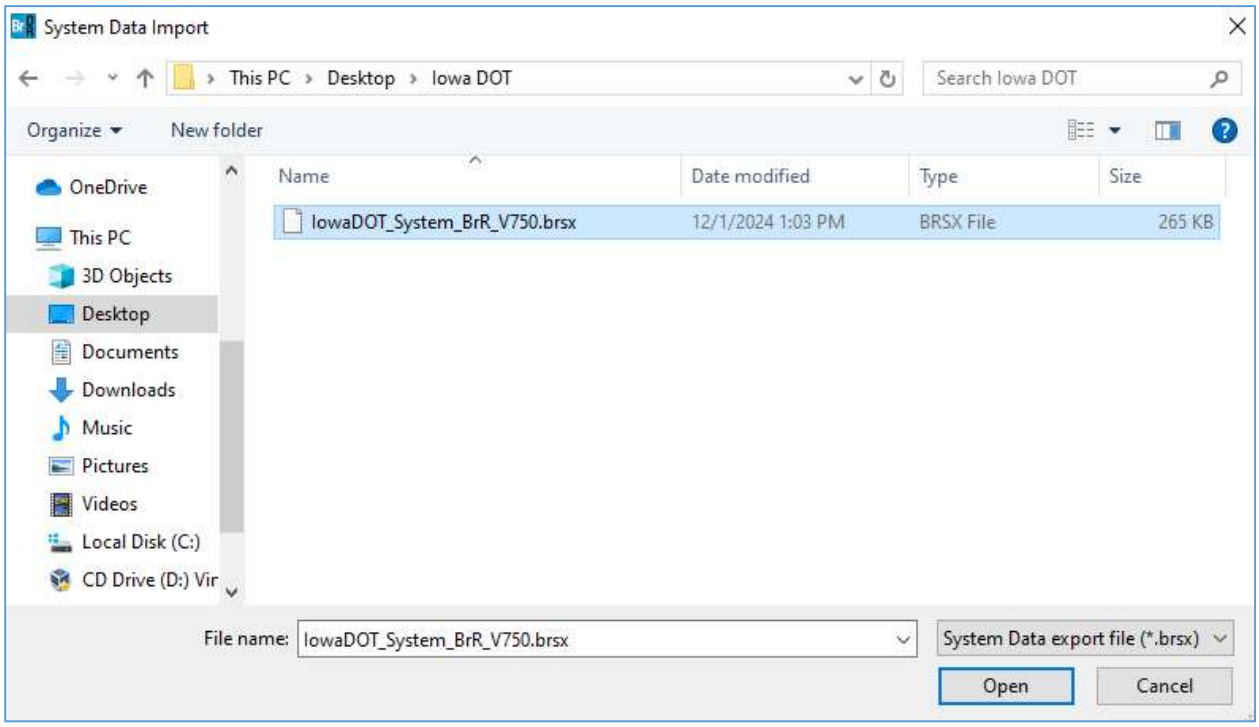
Click BRIDGE EXPLORER in the top left corner.



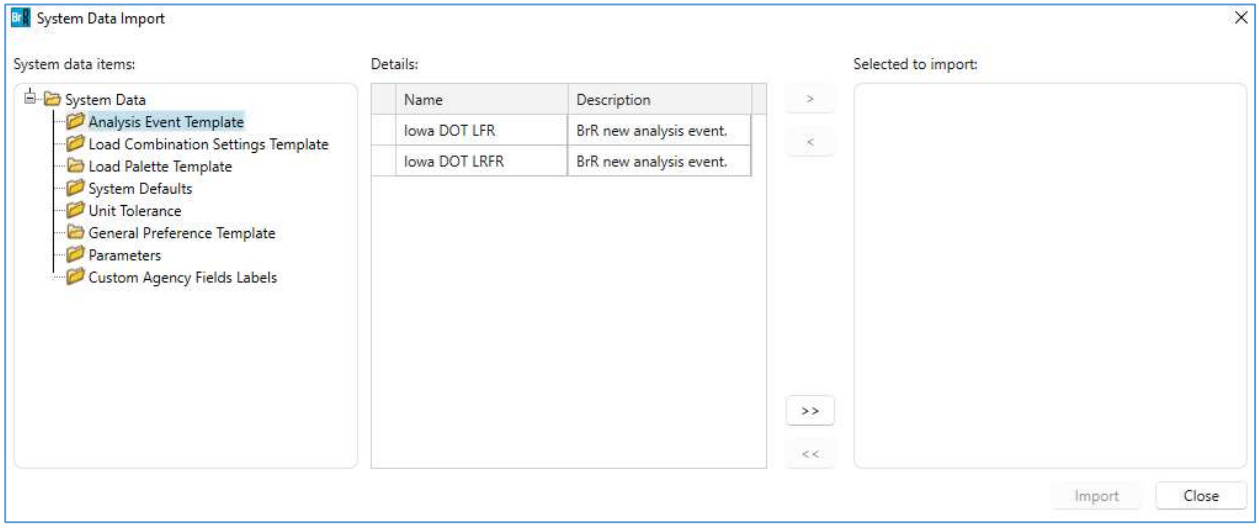
In the tab that opens, click Import.



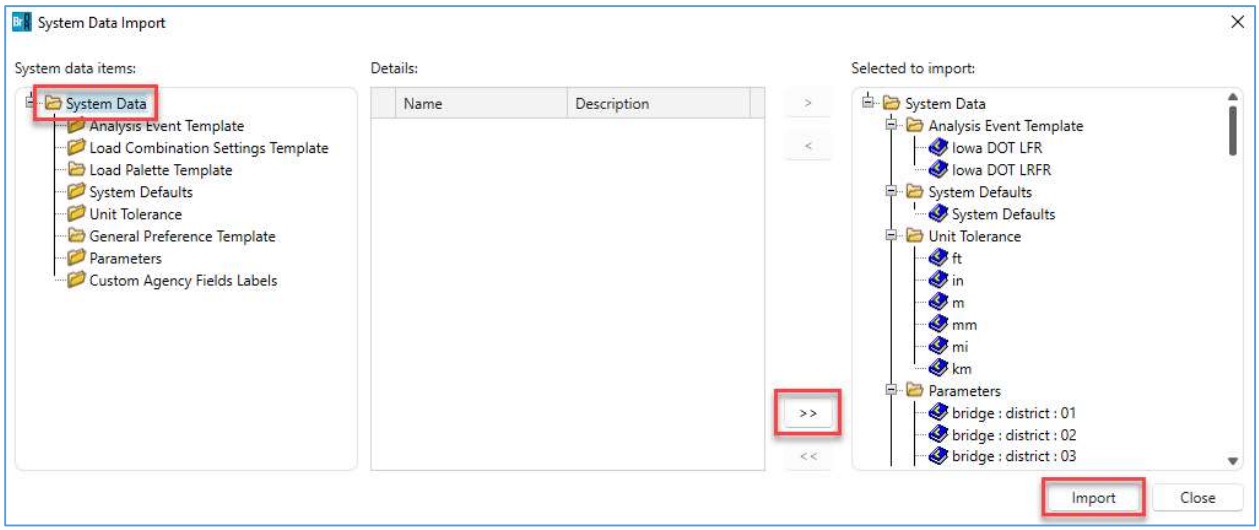
A file explorer window will open. Navigate to the location where the system defaults file has been saved. Click on the file to select it, and then click Open.



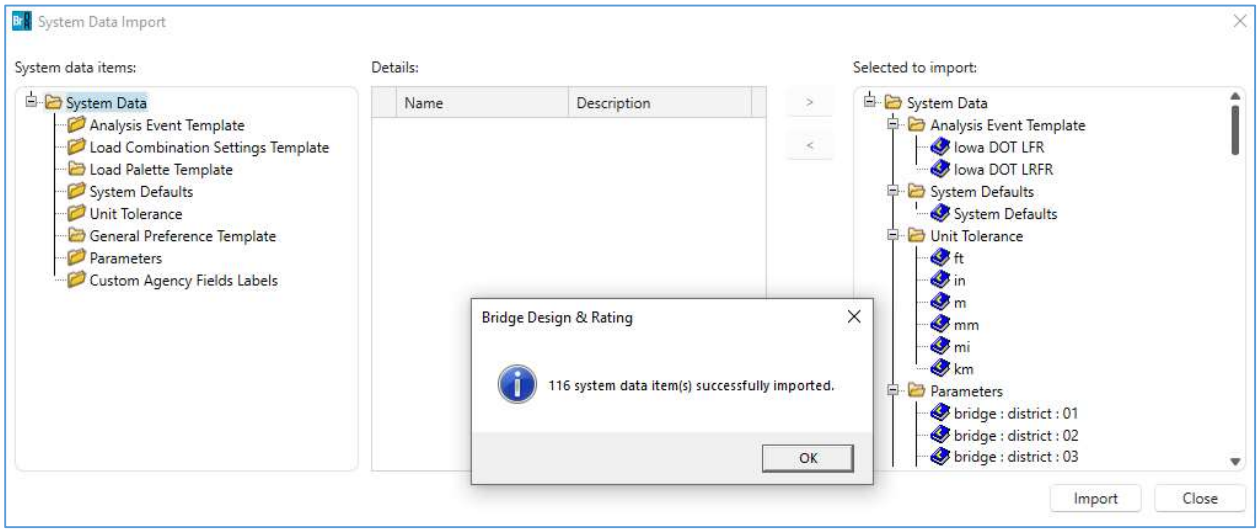
The System Data Import window will open. You can click each folder under the System Data folder to view details of the system data that can be imported.



To import all, click the main System Data folder to select all. Then click the >> button. The system data to be imported will populate in the panel on the right side of the window. Click Import.



A message will appear indicating a successful import. Click OK, then close the System Data Import window.



The system data contains two Analysis Event Templates (LFR and LRFR), system defaults and tolerances, and parameters with the Iowa DOT Counties. It also creates a Custom Agency Field for the City.

AASHTOWare BrDR 7.5.1

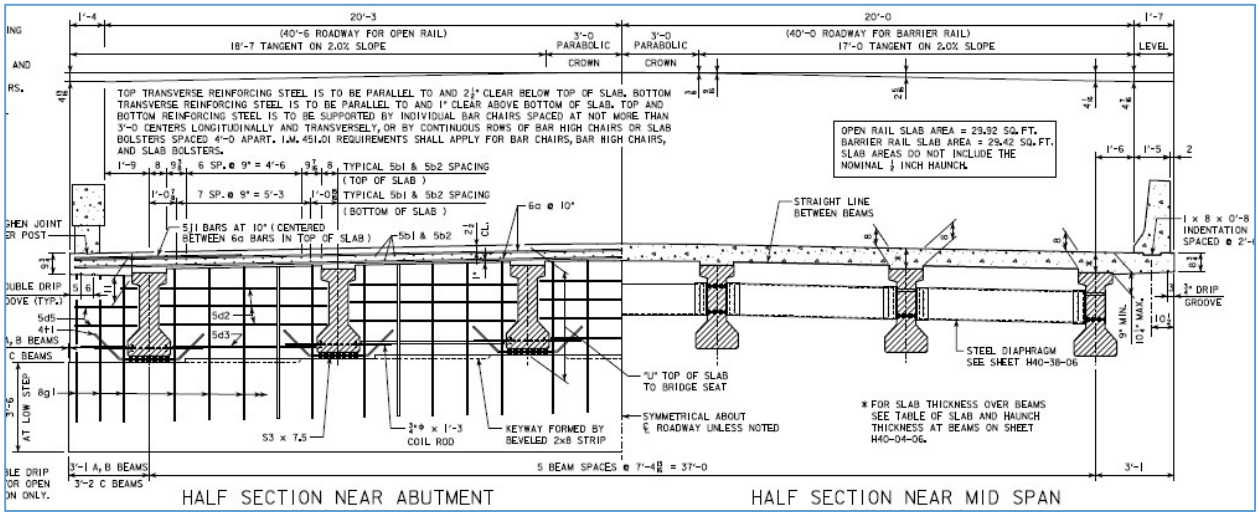
Iowa DOT Bridge Template Tutorial – PS I Beam

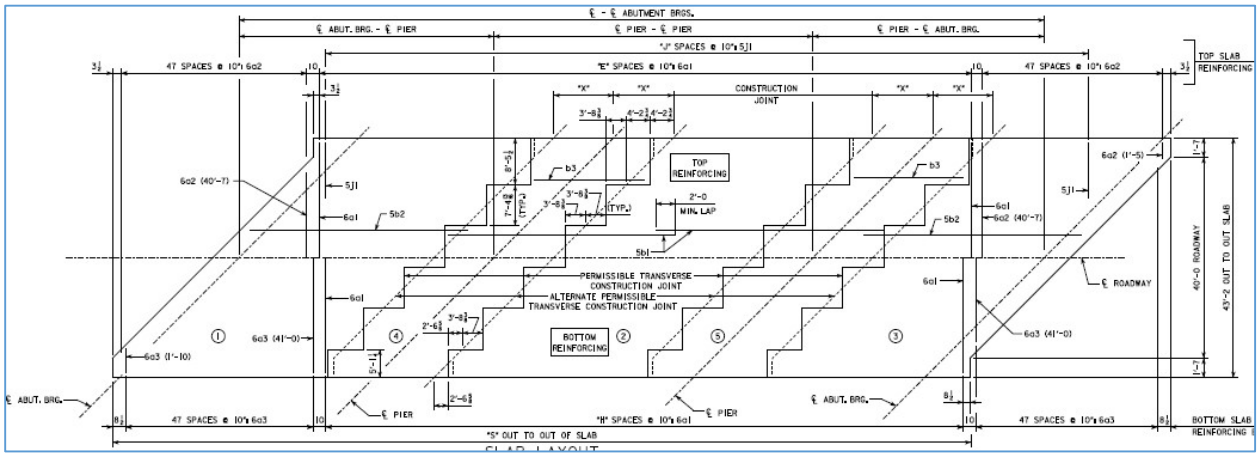
Template_H40-06_266ft4in

Topics Covered

- Importing the Template Model
- Documentation and Assumptions
- Bridge Alternatives
- Added Loads: Wearing Surface, Appurtenances, Utilities and Other Member Loads
- Deterioration: PS Strands, Point of Interest Overrides
- Analysis: LRFR Load Rating Analysis
- Results and Output

Bridge Information





Bridge Information:

Bridge ID: ExampleStandardBridge2

NBI Structure ID: ExampleStandardBridge2

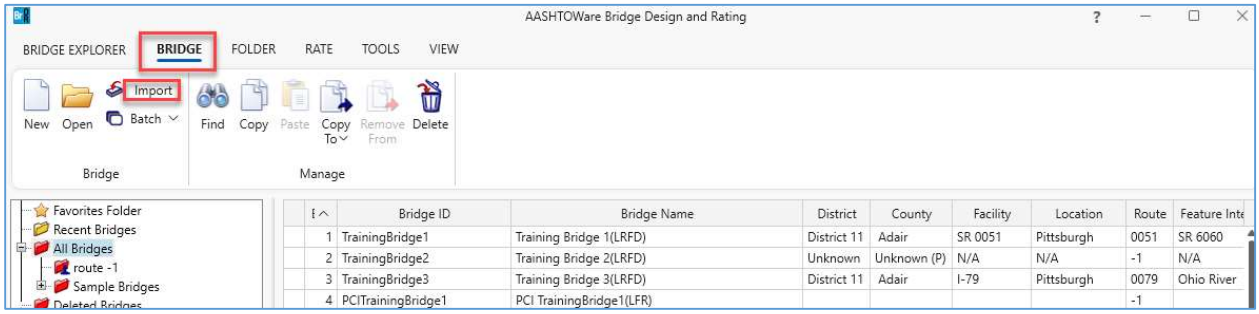
As-built plans indicate this structure was built using the 45 degree skew alternative.

Inspection Data:

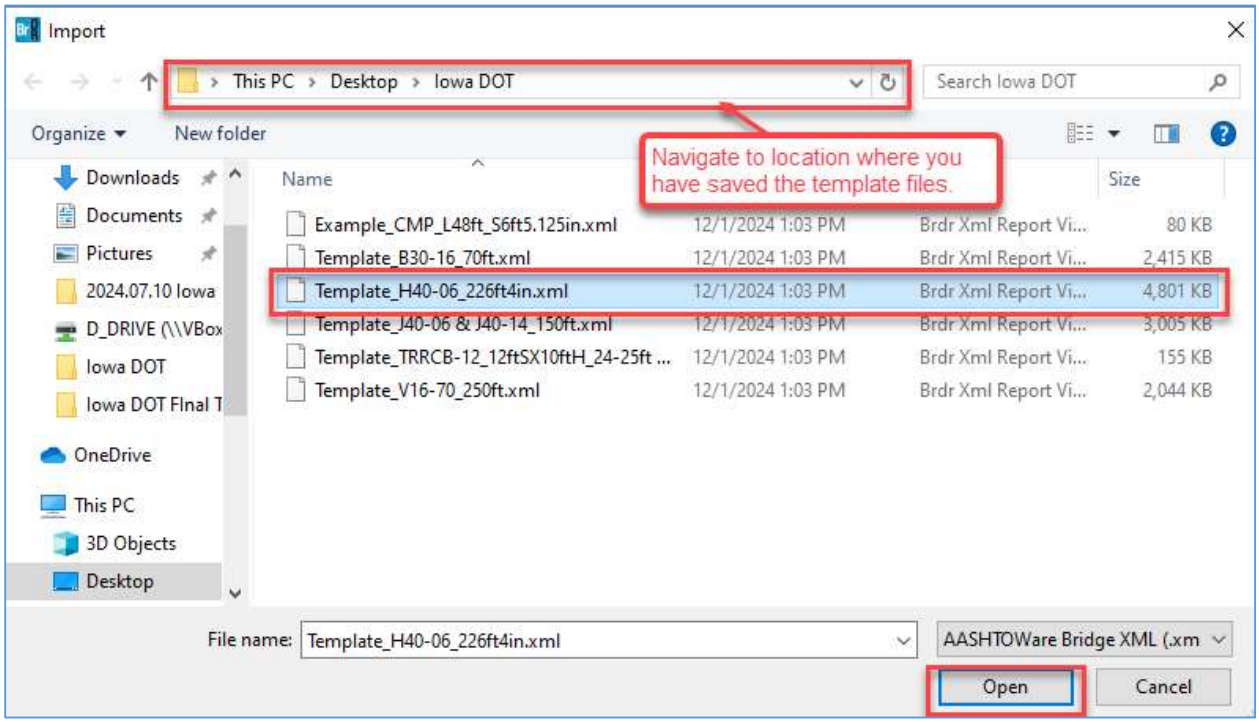
Field measured wearing surface: 2” bituminous wearing surface

Utility line: 8” diameter unknown utility attached to north exterior girder

Importing the Template Model

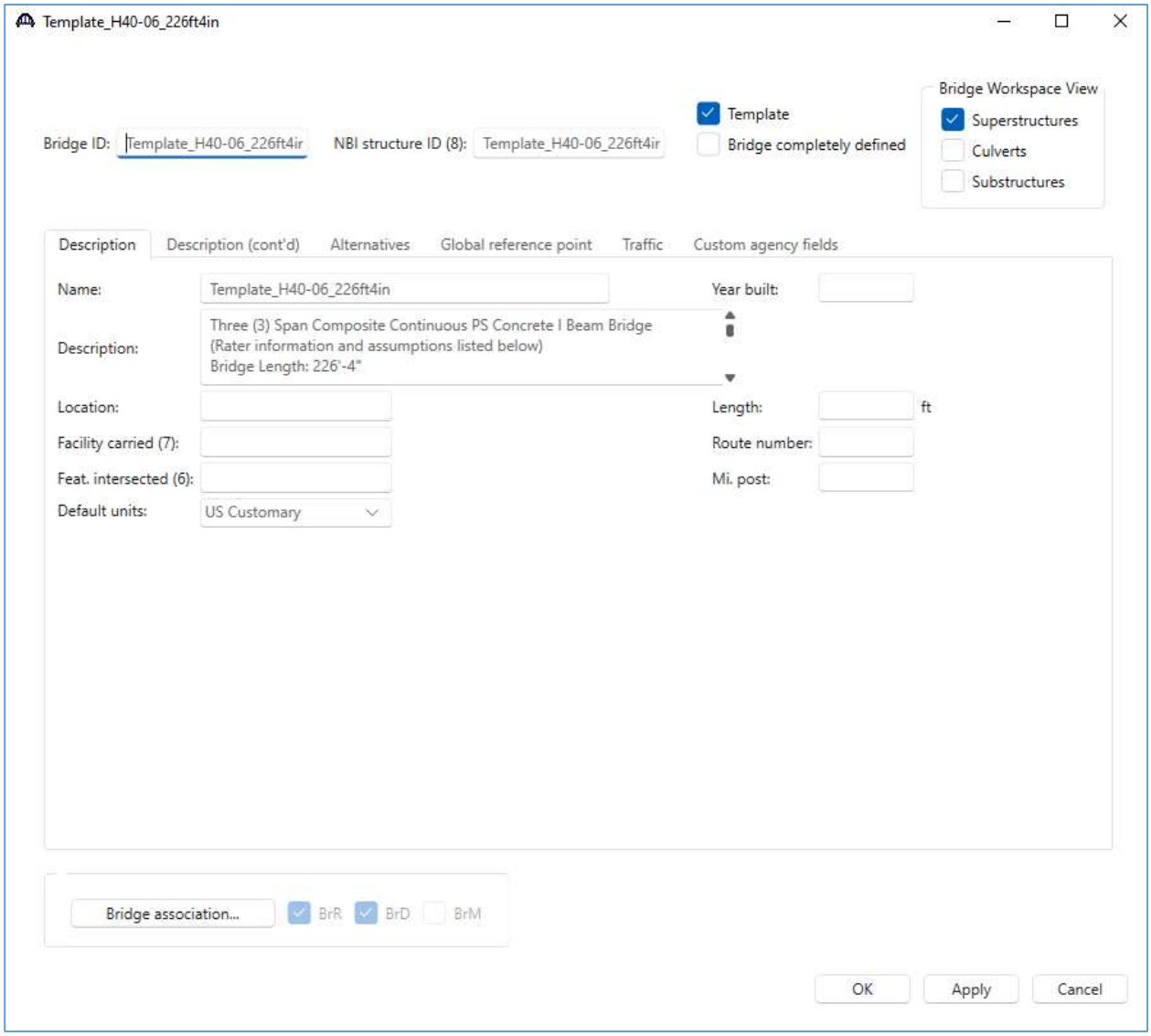


In the Bridge Explorer, click the BRIDGE tab, then click the "Import" button. This will open a file explorer window.



In the file explorer window, navigate to the location where you have saved the template file you would like to import. Click on the file to select it, then click Open.

After clicking “Open”, the template model will be imported and the Bridge Description window will automatically open.

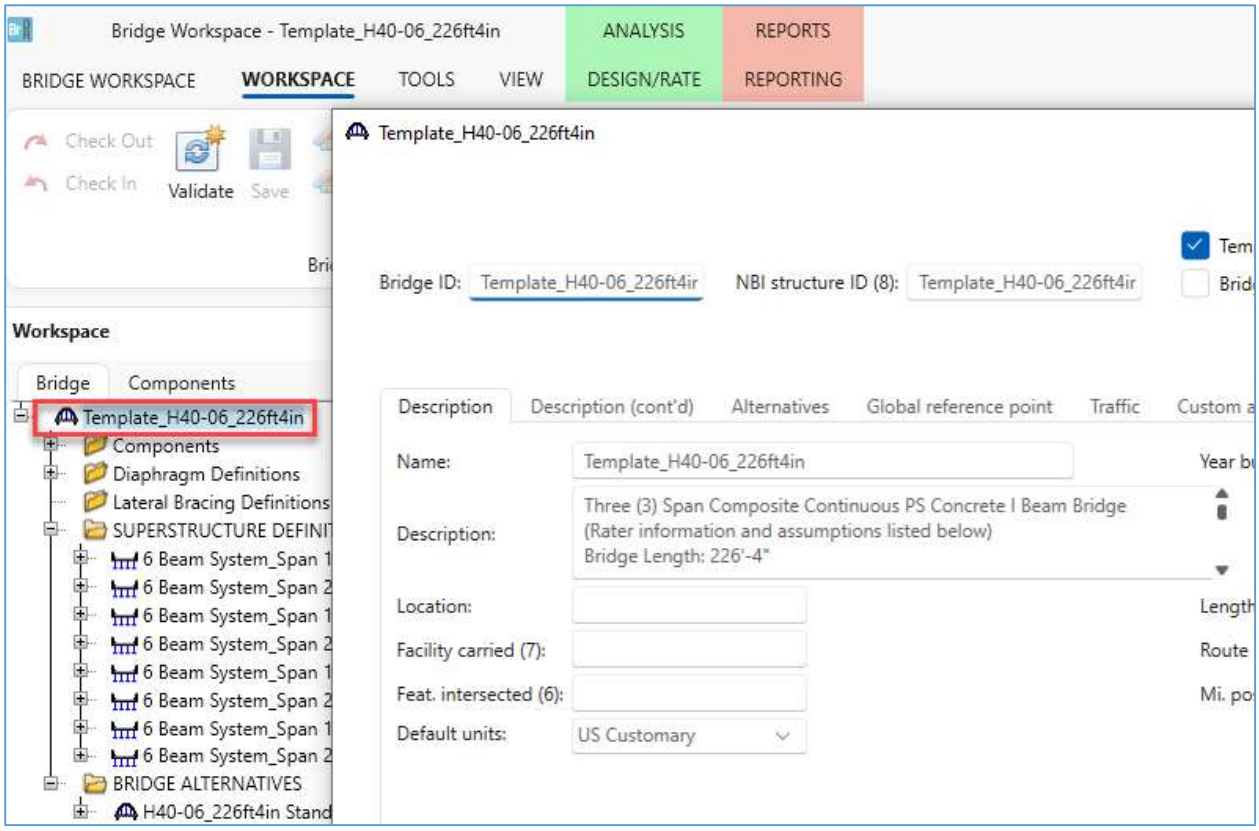


Enter the Bridge ID, NBI Structure ID, year built and location information for the bridge. Note that the Bridge ID and NBI Structure must be unique for each bridge in the BrR database. The NBI Structure ID can be used for both the Bridge ID and NBI Structure ID of the bridge being modeled.

Uncheck “Template” in the upper right corner, since this model will represent an in-service bridge rather than a template once it has been updated to reflect the actual bridge information, loads and conditions.

Use the scroll bar at the right side of the Description field to review the bridge template description. Review the assumptions to ensure that they are appropriate for the bridge. This information is also included in the documentation that accompanies the template model in the Assumptions section. Click OK.

To reopen this window at any time, double click the bridge name at the top of the Bridge Workspace tree.



Documentation and Assumptions

The PDF file Template_H40-06-266ft4in Rating Results and Supporting Calcs.pdf contains references, assumptions and calculations used in the creation of the template model.

ASSUMPTIONS

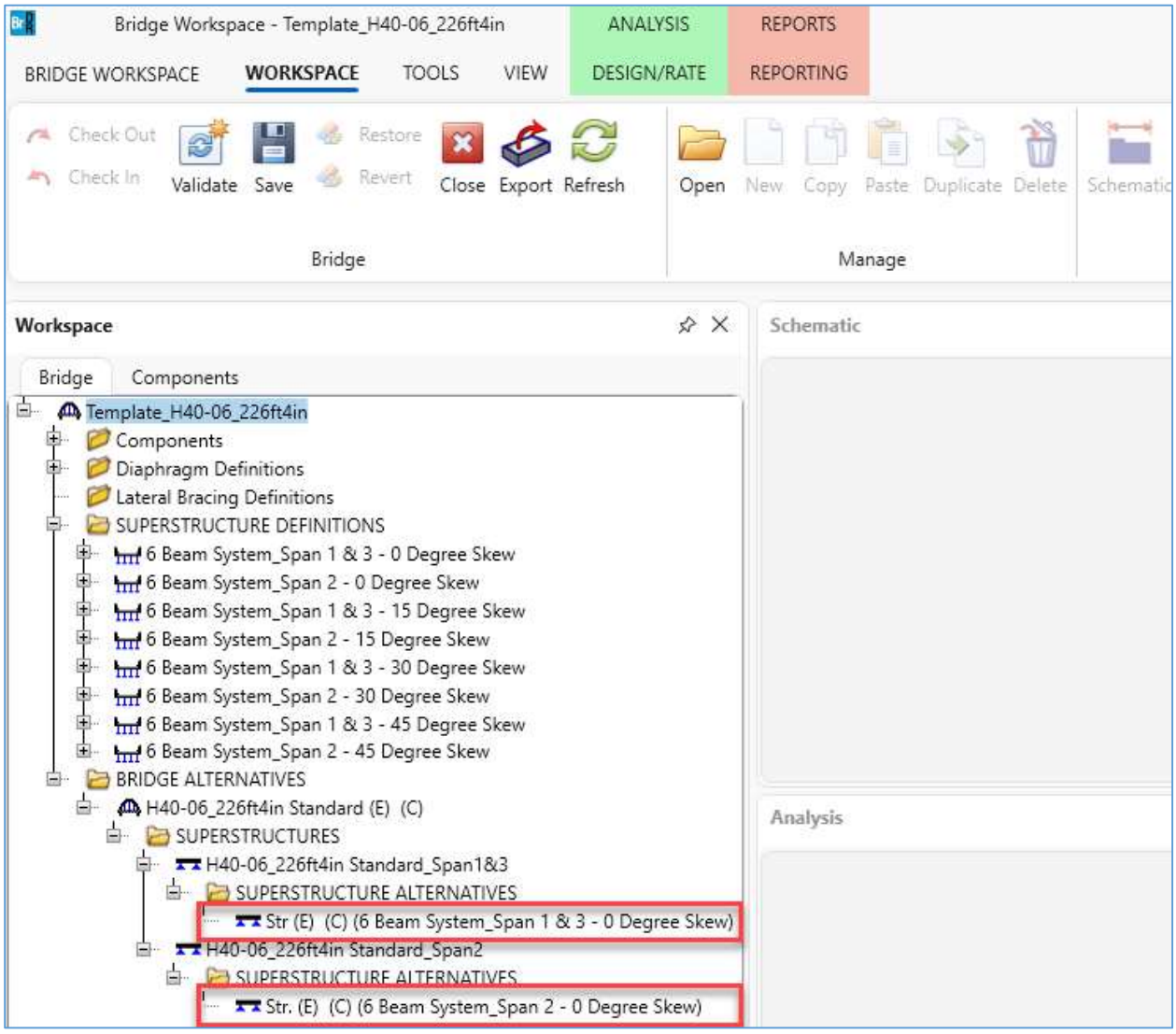
1. This structure is modelled as individual simple spans per Iowa DOT's recommendation.
2. Structural Steel grade is assumed to be Grade 36 ksi based on Standard's year of development.
3. H40-06 Standards have two options for railing - barrier rail and open rail. Barrier rail is used in the model. Open rail is also available in the model and can be defined under Structural Typical Section - Generic.
4. Final age of structure is assumed to be 75 years (27375 days).
5. AASHTO Approximate method is assumed as the Loss method.
6. 0.01" is assumed for haunch thickness in Haunch Profile per Iowa DOT's recommendation. The actual haunch thickness can be modified by the rater if necessary.
7. Intermediate steel diaphragm is assumed for this model. Use 0.285 kips per steel diaphragm, based on Sheet H40-36-06, Note 1.

An abbreviated version of assumptions is also included in the Bridge Description window in the template model.

The documentation, assumptions and supporting calculations should be reviewed along with bridge inspection information and as-built plans (if available) to determine any modifications required for the bridge.

Bridge Alternatives

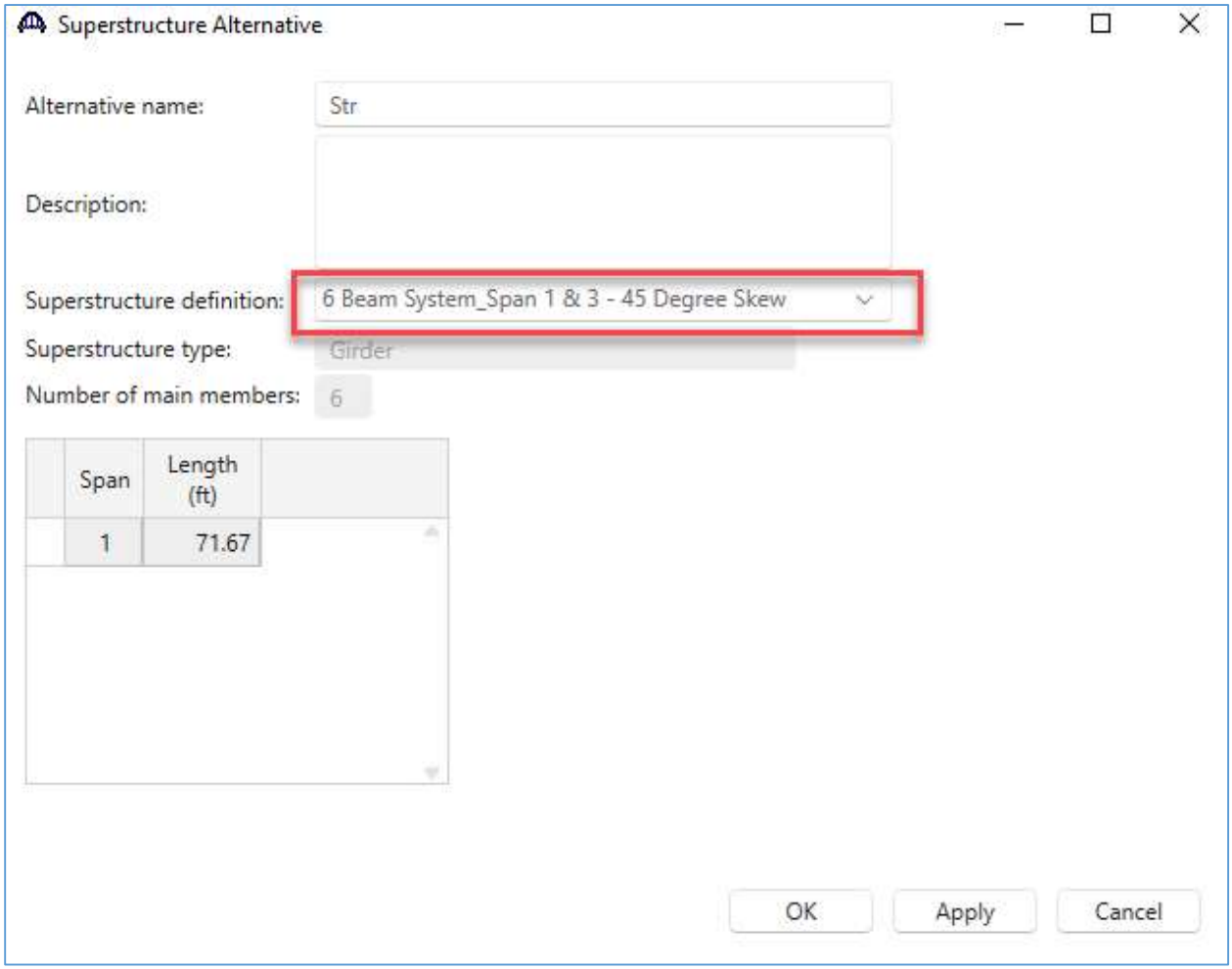
The template is set up with several different alternatives for different skews. For this tutorial, the 45 degree skew will be used. Expand the bridge workspace tree below BRIDGE ALTERNATIVES. The zero degree skew is set as the Bridge Alternative by default.



Note that there are two Superstructure Alternatives included in this Bridge Alternative. This is because they are modeled as simple spans and treated as structurally discontinuous, however both must be included in the rating analysis.

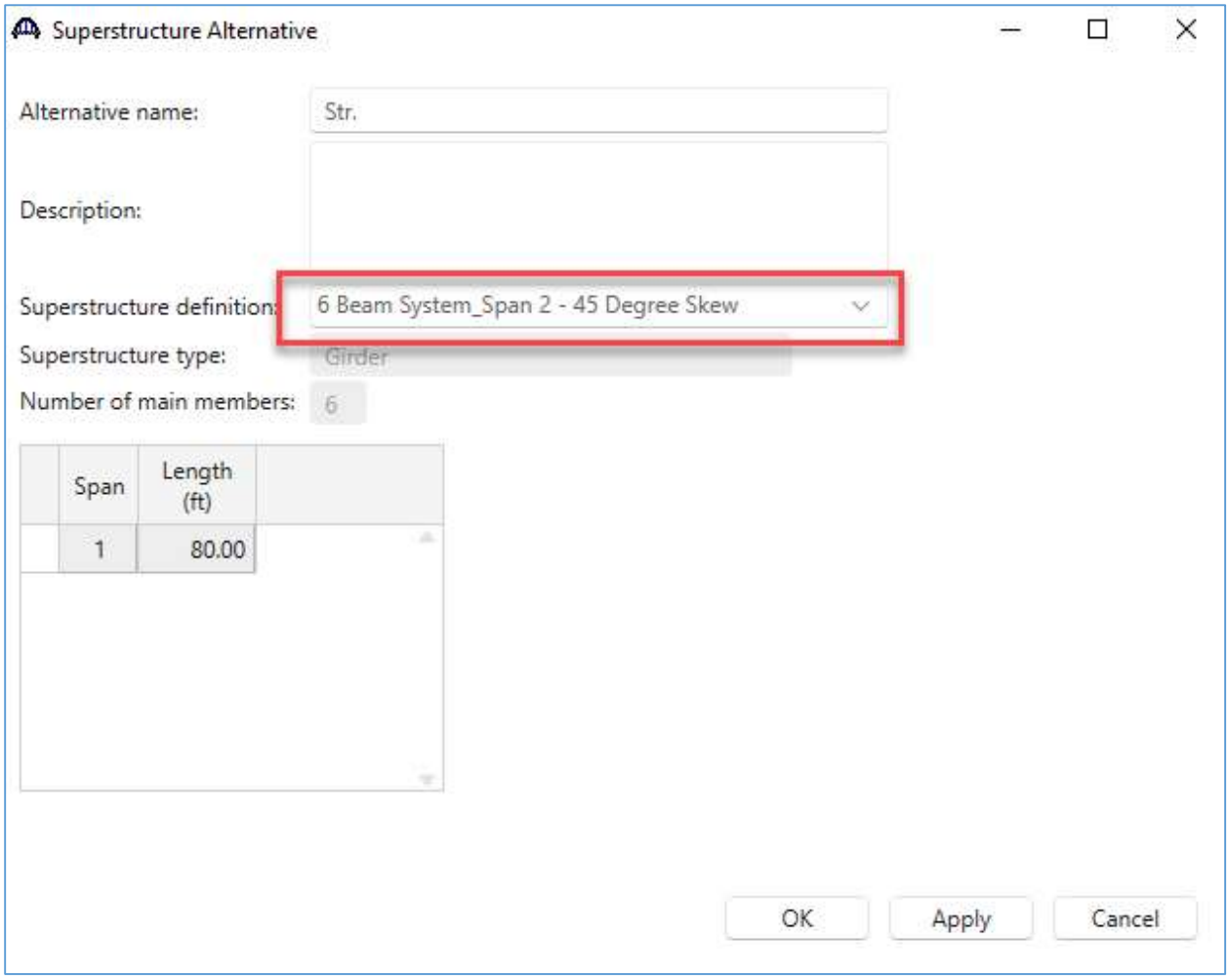
Double click the Superstructure Alternative "Str (E) (C) (6 Beam System_Span 1 & 3 – 0 Degree Skew)" to open the Superstructure Alternative window.

In the “Superstructure definition” field, use the dropdown to select the superstructure for Span 1 & 3 with the 45 degree skew.

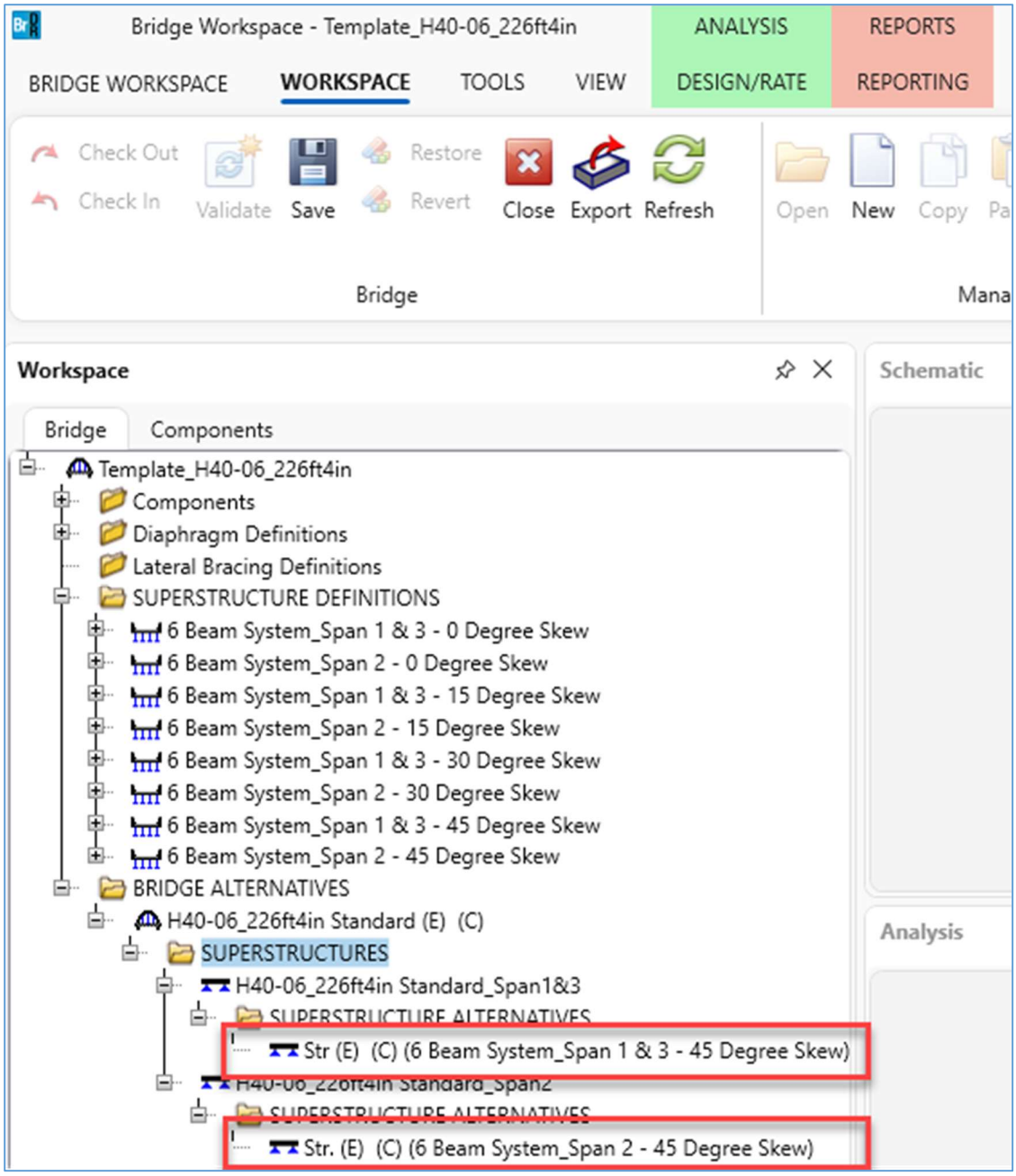


Click OK to save and close the window.

Open the second superstructure alternative.

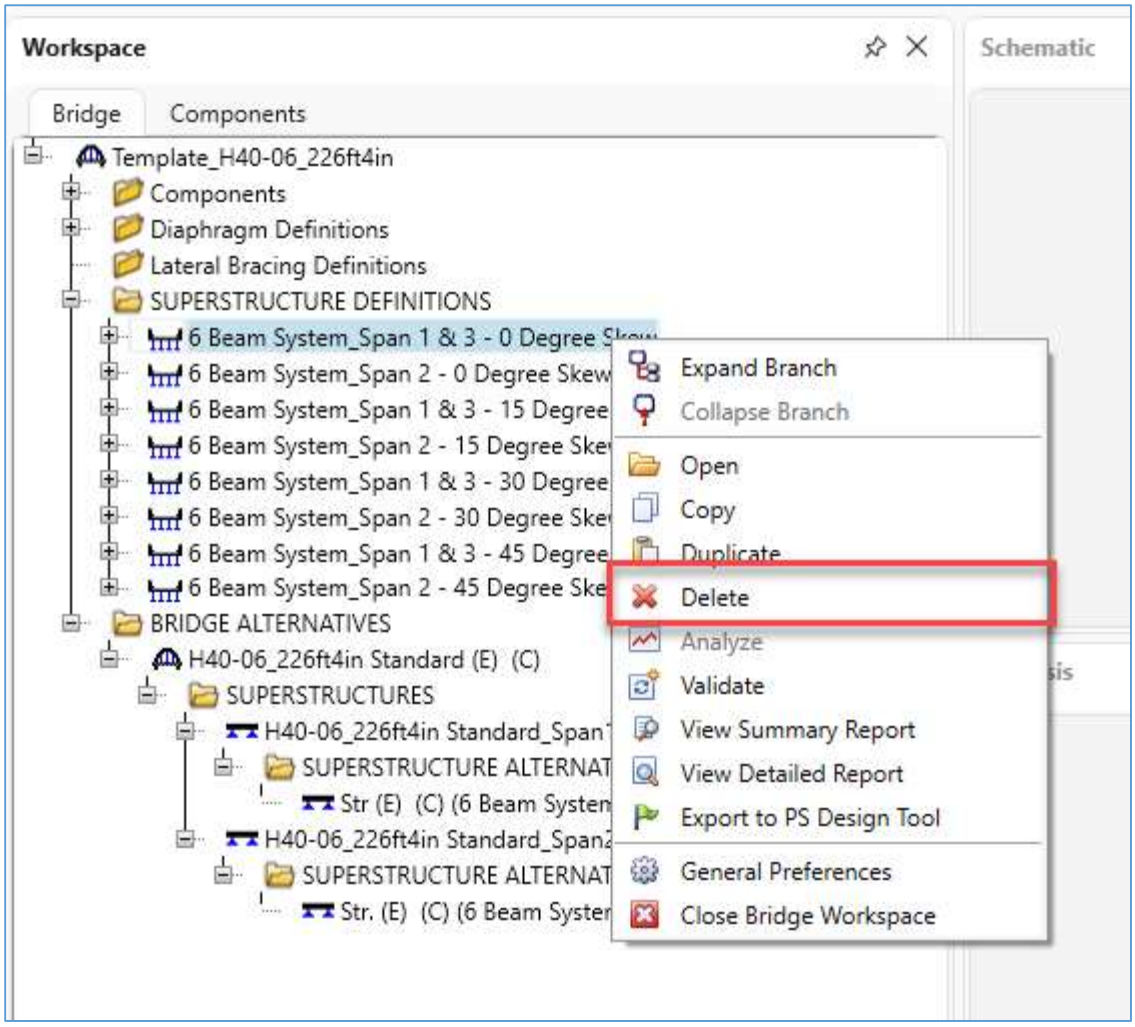


In the “Superstructure definition” field, use the dropdown to select the superstructure for Span 2 with the 45 degree skew.



The Superstructure Alternative name has automatically updated based on the selected alternative.

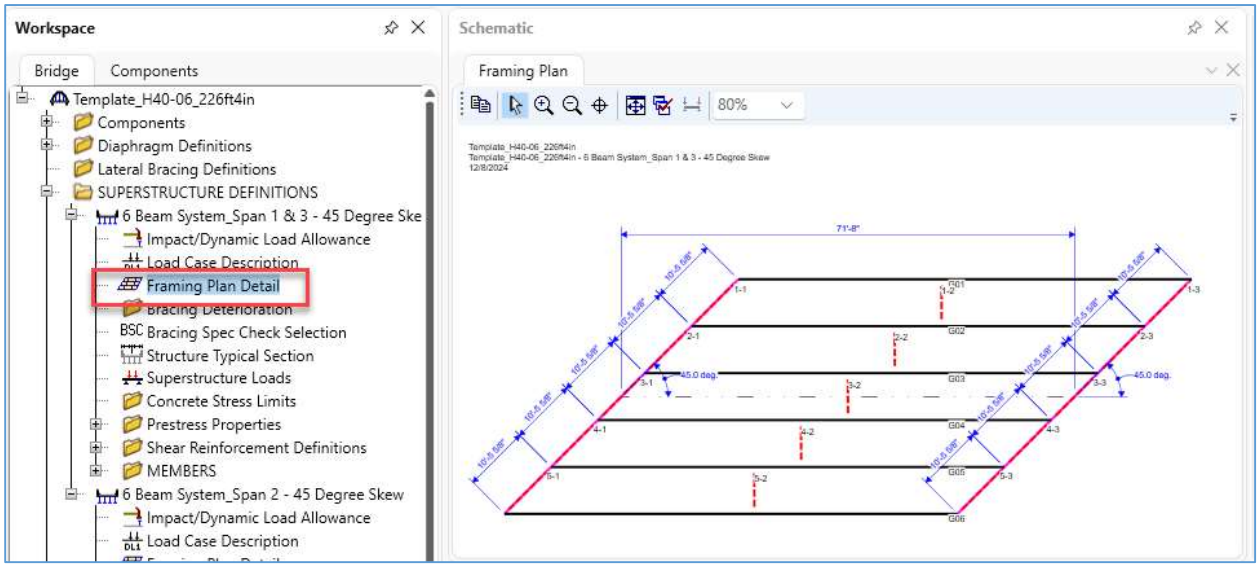
Delete the other superstructure definitions that are not applicable for this bridge by right-clicking on the Superstructure Definition you intend to delete and clicking the Delete button. If you attempt to delete a Superstructure Definition that is assigned as a Bridge Alternative, you will get a message indicating that it is in use and cannot be deleted.



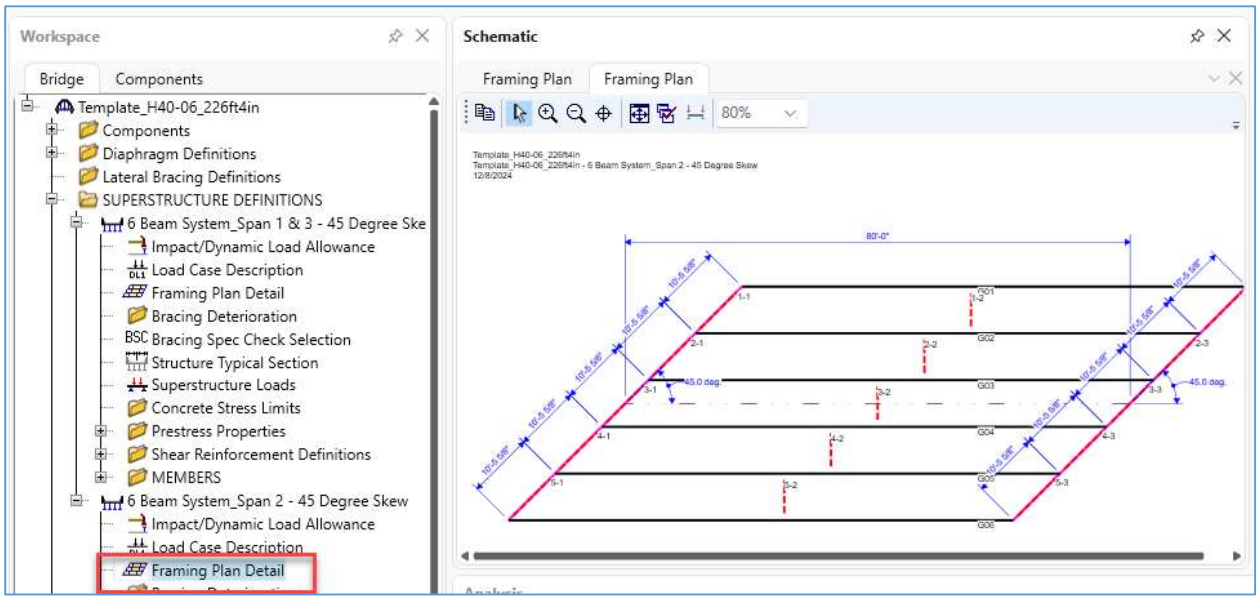
Once the superstructure definition that will be used is set in the Bridge Alternative and the ones that are not applicable are deleted, expand the bridge workspace tree under the Superstructure Definition for 6 Beam System_Span 1 & 3– 45 Degree Skew and 6 Beam System_Span 2– 45 Degree Skew.

Right click on Framing Plan Detail and then click Schematic to review the framing plan schematic.

Span 1 & 3

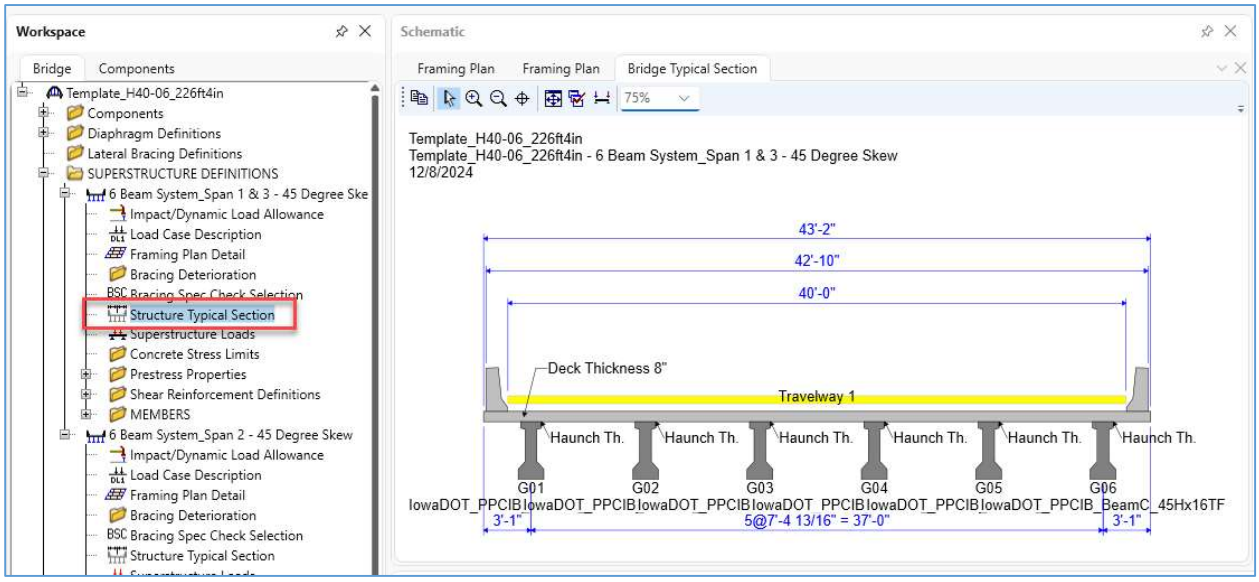


Span 2

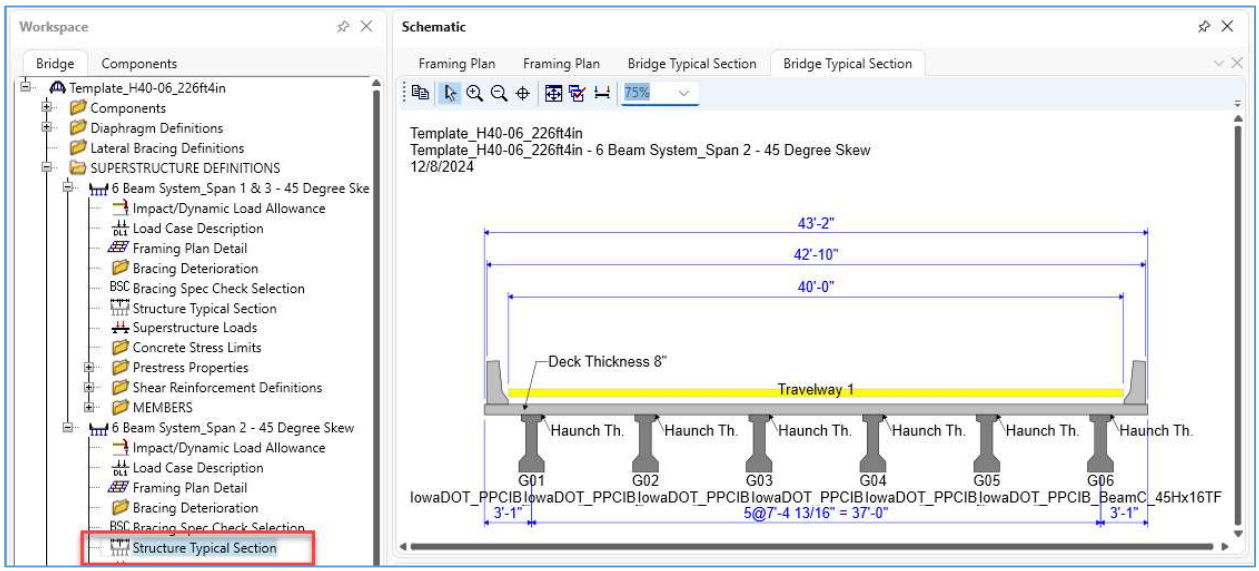


Right click on Structure Typical Section and then click Schematic to review the structure typical section schematic.

Span 1 & 3



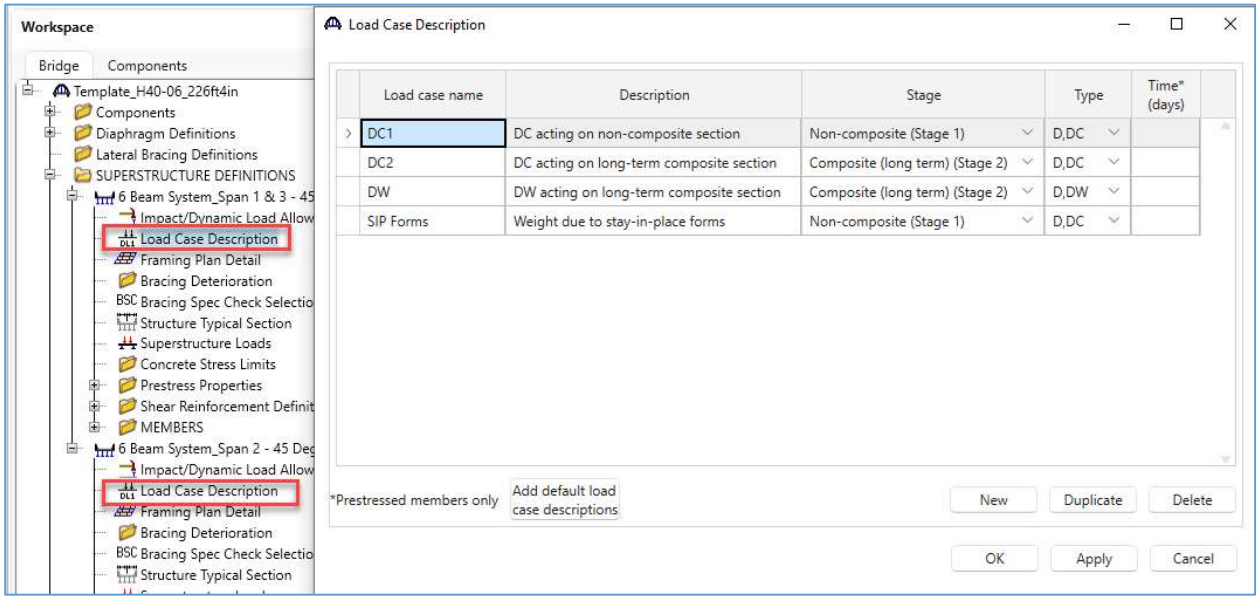
Span 2



Added Loads

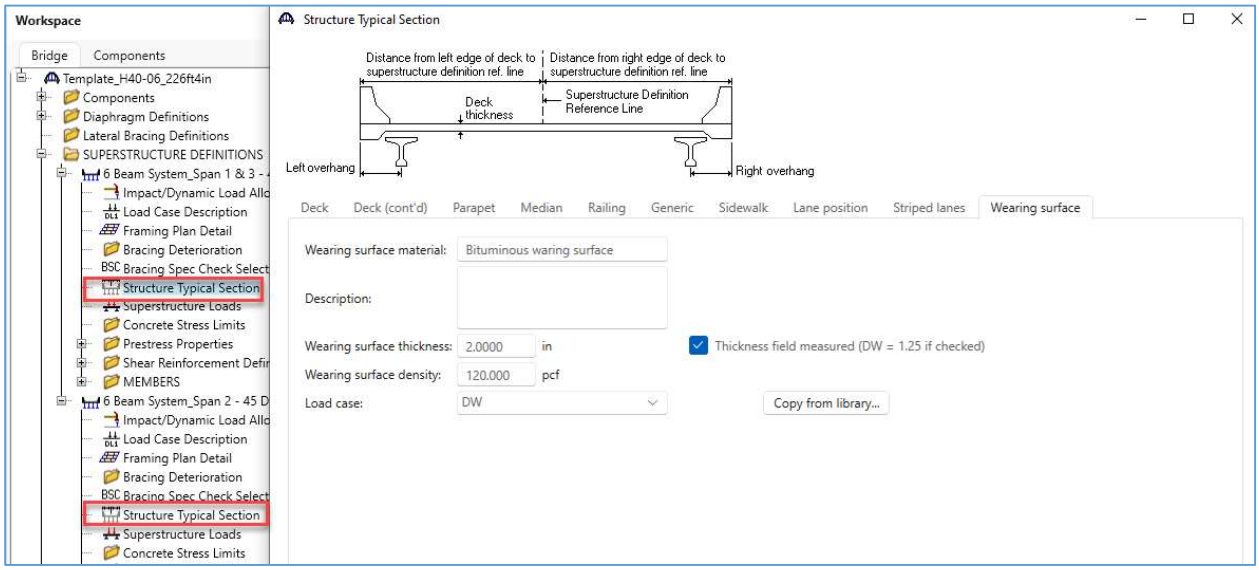
As-built plans, inspection data, NBI data or other records may indicate loads on the structure that are unique to that structure and not included in the template model. Typical examples of these loads include added wearing surface, modified/replaced appurtenances and utilities.

Default load cases have been saved to the template. Review the default load cases by opening the Load Case Description window. You can also add custom load cases if needed.



Added Loads: Wearing surface

To enter or modify the wearing surface, open the Structural Typical Section window and select the "Wearing surface" tab.



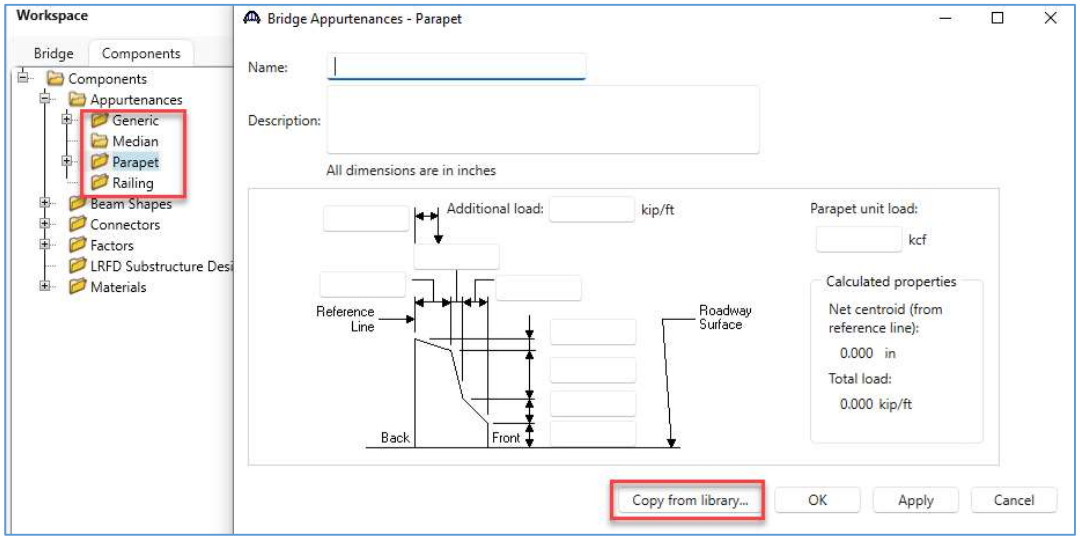
Enter a name for the wearing surface material, and the thickness and density of the wearing surface. Select the load case in which the wearing surface is applied. Click Apply.

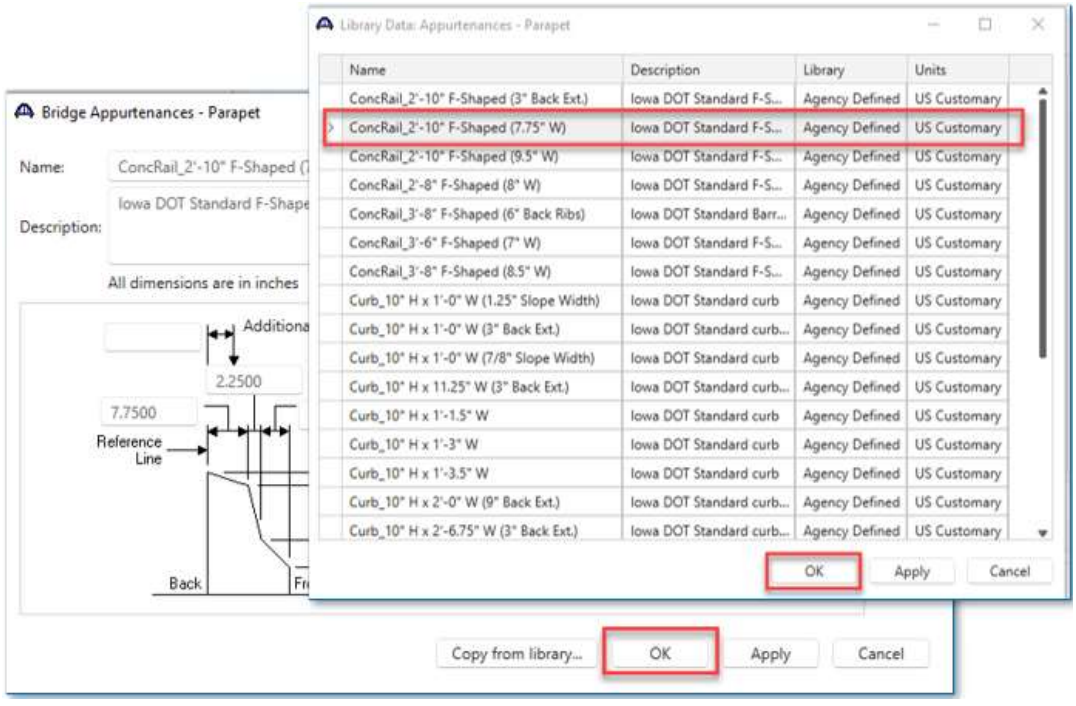
Enter the wearing surface in the Structure Typical Section for both Superstructure Definitions.

Added Loads: Appurtenances

The H40-06 Standards have two options for the railing. The barrier rail is set at the default in the template. The alternate open rail is saved to the bridge model, and can be assigned to the Structure Typical Section in place of the barrier rail. This is noted in the bridge template model and is also indicated in the documentation for the template model in the Assumptions section.

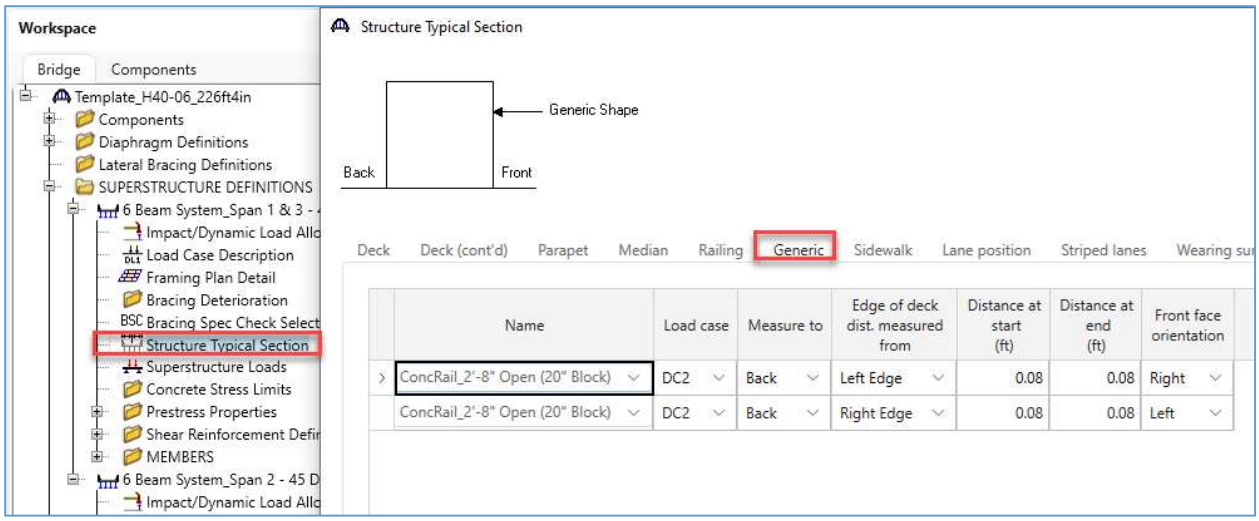
To replace a barrier with one that is not saved to the bridge model, click the components tab. Double click the type of appurtenance you would like to add, and click "Copy from library". In the window that opens, select the appurtenance, click OK in the Library Data window, and click OK in the Bridge Appurtenance window to save the appurtenance to the bridge components.



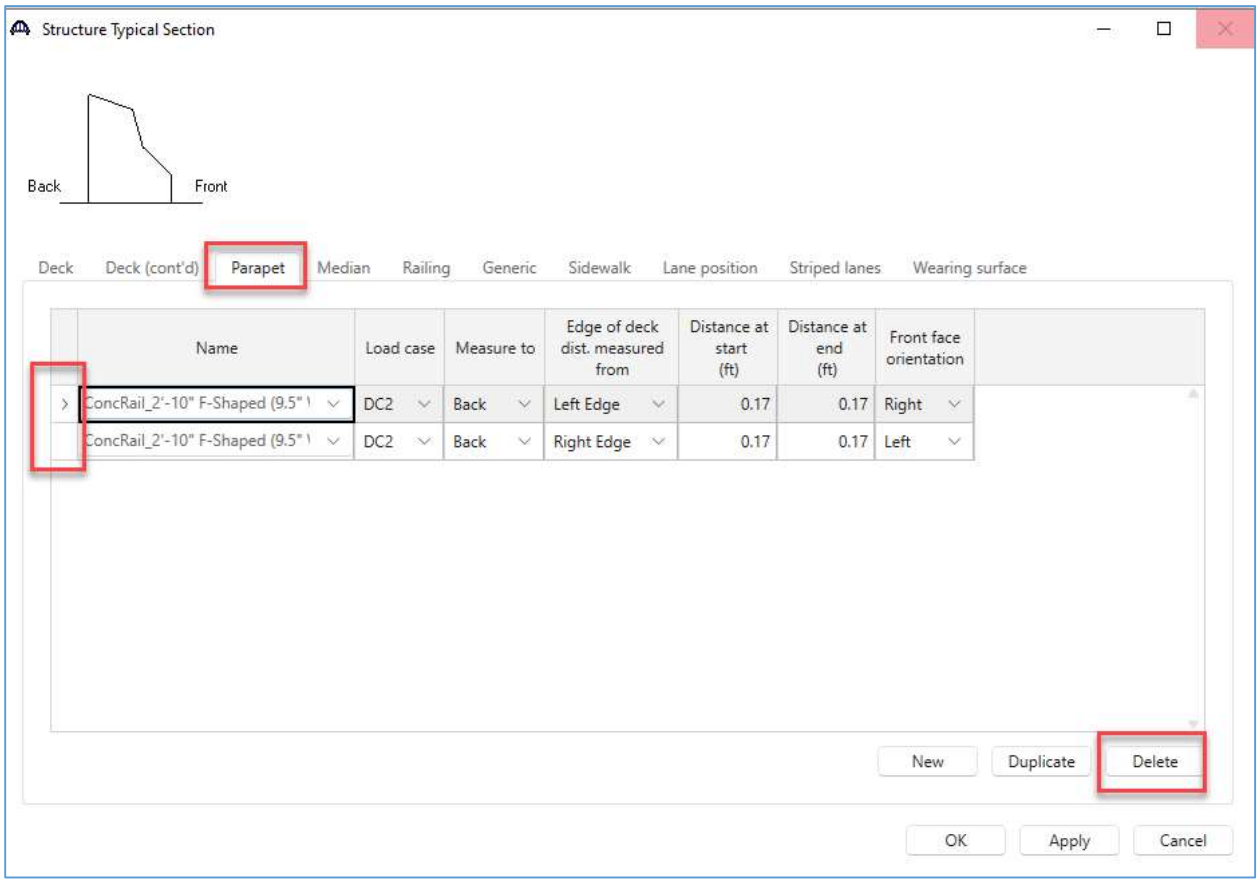


To change the railing in the template from the barrier rail to the open rail, double click to open the Structure Typical Section window. The documentation for this template indicates that the alternate rail is saved as a Generic Appurtenance.

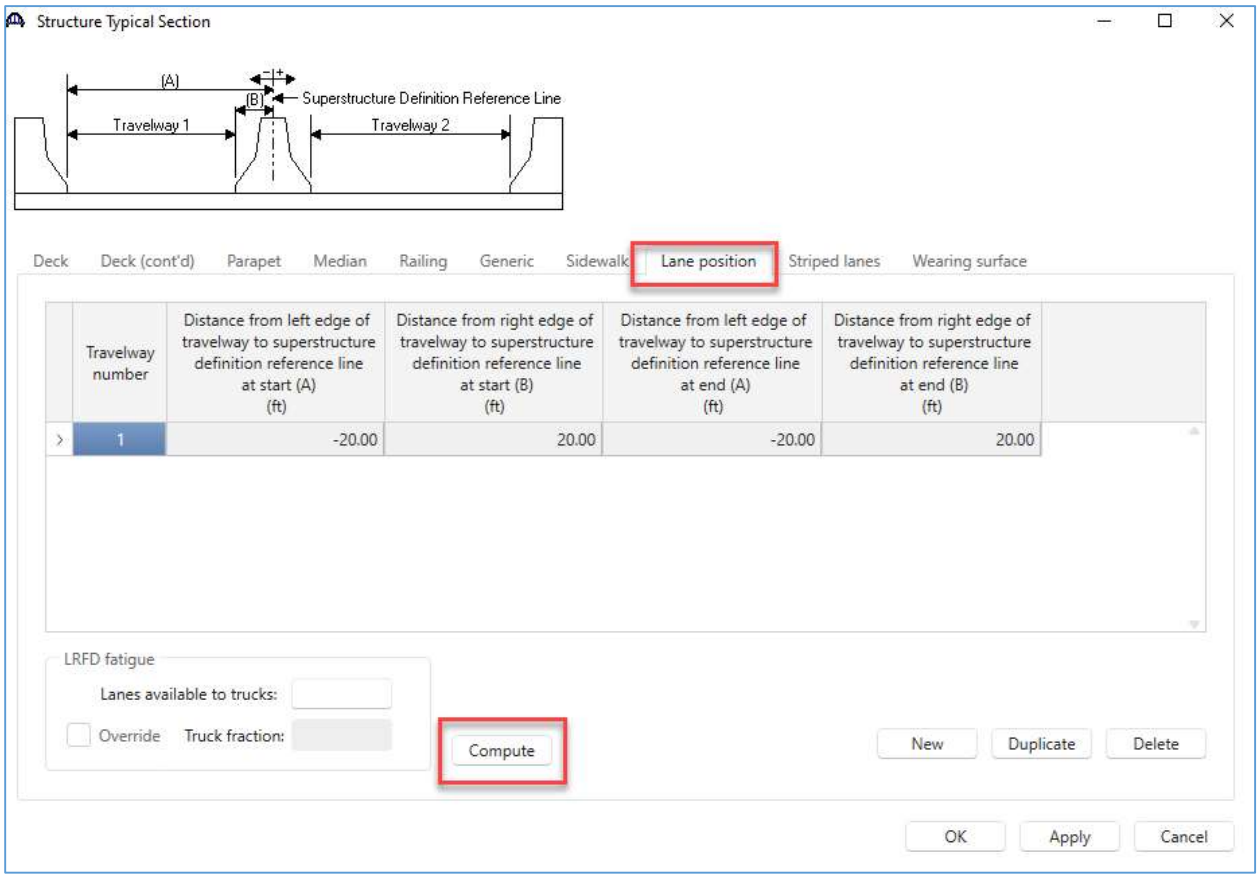
In the Generic appurtenance tab, click new to add data rows for each of the rails. The generic appurtenance ConcRail_2'-8" Open (20" Block) is saved to the bridge and is available in the dropdown menu under "Name". Select the open rail and enter the load case and location information.



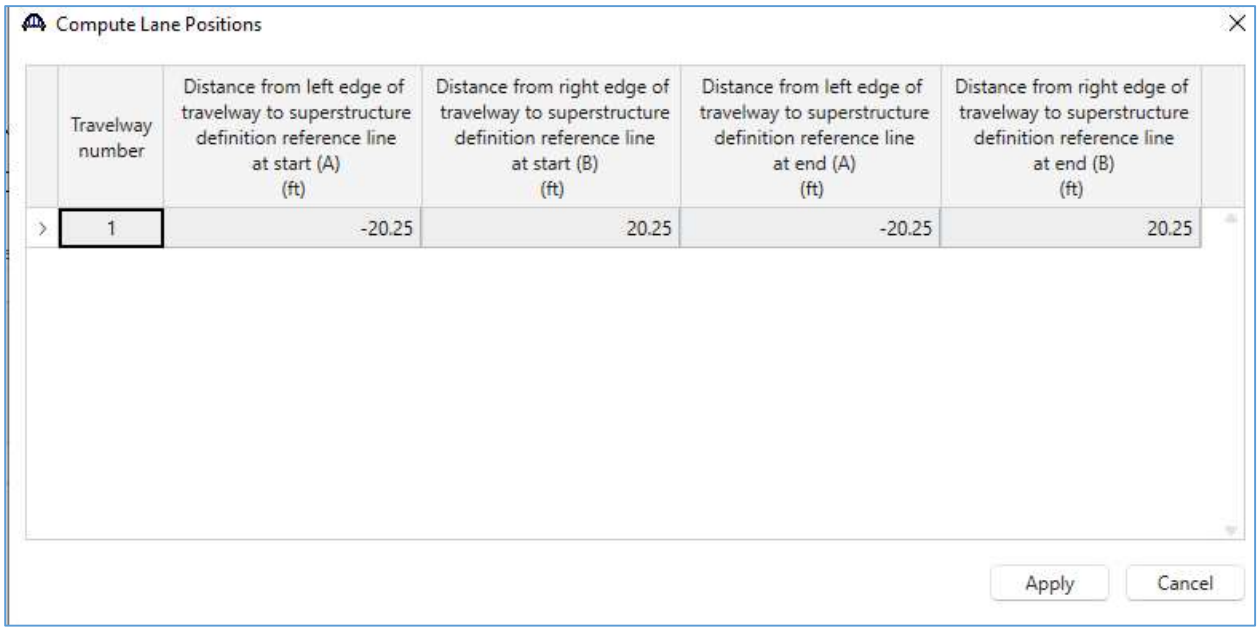
Since the open rail is being used rather than the concrete parapet, the parapets that were default in the template can be removed. In the Structure Typical Section window, click the parapet tab and delete the concrete parapets. Click Apply to save.

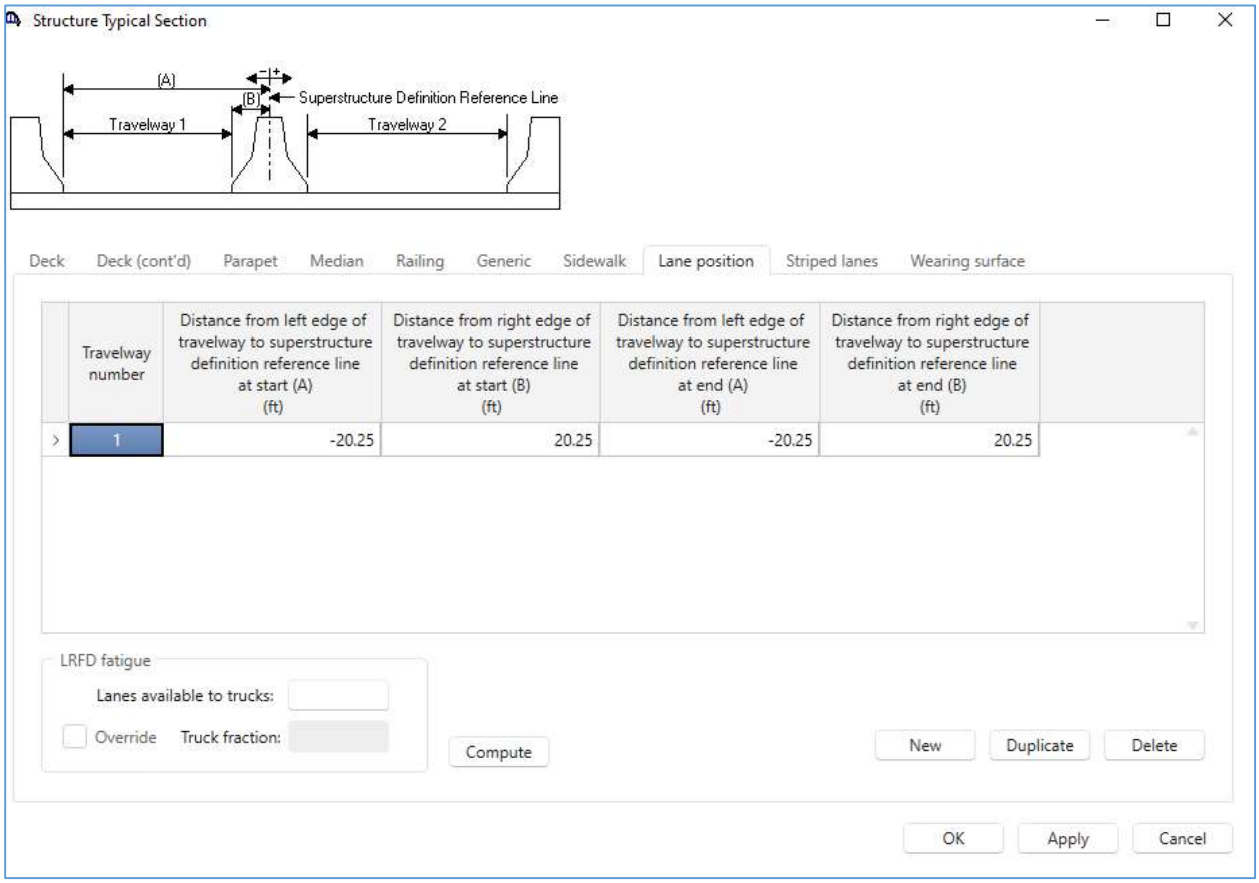


Since the concrete parapets that were deleted from the template are wider than the open rail that they were replaced with, the travelway width should be adjusted accordingly. In the Structure Typical Section window, select the Lane Position tab and click the “Compute” button.



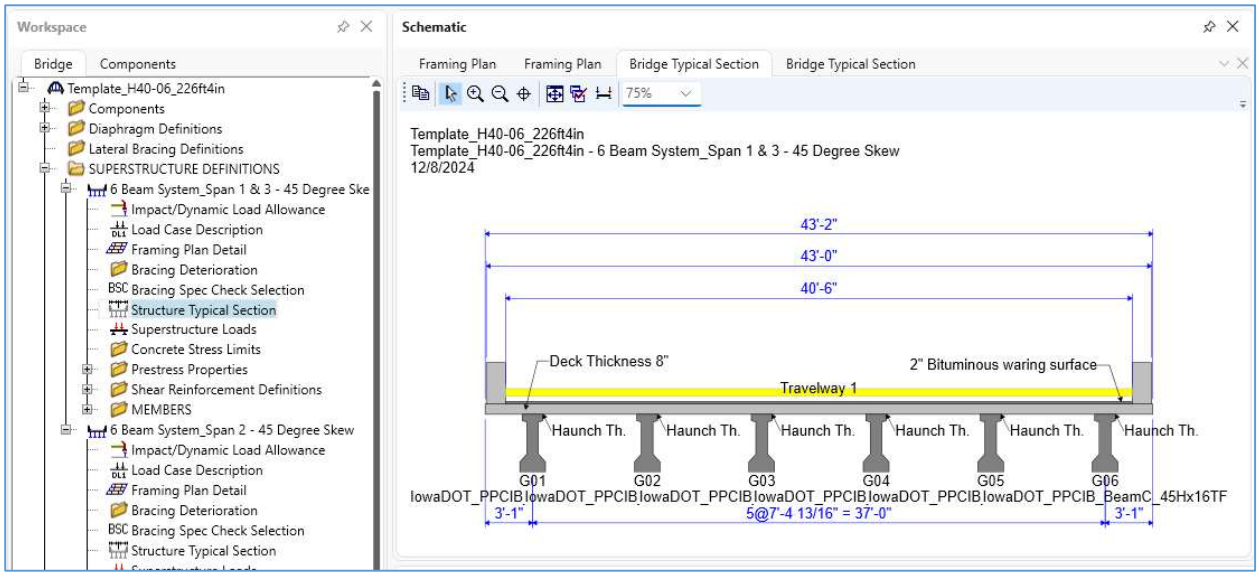
A window will open showing the lane positions (travelway width) that have been computed based on the structure width and the width and location of appurtenances. Review and click Apply to apply the data to the Structure Typical Section.





Click OK to save and close the window.

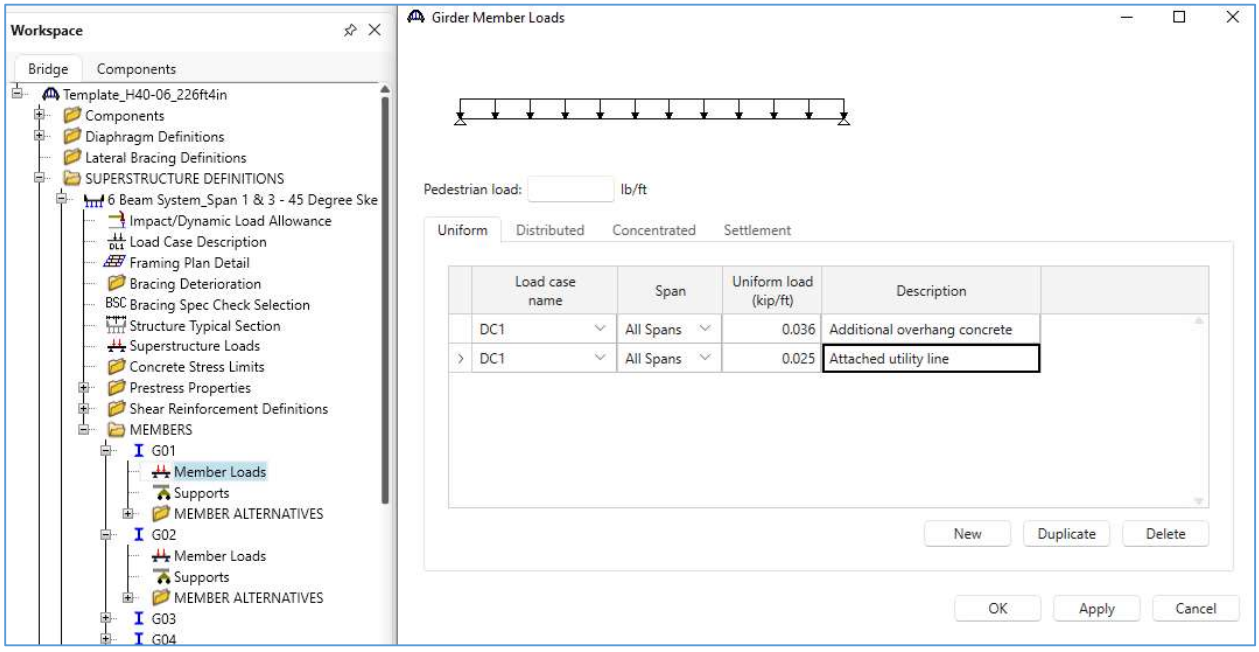
Right click Structure Typical Section and click Schematic to review the modified structure. Note that the barriers are now displayed as generic appurtenances, and the wearing surface has been added, and the roadway width is updated to reflect the correct width based on the type of barrier that is used. This schematic will update to reflect changes when you click Apply or OK in any of the tabs in the Structure Typical Section window



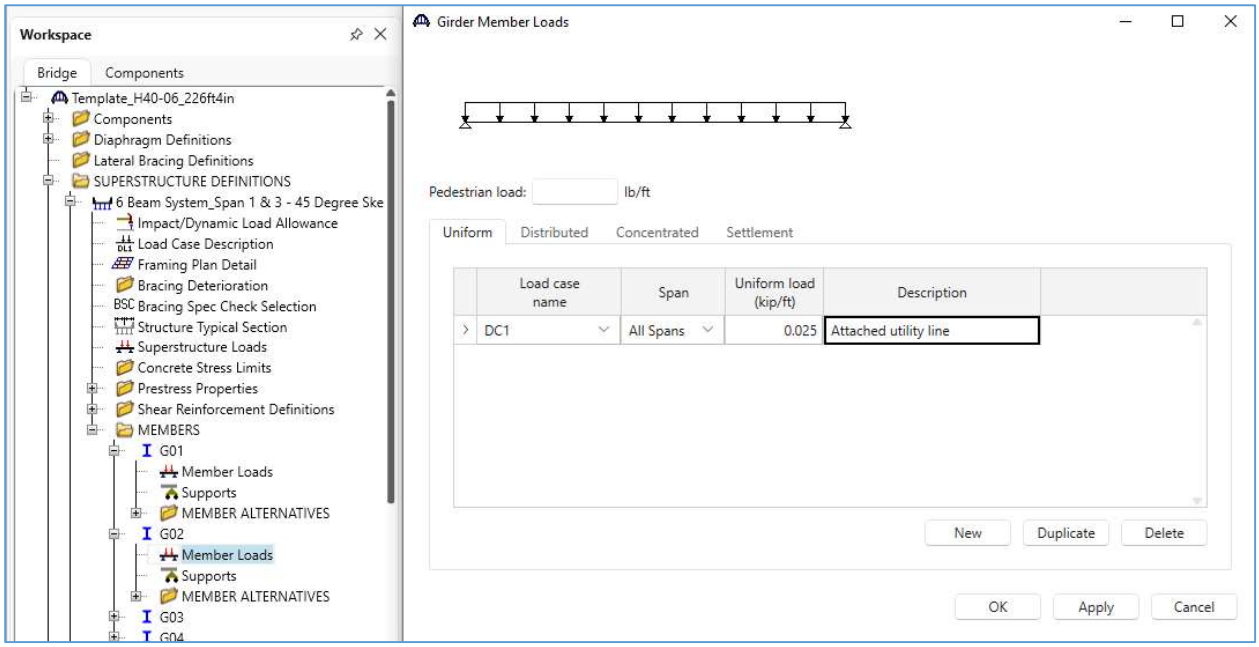
Added Loads: Utilities and Other Member Loads

For this example, inspection information indicates there is attached utility line suspended on brackets between the exterior girder (G01) and first interior girder (G02). From the available data, the weight of the utility line and brackets is estimated to be 50 plf distributed between the 2 girders it is attached to.

Under Members, expand G01 and G02 in the bridge workspace tree. Double click Member Loads under G01 to open the Girder Member Loads window for the first girder. Select the load case, enter the load and add the description. Click OK to save and close the window.



Repeat the process for G02.

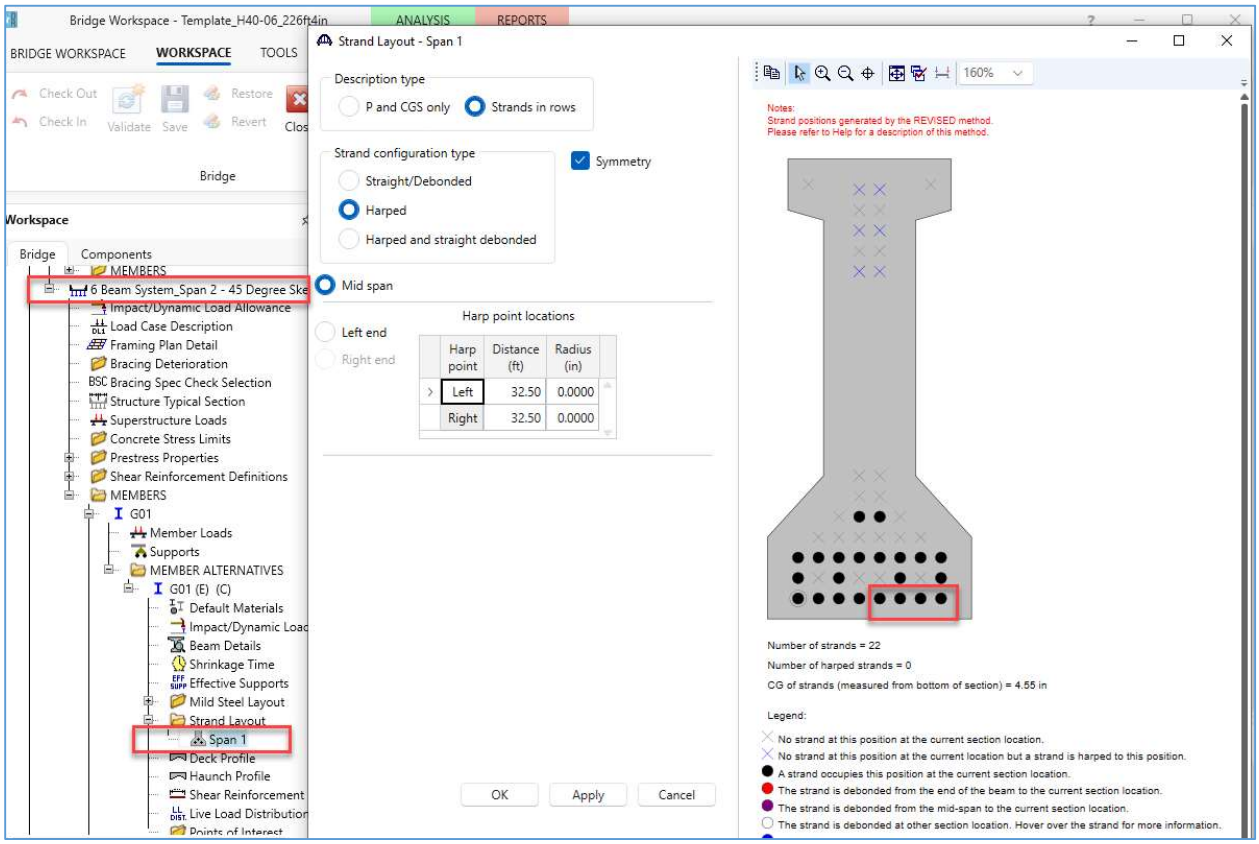


Repeat for the Span 2 Superstructure Definition.

Deterioration: PS Strands

In this example, the inspection data for this bridge indicates deterioration with exposed and corroded prestressing strands G01 in Span 2.

For G01, expand Strand Layout in the bridge workspace tree and double click Span 1. Note that within the member alternative, Span 1 is a name that cannot be changed in the software and refers to the first (and in this case only) span that is defined for the member alternative. The superstructure definition represents the second span in the structure, and the "Span 1" under strand layout represents the first span in the superstructure definition.



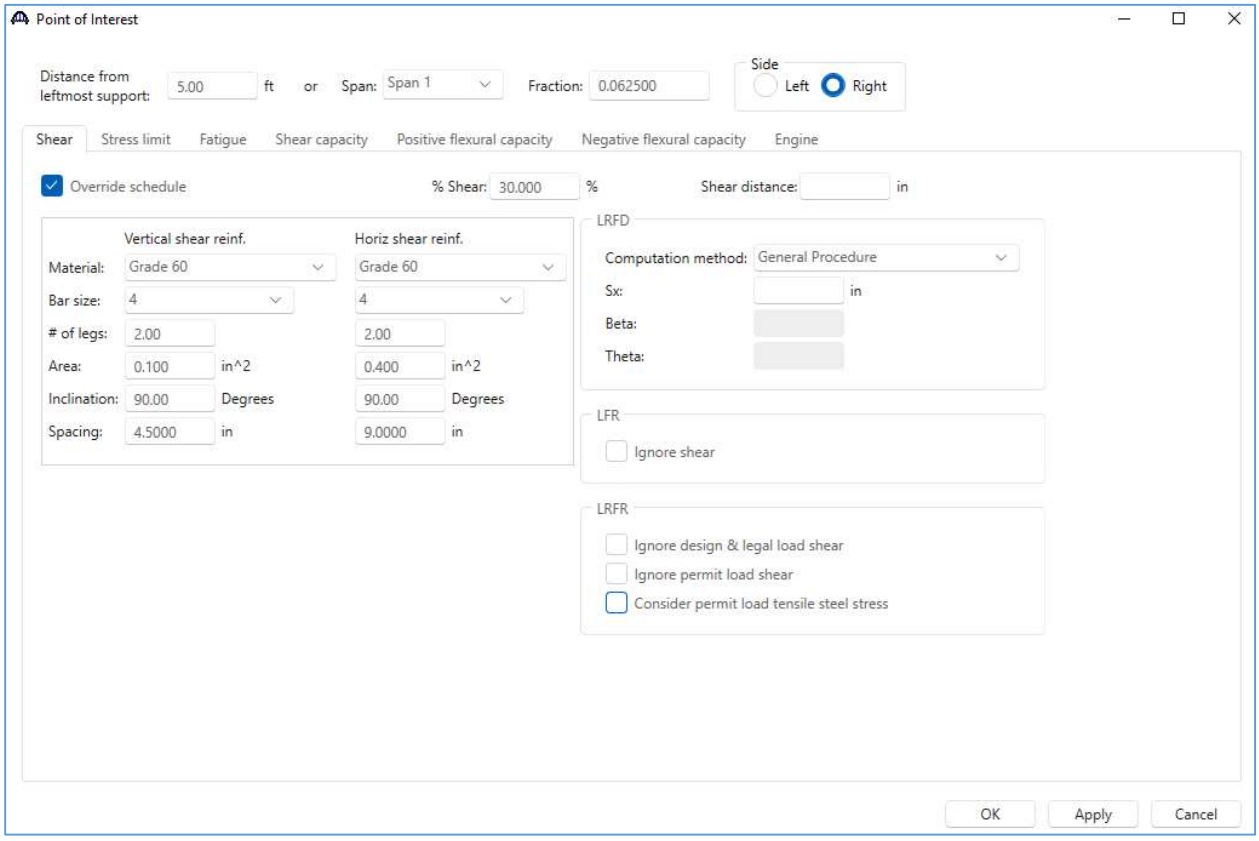
Click a strand to remove it from the cross section. Alternatively, click and drag to highlight multiple strands, then right click and then click "Remove the selected strands" to remove all the selected strands.

Click OK to save and close the window.

Deterioration: Point of Interest Overrides

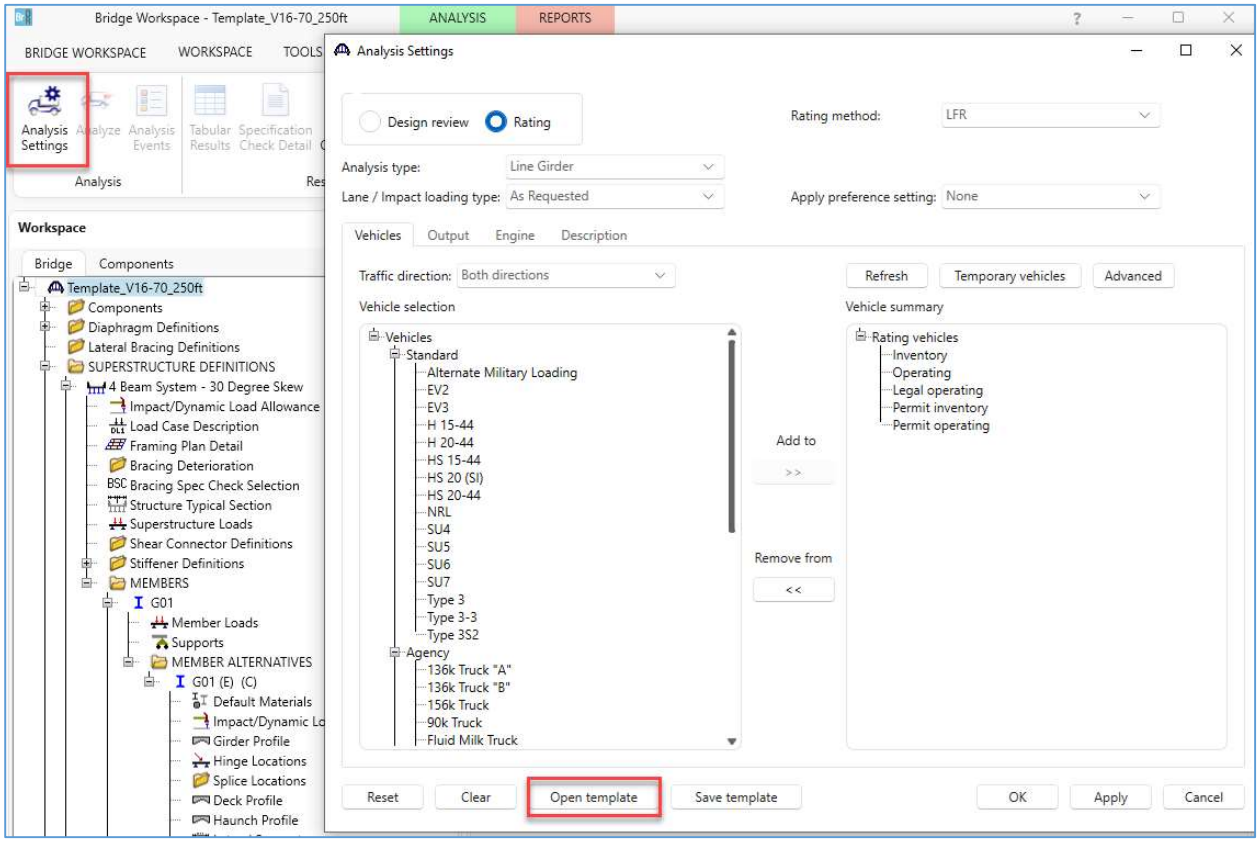
Double click Points of Interest under the member alternative to open the Points of Interest window for G01 in Span 2. The shear reinforcement, shear capacity and flexural capacity can be directly entered for any analysis point. Alternatively, other parameters that affect capacity can also be modified.

Click Override Schedule and enter the overrides shown below.

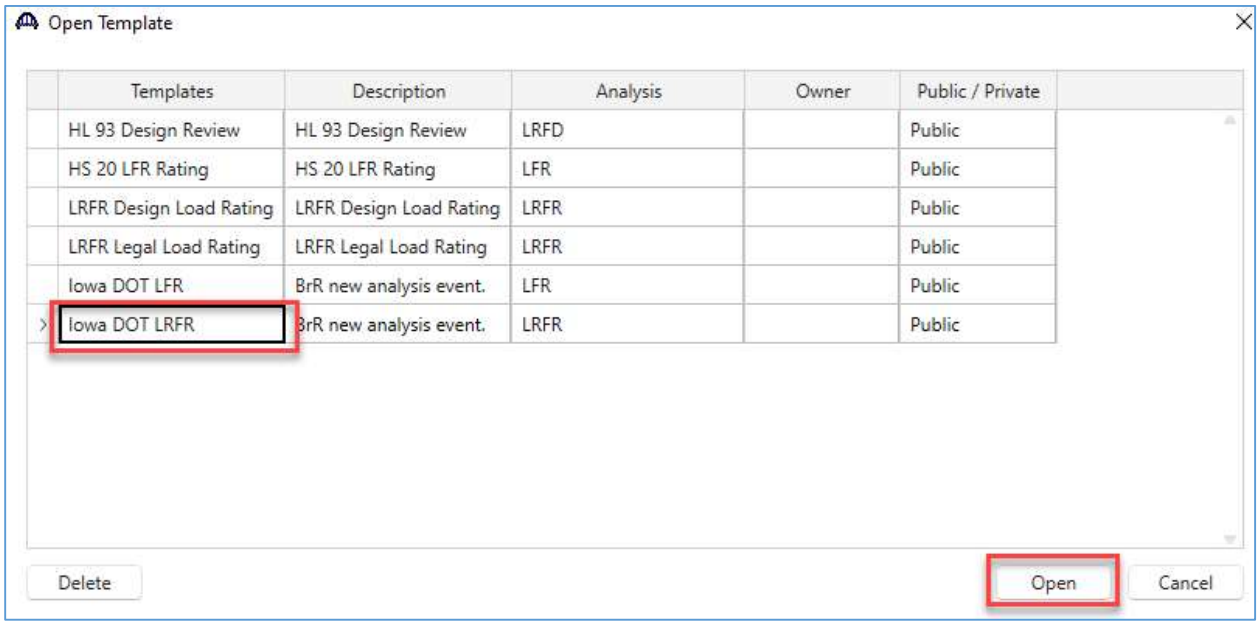


Analysis: LRFR Load Rating Analysis

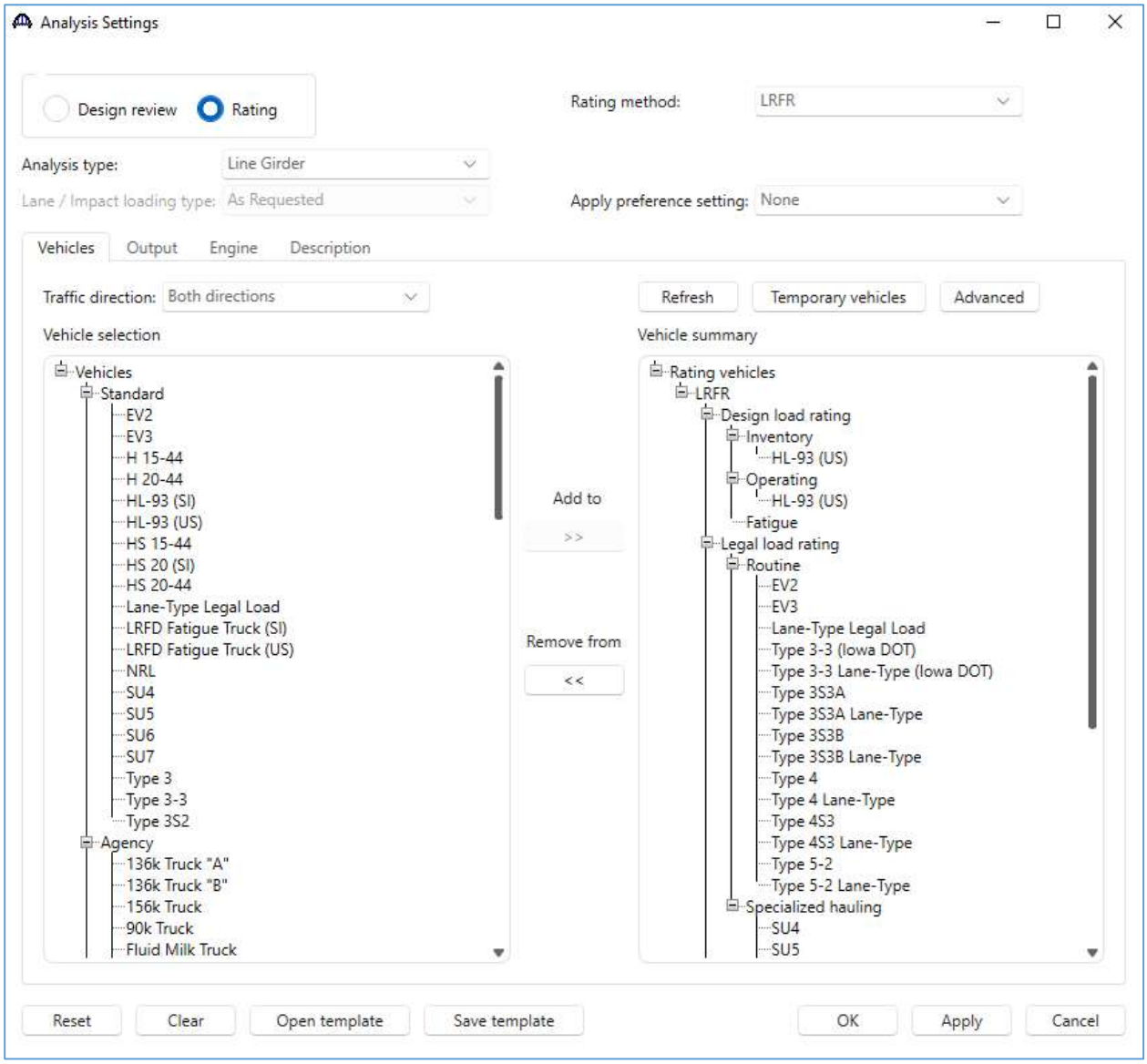
For this example to run the rating analysis, open the Analysis settings window and click Open Template.



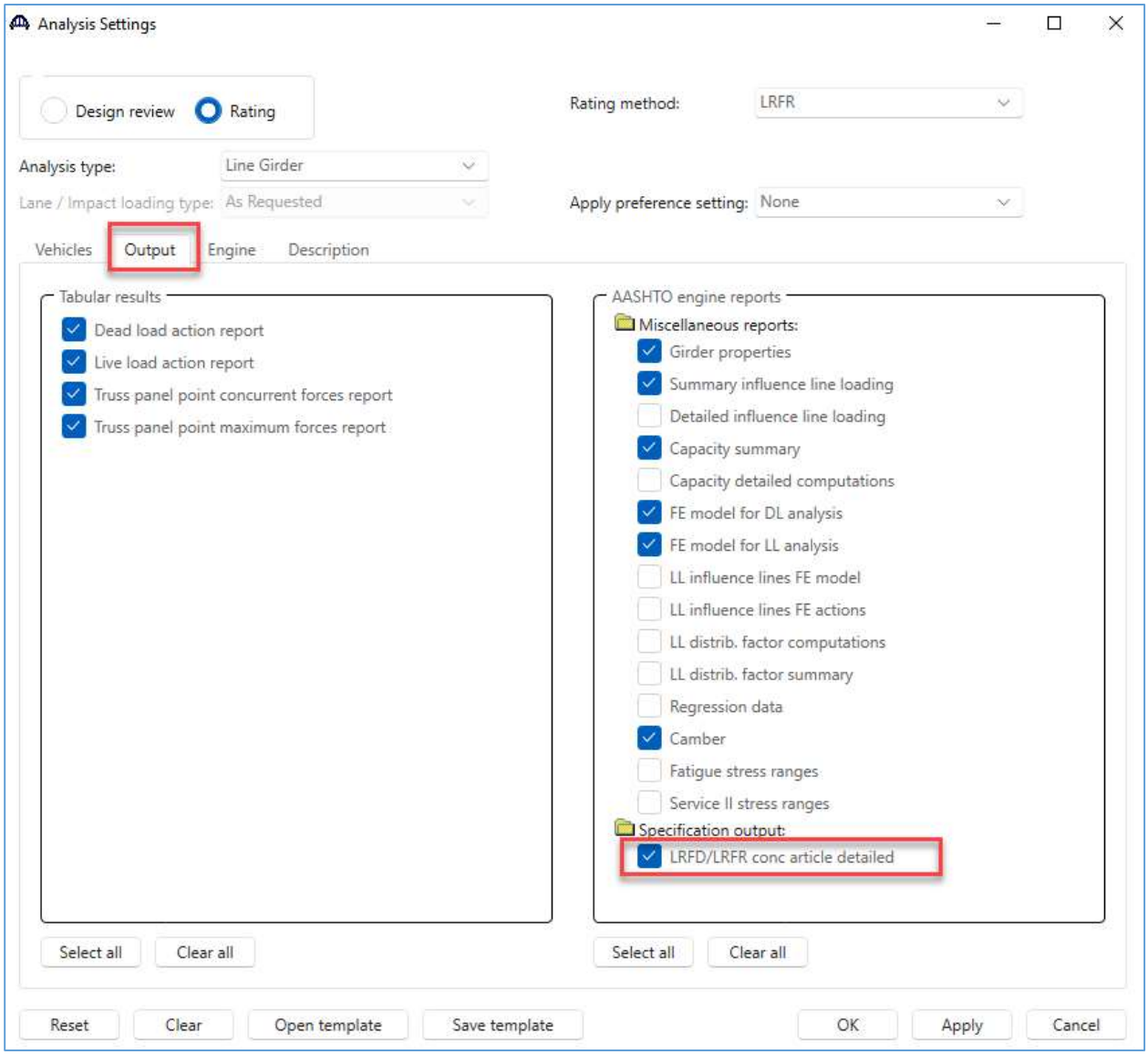
Select the Iowa DOT LFR template and then click Open.



The Analysis Settings template includes the vehicles and settings for LRFR rating analysis.

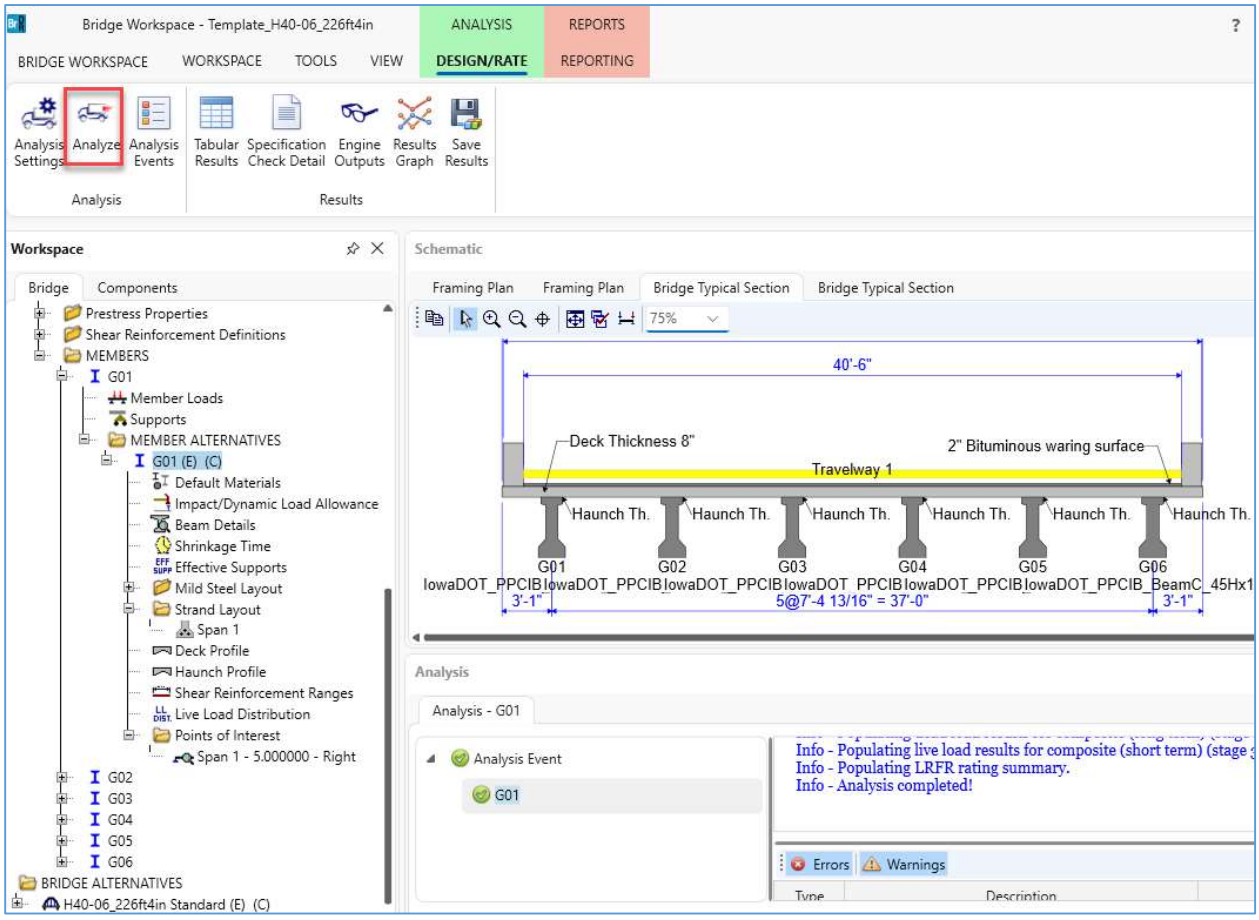


For this analysis, we want to view the detailed output for the concrete capacity articles. Click the “Output” tab and select “LRFD/LRFR conc article detailed” under AASHTO engine reports.



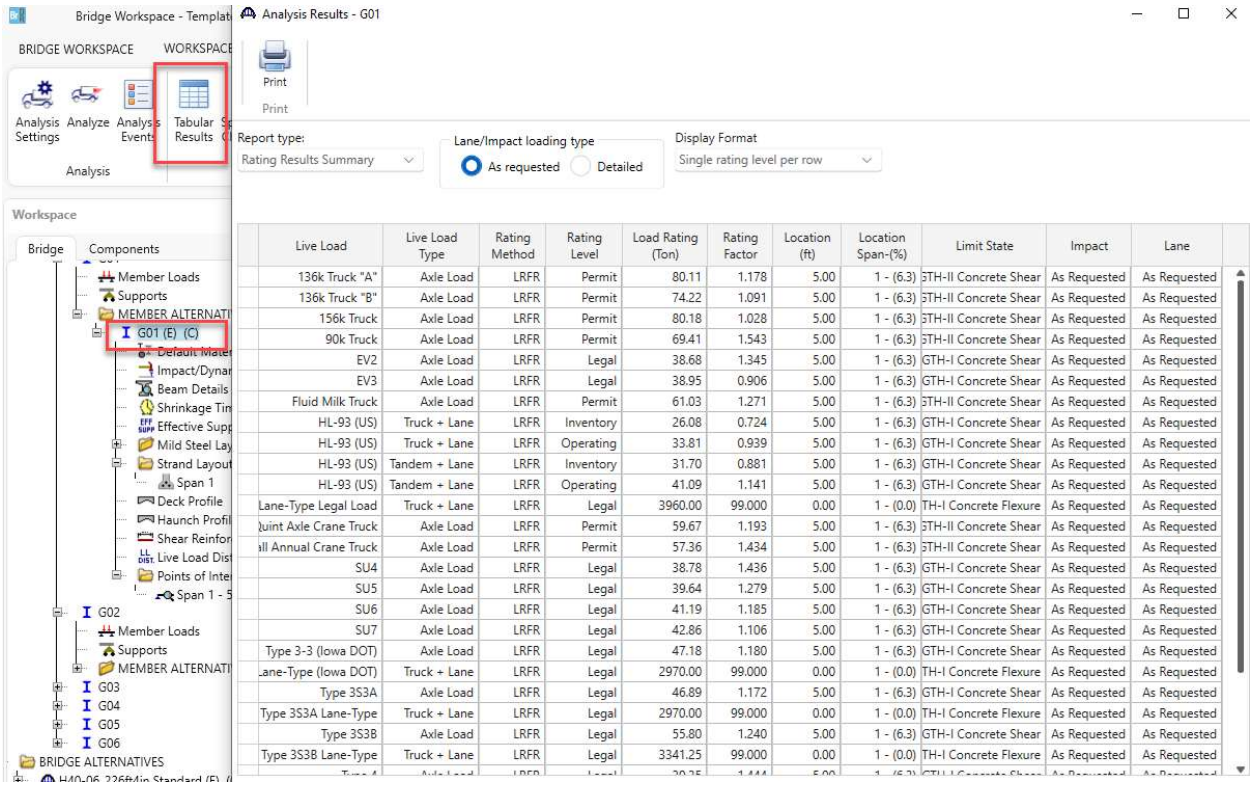
Click OK to save and close.

Once the Analysis Settings Template has been set, click the member alternative for G01 and click Analyze to run the analysis.



Results and Output

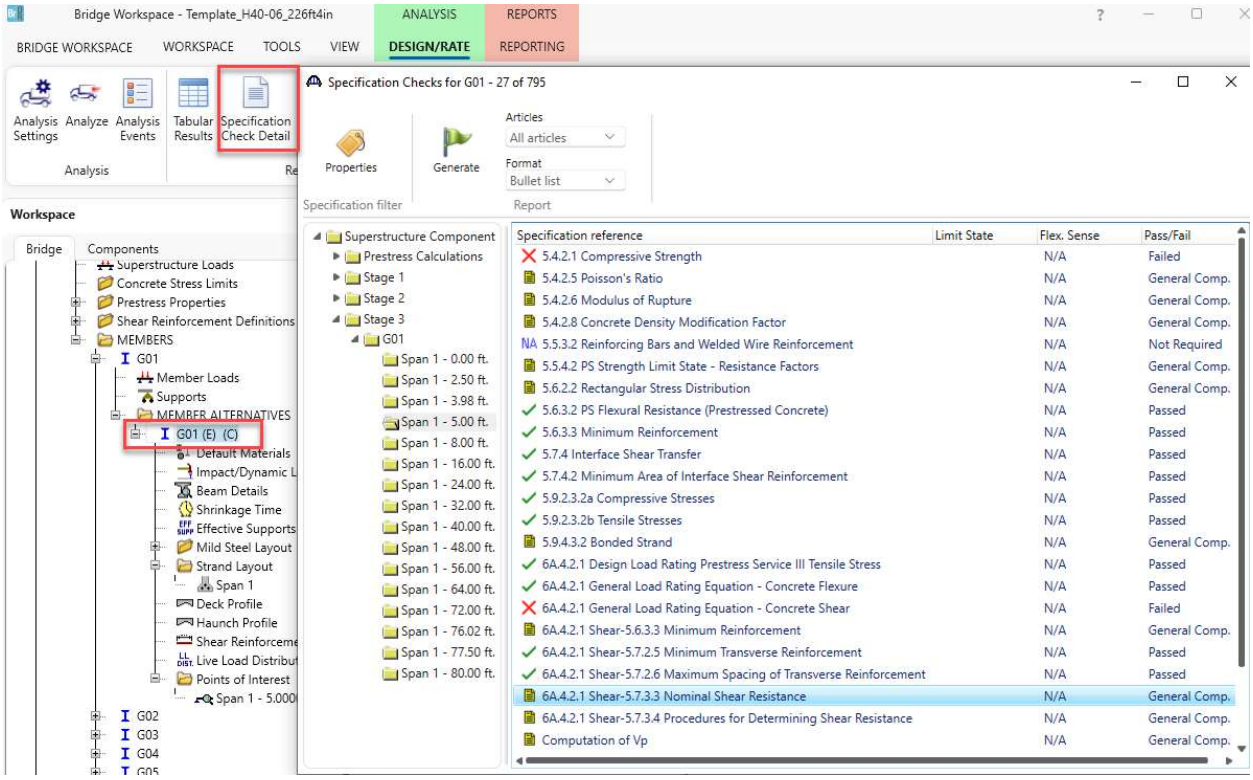
Click the member alternative to select, and then click Tabular Results. In the window that opens, use the dropdown to change the display to “Single rating level per row.”

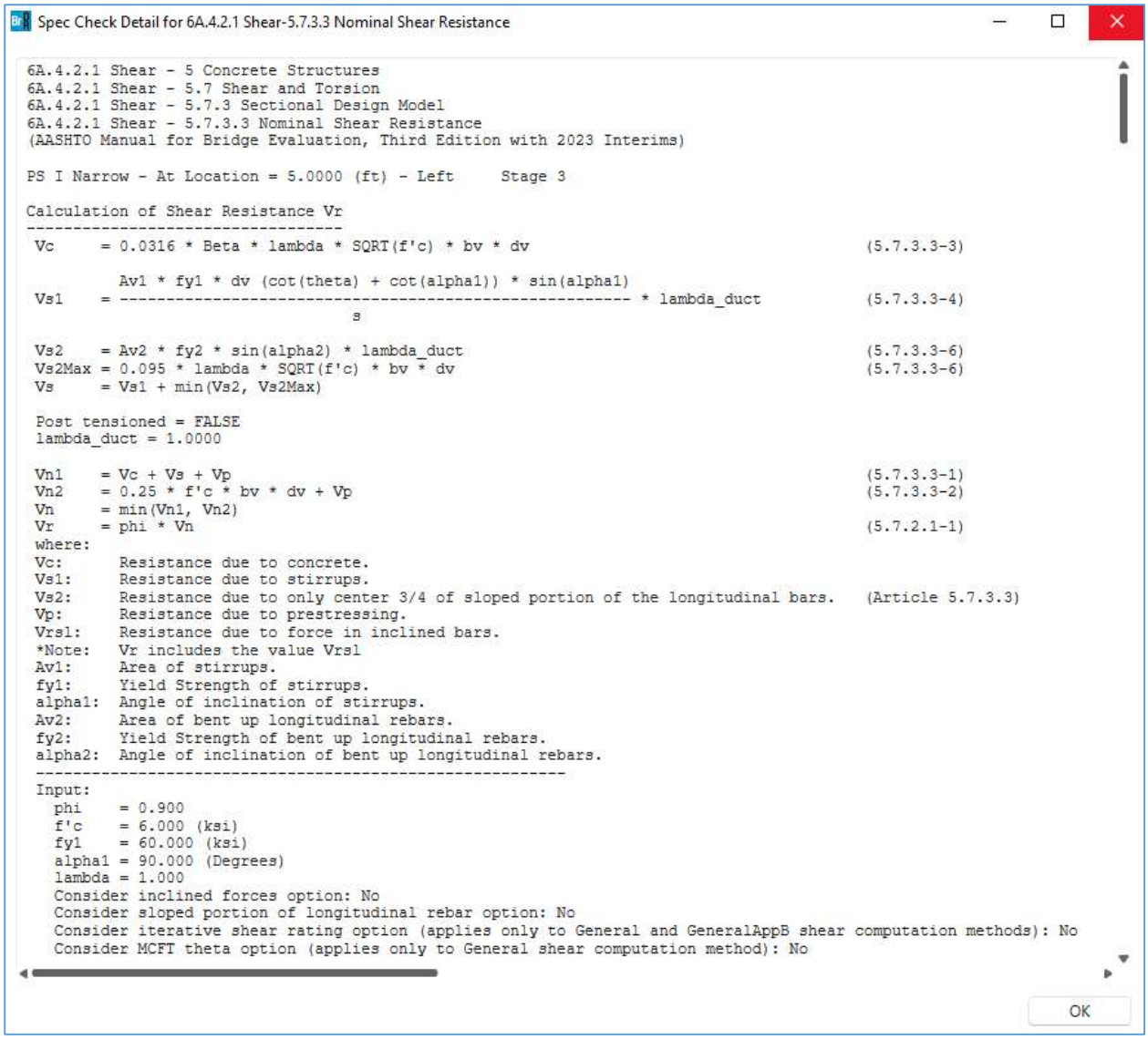


Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	Impact	Lane
136k Truck "A"	Axle Load	LRFR	Permit	80.11	1.178	5.00	1 - (6.3)	GTH-II Concrete Shear	As Requested	As Requested
136k Truck "B"	Axle Load	LRFR	Permit	74.22	1.091	5.00	1 - (6.3)	GTH-II Concrete Shear	As Requested	As Requested
156k Truck	Axle Load	LRFR	Permit	80.18	1.028	5.00	1 - (6.3)	GTH-II Concrete Shear	As Requested	As Requested
90k Truck	Axle Load	LRFR	Permit	69.41	1.543	5.00	1 - (6.3)	GTH-II Concrete Shear	As Requested	As Requested
EV2	Axle Load	LRFR	Legal	38.68	1.345	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
EV3	Axle Load	LRFR	Legal	38.95	0.906	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
Fluid Milk Truck	Axle Load	LRFR	Permit	61.03	1.271	5.00	1 - (6.3)	GTH-II Concrete Shear	As Requested	As Requested
HL-93 (US)	Truck + Lane	LRFR	Inventory	26.08	0.724	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
HL-93 (US)	Truck + Lane	LRFR	Operating	33.81	0.939	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Inventory	31.70	0.881	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Operating	41.09	1.141	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
Lane-Type Legal Load	Truck + Lane	LRFR	Legal	3960.00	99.000	0.00	1 - (0.0)	TH-I Concrete Flexure	As Requested	As Requested
Quint Axle Crane Truck	Axle Load	LRFR	Permit	59.67	1.193	5.00	1 - (6.3)	GTH-II Concrete Shear	As Requested	As Requested
All Annual Crane Truck	Axle Load	LRFR	Permit	57.36	1.434	5.00	1 - (6.3)	GTH-II Concrete Shear	As Requested	As Requested
SU4	Axle Load	LRFR	Legal	38.78	1.436	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
SU5	Axle Load	LRFR	Legal	39.64	1.279	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
SU6	Axle Load	LRFR	Legal	41.19	1.185	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
SU7	Axle Load	LRFR	Legal	42.86	1.106	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
Type 3-3 (Iowa DOT)	Axle Load	LRFR	Legal	47.18	1.180	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
Lane-Type (Iowa DOT)	Truck + Lane	LRFR	Legal	2970.00	99.000	0.00	1 - (0.0)	TH-I Concrete Flexure	As Requested	As Requested
Type 3S3A	Axle Load	LRFR	Legal	46.89	1.172	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
Type 3S3A Lane-Type	Truck + Lane	LRFR	Legal	2970.00	99.000	0.00	1 - (0.0)	TH-I Concrete Flexure	As Requested	As Requested
Type 3S3B	Axle Load	LRFR	Legal	55.80	1.240	5.00	1 - (6.3)	GTH-I Concrete Shear	As Requested	As Requested
Type 3S3B Lane-Type	Truck + Lane	LRFR	Legal	3341.25	99.000	0.00	1 - (0.0)	TH-I Concrete Flexure	As Requested	As Requested

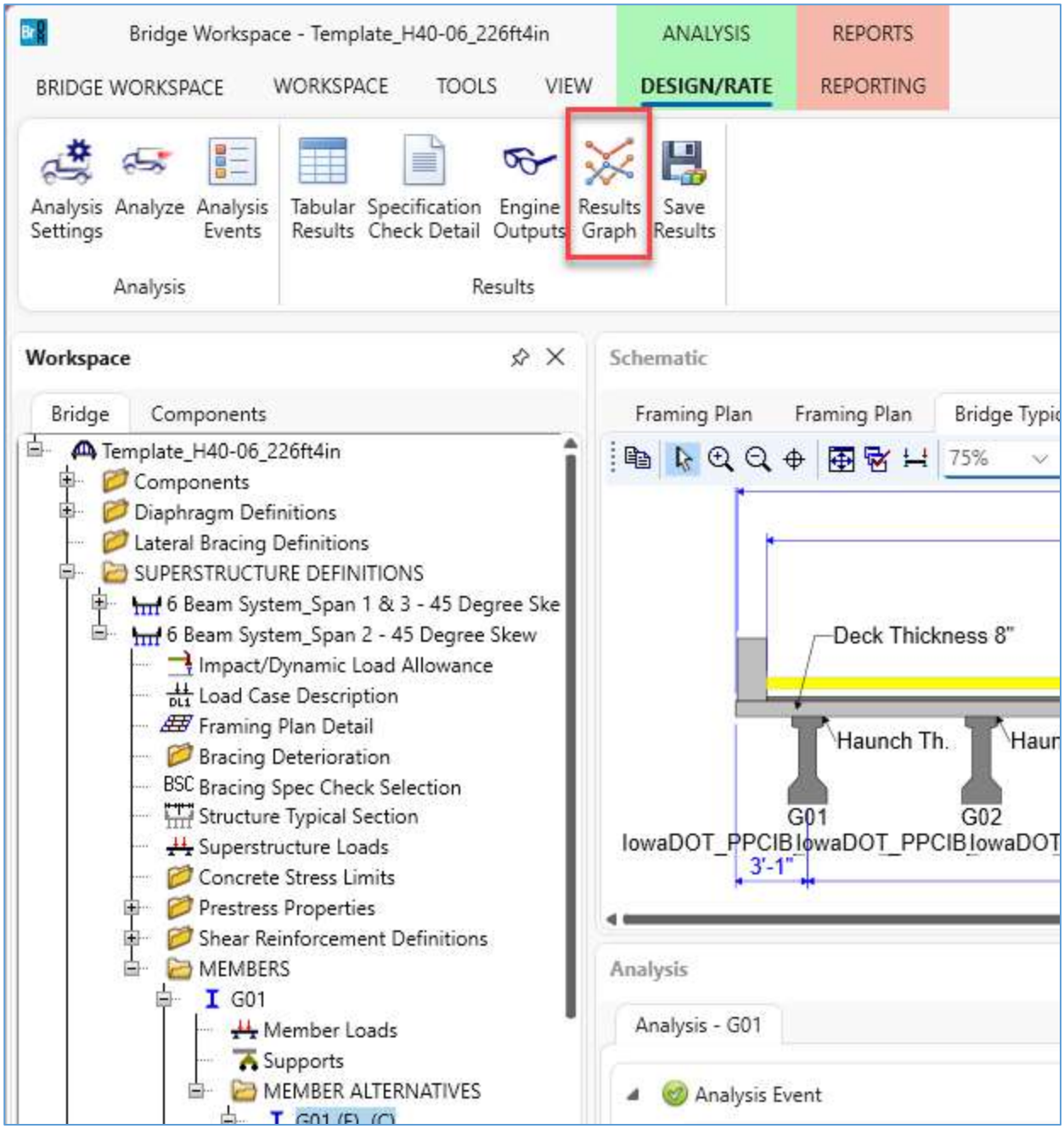
To view the detailed results, click the member alternative to select it and then click Specification Check Detail.

Expand the tree on the left side of the window and select an analysis location, Double click any article to open the detailed results.

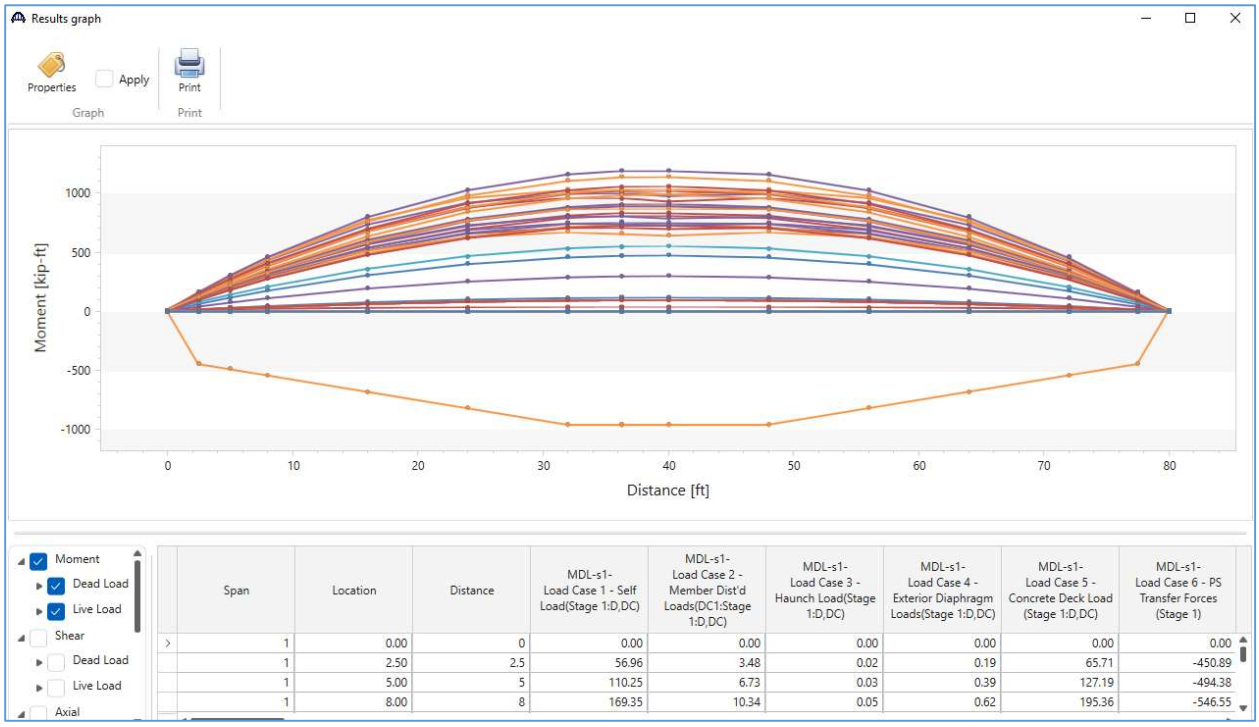



Spec Check Detail for 6A.4.2.1 Shear-5.7.3.3 Nominal Shear Resistance
6A.4.2.1 Shear - 5 Concrete Structures
6A.4.2.1 Shear - 5.7 Shear and Torsion
6A.4.2.1 Shear - 5.7.3 Sectional Design Model
6A.4.2.1 Shear - 5.7.3.3 Nominal Shear Resistance
(AASHTO Manual for Bridge Evaluation, Third Edition with 2023 Interims)
PS I Narrow - At Location = 5.0000 (ft) - Left Stage 3
Calculation of Shear Resistance Vr
Vc = 0.0316 * Beta * lambda * SQRT(f'c) * bv * dv (5.7.3.3-3)
Vs1 = Av1 * fy1 * dv (cot(theta) + cot(alpha1)) * sin(alpha1) / s * lambda_duct (5.7.3.3-4)
Vs2 = Av2 * fy2 * sin(alpha2) * lambda_duct (5.7.3.3-6)
Vs2Max = 0.095 * lambda * SQRT(f'c) * bv * dv (5.7.3.3-6)
Vs = Vs1 + min(Vs2, Vs2Max)
Post tensioned = FALSE
lambda_duct = 1.0000
Vn1 = Vc + Vs + Vp (5.7.3.3-1)
Vn2 = 0.25 * f'c * bv * dv + Vp (5.7.3.3-2)
Vn = min(Vn1, Vn2)
Vr = phi * Vn (5.7.2.1-1)
where:
Vc: Resistance due to concrete.
Vs1: Resistance due to stirrups.
Vs2: Resistance due to only center 3/4 of sloped portion of the longitudinal bars. (Article 5.7.3.3)
Vp: Resistance due to prestressing.
Vrsl: Resistance due to force in inclined bars.
*Note: Vr includes the value Vrsl
Av1: Area of stirrups.
fy1: Yield Strength of stirrups.
alpha1: Angle of inclination of stirrups.
Av2: Area of bent up longitudinal rebars.
fy2: Yield Strength of bent up longitudinal rebars.
alpha2: Angle of inclination of bent up longitudinal rebars.
Input:
phi = 0.900
f'c = 6.000 (ksi)
fy1 = 60.000 (ksi)
alpha1 = 90.000 (Degrees)
lambda = 1.000
Consider inclined forces option: No
Consider sloped portion of longitudinal rebar option: No
Consider iterative shear rating option (applies only to General and GeneralAppB shear computation methods): No
Consider MCFT theta option (applies only to General shear computation method): No
OK

You can also open the Results Graph window to review force effects graphs for dead loads and live loads.



Expand the tree on the left and use the check box to toggle on/off display of each load type.



Span	Location	Distance	MDL-s1-Load Case 1 - Self Load(Stage 1:D,DC)	MDL-s1-Load Case 2 - Member Dist'd Loads(DC1:Stage 1:D,DC)	MDL-s1-Load Case 3 - Haunch Load(Stage 1:D,DC)	MDL-s1-Load Case 4 - Exterior Diaphragm Loads(Stage 1:D,DC)	MDL-s1-Load Case 5 - Concrete Deck Load (Stage 1:D,DC)	MDL-s1-Load Case 6 - PS Transfer Forces (Stage 1)
1	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00
1	2.50	2.5	56.96	3.48	0.02	0.19	65.71	-450.89
1	5.00	5	110.25	6.73	0.03	0.39	127.19	-494.38
1	8.00	8	169.35	10.34	0.05	0.62	195.36	-546.55

AASHTOWare BrDR 7.5.1

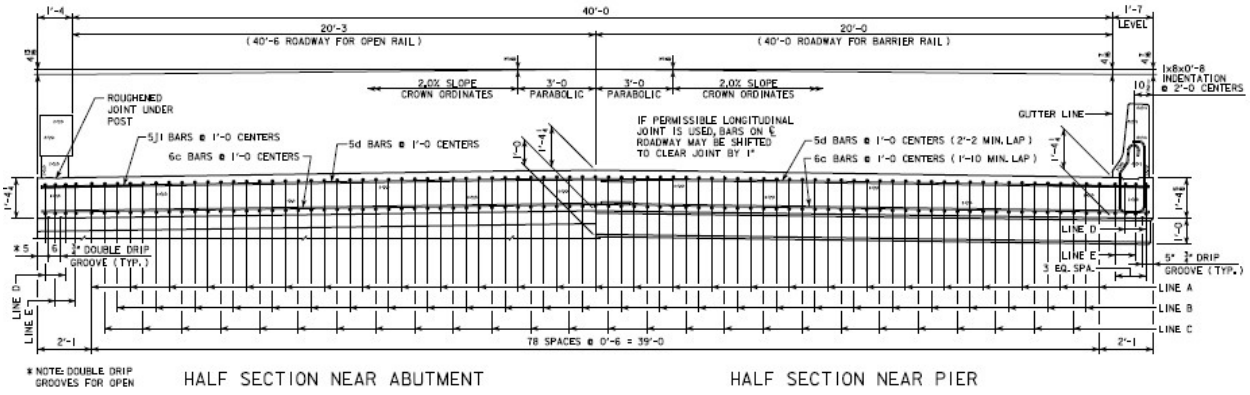
Iowa DOT Bridge Template Tutorial – RC Slab

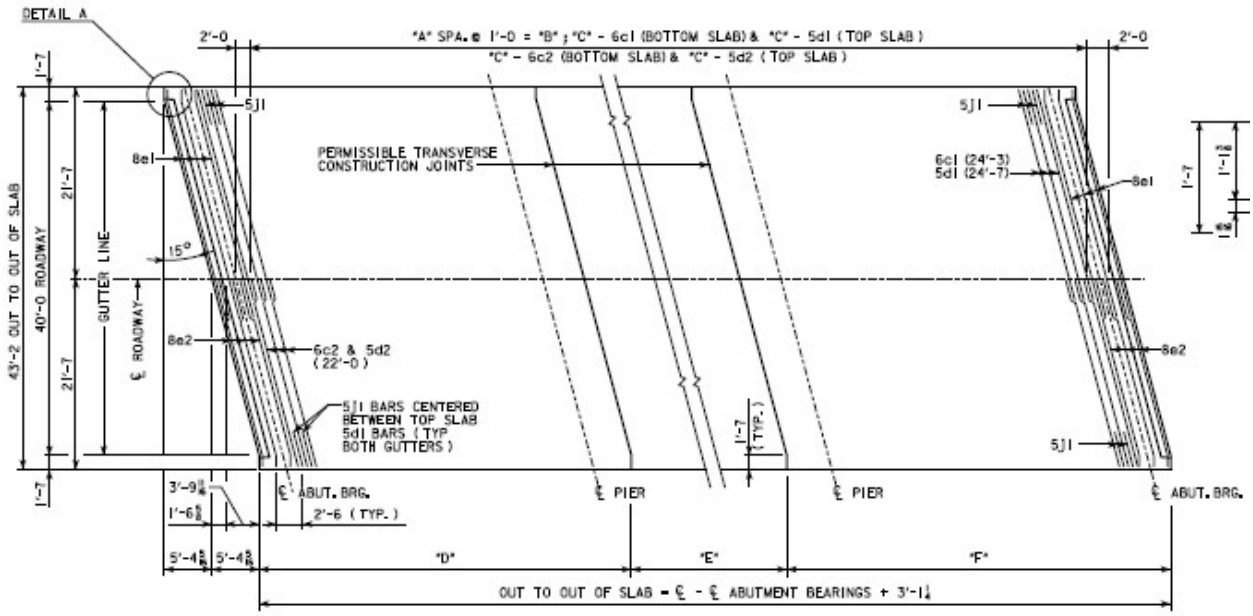
Template_J4—06 & J40-14_150ft

Topics Covered

- Importing the Template Model
- Documentation and Assumptions
- Bridge Alternatives
- Added Loads: Wearing Surface, Appurtenances, Utilities and Other Member Loads
- Deterioration: Point of Interest Overrides
- Analysis: LRFR Load Rating Analysis
- Results and Output

Bridge Information





Bridge Information:

Bridge ID: ExampleStandardBridge3

NBI Structure ID: ExampleStandardBridge3

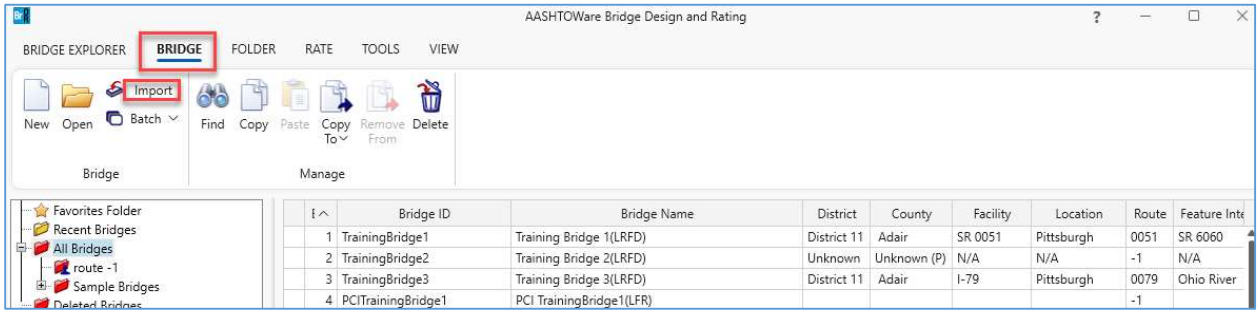
As-built plans indicate this structure was built using the 15 degree skew alternative.

Inspection Data:

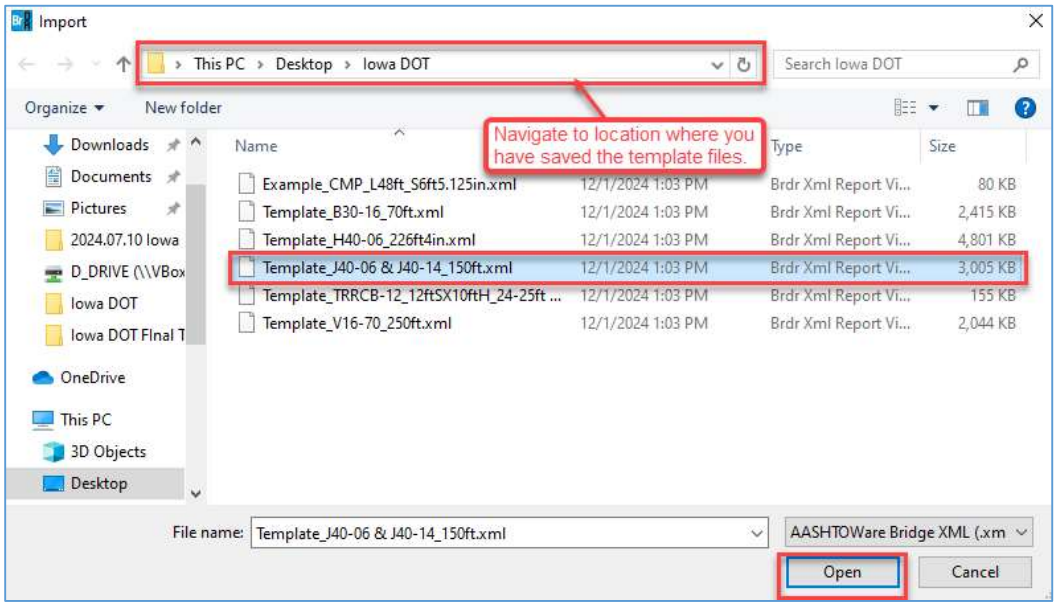
Field measured wearing surface: 3” gravel wearing surface

Utility line: 8” diameter unknown utility attached side of slab

Importing the Template Model

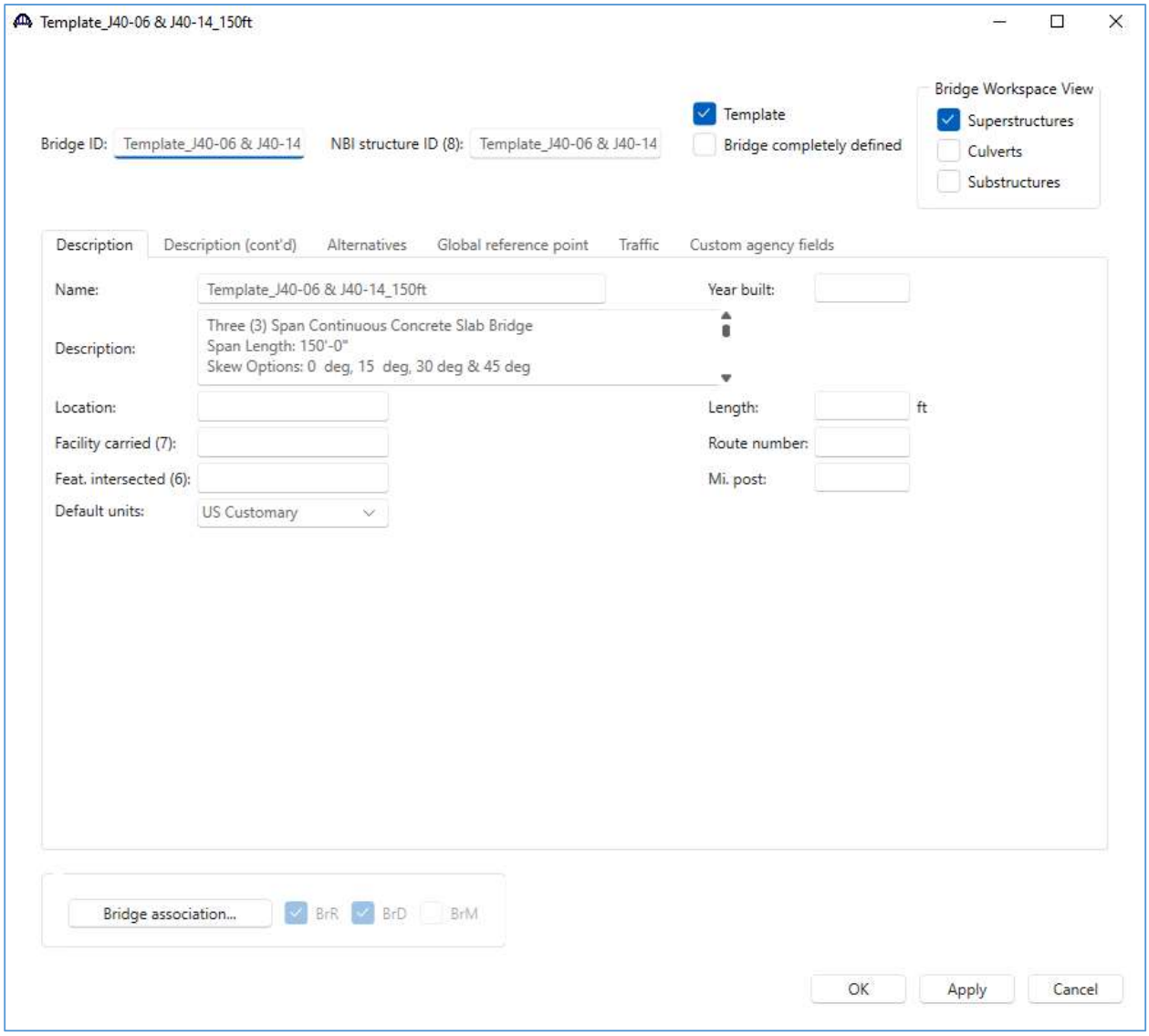


In the Bridge Explorer, click the BRIDGE tab, then click the “Import” button. This will open a file explorer window.



In the file explorer window, navigate to the location where you have saved the template file you would like to import. Click on the file to select it, then click Open.

After clicking “Open”, the template model will be imported and the Bridge Description window will automatically open.

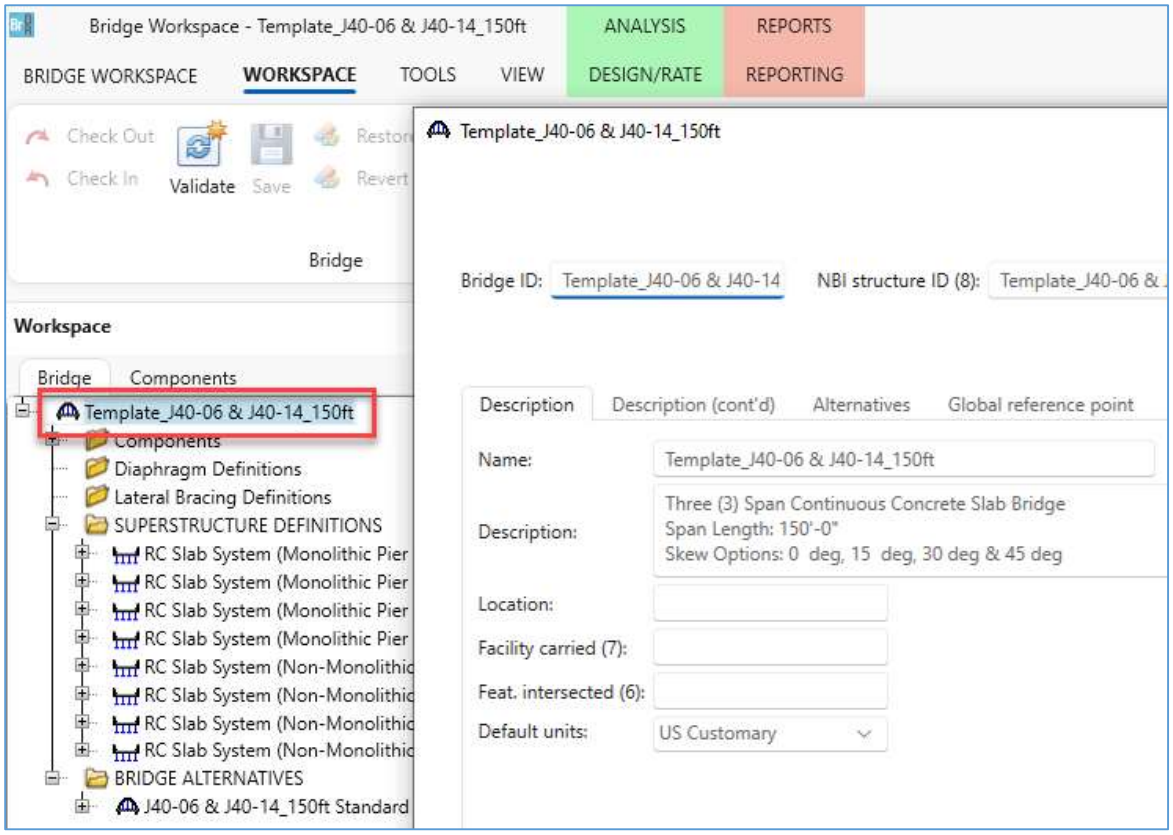


Enter the Bridge ID, NBI Structure ID, year built and location information for the bridge. Note that the Bridge ID and NBI Structure must be unique for each bridge in the BrR database. The NBI Structure ID can be used for both the Bridge ID and NBI Structure ID of the bridge being modeled.

Uncheck “Template” in the upper right corner, since this model will represent an in-service bridge rather than a template once it has been updated to reflect the actual bridge information, loads and conditions.

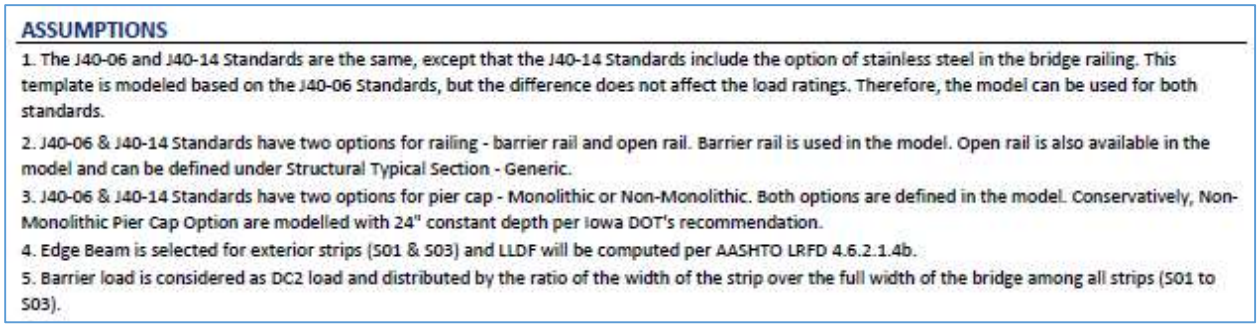
Use the scroll bar at the right side of the Description field to review the bridge template description. Review the assumptions to ensure that they are appropriate for the bridge. This information is also included in the documentation that accompanies the template model in the Assumptions section. Click OK.

To reopen this window at any time, double click the bridge name at the top of the Bridge Workspace tree.



Documentation and Assumptions

The PDF file Template_J40-06 & J40-14_150ft_Rating Results & Supporting Calcs.pdf contains references, assumptions and calculations used in the creation of the template model.



ASSUMPTIONS

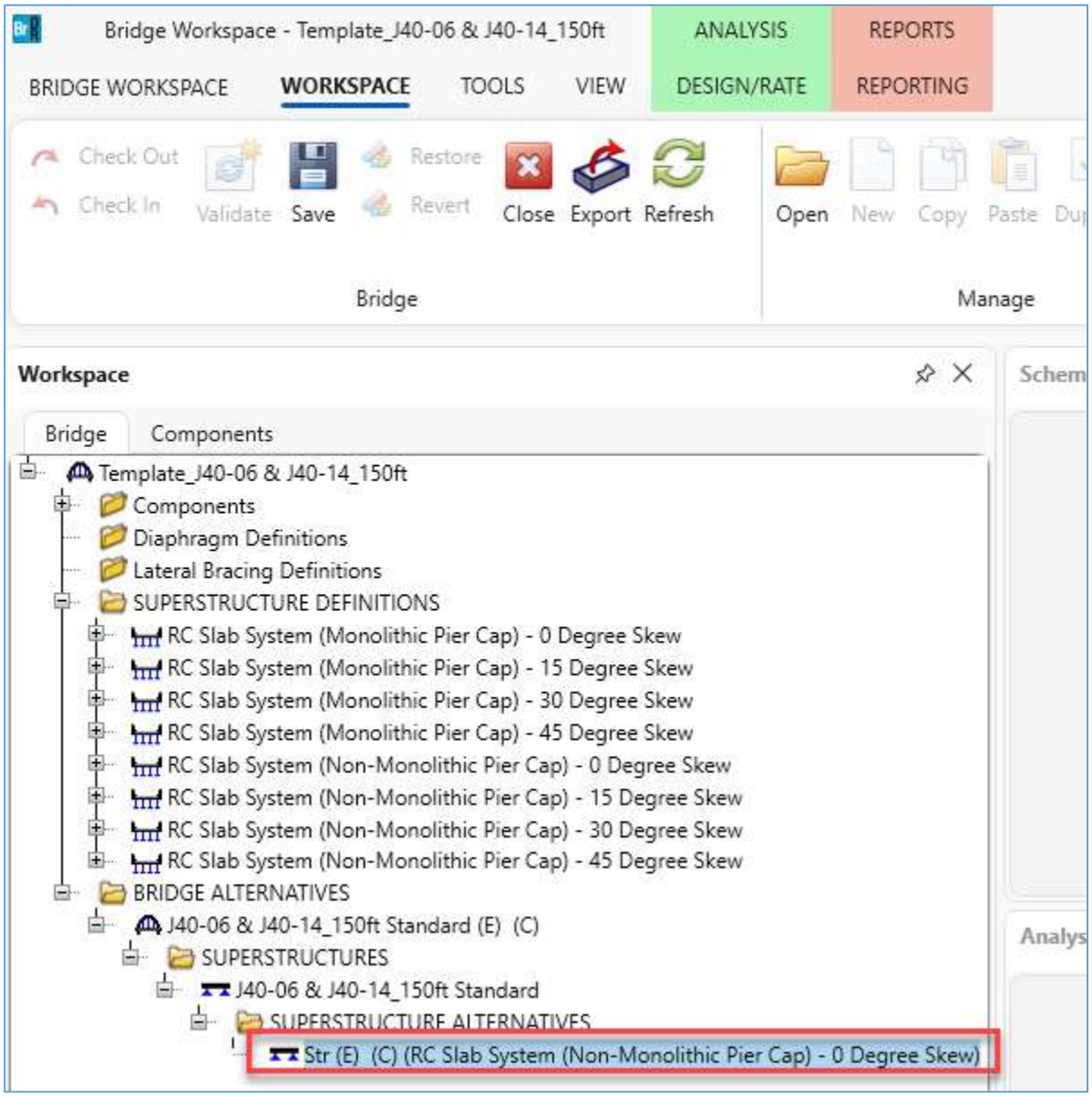
1. The J40-06 and J40-14 Standards are the same, except that the J40-14 Standards include the option of stainless steel in the bridge railing. This template is modeled based on the J40-06 Standards, but the difference does not affect the load ratings. Therefore, the model can be used for both standards.
2. J40-06 & J40-14 Standards have two options for railing - barrier rail and open rail. Barrier rail is used in the model. Open rail is also available in the model and can be defined under Structural Typical Section - Generic.
3. J40-06 & J40-14 Standards have two options for pier cap - Monolithic or Non-Monolithic. Both options are defined in the model. Conservatively, Non-Monolithic Pier Cap Option are modelled with 24" constant depth per Iowa DOT's recommendation.
4. Edge Beam is selected for exterior strips (S01 & S03) and LLDF will be computed per AASHTO LRFD 4.6.2.1.4b.
5. Barrier load is considered as DC2 load and distributed by the ratio of the width of the strip over the full width of the bridge among all strips (S01 to S03).

An abbreviated version of assumptions is also included in the Bridge Description window in the template model.

The documentation, assumptions and supporting calculations should be reviewed along with bridge inspection information and as-built plans (if available) to determine any modifications required for the bridge.

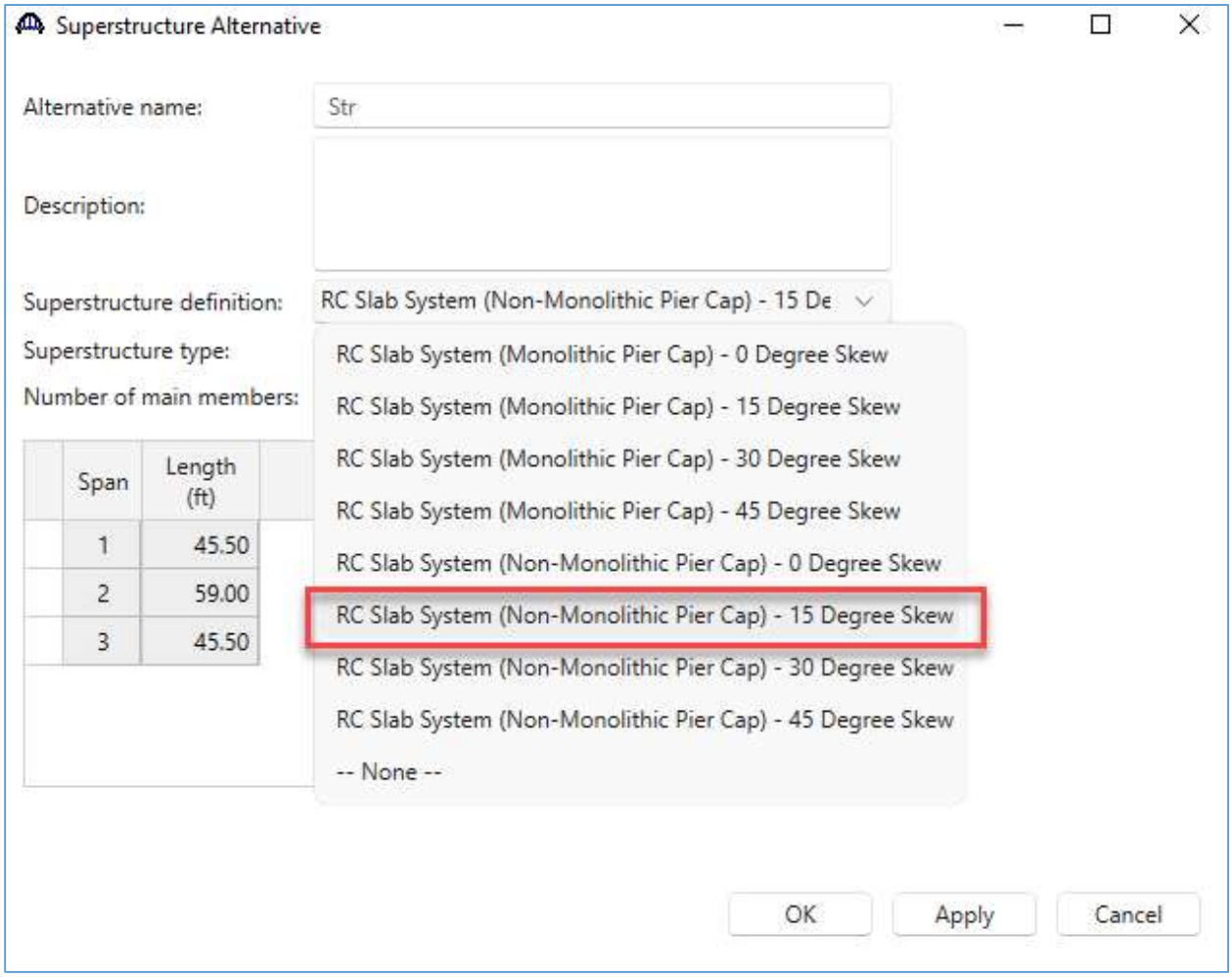
Bridge Alternatives

The template is set up with several different alternatives for different skews. Additionally, monolithic and non-monolithic pier cap alternatives are included. For this tutorial, the bridge being rated has the non-monolithic pier cap and has a 15 degree skew. Expand the bridge workspace tree below BRIDGE ALTERNATIVES.

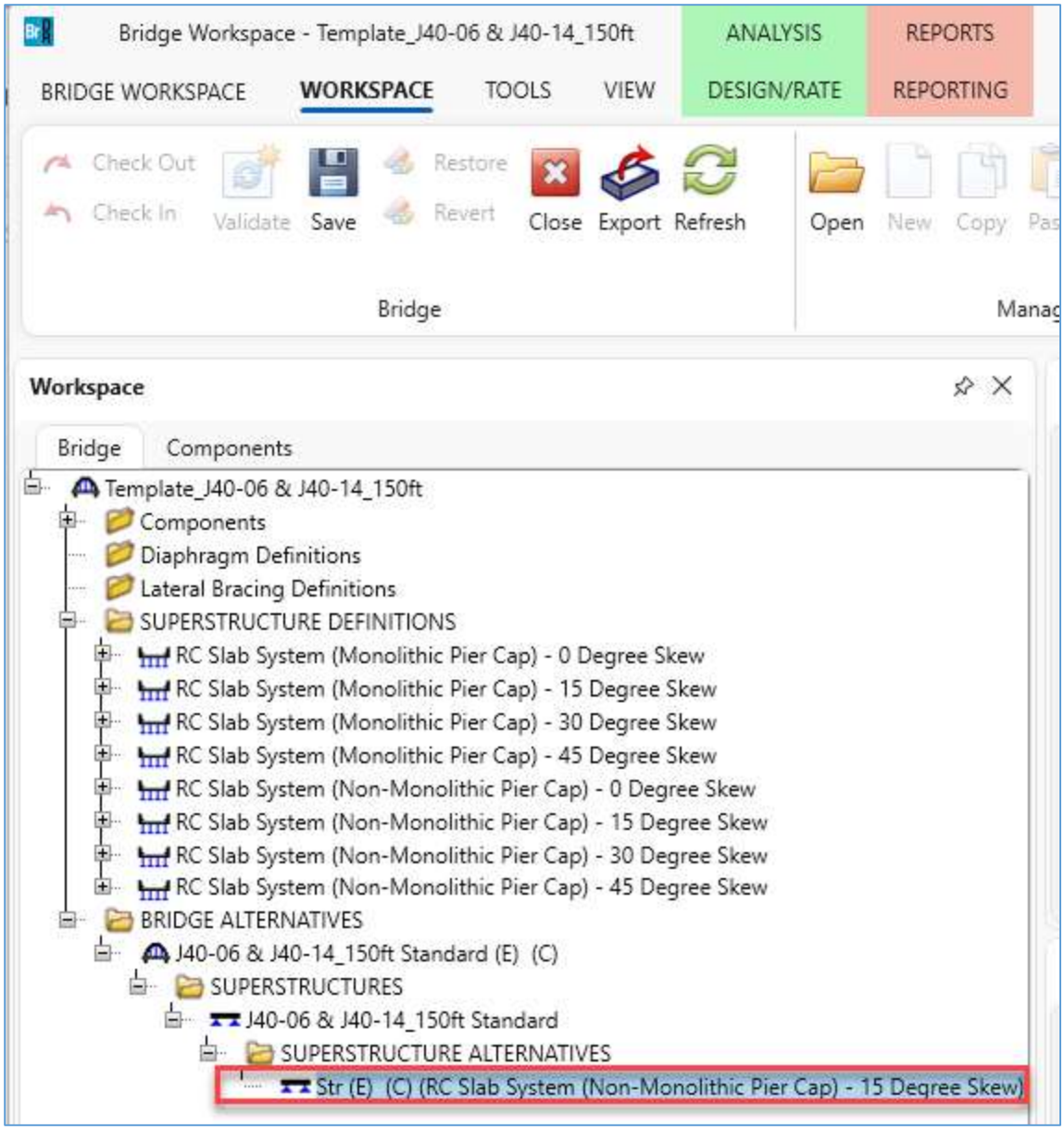


Double click the Superstructure Alternative "Str (E) (C) (RC Slab System (Non-Monolithic Pier Cap – 0 Degree Skew)" to open the Superstructure Alternative window.

In the “Superstructure definition” field, use the dropdown to select the superstructure with the non-monolithic pier cap and the 15 degree skew.

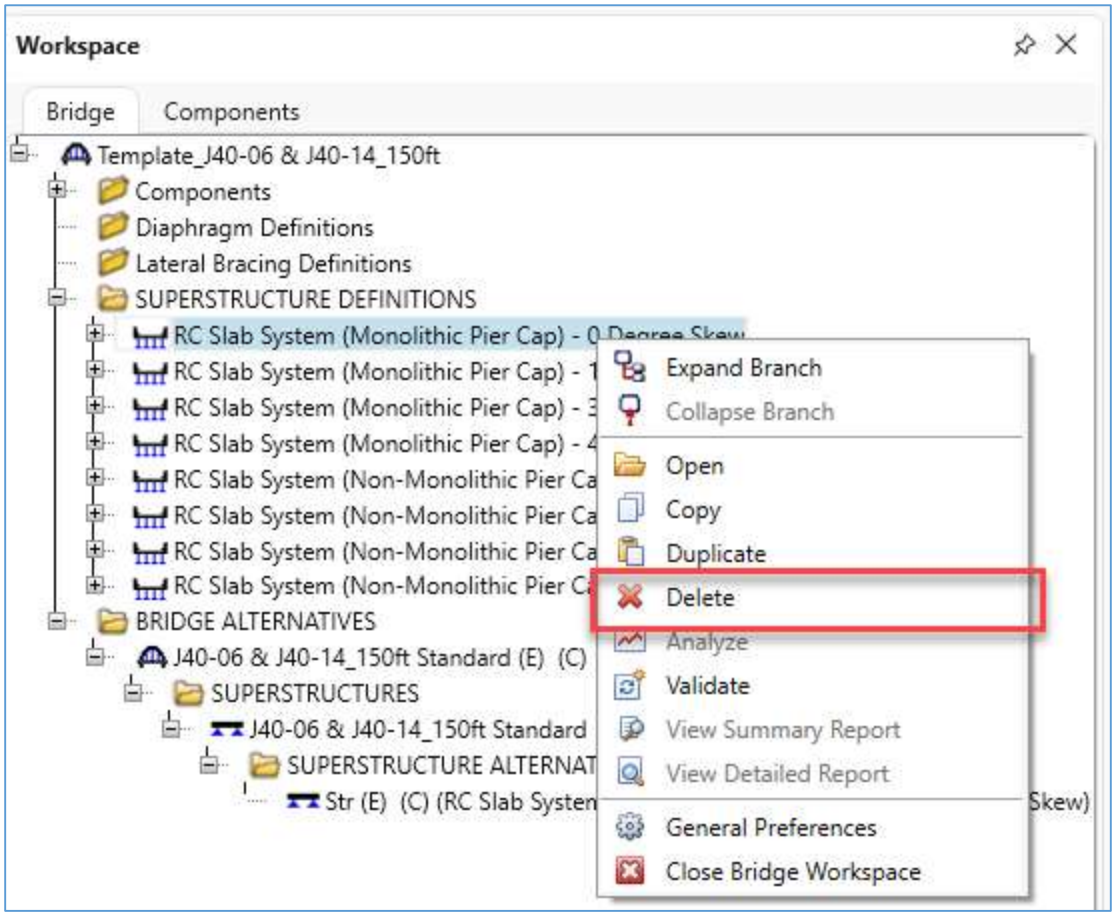


Click OK to save and close the window.



The Superstructure Alternative name has automatically updated based on the selected alternative.

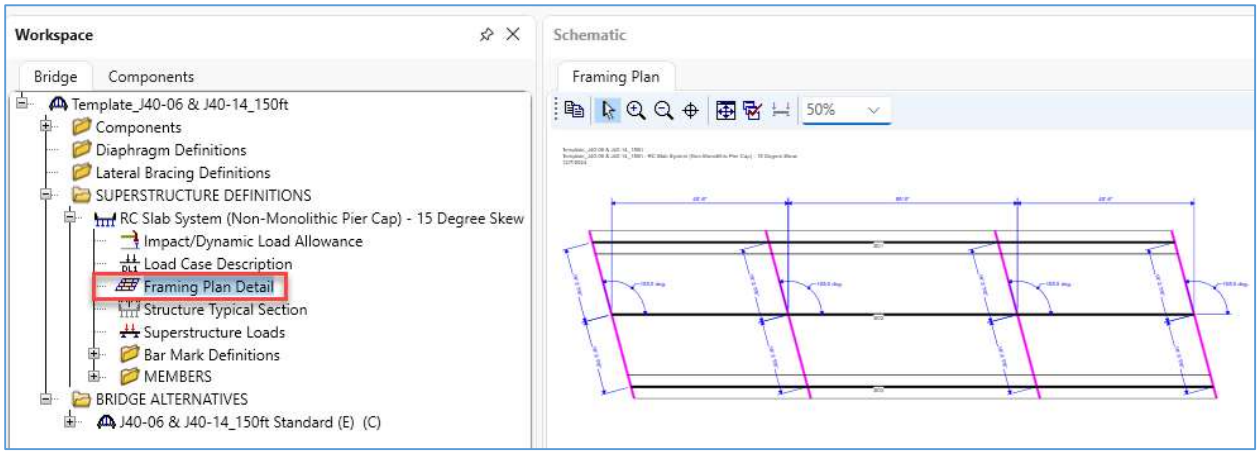
Delete the other superstructure definitions that are not applicable for this bridge by right-clicking on the Superstructure Definition you intend to delete and clicking the Delete button. If you attempt to delete a Superstructure Definition that is assigned as a Bridge Alternative, you will get a message indicating that it is in use and cannot be deleted.



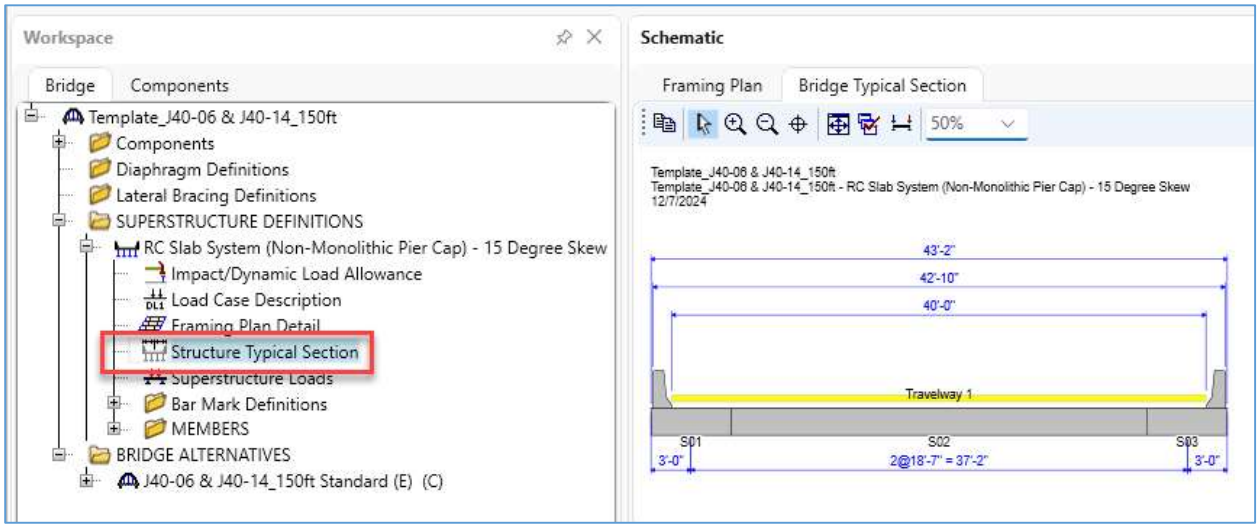
Once the superstructure definition that will be used is set in the Bridge Alternative and the ones that are not applicable are deleted, expand the bridge workspace tree under the Superstructure Definition for RC Slab System (Non-Monolithic Pier Cap) – 15 Degree Skew.

Note: All other templates will only provide the non-monolithic option. Template_J40-06 & J40-14_150ft is the only template providing a monolithic option as an example.

Right click on Framing Plan Detail and then click Schematic to review the framing plan schematic.



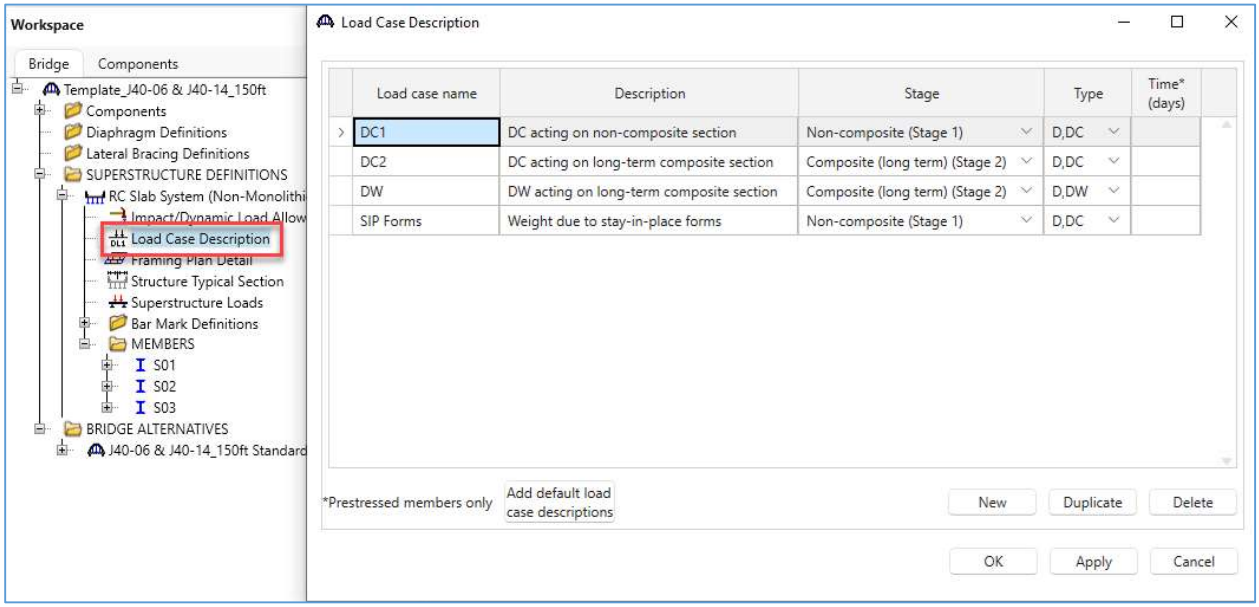
Right click on Structure Typical Section and then click Schematic to review the structure typical section schematic.



Added Loads

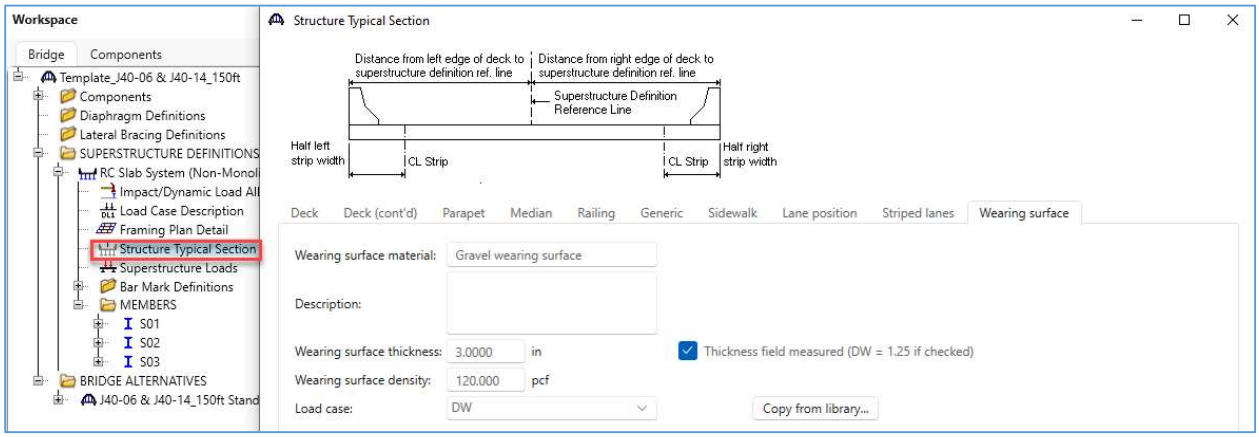
As-built plans, inspection data, NBI data or other records may indicate loads on the structure that are unique to that structure and not included in the template model. Typical examples of these loads include added wearing surface, modified/replaced appurtenances and utilities.

Default load cases have been saved to the template. Review the default load cases by opening the Load Case Description window. You can also add custom load cases if needed.



Added Loads: Wearing surface

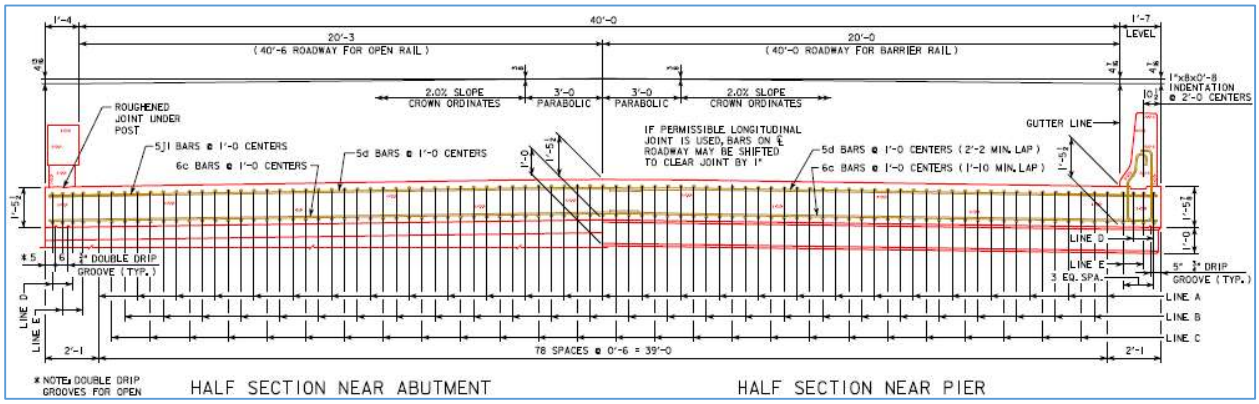
To enter or modify the wearing surface, open the Structural Typical Section window and select the "Wearing surface" tab.



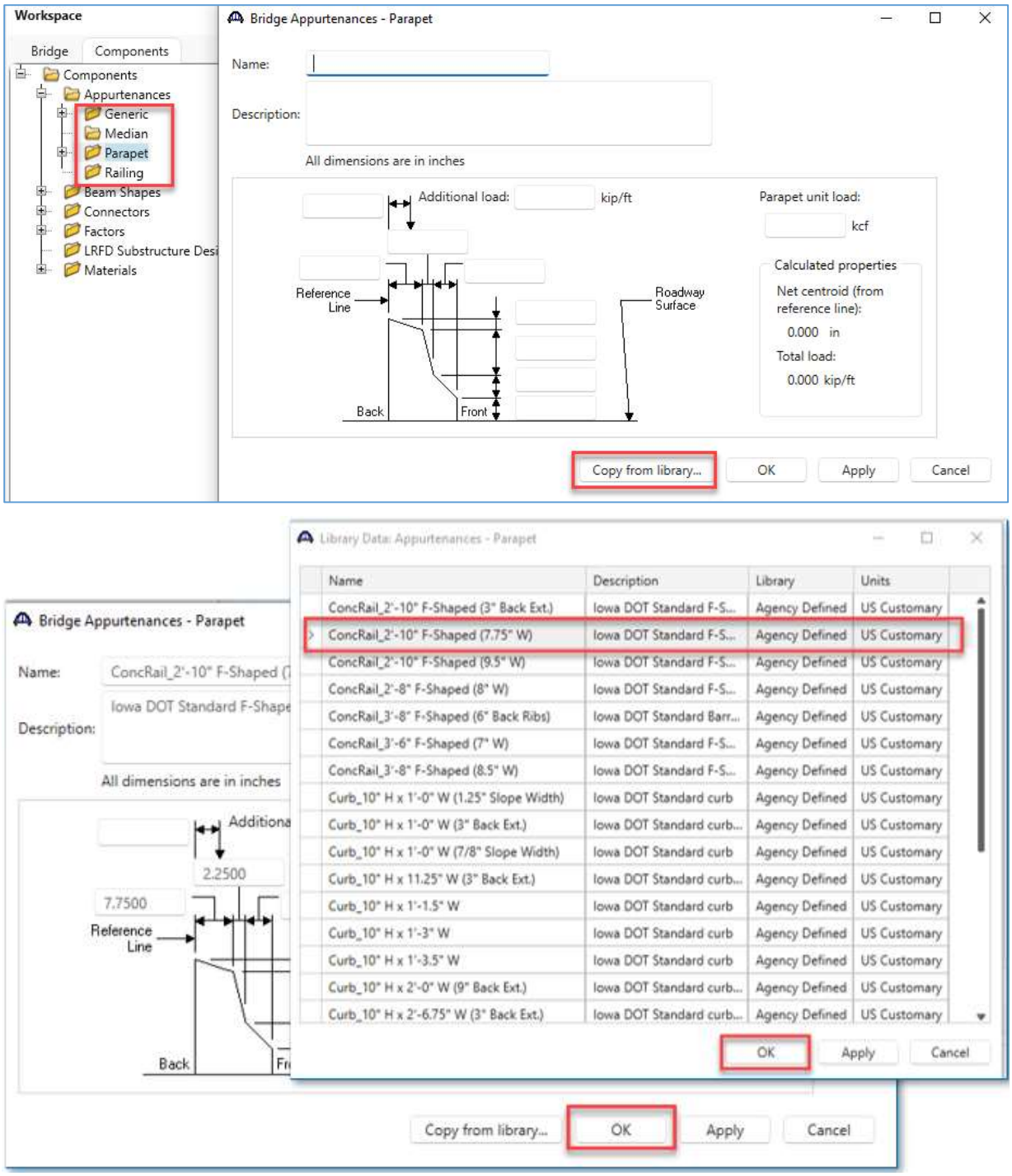
Enter a name for the wearing surface material, and the thickness and density of the wearing surface. Select the load case in which the wearing surface is applied. Click Apply.

Added Loads: Appurtenances

The J40-06 and J40-14 Standards have two options for the railing. The barrier rail is set at the default in the template. The alternate open rail is saved to the bridge model, and can be assigned to the Structure Typical Section in place of the barrier rail. This is noted in the bridge template model and is also indicated in the documentation for the template model in the Assumptions section.

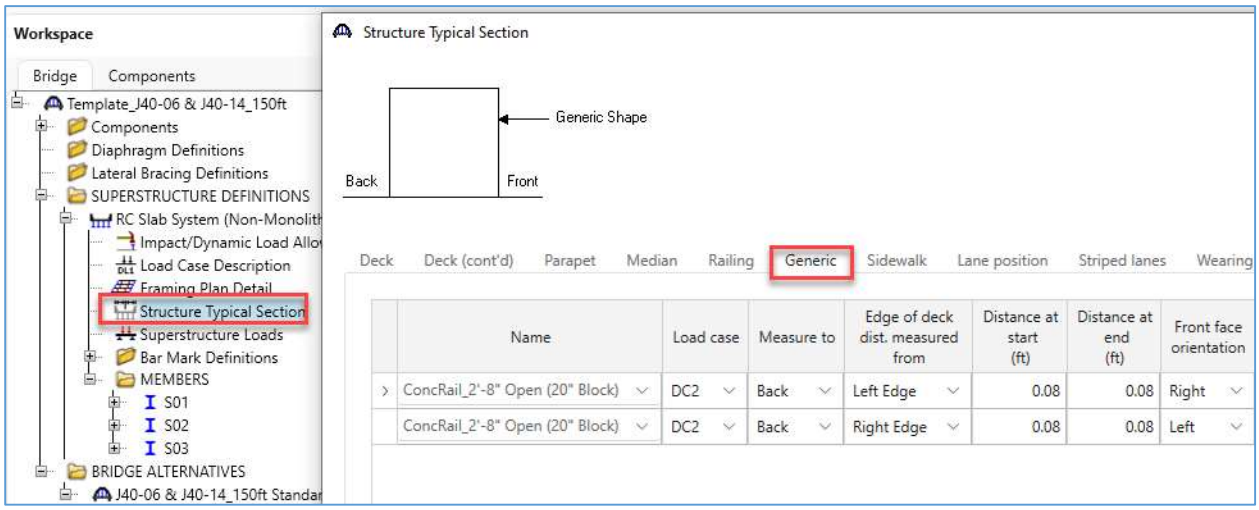


To replace a barrier with one that is not saved to the bridge model, click the components tab. Double click the type of appurtenance you would like to add, and click “Copy from library”. In the window that opens, select the appurtenance, click OK in the Library Data window, and click OK in the Bridge Appurtenance window to save the appurtenance to the bridge components.

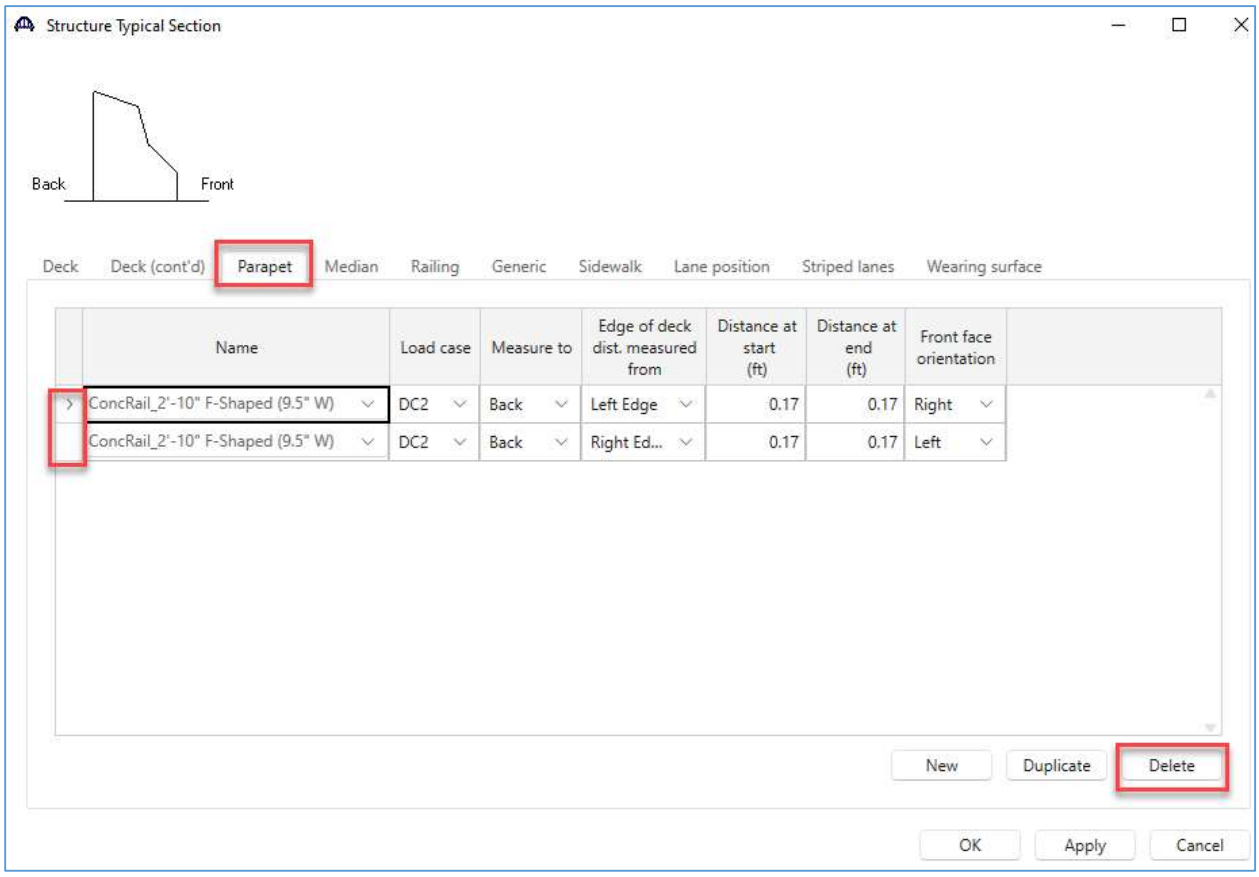


To change the railing in the template from the barrier rail to the open rail, double click to open the Structure Typical Section window. The documentation for this template indicates that the alternate rail is saved as a Generic Appurtenance.

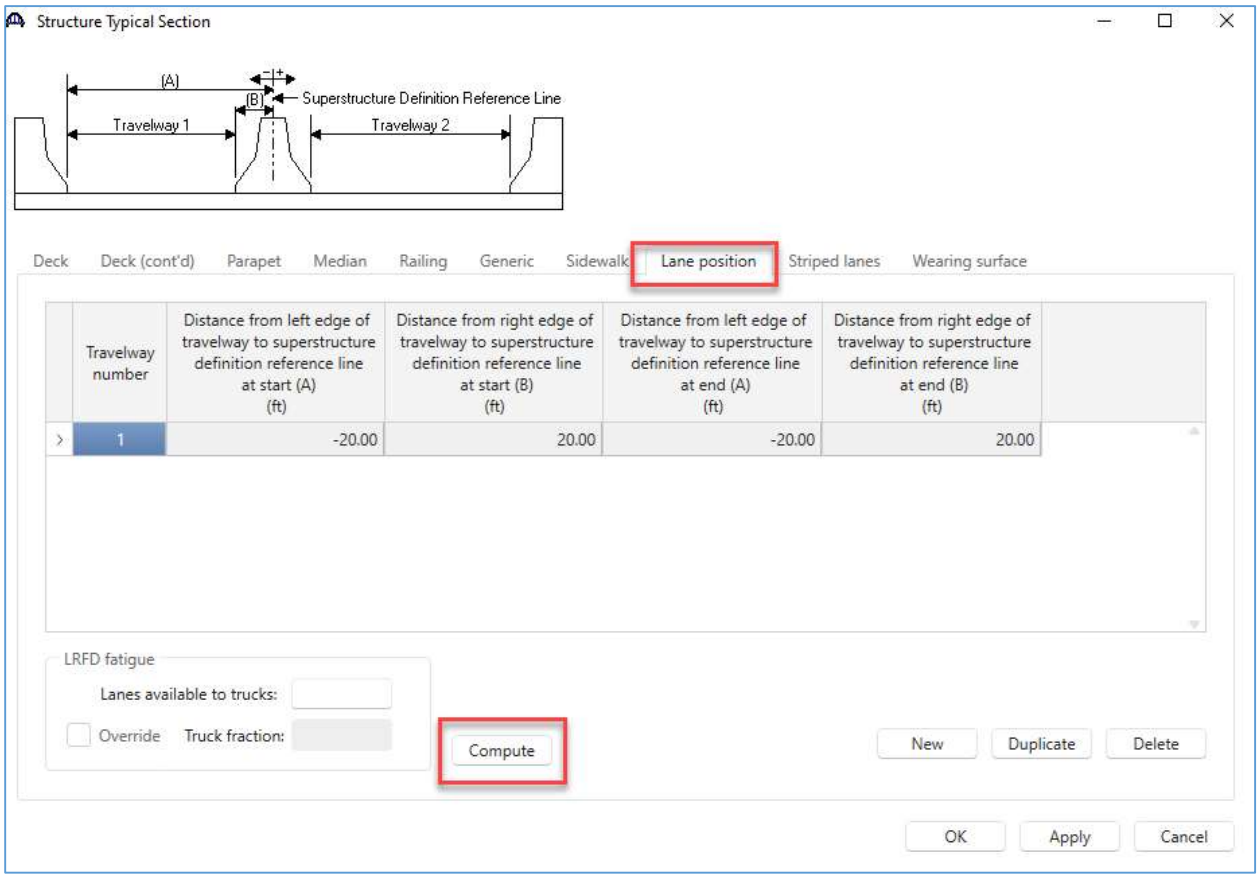
In the Generic appurtenance tab, click “New” to add data rows for each of the rails. The generic appurtenance ConcRail_2’-8” Open (20” Block) is saved to the bridge and is available in the dropdown menu under “Name”. Select the open rail and enter the load case and location information.



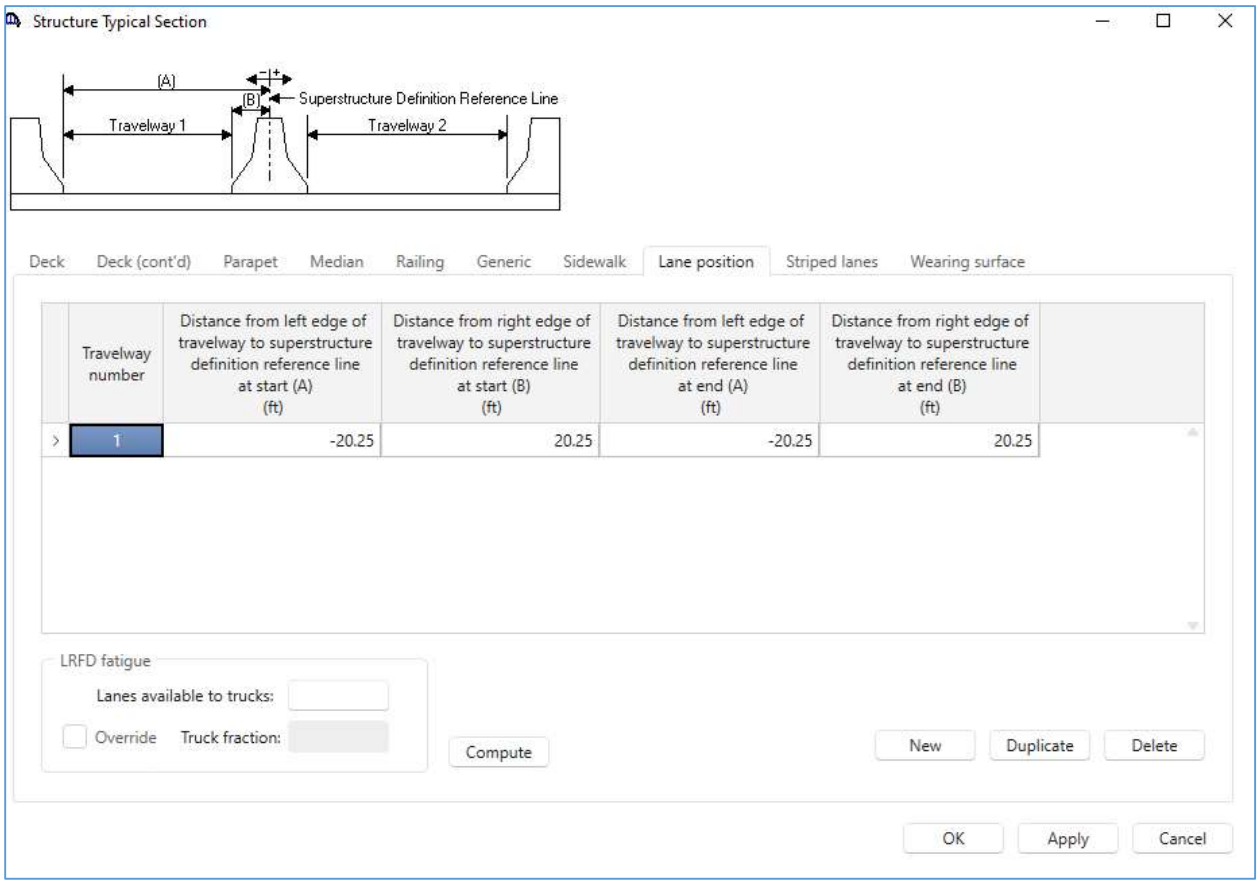
Since the open rail is being used rather than the concrete parapet, the parapets that were default in the template can be removed. In the Structure Typical Section window, click the parapet tab and delete the concrete parapets. Click Apply to save.



Since the concrete parapets that were deleted from the template are wider than the open rail that they were replaced with, the travelway width should be adjusted accordingly. In the Structure Typical Section window, select the Lane Position tab and click the “Compute” button.

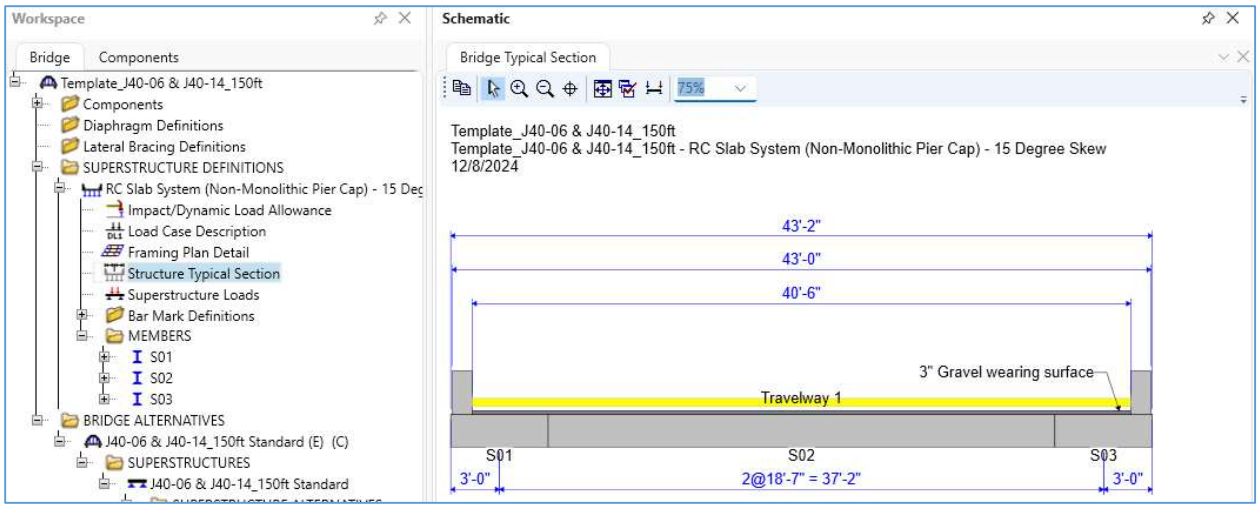


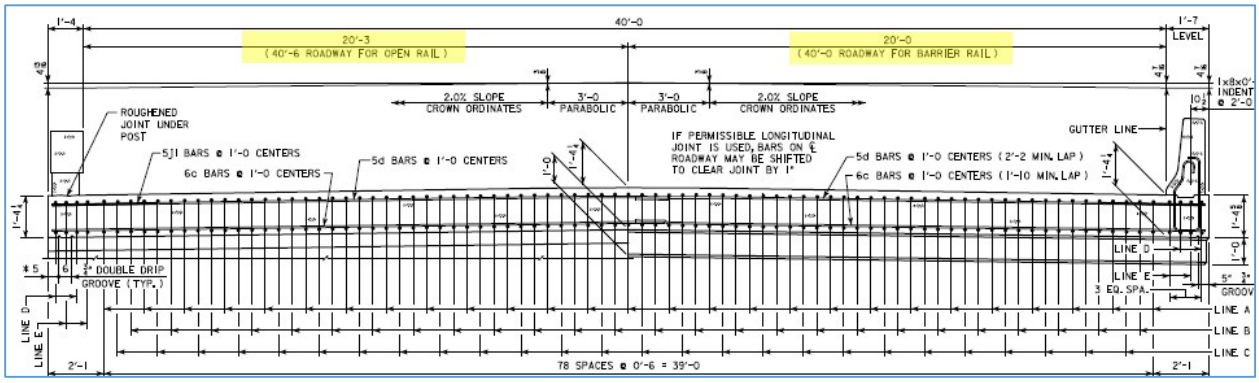
A window will open showing the lane positions (travelway width) that have been computed based on the structure width and the width and location of appurtenances. Review and click Apply to apply the data to the Structure Typical Section.



Click OK to save and close the window.

Right click Structure Typical Section and click Schematic to review the modified structure. Note that the barriers are now displayed as generic appurtenances, and the gravel wearing surface has been added, and the roadway width is updated to reflect the correct width based on the type of barrier that is used.

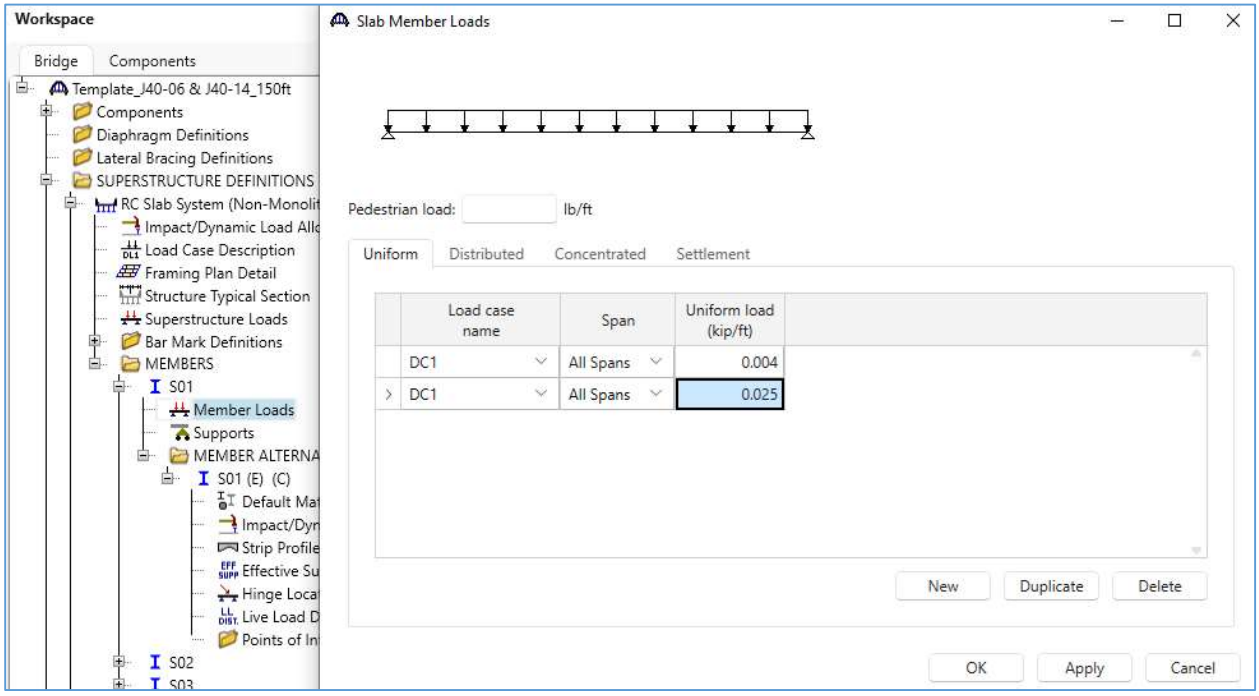




Added Loads: Utilities and Other Member Loads

For this example, inspection information indicates there is attached utility line mounted to the outside edge of the slab. From the available data, the weight of the utility line and brackets is estimated to be 25 plf.

Under Members, expand S01 in the bridge workspace tree. Double click Member Loads under S01 to open the Slab Member Loads window for the exterior slab strip. Select the load case, spans and enter the load. Click OK to save and close the window.



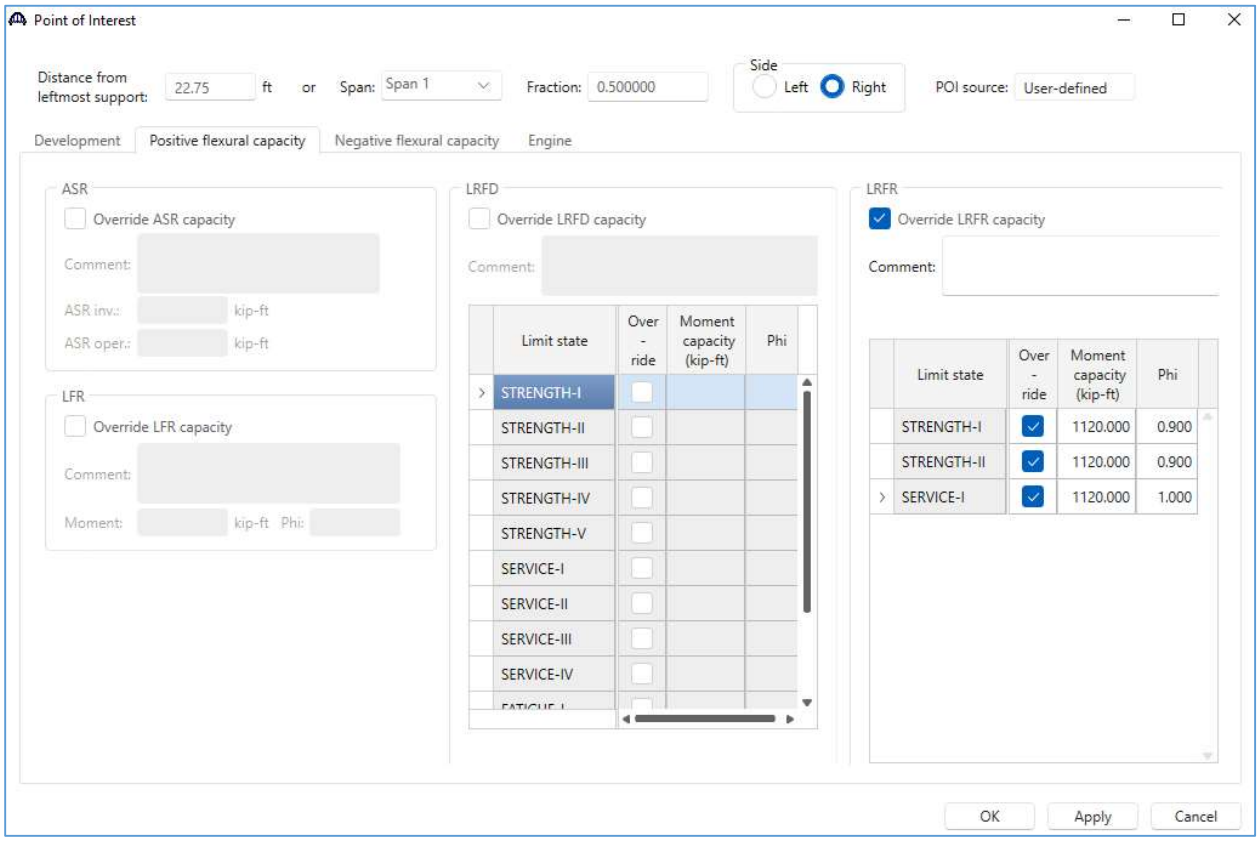
For this example, it is assumed that the weight of the utility line will be carried by the exterior slab strip. If an added load is intended to be distributed across the entire slab, enter the proportion of the load to be carried by the edge strip as a Member Load for each of the edge strips, and enter the remainder of the load as a member load to the center strip.

Deterioration: Point of Interest Overrides

Double click Points of Interest under the member alternative to open the Points of Interest window. Enter the location of the analysis point to override, select the appropriate checkbox, and enter the override capacity for that analysis point.

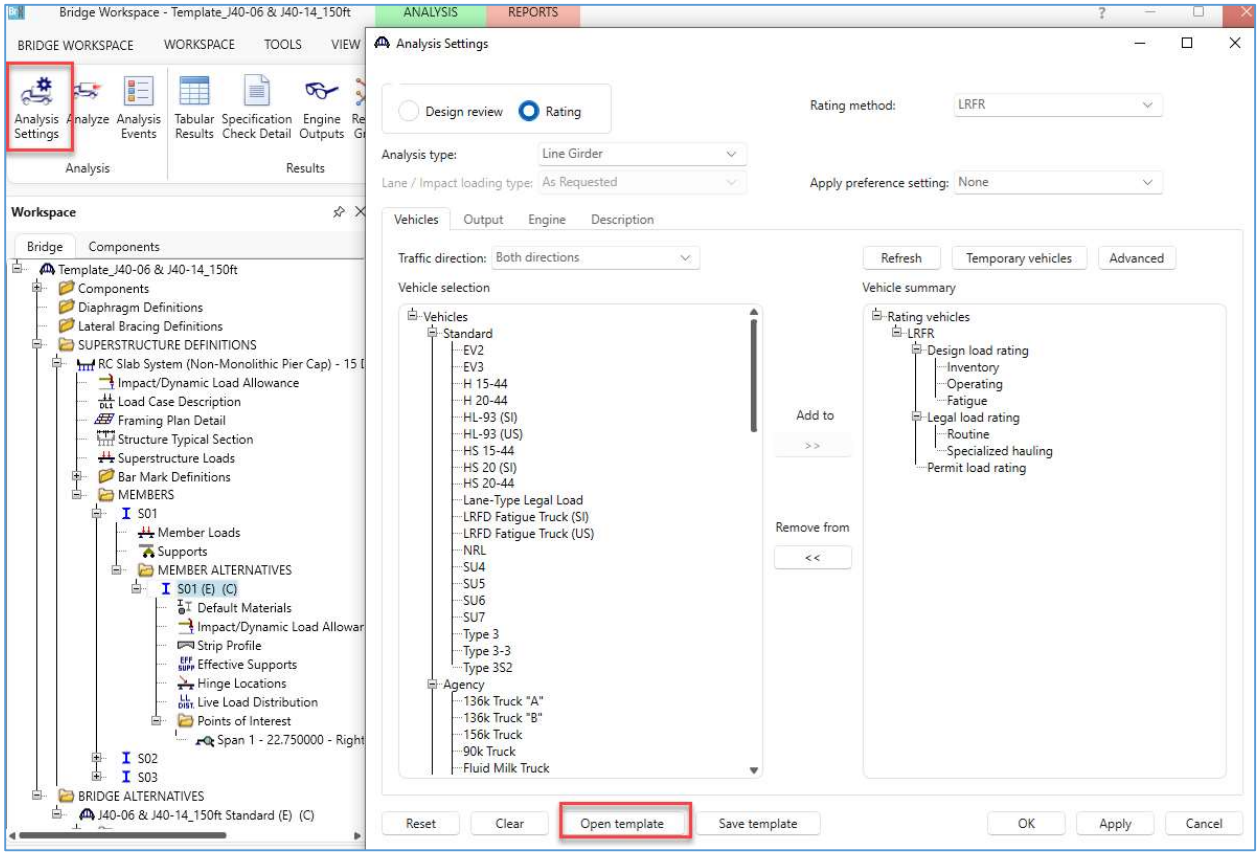
For this example, inspection information indicated spalling with exposed and corroded reinforcement at midspan. The reduced capacity was computed and will be entered as a Point of Interest Override.

Click OK to save and close.

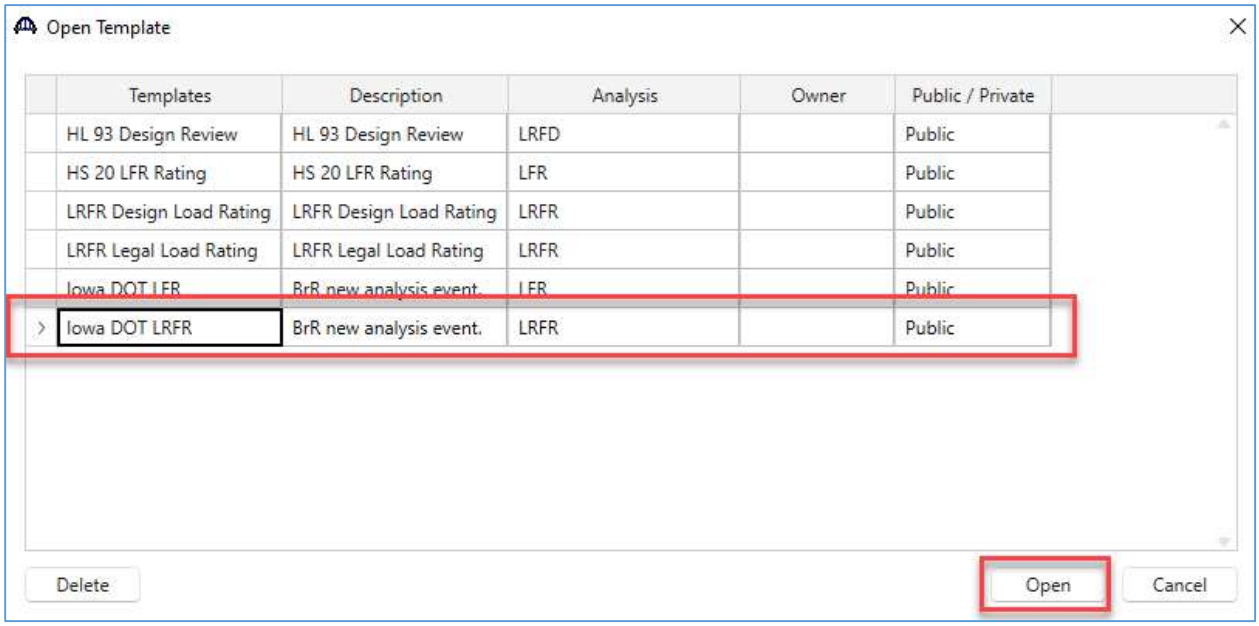


Analysis: LRFR Load Rating Analysis

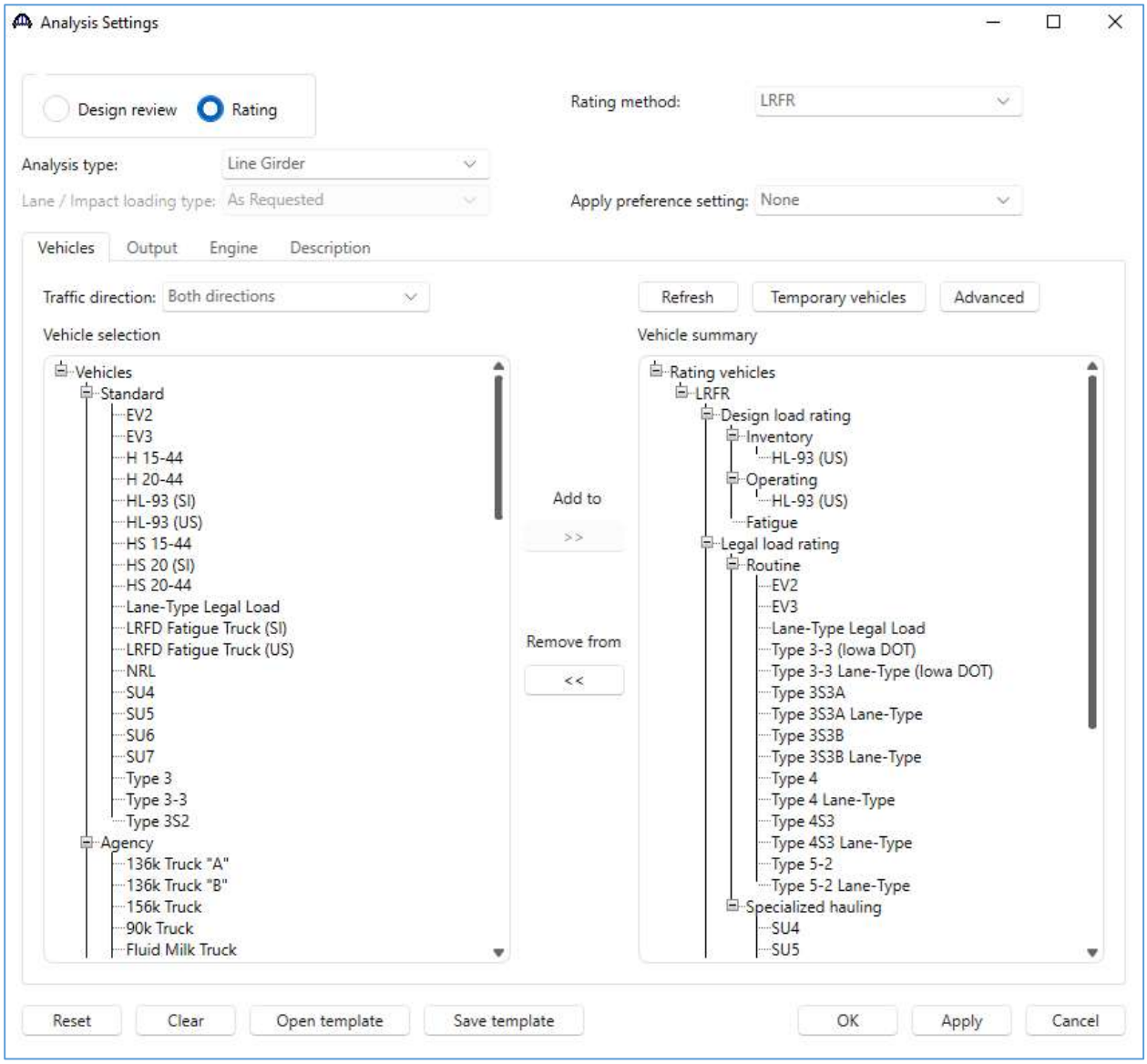
To run the rating analysis, open the Analysis Settings window and click Open Template.



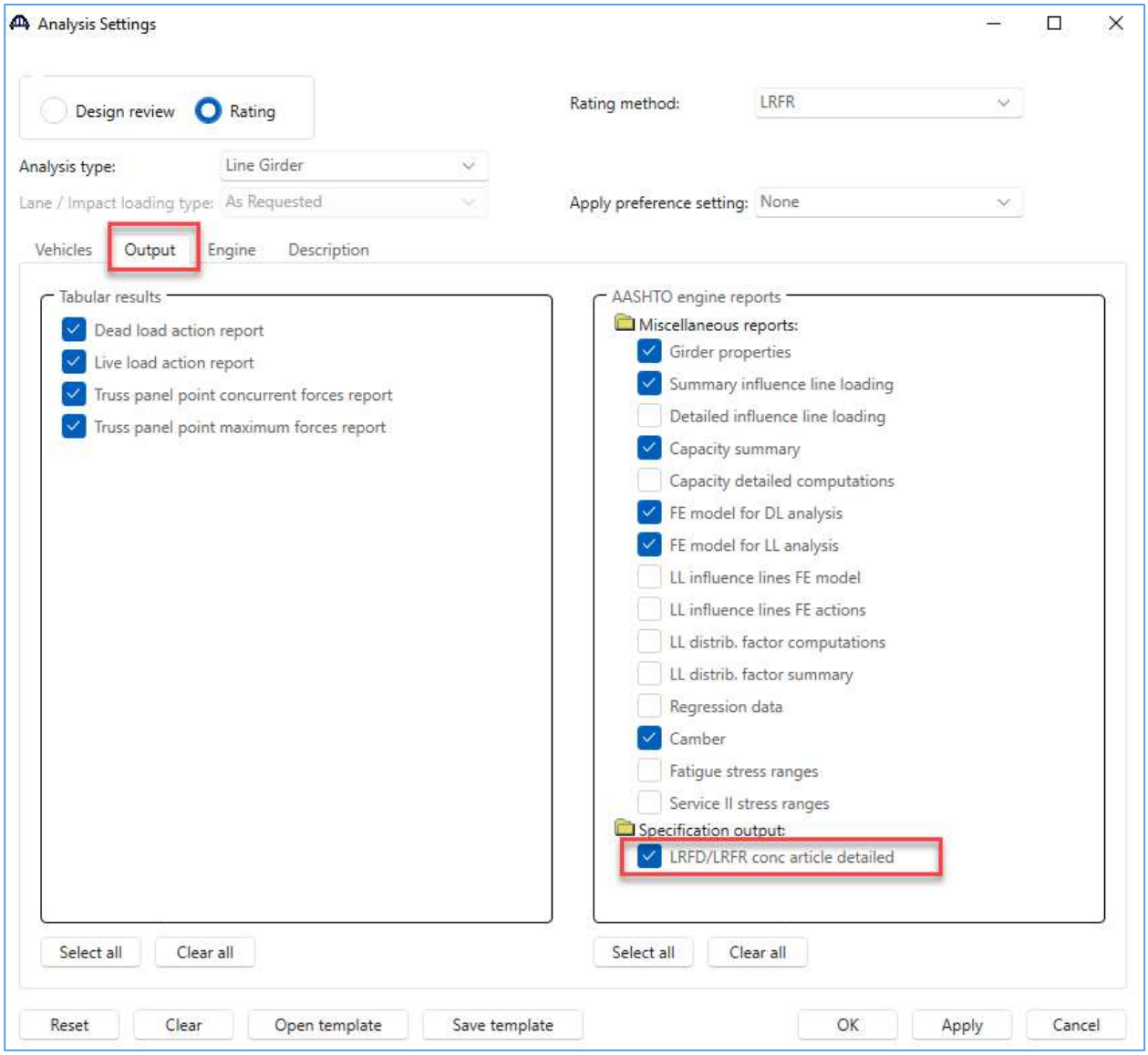
Select the Iowa DOT LRFR template and then click Open.



The Analysis Settings template includes the vehicles and settings for LRFR rating analysis.

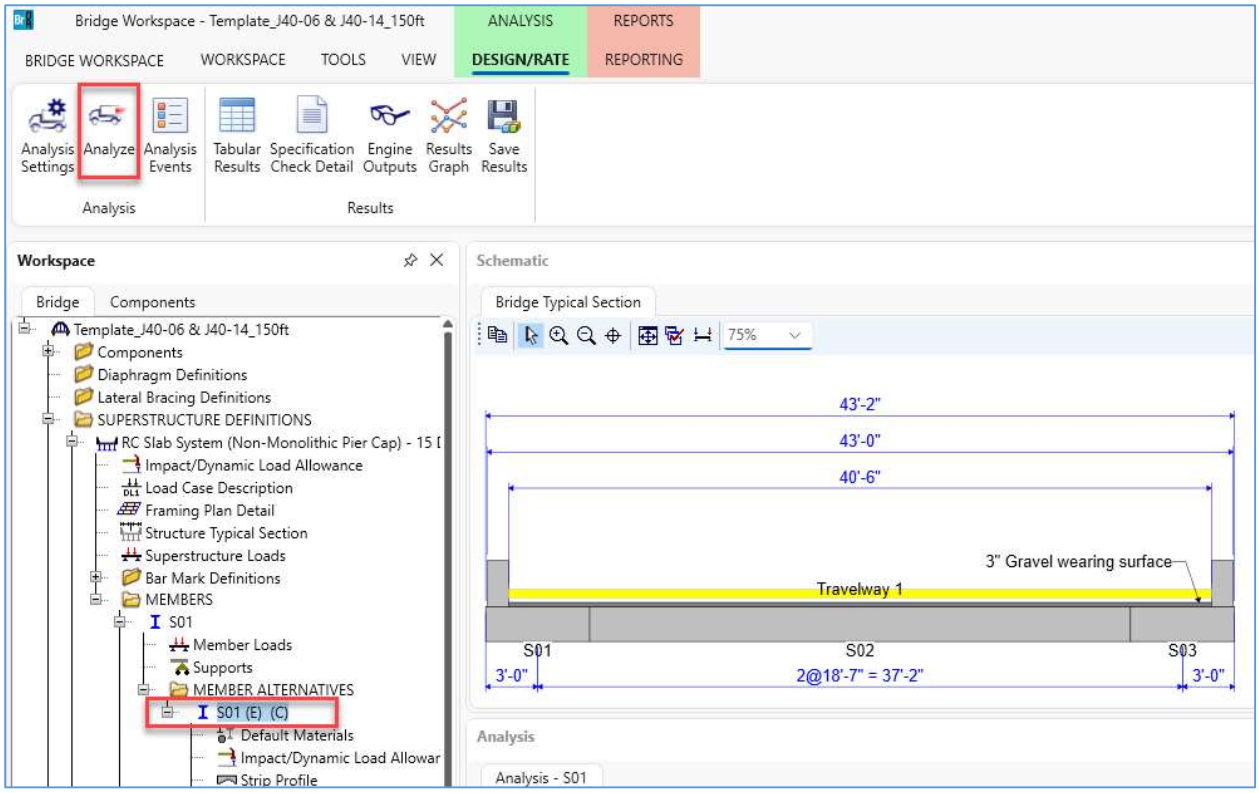


For this analysis, we want to view the detailed output for the concrete capacity articles. Click the "Output" tab and select "LRFD/LRFR conc article detailed" under AASHTO engine reports.



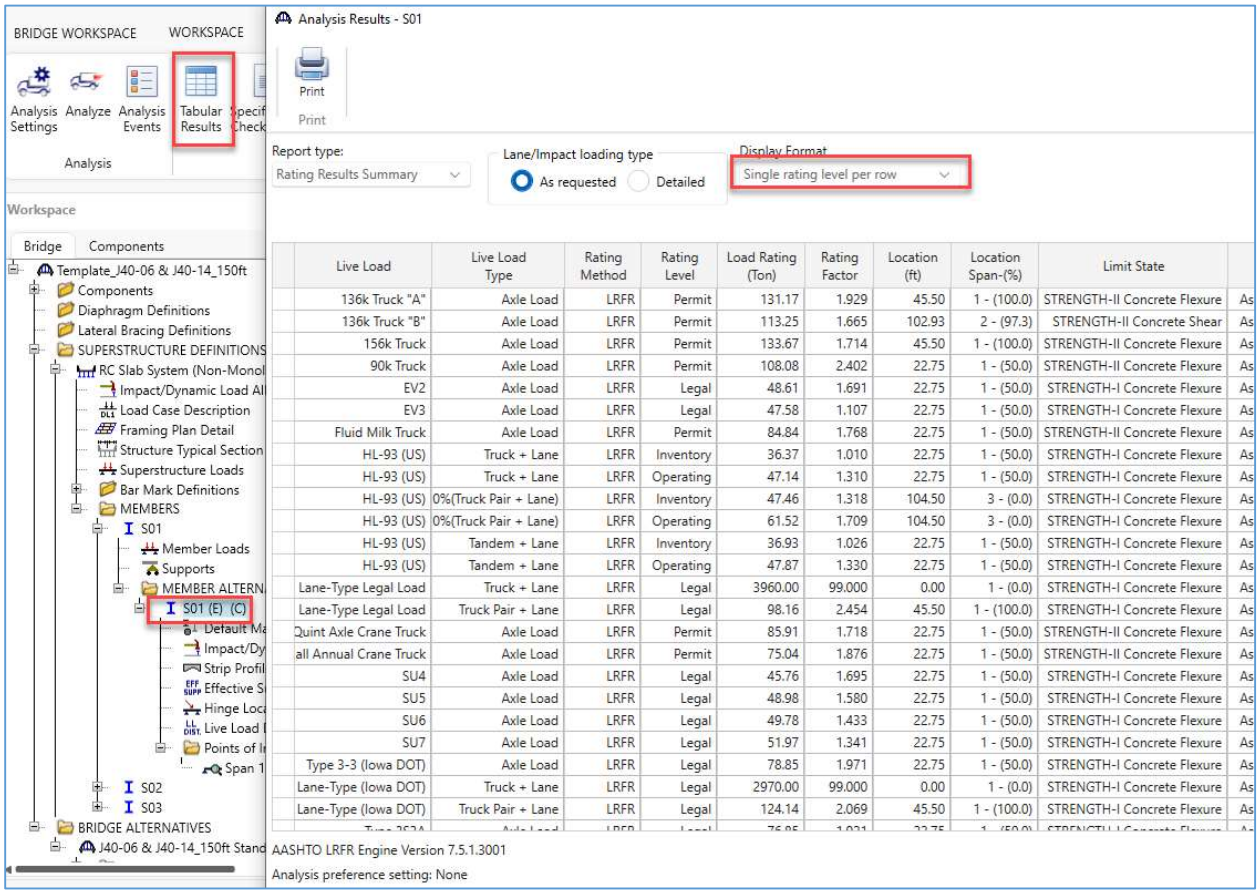
Click OK to save and close.

Click the member alternative for S01 to select, and then click Analyze.



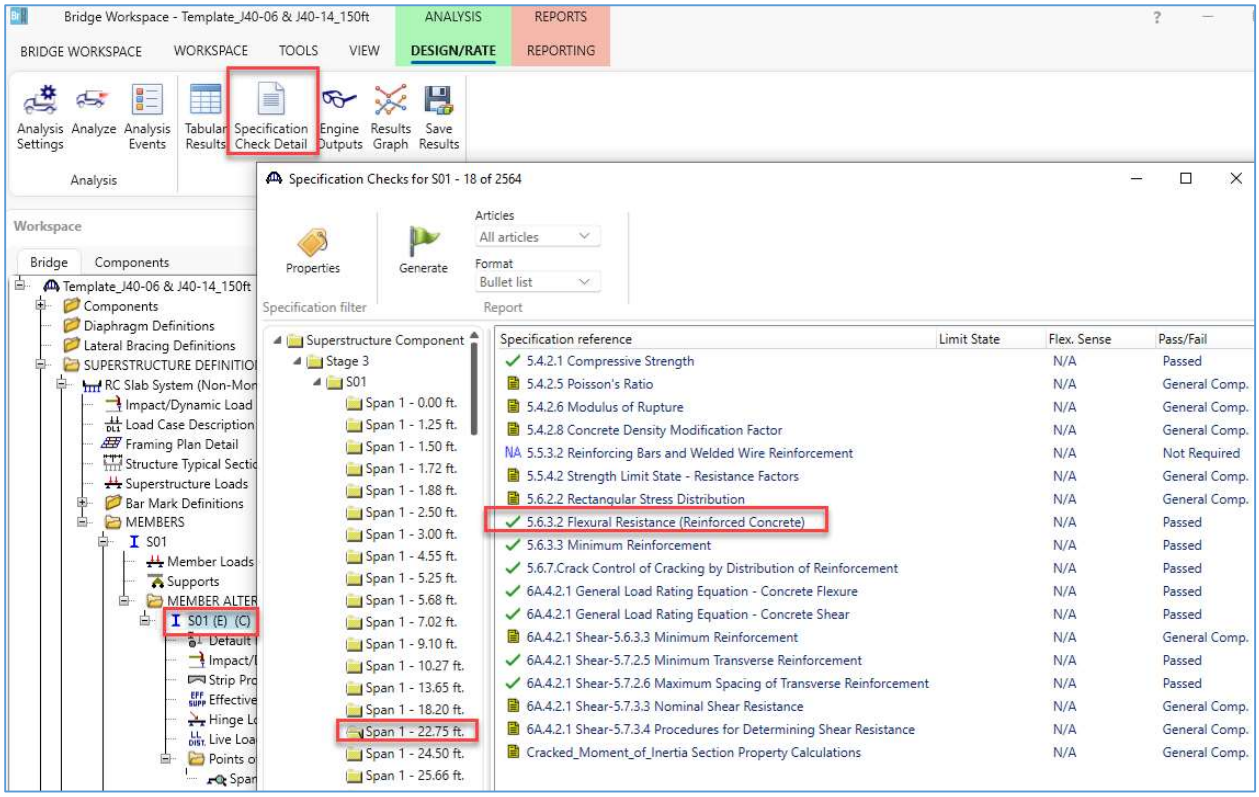
Results

Click the member alternative to select, and then click Tabular Results. In the window that opens, use the dropdown to change the display to “Single rating level per row.”

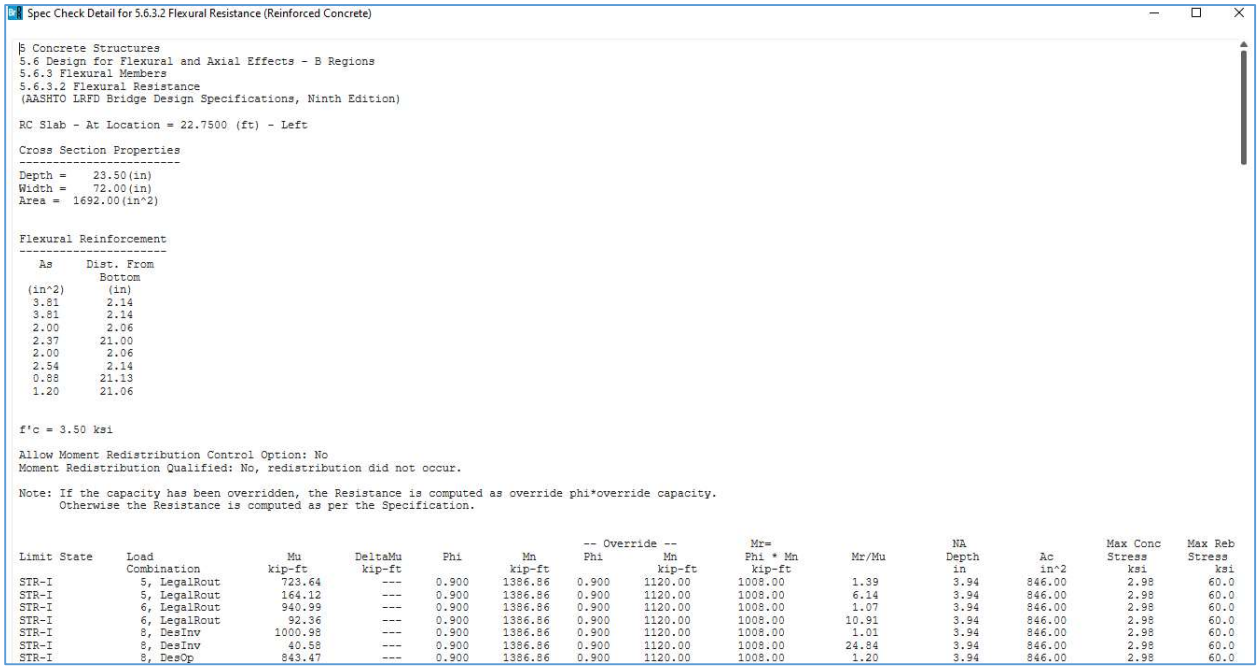


Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	
136k Truck "A"	Axle Load	LRFR	Permit	131.17	1.929	45.50	1 - (100.0)	STRENGTH-II Concrete Flexure	As
136k Truck "B"	Axle Load	LRFR	Permit	113.25	1.665	102.93	2 - (97.3)	STRENGTH-II Concrete Shear	As
156k Truck	Axle Load	LRFR	Permit	133.67	1.714	45.50	1 - (100.0)	STRENGTH-II Concrete Flexure	As
90k Truck	Axle Load	LRFR	Permit	108.08	2.402	22.75	1 - (50.0)	STRENGTH-II Concrete Flexure	As
EV2	Axle Load	LRFR	Legal	48.61	1.691	22.75	1 - (50.0)	STRENGTH-I Concrete Flexure	As
EV3	Axle Load	LRFR	Legal	47.58	1.107	22.75	1 - (50.0)	STRENGTH-I Concrete Flexure	As
Fluid Milk Truck	Axle Load	LRFR	Permit	84.84	1.768	22.75	1 - (50.0)	STRENGTH-II Concrete Flexure	As
HL-93 (US)	Truck + Lane	LRFR	Inventory	36.37	1.010	22.75	1 - (50.0)	STRENGTH-I Concrete Flexure	As
HL-93 (US)	Truck + Lane	LRFR	Operating	47.14	1.310	22.75	1 - (50.0)	STRENGTH-I Concrete Flexure	As
HL-93 (US)	0%(Truck Pair + Lane)	LRFR	Inventory	47.46	1.318	104.50	3 - (0.0)	STRENGTH-I Concrete Flexure	As
HL-93 (US)	0%(Truck Pair + Lane)	LRFR	Operating	61.52	1.709	104.50	3 - (0.0)	STRENGTH-I Concrete Flexure	As
HL-93 (US)	Tandem + Lane	LRFR	Inventory	36.93	1.026	22.75	1 - (50.0)	STRENGTH-I Concrete Flexure	As
HL-93 (US)	Tandem + Lane	LRFR	Operating	47.87	1.330	22.75	1 - (50.0)	STRENGTH-I Concrete Flexure	As
Lane-Type Legal Load	Truck + Lane	LRFR	Legal	3960.00	99.000	0.00	1 - (0.0)	STRENGTH-I Concrete Flexure	As
Lane-Type Legal Load	Truck Pair + Lane	LRFR	Legal	98.16	2.454	45.50	1 - (100.0)	STRENGTH-I Concrete Flexure	As
Quint Axle Crane Truck	Axle Load	LRFR	Permit	85.91	1.718	22.75	1 - (50.0)	STRENGTH-II Concrete Flexure	As
all Annual Crane Truck	Axle Load	LRFR	Permit	75.04	1.876	22.75	1 - (50.0)	STRENGTH-II Concrete Flexure	As
SU4	Axle Load	LRFR	Legal	45.76	1.695	22.75	1 - (50.0)	STRENGTH-I Concrete Flexure	As
SU5	Axle Load	LRFR	Legal	48.98	1.580	22.75	1 - (50.0)	STRENGTH-I Concrete Flexure	As
SU6	Axle Load	LRFR	Legal	49.78	1.433	22.75	1 - (50.0)	STRENGTH-I Concrete Flexure	As
SU7	Axle Load	LRFR	Legal	51.97	1.341	22.75	1 - (50.0)	STRENGTH-I Concrete Flexure	As
Type 3-3 (Iowa DOT)	Axle Load	LRFR	Legal	78.85	1.971	22.75	1 - (50.0)	STRENGTH-I Concrete Flexure	As
Lane-Type (Iowa DOT)	Truck + Lane	LRFR	Legal	2970.00	99.000	0.00	1 - (0.0)	STRENGTH-I Concrete Flexure	As
Lane-Type (Iowa DOT)	Truck Pair + Lane	LRFR	Legal	124.14	2.069	45.50	1 - (100.0)	STRENGTH-I Concrete Flexure	As

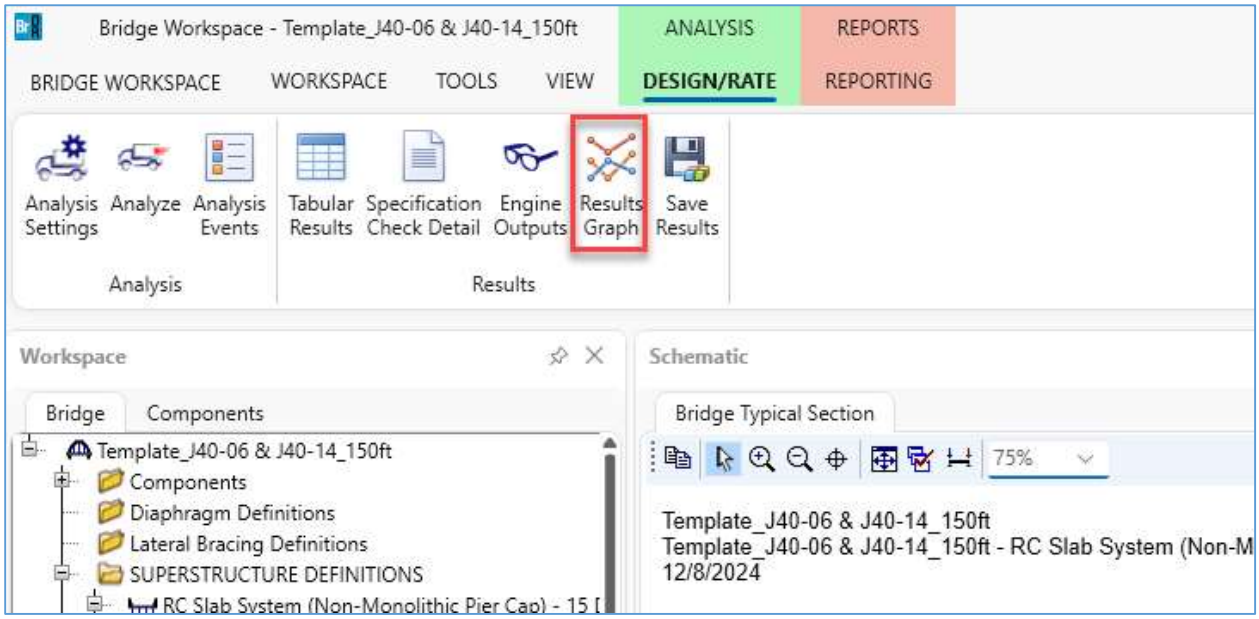
To view the detailed results, click the member alternative to select it and then click Specification Check Detail.



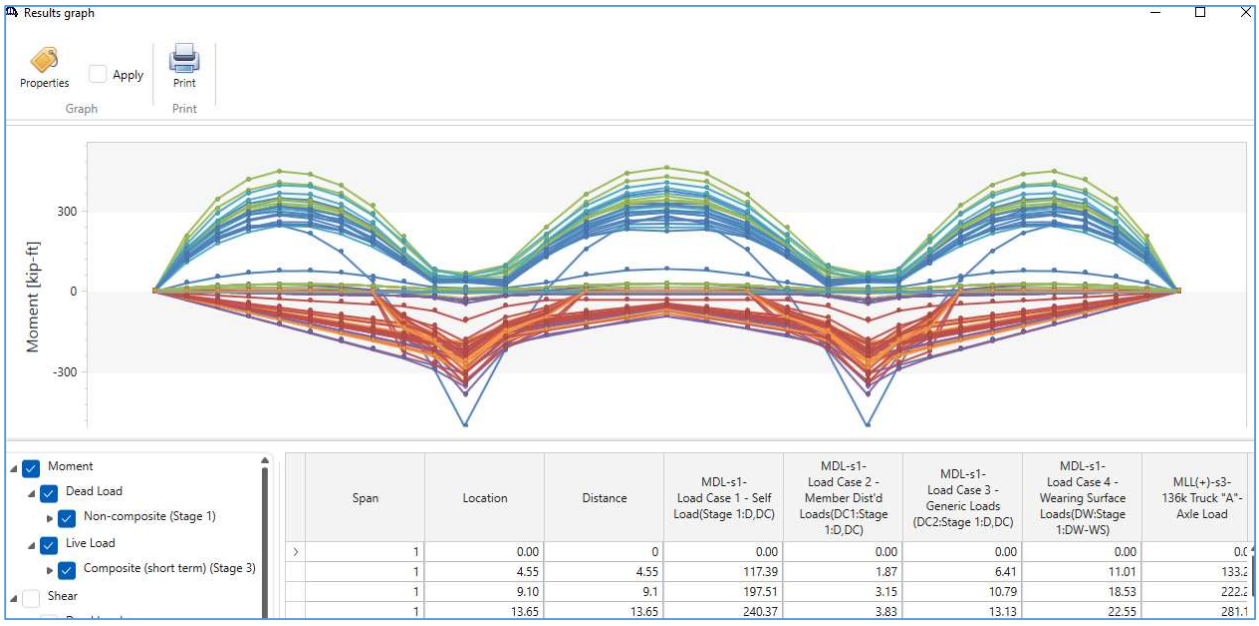
Expand the Stage 3 results, and click the location at 22.75 ft. Double click any of the spec articles to open the detailed article.



You can also open the Results Graph window to review force effects graphs for dead loads and live loads.



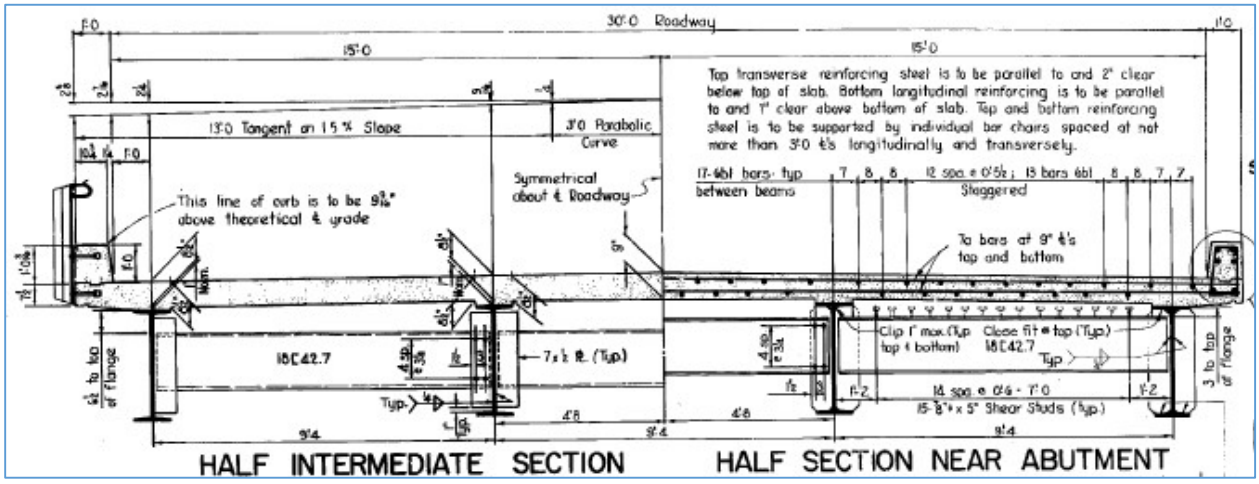
Expand the tree on the left and use the check box to toggle on/off display of each load type.

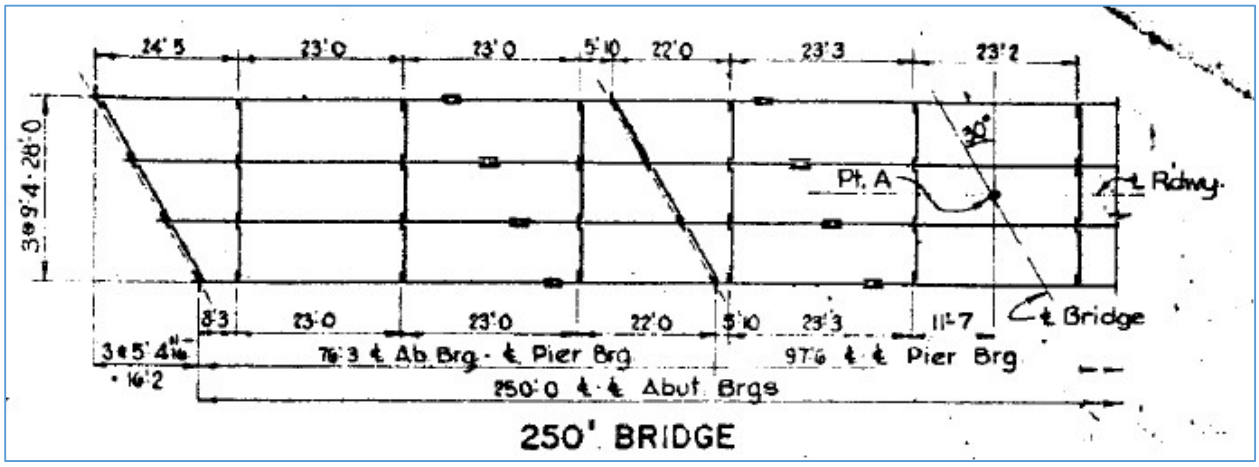


Topics Covered

- Importing the Template Model
- Documentation and Assumptions
- Bridge Alternatives
- Added Loads: Wearing Surface, Appurtenances, Utilities and Other Member Loads
- Deterioration: Steel Section Loss, Point of Interest Overrides
- Analysis: LFR Load Rating Analysis
- Results and Output

Bridge Information





Bridge Information:

Bridge ID: ExampleStandardBridge1

NBI Structure ID: ExampleStandardBridge1

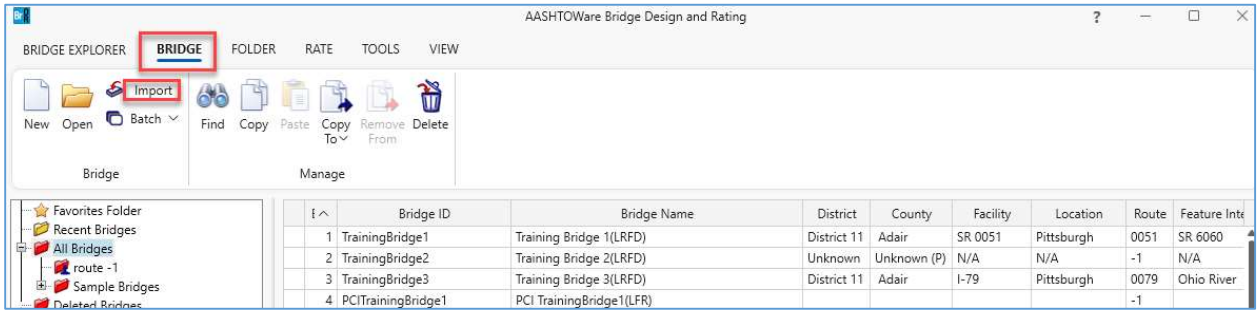
As-built plans indicate this structure was built using the 30 degree skew alternative.

Inspection Data:

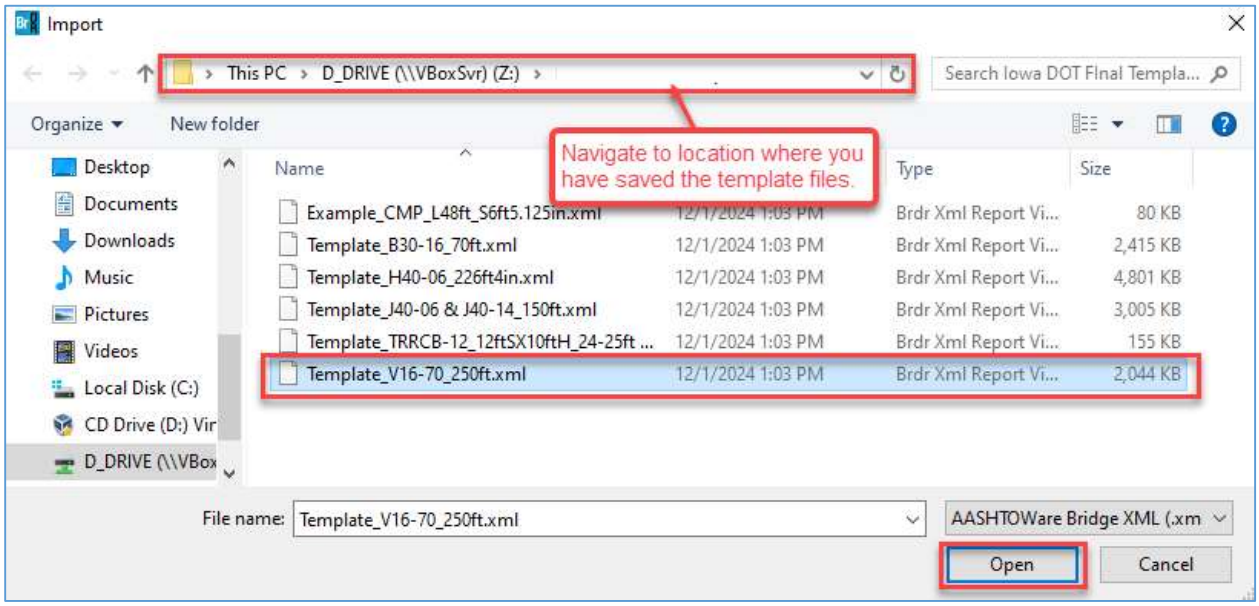
Field measured wearing surface: 3-1/2” bituminous wearing surface

Utility line: 12” diameter unknown utility bracketed between exterior and first interior girder

Importing the Template Model

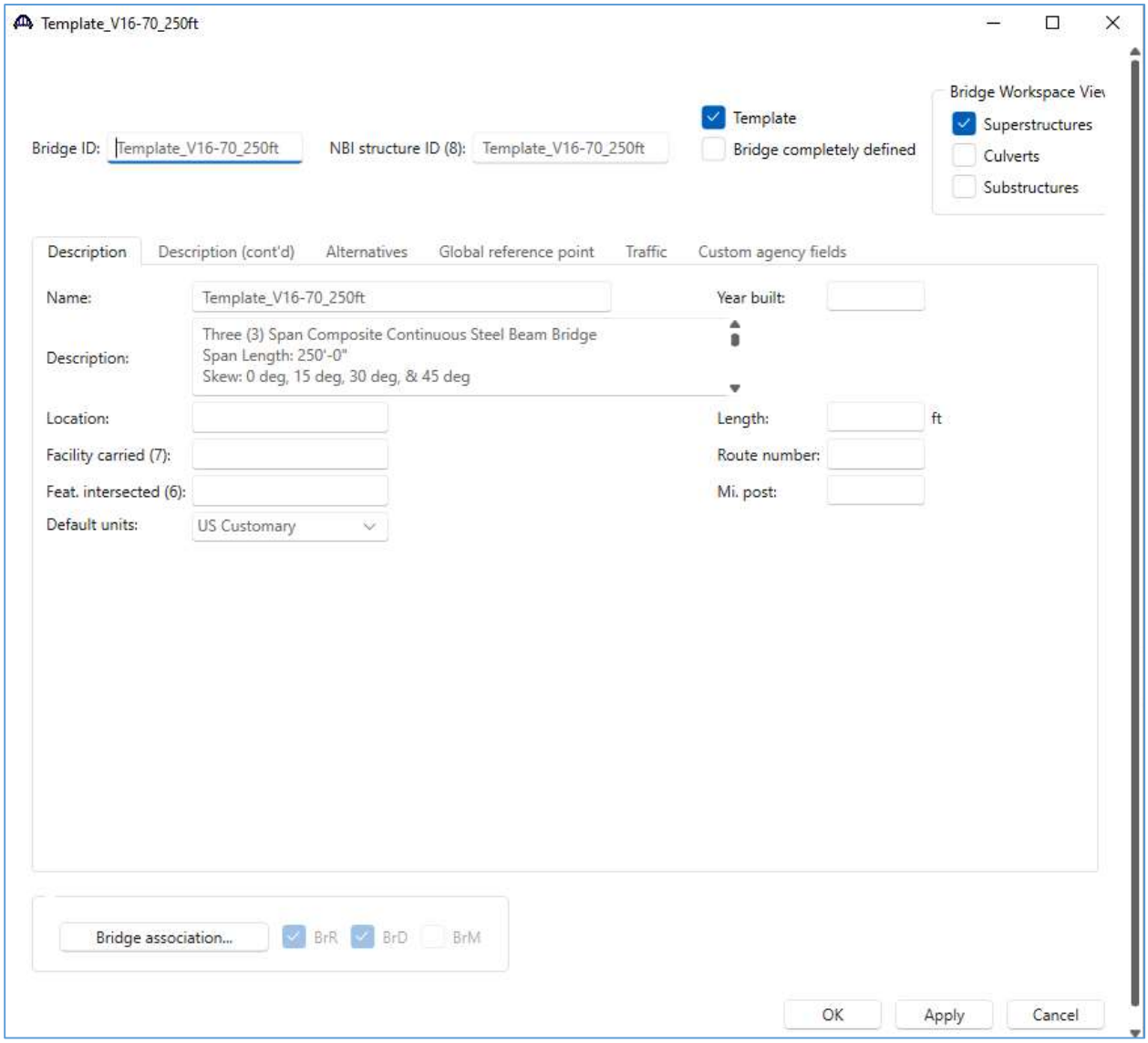


In the Bridge Explorer, click the BRIDGE tab, then click the "Import" button. This will open a file explorer window.



In the file explorer window, navigate to the location where you have saved the template file you would like to import. Click on the file to select it, then click Open.

After clicking “Open”, the template model will be imported and the Bridge Description window will automatically open.

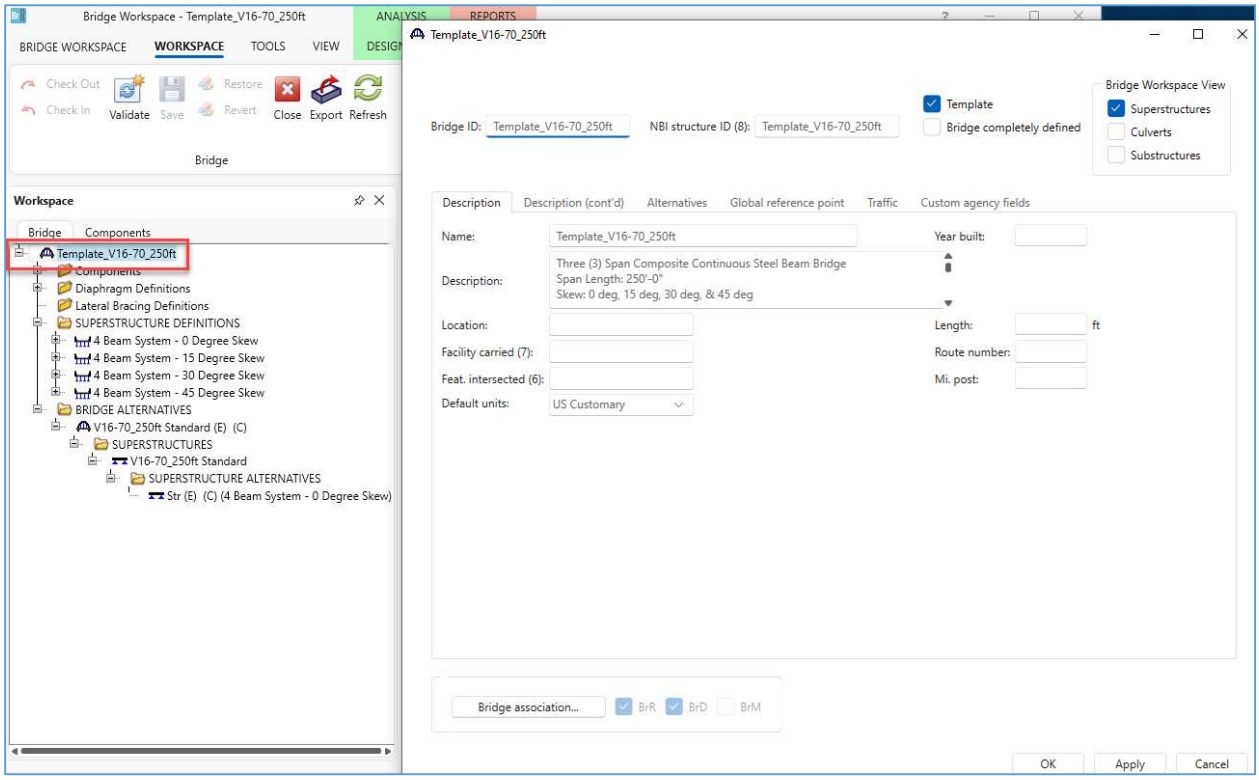


Enter the Bridge ID, NBI Structure ID, year built and location information for the bridge. Note that the Bridge ID and NBI Structure must be unique for each bridge in the BrR database. The NBI Structure ID can be used for both the Bridge ID and NBI Structure ID of the bridge being modeled.

Uncheck “Template” in the upper right corner, since this model will represent an in-service bridge rather than a template once it has been updated to reflect the actual bridge information, loads and conditions.

Use the scroll bar at the right side of the Description field to review the bridge template description. Review the assumptions to ensure that they are appropriate for the bridge. This information is also included in the documentation that accompanies the template model in the Assumptions section. Click OK.

To reopen this window at any time, double click the bridge name at the top of the Bridge Workspace tree.



Documentation and Assumptions

The PDF file Template_V16-70_250ft Rating Results and Supporting Calcs.pdf contains references, assumptions and calculations used in the creation of the template model.

ASSUMPTIONS

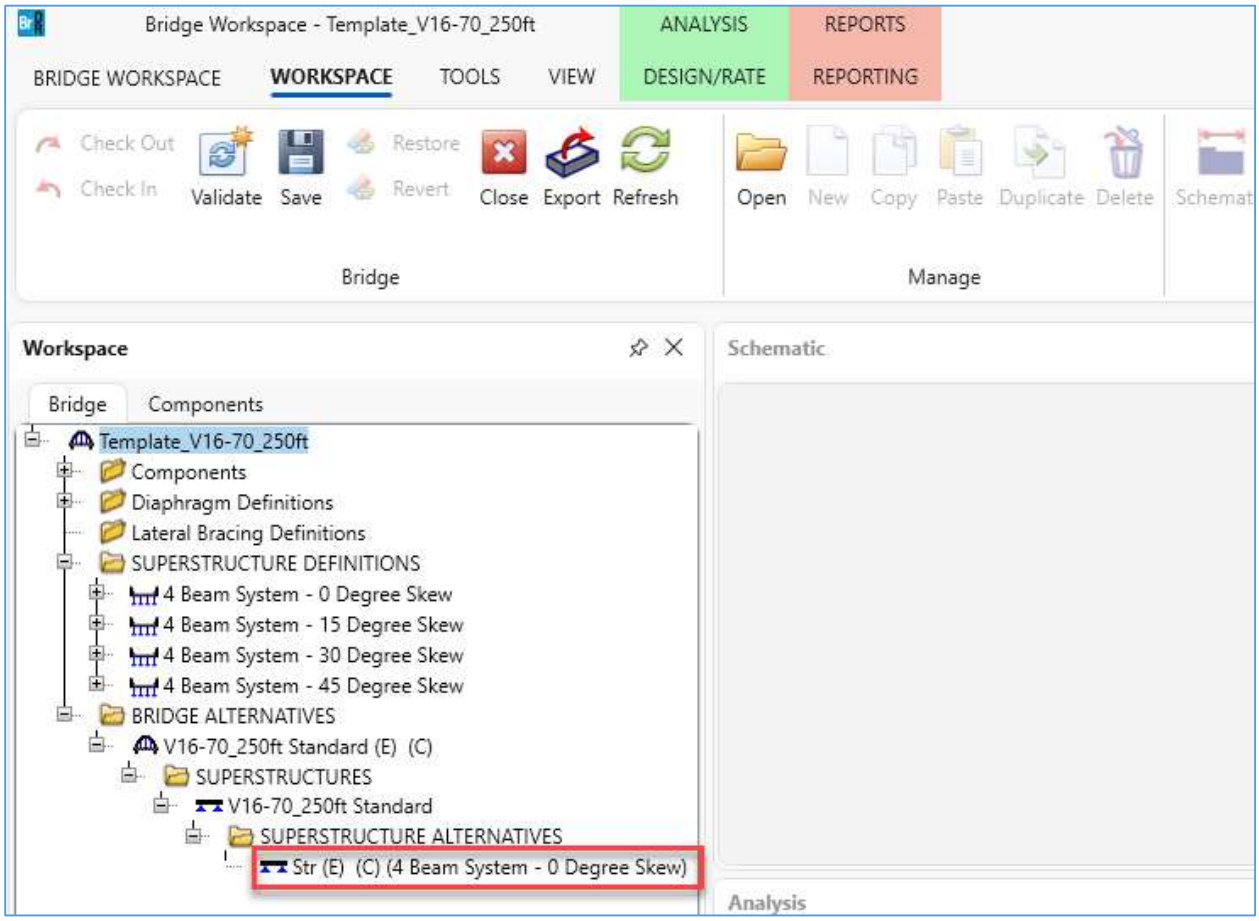
1. The unit weight of 30 plf is conservatively assumed for aluminum handrail.
2. 0.01" is assumed for haunch thickness in Haunch Profile per IowaDOT recommendation. The actual haunch thickness can be modified by the rater if necessary.

An abbreviated version of assumptions is also included in the Bridge Description window in the template model.

The documentation, assumptions and supporting calculations should be reviewed along with bridge inspection information and as-built plans (if available) to determine any modifications required for the bridge.

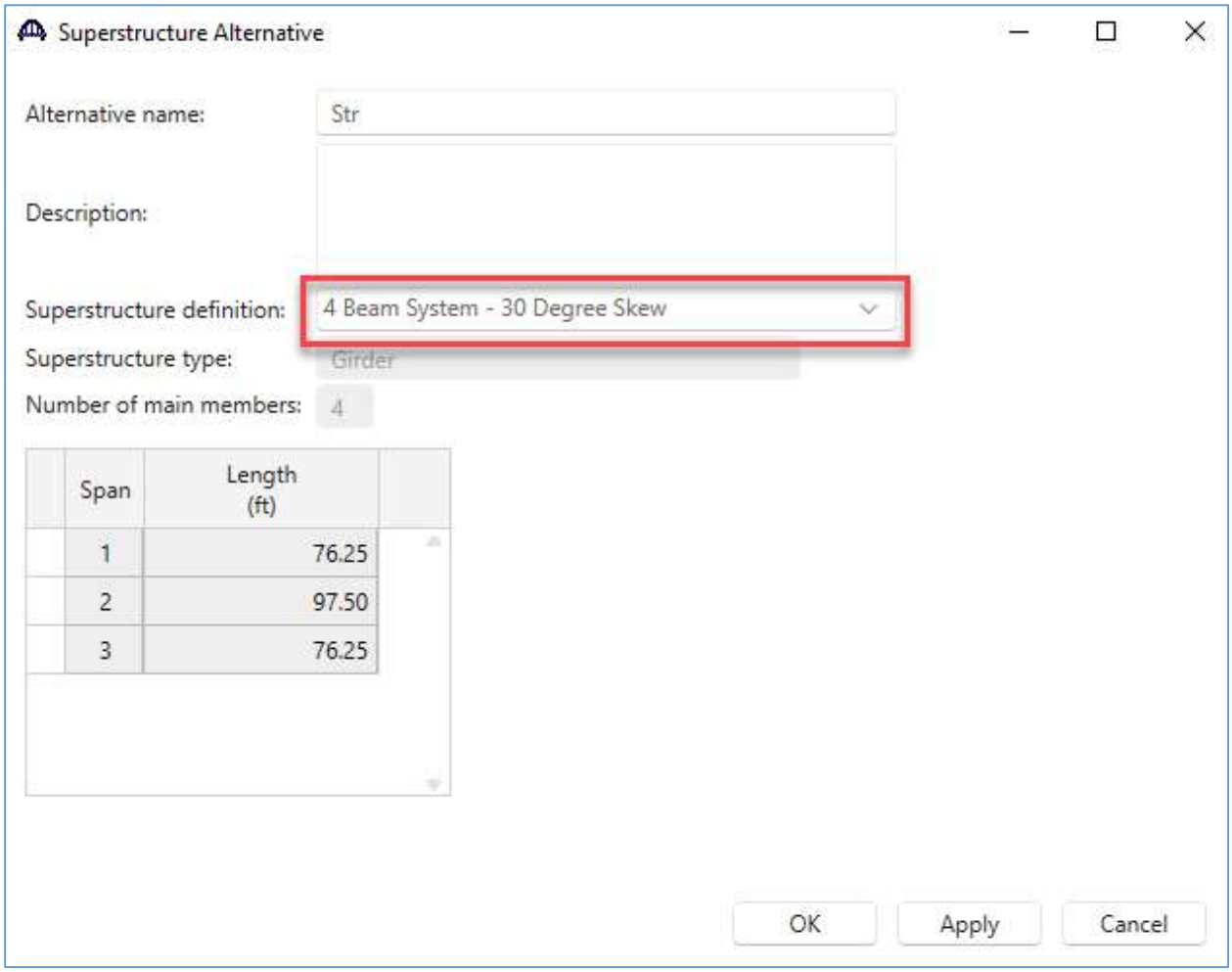
Bridge Alternatives

The template is set up with several different alternatives for different skews. For this tutorial, the 30 degree skew will be used. Expand the bridge workspace tree below BRIDGE ALTERNATIVES. The zero degree skew is set as the Bridge Alternative by default.

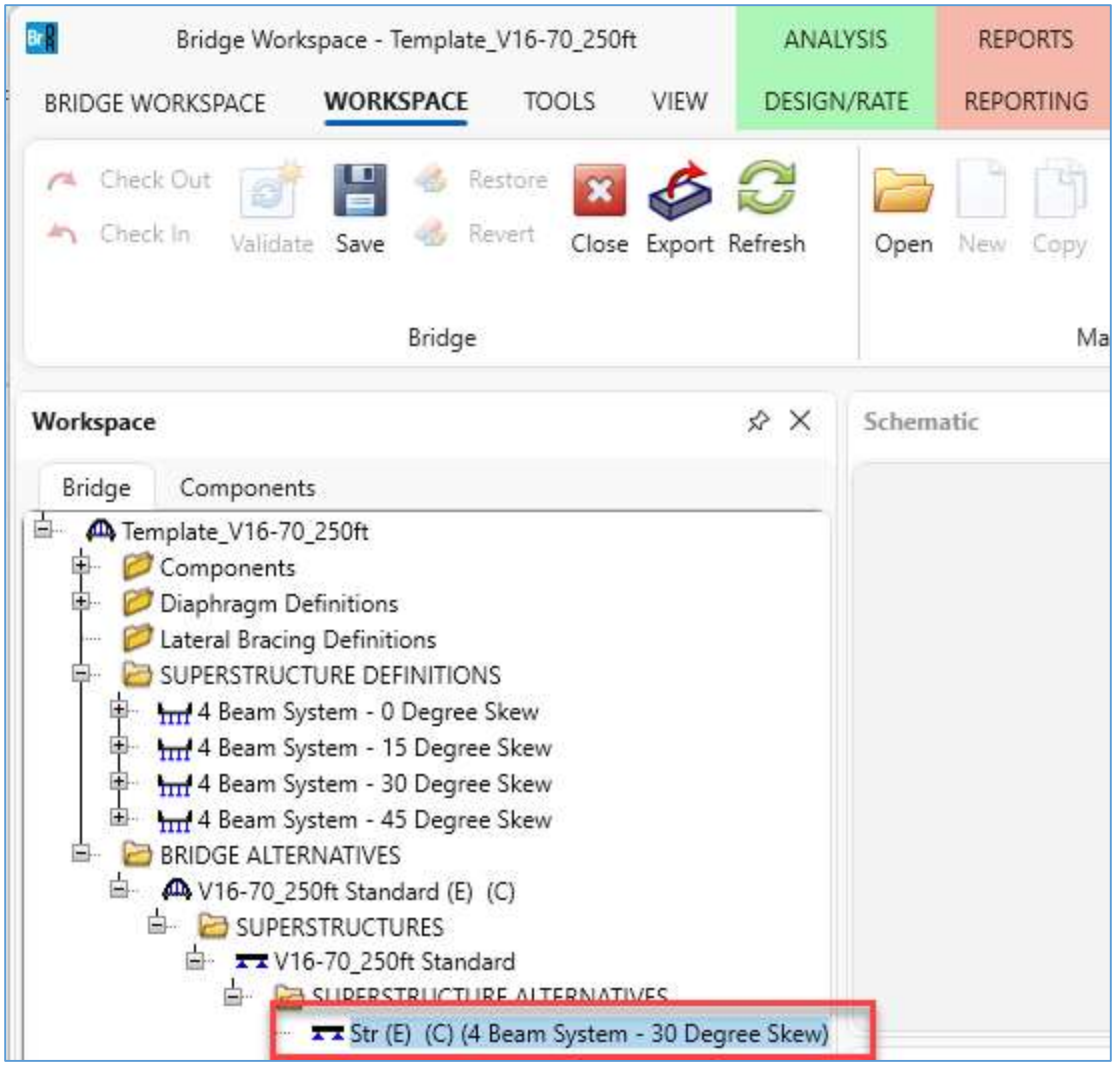


Double click the Superstructure Alternative "Str (E) (C) (4 Beam System – 0 Degree Skew)" to open the Superstructure Alternative window.

In the “Superstructure definition” field, use the dropdown to select the superstructure with the 30 degree skew.

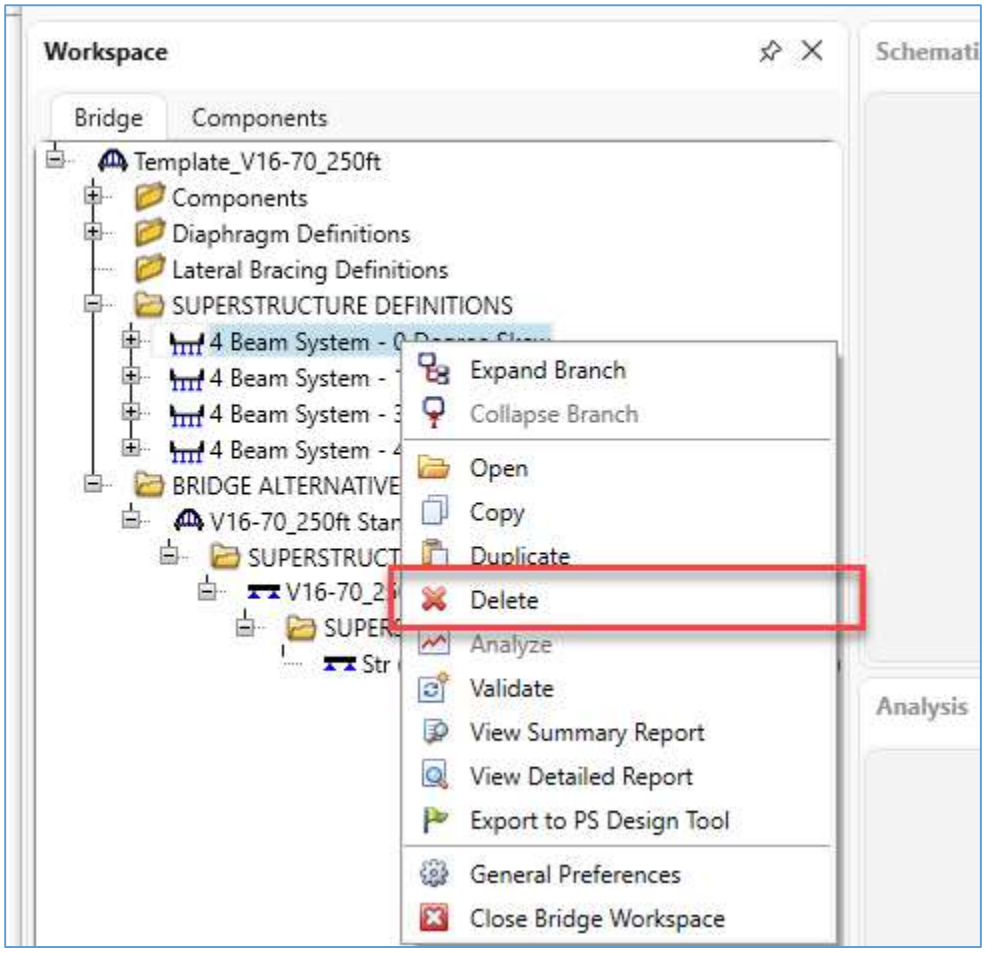


Click OK to save and close the window.



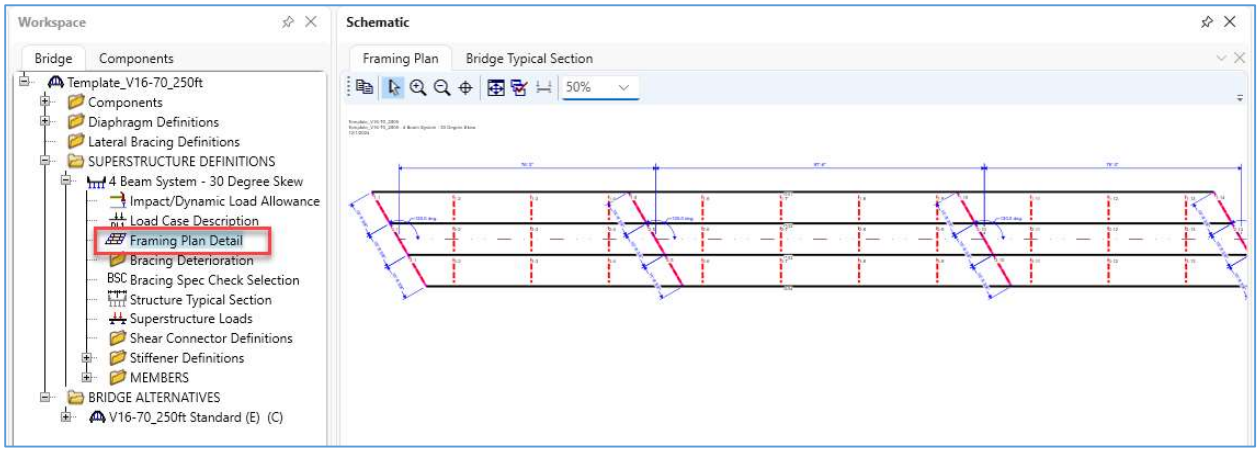
The Superstructure Alternative name has automatically updated based on the selected alternative.

Delete the other superstructure definitions that are not applicable for this bridge by right-clicking on the Superstructure Definition you intend to delete and clicking the Delete button. If you attempt to delete a Superstructure Definition that is assigned as a Bridge Alternative, you will get a message indicating that it is in use and cannot be deleted.

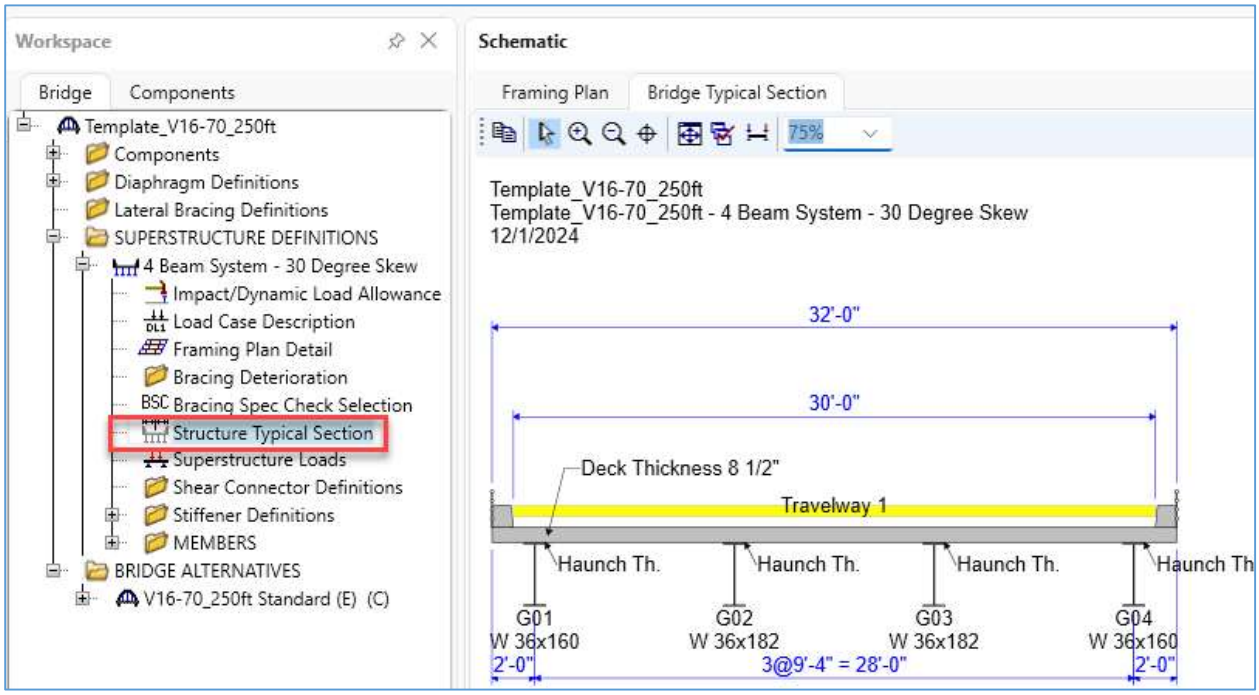


Once the superstructure definition that will be used is set in the Bridge Alternative and the ones that are not applicable are deleted, expand the bridge workspace tree under the Superstructure Definition for 4 Beam System – 30 Degree Skew.

Right click on Framing Plan Detail and then click Schematic to review the framing plan schematic.



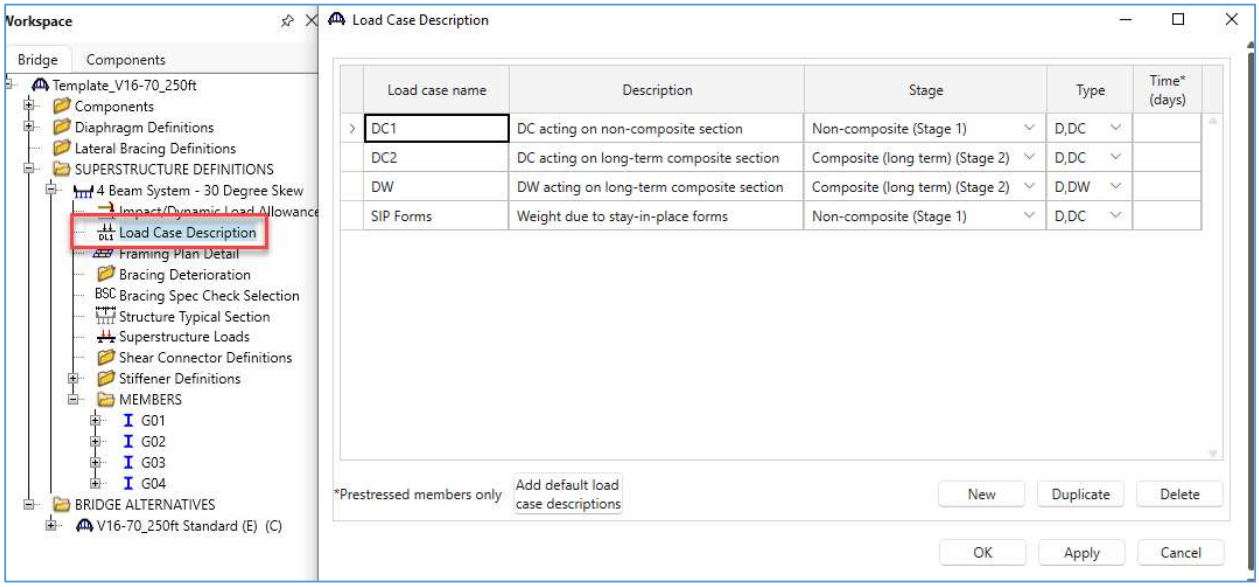
Right click on Structure Typical Section and then click Schematic to review the structure typical section schematic.



Added Loads

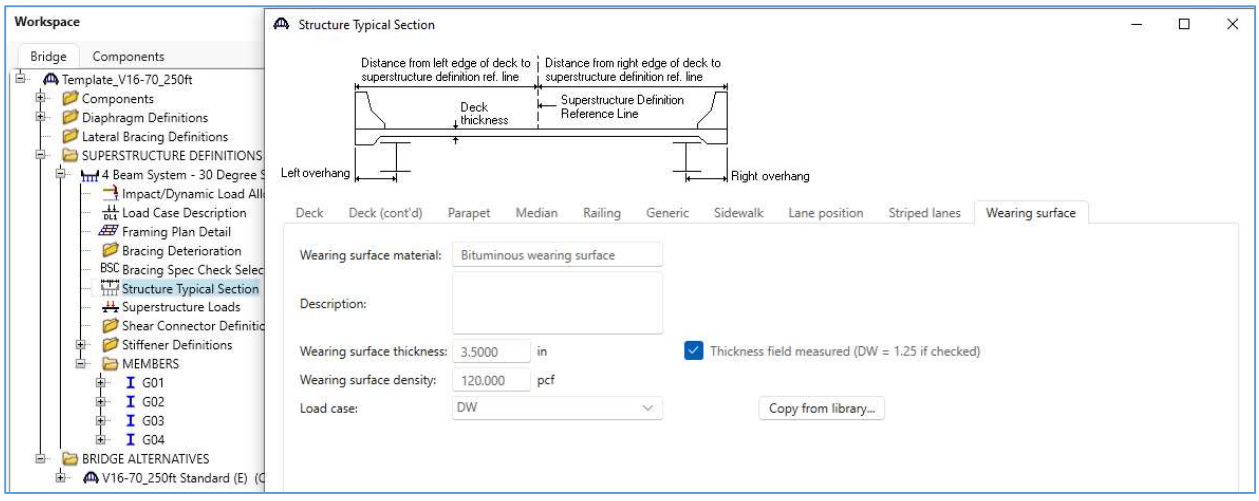
As-built plans, inspection data, NBI data or other records may indicate loads on the structure that are unique to that structure and not included in the template model. Typical examples of these loads include added wearing surface, modified/replaced appurtenances and utilities.

Default load cases have been saved to the template. Review the default load cases by opening the Load Case Description window. You can also add custom load cases if needed.



Added Loads: Wearing Surface

To enter or modify the wearing surface, open the Structural Typical Section window and select the "Wearing surface" tab.

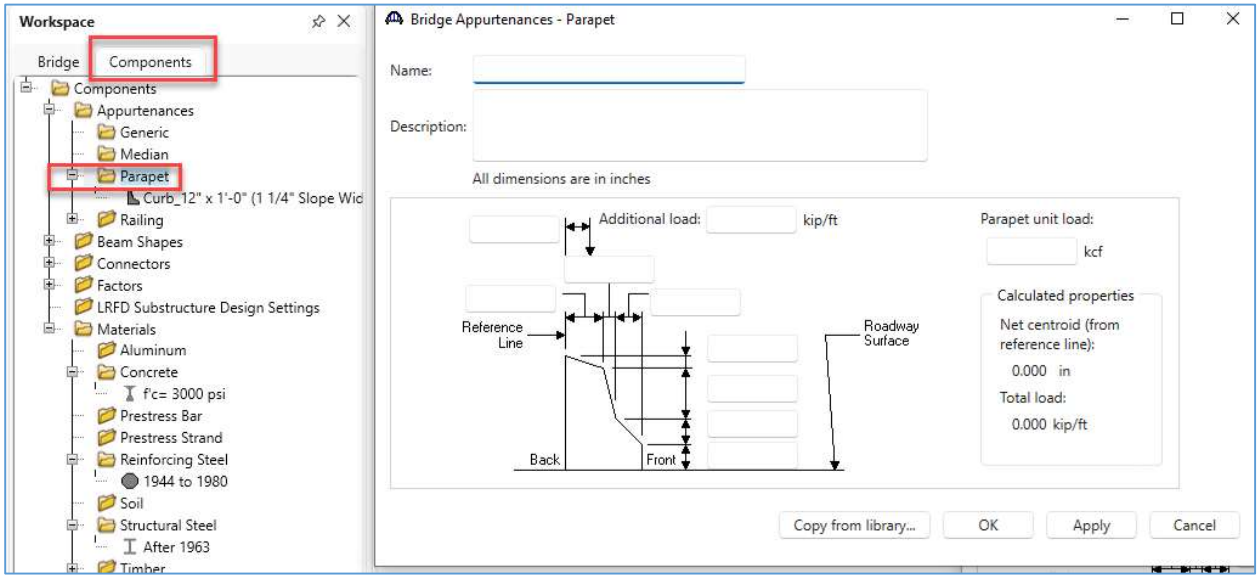


Enter a name for the wearing surface material, and the thickness and density of the wearing surface. Select the load case in which the wearing surface is applied. Click Apply.

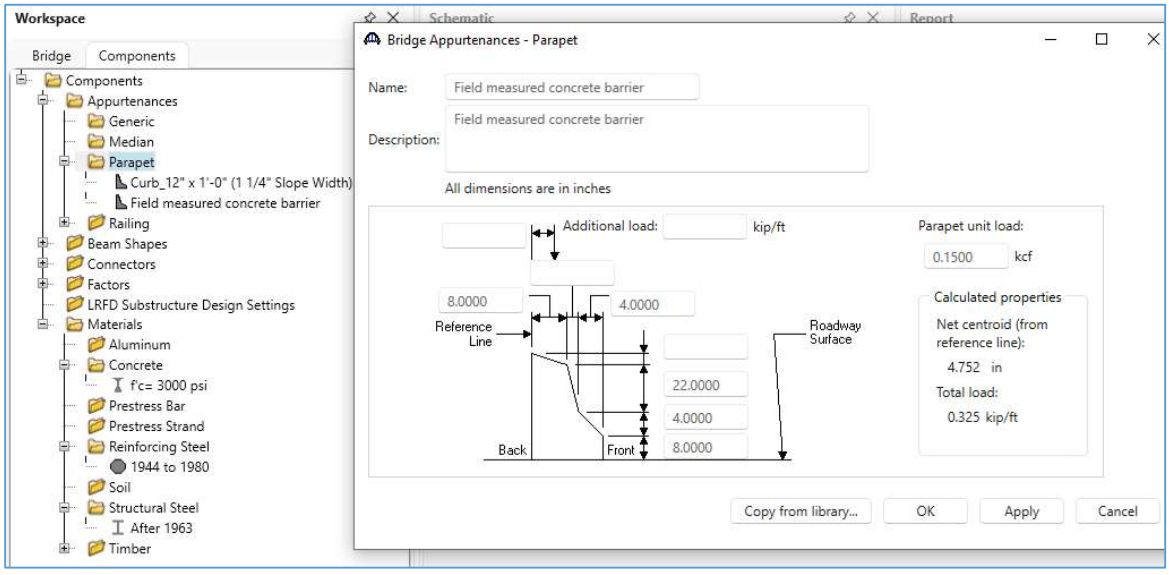
Added Loads: Appurtenances

Barriers and railings may have been modified or replaced. For this example, the inspection data indicates that the standard curb and metal rail has been replaced with concrete parapets. The parapets in place for this example were field-measured and do not appear to match any standard barrier definition in the Library.

To create a barrier based on field measured data, double click Parapet under the Bridge Workspace "Components" tab.

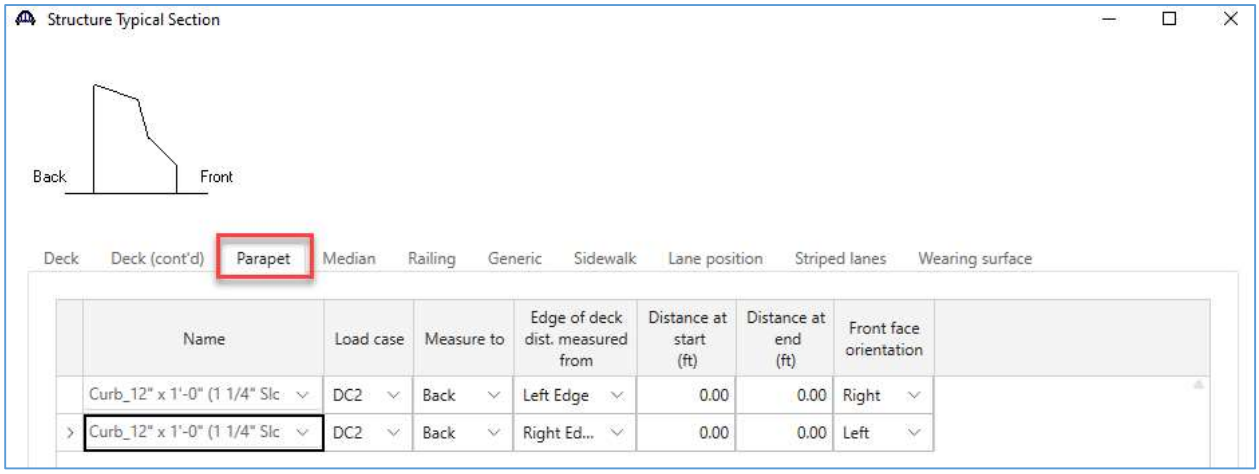


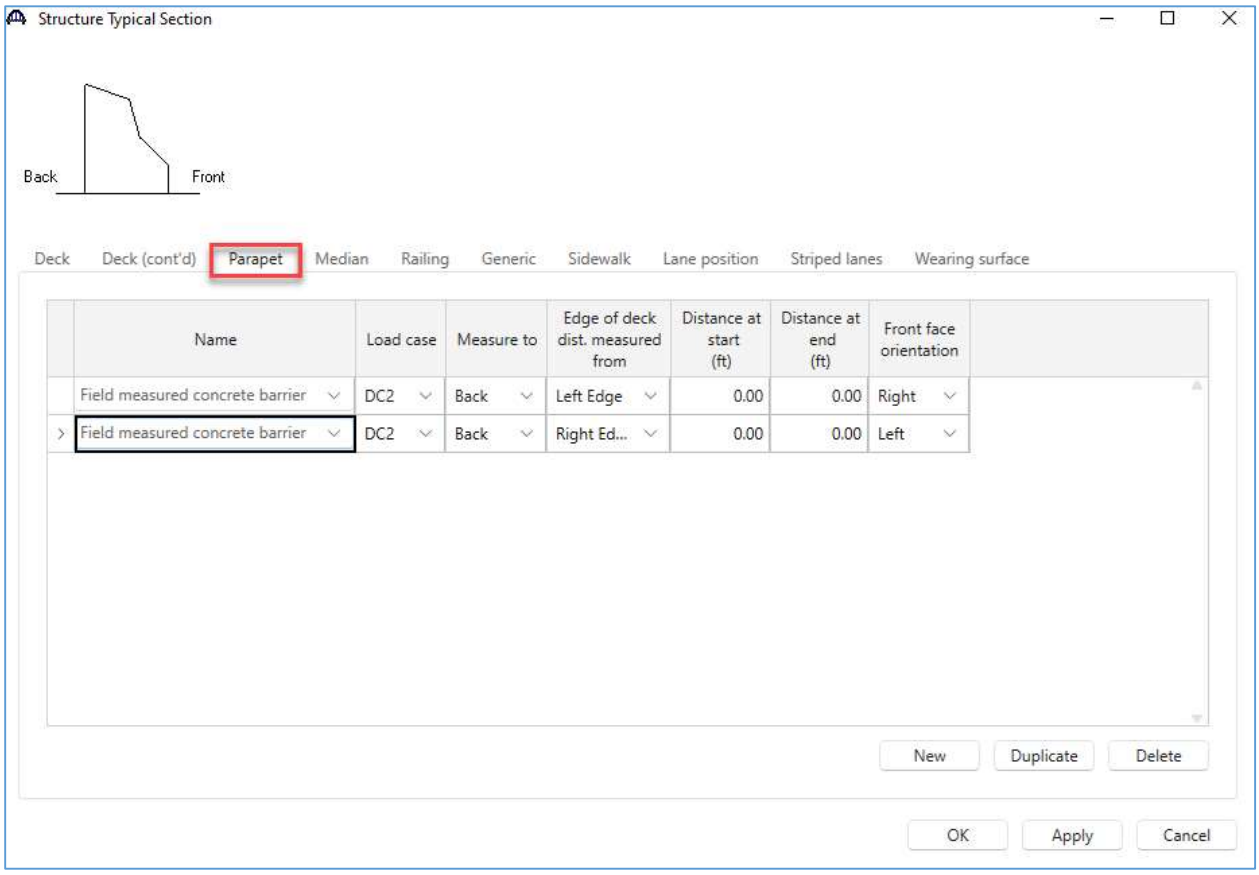
Enter a name for the barrier, the dimensions, and the unit load. Click Apply to save this barrier definition to the bridge model. You will see this is now available under Parapet in the Components tab. Review the "Calculated properties" (Net centroid and Total load) on the right side of the window, and click OK to save and close.



To add the newly created barrier to the structure, open the Structure Typical Section window and select the Parapet tab. The tab shows the curb that is typical to this bridge and is included in the template model, but in this example, the curb and rail have been replaced with a concrete barrier.

Under Name, use the dropdown to change the standard curb to the field measured concrete barrier that was saved to the bridge file in the previous step.

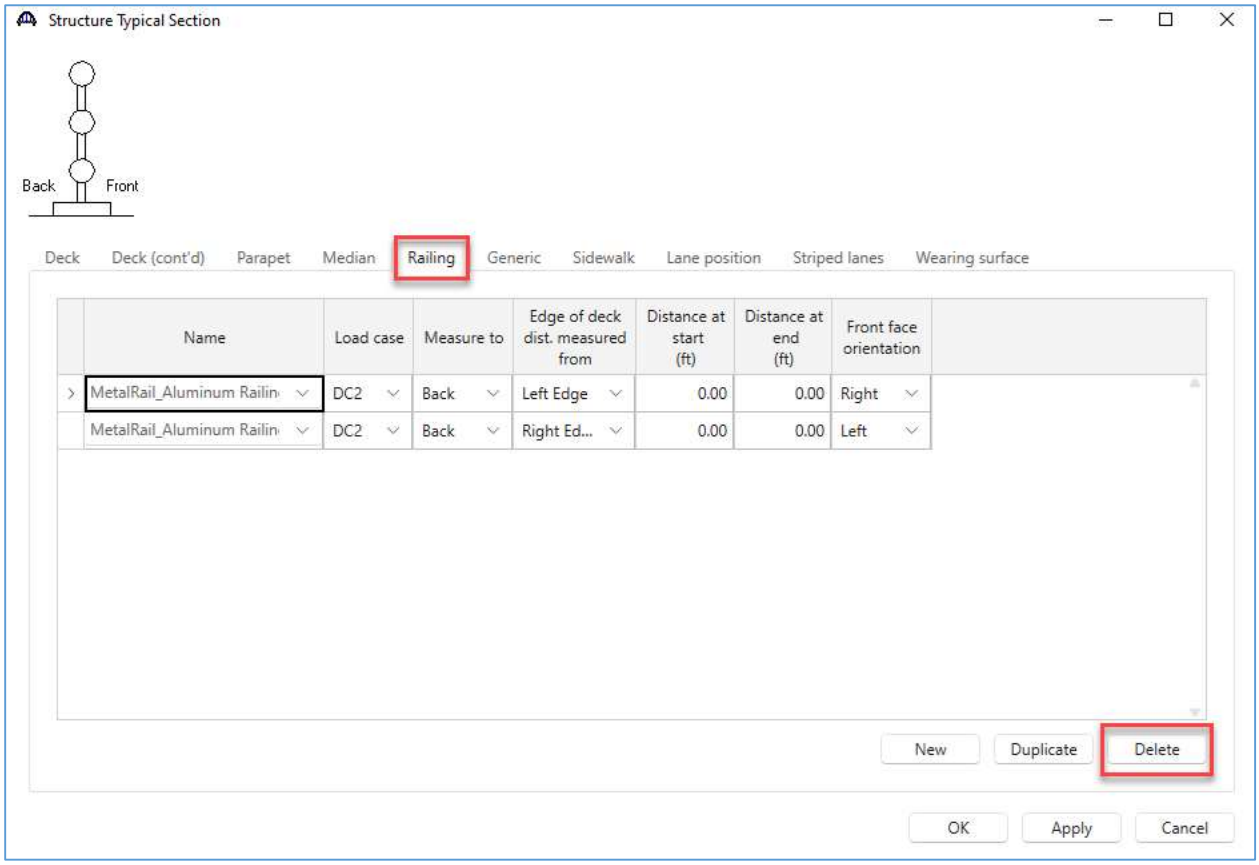




Click Apply to save.

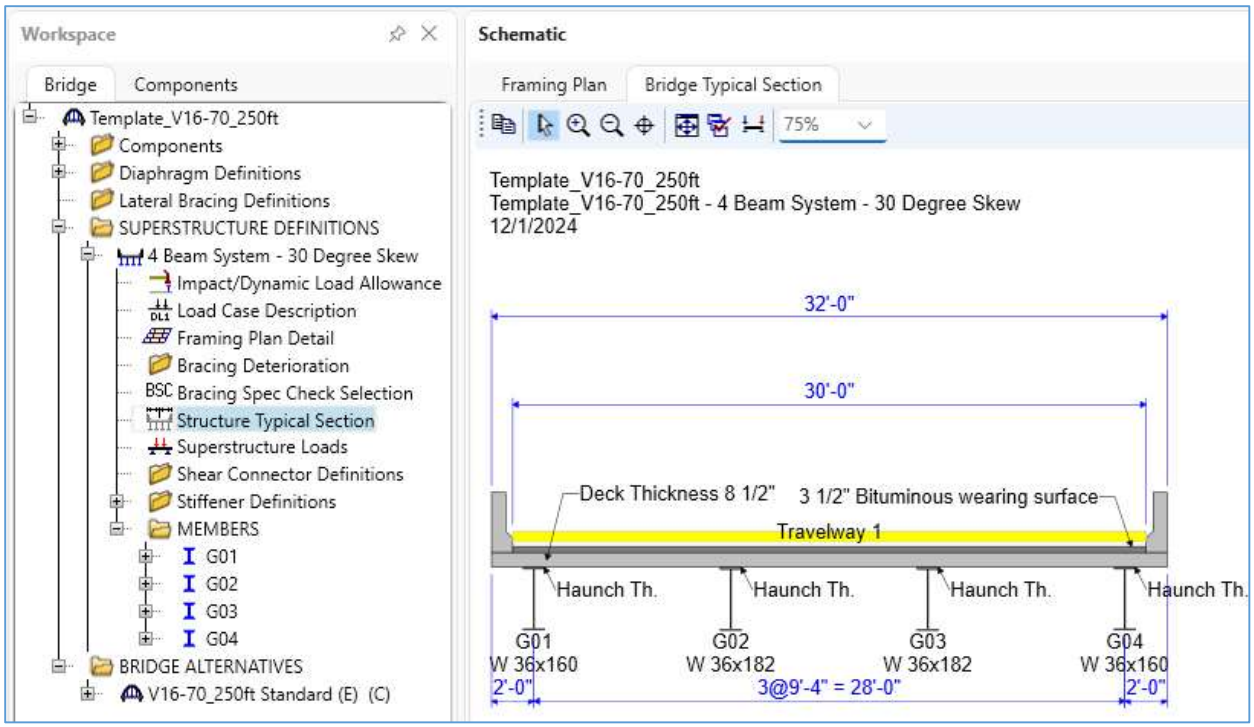
Since the typical barrier for this bridge is a concrete curb with metal rail, the rail will also need to be removed since the field measured concrete barrier is the only type of barrier on the structure.

Select the Railing tab. Select the railing to be deleted, and use the Delete button to delete the metal railing. Click Apply to save, or OK to save and close the window.



In the event that an appurtenance is a different width than the one originally in the template, you may also need to recompute the travelway width. Since this barrier is the same width as the one that was previously included in the model, this is not necessary for this example.

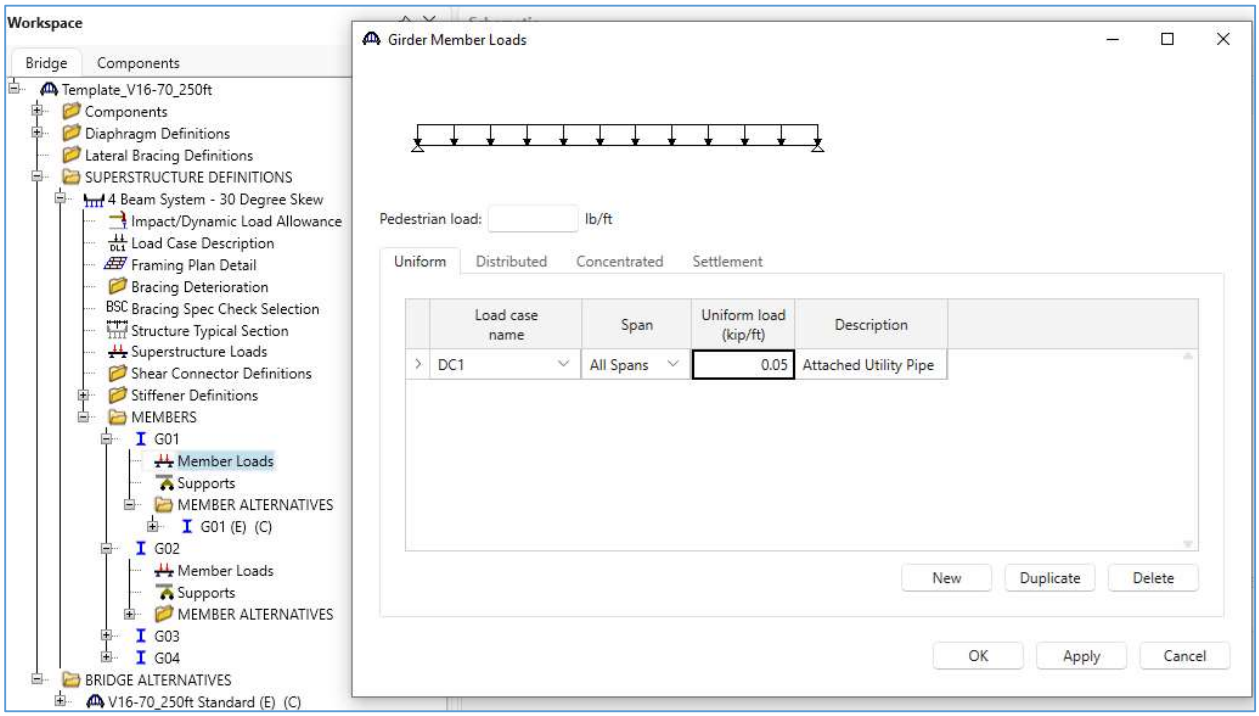
Review the Structural Typical Section Schematic to ensure that the new appurtenances are positioned as intended. This schematic will update to reflect changes when you click Apply or OK in any of the tabs in the Structure Typical Section window. Note that the added wearing surface that was added in the previous section is also shown in this schematic.



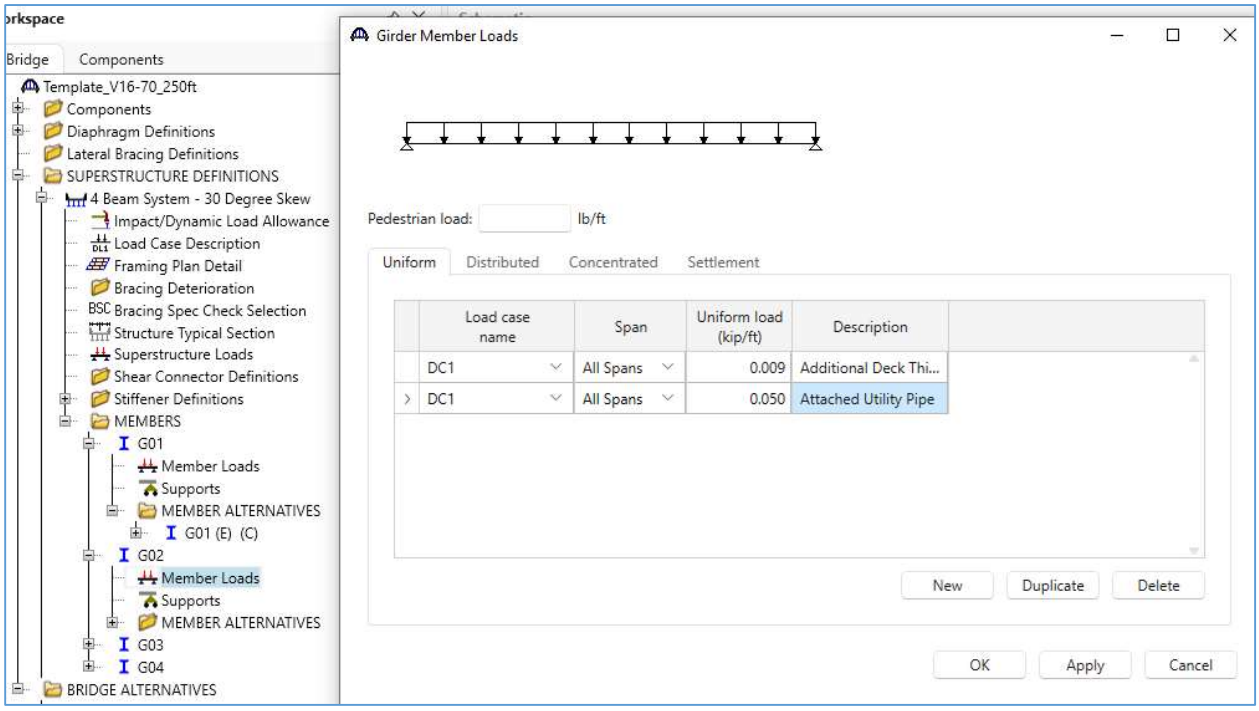
Added Loads: Utilities and Other Member Loads

For this example, inspection information indicates there is attached utility line suspended on brackets between the exterior girder (G01) and first interior girder (G02). From the available data, the weight of the utility line and brackets is estimated to be 100 plf distributed between the 2 girders it is attached to.

Under Members, expand G01 and G02 in the bridge workspace tree. Double click Member Loads under G01 to open the Girder Member Loads window for the first girder. Select the load case, enter the load and add the description. Click OK to save and close the window.



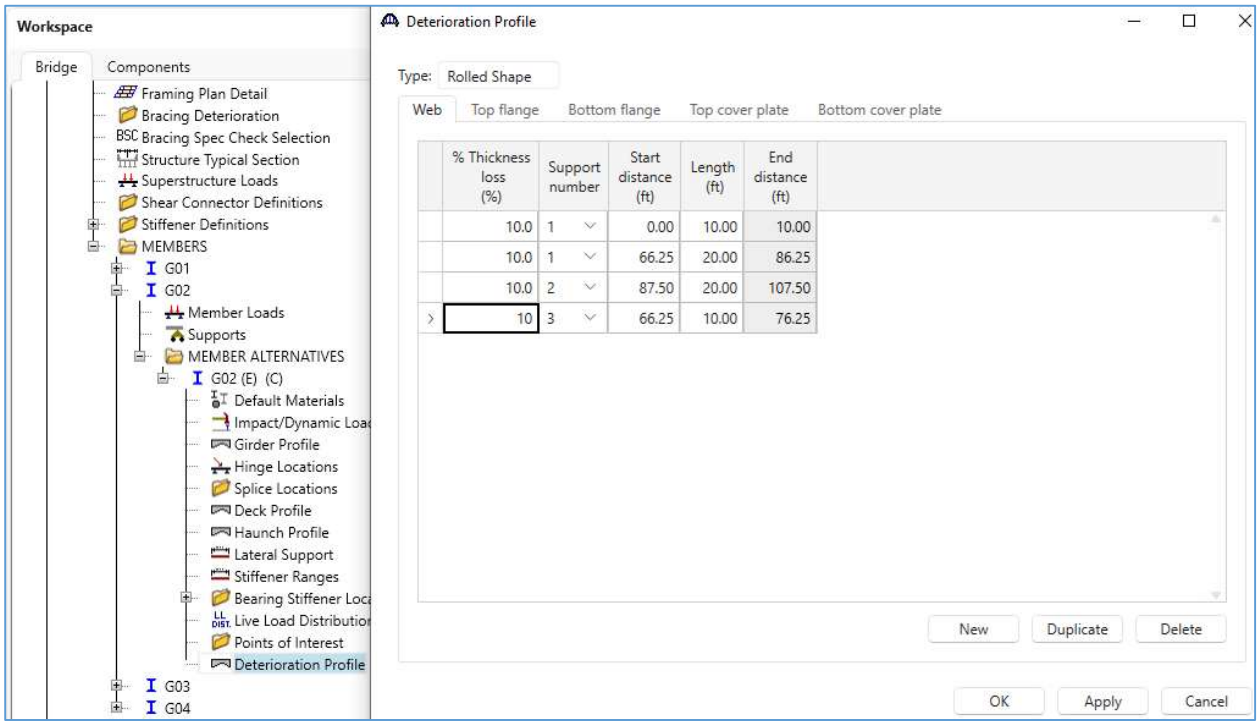
Repeat the process for G02. Note that the template contains an additional Member Load for G02 to account for the additional deck thickness toward the centerline of the bridge.

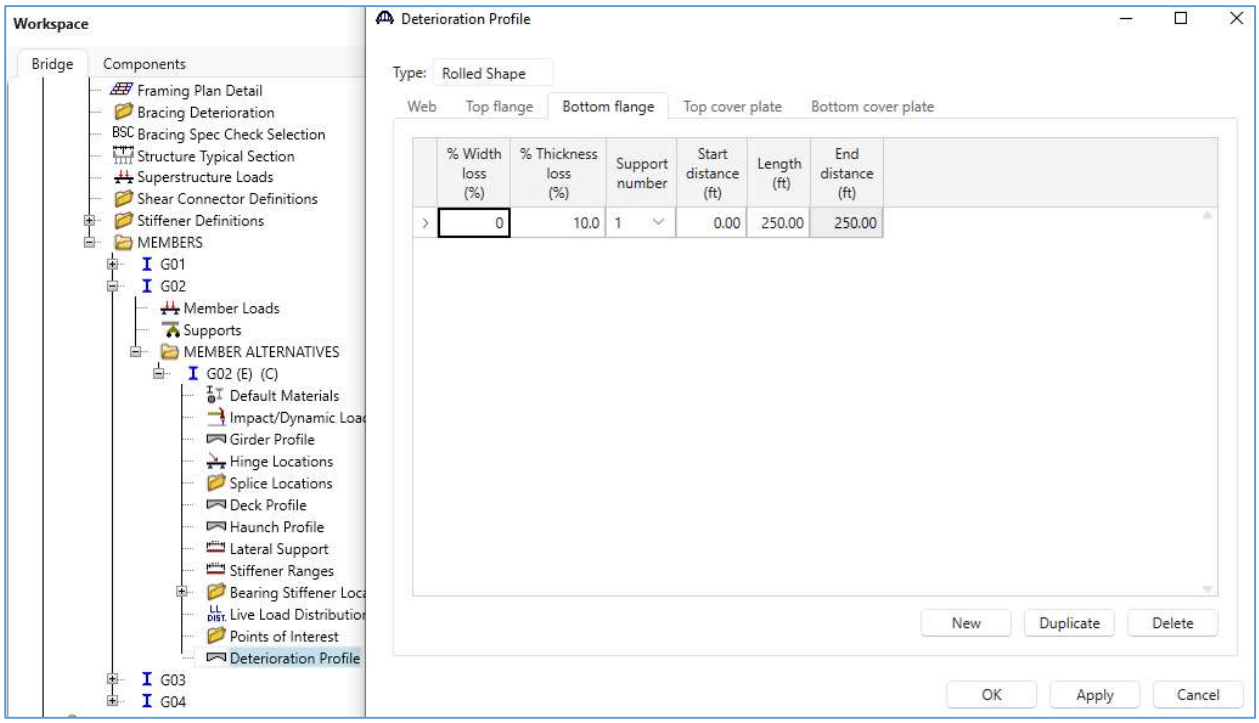


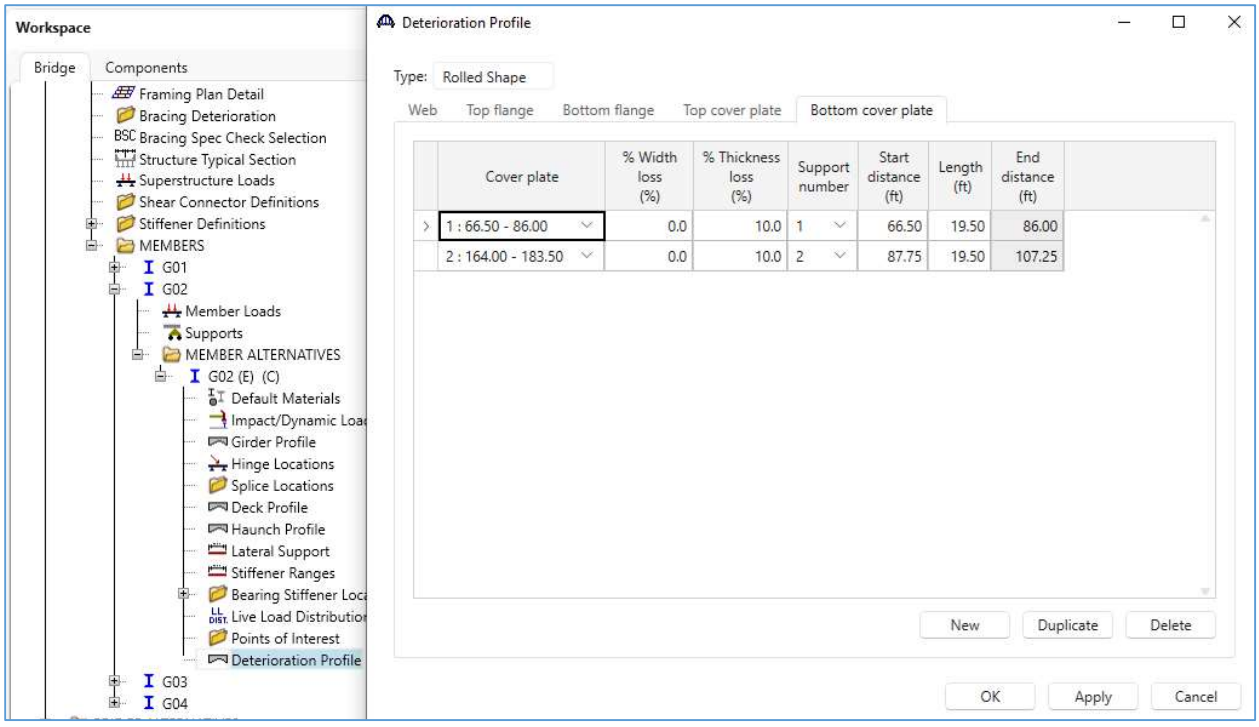
Deterioration: Steel Section Loss

The inspection data for this bridge indicates section loss at the web and bottom flanges and cover plates of G02.

For G02, double click Deterioration Profile under the Member Alternative to open the Deterioration Profile window. In the “Web”, “Bottom flange” and “Bottom Cover Plate” tabs, enter the web and flange deterioration.



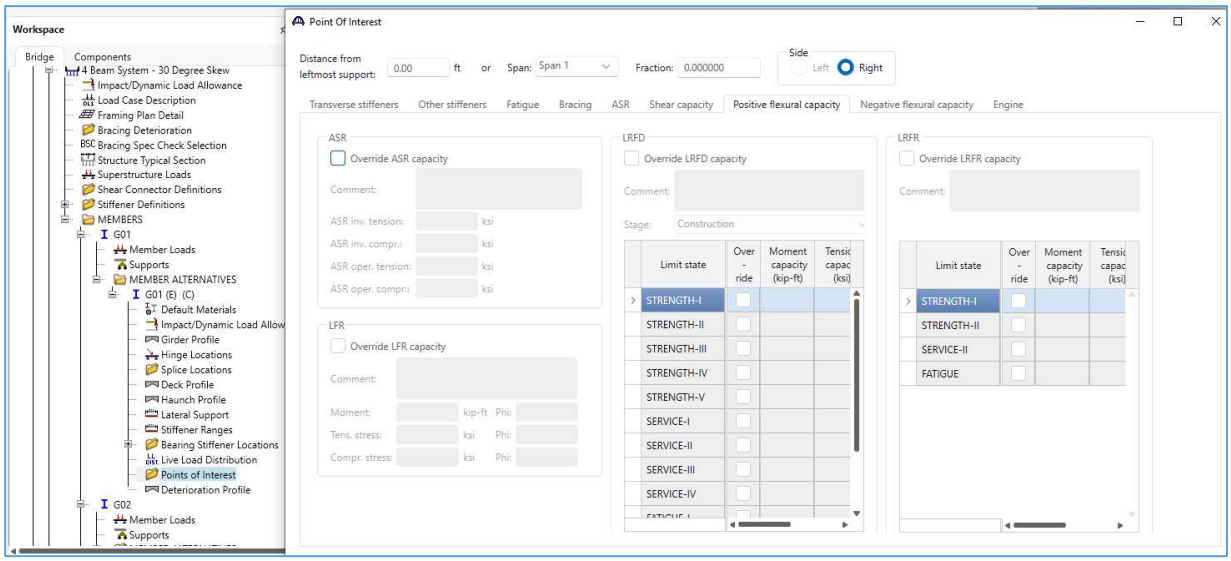




Deterioration: Point of Interest Overrides

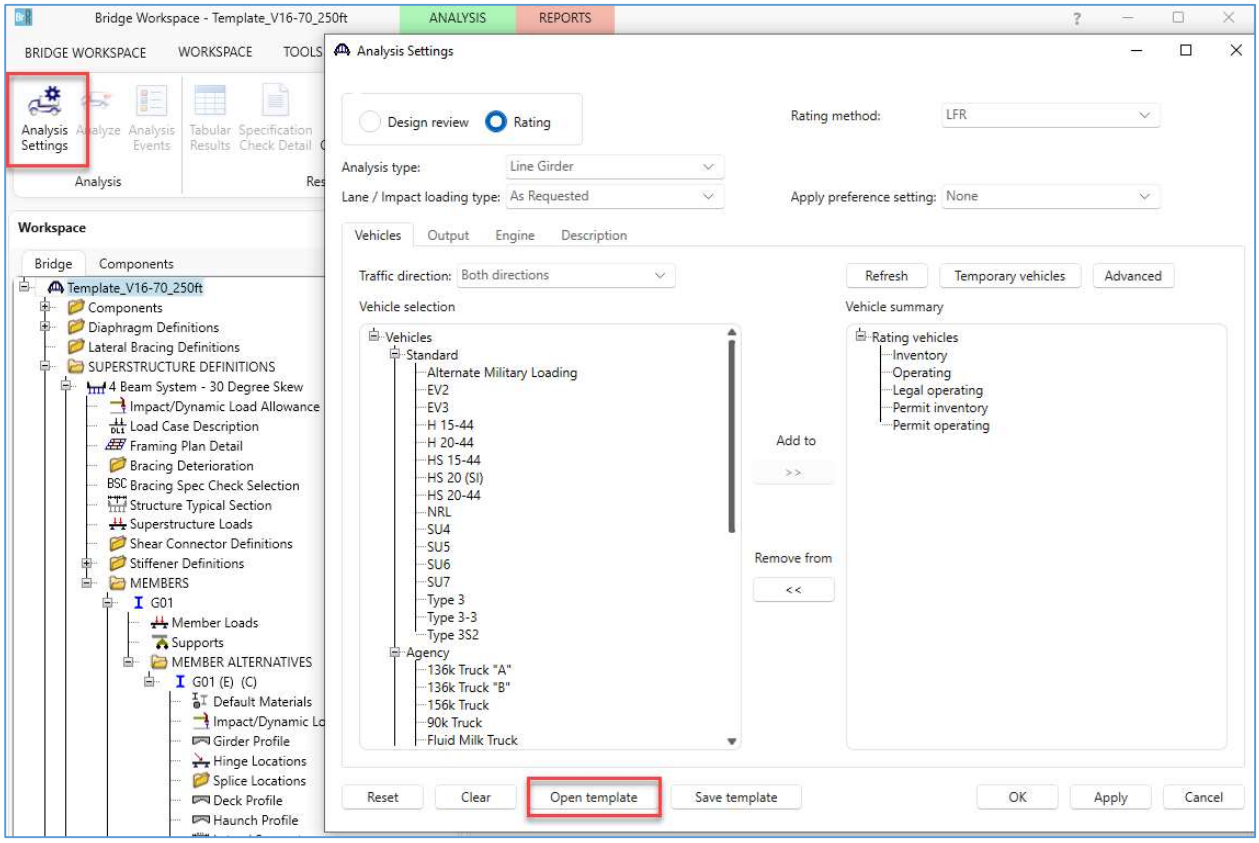
In some cases, there may be other considerations required to determine the remaining capacity of the section. Double click Points of Interest under the member alternative to open the Points of Interest window. Enter the location of the analysis point to override, select the appropriate checkbox, and enter the override capacity for that analysis point.

This can be used to override capacity, unbraced length or other properties at individual points along the beam. For this example, the deterioration can be modeled appropriately in the Deterioration Profile window, so no input is required here. Click Close or the X at the top right corner to exit without saving any override data.

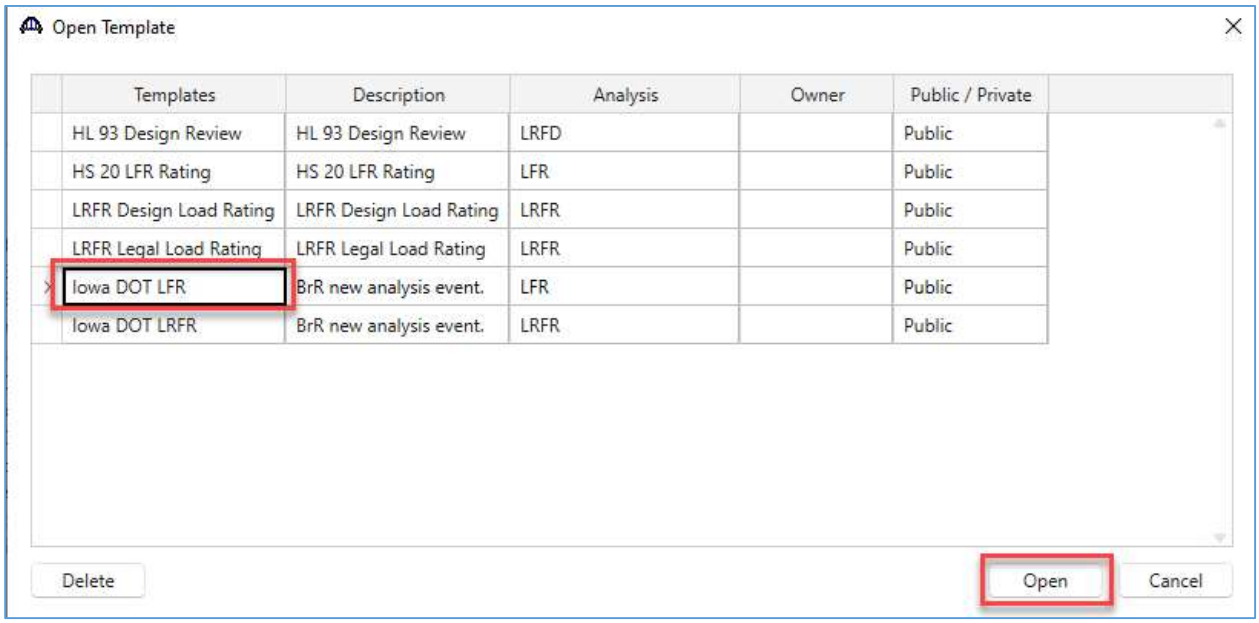


Analysis: LFR Load Rating Analysis

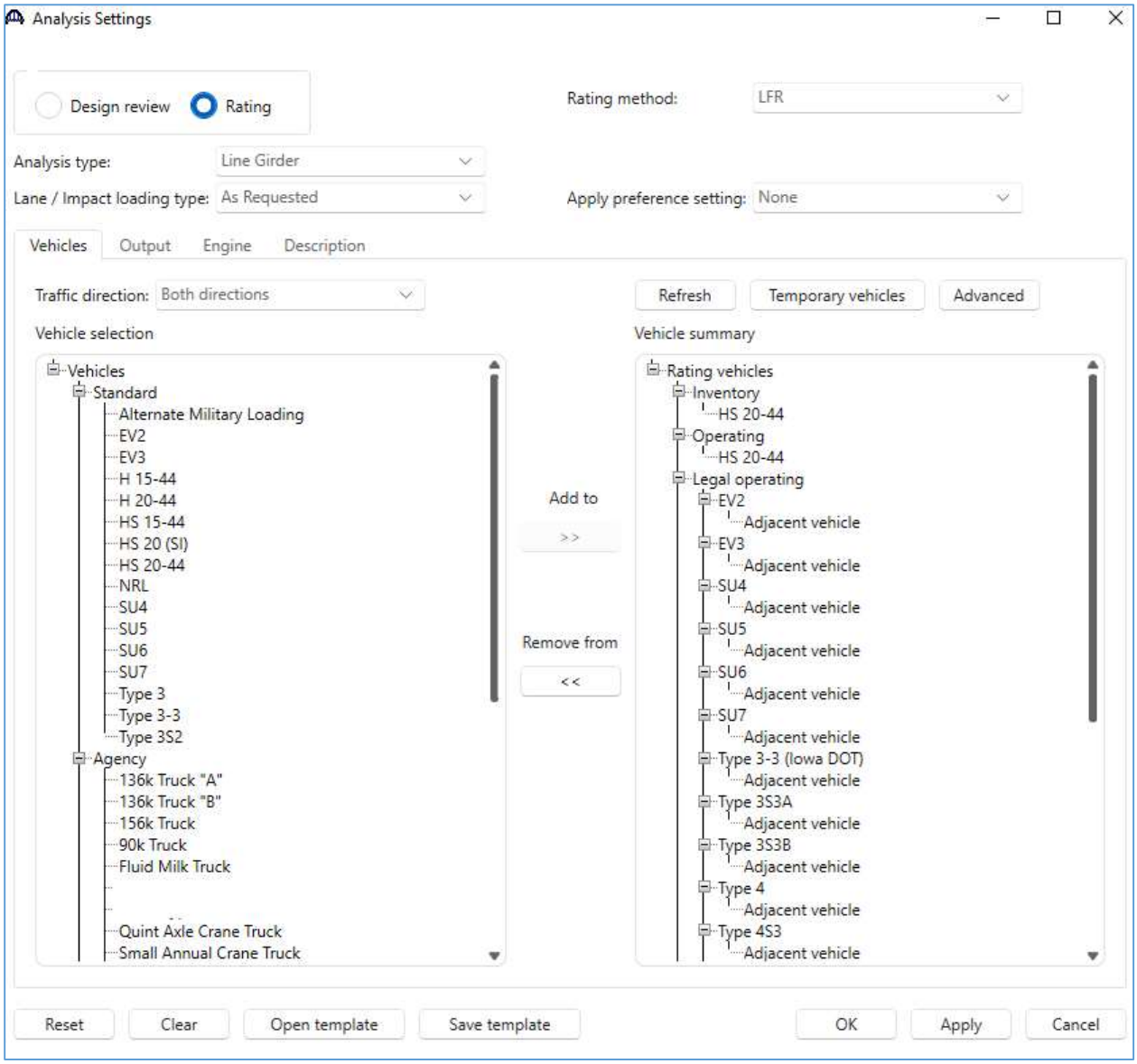
To run the rating analysis, open the Analysis Settings window and click Open Template.



Select the Iowa DOT LFR template and then click Open.

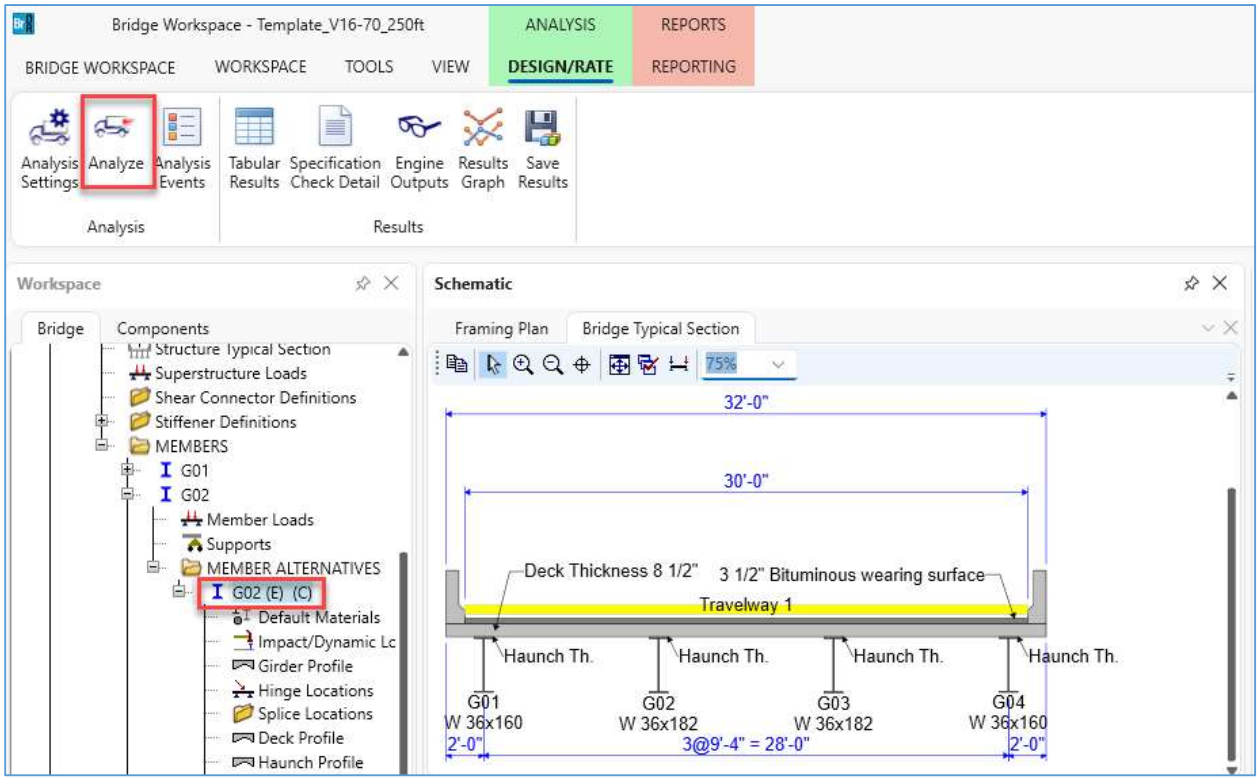


The Analysis Settings template includes the vehicles and settings for LFR rating analysis.



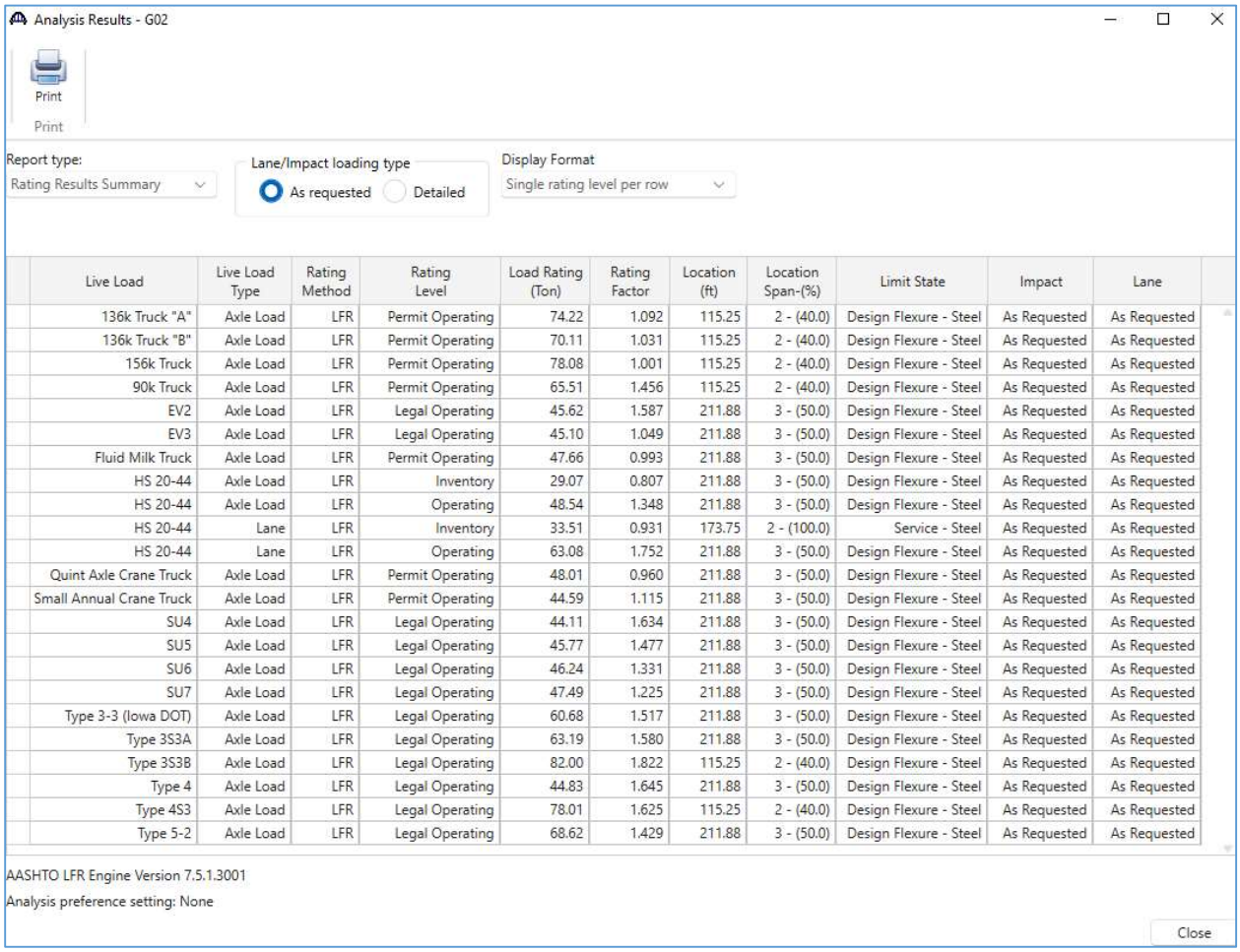
Click OK to save and close.

Once the Analysis Settings Template has been set, select the G02 Member Alternative and click Analyze to run the analysis.



Results and Output

Click the member alternative to select, and then click Tabular Results. In the window that opens, use the dropdown to change the display to “Single rating level per row.”

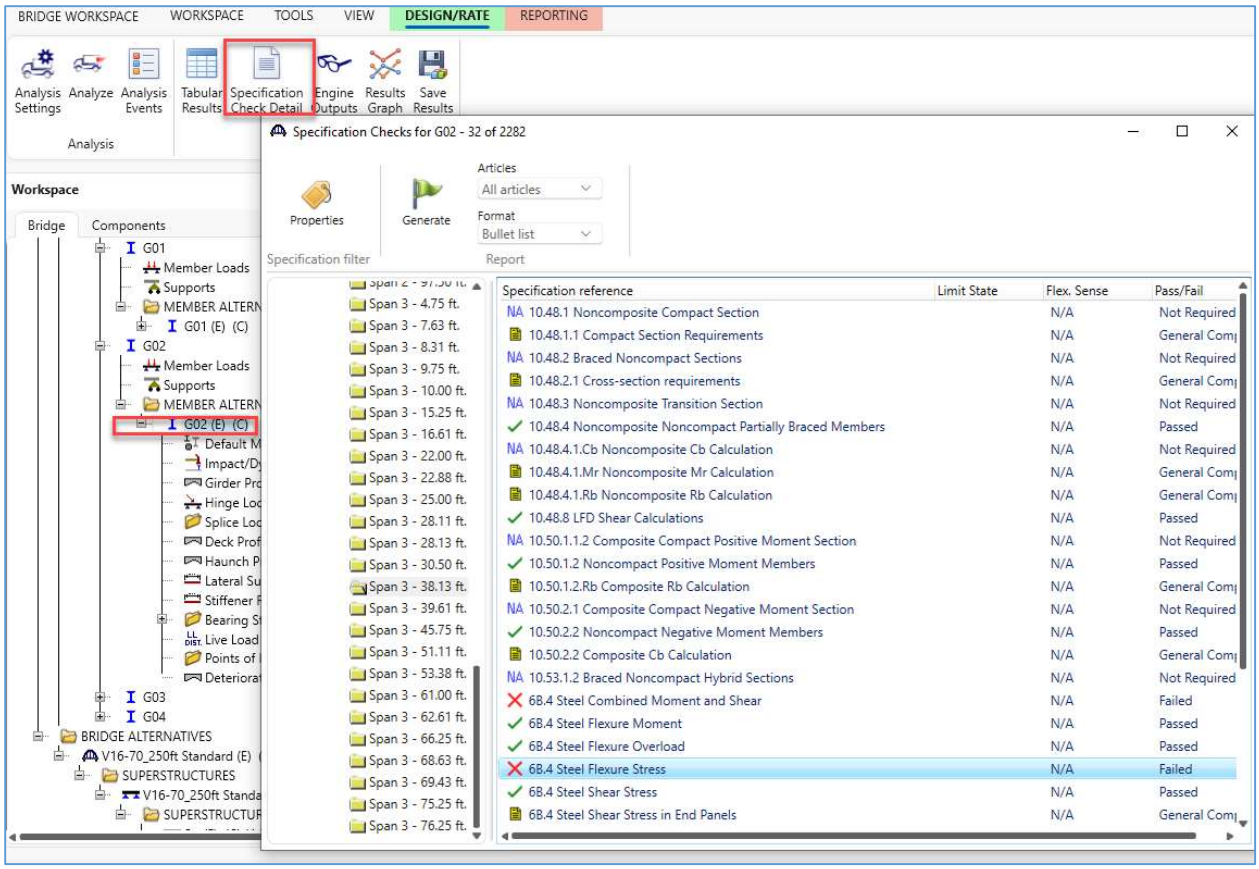


Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	Impact	Lane
136k Truck "A"	Axle Load	LFR	Permit Operating	74.22	1.092	115.25	2 - (40.0)	Design Flexure - Steel	As Requested	As Requested
136k Truck "B"	Axle Load	LFR	Permit Operating	70.11	1.031	115.25	2 - (40.0)	Design Flexure - Steel	As Requested	As Requested
156k Truck	Axle Load	LFR	Permit Operating	78.08	1.001	115.25	2 - (40.0)	Design Flexure - Steel	As Requested	As Requested
90k Truck	Axle Load	LFR	Permit Operating	65.51	1.456	115.25	2 - (40.0)	Design Flexure - Steel	As Requested	As Requested
EV2	Axle Load	LFR	Legal Operating	45.62	1.587	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
EV3	Axle Load	LFR	Legal Operating	45.10	1.049	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
Fluid Milk Truck	Axle Load	LFR	Permit Operating	47.66	0.993	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
HS 20-44	Axle Load	LFR	Inventory	29.07	0.807	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
HS 20-44	Axle Load	LFR	Operating	48.54	1.348	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
HS 20-44	Lane	LFR	Inventory	33.51	0.931	173.75	2 - (100.0)	Service - Steel	As Requested	As Requested
HS 20-44	Lane	LFR	Operating	63.08	1.752	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
Quint Axle Crane Truck	Axle Load	LFR	Permit Operating	48.01	0.960	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
Small Annual Crane Truck	Axle Load	LFR	Permit Operating	44.59	1.115	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
SU4	Axle Load	LFR	Legal Operating	44.11	1.634	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
SU5	Axle Load	LFR	Legal Operating	45.77	1.477	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
SU6	Axle Load	LFR	Legal Operating	46.24	1.331	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
SU7	Axle Load	LFR	Legal Operating	47.49	1.225	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
Type 3-3 (Iowa DOT)	Axle Load	LFR	Legal Operating	60.68	1.517	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
Type 3S3A	Axle Load	LFR	Legal Operating	63.19	1.580	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
Type 3S3B	Axle Load	LFR	Legal Operating	82.00	1.822	115.25	2 - (40.0)	Design Flexure - Steel	As Requested	As Requested
Type 4	Axle Load	LFR	Legal Operating	44.83	1.645	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested
Type 4S3	Axle Load	LFR	Legal Operating	78.01	1.625	115.25	2 - (40.0)	Design Flexure - Steel	As Requested	As Requested
Type 5-2	Axle Load	LFR	Legal Operating	68.62	1.429	211.88	3 - (50.0)	Design Flexure - Steel	As Requested	As Requested

AASHTO LFR Engine Version 7.5.1.3001
Analysis preference setting: None
Close

To view the detailed results, click the member alternative to select it and then click Specification Check Detail.

Expand the tree on the left side of the window and select an analysis location. Double click any article to open the detailed results.



Spec Check Detail for LFD Steel Elastic Section Properties

```
Mechanics of Materials
Steel Elastic Section Properties
(AASHTO Standard Specifications for Highway Bridges, Seventeenth Edition - 2002)

Steel Plate - At Location = 211.8750 (ft) - Left     Stage 3

Section within Top Flange Continuous Bracing Region

Note:  Cross section dimensions have been adjusted for deterioration.

Ignore Long. Reinf. in Negative Moment Capacity Control Option: No

                     Cross Section Properties
--------------------------------------------------------------------
Eff. Slab Width =  96.0000 (in)       Haunch Width =  12.0750 (in)
Eff. Slab Thick =   8.0000 (in)       Haunch Thick =   0.0100 (in)
Slab f'c        =   3.0000 (ksi)

Note: Haunch thickness is measured from top of top flange to bottom of slab

Girder Data:
------------
Web Depth = 33.9700 (in)
Web Thick = 0.7250 (in)
Web Fy    = 36.0000 (ksi)

Component              Width          Thick             Fy
                        (in)           (in)           (ksi)
--------------------------------------------------------------------
Top Flange           12.0750        1.1800        36.0000
Bot Flange           12.0750        1.0620        36.0000


Section Type: Composite

m = 1.00
n = 9.19

                                    Positive Flexure
                                Elastic Section Properties

 Component                 A            d          A*d           Io         Ybar       A*Ybar^2
                         (in^2)         (in)       (in^3)       (in^4)       (in)        (in^4)
-------------------------------------------------------------------------------------------------
 Slab (transformed)       83.58       40.22      3361.66       445.75      -8.28       5735.64
 Top Flange               14.25       35.62       507.56         1.65      -3.68        193.39
 Web                      24.63       18.05       444.47      2368.34      13.89       4752.19
 Bot Flange               12.82        0.53         6.81         1.21      31.41      12649.15
-------------------------------------------------------------------------------------------------
 Sum                     135.28                  4320.49      2816.94                 23330.37
```

Spec Check Detail for 6B.4 Steel Flexure Stress

```
Part B - ALLOWABLE STRESS RATING AND LOAD FACTOR RATING
6B.4 RATING EQUATION
6B.4.1 General - Steel Flexure Stress
(AASHTO Manual for Bridge Evaluation, Third Edition with 2023 Interims)

Steel Plate - At Location = 211.8750 (ft) - Left     Stage 3

Section within Top Flange Continuous Bracing Region


INPUT:

Section Type:  Composite
Top Flange Continuously Laterally Supported: Yes
Allow Plastic Analysis Control Option: Yes

Sy top flange    : 28.68  (in^3)
Sy bottom flange : 25.81  (in^3)

fR = Capacity flange stress
A1 = Dead Load Factor
A2 = Live Load Factor
fDLz  = factored dead load stress from vertical forces on flange
fLLIz = factored live load stress from vertical forces on flange
fDL1  = factored dead load stress from lateral forces on flange
fLL1  = factored live load stress from lateral forces on flange

     fR - A1*(fDLz + ABS(fDL1*(1/3)))
RF = ---------------------------------
     A2*(fLLIz(1+I) + ABS(fLL1*(1/3)))



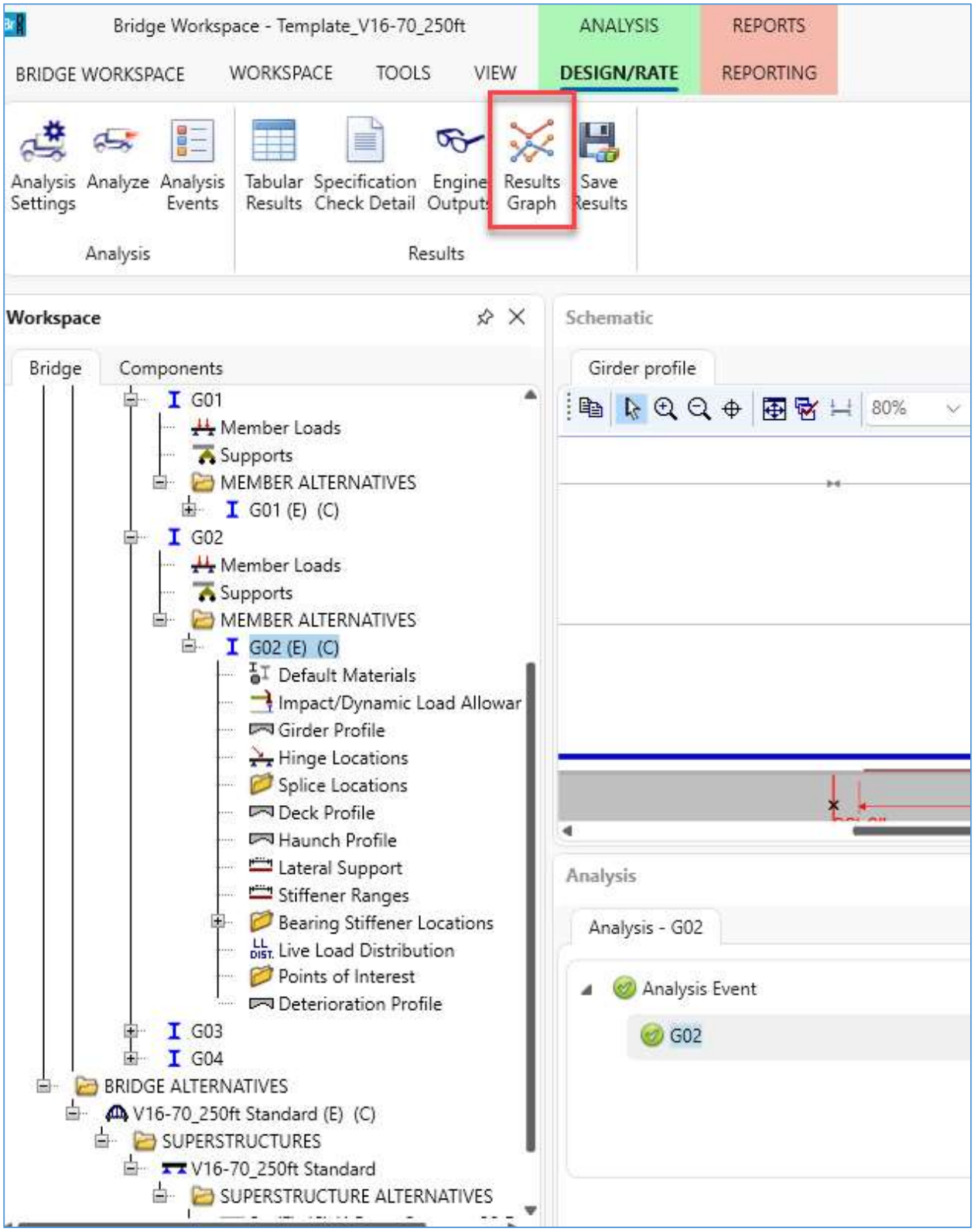
Stage 1:

Component        C         S        Fy
                (in)     (in^3)    (ksi)
-----------------------------------------
Top Flange    17.666    -605.33    36.00
Bot Flange    -18.546   576.61     36.00

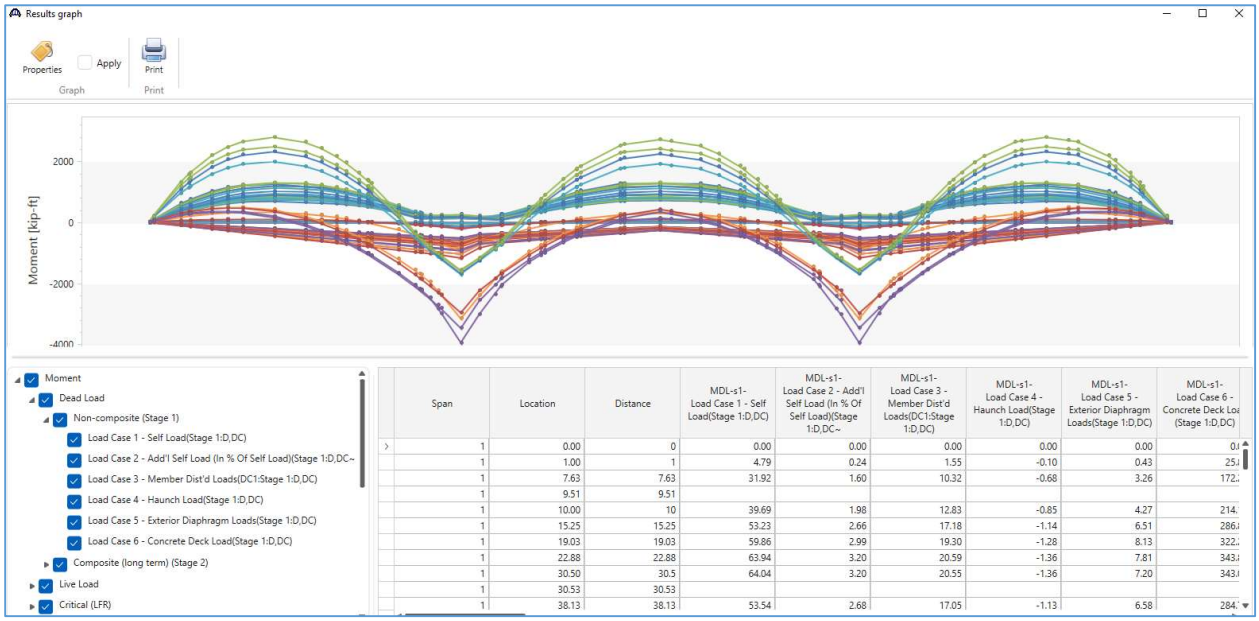

Stage 2:

        Positive Flexure                          Negative Flexure
Component        C         S          Component        C         S
                (in)     (in^3)                      (in)     (in^3)
--------------------------------    --------------------------------
Top Flange    10.076   -1920.30     Top Flange    17.666    -605.33
Bot Flange    -26.136   740.29      Bot Flange    -18.546   576.61
```

You can also open the Results Graph window to review force effects graphs for dead loads and live loads.



Expand the tree on the left and use the check box to toggle on/off display of each load type.



Span	Location	Distance	MDL-s1-Load Case 1 - Self Load(Stage 1:D,DC)	MDL-s1-Load Case 2 - Add'l Self Load (In % Of Self Load)(Stage 1:D,DC~	MDL-s1-Load Case 3 - Member Dist'd Loads(DC1:Stage 1:D,DC)	MDL-s1-Load Case 4 - Haunch Load(Stage 1:D,DC)	MDL-s1-Load Case 5 - Exterior Diaphragm Loads(Stage 1:D,DC)	MDL-s1-Load Case 6 - Concrete Deck Loa (Stage 1:D,DC)
1	0.00	0	0.00	0.00	0.00	0.00	0.00	0.(
1	1.00	1	4.79	0.24	1.55	-0.10	0.43	25.(
1	7.63	7.63	31.92	1.60	10.32	-0.68	3.26	172.(
1	9.51	9.51						
1	10.00	10	39.69	1.98	12.83	-0.85	4.27	214.(
1	15.25	15.25	53.23	2.66	17.18	-1.14	6.51	286.(
1	19.03	19.03	59.86	2.99	19.30	-1.28	8.13	322.(
1	22.88	22.88	63.94	3.20	20.59	-1.36	7.81	343.(
1	30.50	30.5	64.04	3.20	20.55	-1.36	7.20	343.(
1	30.53	30.53						
1	38.13	38.13	53.54	2.68	17.05	-1.13	6.58	284.(

Library Tutorial

LIB1 - Libraries

Library Concepts

The libraries of BrDR allow for the description of items that are standardized or used frequently in the description of a bridge or by analysis events. The libraries of BrDR currently define the following items:

- Appurtenances (parapets, medians, railings, etc.)
- Connectors (bolts, nails)
- Corrugated Metal Panel
- Factors
- LRFD DF Applicability Ranges
- LRFD Substructure Design Settings
- Materials (steel, concrete, etc.)
- Metal Box Culvert
- Metal Pipe Culvert (corrugated, spiral rib, structural plate)
- Prestress Shapes
- Steel Shapes
- Timber Shapes
- Vehicles

BrDR is pre-loaded with library items selected by AASHTO. These items were taken from various sources including the following:

- *AASHTO LRFD Bridge Design Specifications*
- *AASHTO Manual for Bridge Evaluation*
- *AASHTO Standard Specifications for Highway Bridges*
- *AASHTO Standard Specifications for Transportation Materials*
- *AISC Manual of Steel Construction*
- *PCI Precast Prestressed Concrete Bridge Design Manual*

Library Types

Three types of library items:

Standard Items added to database by AASHTO. Standard library items are not editable.

Agency All items added to the library by a user.

User Defined Only available for vehicles.

Using Library Data

Two methods to use library items:

Linking Library item associated with a bridge component or analysis event. If the library item is modified, then the updated data is used by the bridge component or analysis event. (Factors, Vehicles, LRFD DF Applicability Ranges)

Copying Data from library item copied from a library item to a bridge item. A change in the library item has no effect on bridge items that use data previously copied from library item. (Steel Shapes, PS Shapes, Timber Shapes, Factors, LRFD Substructure Design Settings, Materials, Appurtenances, Connections, Corrugated Metal Panel)

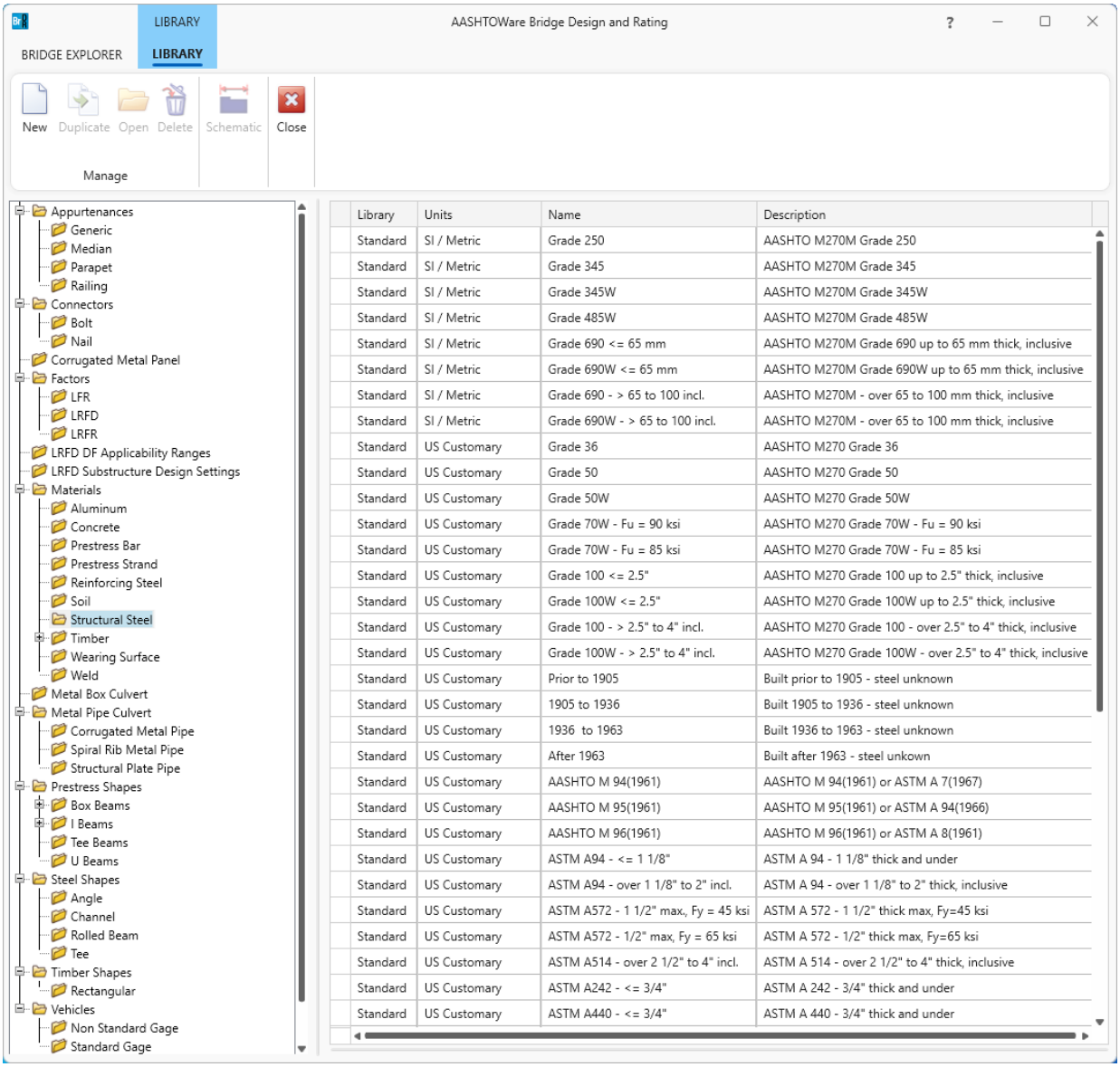
Linking is used to reduce amount of data stored in database for items that are unlikely to be modified.

Library Security

- Library access can be restricted for read, write, create, and delete access.
- Access restrictions apply to all libraries for a given user or group of users.
- Limit number of users with write, create, and delete access.
    - Reduce possibility of incorrect data.
    - Reduce duplicate items and inappropriate items.

Library Explorer

The Library Explorer is used to navigate the various libraries. The tree control in the left pane organizes the libraries. The item selected in the tree control determines the library items to be listed in the right pane of the window.

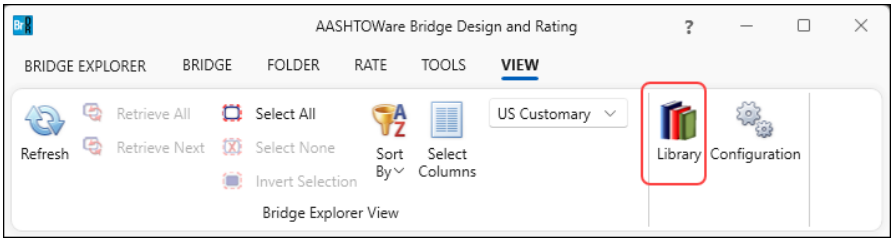


Library	Units	Name	Description
Standard	SI / Metric	Grade 250	AASHTO M270M Grade 250
Standard	SI / Metric	Grade 345	AASHTO M270M Grade 345
Standard	SI / Metric	Grade 345W	AASHTO M270M Grade 345W
Standard	SI / Metric	Grade 485W	AASHTO M270M Grade 485W
Standard	SI / Metric	Grade 690 <= 65 mm	AASHTO M270M Grade 690 up to 65 mm thick, inclusive
Standard	SI / Metric	Grade 690W <= 65 mm	AASHTO M270M Grade 690W up to 65 mm thick, inclusive
Standard	SI / Metric	Grade 690 - > 65 to 100 incl.	AASHTO M270M - over 65 to 100 mm thick, inclusive
Standard	SI / Metric	Grade 690W - > 65 to 100 incl.	AASHTO M270M - over 65 to 100 mm thick, inclusive
Standard	US Customary	Grade 36	AASHTO M270 Grade 36
Standard	US Customary	Grade 50	AASHTO M270 Grade 50
Standard	US Customary	Grade 50W	AASHTO M270 Grade 50W
Standard	US Customary	Grade 70W - Fu = 90 ksi	AASHTO M270 Grade 70W - Fu = 90 ksi
Standard	US Customary	Grade 70W - Fu = 85 ksi	AASHTO M270 Grade 70W - Fu = 85 ksi
Standard	US Customary	Grade 100 <= 2.5"	AASHTO M270 Grade 100 up to 2.5" thick, inclusive
Standard	US Customary	Grade 100W <= 2.5"	AASHTO M270 Grade 100W up to 2.5" thick, inclusive
Standard	US Customary	Grade 100 - > 2.5" to 4" incl.	AASHTO M270 Grade 100 - over 2.5" to 4" thick, inclusive
Standard	US Customary	Grade 100W - > 2.5" to 4" incl.	AASHTO M270 Grade 100W - over 2.5" to 4" thick, inclusive
Standard	US Customary	Prior to 1905	Built prior to 1905 - steel unknown
Standard	US Customary	1905 to 1936	Built 1905 to 1936 - steel unknown
Standard	US Customary	1936 to 1963	Built 1936 to 1963 - steel unknown
Standard	US Customary	After 1963	Built after 1963 - steel unkown
Standard	US Customary	AASHTO M 94(1961)	AASHTO M 94(1961) or ASTM A 7(1967)
Standard	US Customary	AASHTO M 95(1961)	AASHTO M 95(1961) or ASTM A 94(1966)
Standard	US Customary	AASHTO M 96(1961)	AASHTO M 96(1961) or ASTM A 8(1961)
Standard	US Customary	ASTM A94 - <= 1 1/8"	ASTM A 94 - 1 1/8" thick and under
Standard	US Customary	ASTM A94 - over 1 1/8" to 2" incl.	ASTM A 94 - over 1 1/8" to 2" thick, inclusive
Standard	US Customary	ASTM A572 - 1 1/2" max., Fy = 45 ksi	ASTM A 572 - 1 1/2" thick max, Fy=45 ksi
Standard	US Customary	ASTM A572 - 1/2" max, Fy = 65 ksi	ASTM A 572 - 1/2" thick max, Fy=65 ksi
Standard	US Customary	ASTM A514 - over 2 1/2" to 4" incl.	ASTM A 514 - over 2 1/2" to 4" thick, inclusive
Standard	US Customary	ASTM A242 - <= 3/4"	ASTM A 242 - 3/4" thick and under
Standard	US Customary	ASTM A440 - <= 3/4"	ASTM A 440 - 3/4" thick and under

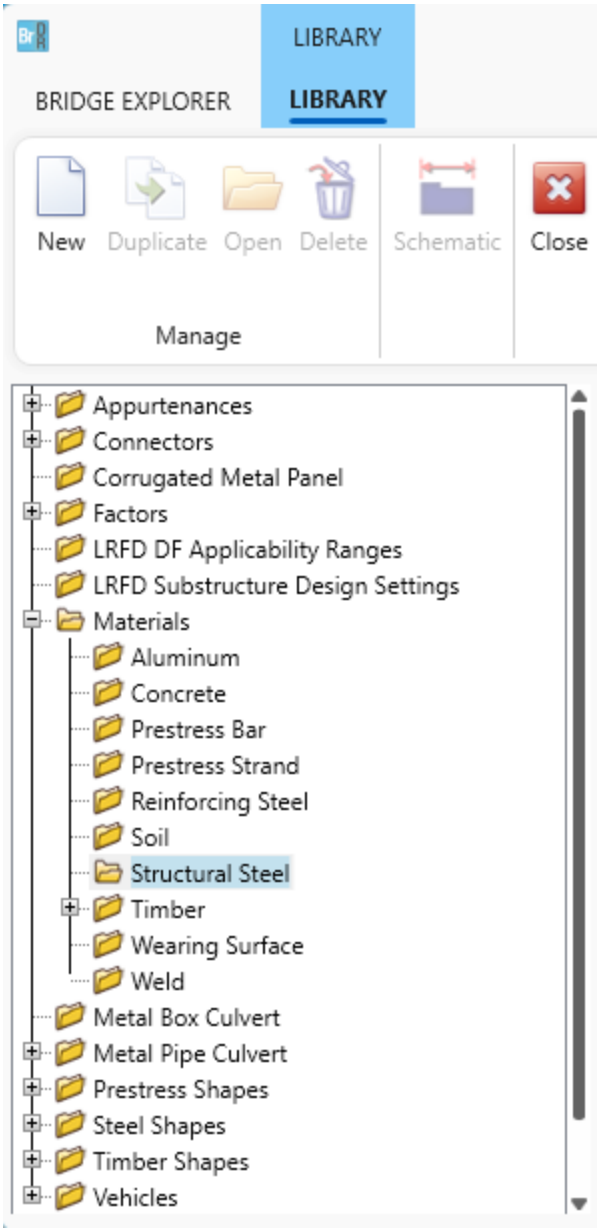
Exercise

Add Steel Material Library Item

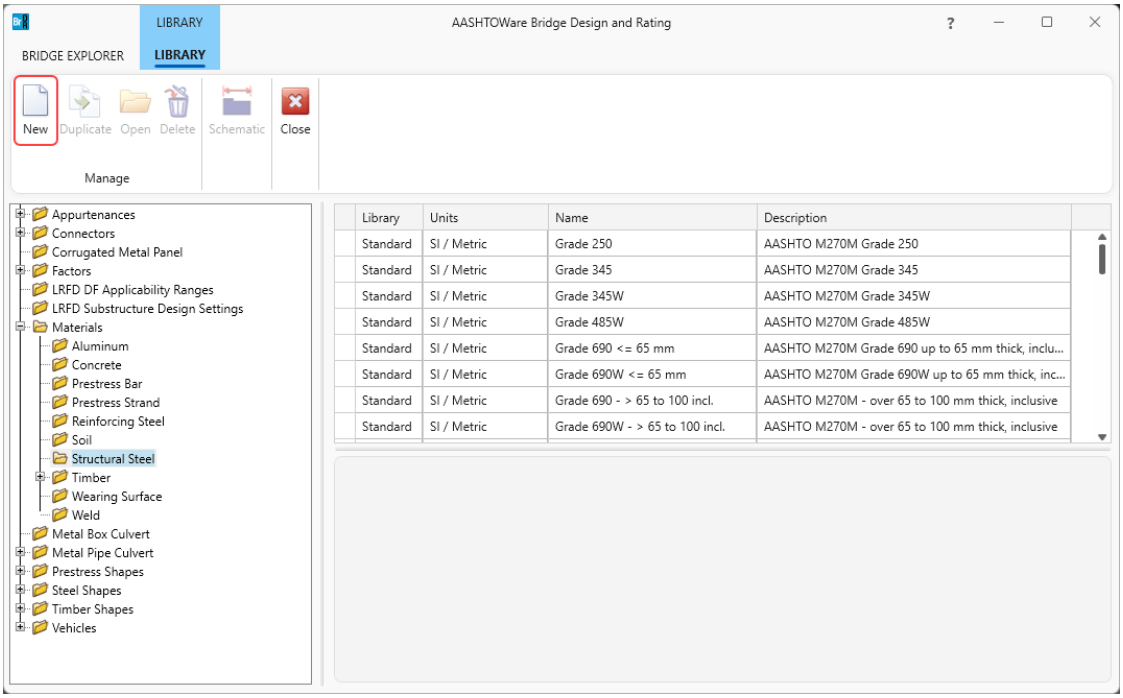
1. Click the **Library** button under the **VIEW** tab in the ribbon.



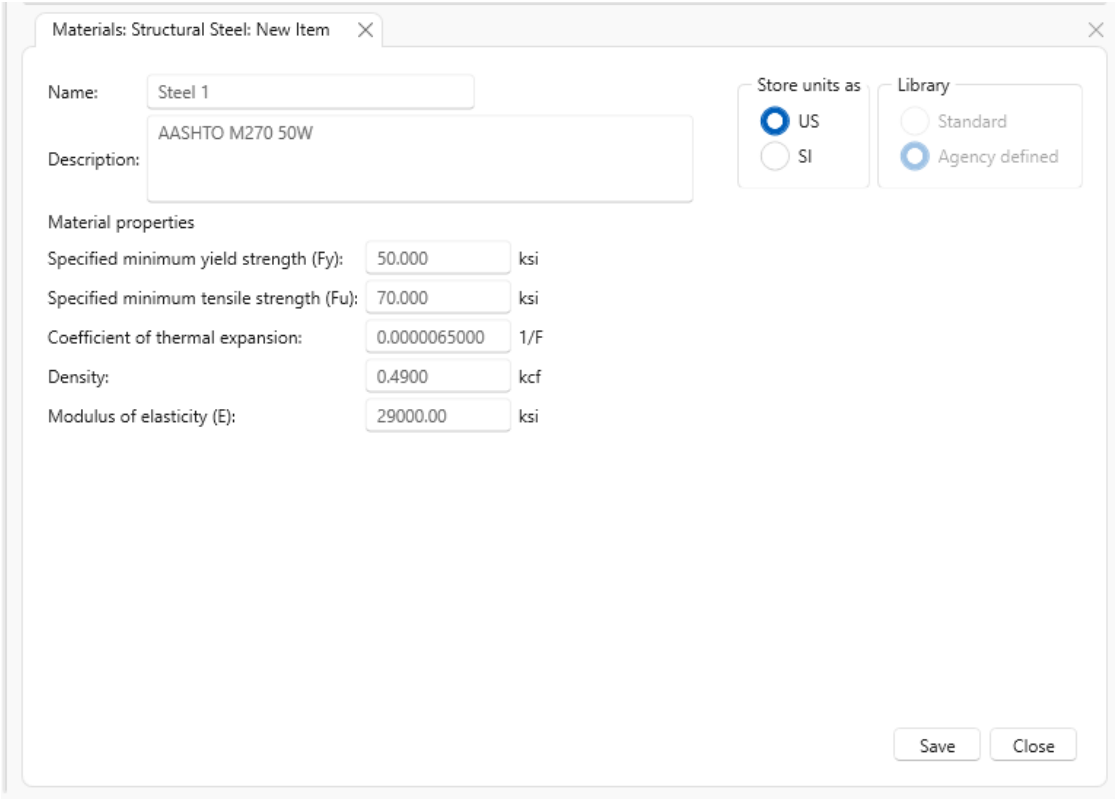
Select the tree item **Materials/Structural Steel** as shown below.



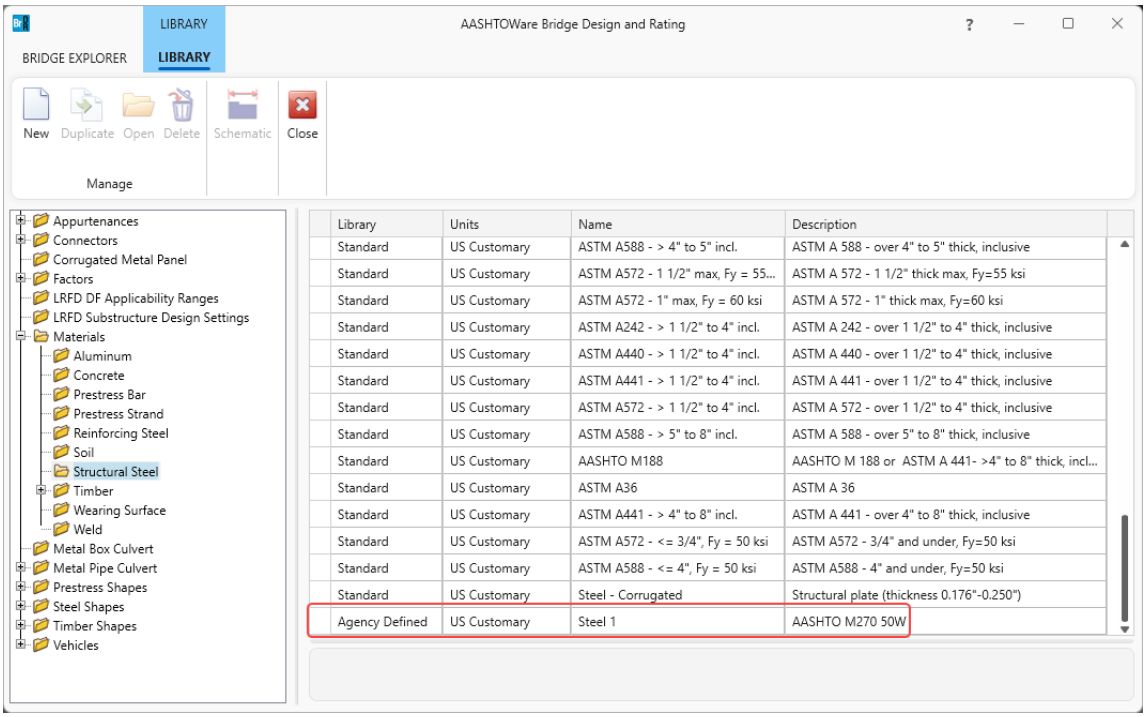
2. Click the **New** button in the ribbon. A **Materials: Structural Steel: New Item** window will appear in the panel below the list of Standard library items.



3. Select the system of units using the radio buttons and then fill in the structural steel information as shown below. Note that the name must be unique among all structural steel library items.

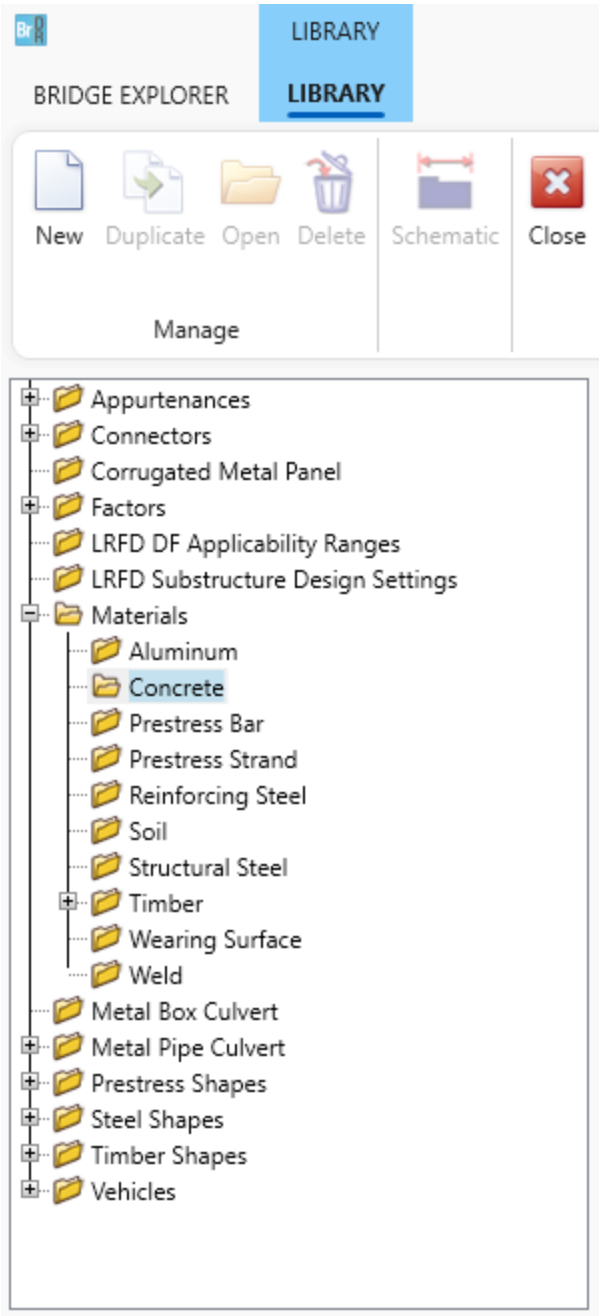


4. Click **Save**. The new structural steel material will now be listed in the right pane of the Library Explorer for the tree items **Materials/Structural Steel** as an Agency Defined item.

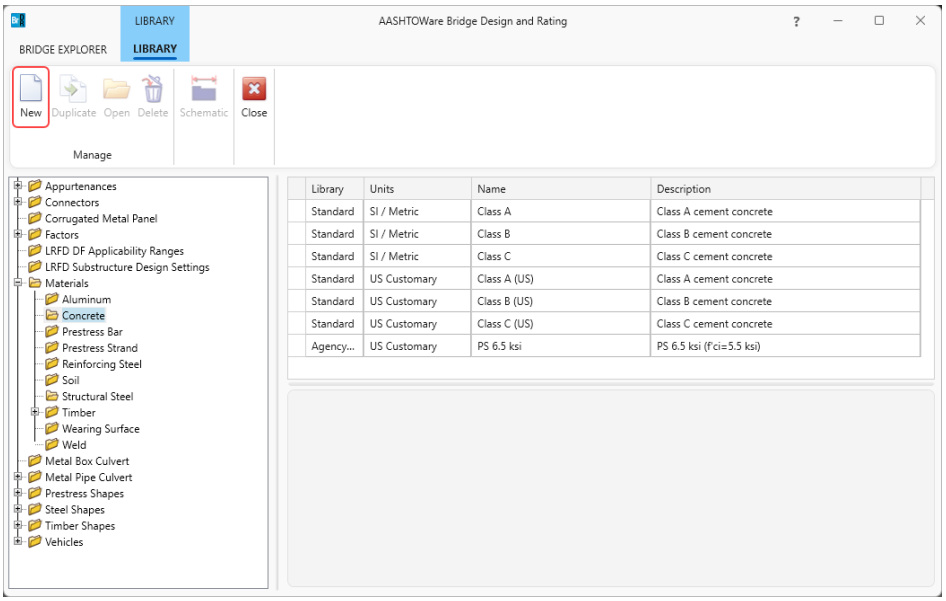


Add Concrete Material Library Item

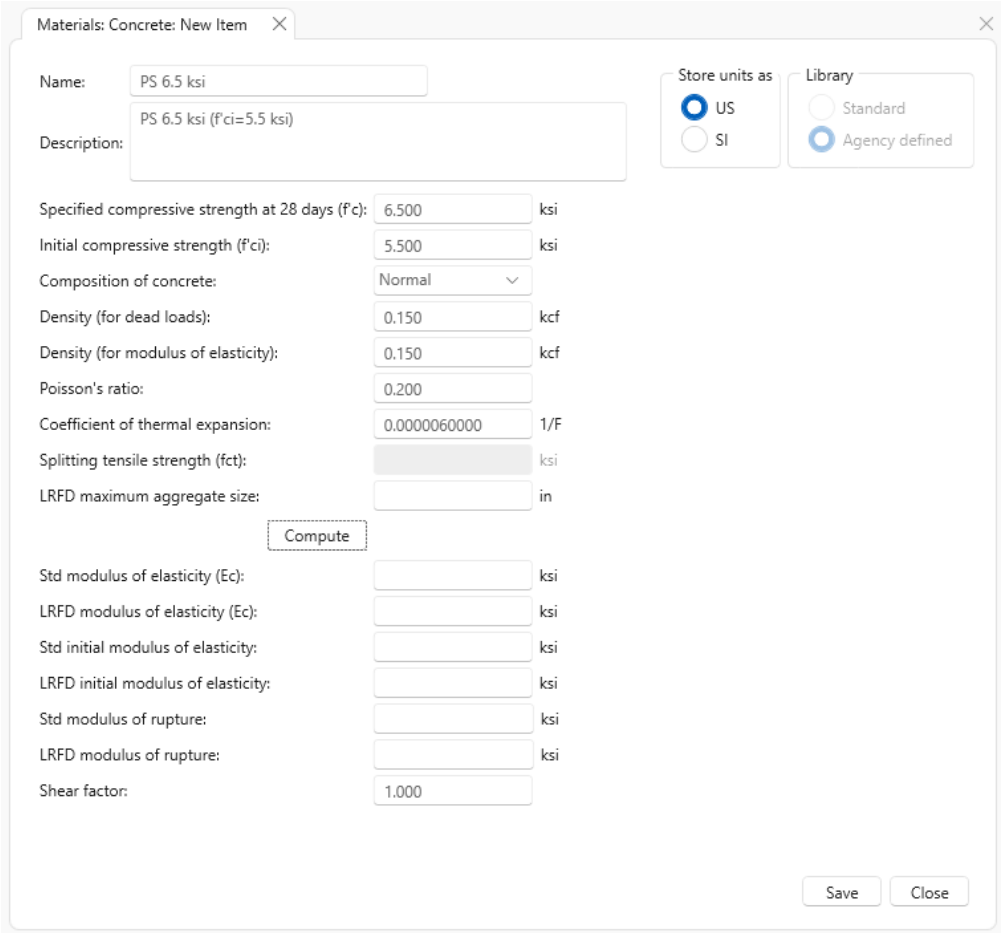
1. Select the tree item **Materials/Concrete** as shown below.



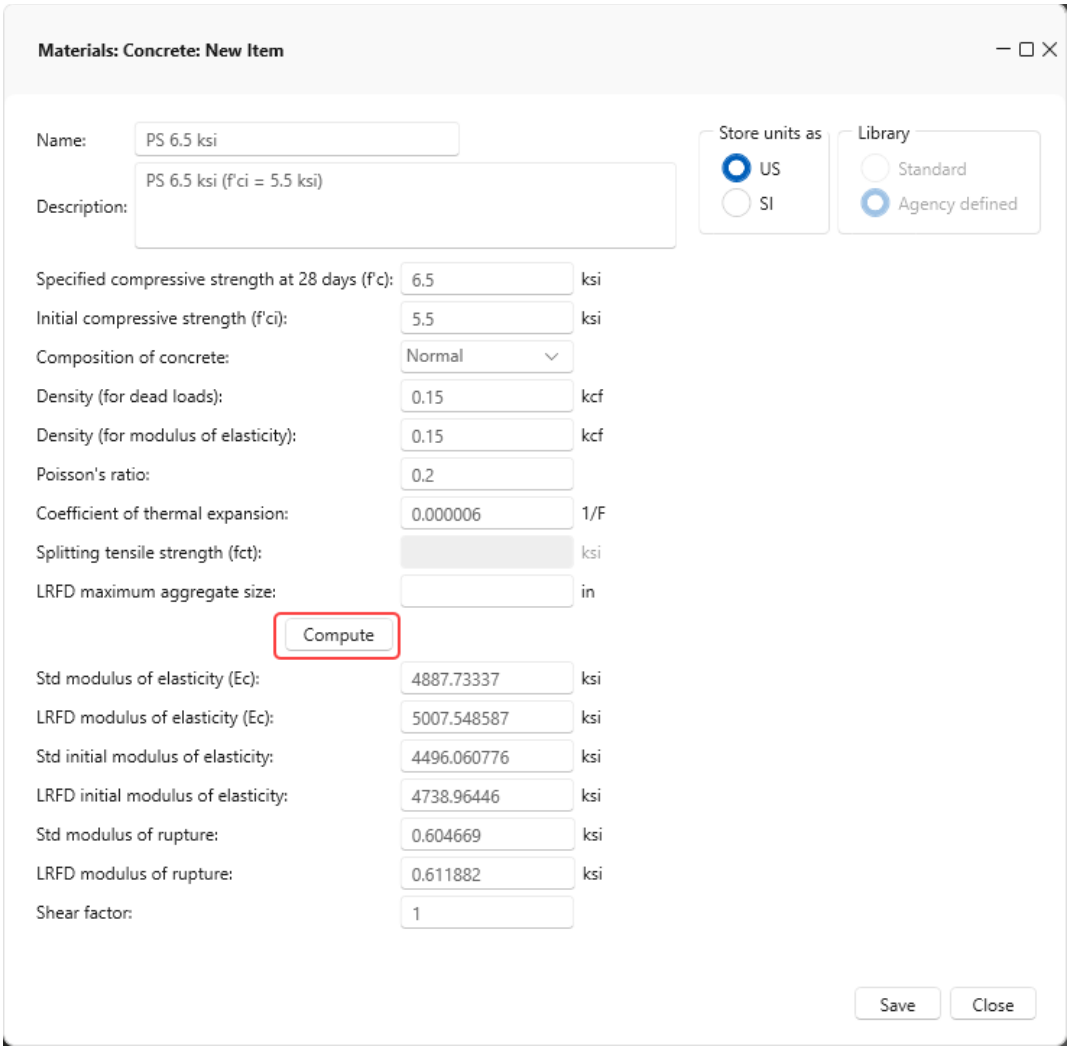
2. Click the **New** button in the ribbon. A **Materials: Concrete: New Item** window will appear in the panel below the list of Standard library items.



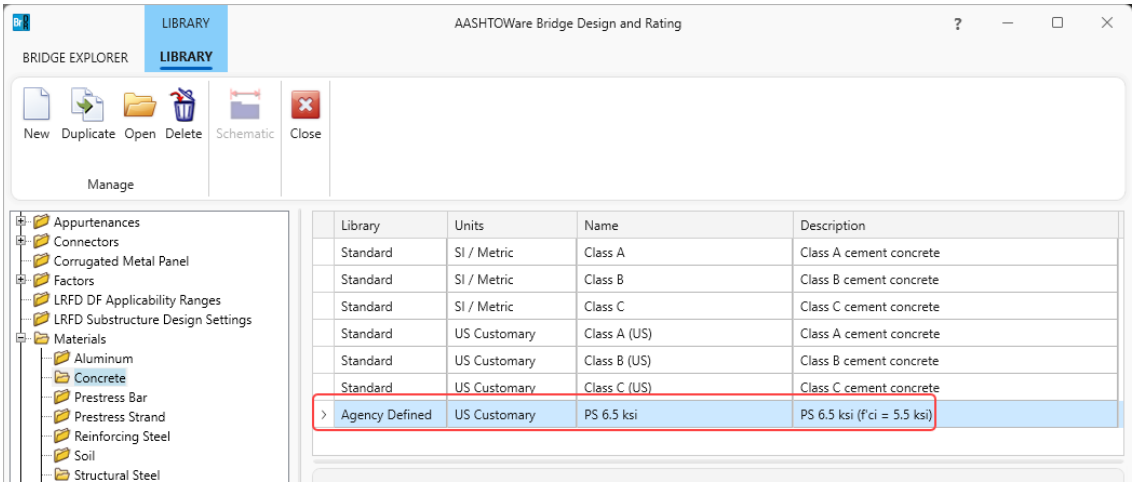
3. Select the system of units using the radio buttons and then fill in the concrete information as shown below. Note that the name must be unique among all concrete library items.



4. Click the **Compute** button to calculate the remaining properties or manually enter the values.

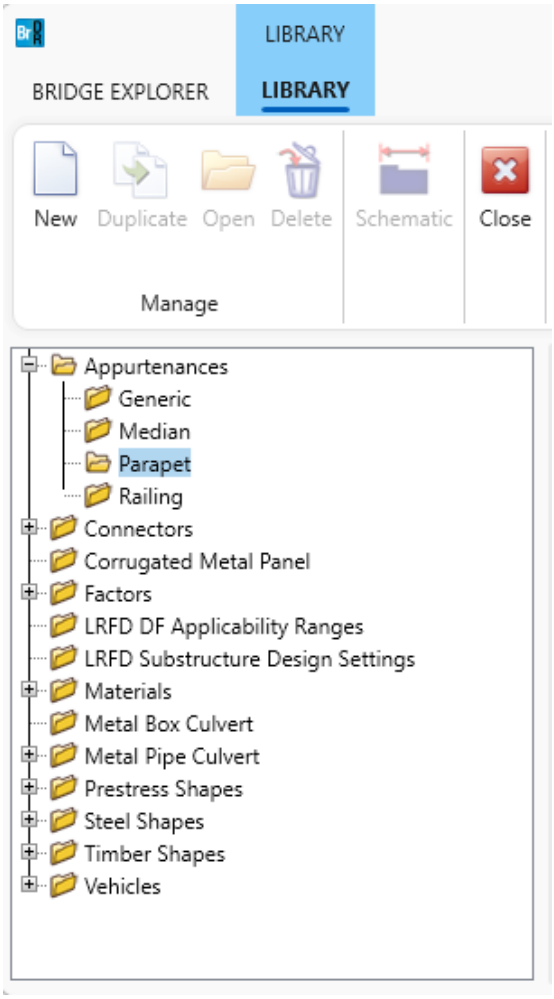


5. Click **Save**. The new concrete material will now be listed in the right pane of the Library Explorer for the tree items **Materials/Concrete** as an Agency Defined item.

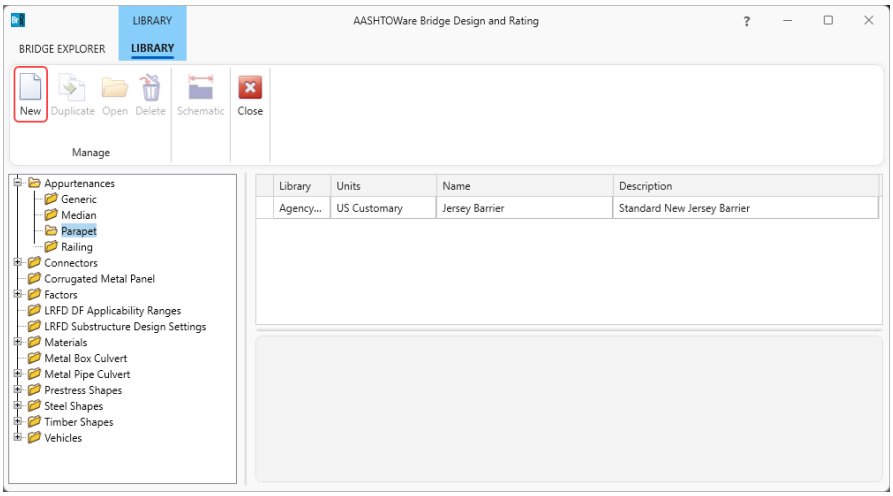


Add Parapet Library Item

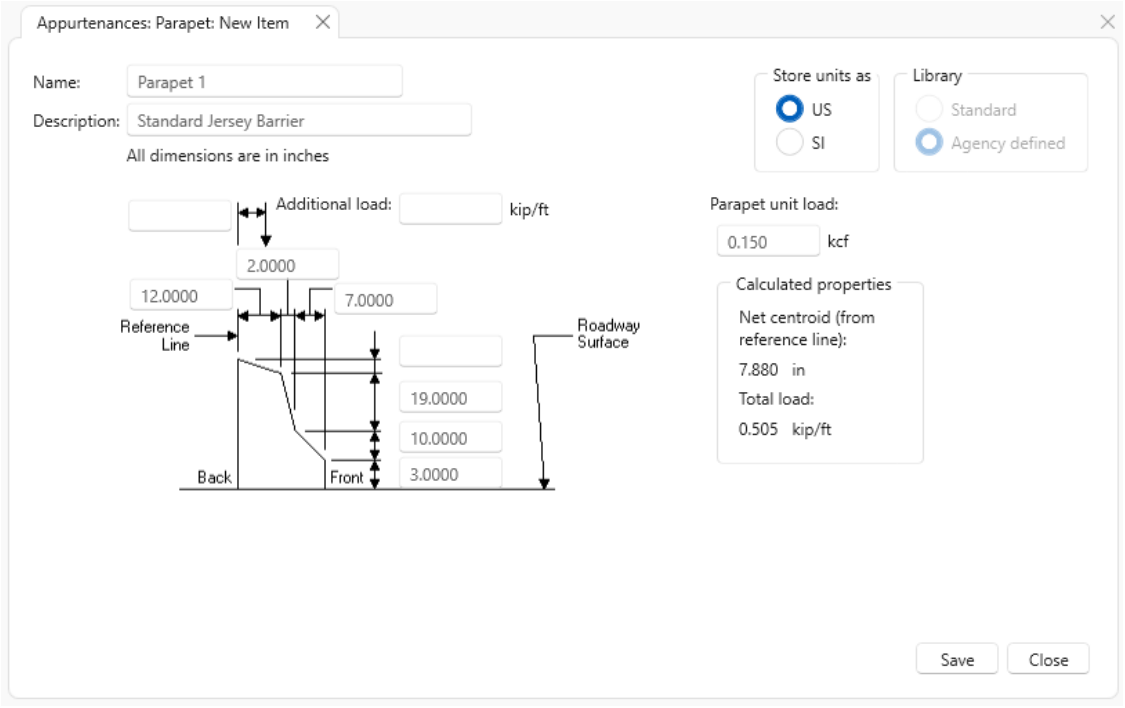
1. Select the tree item **Appurtenances/Parapet** as shown below.



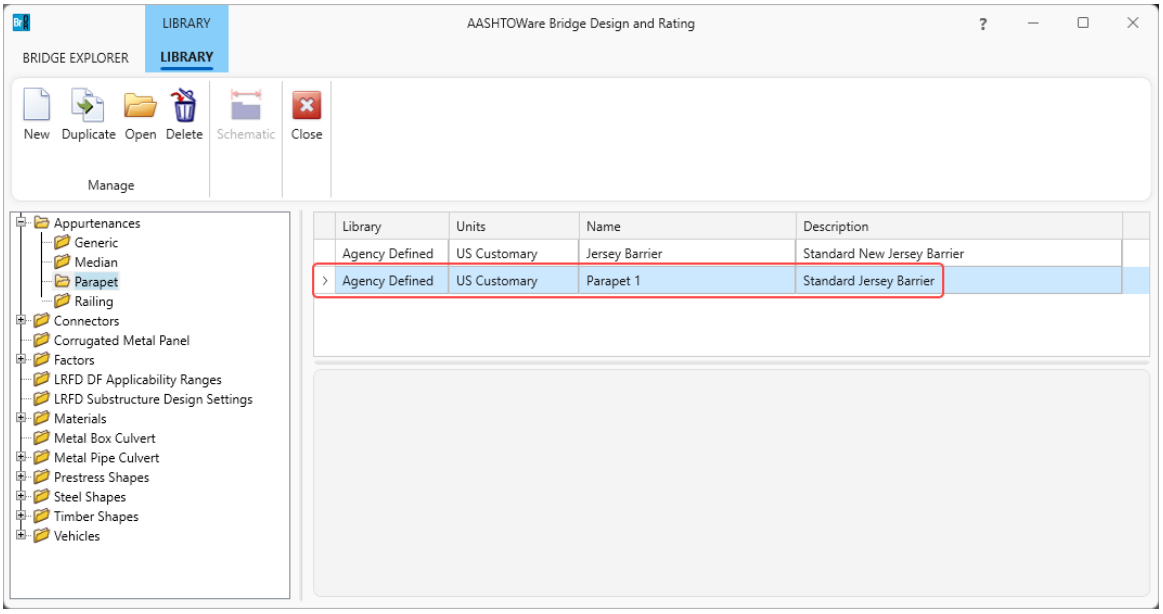
2. Click the **New** button in the ribbon. An **Appurtenances: Parapet: New Item** window will appear in the panel below the list of Standard library items.



3. Select the system of units using the radio buttons and then fill in the parapet information as shown below. Note that the name must be unique among all parapet library items.

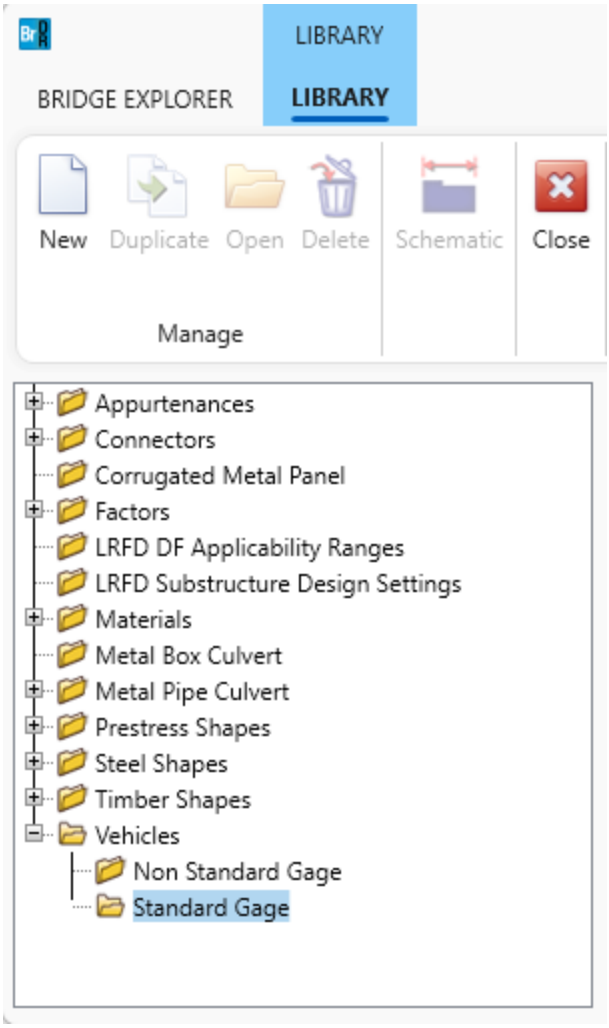


4. Click **Save**. The new parapet will now be listed in the right pane of the Library Explorer for the tree items **Appurtenances/Parapet** as an Agency Defined item.

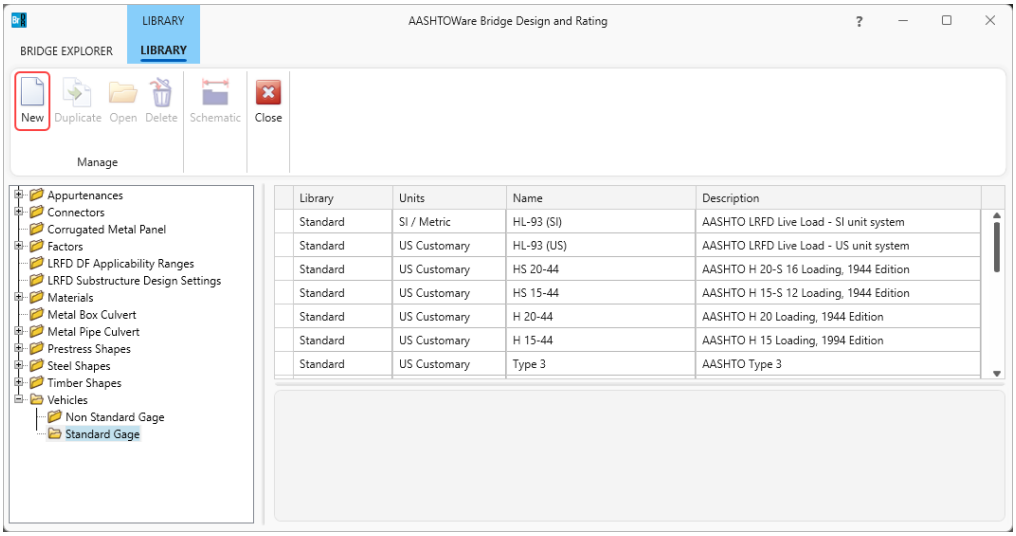


Add Vehicle Library Item

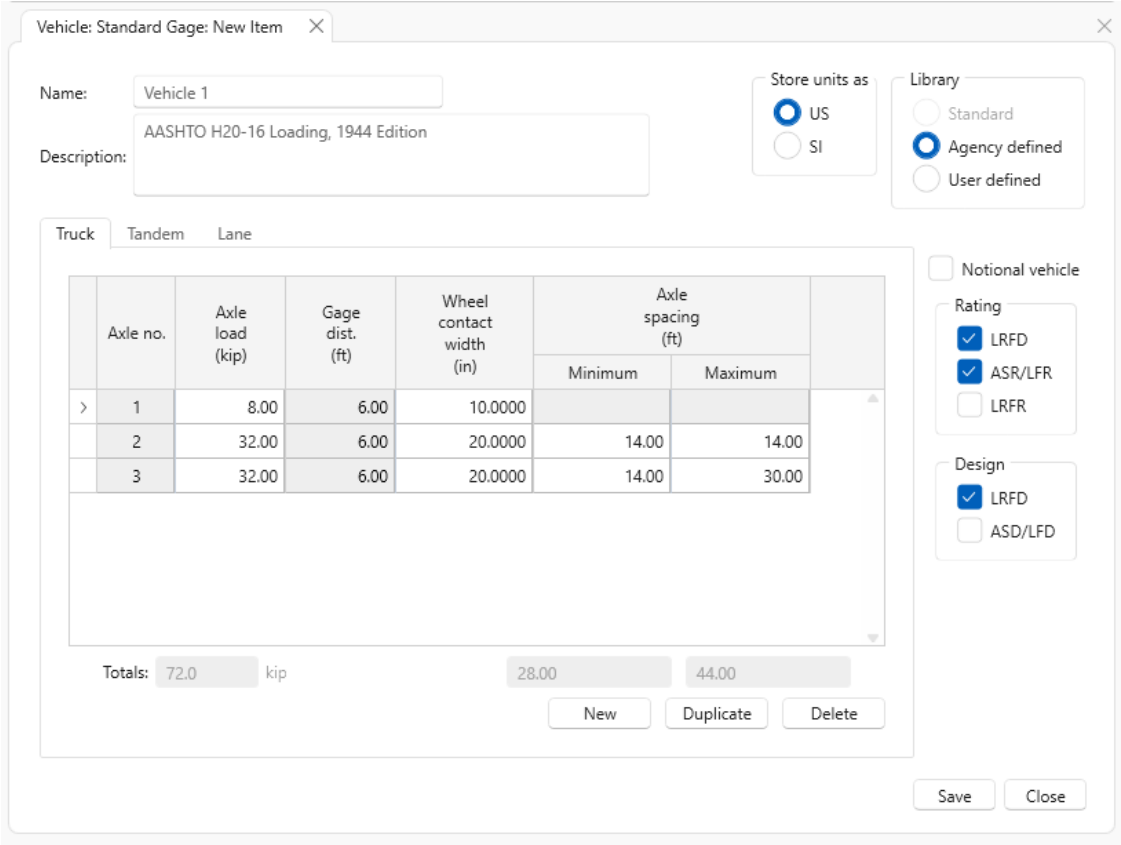
1. Select the tree item **Vehicles/Standard Gage** as shown below.



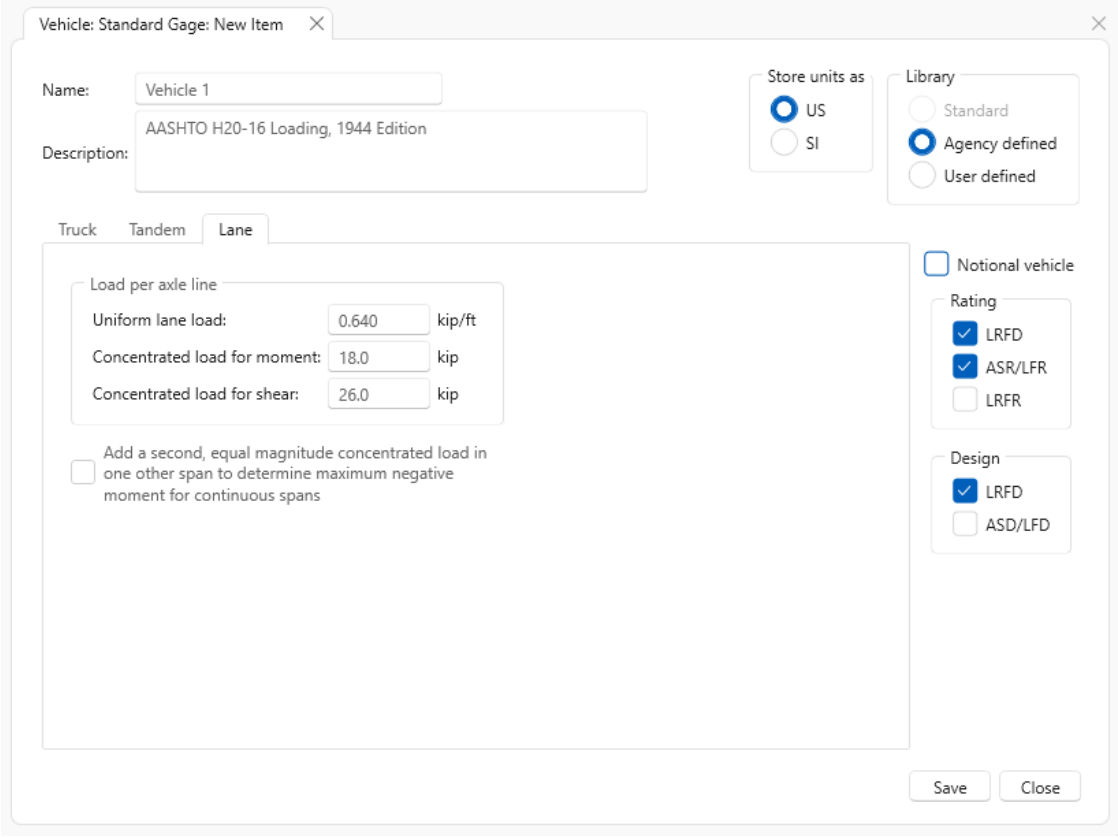
2. Click the **New** button in the ribbon. A **Vehicle: Standard Gage: New Item** window will appear.



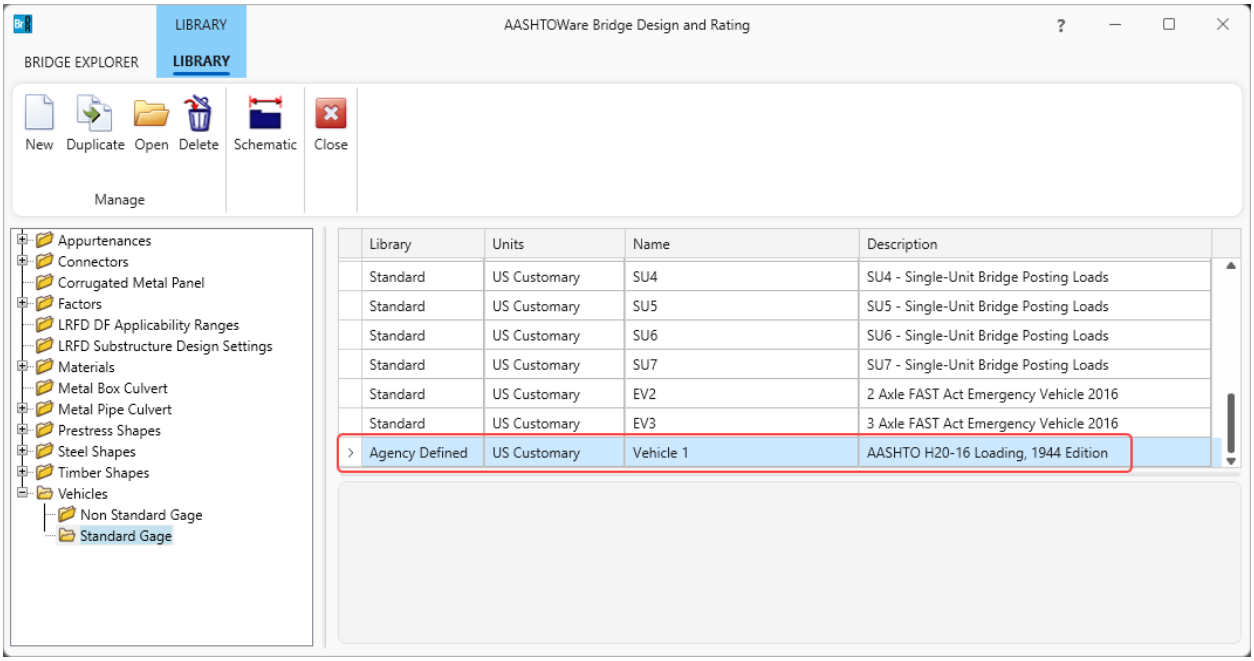
3. Select the system of units using the radio buttons and then fill in the vehicle information as shown below for all items not on the tab control. Note that the name must be unique among all vehicle library items. The checkboxes inside the **Design** and **Rating** groups are used to filter the vehicle during an analysis event based on the type of event and the type of analysis engine selected. The **Vehicle Library** has a library type called **User Defined**. This library allows users to add their own vehicles.



4. Click the **New** button to add an axle to the vehicle.
5. Enter the first axle's dimensions. (Axle spacing is not applicable for the first axle.)
6. Repeat steps 4 and 5 for each additional axle.
7. Select the **Lane Tab**. Enter data on the **Lane** tab as shown below.



8. Click **Save**. The new vehicle will now be listed in the right pane of the Library Explorer for the tree items **Vehicles/Standard Gage**.



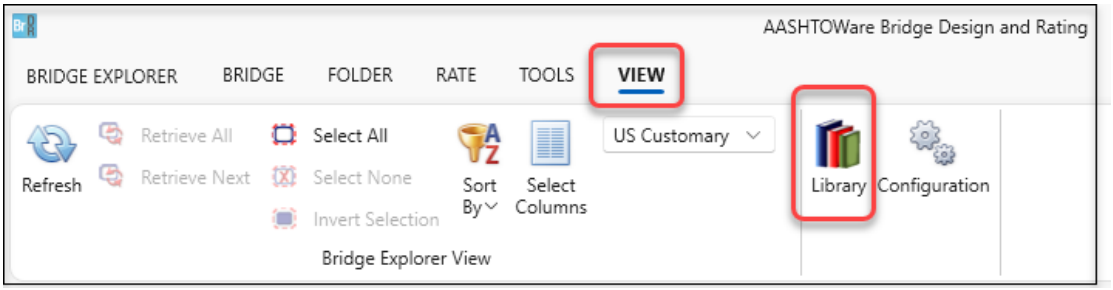
Library Tutorial

LIB2 – Library Export/Import Example

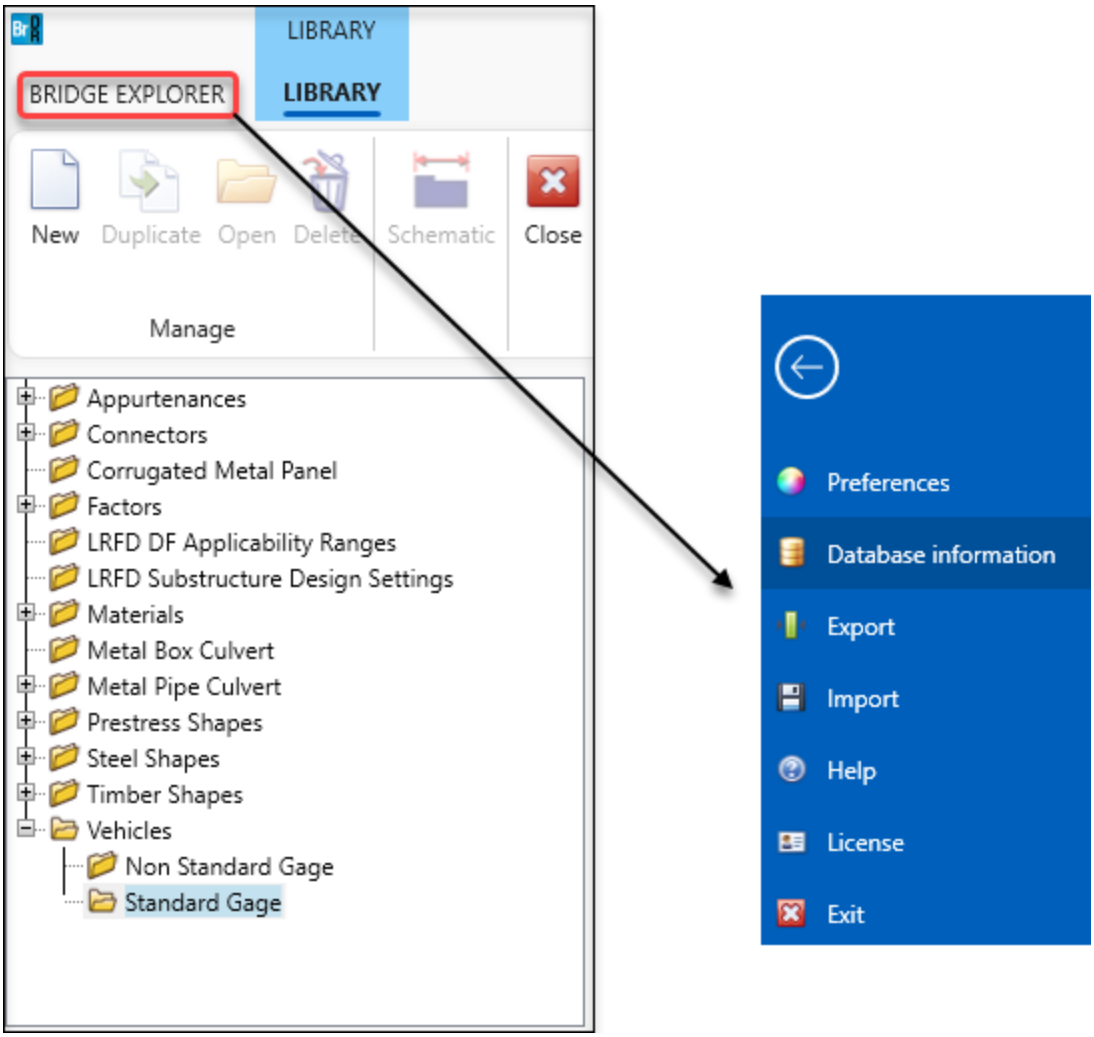
Library Export/Import

Where is it?

VIEW on the **BRIDGE EXPLORER** ribbon will expose the **Library** button.



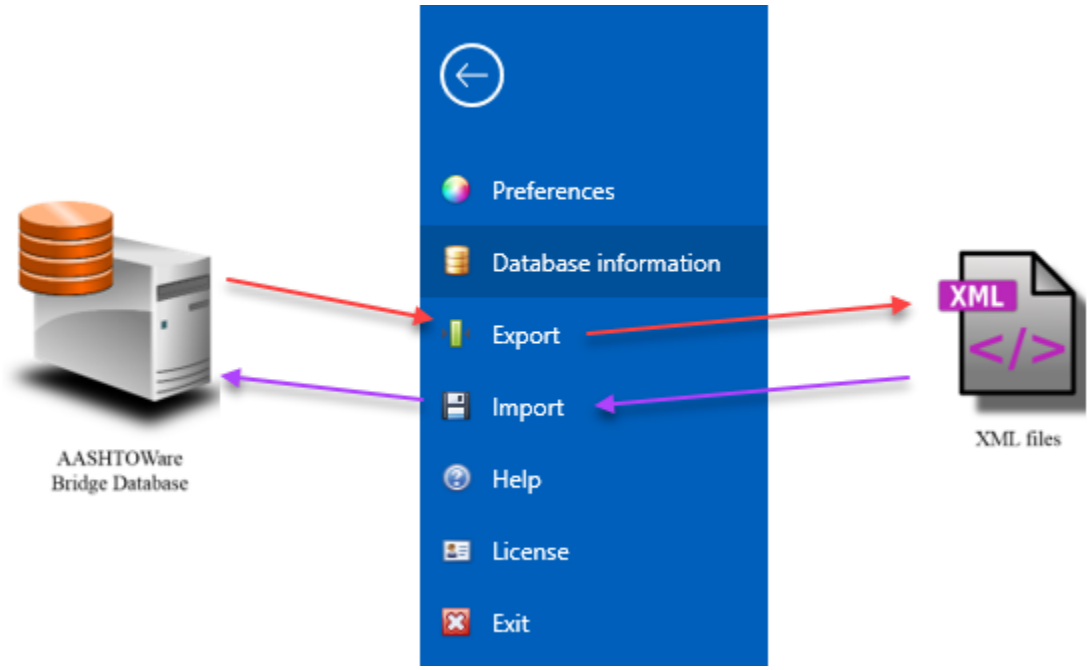
Select **BRIDGE EXPLORER** to expose the menu.



What is it?

Library Export/Import is a feature in the Library Explorer to exchange library items between AASHTOWare Bridge databases.

- Library Export allows user to export selected **Agency Defined** library items in a AASHTOWare Bridge database to an XML file.
- Library Import allows user to import selected library items in that XML file to a different AASHTOWare Bridge database.



Why use it?

The ability to exchange library data enforces the requirements of modeling a bridge with the same components or performing a rating with the same customized vehicle. This eliminates the risk of manually creating the same library item in different AASHTOWare Bridge databases.

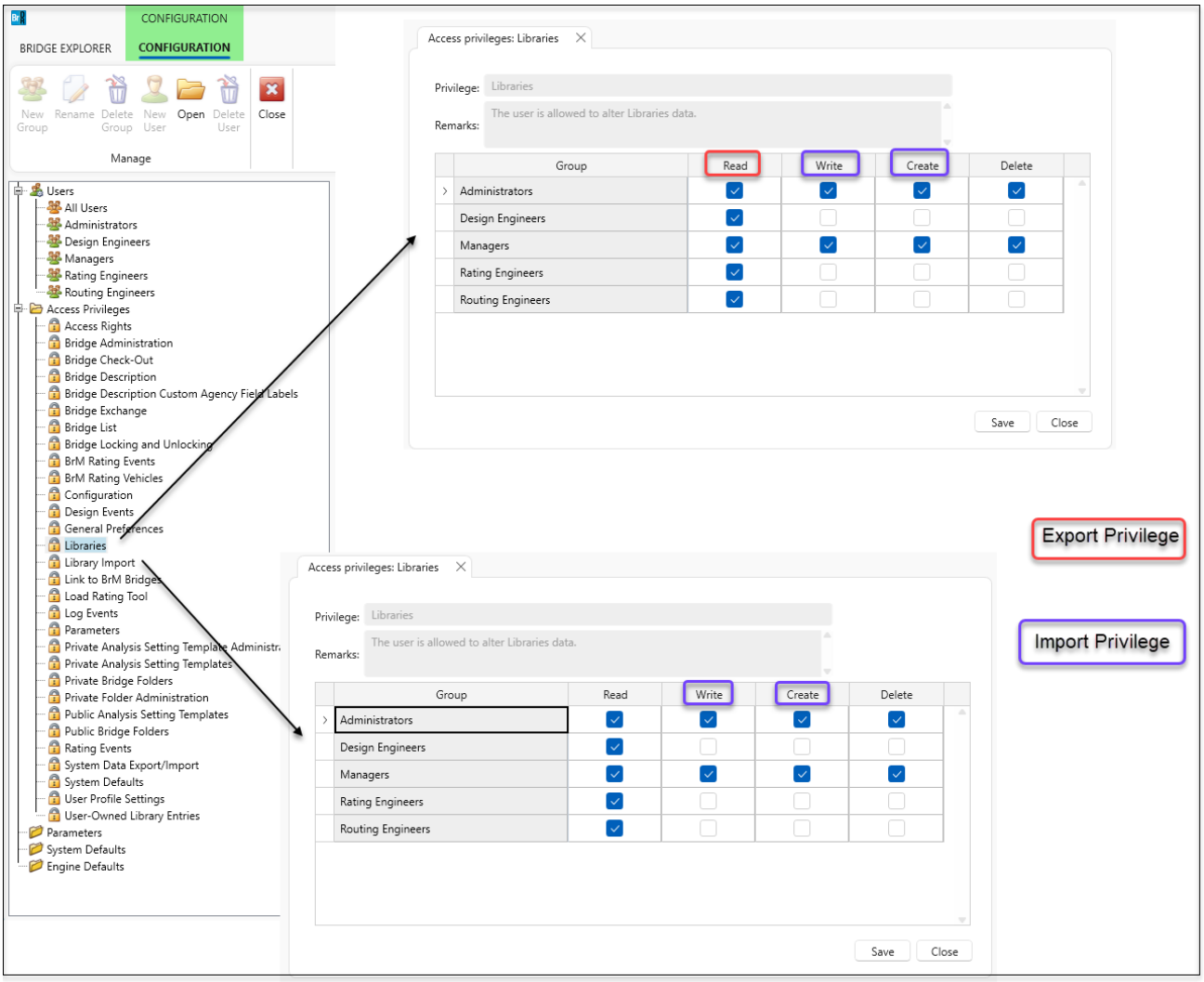
When use it?

- When you want to transfer customized library items to a different AASHTOWare Bridge database so you can model a bridge with the same components.

Who can use it?

The export and import features are available to the user that has the proper access privileges granted in **Libraries** and **Library Import**. Without the proper privileges, the Export and Import items in the **Bridge Explorer** on the ribbon will expose the menu and will be grayed out.

- For export, user needs to have **Read** privilege of **Libraries**.
- For import, user needs to have **Write** and **Create** privileges in both **Libraries** and **Library Import**.

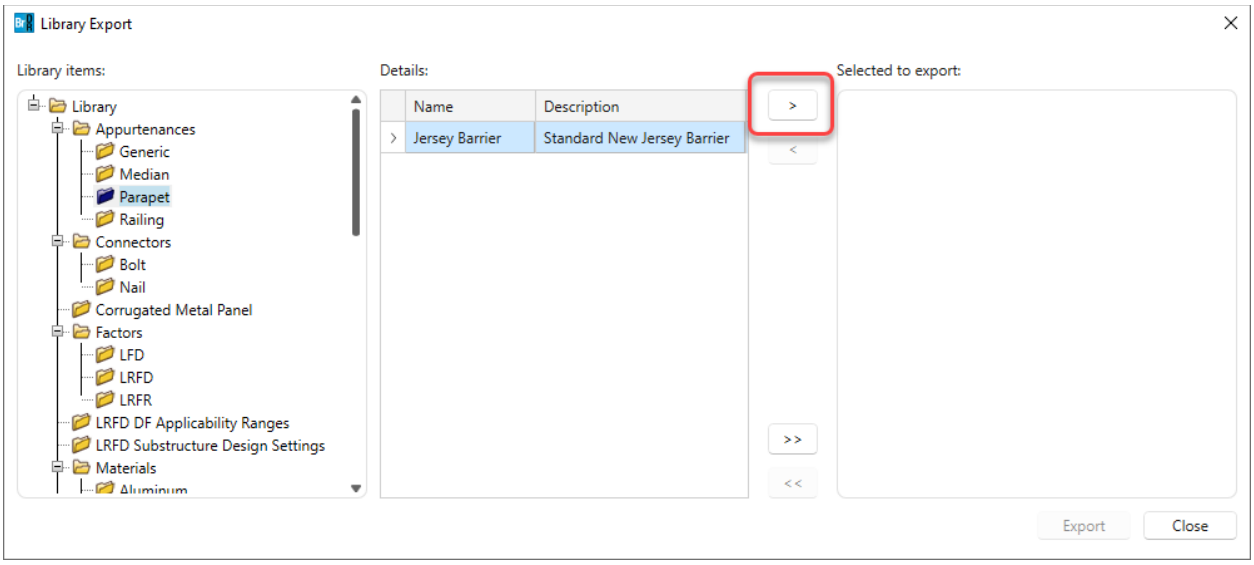


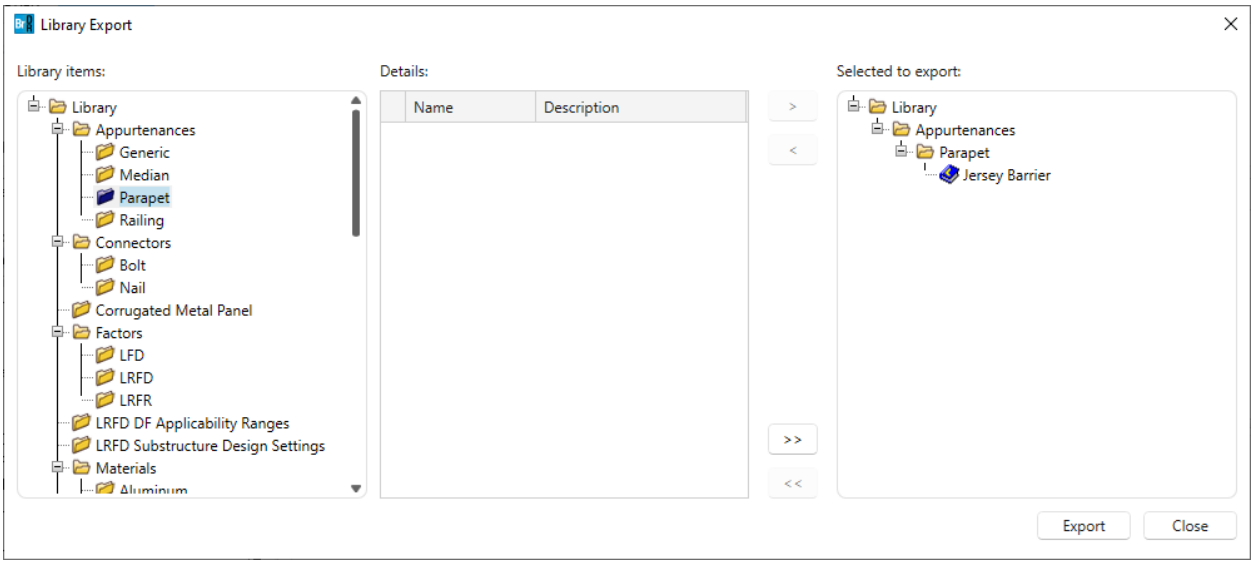
How to use it?

Both the export and import windows are displayed by opening the Library Explorer and selecting the **Bridge Explorer** on the ribbon to expose the menu. Both windows allow you to pick and choose the available library items.

To safeguard your existing library data, import will check for duplicates to prevent overwriting customized data. All imported library items will be located in their respective Agency folders.

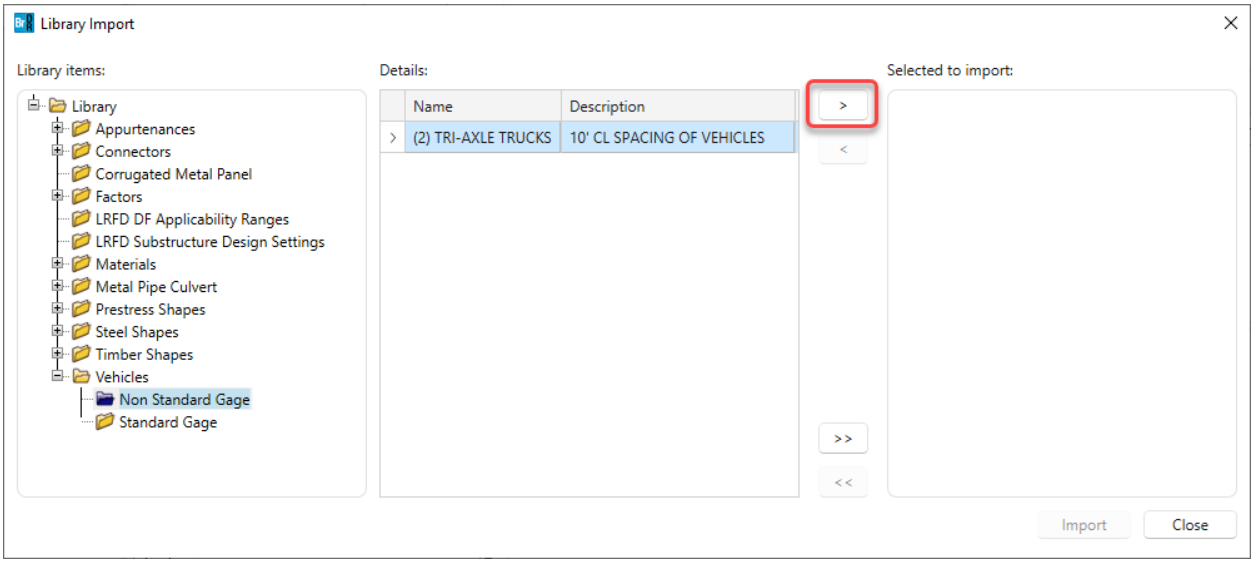
Library Export

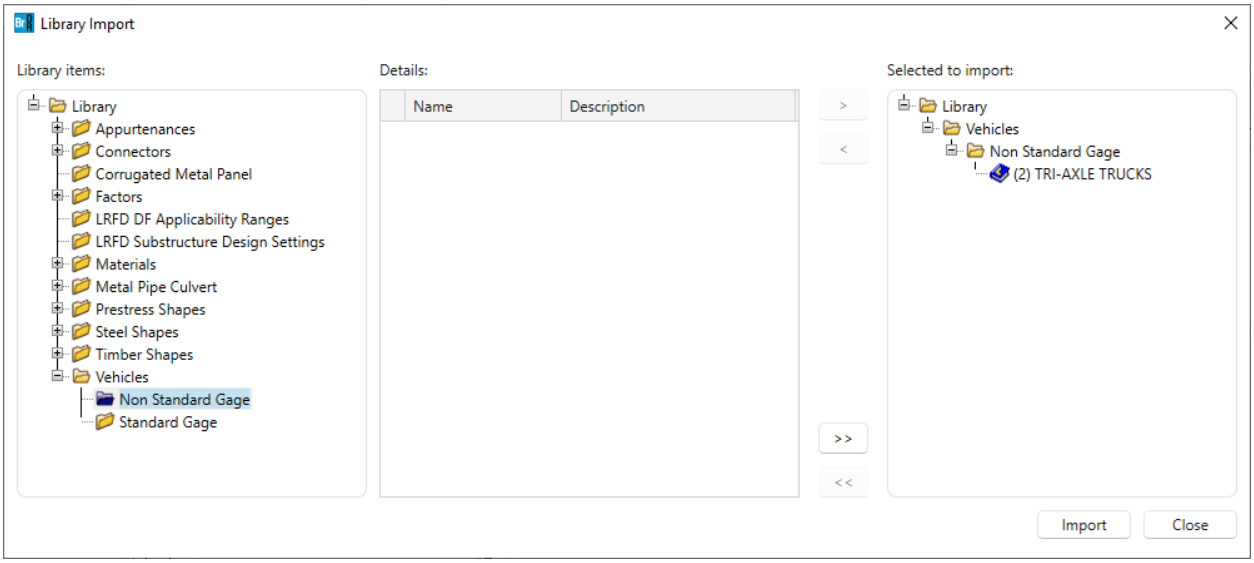




- Library Items:
  Displays a tree that includes each of the library folders in the Library Explorer. Blue folders in this tree indicate that the folder contains data that can be exported.
- Details:
  Displays a list of the names and descriptions of the data items in the currently selected library folder in the **Library items** tree.
-
  Select this button to add the data items currently selected in the **Details** list to the list of items **Selected to export**.
-
  Select this button to remove the data items currently selected in the **Selected to export** list.
-
  Select this button to add all the data items in all of the library folders to the list of items **Selected to export.**
-
  Select this button to remove all the data items in the **Selected to export** list.
- Selected to export:
  Displays the data items that have been selected for export.

Library Import





- Library Items:

  Displays a tree that includes each of the library folders in the Library Explorer. Blue folders in this tree indicate that the folder contains data that can be imported.

- Details:

  Displays a list of the names and descriptions of the data items in the currently selected library folder in the **Library items** tree.

-

  Select this button to add the data items currently selected in the **Details** list to the list of items **Selected to import.**

-

  Select this button to remove the data items currently selected in the **Selected to import** list.

-

  Select this button to add all the data items in all of the library folders to the list of items **Selected to import.**

-

  Select this button to remove all the data items in the **Selected to import** list.

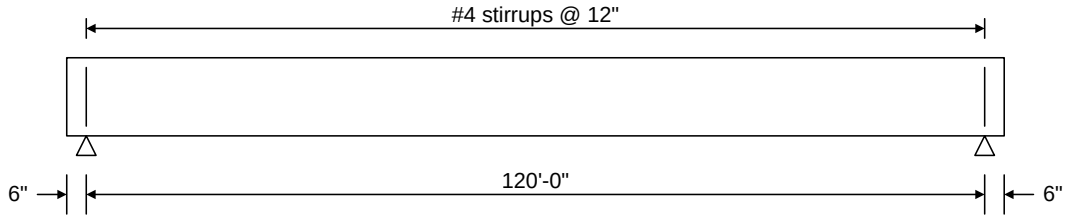
- Selected to import:

  Displays the data items that have been selected for import.

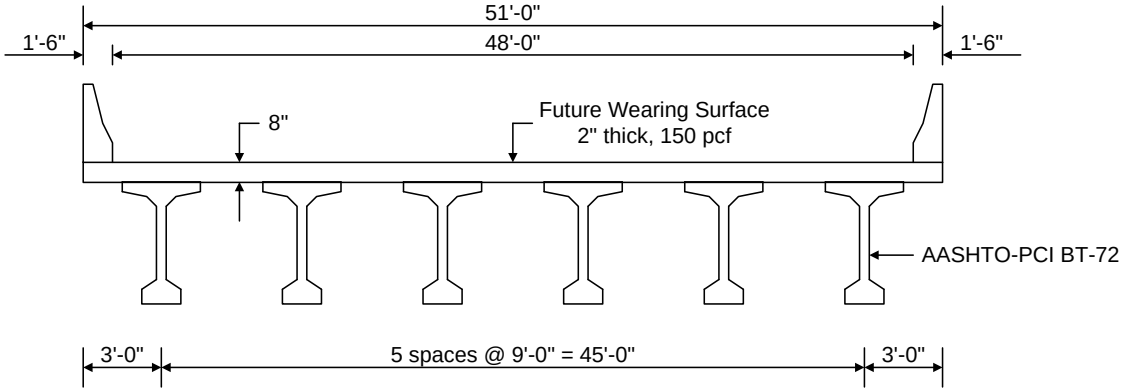
Prestress Tutorial 1

PS1 - Simple Span Prestressed I Beam Example

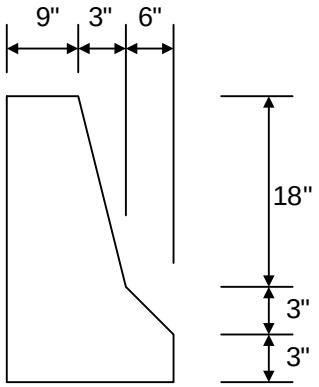
PS1 - Simple Span Prestressed I Beam Example



Elevation

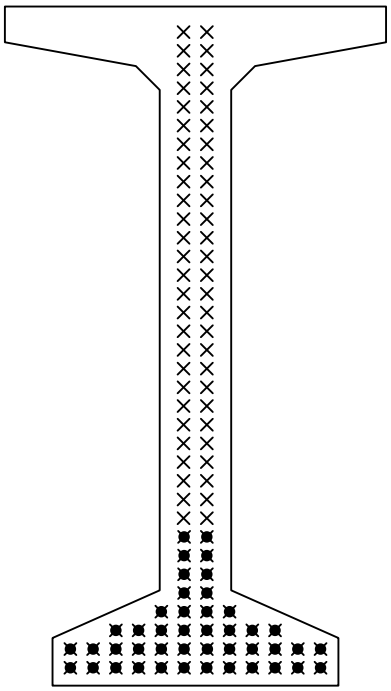


Typical Section

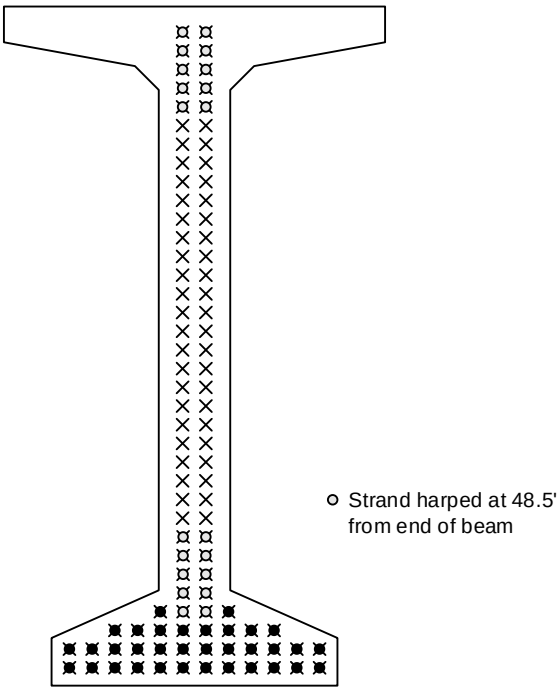


Weight = 300 plf

Parapet Detail



Strand Pattern at Mid-Span



Strand Pattern at End of Beam

Material Properties

Beam Concrete: f'c = 6.5 ksi, f'ci = 5.5 ksi

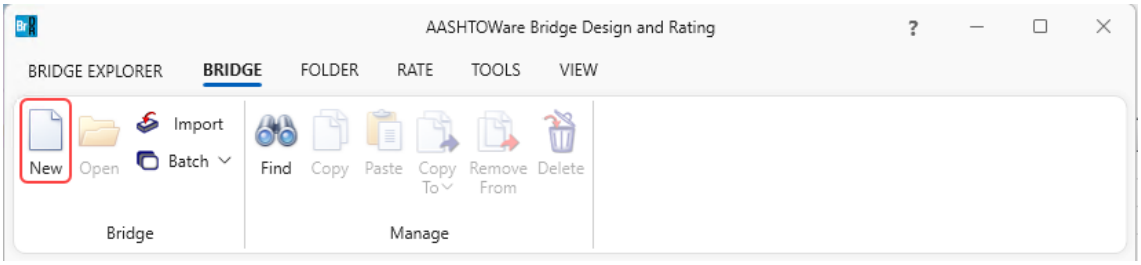
Deck Concrete: f'c = 4.5 ksi

Prestressing Strand: 1/2" dia., 7 Wire strand, Fu = 270 ksi, Low Relaxation

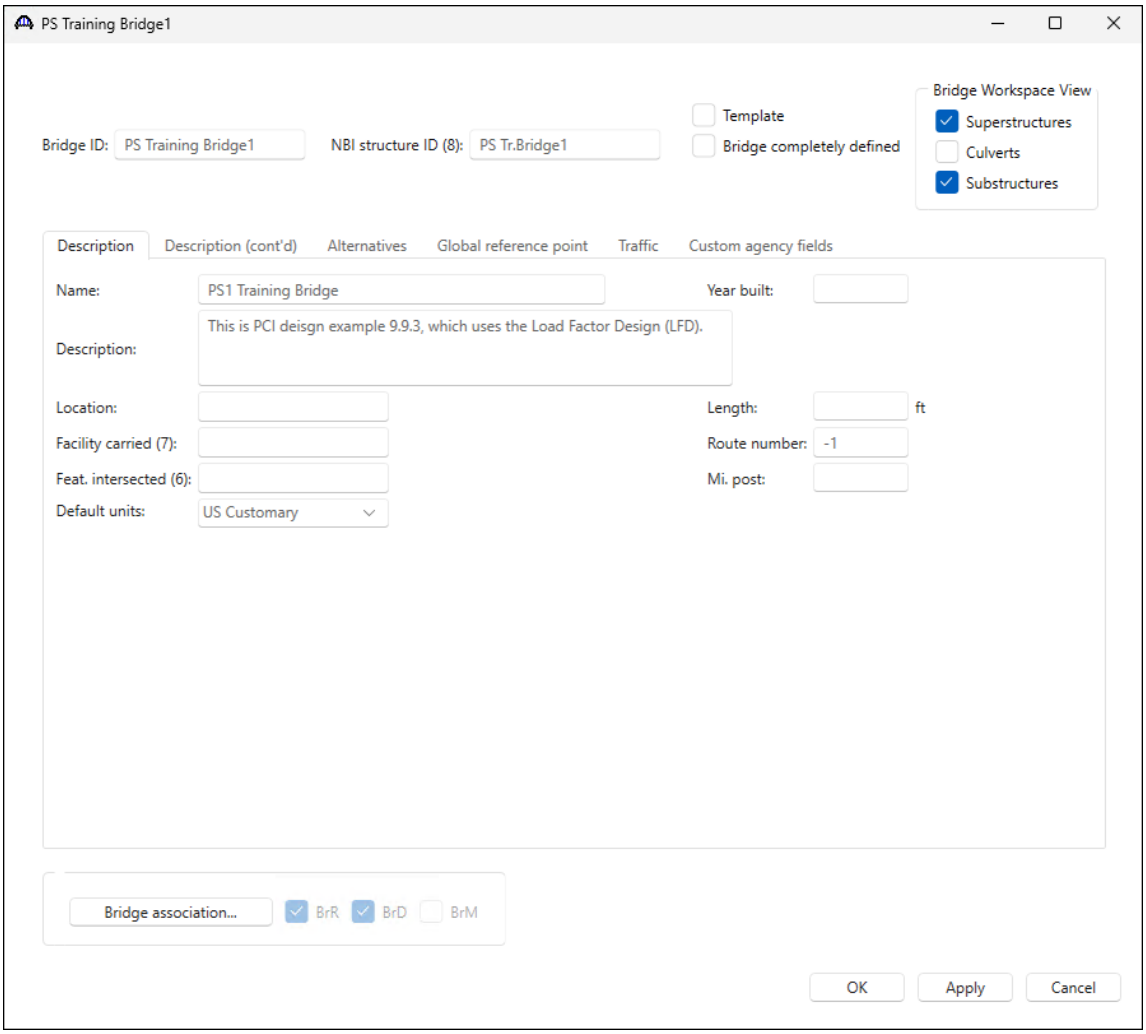
BrDR Training

PS1 – Simple Span PS I Beam Example

From the **Bridge Explorer** create a **new bridge** by clicking on the **New** button from the **BRIDGE** tab as shown below.



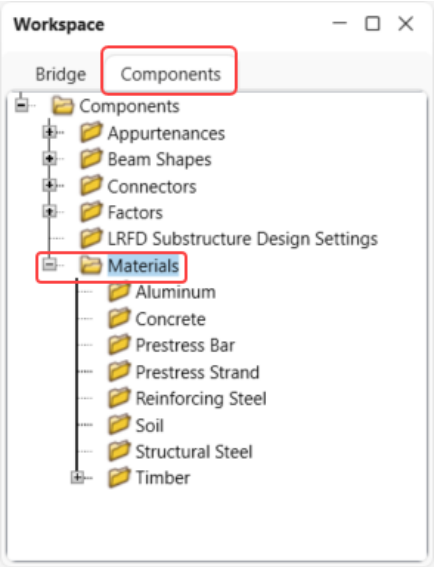
Enter the following description data.



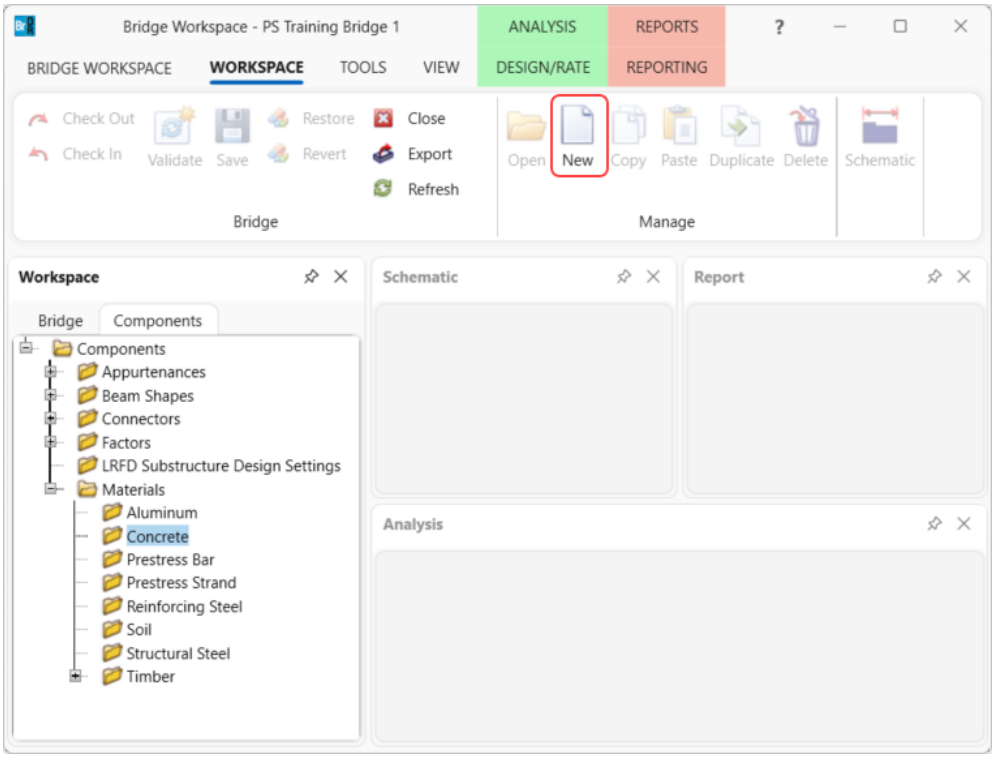
Click **OK** to apply the data and close the window.

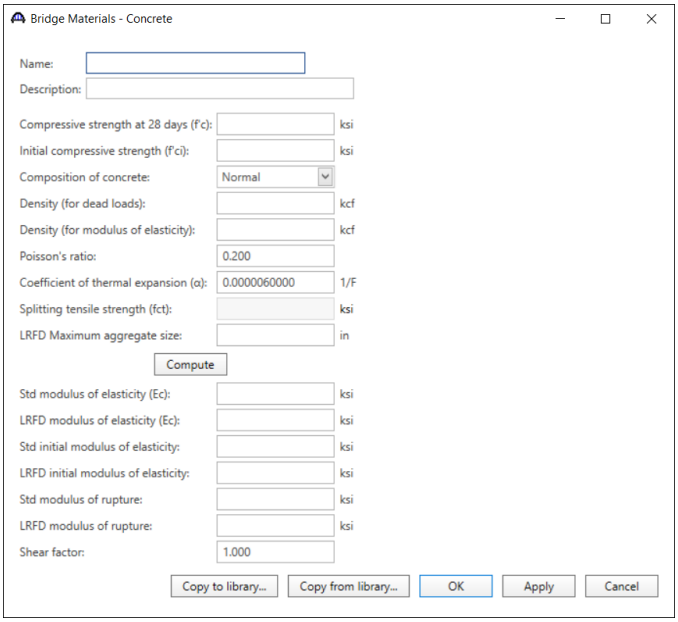
Bridge Materials

To enter the materials to be used by members of the bridge, navigate to the **Components** tab, and click on the ⊞ button to expand the tree for **Materials**. The tree with the expanded **Materials** branch is shown below.

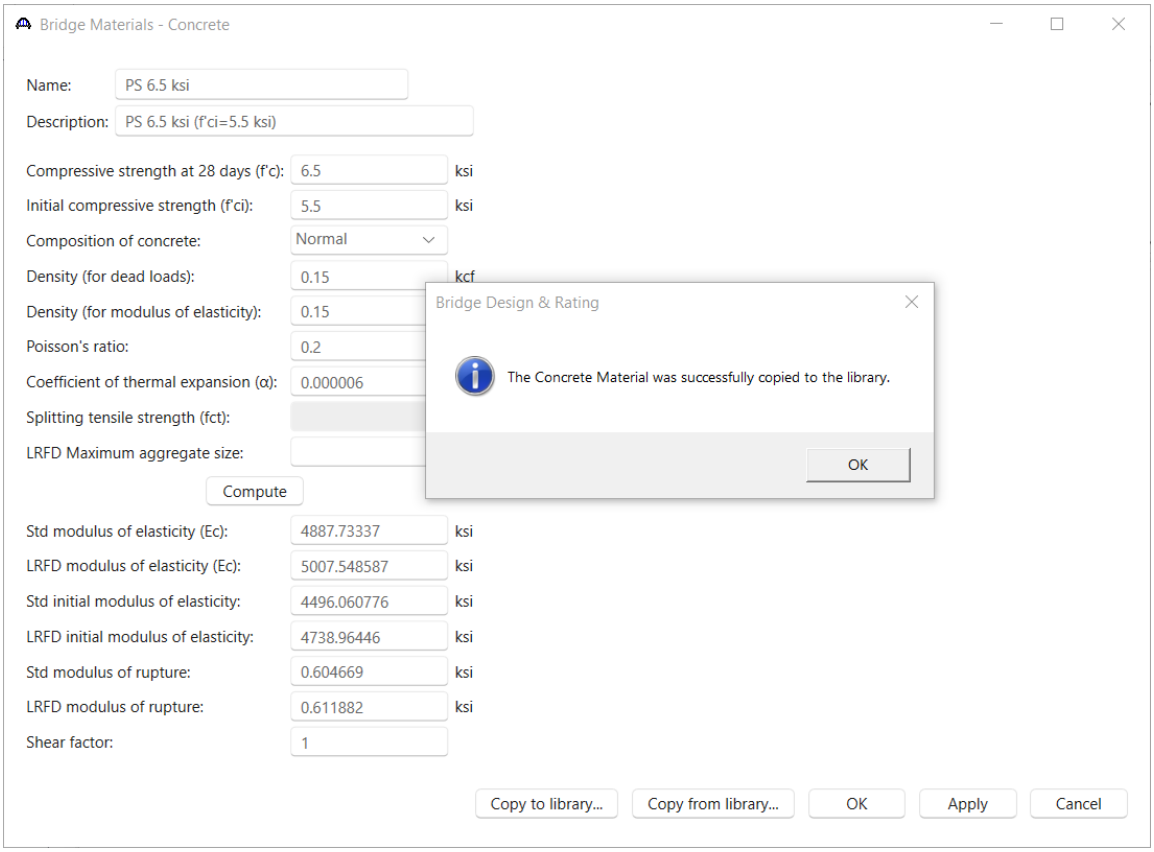


To add a new concrete material, click on **Concrete,** and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or right mouse click on **Concrete** and select **New**). The window shown below will open.



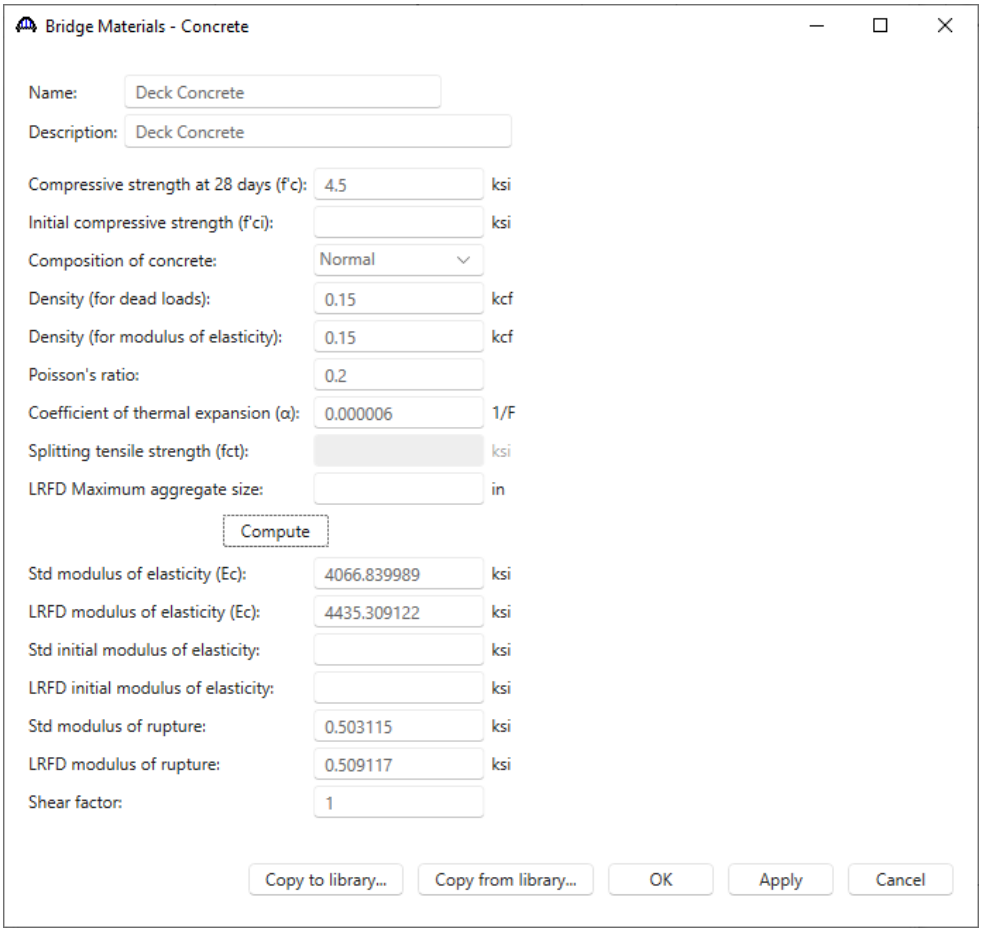


Enter the values shown above the **Compute** button and click the **Compute** button to compute the remaining values below them. Click the **Copy to library…** button to save this concrete material to the library.



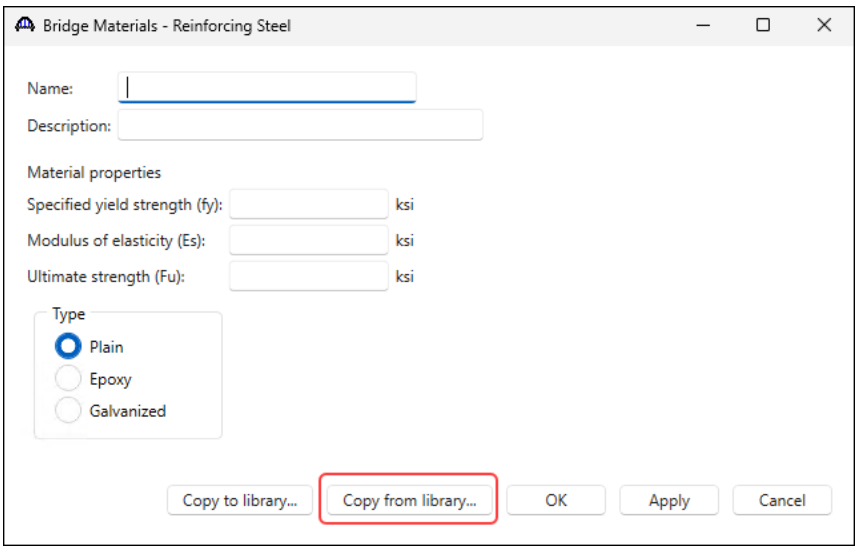
Click **OK** to apply the data and close the window.

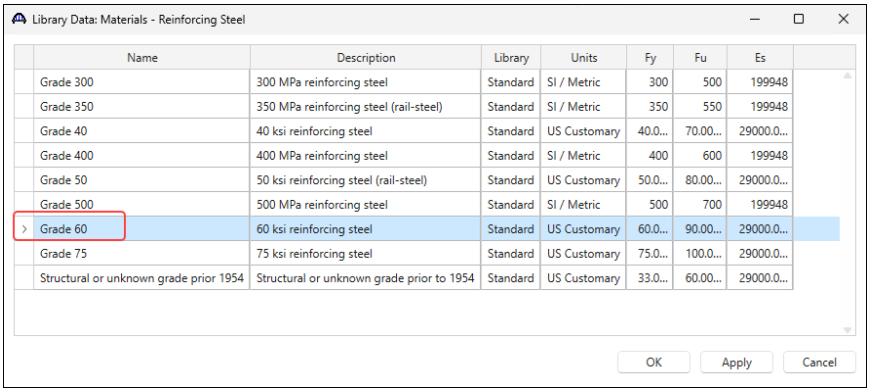
Add concrete material for the **deck** using the same technique. See below for deck concrete material.

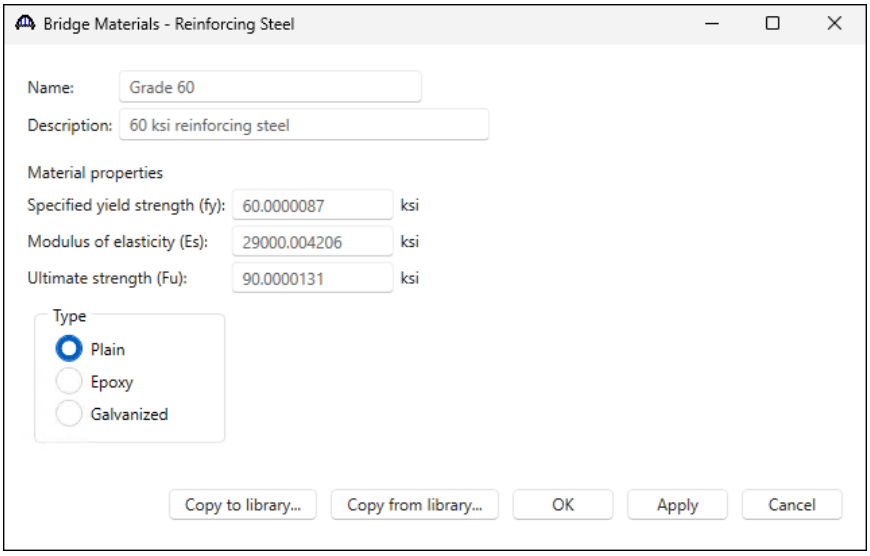


Reinforcement material and **Prestress strand** material can be added by using the **Copy from library** option and selecting the materials shown below**.**

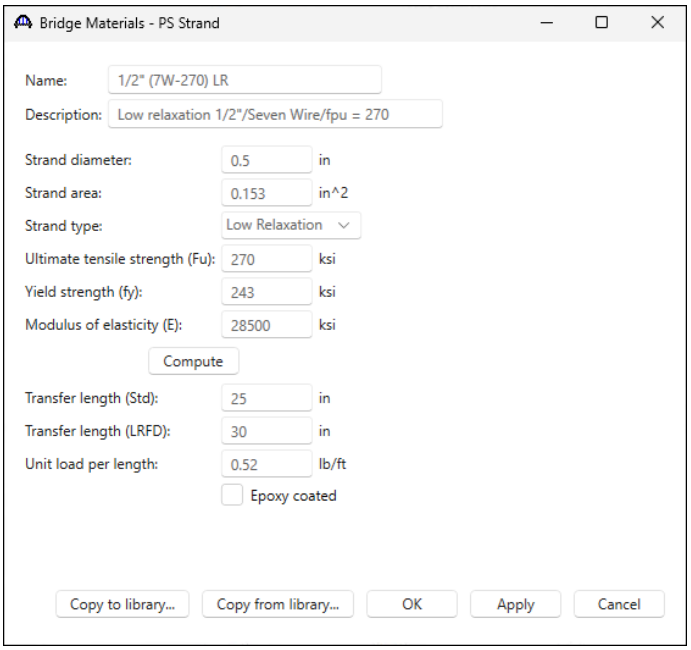
Reinforcing Steel





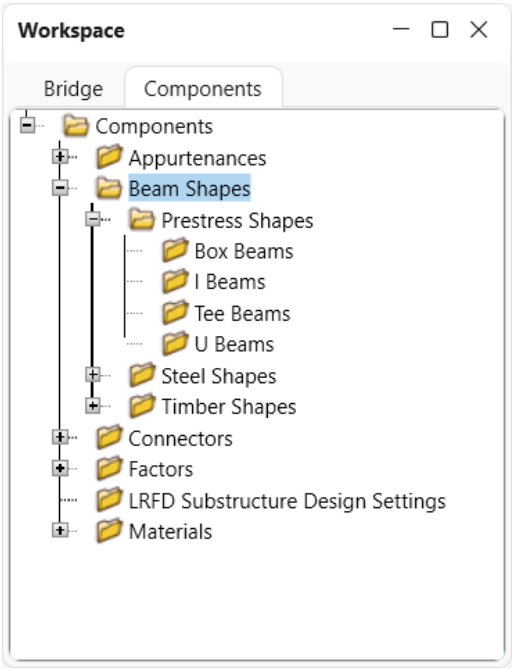


Similarly, copy the following **Prestress strand** material.

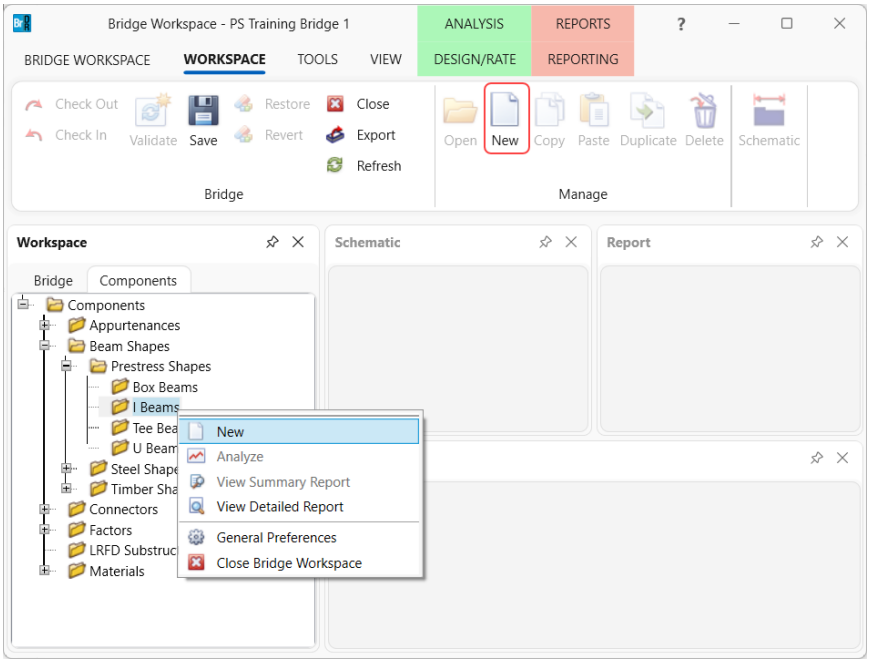


Beam Shapes

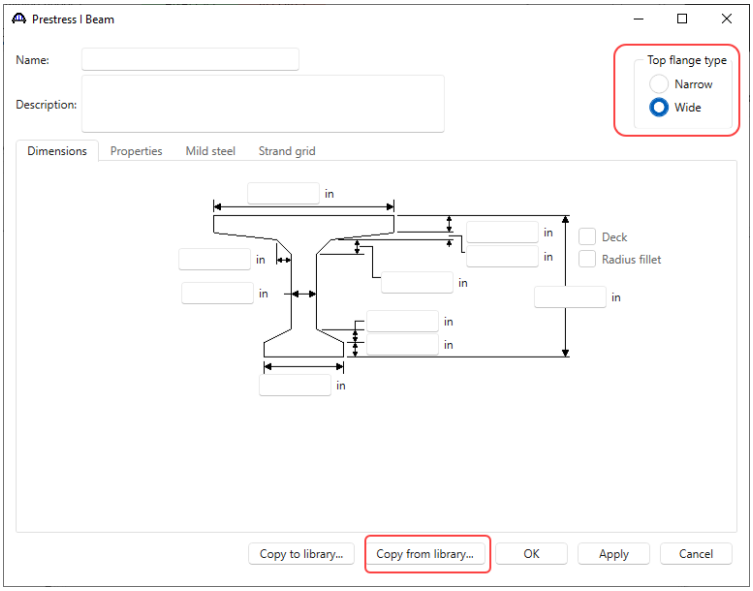
To enter a prestress beam shape, expand the tree labeled **Beam Shapes** and **Prestress Shapes** as shown below.



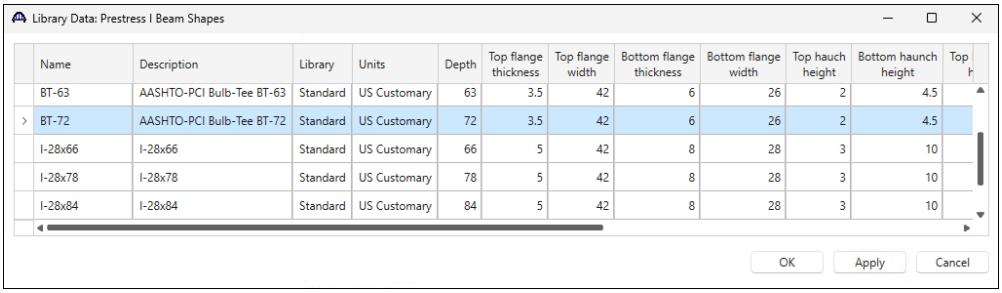
Click on the **I Beams** node in the **Components** tree and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or right mouse click on **I Beams** and select **New** or double click on **I Beams** in the **Components** tree). The window shown below will open.

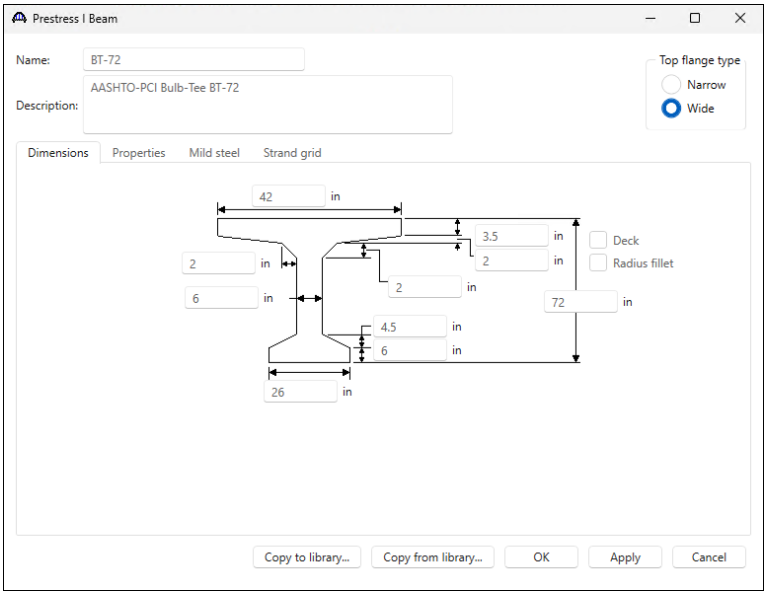


Select the **Top flange type** as **Wide** and click the **Copy from library…** button.



Select **BT-72 (AASHTO-PCI Bulb-Tee BT-72)** and click **OK**. The beam properties are copied to the **Prestress I Beam** window as shown below.

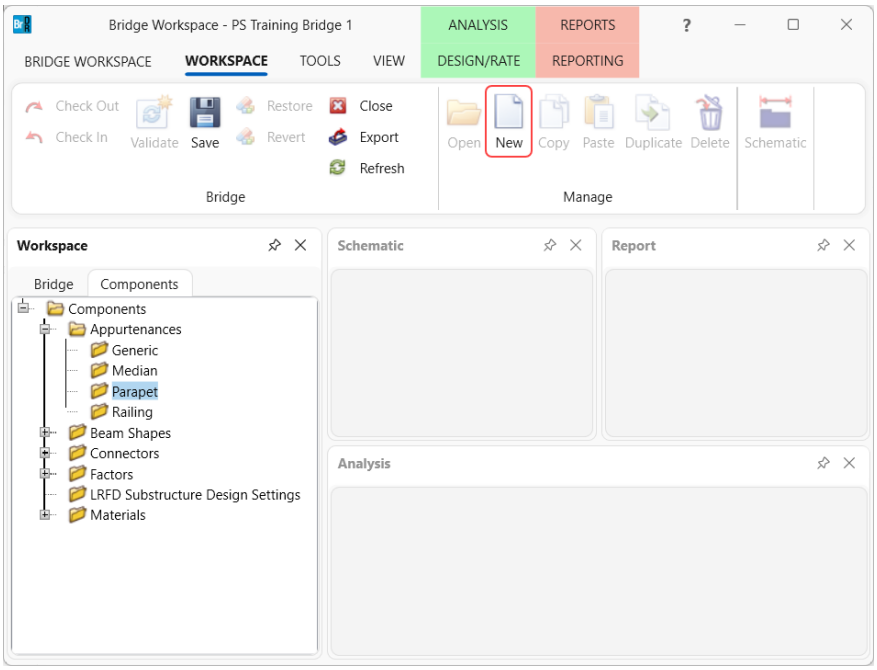




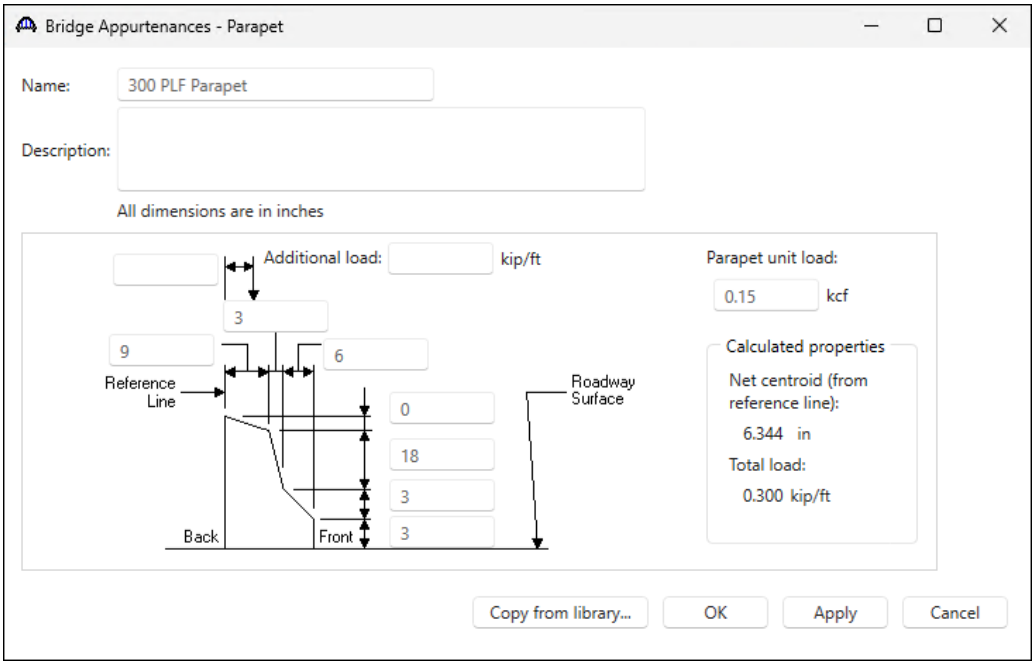
Click **OK** to apply the data and close the window.

Bridge - Appurtenances

To enter the appurtenances, expand the tree branch labeled **Appurtenances**. To define a parapet, select **Parapet** and click on **New** from the **Manage** button on the **WORKSPACE** ribbon (or double click on **Parapet** in the **Components** tree).



Enter the parapet details as shown below.

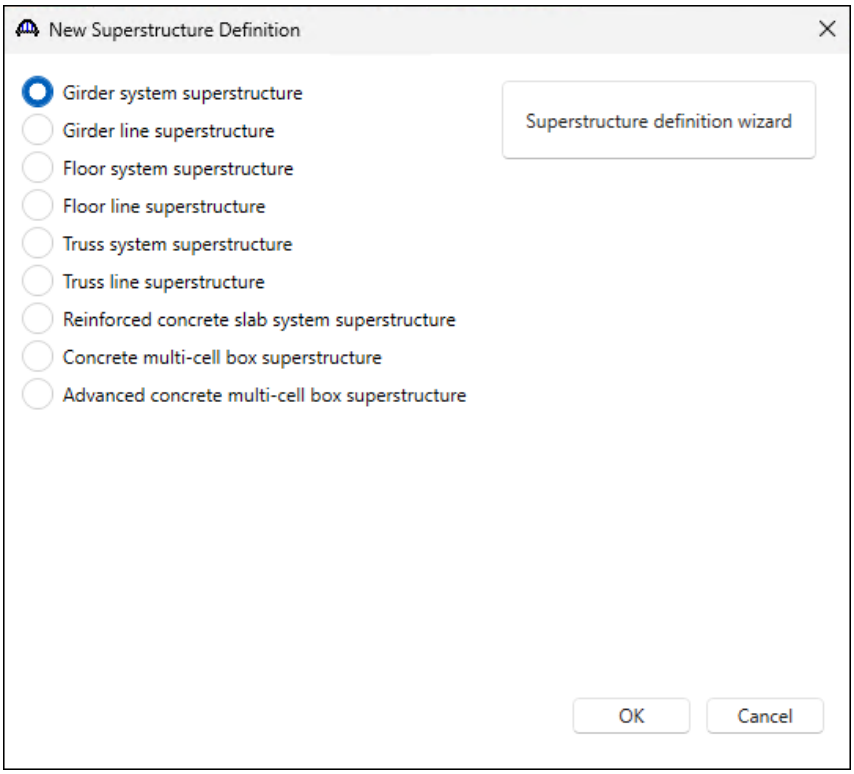


Click **OK** to apply the data and close the window.

The default impact factors, standard LRFD and LFR factors will be used**.** Bridge Alternatives will be added after entering the Structure Definition.

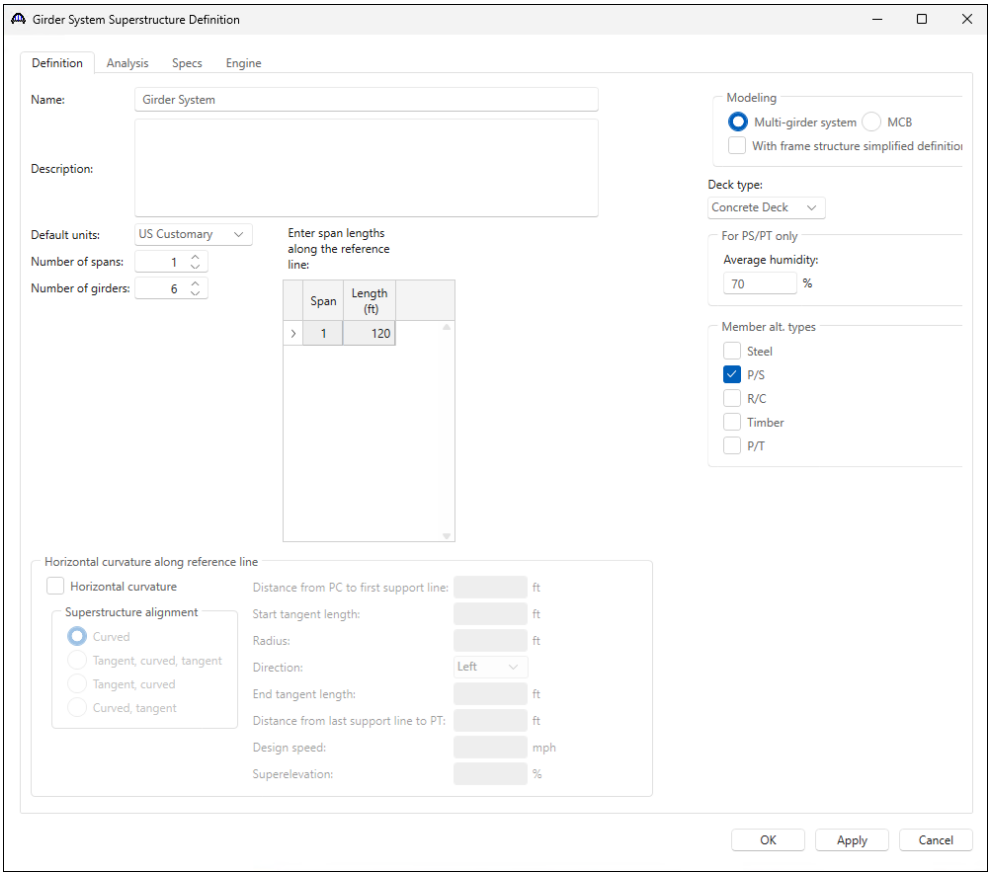
Superstructure definition

Returning to the **Bridge** tab of the **Bridge Workspace**, double click on **SUPERSTRUCTURE DEFINITIONS** (or click on **SUPERSTRUCTURE DEFINITIONS** and select **New** from the **Manage** group of the **WORKSPACE** ribbon or right mouse click on **SUPERSTRUCTURE DEFINITIONS** and select **New** from the popup menu) to create a new structure definition. The window shown below will appear.



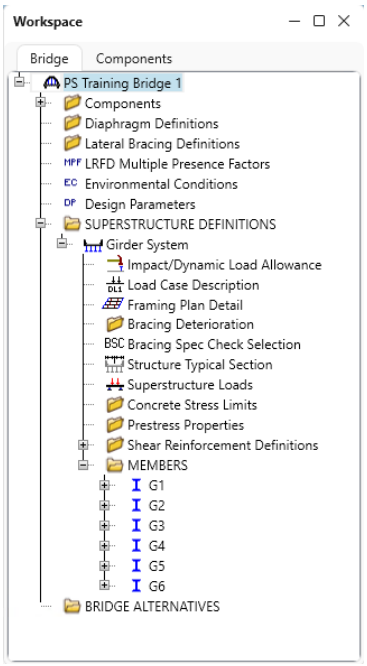
Select **Girder system superstructure**, click **OK**

The **Girder System Superstructure Definition** window will open. Enter the data as shown below.



Click **OK** to apply the data and close the window.

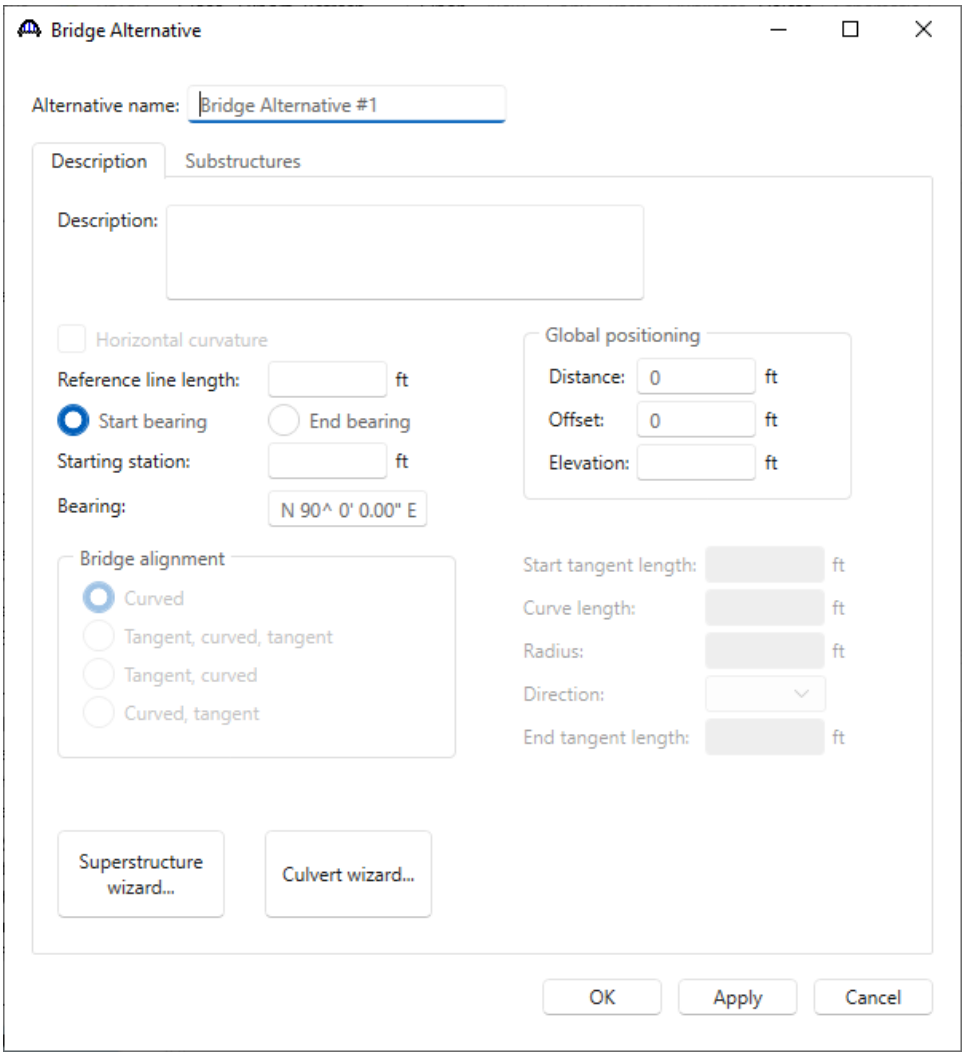
The partially expanded **Bridge Workspace** tree is shown below.



Navigate to the **Bridge Alternatives** node in the **Bridge Workspace** tree and create a new **Bridge Alternative**, a new **Structure**, and a new **Structure Alternative** as shown below.

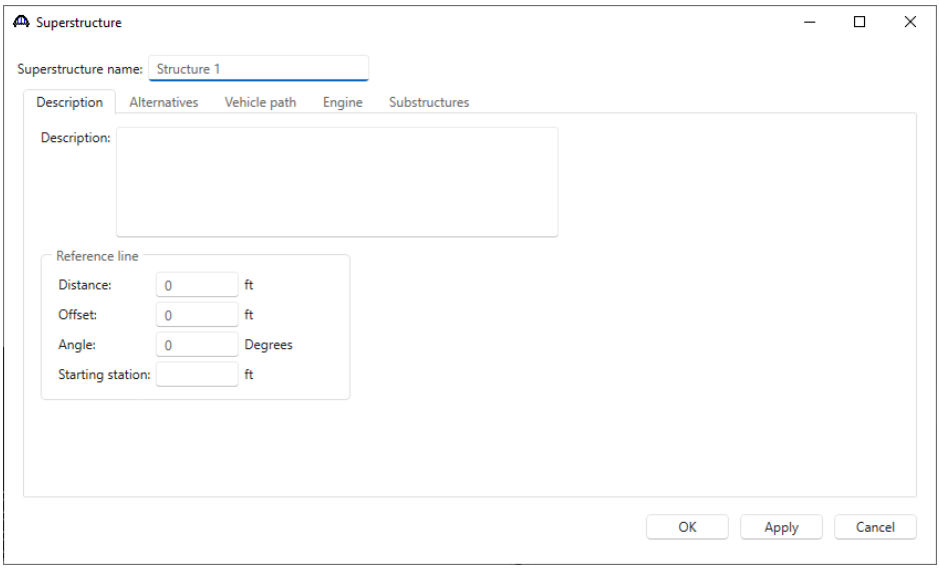
BRIDGE ALTERNATIVES

Navigate to the **BRIDGE ALTERNATIVES** node in the **Bridge Workspace** tree and create a new bridge alternative by double-clicking on **BRIDGE ALTERNATIVES** (or click on **BRIDGE ALTERNATIVES** and select **New** from the **Manage** group of the **WORKSPACE** ribbon). Enter the following data.



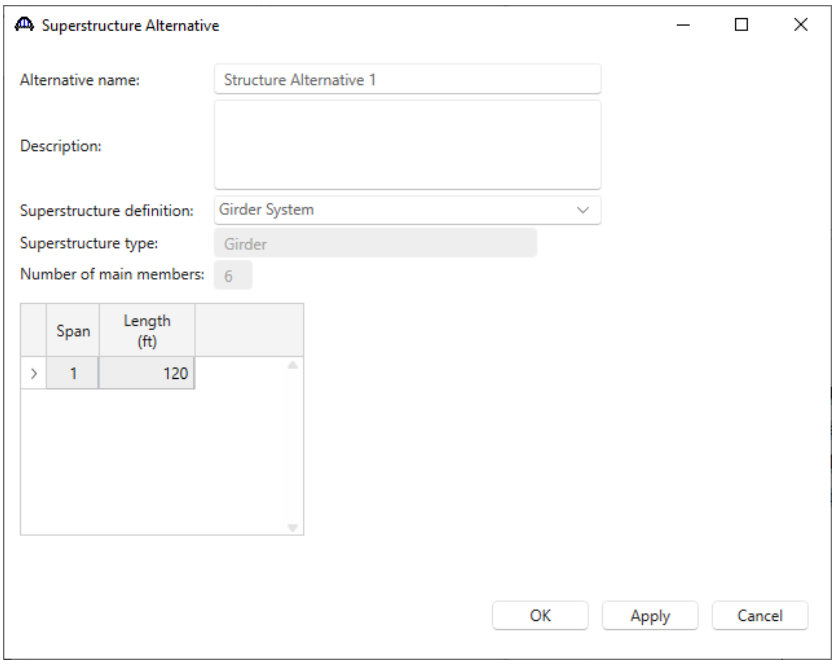
Click **OK** to apply the data and close the window.

Expand the **Bridge Alternative #1** node in the **Bridge Workspace** tree. Double-click on the **SUPERSTRUCTURES** node (or select **SUPERSTRUCTURES** and click **New** from the **Manage** group of the **WORKSPACE** ribbon) and enter the following new superstructure.



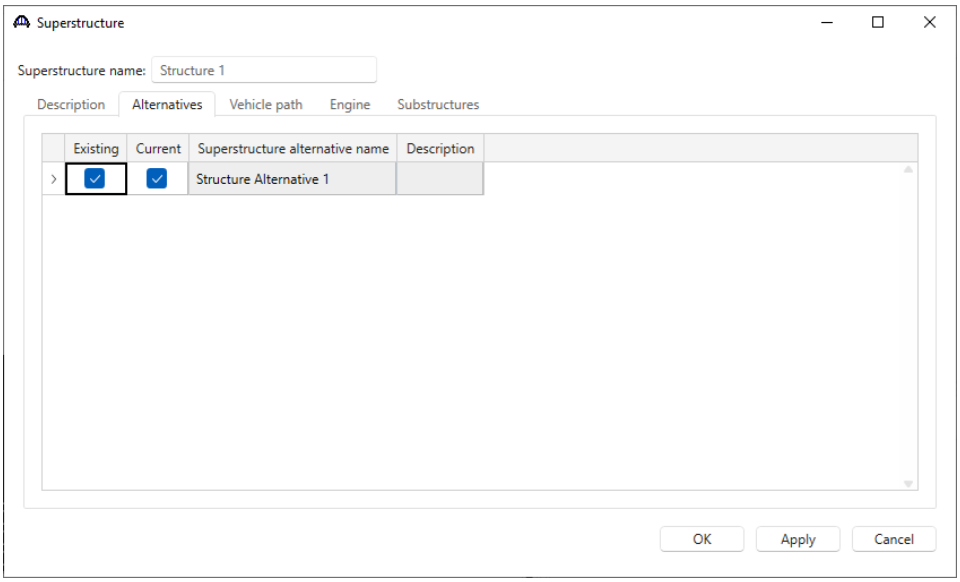
Click **OK** to apply the data and close the window.

Expand the **Structure 1** node in the **Bridge Workspace** tree. Double-click on the **SUPERSTRUCTURE ALTERNATIVES** node (or select **SUPERSTRUCTURE ALTERNATIVES** and click **New** from the **Manage** group of the **WORKSPACE** ribbon) and enter the following new superstructure alternative. Select the superstructure definition **Girder System** as the current superstructure definition for this **Superstructure Alternative**.

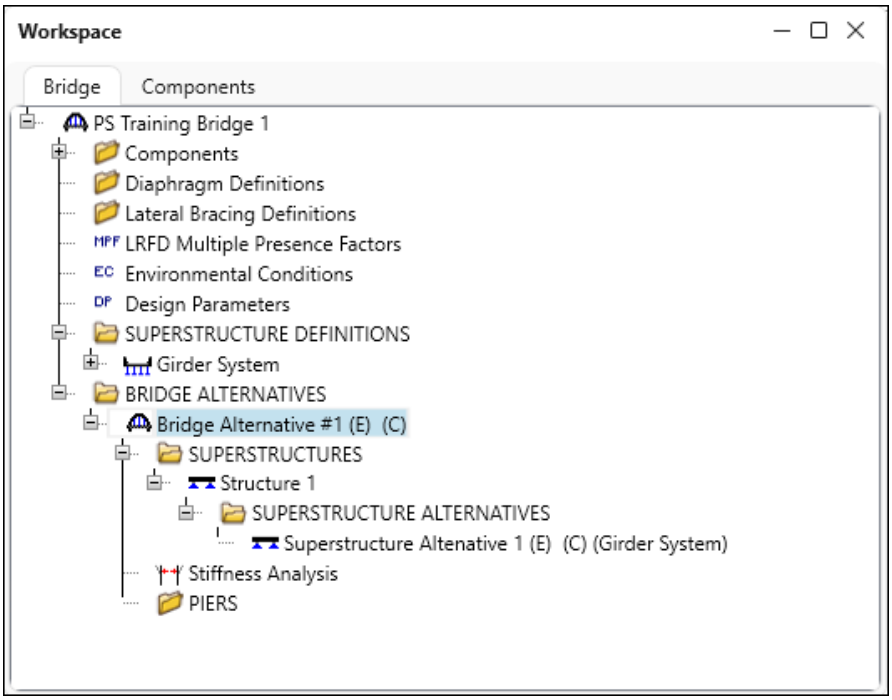


Click **OK** to apply the data and close the window.

Re-open the **Structure 1** window and navigate to the **Alternatives** tab. The **Structure Alternative #1** will be shown as the **Existing** and **Current** alternative for **Structure #1**.

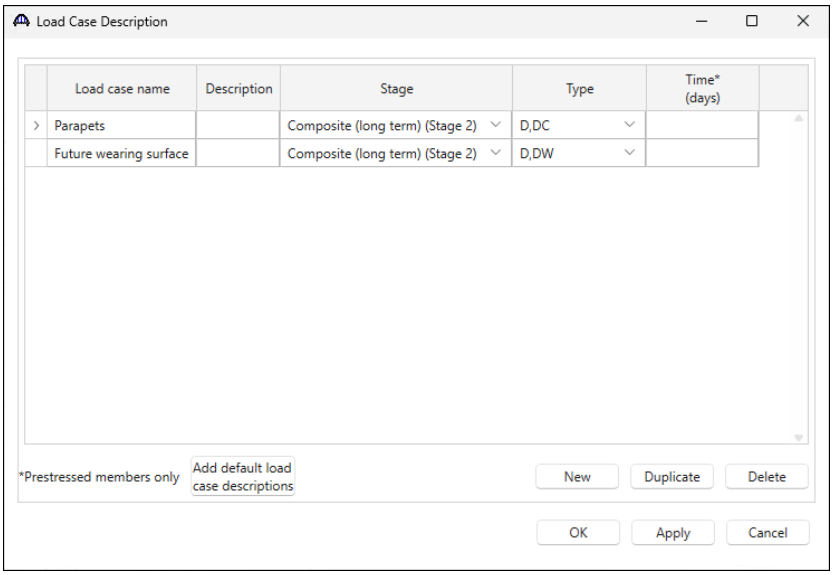


The partially expanded **Bridge Workspace** tree is shown below.



Load Case Description

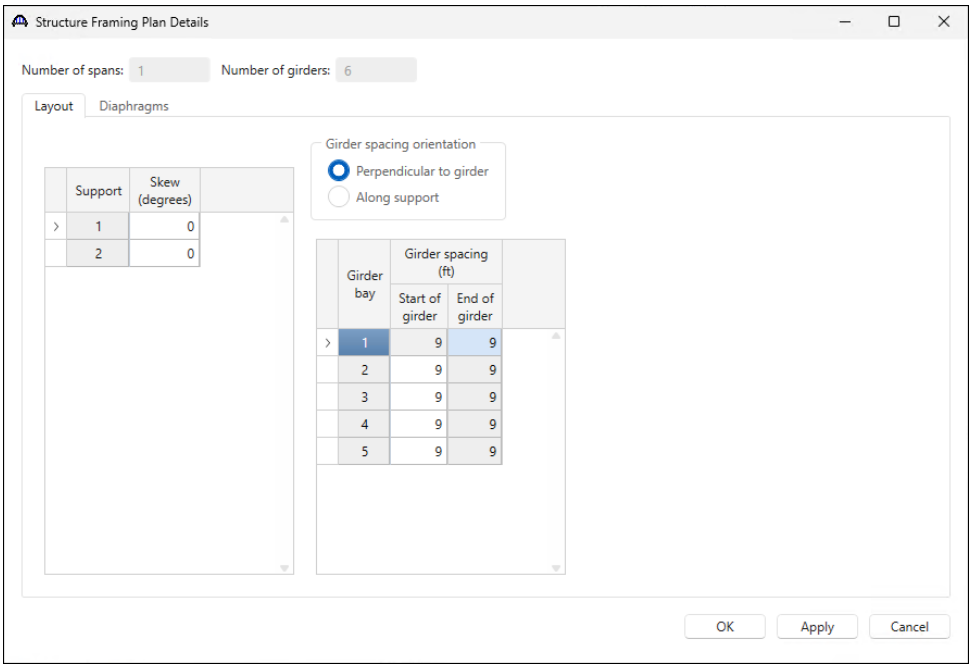
Navigate back to the superstructure definition – **Girder System**. Double-click on the **Load Case Description** node in the **Bridge Workspace** tree to open the **Load Case Description window** and define the dead load cases as shown below. The completed **Load Case Description** window is shown below.



Click **OK** to apply the data and close the window.

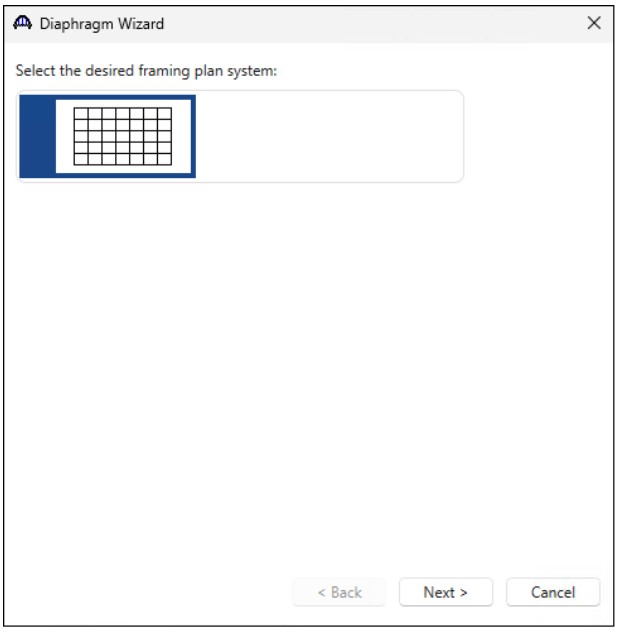
Structure Framing Plan Detail – Layout

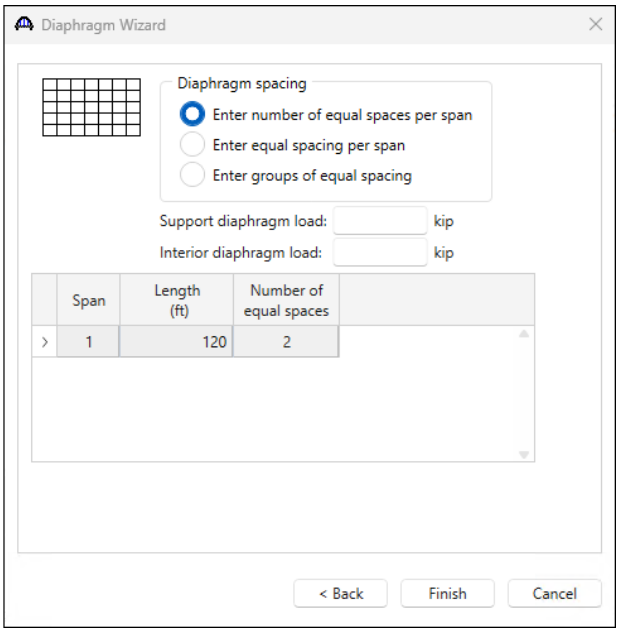
Double-click on **Framing Plan Detail** in the **Bridge Workspace** tree to describe the framing plan in the **Structure Framing Plan Details** window. Enter the data as shown below and click **Apply** to apply the data and not close the window.



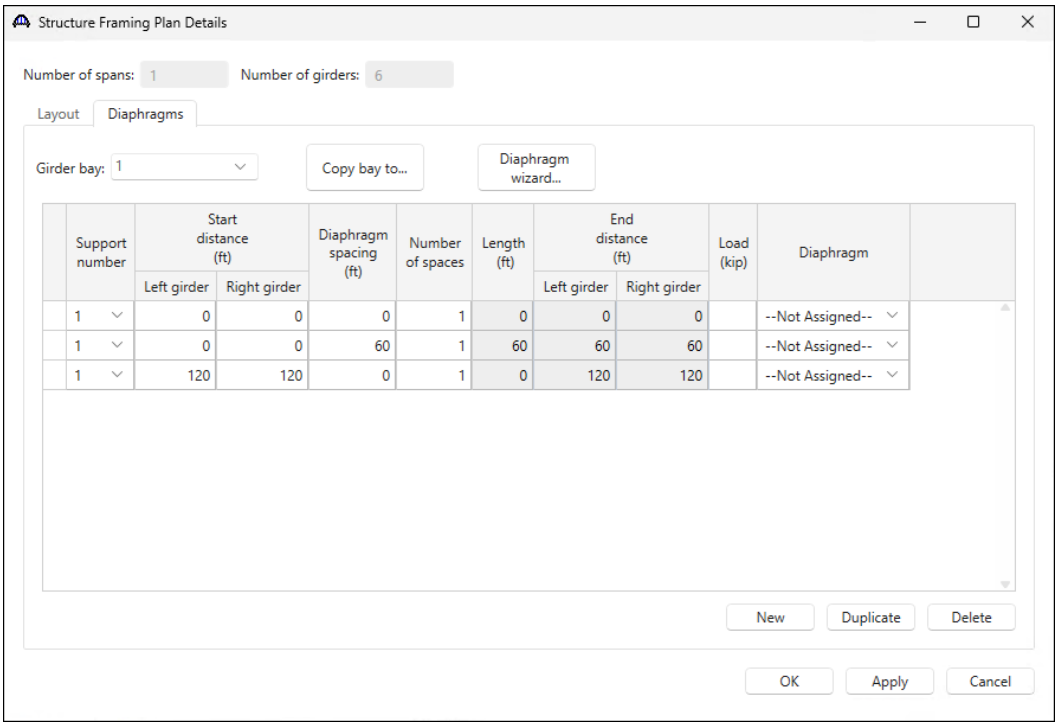
Structure Framing Plan Detail – Diaphragms

Switch to the **Diaphragms** tab to enter diaphragm spacing. Click the **Diaphragm wizard…** button to add diaphragms for the entire structure. **Select the desired framing plan system** and click the **Next** button. Enter the following data on the window shown below.





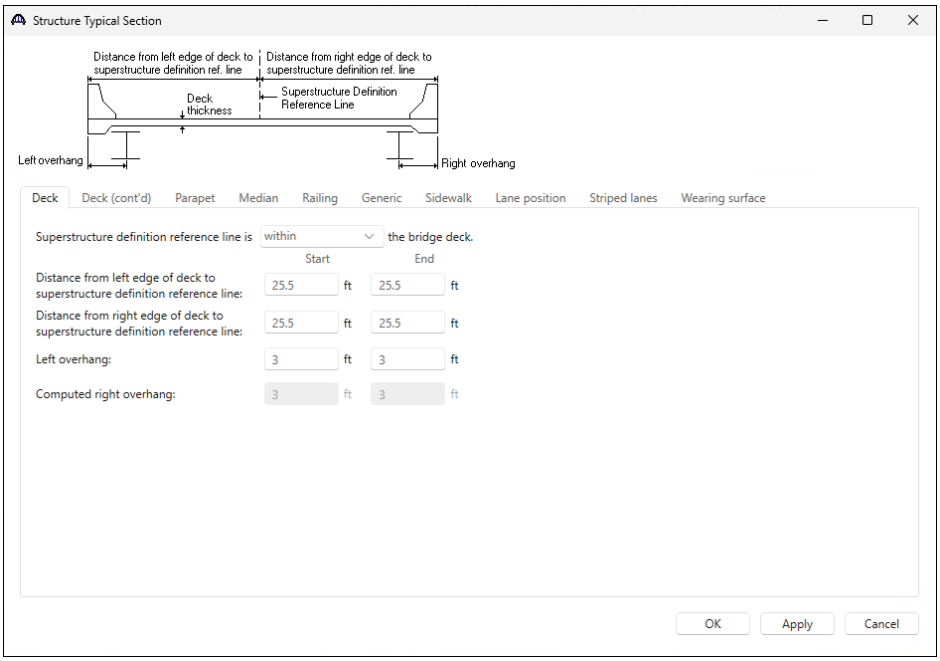
Click the **Finish** button to add the diaphragms. The **Diaphragm Wizard** will create diaphragms for all the girder bays in the structure. The diaphragms created for **Girder bay 1** are shown below.



Click **OK** to apply the data and close the window.

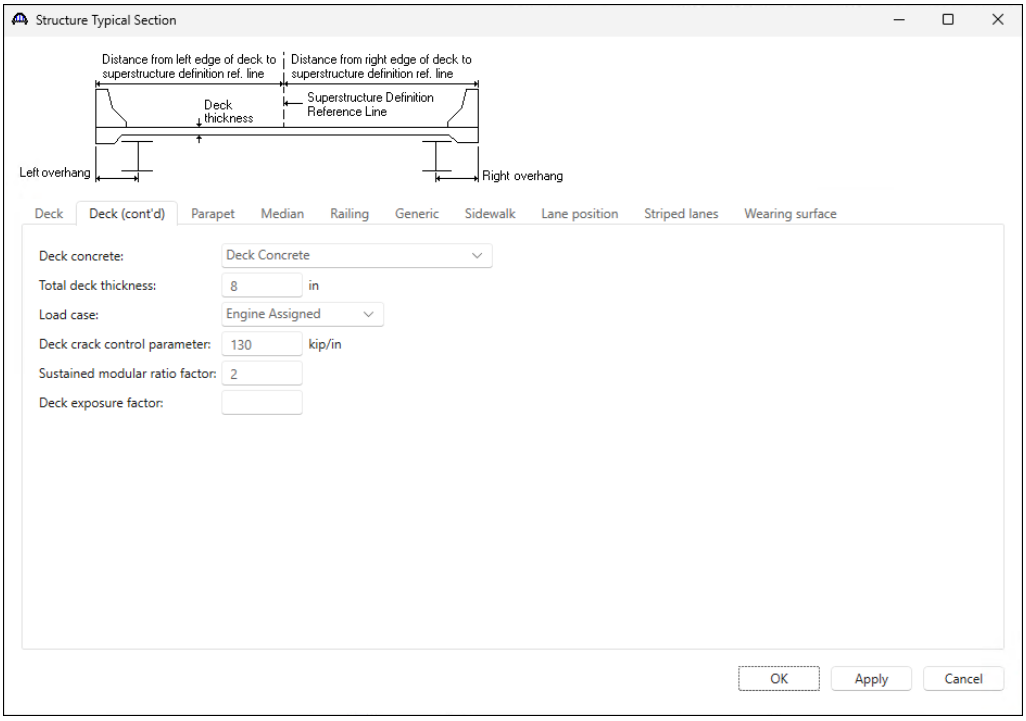
Structure Typical Section - Deck

Next define the structure typical section by double-clicking on **Structure Typical Section** node in the **Bridge Workspace** tree. Input the data describing the typical section in as shown below and click **Apply**.



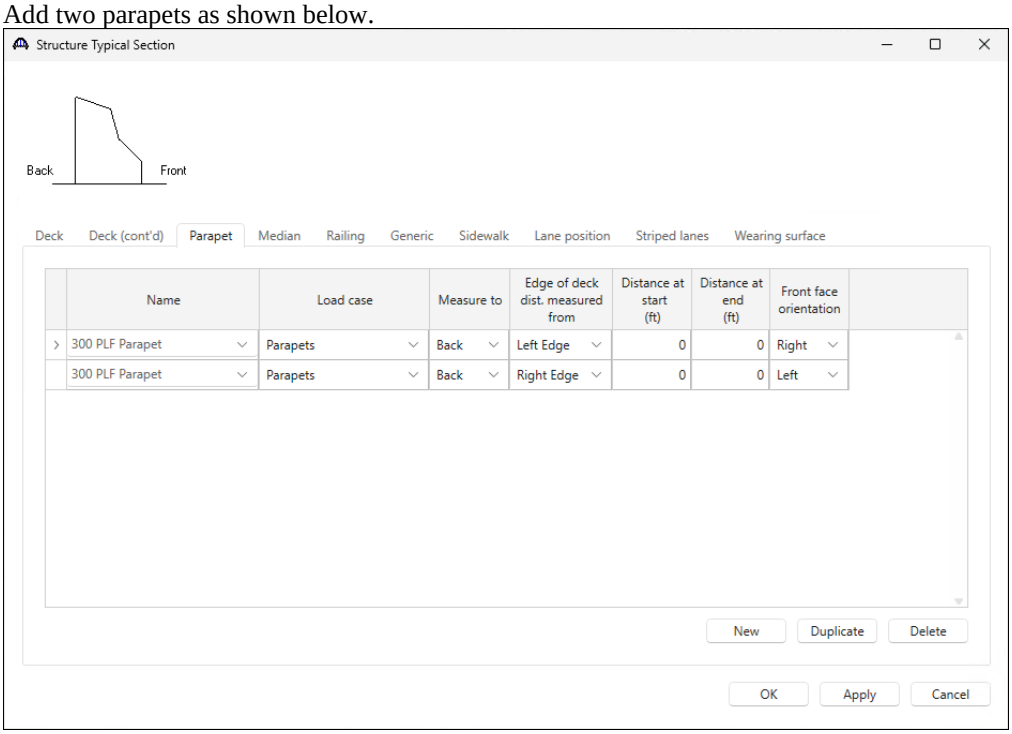
Structure Typical Section – Deck (cont'd)

The **Deck (cont'd)** tab is used to enter information about the **Deck concrete** and the **Total deck thickness**. The material to be used for the deck concrete is selected from the list of bridge materials. Enter the data as shown below.



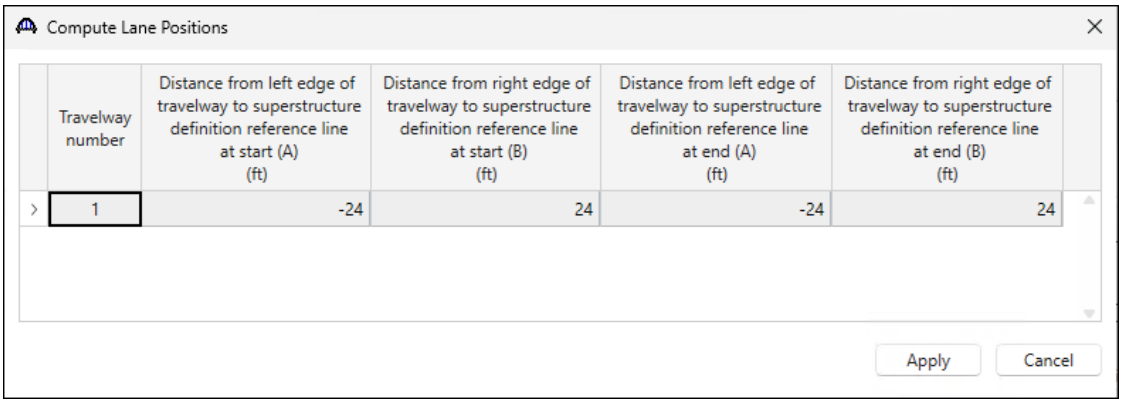
Structure Typical Section – Parapets

Add two parapets as shown below.

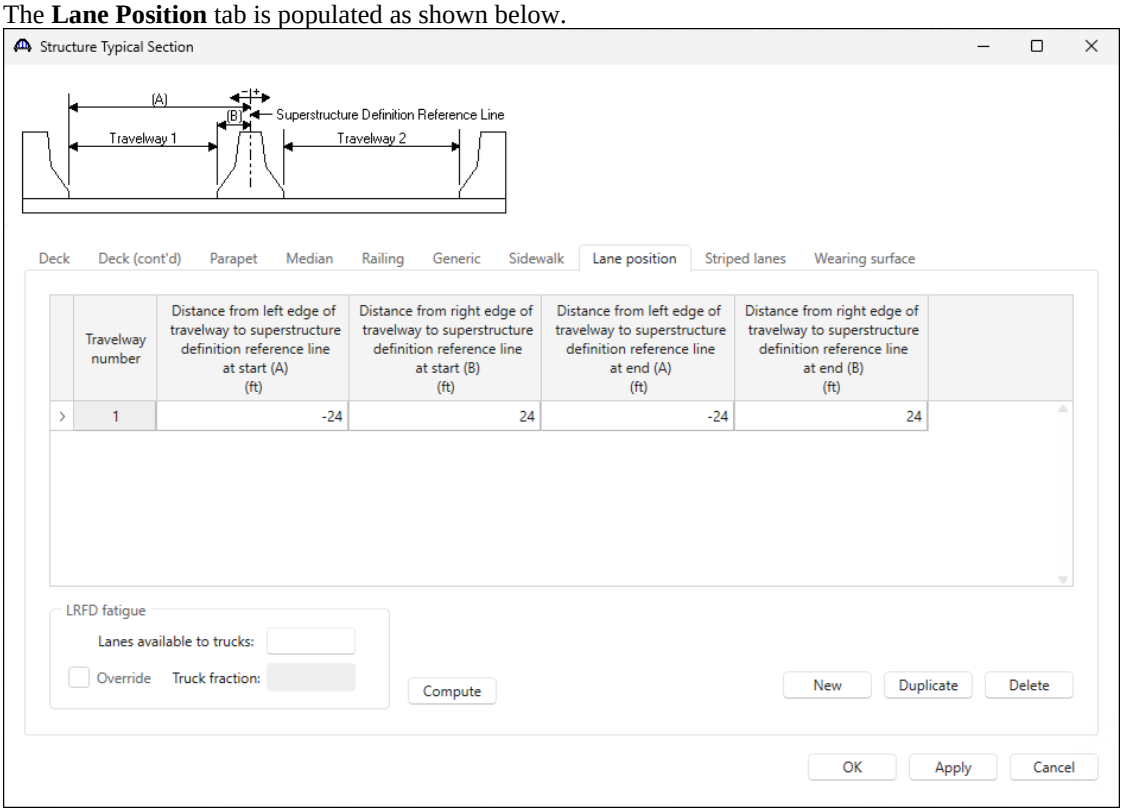


Structure Typical Section – Lane Positions

Select the **Lane position** tab and use the **Compute…** button to compute the lane positions. A window showing the results of the computation opens. Click **Apply** to apply the computed values.

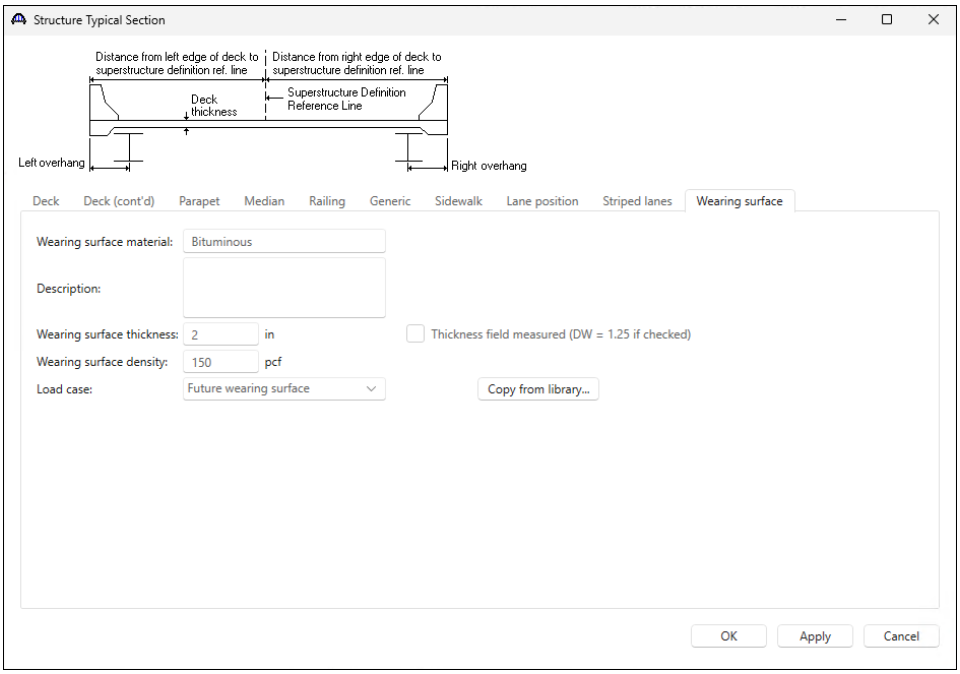


The **Lane Position** tab is populated as shown below.



Structure Typical Section – Wearing surface.

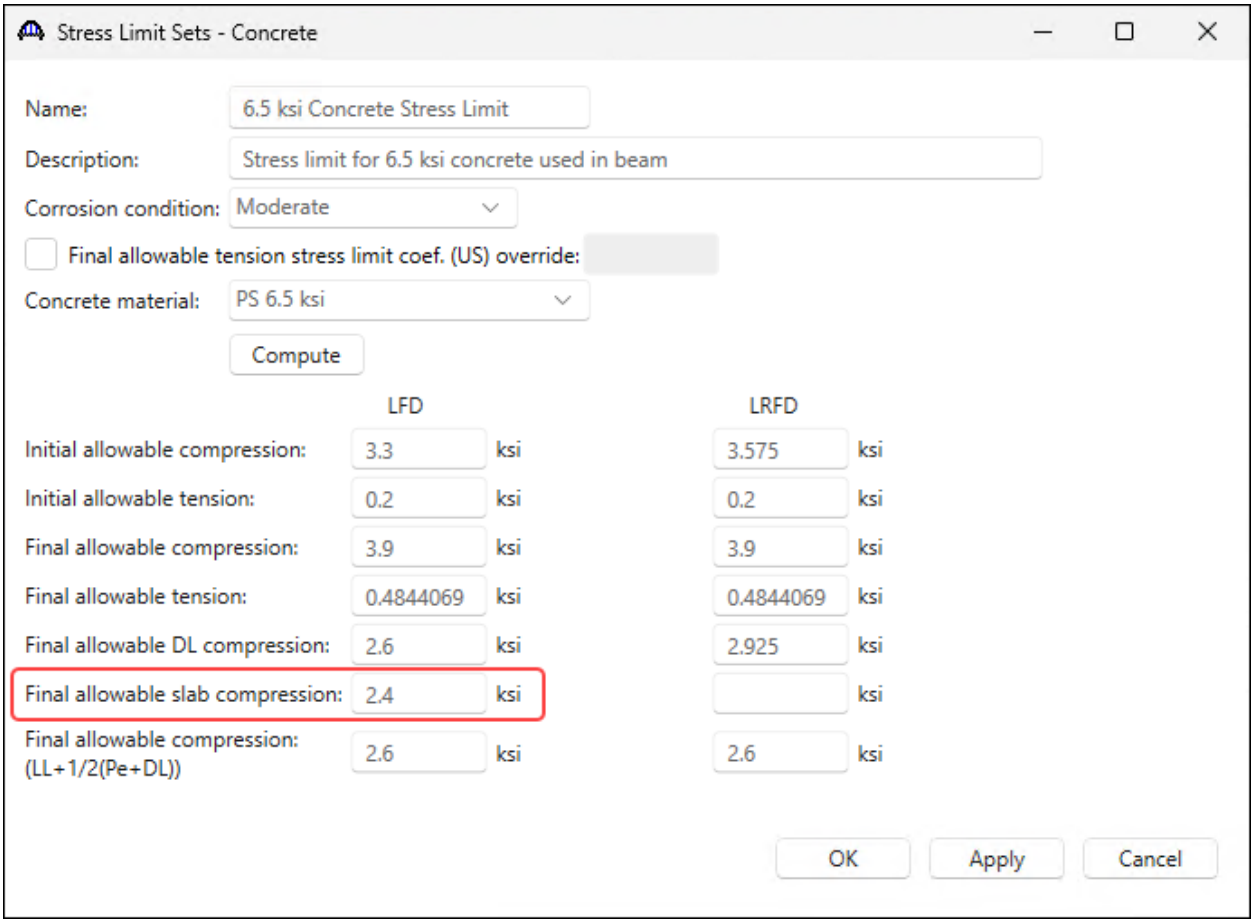
Enter the data shown below.



Click **OK** to apply the data and close the window.

Concrete Stress Limits

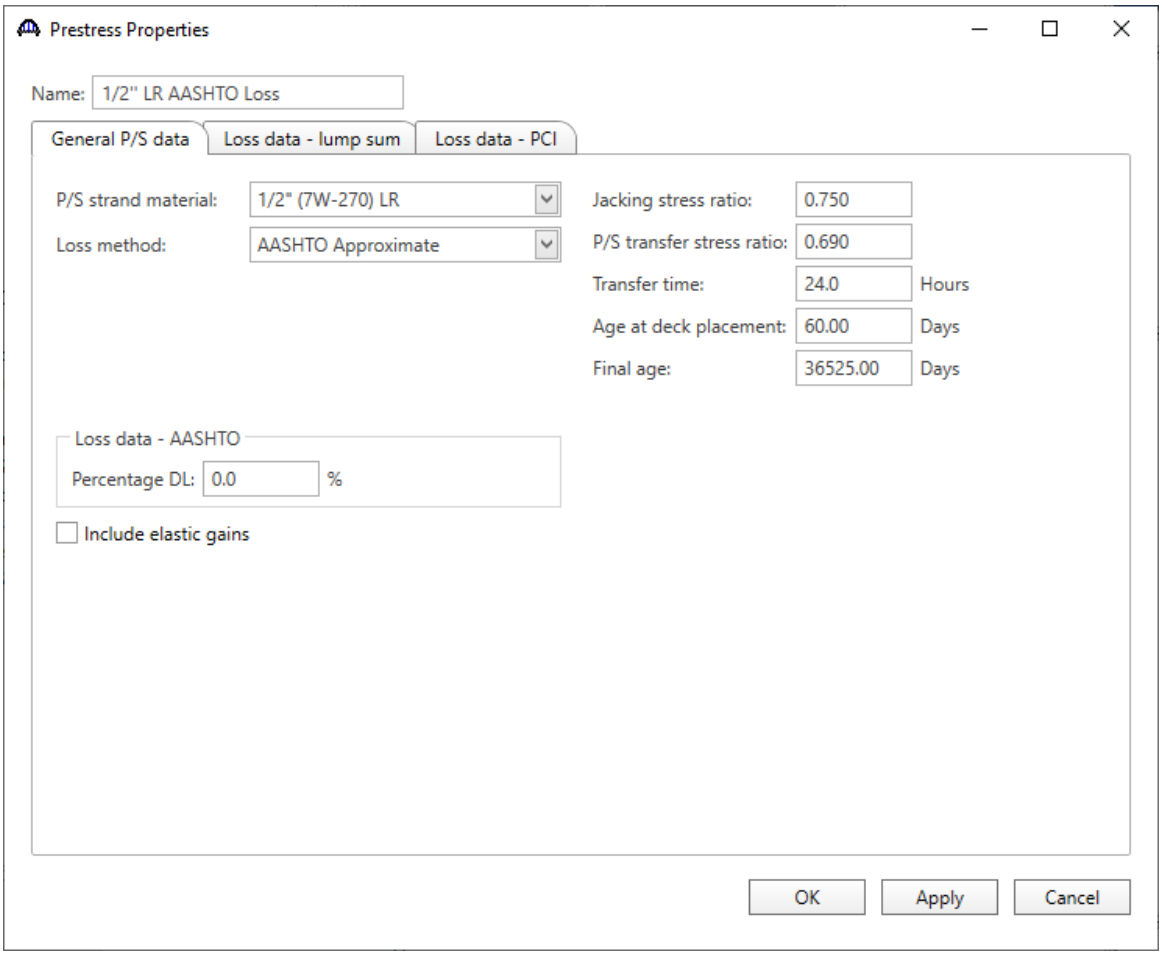
A Stress Limit defines the allowable concrete stresses for a given concrete material. Double click on the **Concrete Stress Limits** node in the **Bridge Workspace** tree to open the **Stress Limit Sets – Concrete** window. Enter data shown above the **Compute** button, select **Moderate** for the **Corrosion condition** and select the **PS 6.5 ksi** concrete material from the drop-down menu of the **Concrete material**. Click the **Compute** button. Default values for the allowable stresses will be computed based on the **Concrete material** selected and the AASHTO Specifications. A default value for the **Final allowable slab compression** is not computed since the deck concrete is typically different from the concrete used in the beam. Enter the value shown below for the **LFD Final allowable slab compression**.



Click **OK** to apply the data and close the window.

Prestress Properties

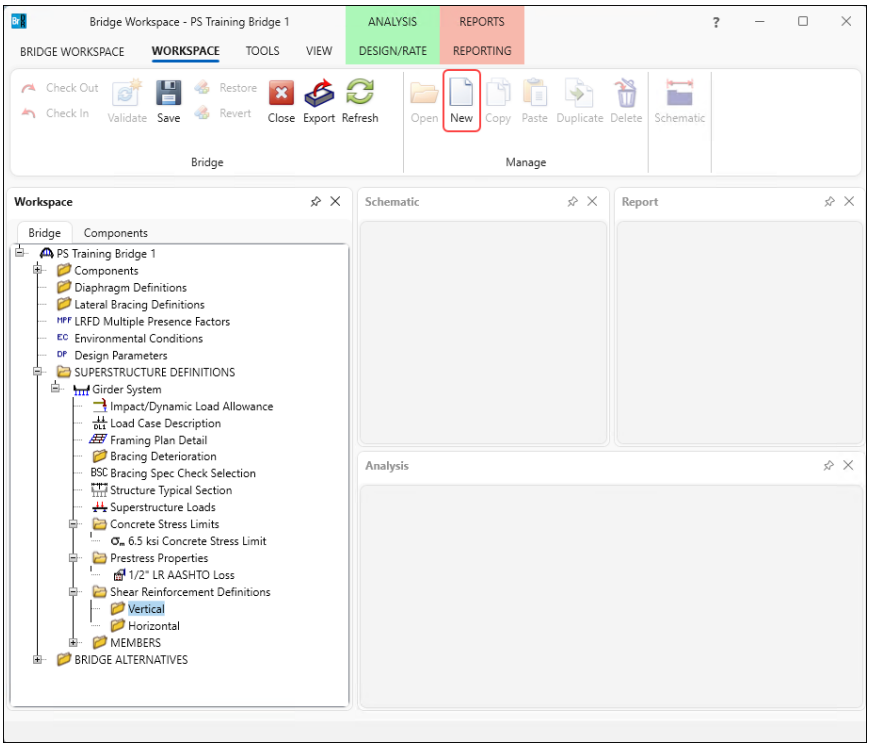
Double click on the **Prestress Properties** node in the **Bridge Workspace** tree to open the **Prestress Properties** window. Define the prestress properties as shown below. Since the **AASHTO Approximate** method is used to compute the losses, only the information on the **General P/S data** tab is required.



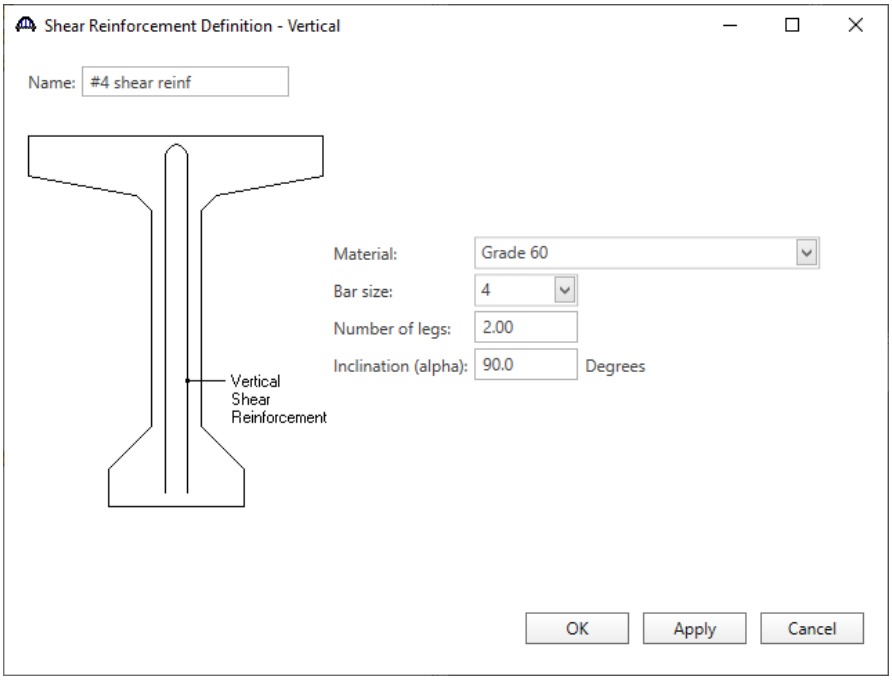
Click **OK** to apply the data and close the window.

Shear Reinforcement

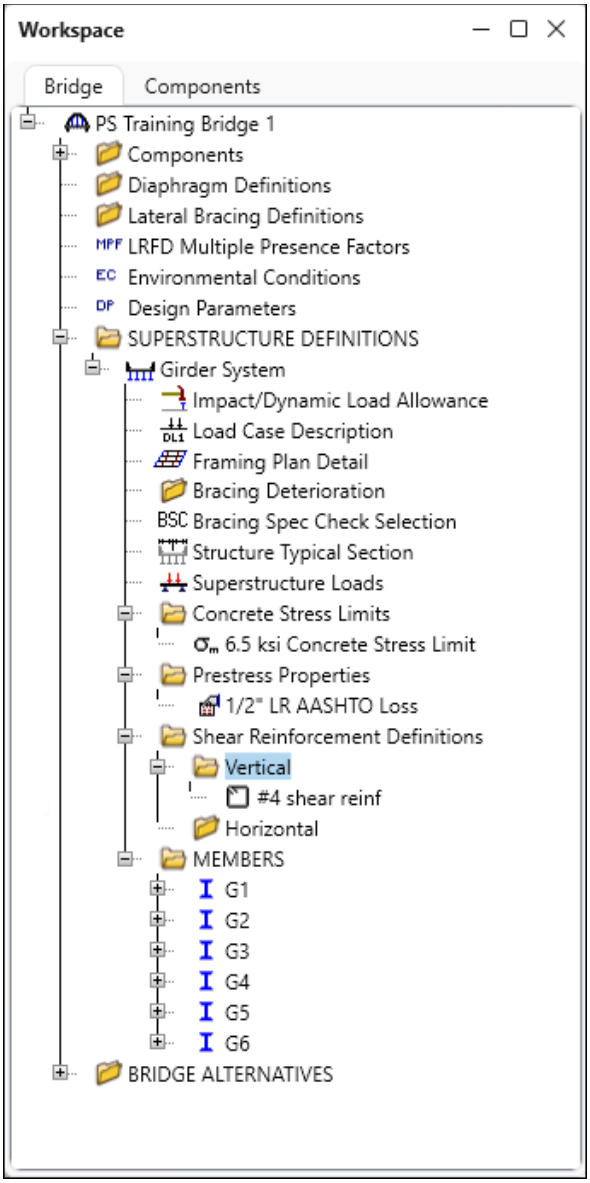
Define shear reinforcement to be used by the girders. Expand the **Shear Reinforcement Definitions** on the **Bridge Workspace** tree, select the **Vertical** node and click on **New** from the **Manage** group of the **WORKSPACE** ribbon (or double click on **Vertical)**.



Define the stirrup as shown below. Click **OK** to apply the data and close the window.

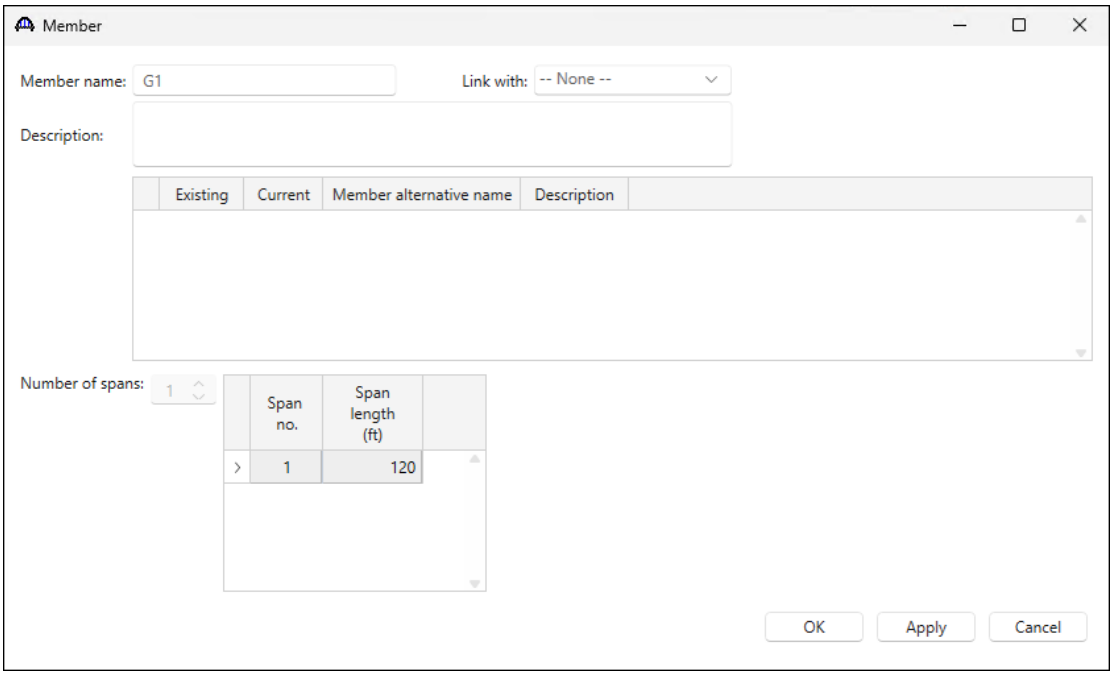


A partially expanded **Bridge Workspace** is shown below.



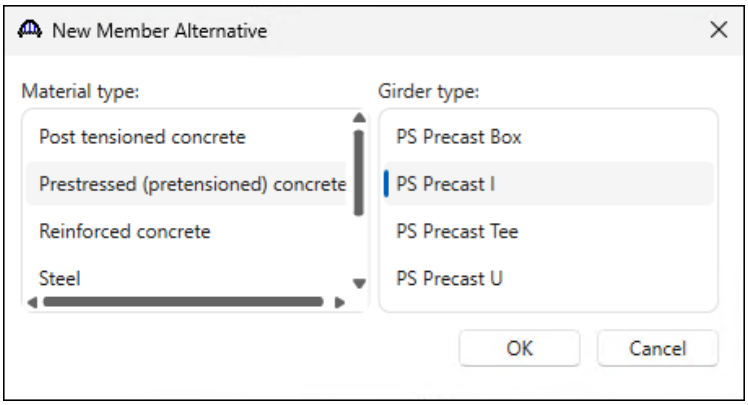
Describing a member:

The **Member** window shows the data that was generated when the structure definition was created. No changes are required in this window. The first Member Alternative created will automatically be assigned as the **Existing** and **Current member alternative** for this Member.



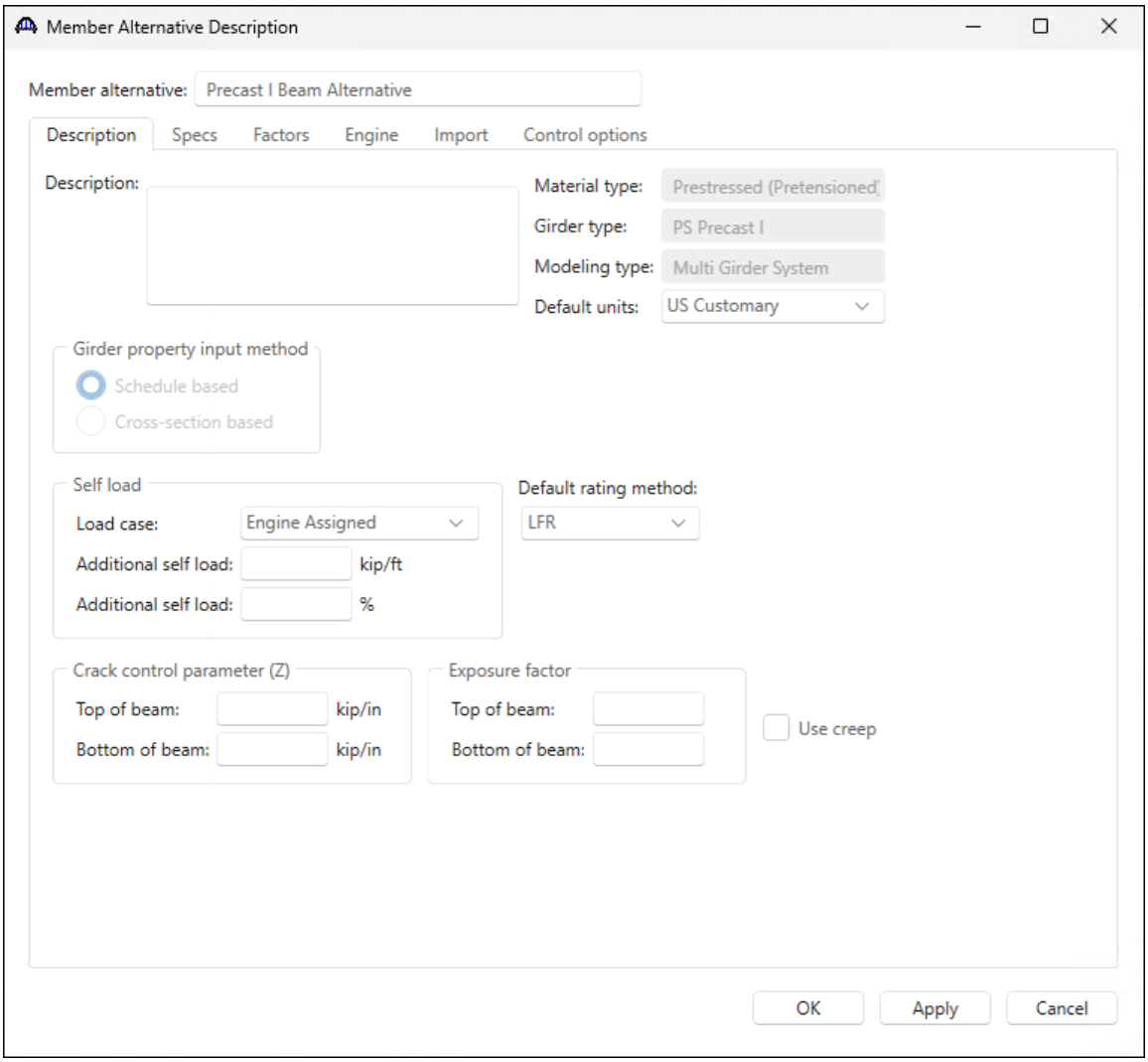
Defining a Member Alternative

Double-click on **MEMBER ALTERNATIVES** in the **Bridge Workspace** tree for member **G1** to create a new member alternative. The **New Member Alternative** window shown below will open. Select **Prestressed (pretensioned) concrete** for the **Material type** and **PS Precast I** for the **Girder Type**.



Click **OK** to close the window and create a new member alternative.

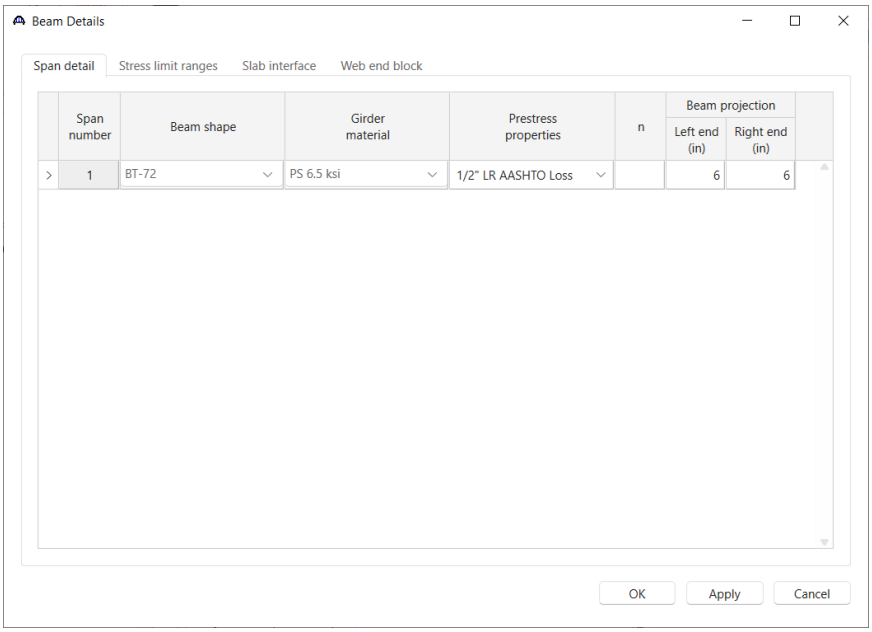
The **Member Alternative Description** window will open as shown below. Enter the data as shown below. The **Schedule based Girder property input method** is the only input method available for a prestressed concrete beam.



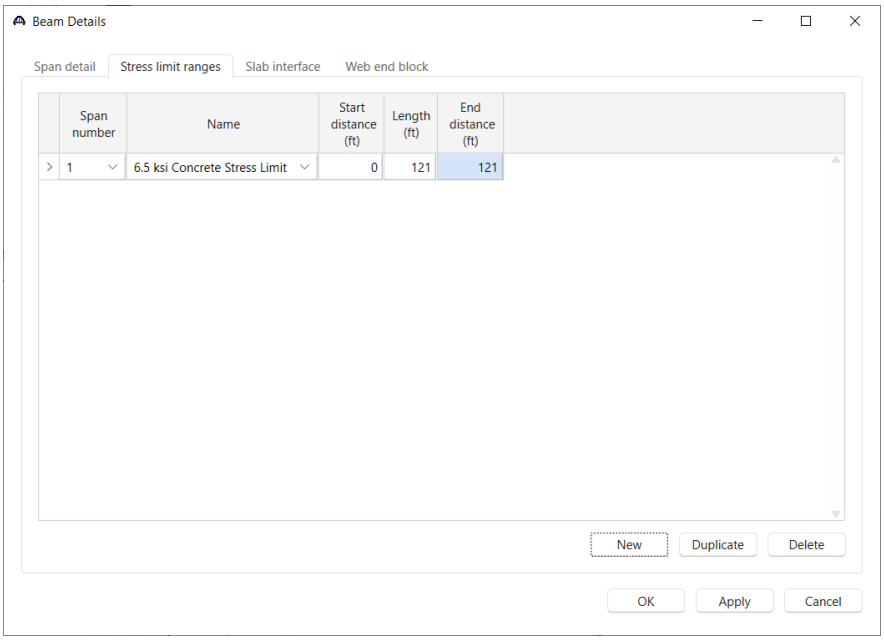
Click **OK** to close the window and create a new member alternative.

Beam Details

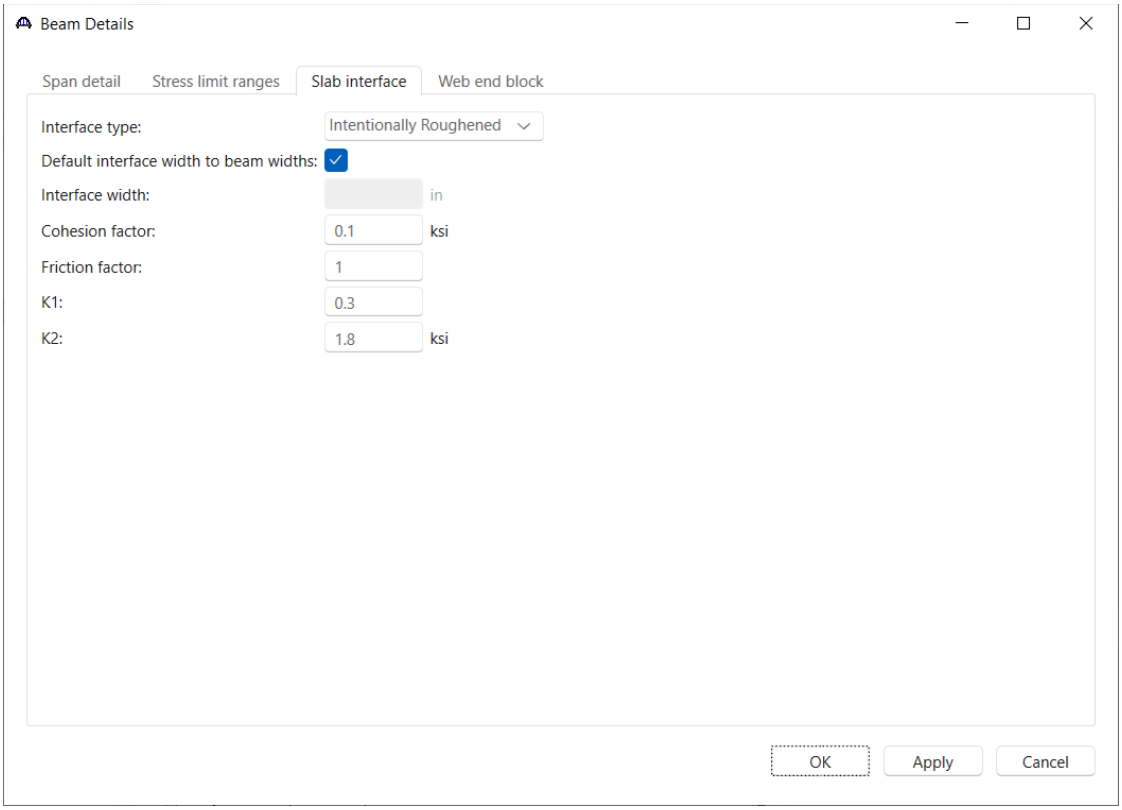
Expand the newly added member alternative in the workspace. Next describe the beam by double clicking on the **Beam Details** node in the **Bridge Workspace** tree. Enter the data in each tab of the **Beam Details** window as shown below.



Navigate to the **Stress limit ranges** tab and enter data as shown below. Note that the **Stress limit ranges** are defined over the entire length of the precast beam, including the projections of the beam past the centerline of bearing which were entered on the **Span detail** tab of this window.



Navigate to the **Slab interface** tab and enter data as shown below.

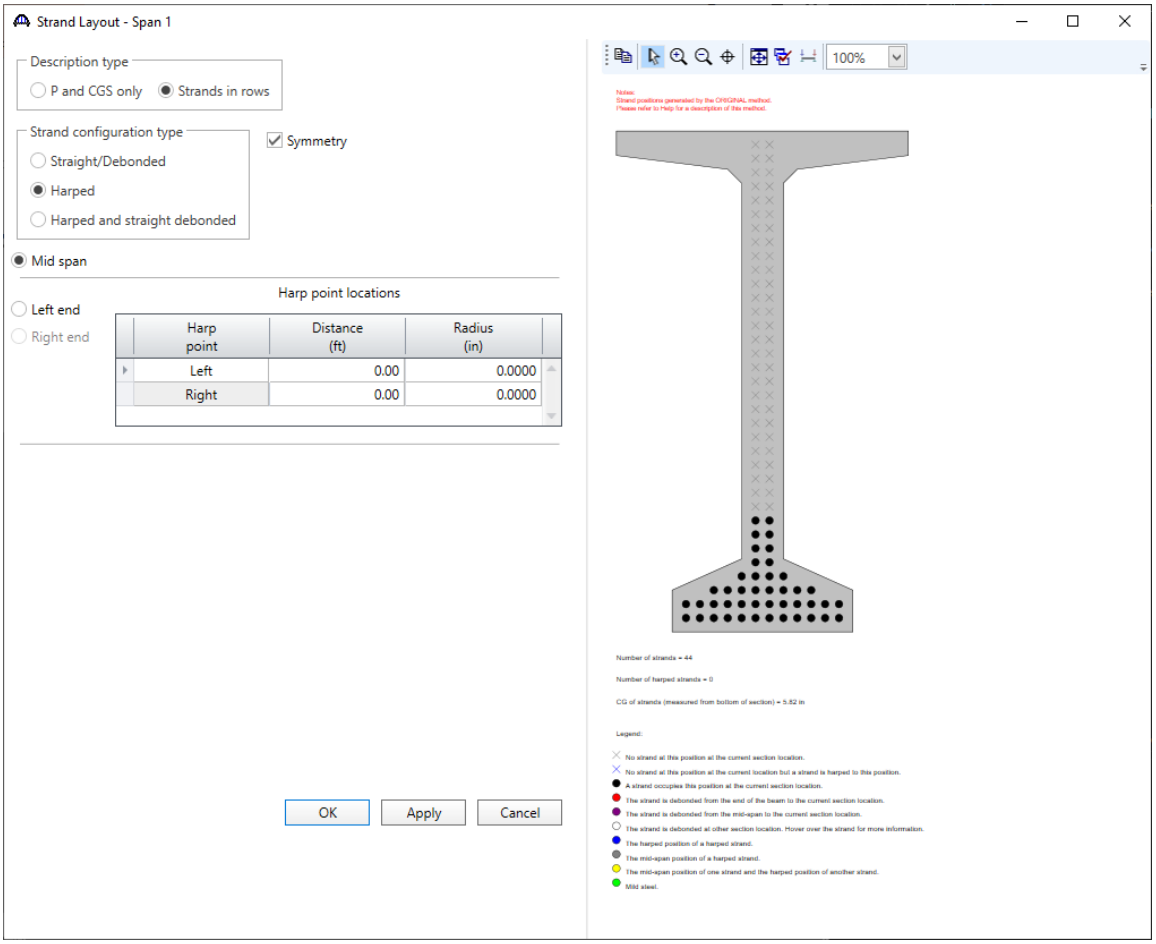


Click **OK** to apply the data and close the window.

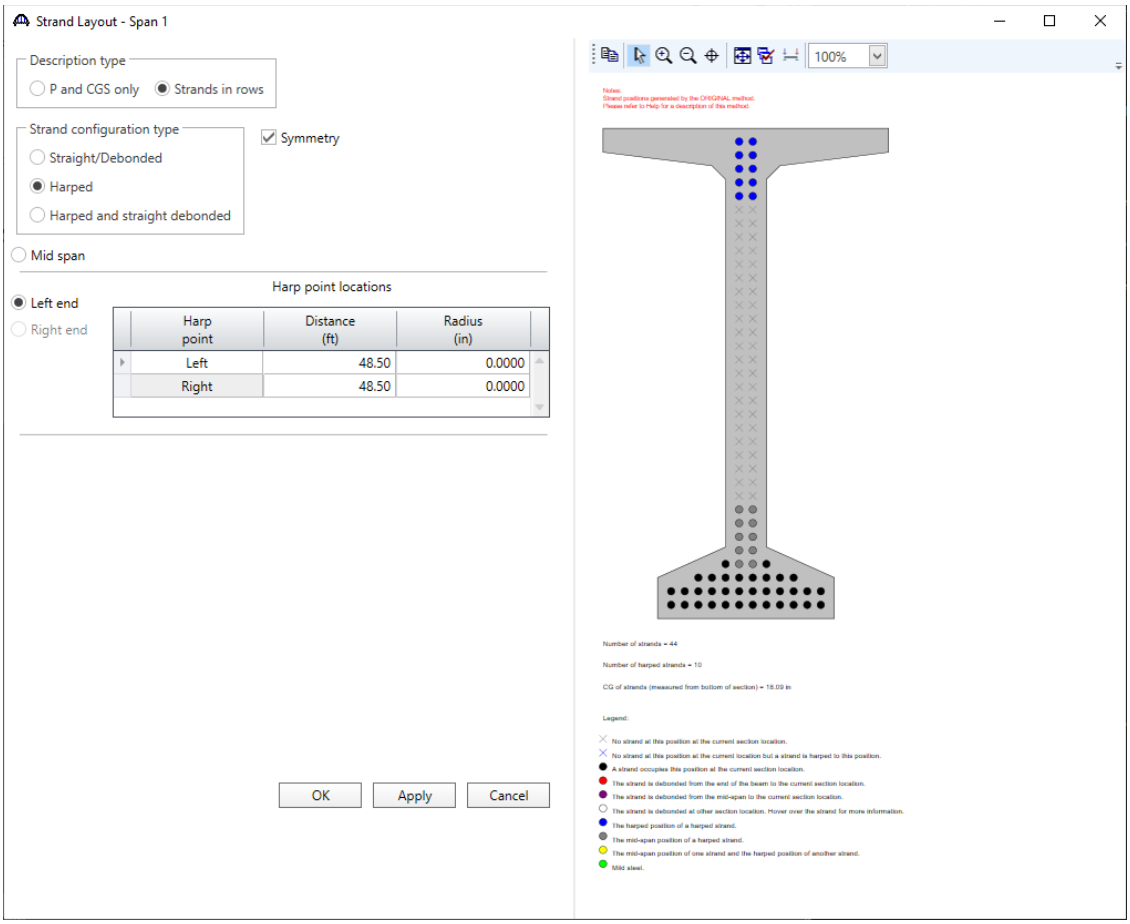
Strand Layout

Expand the tree under **Strand Layout** and open the **Span 1** window. Use the **Zoom** buttons on the right side of this window to shrink/expand the schematic of the beam shape so that the entire beam is visible.

Select the **Description type** as **Strands in rows** and the **Strand configuration type** as **Harped**. The **Mid span** radio button will now become active. Strands can now be defined at the middle of the span by selecting strands in the right hand schematic. Select the bottom 44 strands in the schematic so that the CG of the strands is 5.82 inches and click the **Apply** button.



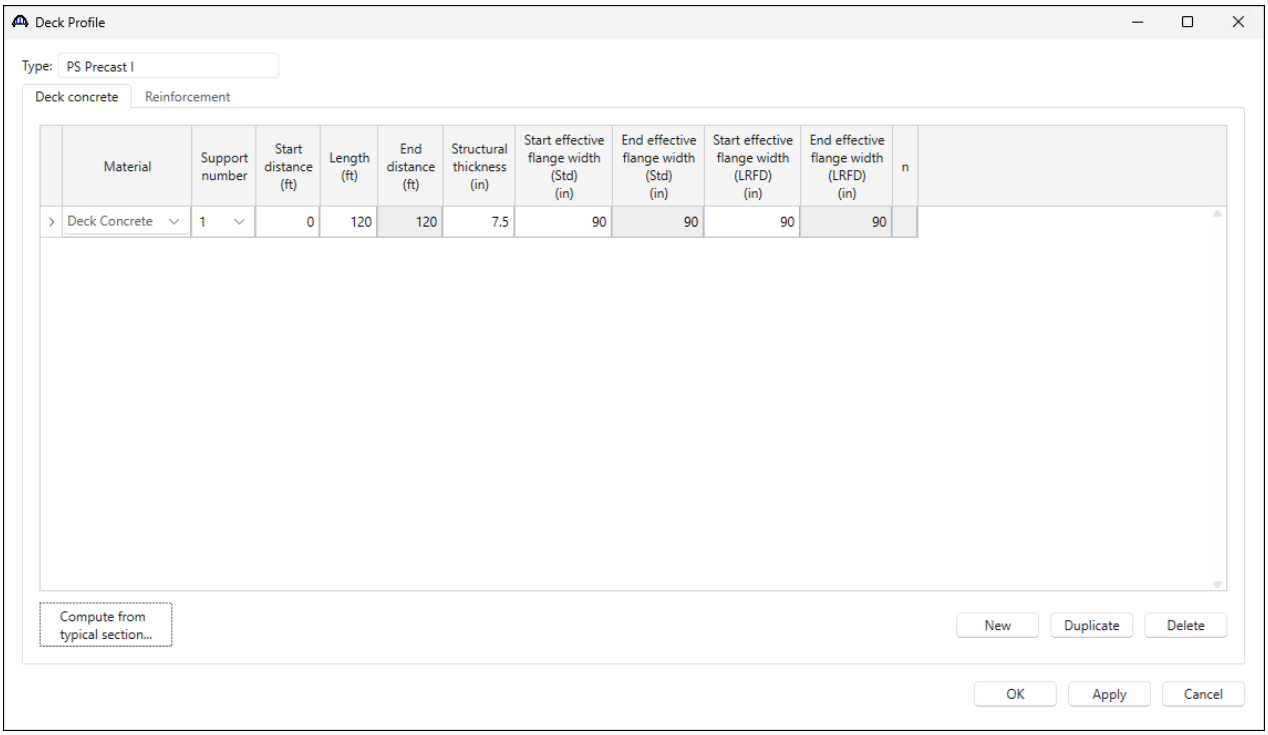
Now select the **Left end** radio button to enter the following harped strand locations at the left end of the precast beam. Place the cursor in the schematic view on the right side of the screen. The strands can be defined at the left end of the span by selecting strand locations in the right hand schematic. Select the top 10 strand locations in the schematic so that the CG of the strands is 18.09 inches.



Click **OK** to apply the data and close the window.

Deck Profile

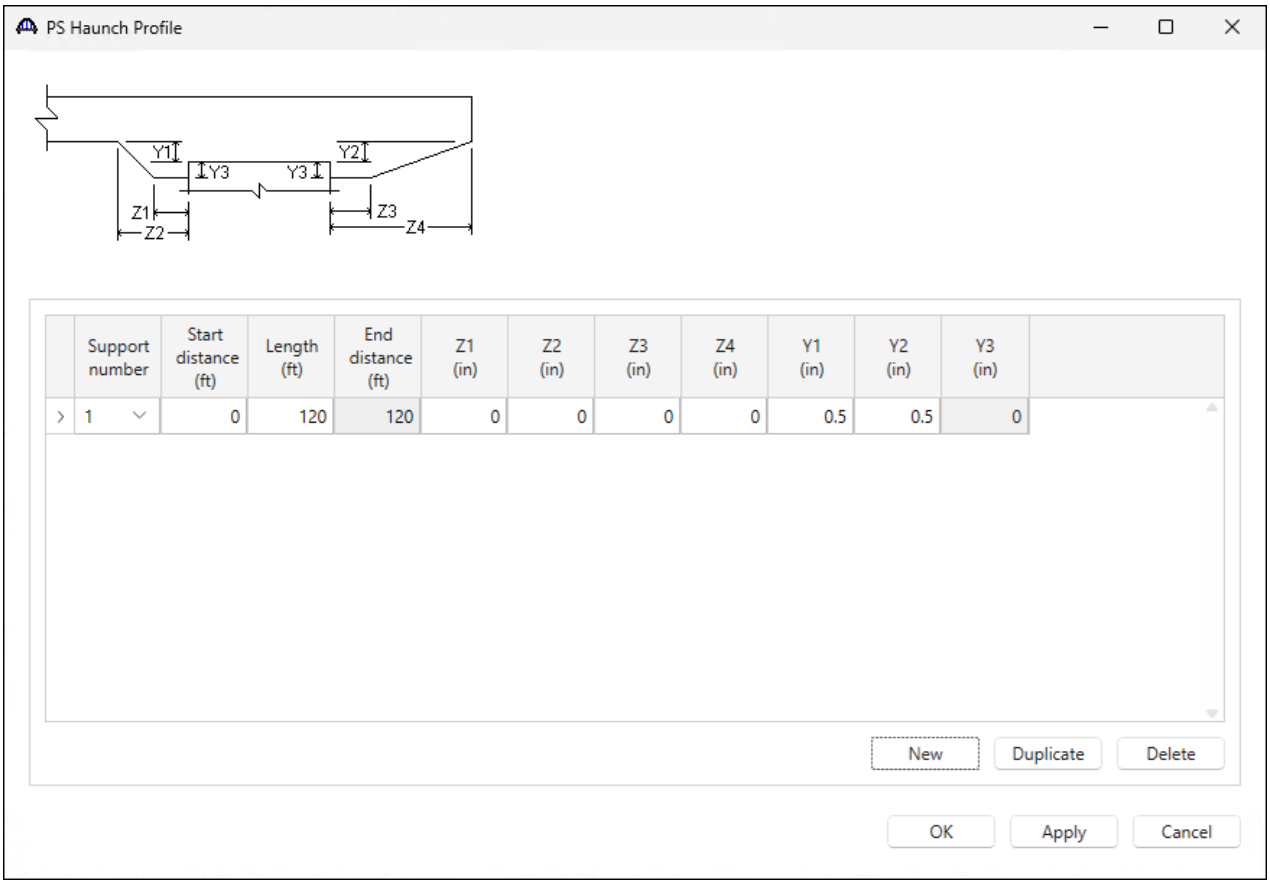
Next open the **Deck Profile** window by double-clicking the **Deck Profile** node in the **Bridge Workspace** tree and enter the data describing the structural properties of the deck. The window is shown below.



No reinforcement is described. Click **OK** to apply the data and close the window.

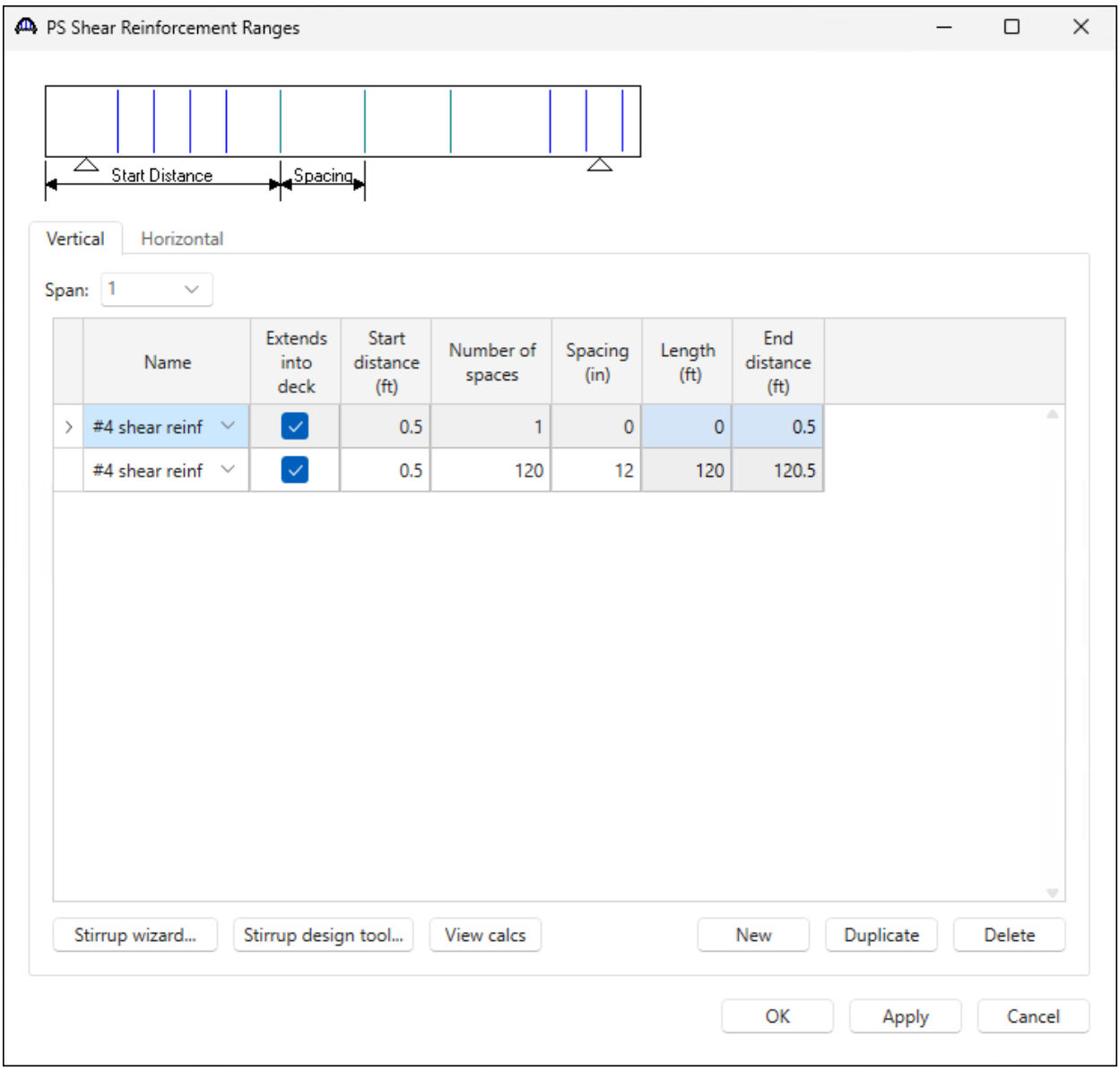
Haunch Profile

The haunch profile is defined by double-clicking on the **Haunch Profile** node in the **Bridge Workspace** tree. Enter data as shown below and Click **OK** to apply the data and close the window.



Shear Reinforcement Ranges

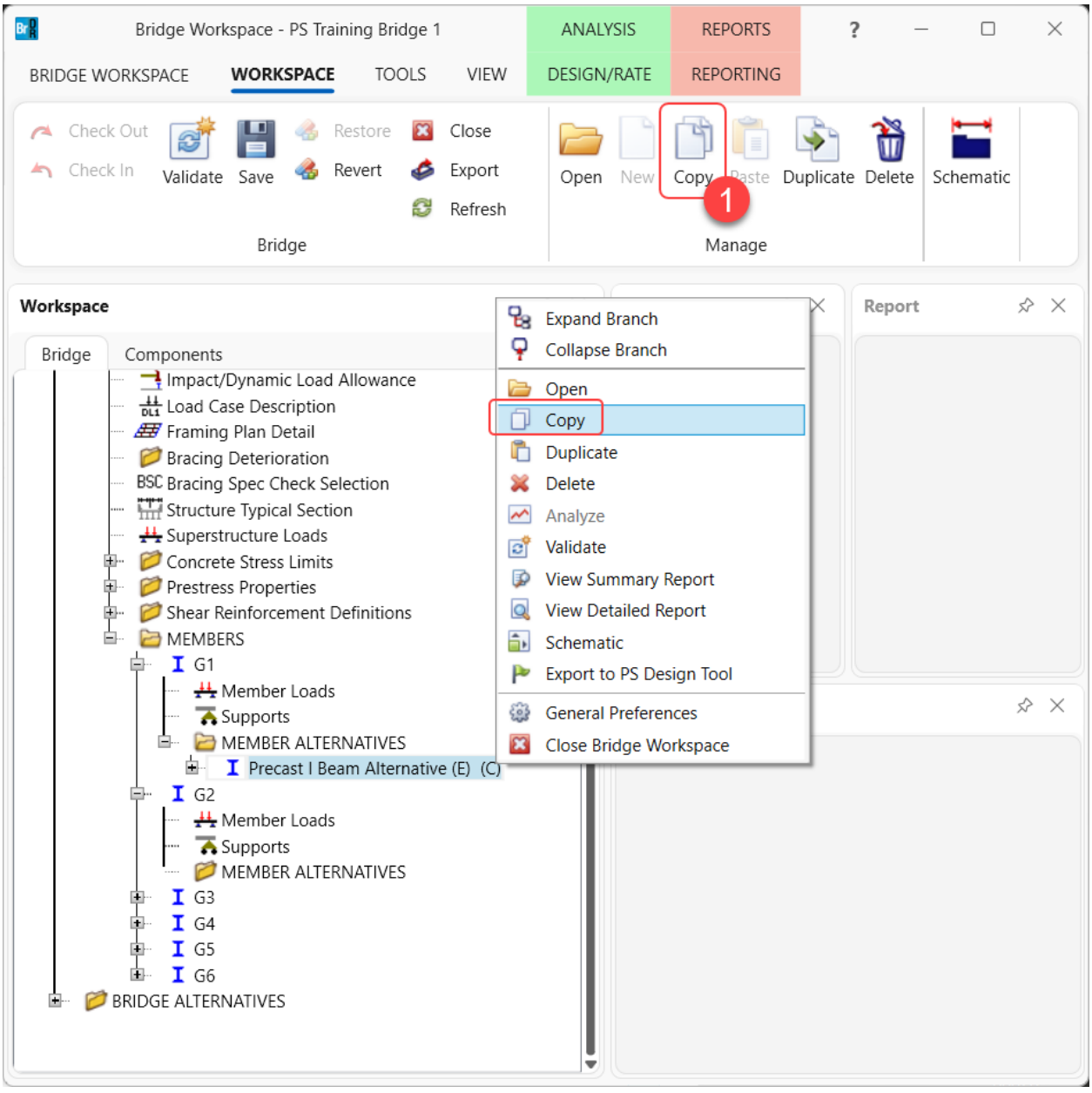
Double-click on the **Shear Reinforcement Ranges** node in the **Bridge Workspace** tree to open the **PS Shear Reinforcement Ranges** window. The shear reinforcement ranges are entered as described below. The vertical shear reinforcement is defined as extending into the deck on the **Vertical** tab of this window. This indicates composite action between the beam and the deck. Data does not have to be entered on the **Horizontal** tab to indicate composite action since that has been defined by extending the vertical bars into the deck.

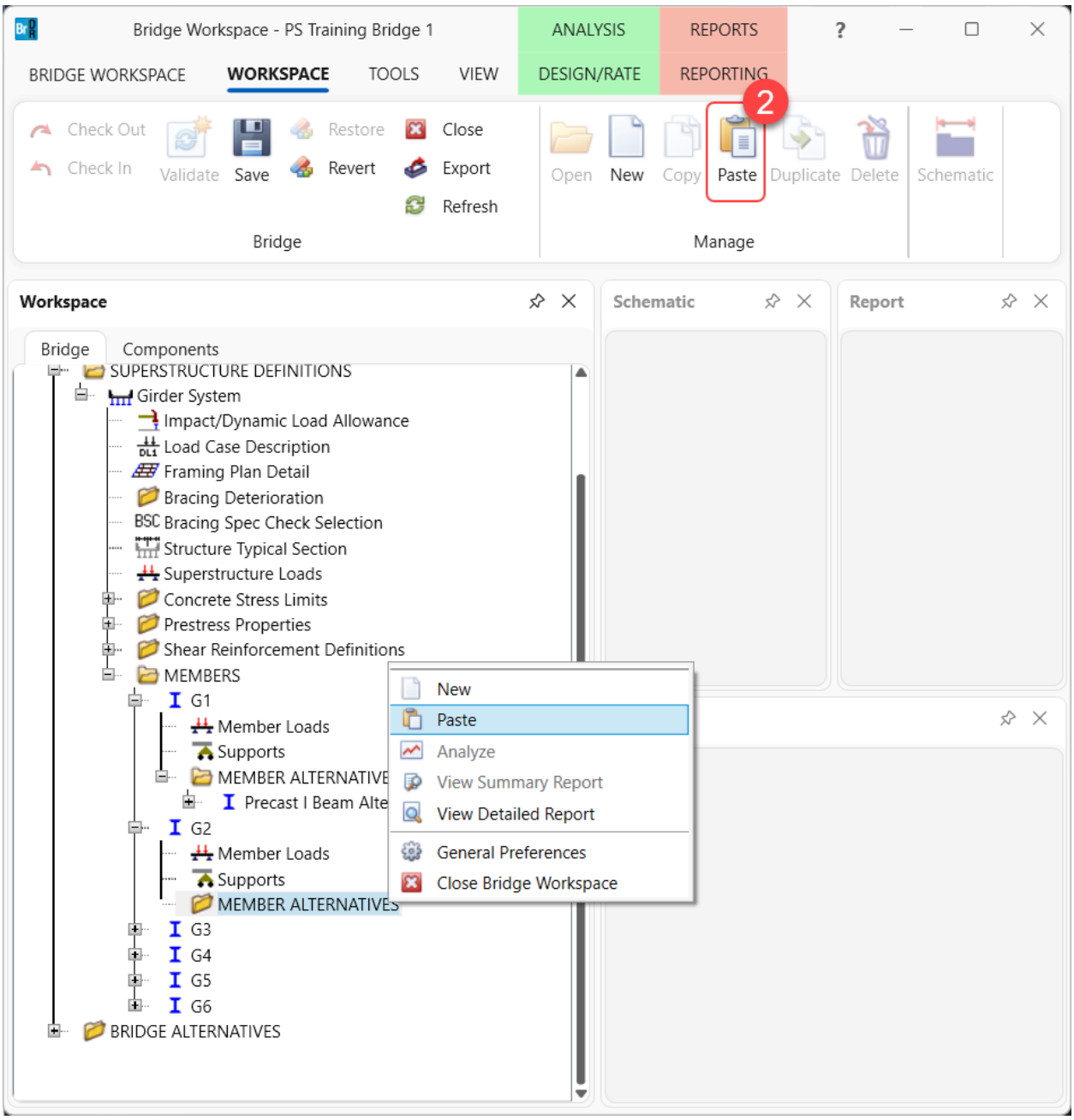


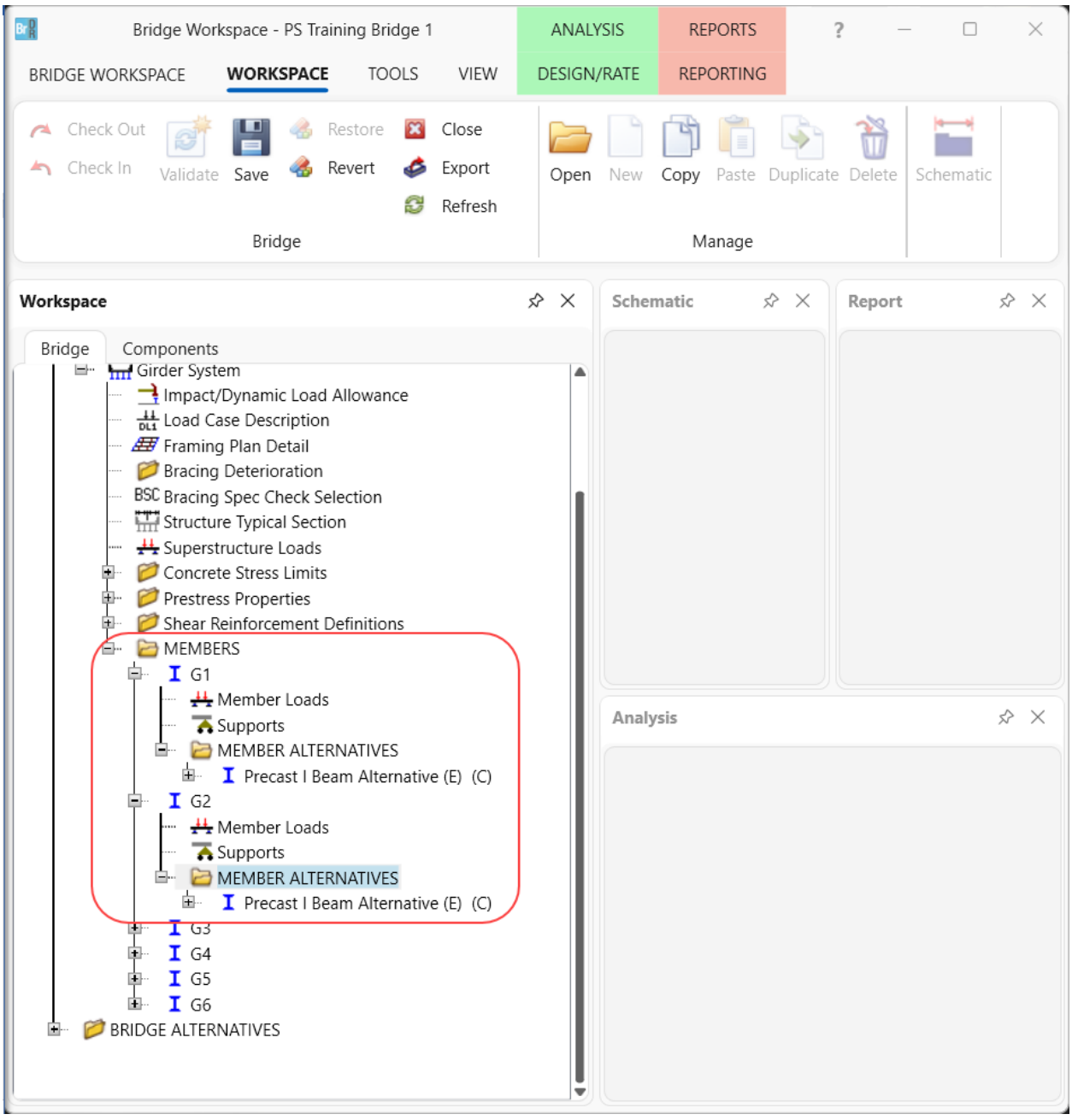
Click **OK** to apply the data and close the window.

Live Load Distribution

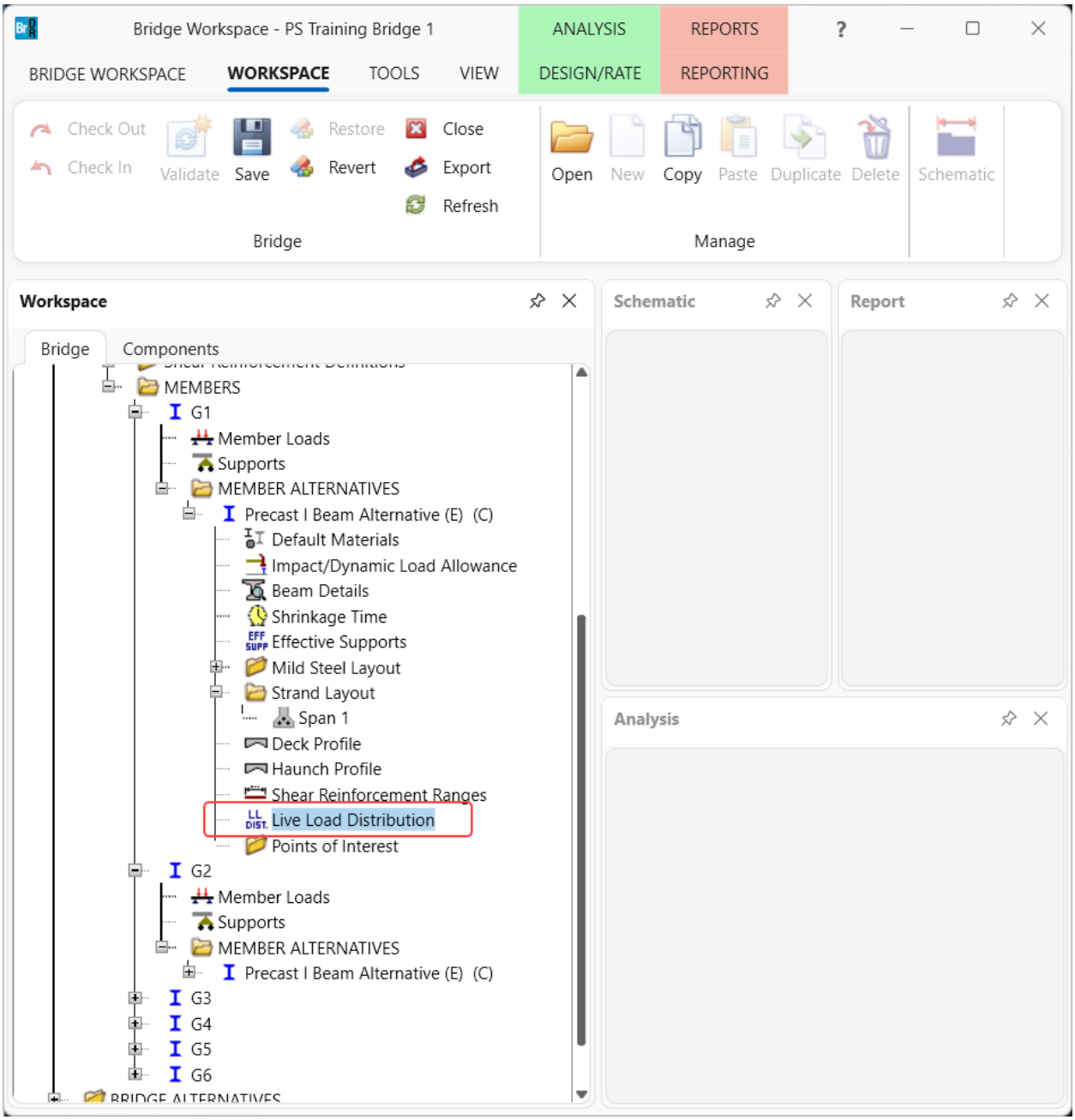
To compute the LRFD live load distribution factors, the interior girder adjacent to exterior girder must be defined. BrDR uses the beam shape assigned to this member alternative and the beam shapes assigned to the adjacent member alternatives to compute the distribution factors. If the **Compute from typical section…** button is used on this window without the adjacent girder defined, BrDR will throw a warning message indicating that since beam shapes are not assigned to adjacent member alternative, BrDR cannot calculate the distribution factors. In this case, the factors will have to be manually entered. For this example, copy the **Precast I Beam** member alternative of member **G1** and paste to **G2** as a member alternative.



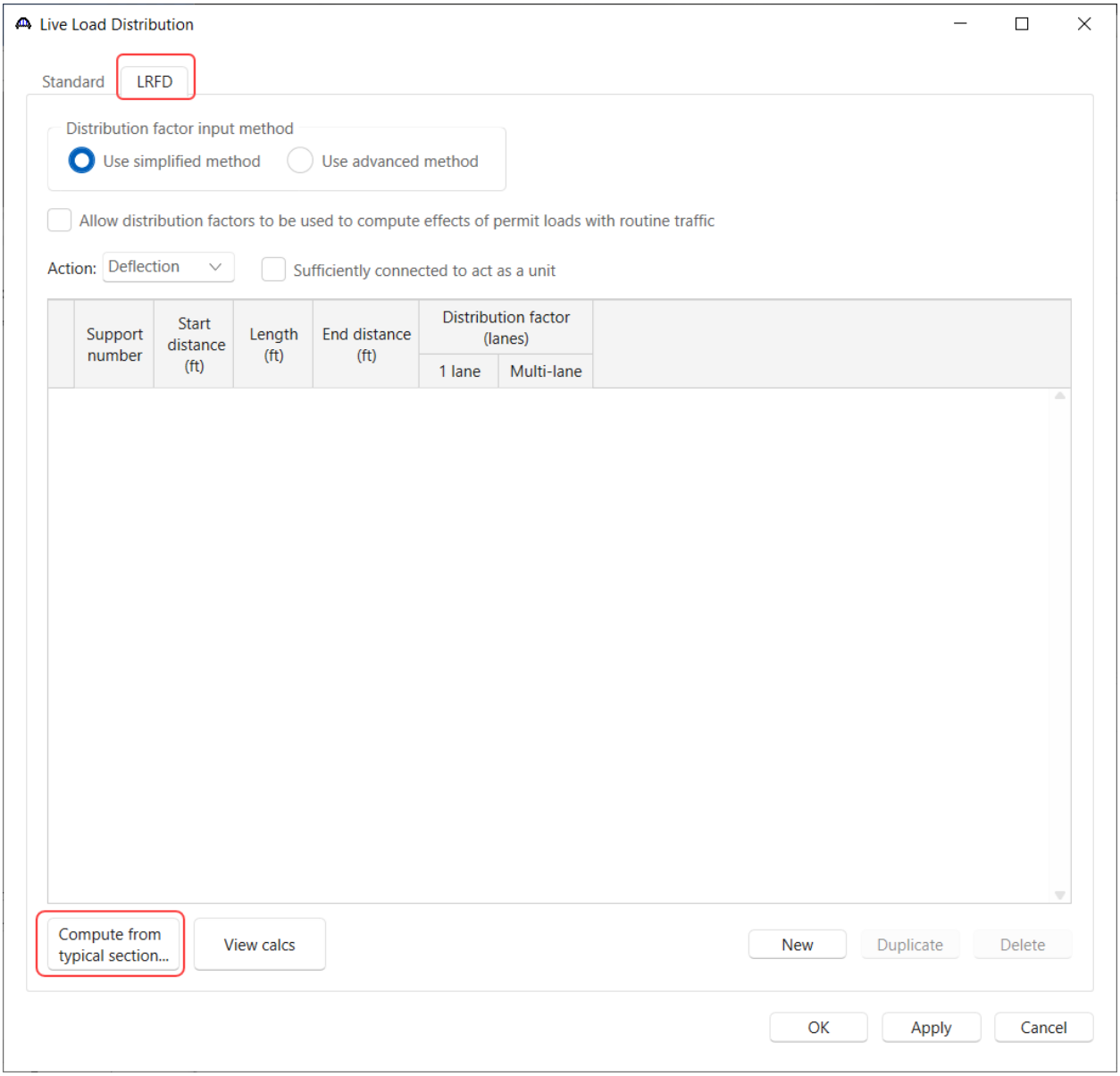

Bridge Workspace - PS Training Bridge 1
ANALYSIS
REPORTS
BRIDGE WORKSPACE
WORKSPACE
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DESIGN/RATE
REPORTING
Check Out
Check In
Validate
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Restore
Revert
Close
Export
Refresh
Bridge
Open
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Copy
Paste
Duplicate
Delete
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Bracing Deterioration
Bracing Spec Check Selection
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Superstructure Loads
Concrete Stress Limits
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New
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View Detailed Report
General Preferences
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Bridge Workspace - PS Training Bridge 1
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REPORTS
BRIDGE WORKSPACE
WORKSPACE
TOOLS
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REPORTING
Check Out
Check In
Validate
Save
Restore
Revert
Close
Export
Refresh
Bridge
Open
New
Copy
Paste
Duplicate
Delete
Schematic
Manage
Workspace
Schematic
Report
Analysis
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Impact/Dynamic Load Allowance
Load Case Description
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Bracing Deterioration
Bracing Spec Check Selection
Structure Typical Section
Superstructure Loads
Concrete Stress Limits
Prestress Properties
Shear Reinforcement Definitions
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Member Loads
Supports
MEMBER ALTERNATIVES
Precast I Beam Alternative (E) (C)
G2
Member Loads
Supports
MEMBER ALTERNATIVES
Precast I Beam Alternative (E) (C)
G3
G4
G5
G6
BRIDGE ALTERNATIVES

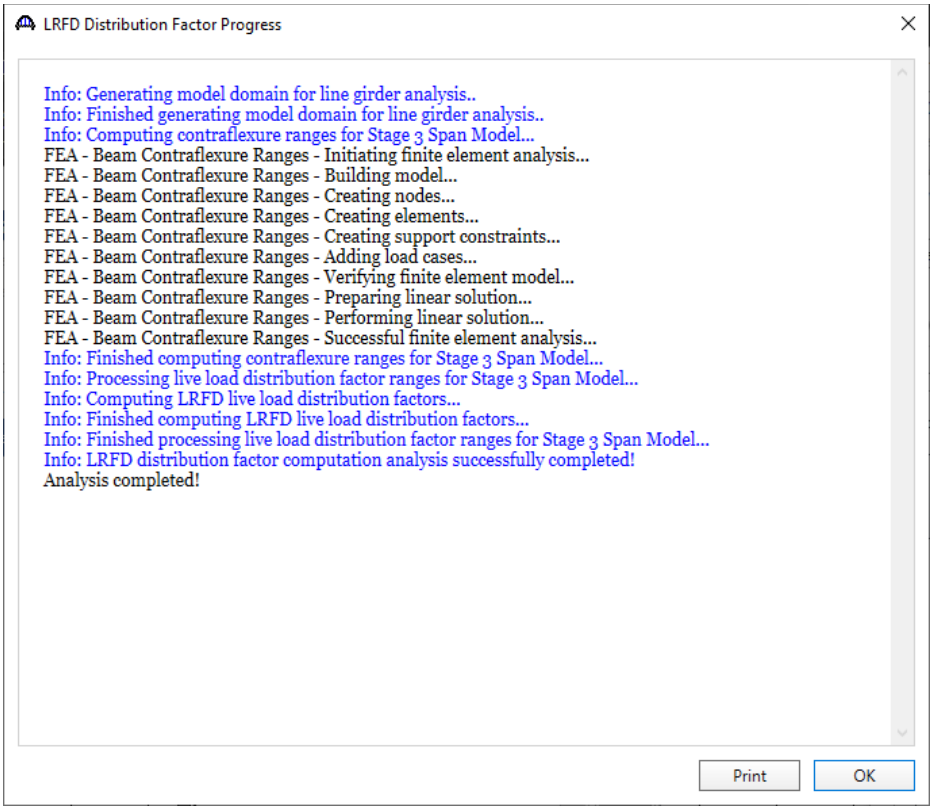
Double click on the **Live Load Distribution** node in the **Bridge Workspace** tree for member **G1** to open the **Live Load Distribution** window.



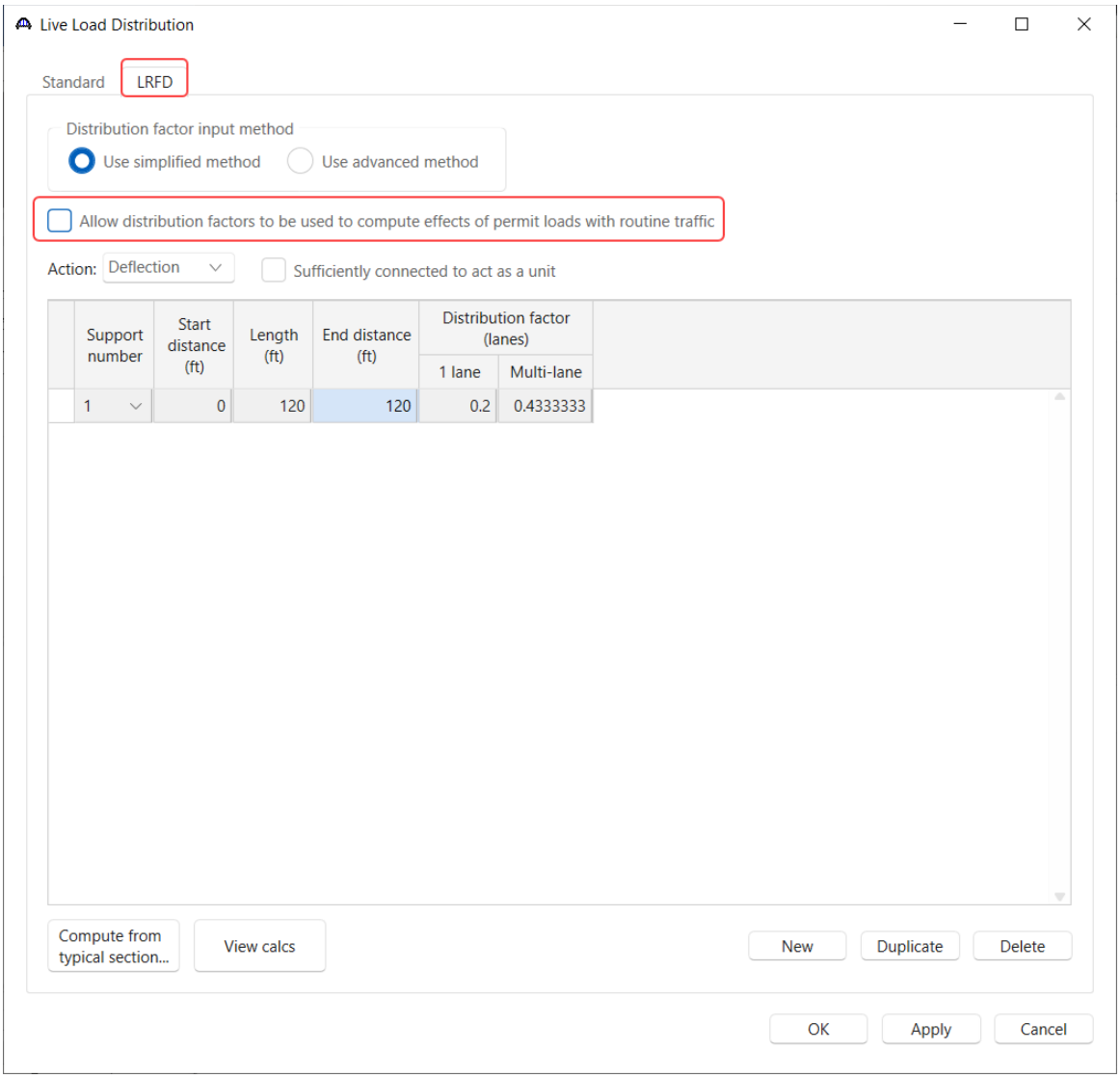
Navigate to the **LRFD** tab of this window. Click the **Compute from typical section . . .** button to compute the LRFD live load distribution factors.



The **LRFD Distribution Factor Progress** window opens as shown below.



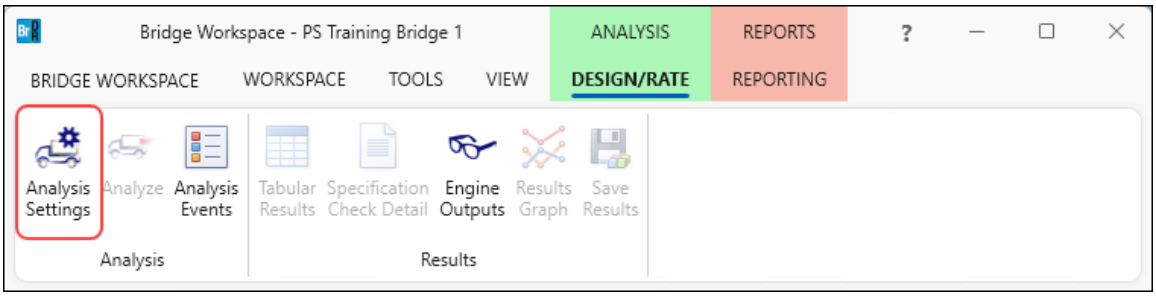
Once the analysis is complete, click **OK** to close this window. The **Live Load Distribution** window is now populated with the distribution factors. Uncheck the **Allow distribution factors to be used to compute effects of permit loads with routine traffic checkbox** and click **OK** to apply these factors and close the window. If these are left blank, BrDR will compute them during the analysis runtime.



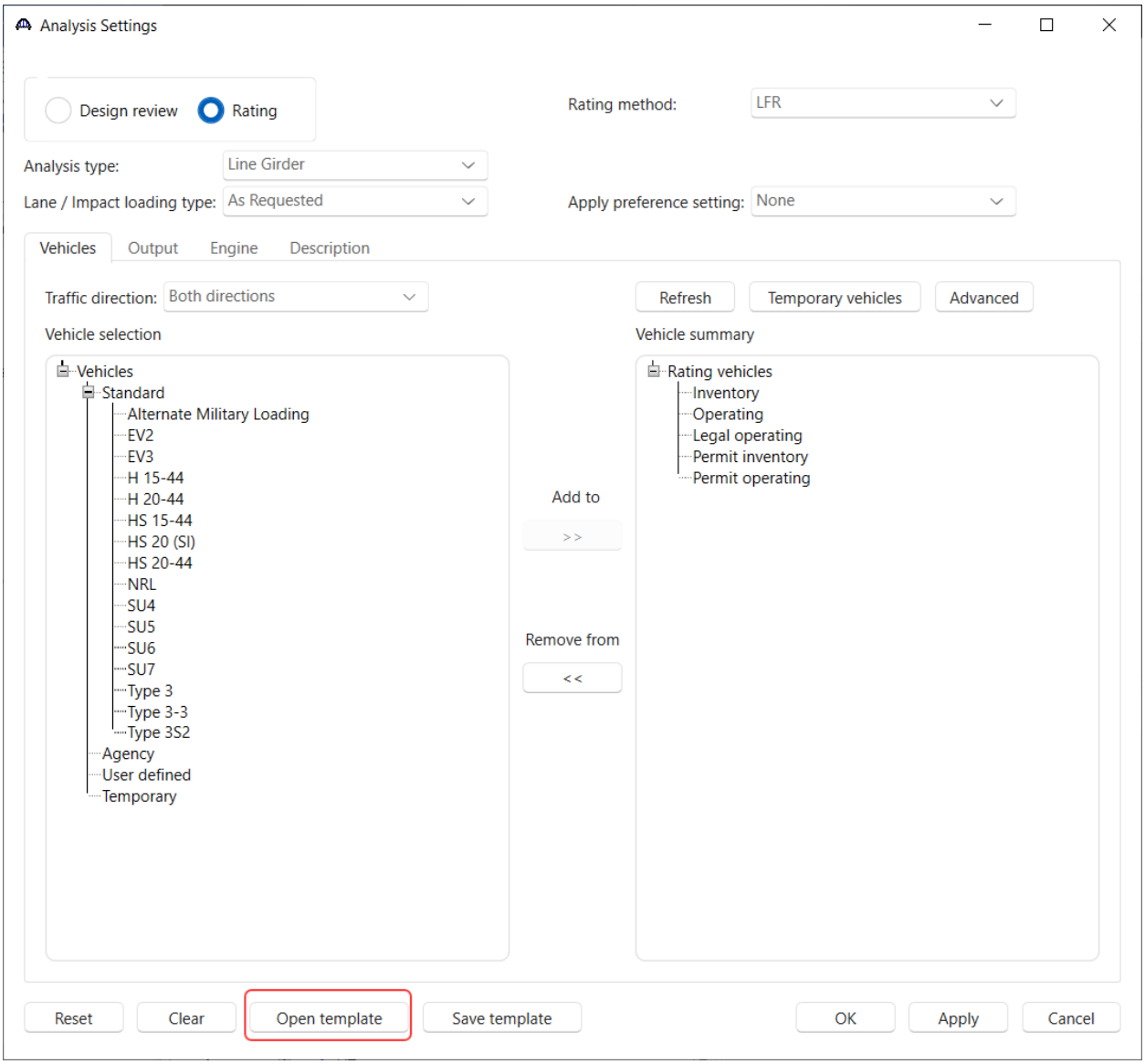
The description of an exterior beam for this structure definition is complete.

LRFR Analysis

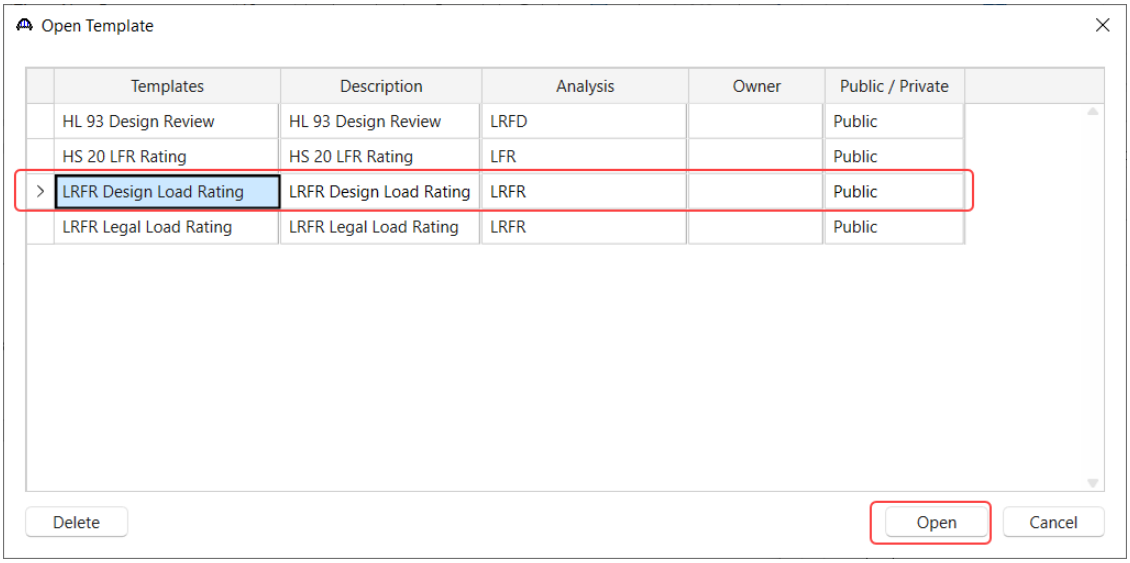
The member alternative for girder **G1** can now be analyzed. To perform an **LRFR** rating, select the **Analysis Settings** button on the **Analysis** group of the **DESIGN/RATE** ribbon.



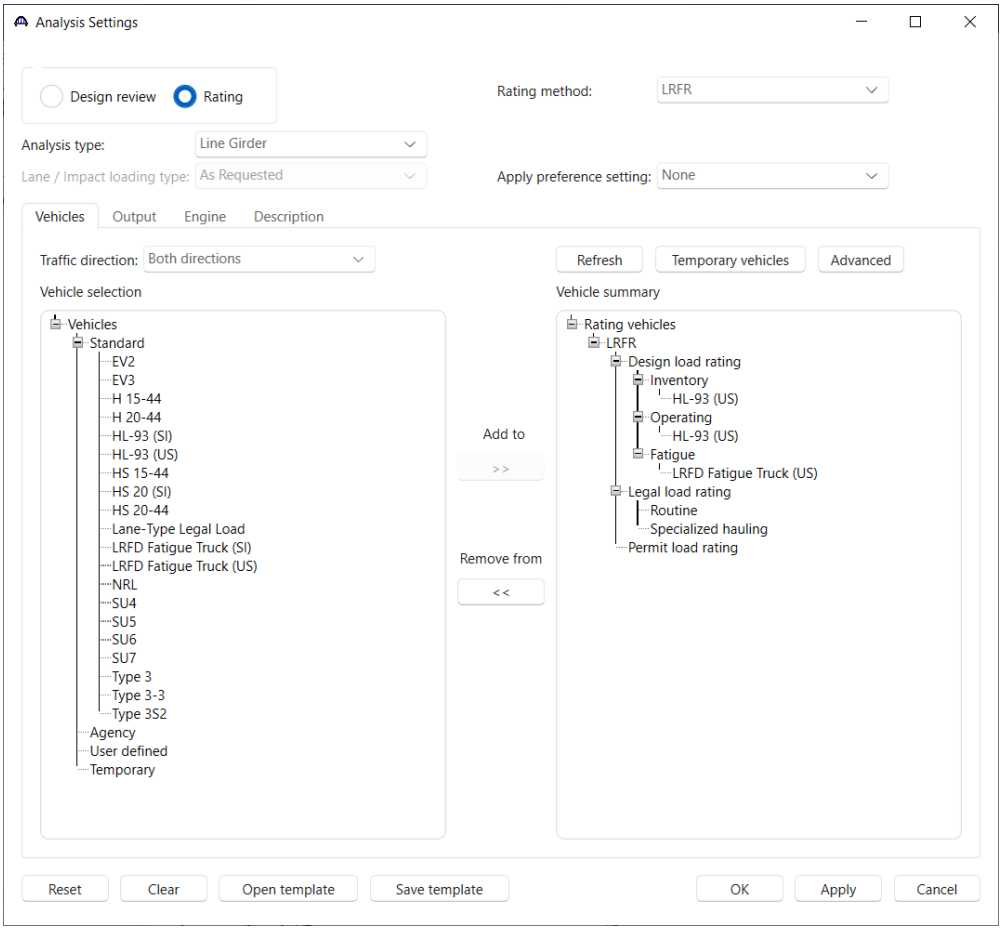
Click the **Open template** button.



Select the **LRFR Design Load Rating** to be used in the rating and click **Open**.



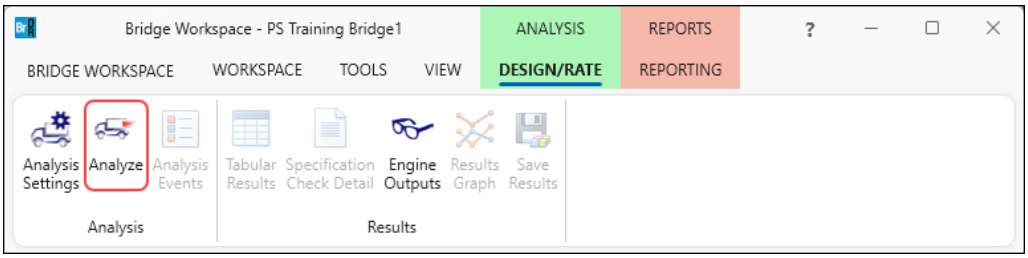
The **Analysis Settings** window will be populated as shown below.



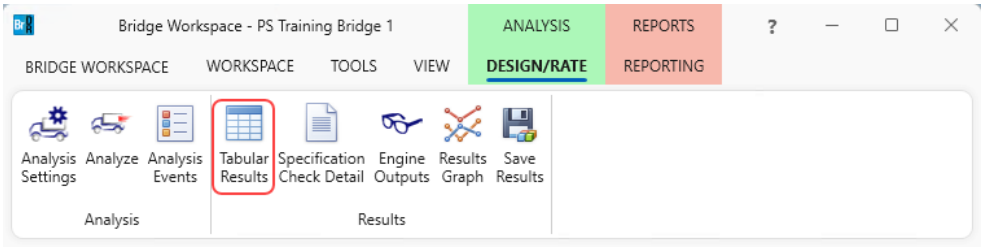
Click **OK** to apply the data and close the window.

Tabular Results

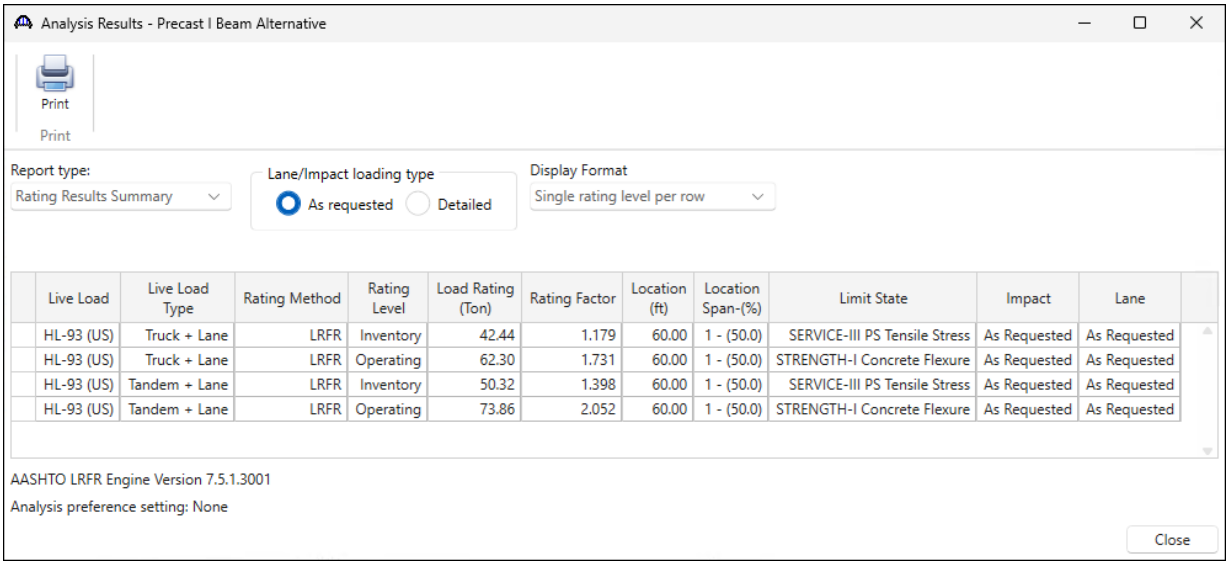
With member alternative **Precast I Beam Alternative** for member **G1** selected, click the **Analyze** button on the **Analysis** group of the **DESIGN/RATE** ribbon to perform the rating.



When the rating is finished results can be reviewed by clicking the **Tabular Results** button on the **Results** group of the ribbon.



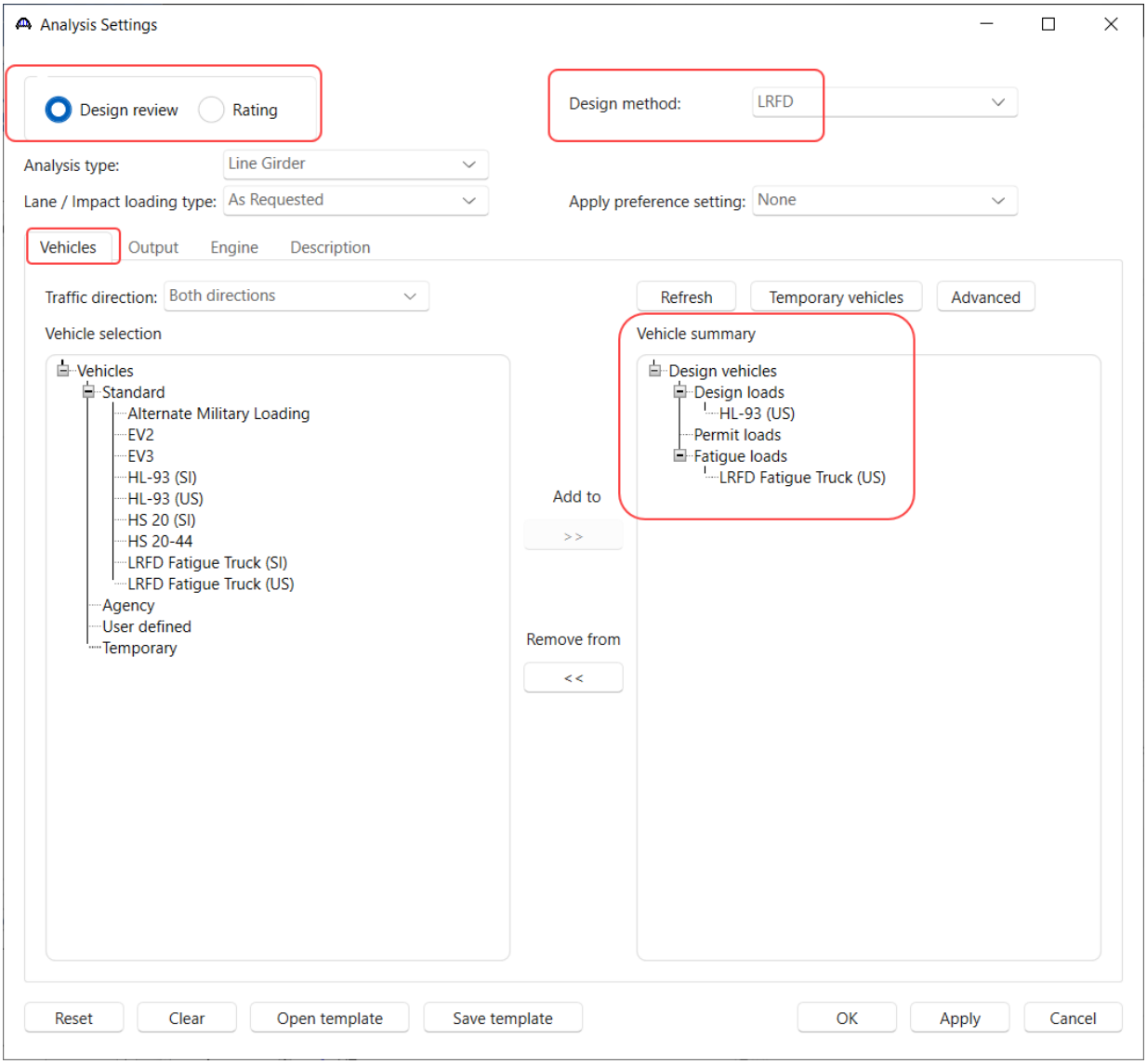
The window shown below will open. Select **Rating Results Summary** as the **Report Type** and **Single rating level per row** as the **Display Format** option to have the ratings arranged as shown below.



Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	Impact	Lane
HL-93 (US)	Truck + Lane	LRFR	Inventory	42.44	1.179	60.00	1 - (50.0)	SERVICE-III PS Tensile Stress	As Requested	As Requested
HL-93 (US)	Truck + Lane	LRFR	Operating	62.30	1.731	60.00	1 - (50.0)	STRENGTH-I Concrete Flexure	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Inventory	50.32	1.398	60.00	1 - (50.0)	SERVICE-III PS Tensile Stress	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Operating	73.86	2.052	60.00	1 - (50.0)	STRENGTH-I Concrete Flexure	As Requested	As Requested

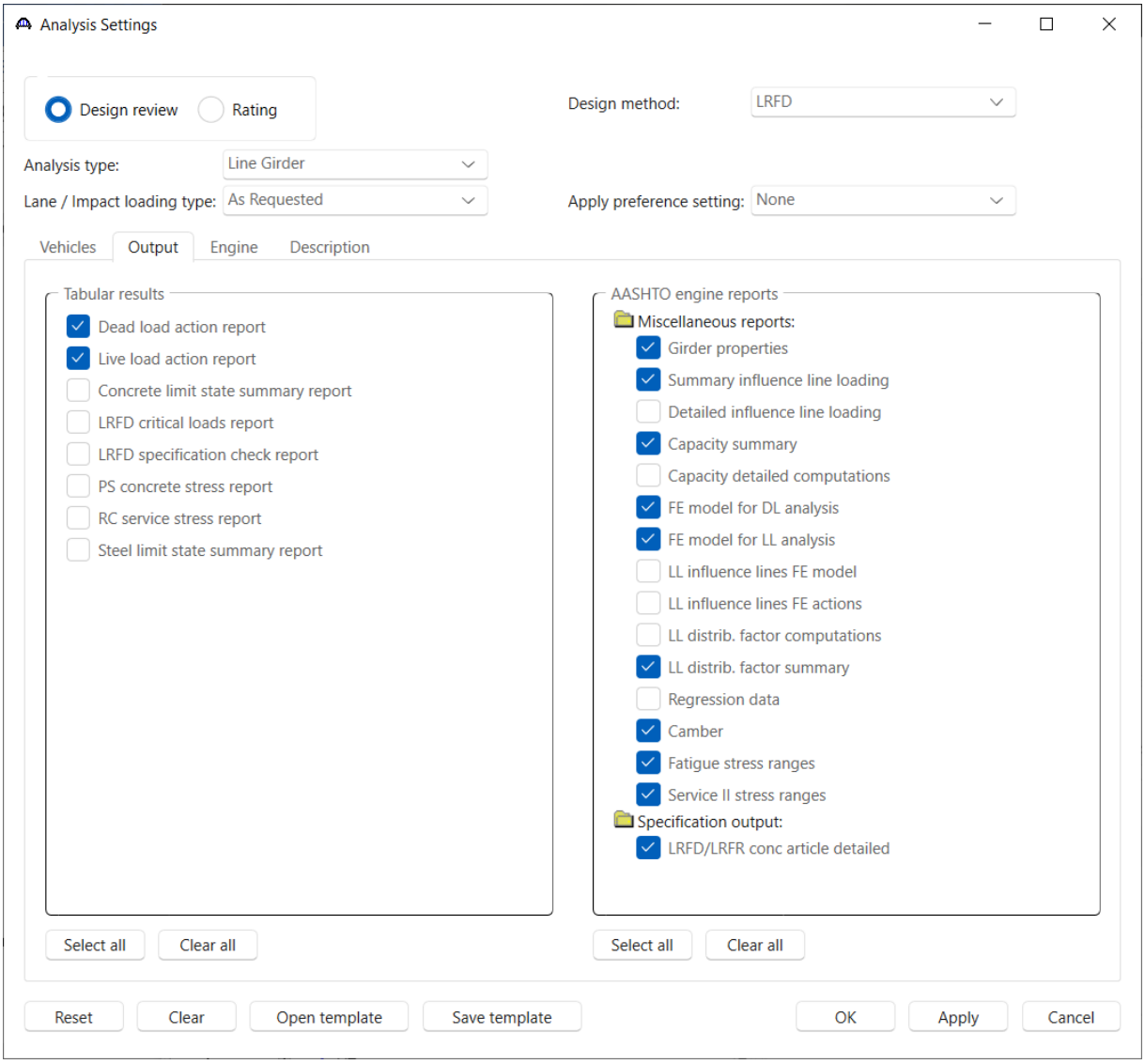
LRFD Design Review

An LRFD design review of this girder for **HL93** loading can be performed by AASHTO LRFD. To perform an LRFD design review, enter the **Analysis Settings** window as shown below or select the **HL 93 Design Review** template from the Open Template button as shown in the previous section.:



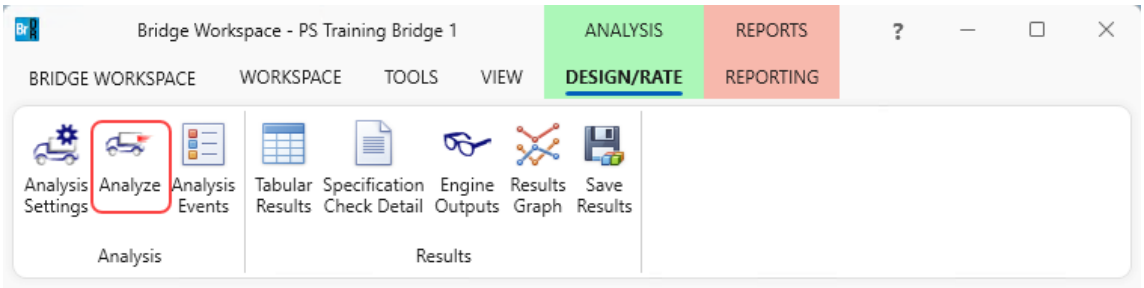
Analysis Settings - Output

Navigate to the **Output** tab and enter the **Analysis Settings** as shown below.

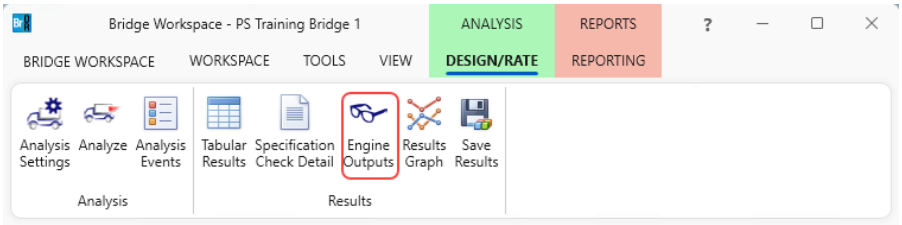


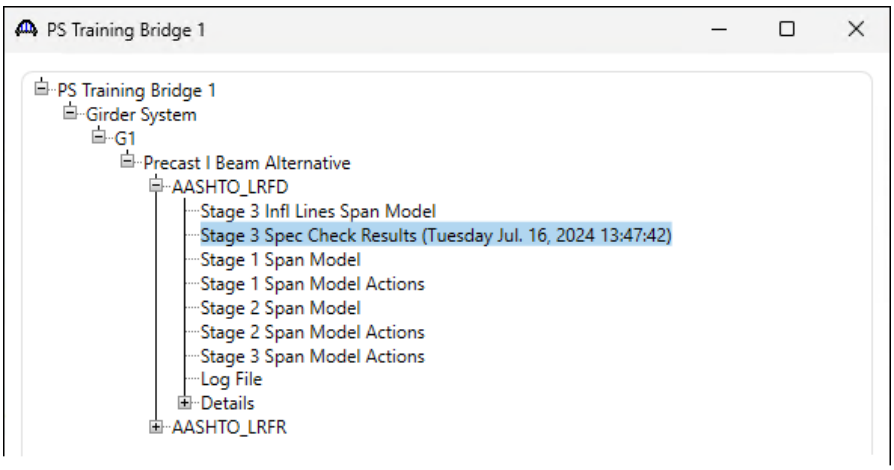
Engine Outputs

Next with member alternative **Precast I Beam Alternative** for member **G1** selected click the **Analyze** button on the **Analysis** group of the **DESIGN/RATE** ribbon to perform the design review.



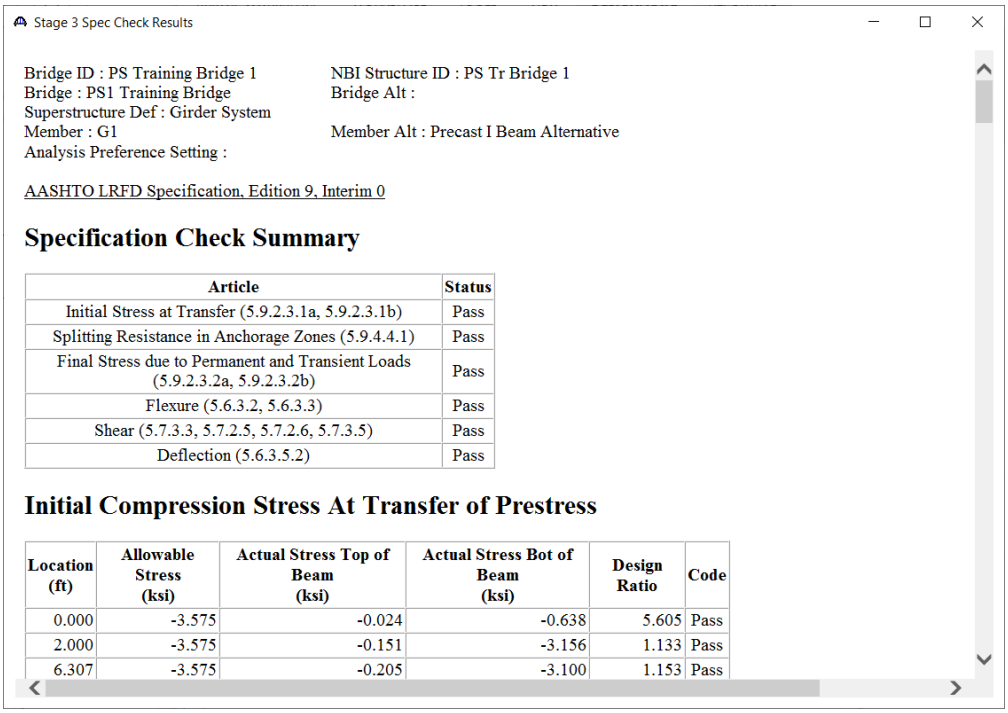
AASHTO LRFD analysis will generate a spec check results file. Click the **Engine Outputs** button from the **Results** group of the **DESIGN/RATE** ribbon to open the following window.





To view the LRFD spec check results (shown below), double click on the **Stage 3 Spec Check Results** under the AASHTO_LRFD branch in this window.

The following file opens.



Stage 3 Spec Check Results

Bridge ID : PS Training Bridge 1
Bridge : PS1 Training Bridge
Superstructure Def : Girder System
Member : G1
Analysis Preference Setting :

NBI Structure ID : PS Tr Bridge 1
Bridge Alt :

Member Alt : Precast I Beam Alternative

AASHTO LRFD Specification, Edition 9, Interim 0

Specification Check Summary

Article	Status
Initial Stress at Transfer (5.9.2.3.1a, 5.9.2.3.1b)	Pass
Splitting Resistance in Anchorage Zones (5.9.4.4.1)	Pass
Final Stress due to Permanent and Transient Loads (5.9.2.3.2a, 5.9.2.3.2b)	Pass
Flexure (5.6.3.2, 5.6.3.3)	Pass
Shear (5.7.3.3, 5.7.2.5, 5.7.2.6, 5.7.3.5)	Pass
Deflection (5.6.3.5.2)	Pass

Initial Compression Stress At Transfer of Prestress

Location (ft)	Allowable Stress (ksi)	Actual Stress Top of Beam (ksi)	Actual Stress Bot of Beam (ksi)	Design Ratio	Code
0.000	-3.575	-0.024	-0.638	5.605	Pass
2.000	-3.575	-0.151	-3.156	1.133	Pass
6.307	-3.575	-0.205	-3.100	1.153	Pass

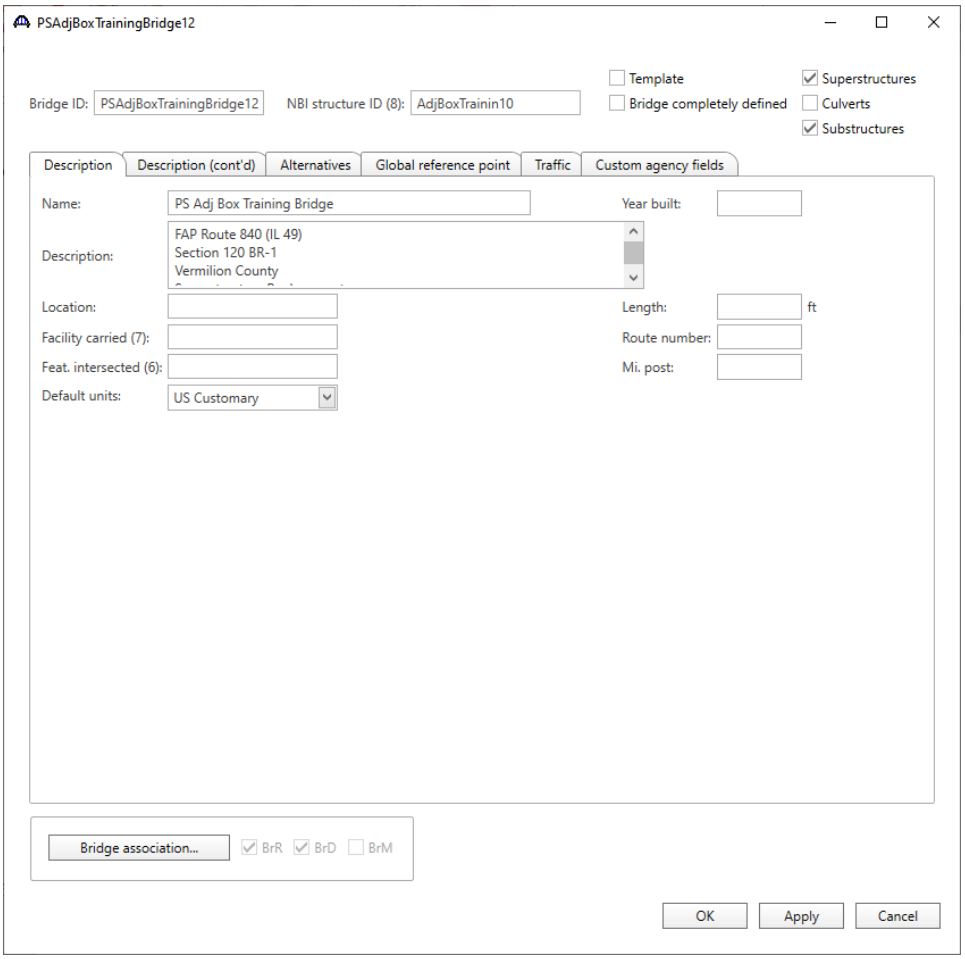
Prestressed Concrete Structure Tutorial

PS15 – Two Span PS adjacent Box With Straight Strands

BrDR Training

PS15 - Two Span PS Adjacent Box With Straight Strands Example

From the **Bridge Explorer** create a **new bridge** and enter the following description data:

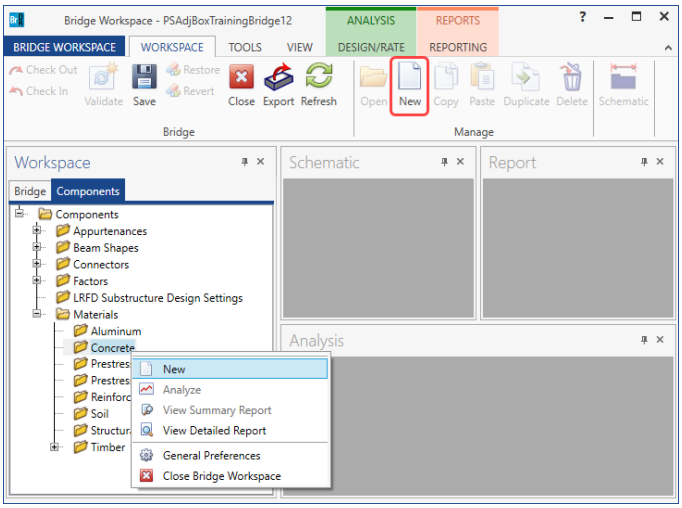


Click **OK** to apply the data and close the window.

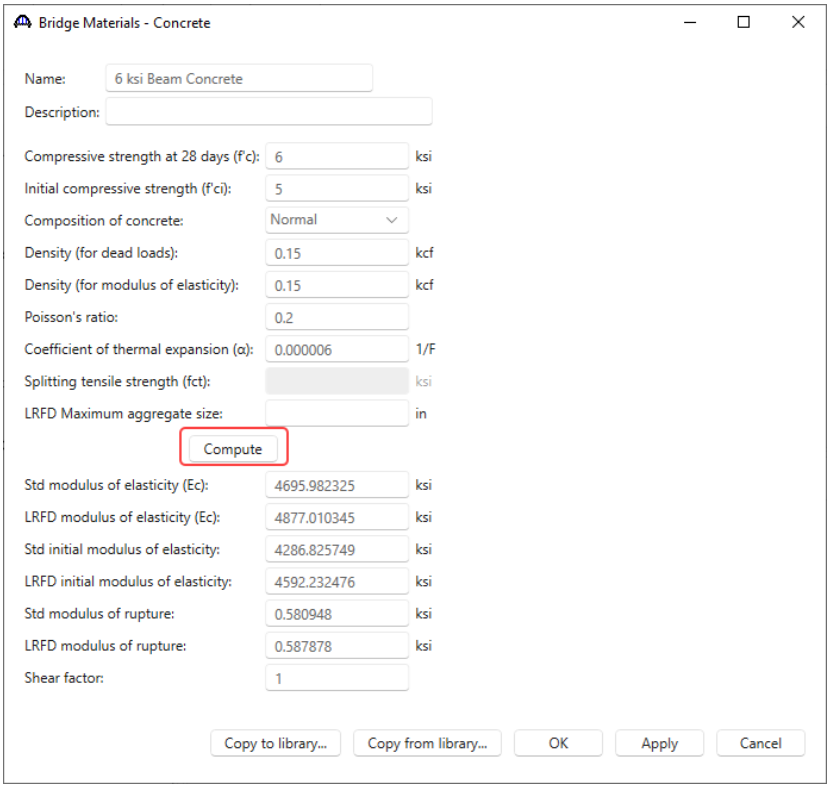
Bridge Components

Bridge Materials - Concrete

To add a new concrete material, in the **Components** tab of the **Bridge Workspace**, expand the **Materials** node by clicking the ⊞ button, select **Concrete,** and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or right mouse click on **Concrete** and select **New**).



The window shown below will open. Enter the values as shown above the **Compute** button and click the **Compute** button to compute the remaining values below them.

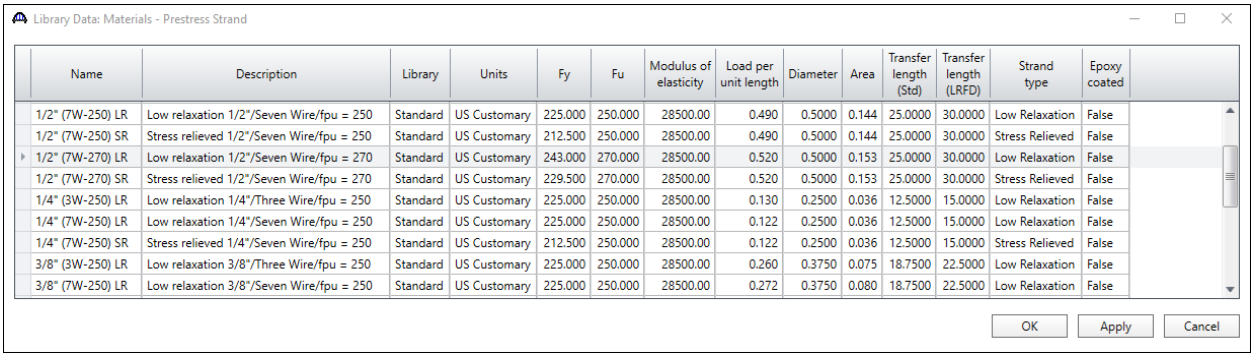


Click **OK** to apply the data and close the window.

Bridge Materials – Prestress strand

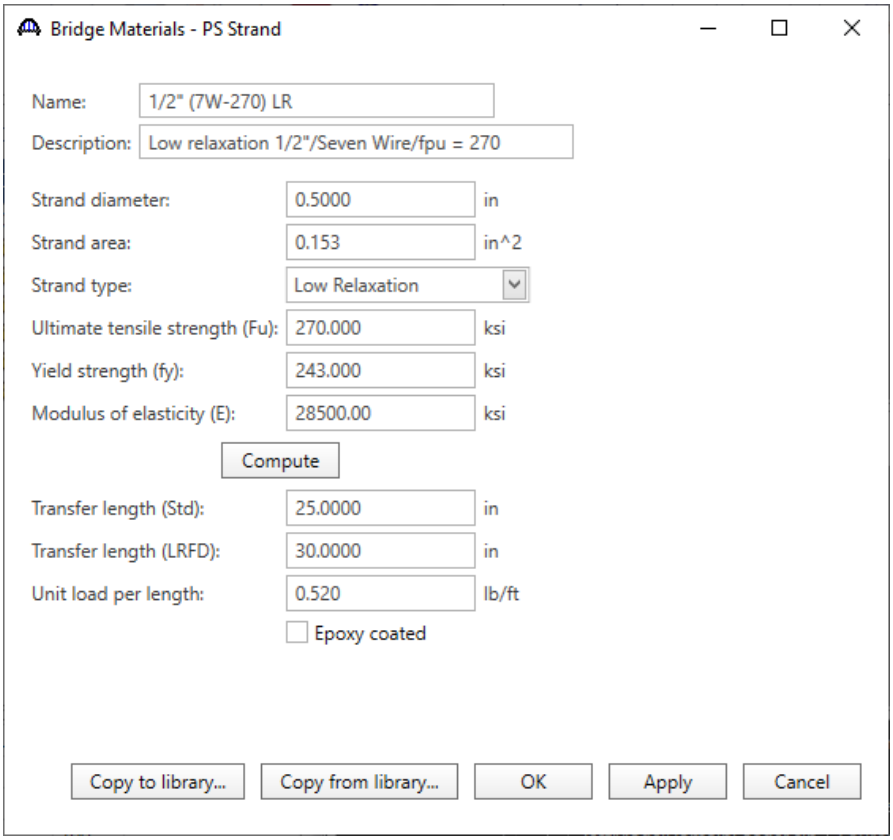
To add a new prestress strand material, select **Prestress Strand** in the **Components** tree**,** and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or right mouse click on **Prestress Strand** and select **New**).

Click on the **Copy from library…** button in this window and select **½" (7W-270) LR** from the library and click **OK.**



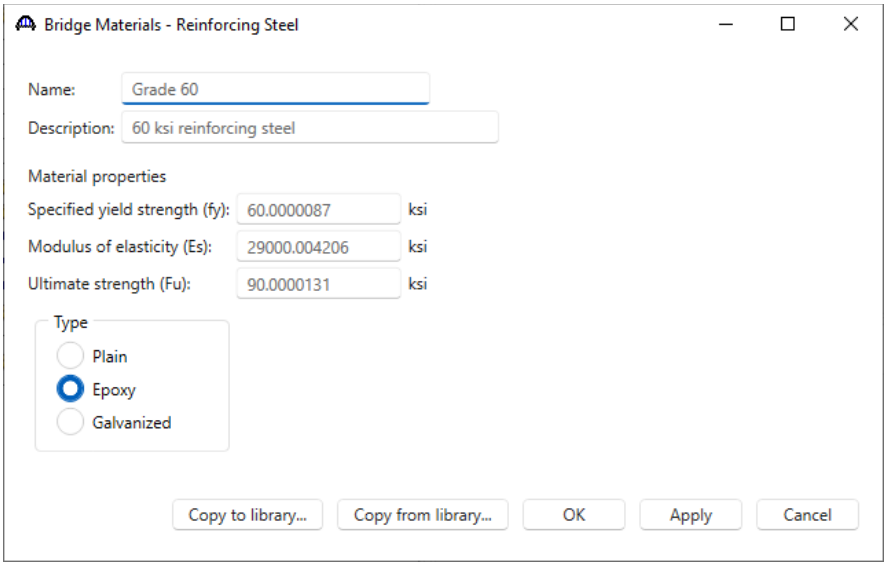
Name	Description	Library	Units	Fy	Fu	Modulus of elasticity	Load per unit length	Diameter	Area	Transfer length (Std)	Transfer length (LRFD)	Strand type	Epoxy coated
1/2" (7W-250) LR	Low relaxation 1/2"/Seven Wire/fpu = 250	Standard	US Customary	225.000	250.000	28500.00	0.490	0.5000	0.144	25.0000	30.0000	Low Relaxation	False
1/2" (7W-250) SR	Stress relieved 1/2"/Seven Wire/fpu = 250	Standard	US Customary	212.500	250.000	28500.00	0.490	0.5000	0.144	25.0000	30.0000	Stress Relieved	False
1/2" (7W-270) LR	Low relaxation 1/2"/Seven Wire/fpu = 270	Standard	US Customary	243.000	270.000	28500.00	0.520	0.5000	0.153	25.0000	30.0000	Low Relaxation	False
1/2" (7W-270) SR	Stress relieved 1/2"/Seven Wire/fpu = 270	Standard	US Customary	229.500	270.000	28500.00	0.520	0.5000	0.153	25.0000	30.0000	Stress Relieved	False
1/4" (3W-250) LR	Low relaxation 1/4"/Three Wire/fpu = 250	Standard	US Customary	225.000	250.000	28500.00	0.130	0.2500	0.036	12.5000	15.0000	Low Relaxation	False
1/4" (7W-250) LR	Low relaxation 1/4"/Seven Wire/fpu = 250	Standard	US Customary	225.000	250.000	28500.00	0.122	0.2500	0.036	12.5000	15.0000	Low Relaxation	False
1/4" (7W-250) SR	Stress relieved 1/4"/Seven Wire/fpu = 250	Standard	US Customary	212.500	250.000	28500.00	0.122	0.2500	0.036	12.5000	15.0000	Stress Relieved	False
3/8" (3W-250) LR	Low relaxation 3/8"/Three Wire/fpu = 250	Standard	US Customary	225.000	250.000	28500.00	0.260	0.3750	0.075	18.7500	22.5000	Low Relaxation	False
3/8" (7W-250) LR	Low relaxation 3/8"/Seven Wire/fpu = 250	Standard	US Customary	225.000	250.000	28500.00	0.272	0.3750	0.080	18.7500	22.5000	Low Relaxation	False

The selected material properties are copied to the **Bridge Materials – PS Strand** window as shown below.



Click **OK** to apply the data and close the window.

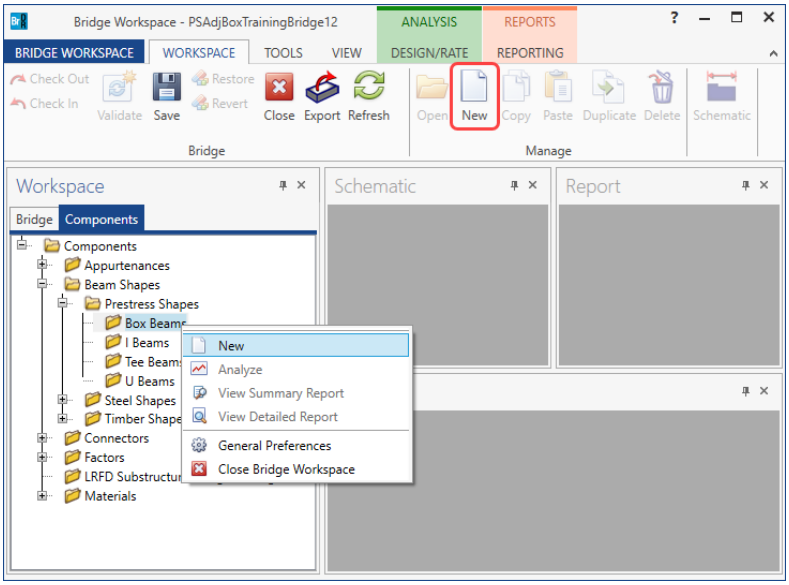
Add the following reinforcement steel in the same manner.



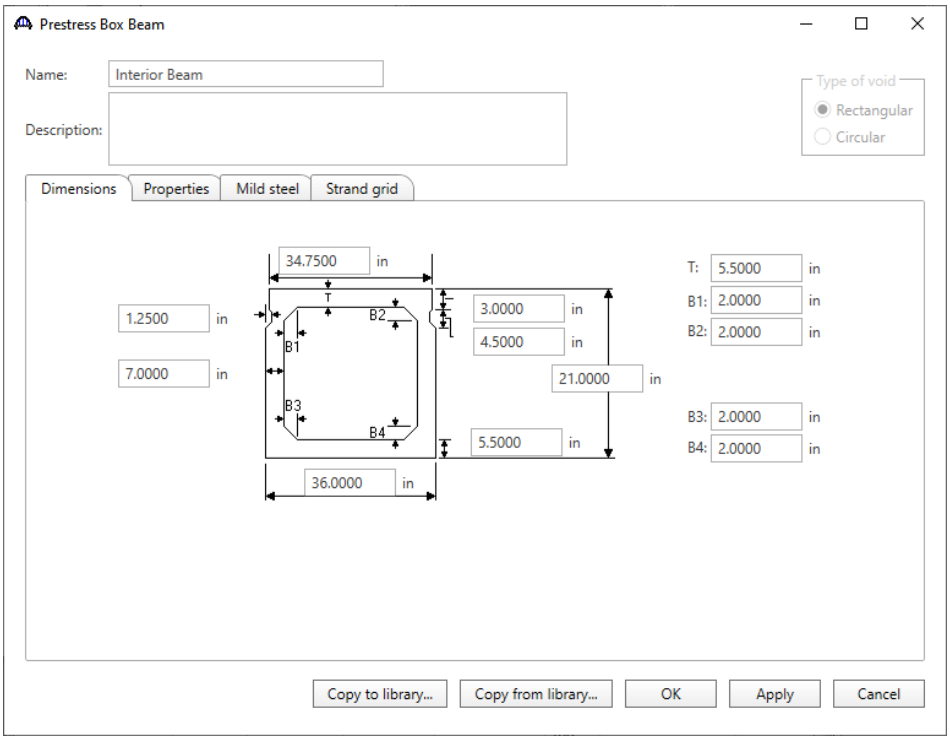
Click **OK** to apply the data and close the window.

Beam Shape

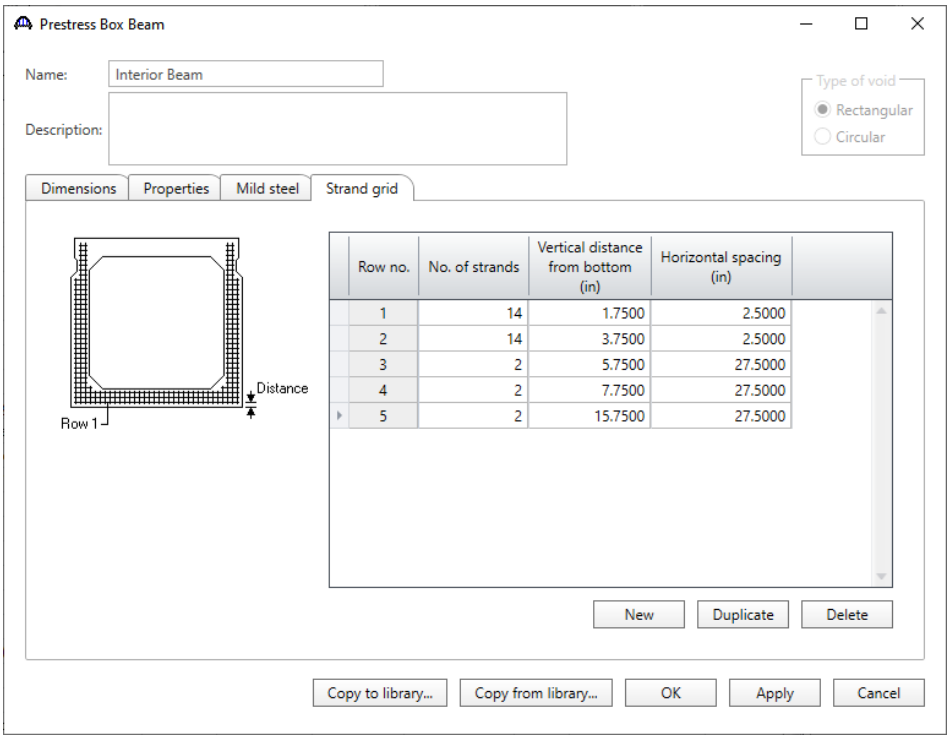
To enter a prestress beam shape to be used in this bridge expand the tree labelled **Beam Shapes** and **Prestress Shapes** as shown below and click on the **Box Beams** node in the **Components** tree, select **New** from the **Manage** group of the **WORKSPACE** ribbon (or right mouse click on **Box Beams** and select **New** or double click on **Box Beams** in the **Components** tree).



The **Prestress Box Beam** window shown below will open. Select the **Type of Void** as **Rectangular** and enter the data for the interior beam as shown below.



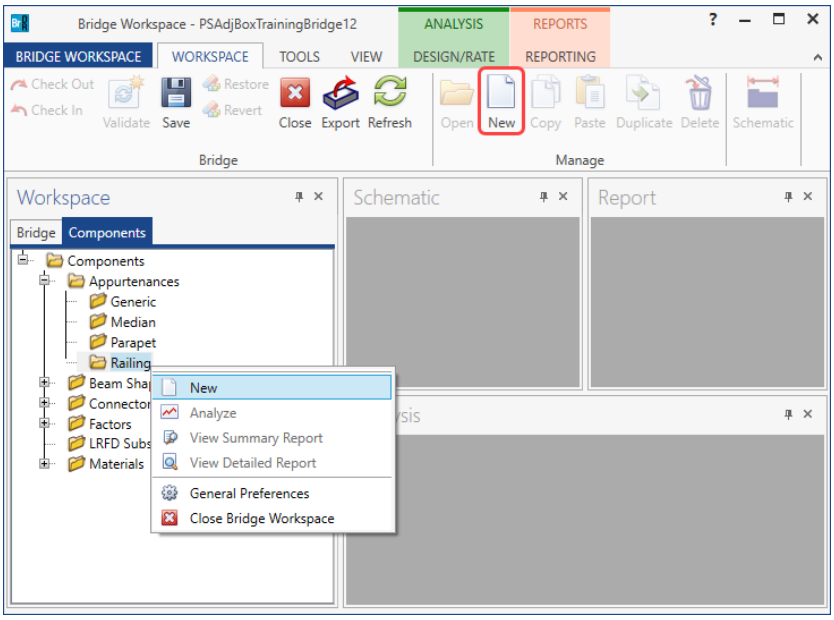
Navigate to the **Strand grid** tab and enter the data as shown below.



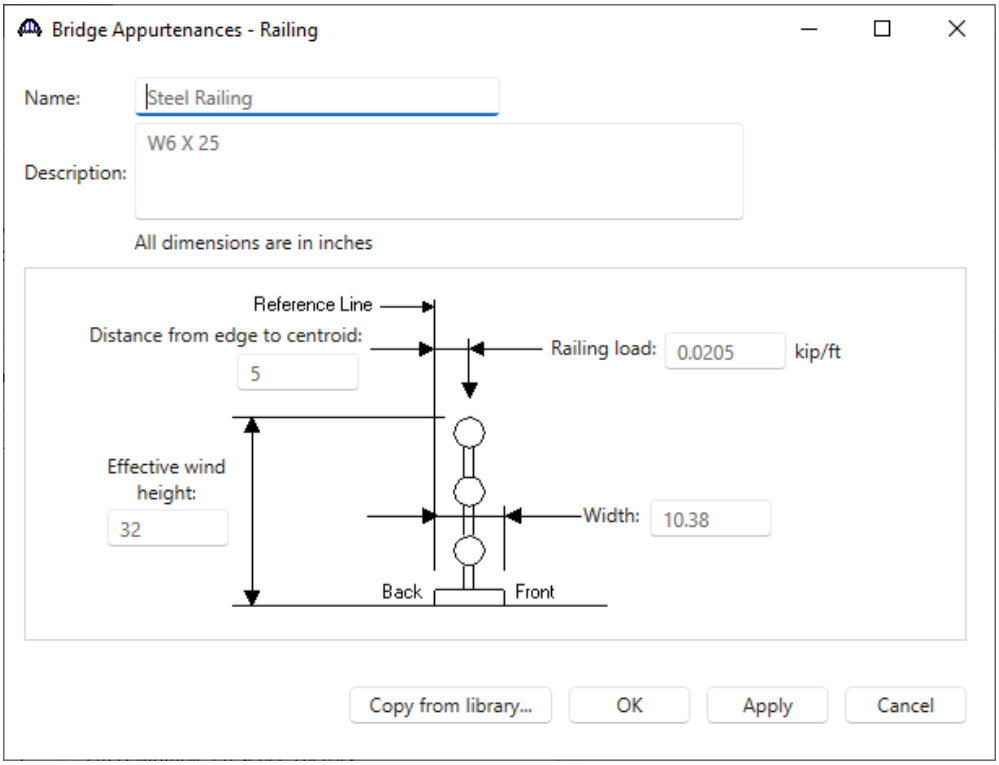
Click **OK** to apply the data and close the window.

Bridge - Appurtenances

To enter the appurtenances to be used within the bridge expand the tree branch labeled **Appurtenances**. To define a steel railing, select **Railing** and click on **New** from the **Manage** button on the **WORKSPACE** ribbon (or right click on **Railing** in the **Components** tree and select **New**).



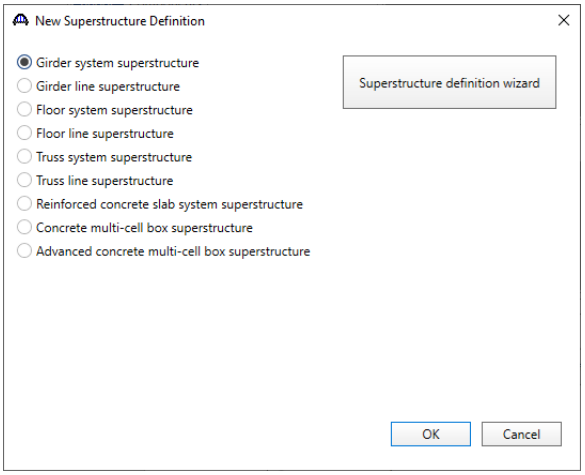
Enter the data as shown below.



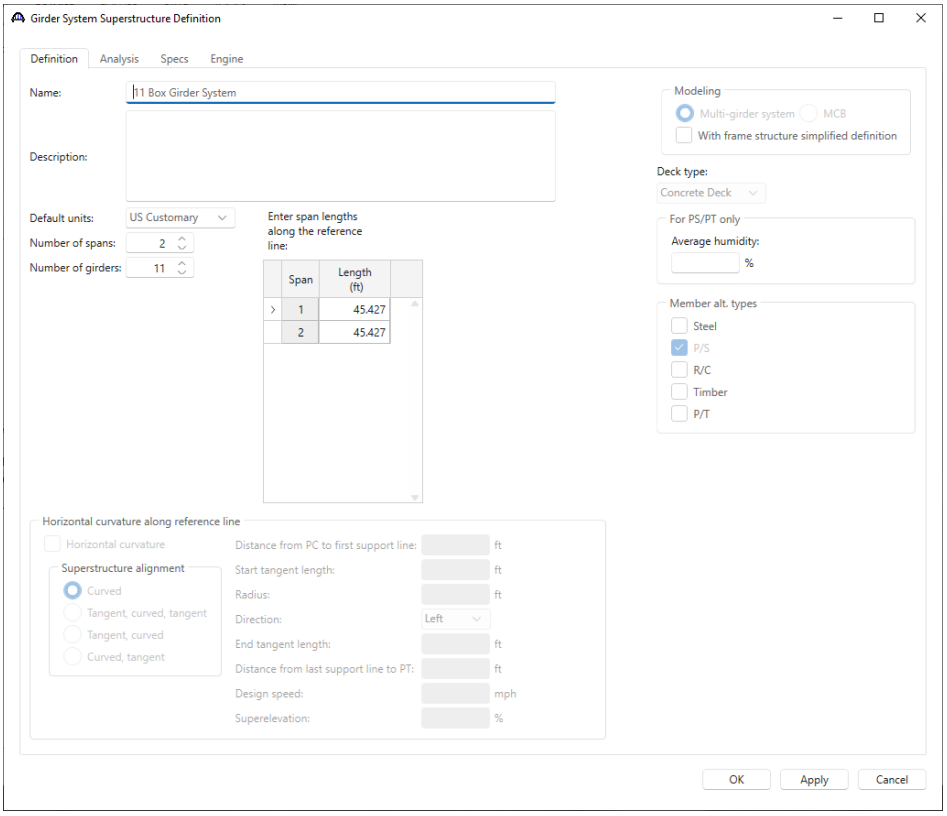
Click **OK** to apply the data and close the window.

Superstructure Definition

Returning to the **Bridge** tab of the **Bridge Workspace**, double click on **SUPERSTRUCTURE DEFINITIONS** (or click on **SUPERSTRUCTURE DEFINITIONS** and select **New** from the **Manage** group of the **WORKSPACE** ribbon or right mouse click on **SUPERSTRUCTURE DEFINITIONS** and select **New** from the popup menu) to create a new structure definition. The window shown below will appear.

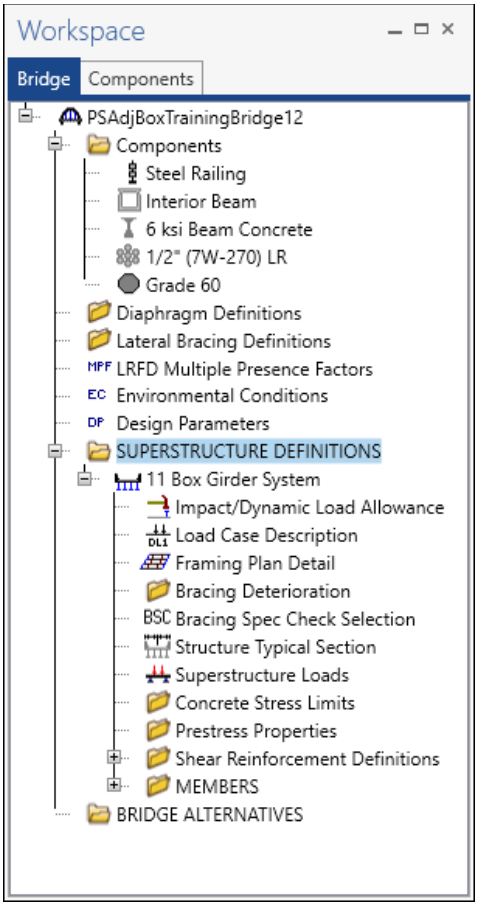


Select **Girder system superstructure**, click **OK** and the **Girder System Superstructure Definition** window will open. Enter the data as shown below.



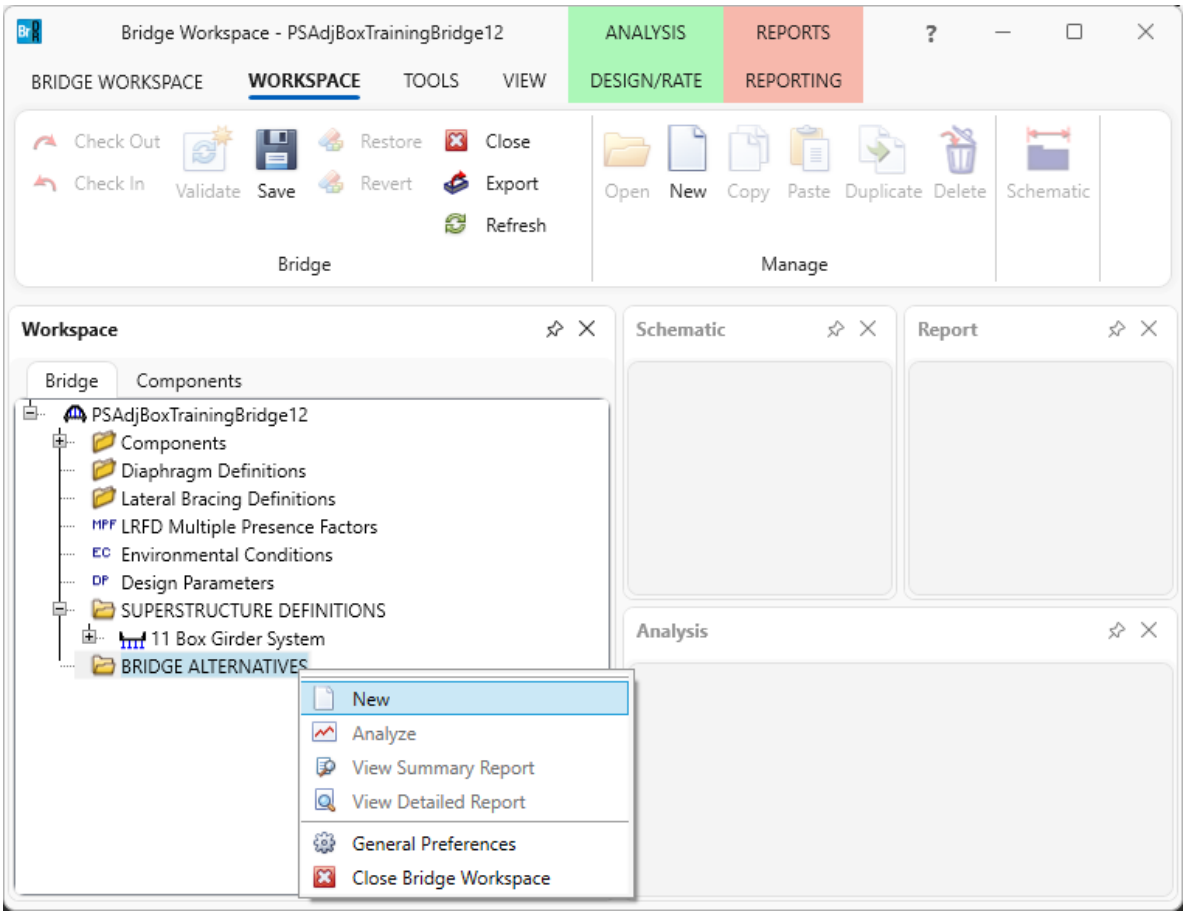
Click **OK** to apply the data and close the window.

The partially expanded **Bridge Workspace** tree is shown below:

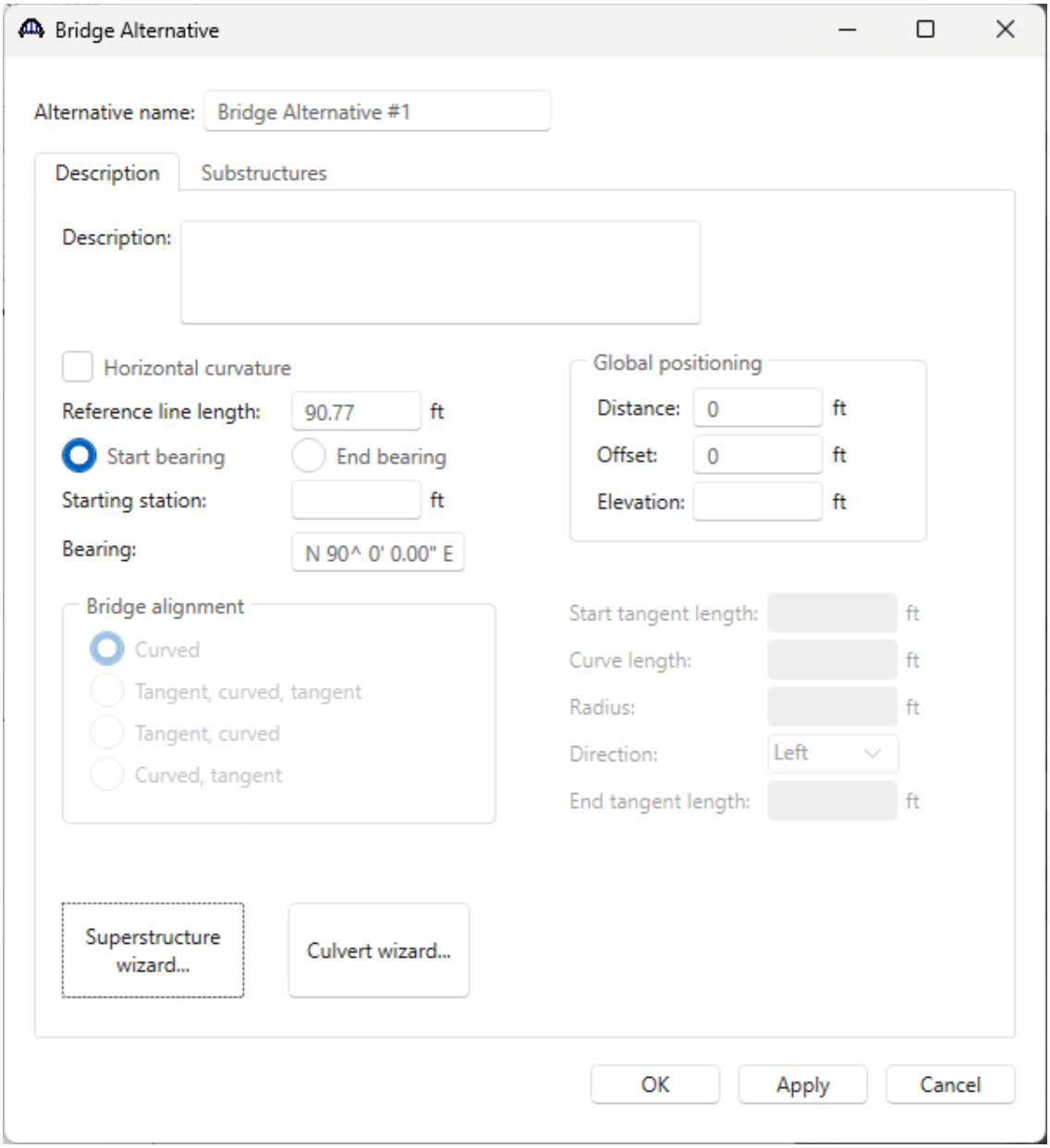


BRIDGE ALTERNATIVES

Navigate to the **BRIDGE ALTERNATIVES** node in the **Bridge Workspace** tree and create a new bridge alternative by double-clicking on **BRIDGE ALTERNATIVES** (or click on **BRIDGE ALTERNATIVES** and select **New** from the **Manage** group of the **WORKSPACE** ribbon).

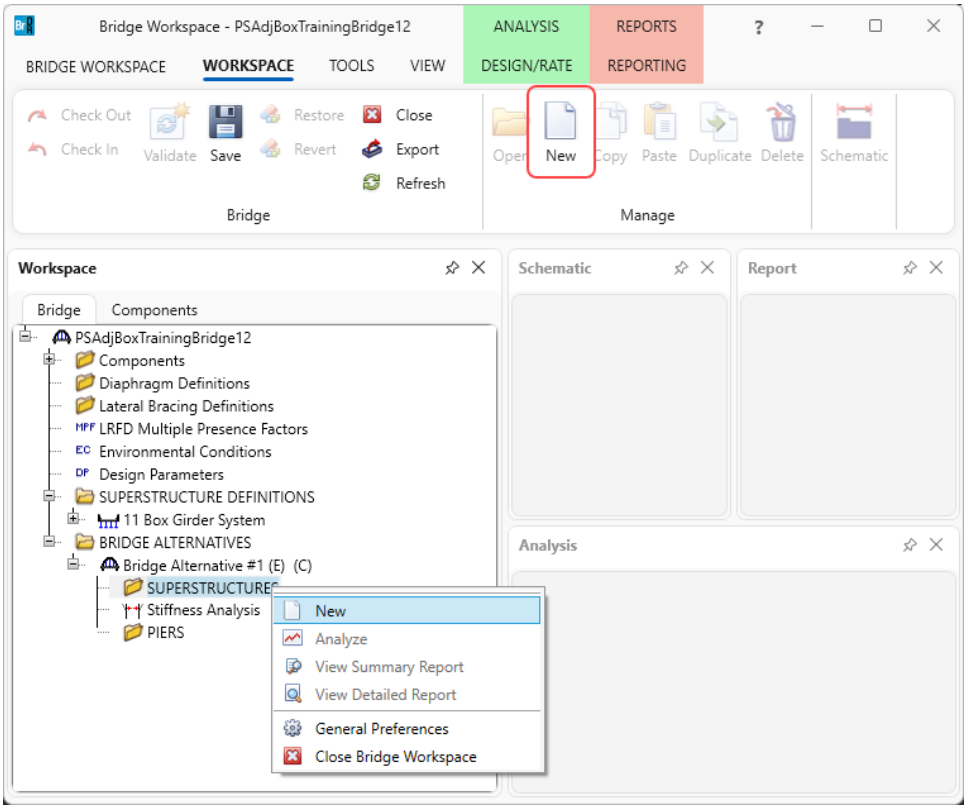


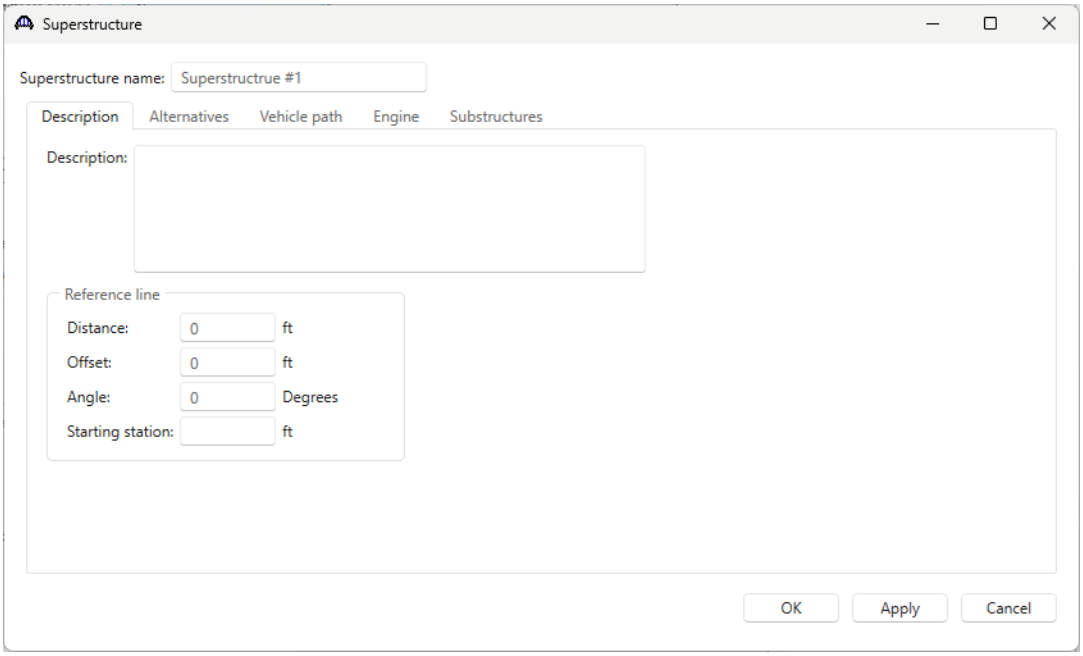
Enter the following data.



Click **OK** to apply the data and close the window.

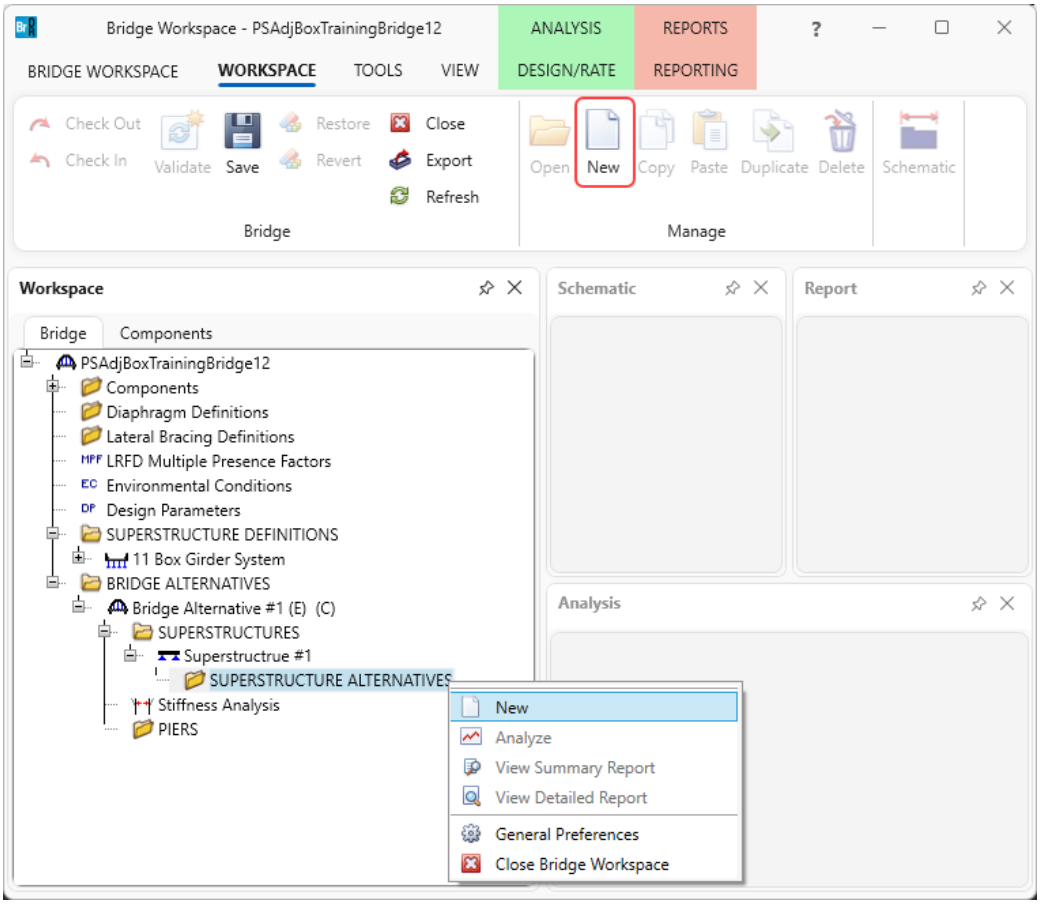
Expand the **Bridge Alternative #1** node in the **Bridge Workspace** tree by clicking the ⊞ button. Double-click on the **SUPERSTRUCTURES** node (or select **SUPERSTRUCTURES**, click **New** from the **Manage** group of the **WORKSPACE** ribbon) and enter the following new superstructure.



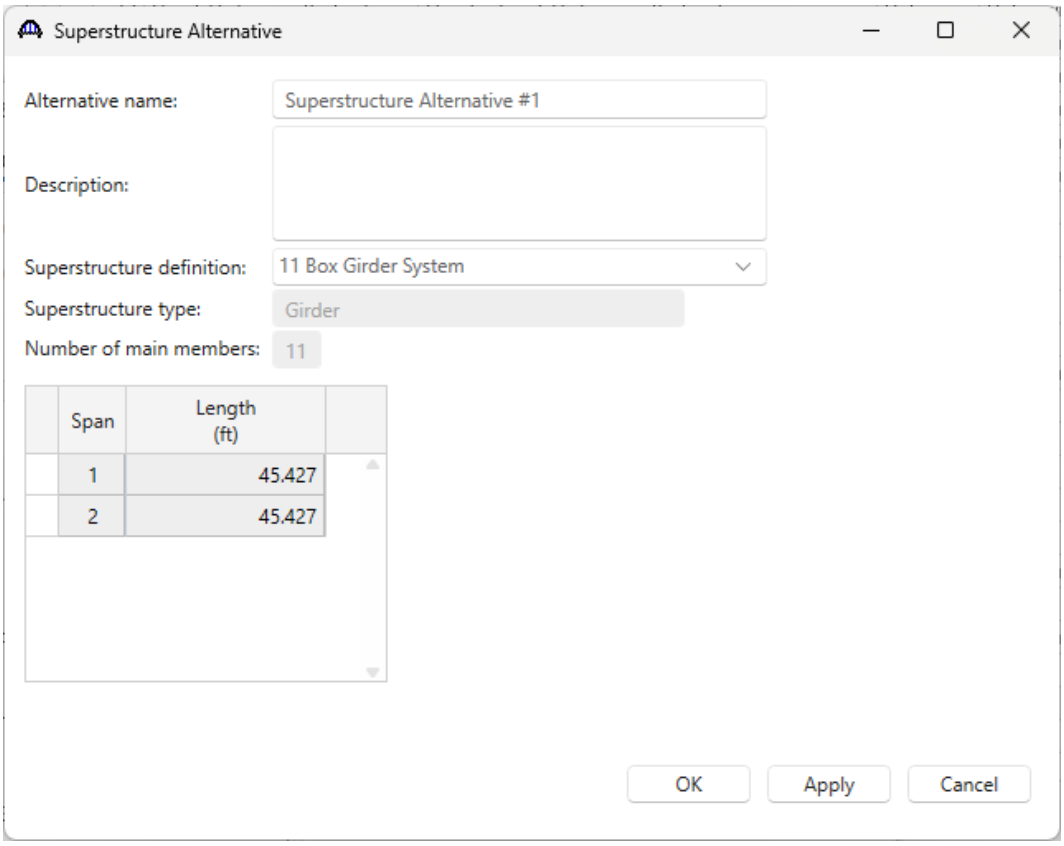


Click **OK** to apply the data and close the window.

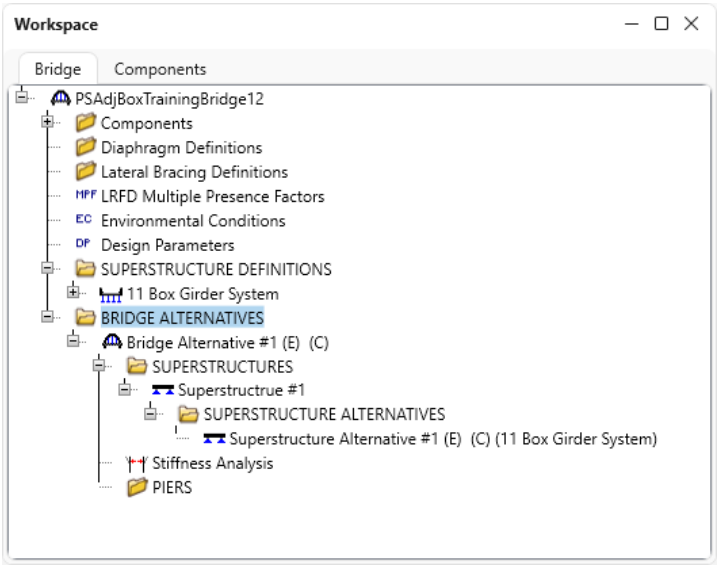
Expand the **Superstructure #1** node in the **Bridge Workspace** tree by clicking the ⊞ button. Double-click on the **SUPERSTRUCTURE ALTERNATIVES** node (or select **SUPERSTRUCTURE ALTERNATIVES** and click **New** from the **Manage** group of the **WORKSPACE** ribbon) and enter the following new superstructure alternative.



Select the **Superstructure definition 11 Box Girder System** as the current superstructure definition for this Superstructure Alternative.



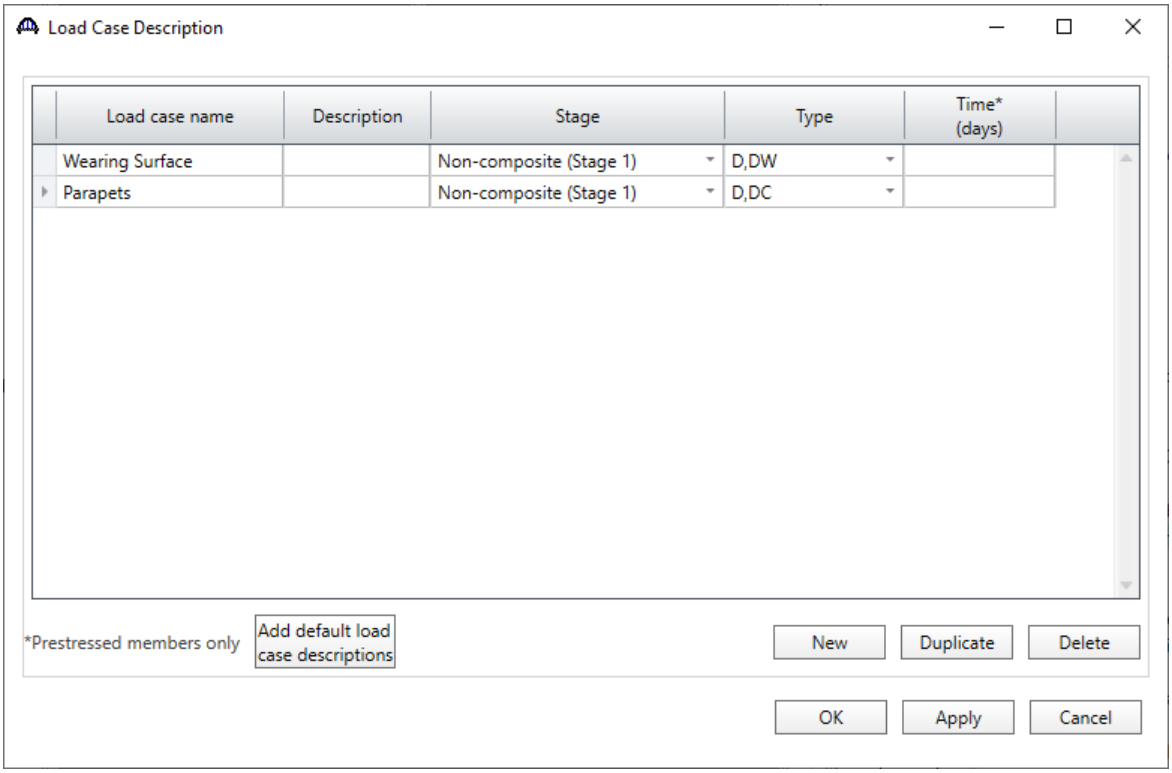
The partially expanded **Bridge Workspace tree** is shown below.



The default impact factors, standard LRFD and LFR factors will be used.

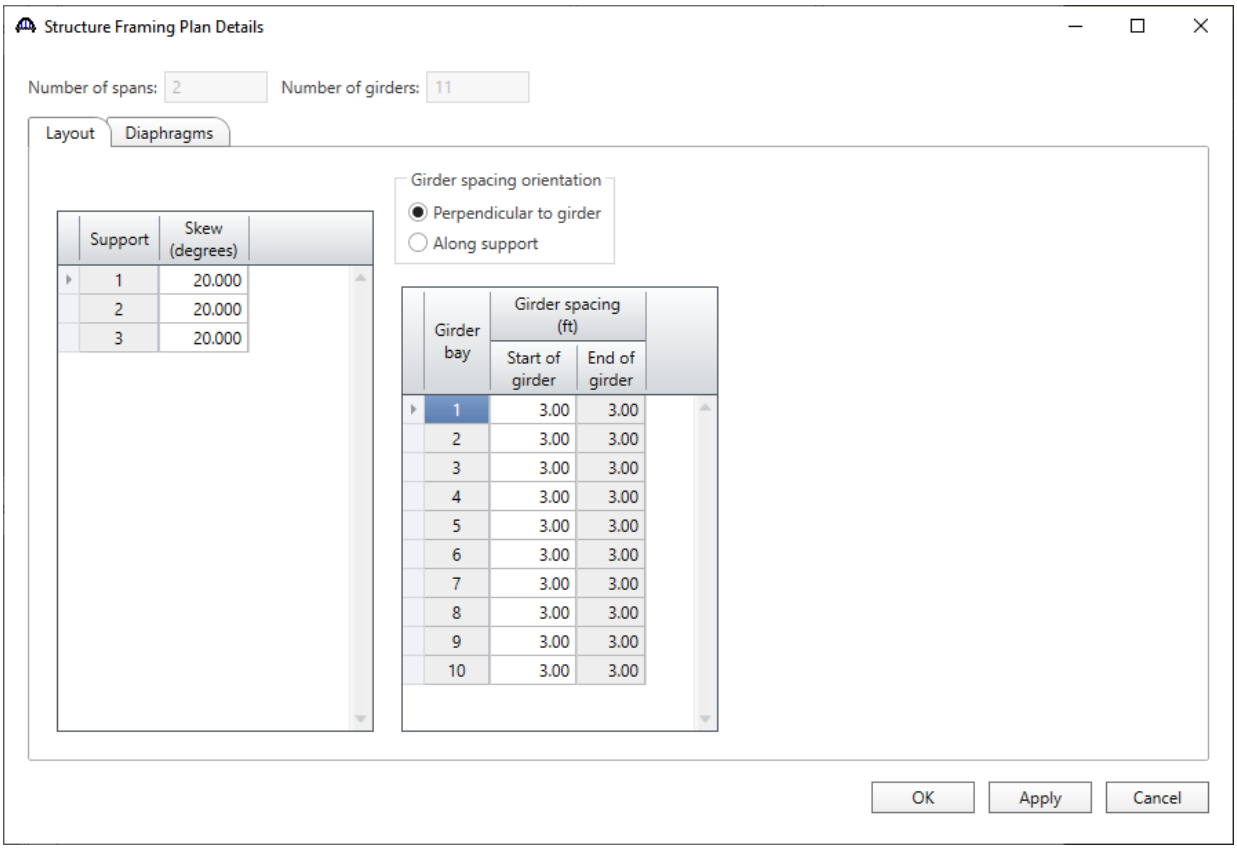
Load Case Description

Navigate back to the superstructure definition **11 Box Girder System**. Double-click on the **Load Case Description** node in the **Bridge Workspace** tree to open the **Load Case Description window** and define the dead load cases as shown below. The completed **Load Case Description** window is shown below.



Structure Framing Plan Detail – Layout

Double-click on **Framing Plan Detail** node in the **Bridge Workspace** tree to describe the framing plan in the **Structure Framing Plan Details** window. Enter the data as shown below.



Click **OK** to apply the data and close the window.

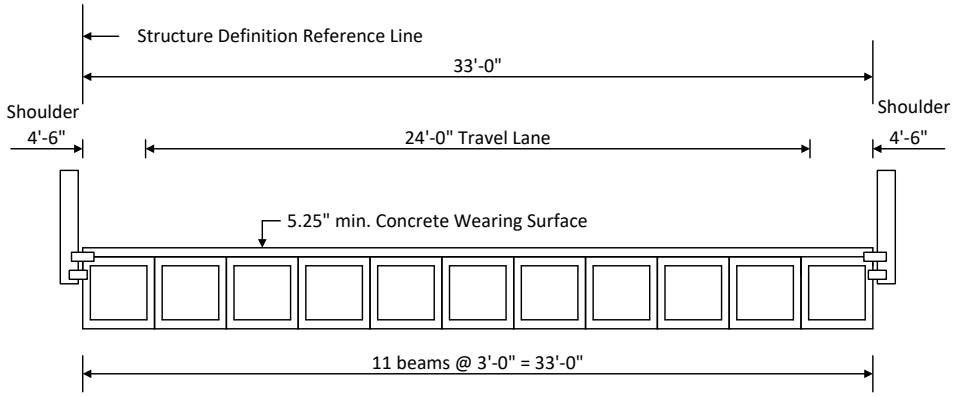
Structure Framing Plan Detail – Diaphragms

The **Diaphragms** tab of this window is used to enter data for exterior diaphragms, in other words diaphragms located between girders. Since an adjacent box beam structure does not have exterior diaphragms, no data will be entered in the **Diaphragms** tab.

Structure Typical Section - Deck

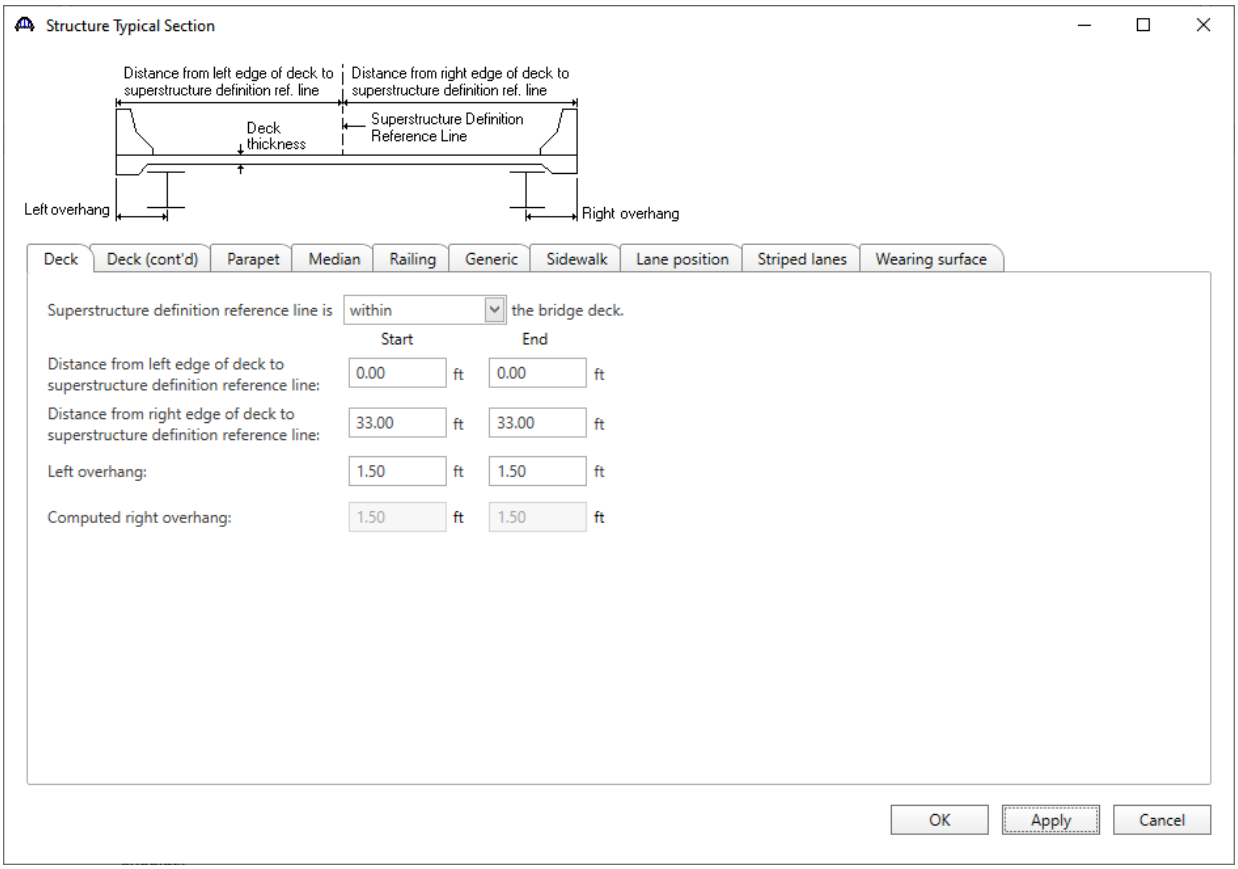
Next, define the structure typical section by double-clicking on the **Structure Typical Section** node in the **Bridge Workspace** tree. Input the data describing the typical section as shown below.

The basic deck geometry is shown below.



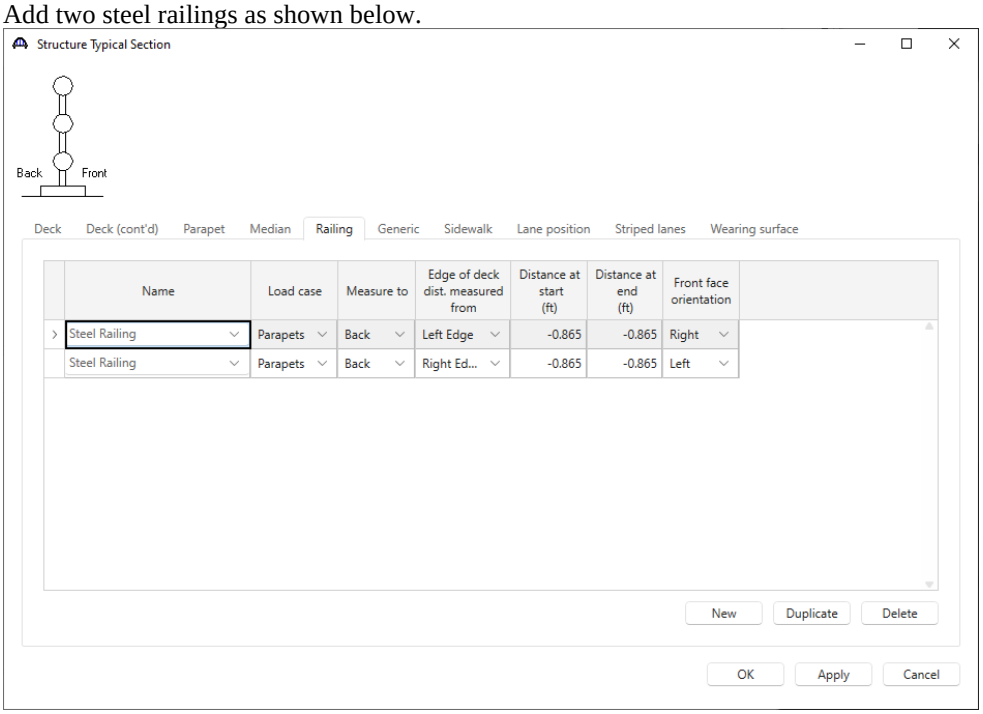
Typical Section

Input the data describing the typical section as shown below.



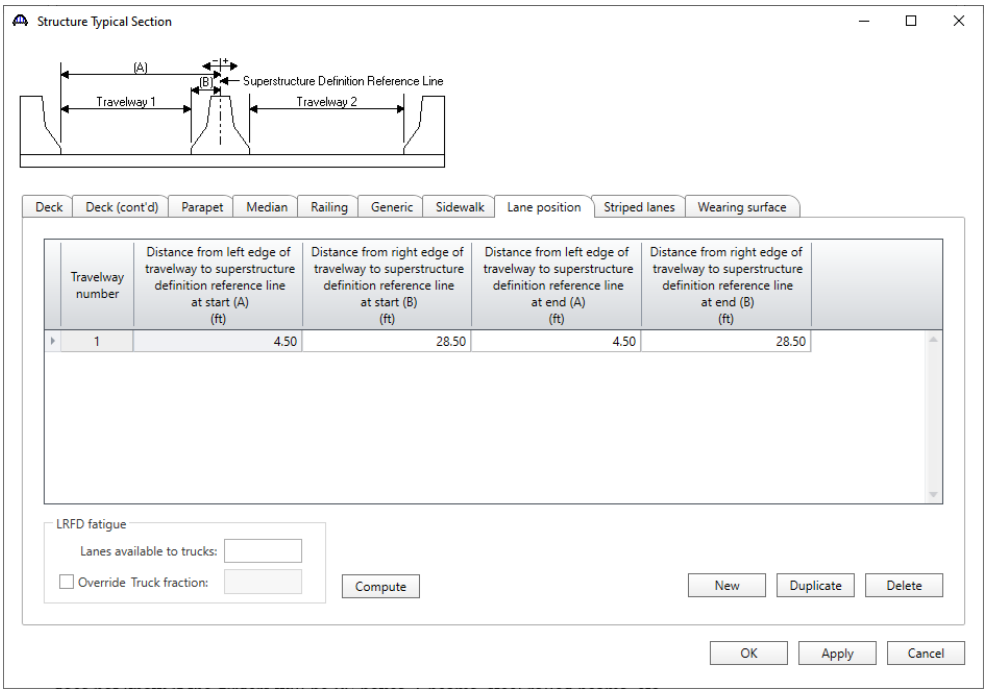
Structure Typical Section – Railing

Add two steel railings as shown below.



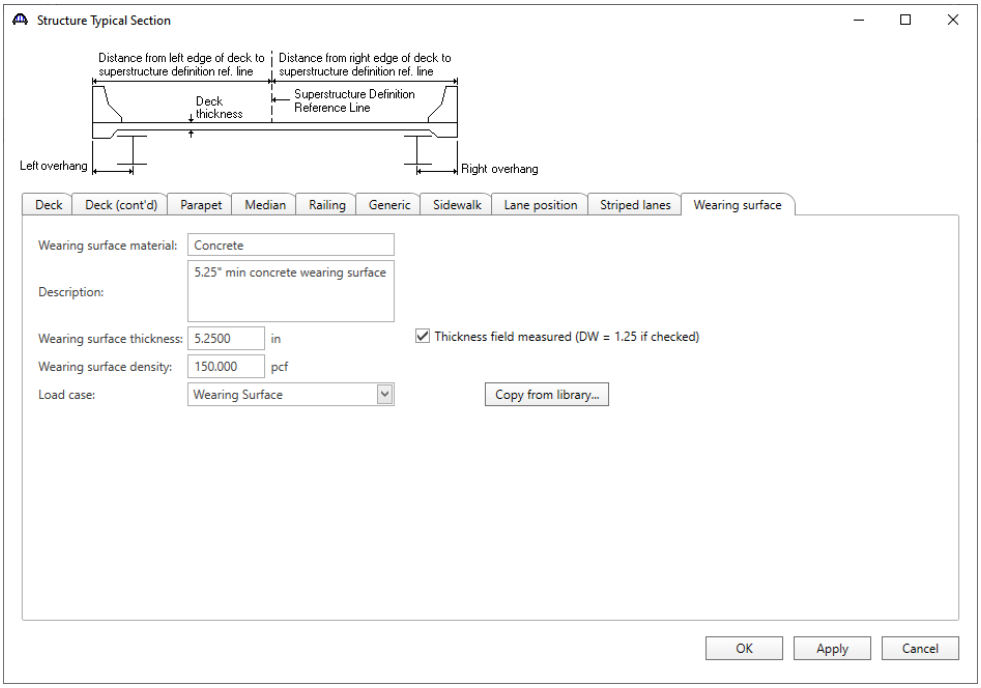
Structure Typical Section – Lane Positions

Select the **Lane position** tab and add the travel lanes as shown below as per the typical section schematic.



Structure Typical Section – Wearing surface

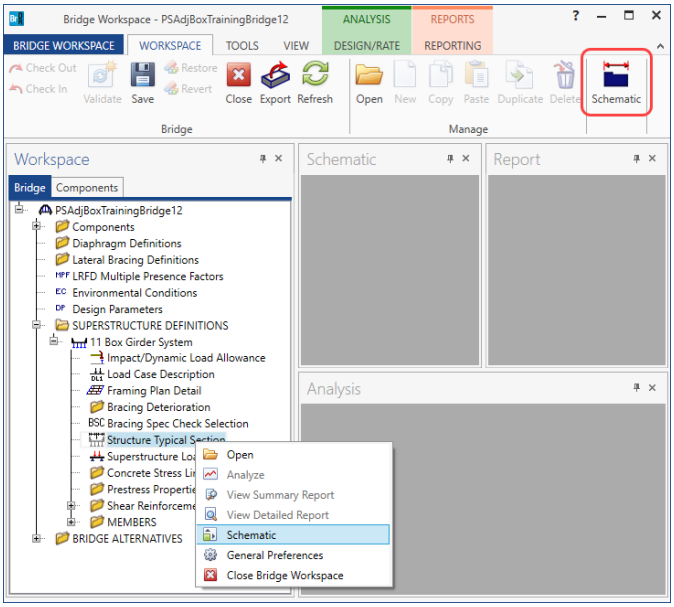
Enter the data shown below.

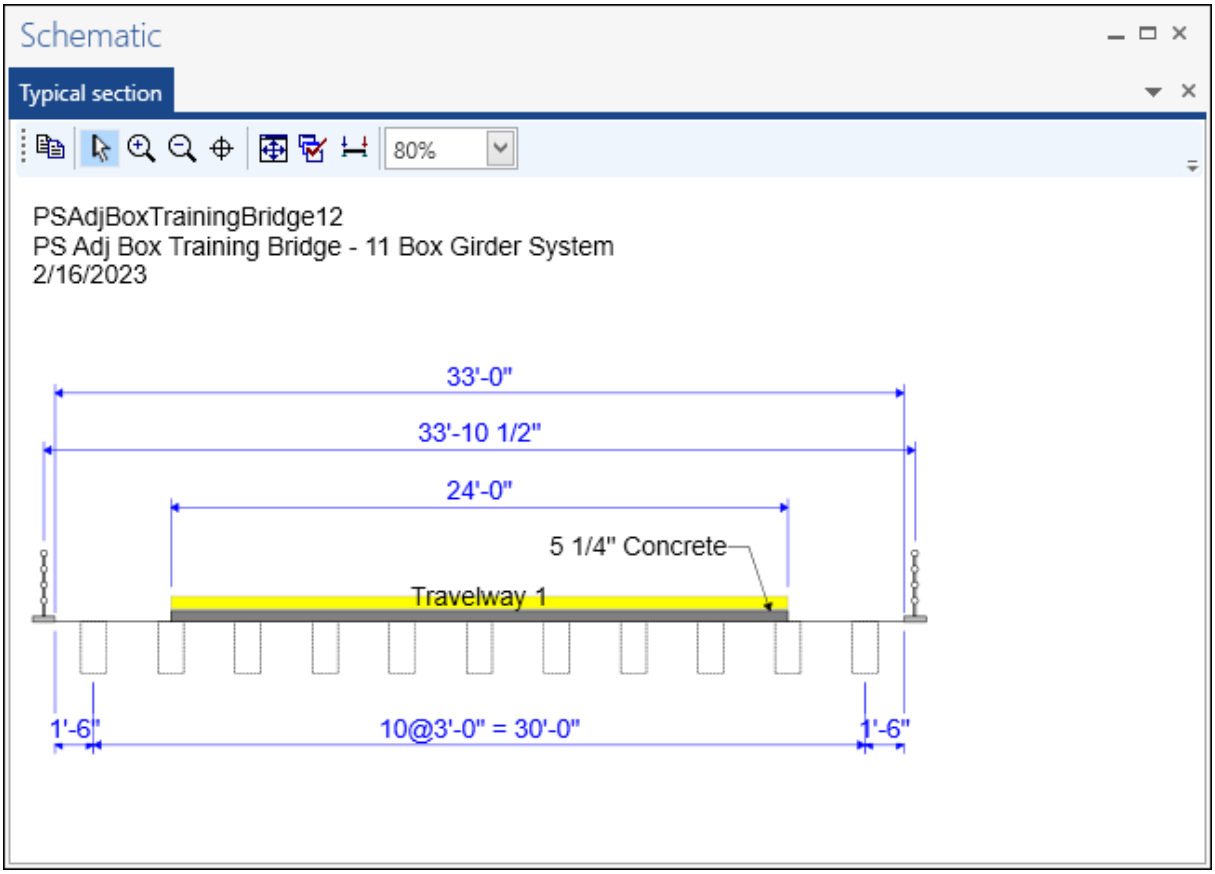


Click **OK** to apply the data and close the window.

Schematic – Structure Typical Section

While the **Structure Typical Section** node is selected in the **Bridge Workspace** tree, open the schematic for the typical section by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click on **Structure Typical Section** in the **Bridge Workspace** and select **Schematic** from the menu).

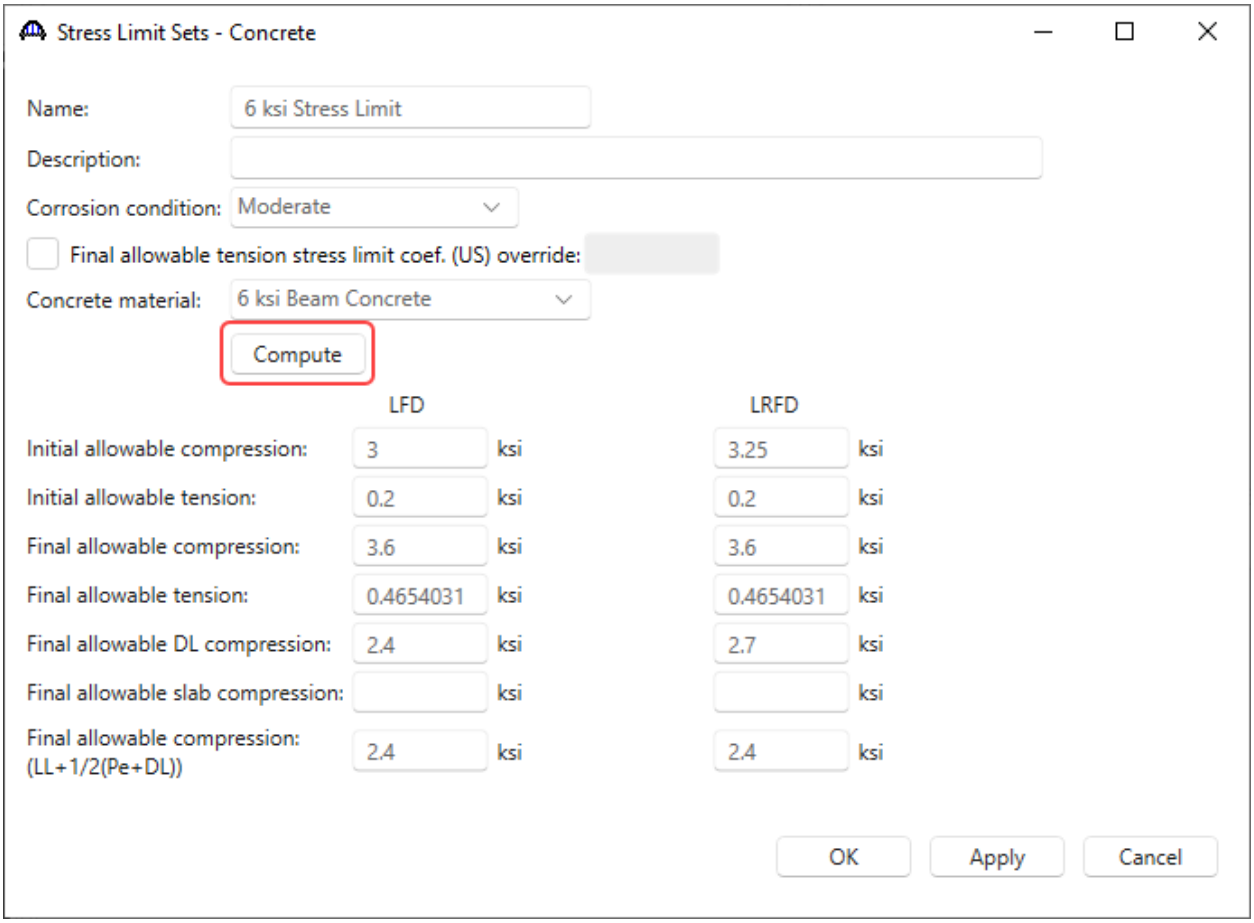




Since the member alternatives are not defined yet, the girders are displayed as dashed boxes. At this point BrDR does not know if the girders will be PS boxes, I-beams, steel rolled beams, etc.

Concrete Stress Limits

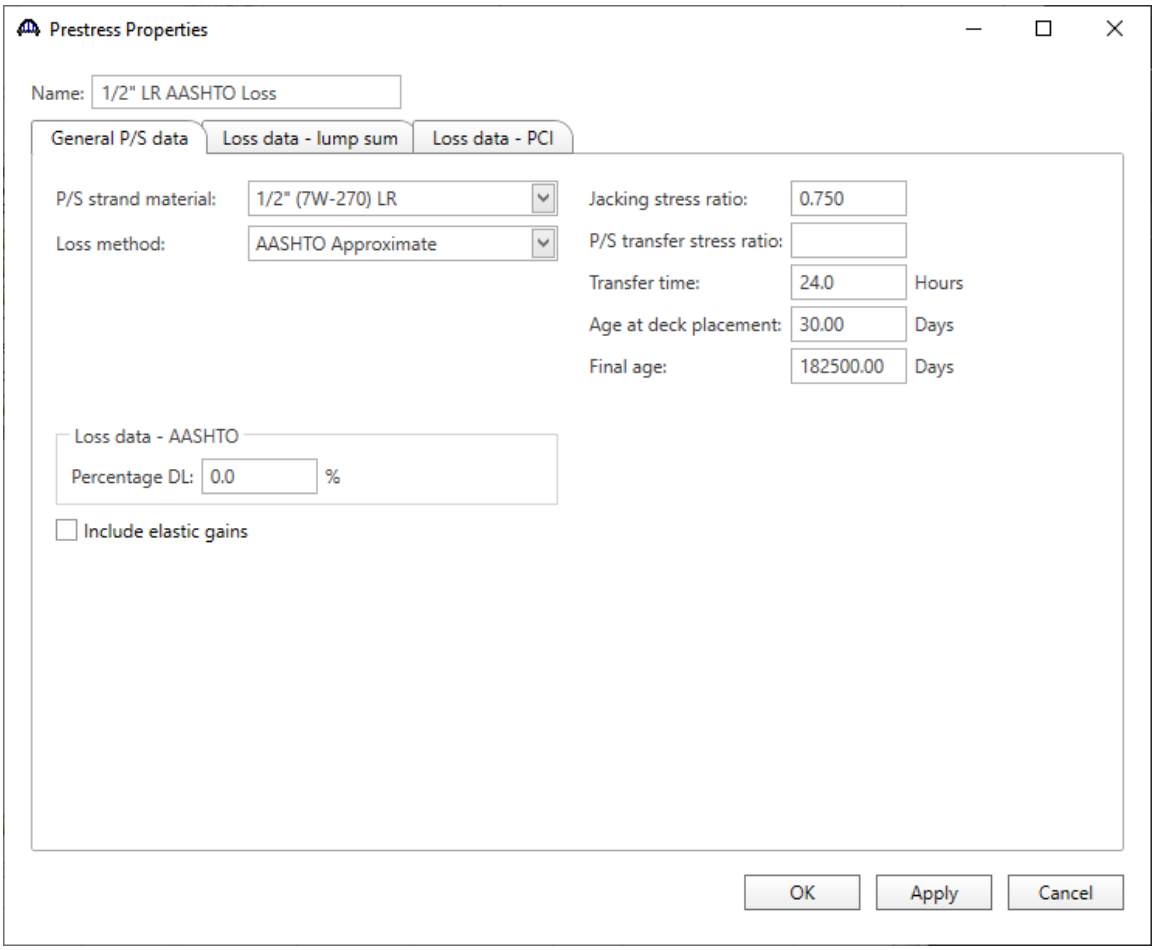
A Stress Limit defines the allowable concrete stresses for a given concrete material. Double click on the **Concrete Stress Limits** node in the **Bridge Workspace** tree to open the **Stress Limit Sets – Concrete** window. Enter data shown above the **Compute** button, select **Moderate** for the **Corrosion condition** and select the **6.0 ksi Beam Concrete** material from the drop-down menu of the **Concrete material**. Click the **Compute** button. Default values for the allowable stresses will be computed based on the **Concrete material** selected and the AASHTO Specifications. The default value for the **Final allowable slab compression** is not computed since the deck concrete is typically different from the concrete used in the beam. This value will be left blank since this example does not have a concrete deck.



Click **OK** to apply the data and close the window.

Prestress Properties

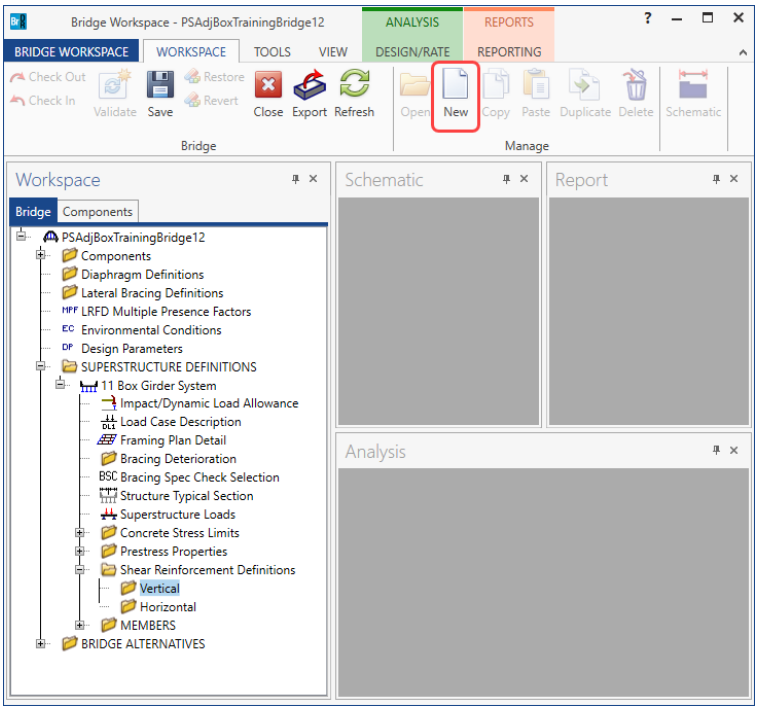
Double click on the **Prestress Properties** node in the **Bridge Workspace** tree to open the **Prestress Properties** window. Define the prestress properties as shown below. Since the **AASHTO Approximate** method is used to compute the losses, only the information on the **General P/S data** tab is required.



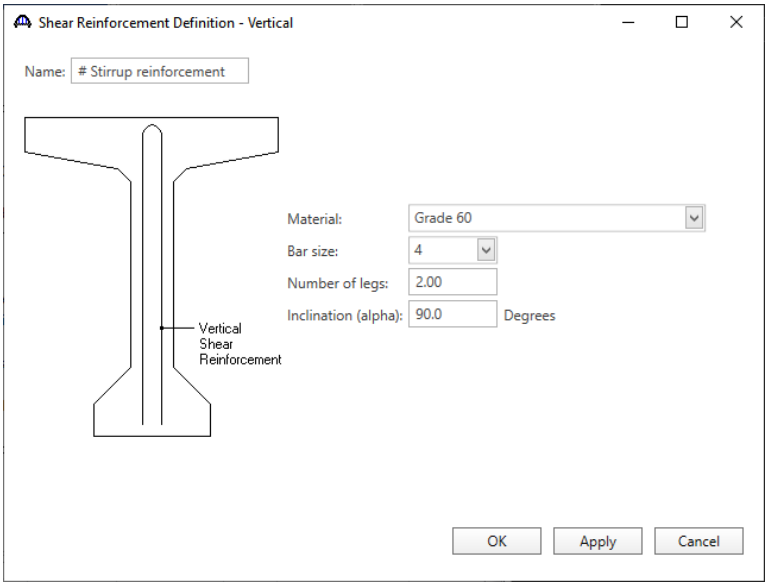
Click **OK** to apply the data and close the window.

Shear Reinforcement

Define the vertical shear reinforcement to be used by the girders. Expand the **Shear Reinforcement Definitions** node in the **Bridge Workspace** tree, select the **Vertical** node and click on **New** from the **Manage** group of the **WORKSPACE** ribbon (or double click on **Vertical)**.

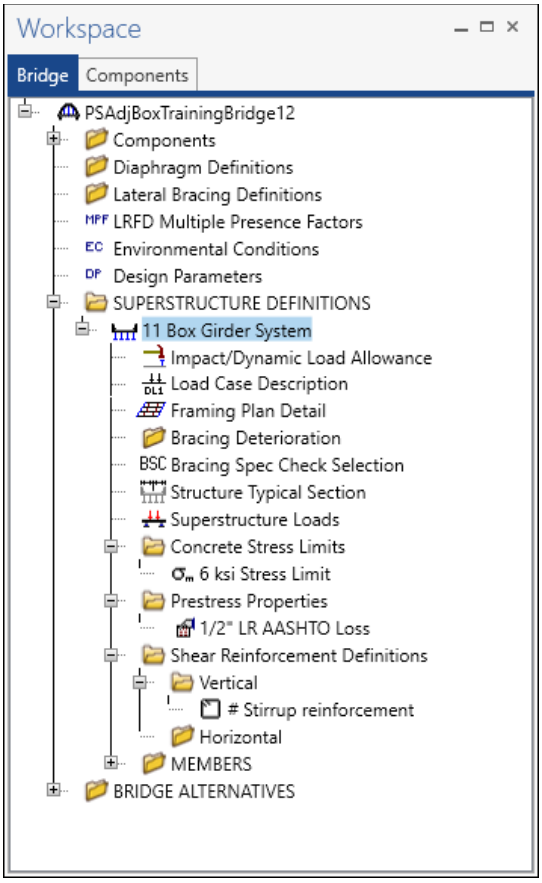


The I shape shown is for illustrative purposes only, it is not meant to display the actual beam shape. Enter the data as shown below.



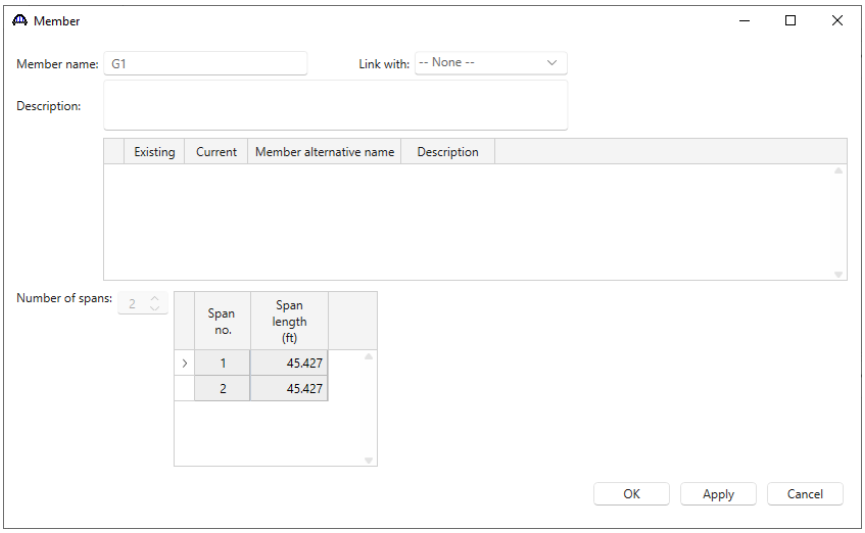
Click **OK** to apply the data and close the window.

A partially expanded **Bridge Workspace** is shown below.



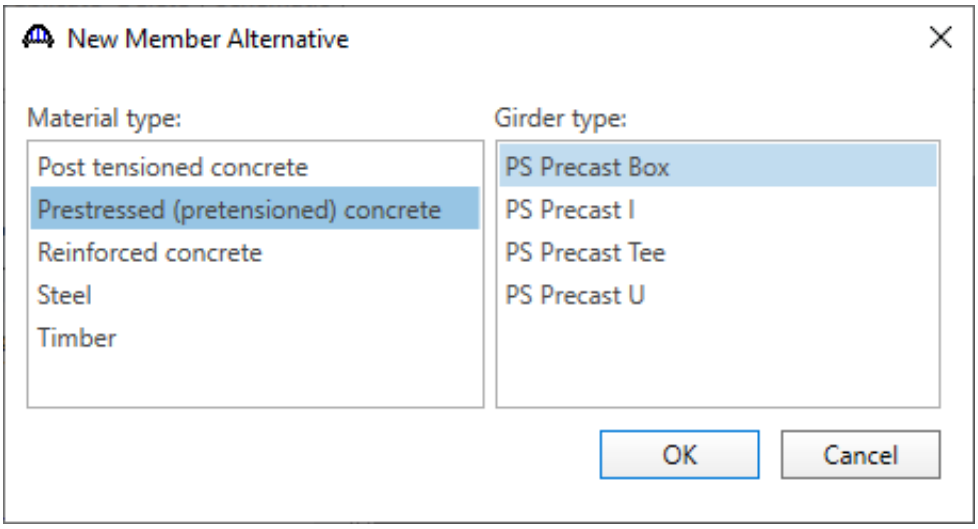
Describing a member

The **Member** window shows the data that was generated when the structure definition was created. No changes are required in this window. The first member alternative created will automatically be assigned as the **Existing** and **Current member alternative** for this Member.



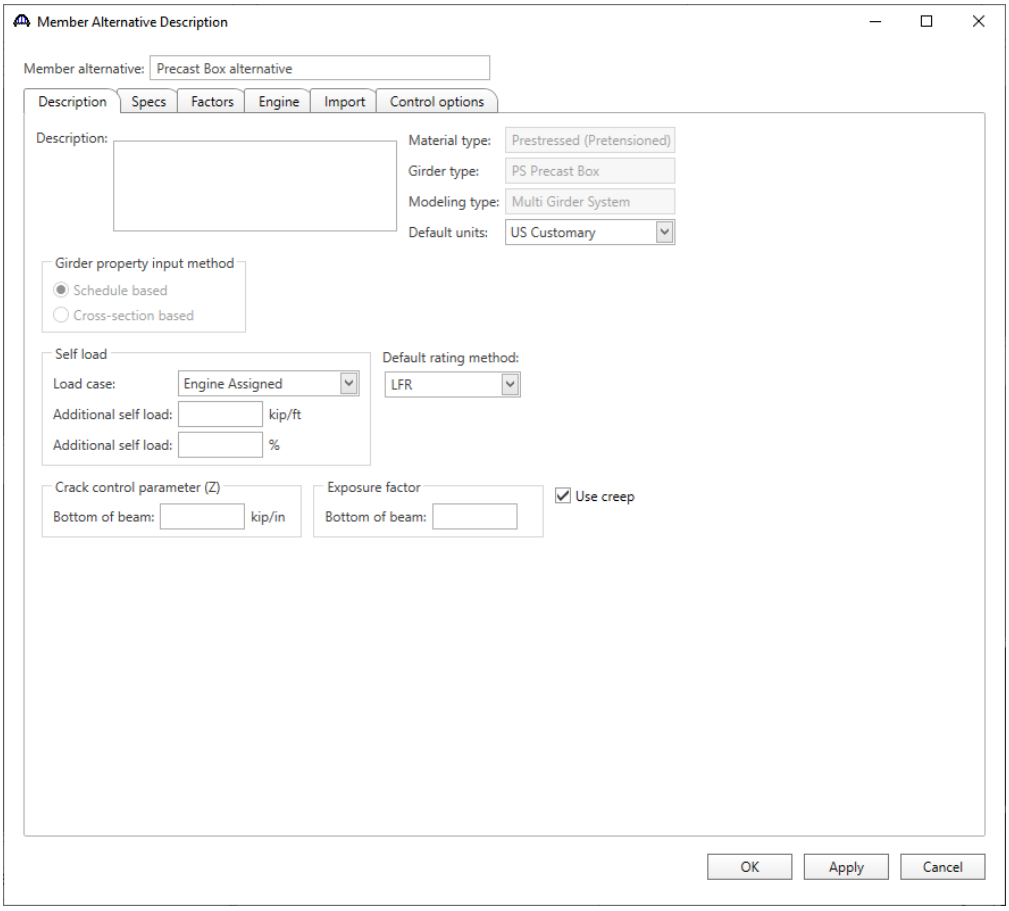
Defining a Member Alternative

Expand node **G2**. Double-click on **MEMBER ALTERNATIVES** in the **Bridge Workspace** tree for member **G2** to create a new member alternative. The **New Member Alternative** window shown below will open. Select **Prestressed (pretensioned) concrete** for the **Material type** and **PS Precast Box** for the **Girder Type**.



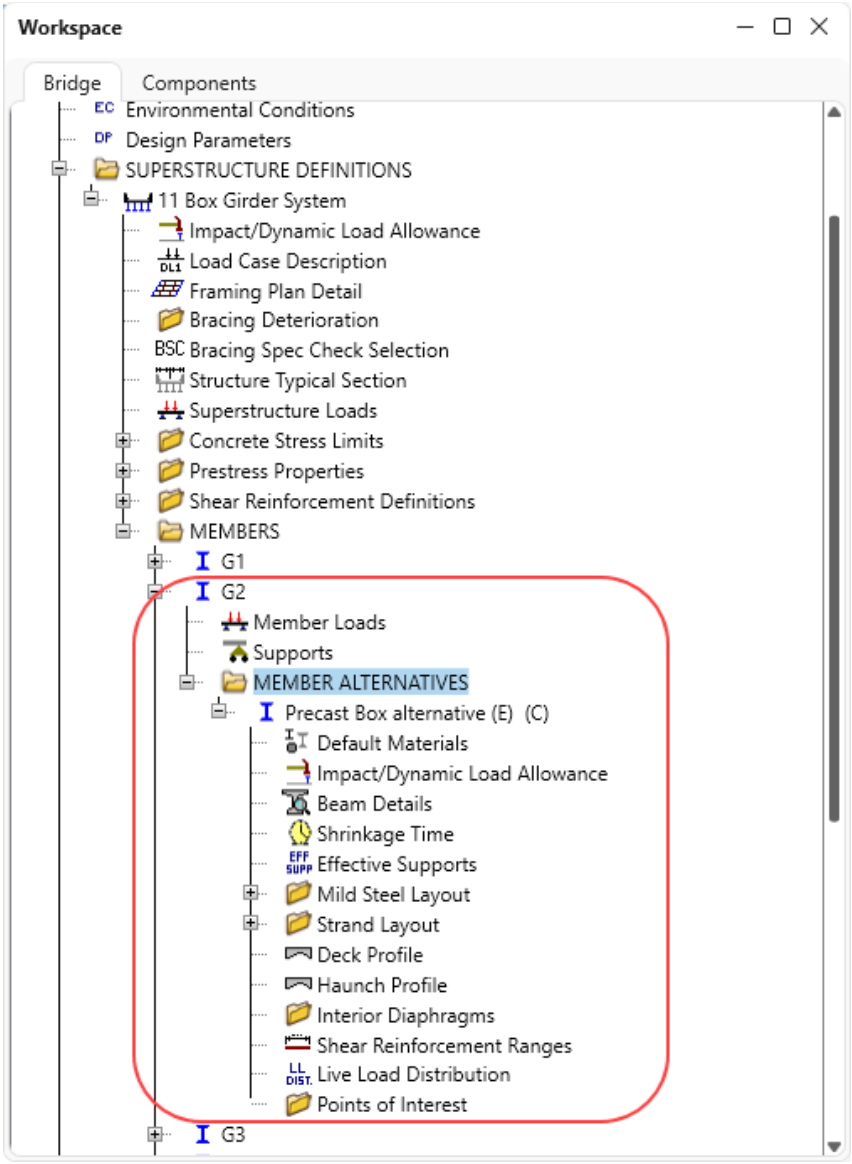
Click **OK** to close the window and create a new member alternative.

The **Member Alternative Description** window will open. Enter the data as shown below. The **Schedule based Girder property input method** is the only input method available for a prestressed concrete beam. Enter data as shown below.



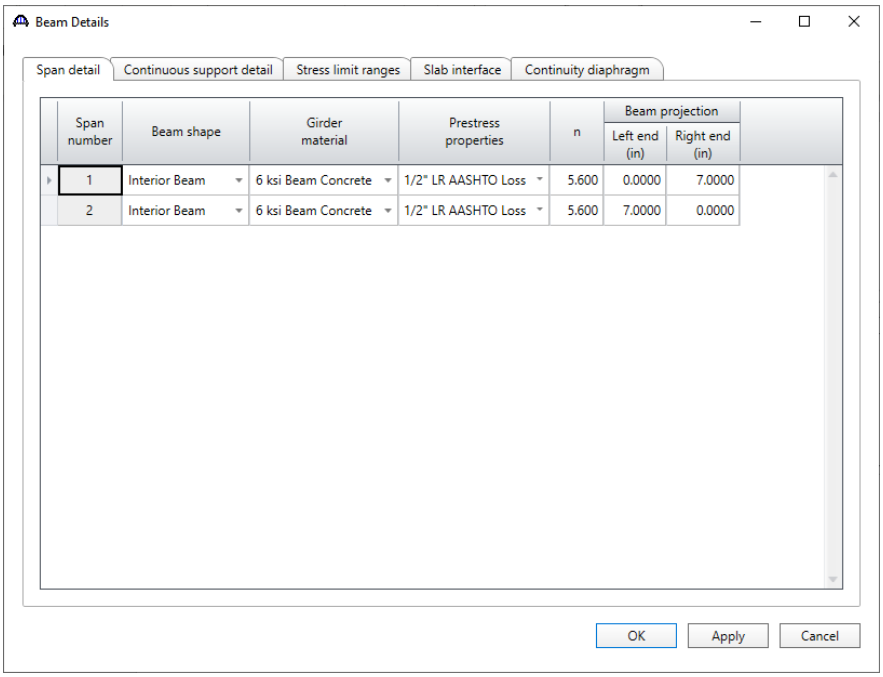
Click **OK** to apply the data and close the window.

Expand the newly added member alternative. The partially expanded **Bridge Workspace** tree is shown below.



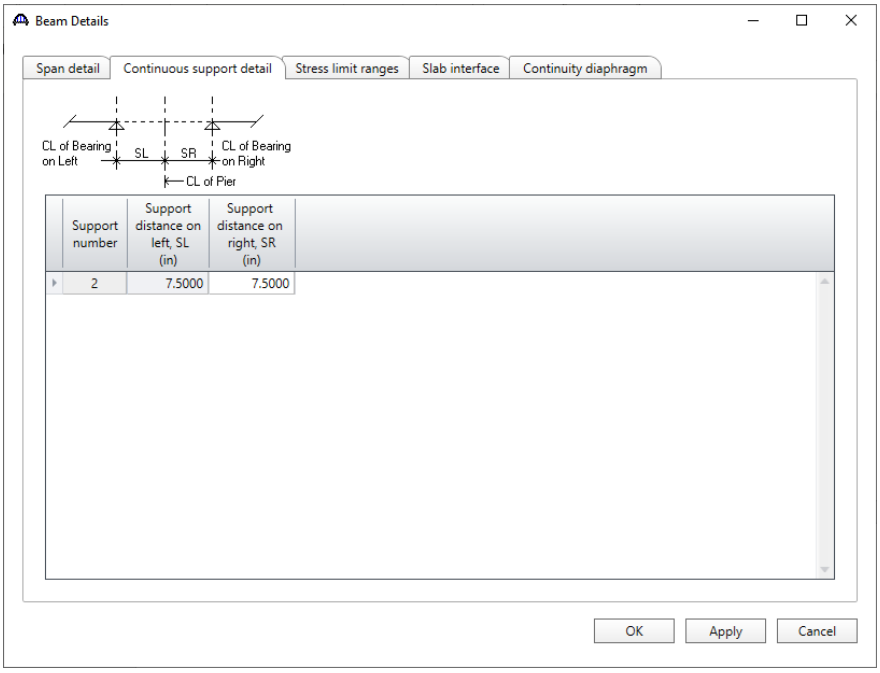
Beam Details – Span detail

Next describe the beam by double clicking on the **Beam Details** node in the **Bridge Workspace** tree. Enter the data in each tab of the **Beam Details** window as shown below.



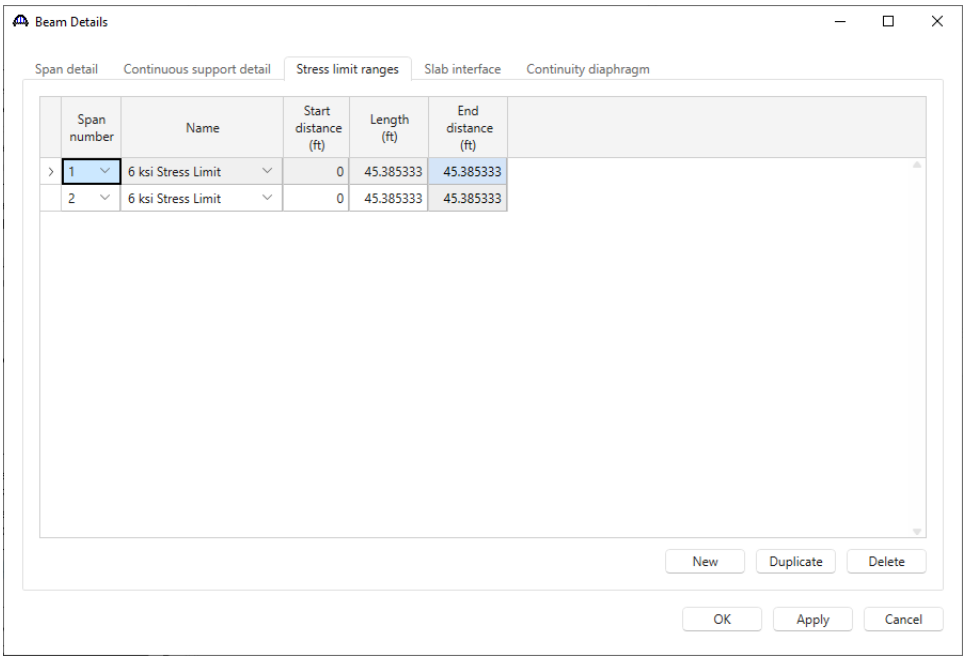
Beam Details – Continuous support detail

Define the continuous support detail as shown below.



Beam Details – Stress limit ranges

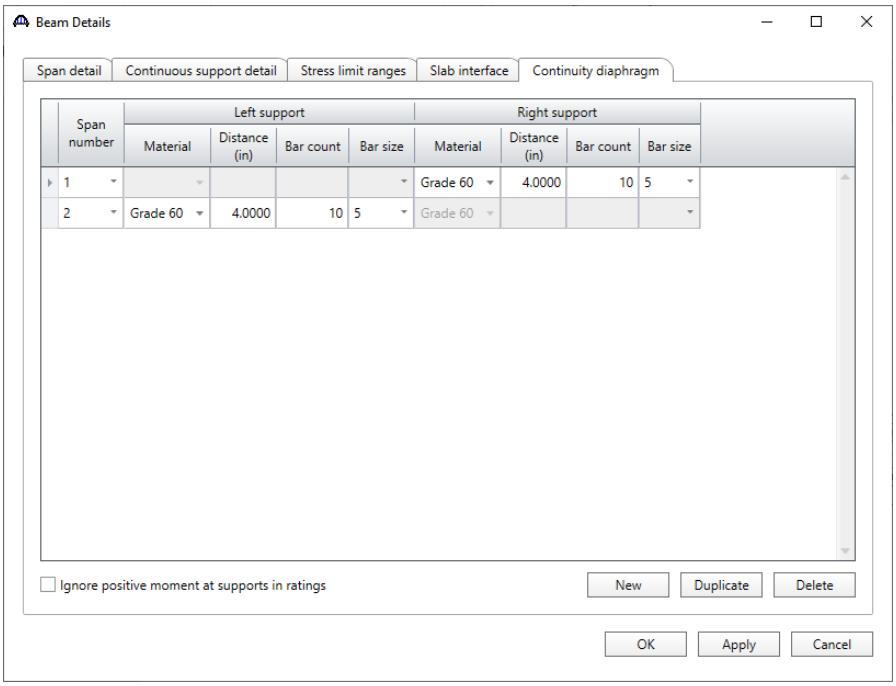
Note that the stress limit ranges are defined over the entire length of the precast beam as shown below for span 1 and span 2.



Since this example does not have a concrete deck, the **Slab interface** tab does not require input.

Beam Details – Continuity diaphragm

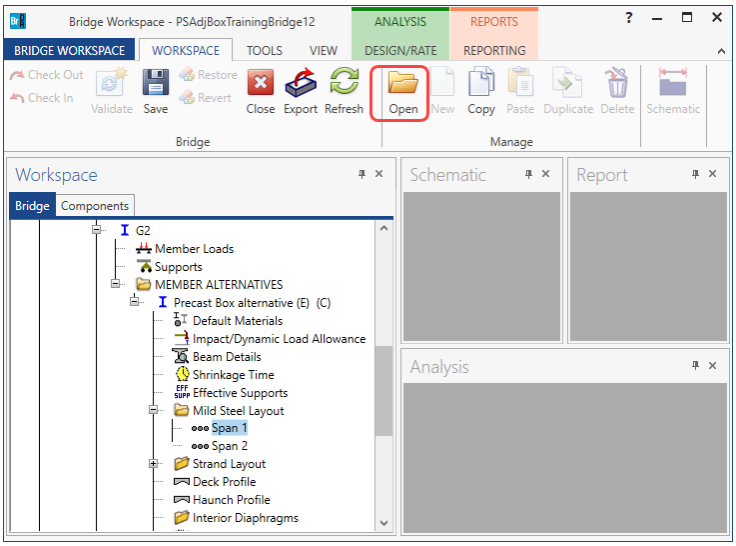
Enter the Continuity diaphragm detail as shown below.



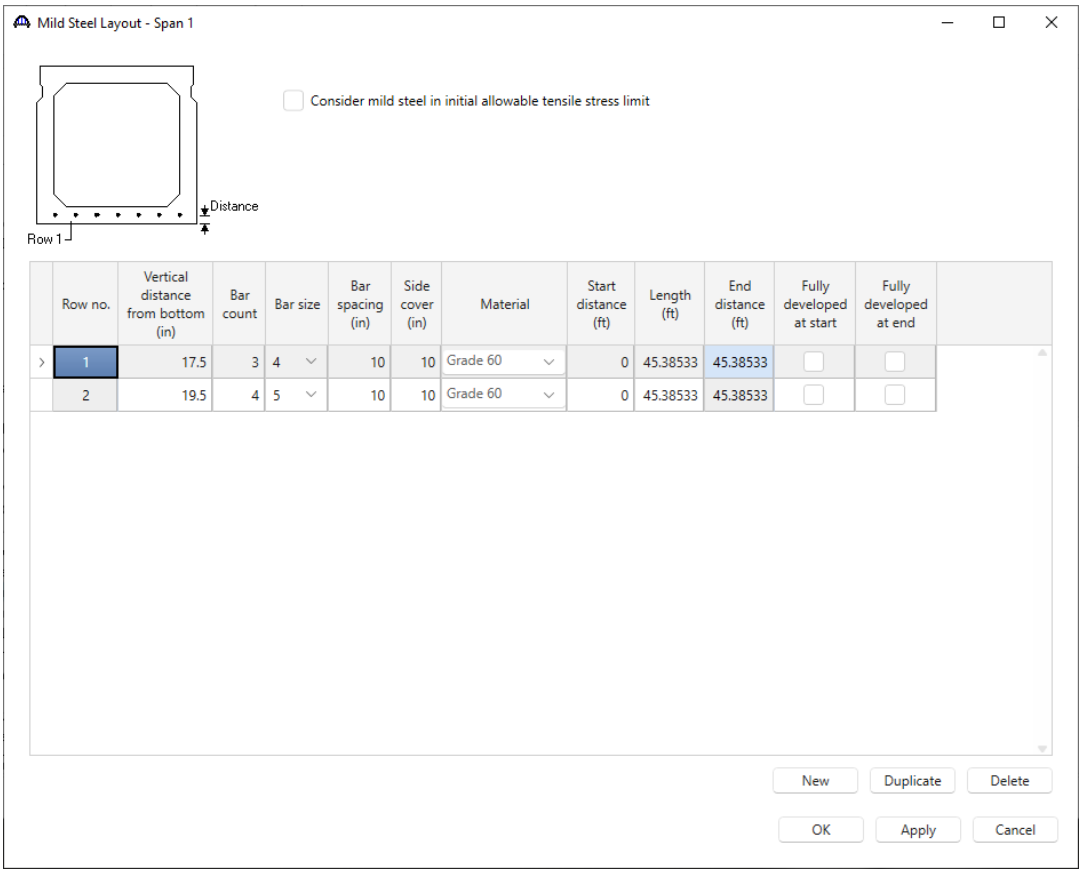
Click **OK** to apply the beam details and close the window.

Mild Steel Layout – Span 1

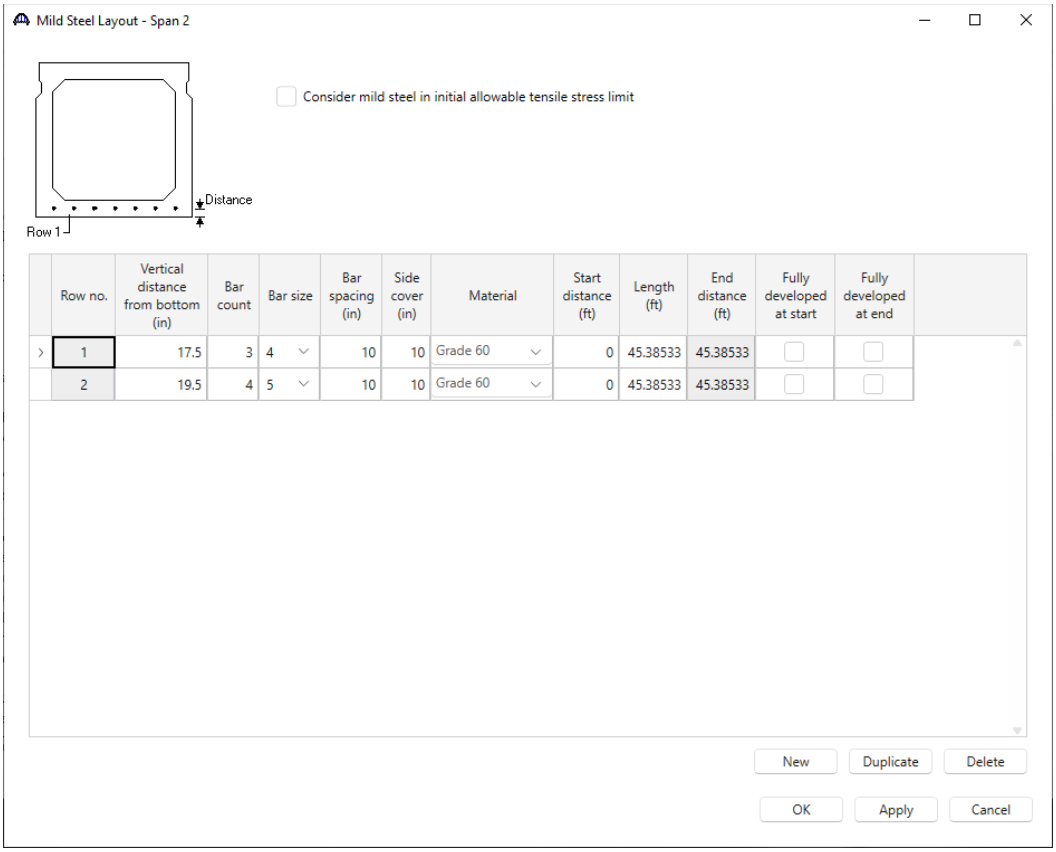
Expand the **Mild Steel Layout** in the **Bridge Workspace** tree and double-click on **Span 1** (or select **Span 1** and click the **Open** button from the **Manage** group of the **WORKSPACE** ribbon) to open the **Mild Steel Layout – Span 1** window.



Enter the Span 1 details as shown below.



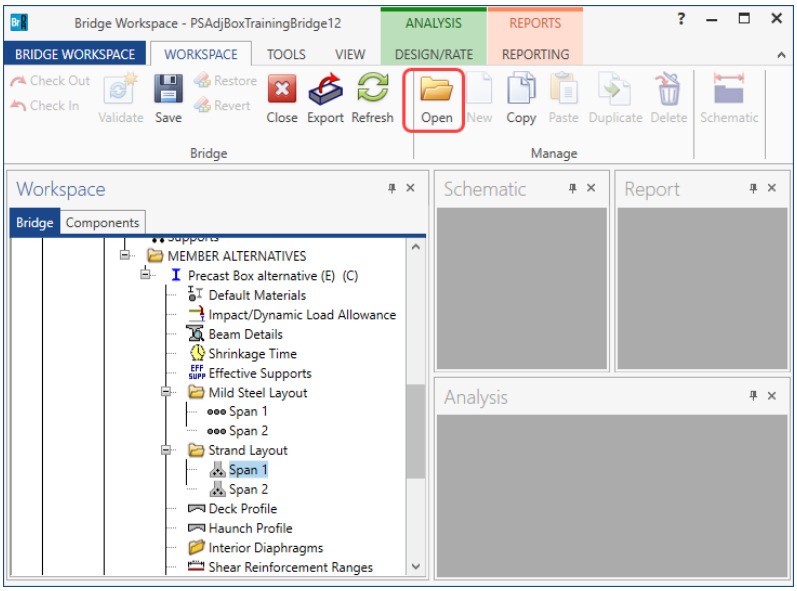
Similarly, enter the **Mild Steel Layout – Span 2** as shown below.



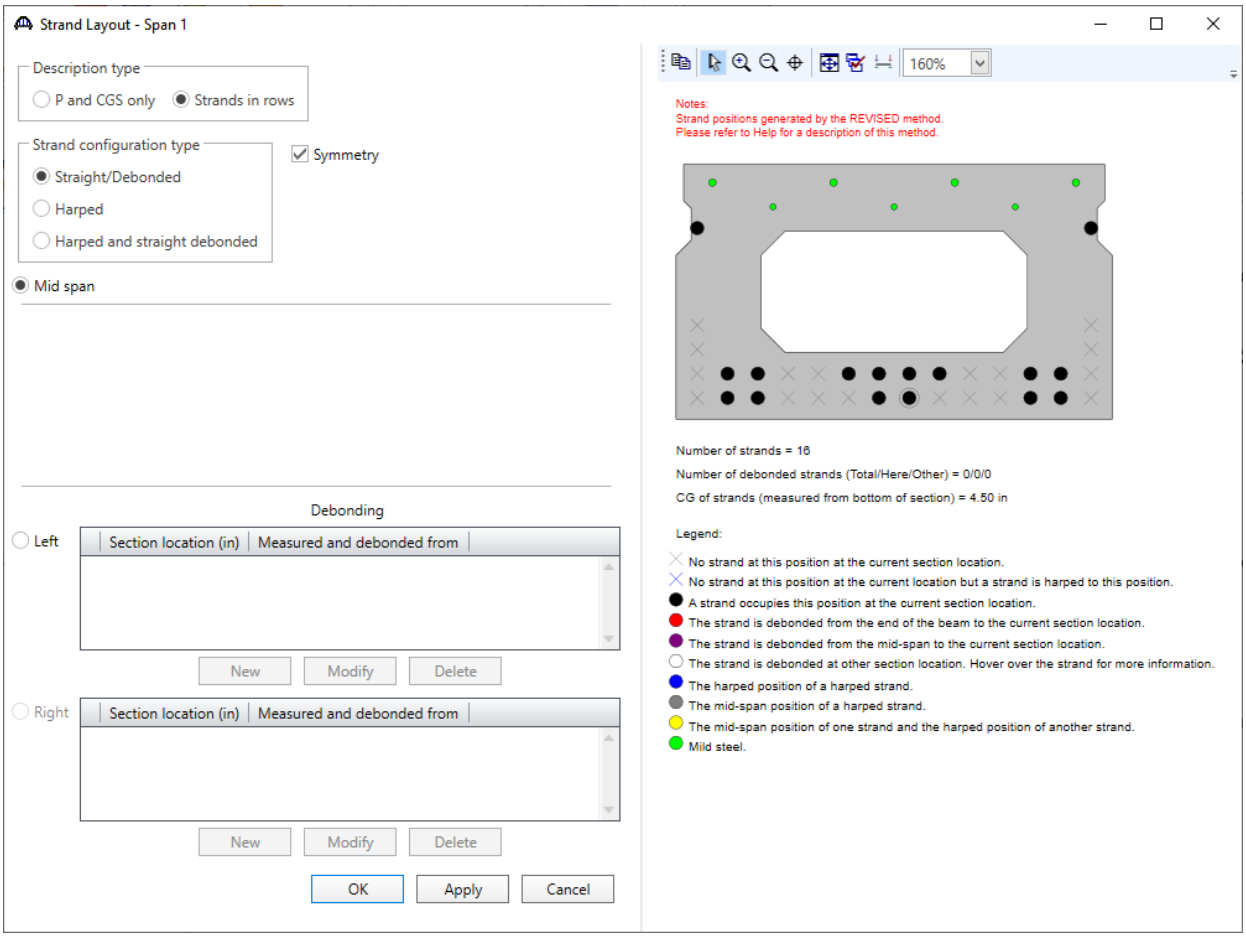
Click **OK** to apply the beam details and close the window.

Strand Layout – Span 1

Expand the **Strand Layout** in the **Bridge Workspace** tree and double-click on **Span 1** (or select **Span 1** and click the **Open** button from the **Manage** group of the **WORKSPACE** ribbon) to open the **Stand Layout – Span 1** window.

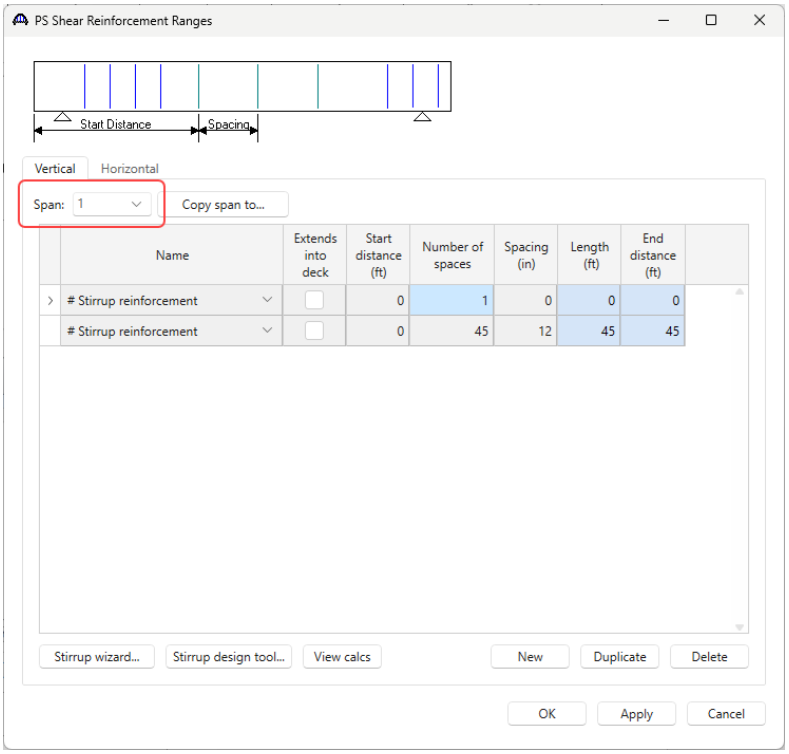


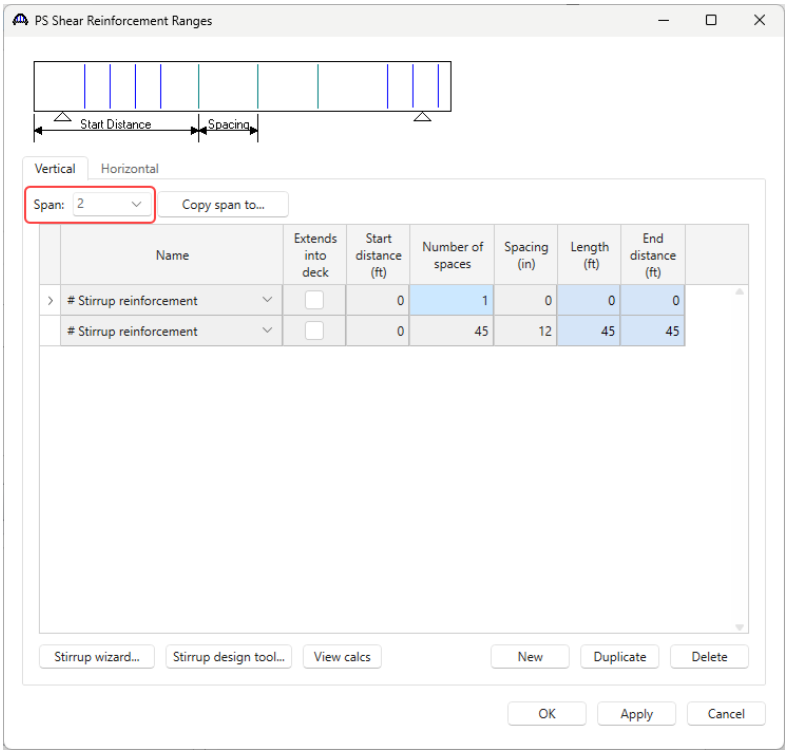
Use the **Zoom** buttons to shrink/expand the schematic of the beam shape on the right side of the screen so that the entire beam is visible. Select the **Description type** as **Strands in rows** and the **Strand configuration type** as **Straight/Debonded**. The **Mid span** radio button will now become active. Strands can now be defined at the middle of the span by selecting strands on the right hand schematic. Select the following strands in the schematic so that the CG of the strands is 4.5 inches. Click the **Apply** button and then **OK** to apply this data. Repeat these steps for **Span 2.**



Shear Reinforcement Ranges

Double-click on the **Shear Reinforcement Ranges** node in the **Bridge Workspace** tree to open the **PS Shear Reinforcement Ranges** window. The shear reinforcement ranges for each span are entered as described below.



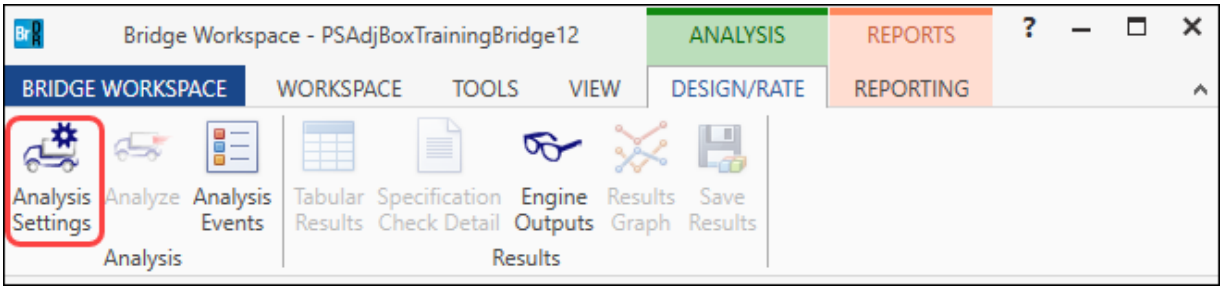


Click **OK** to apply the data and close the window.

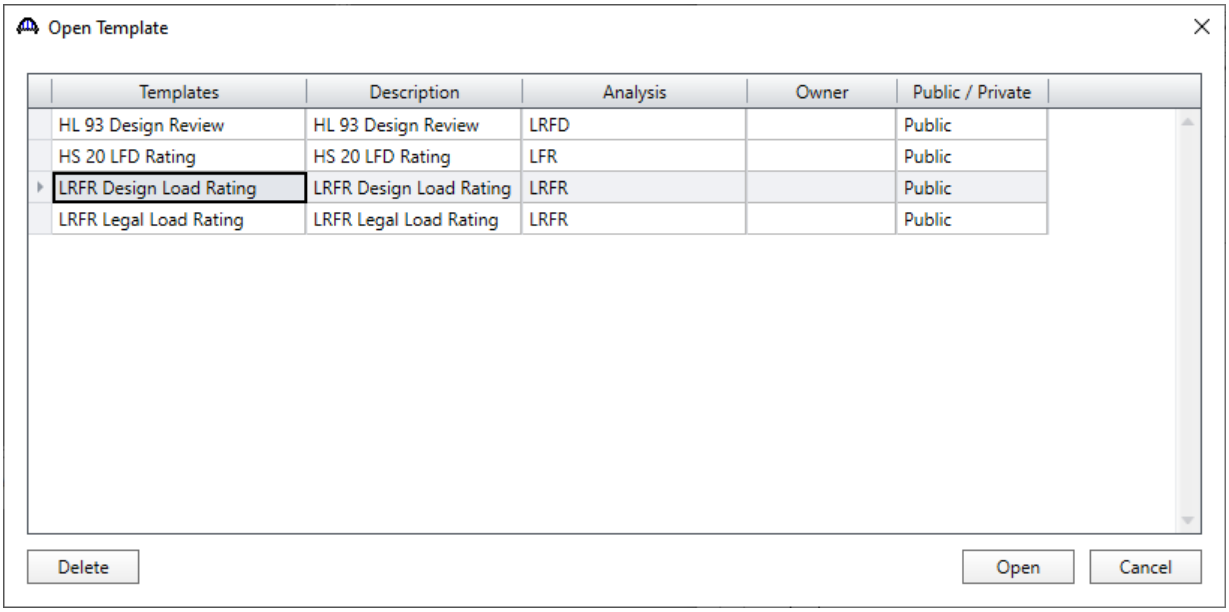
The description of an interior beam for this structure definition is complete. The member alternative can now be analyzed.

LRFR Rating

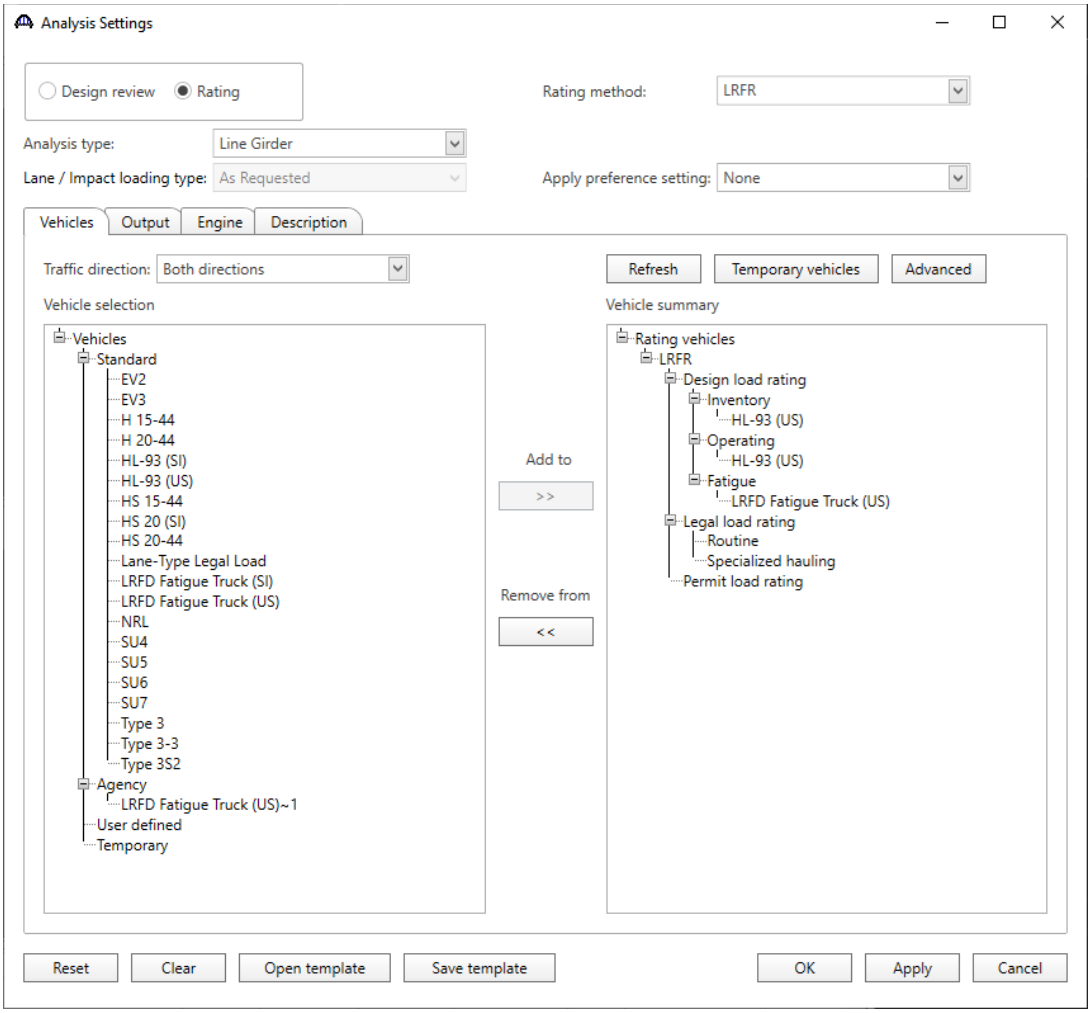
To perform an **LRFR** rating on **G2**, select the **Analysis Settings** button on the **Analysis** group of the **DESIGN/RATE** ribbon to open the window shown below.



Click the **Open Template** button and select the **LRFR Design Load Rating** to be used in the rating and click **OK**.



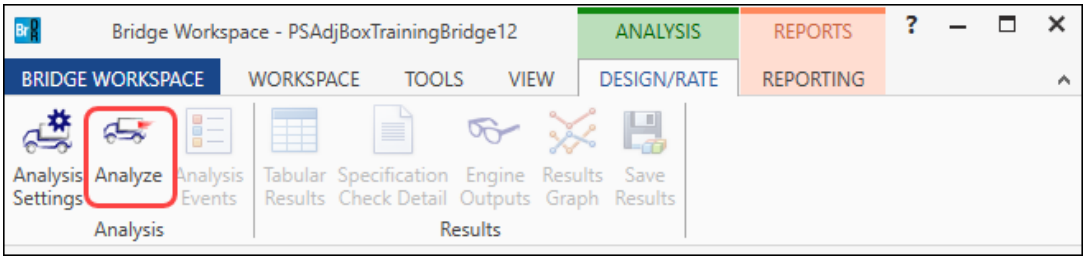
The **Analysis Settings** window will be updated as shown below.



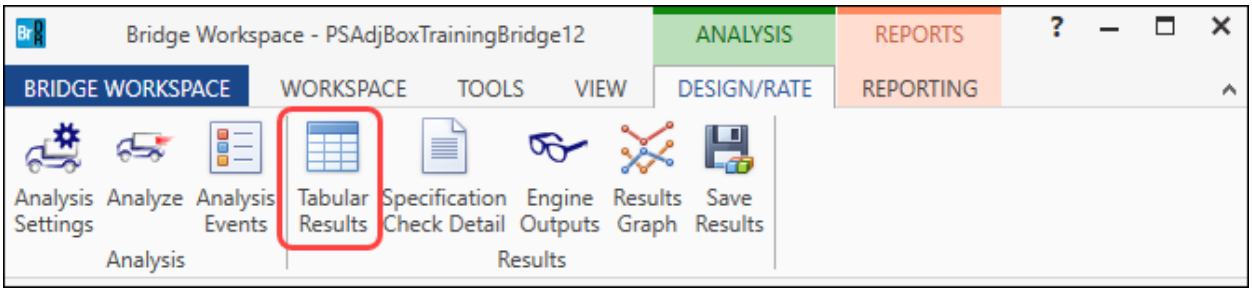
Click **OK** to apply the data and close the window.

Tabular Results

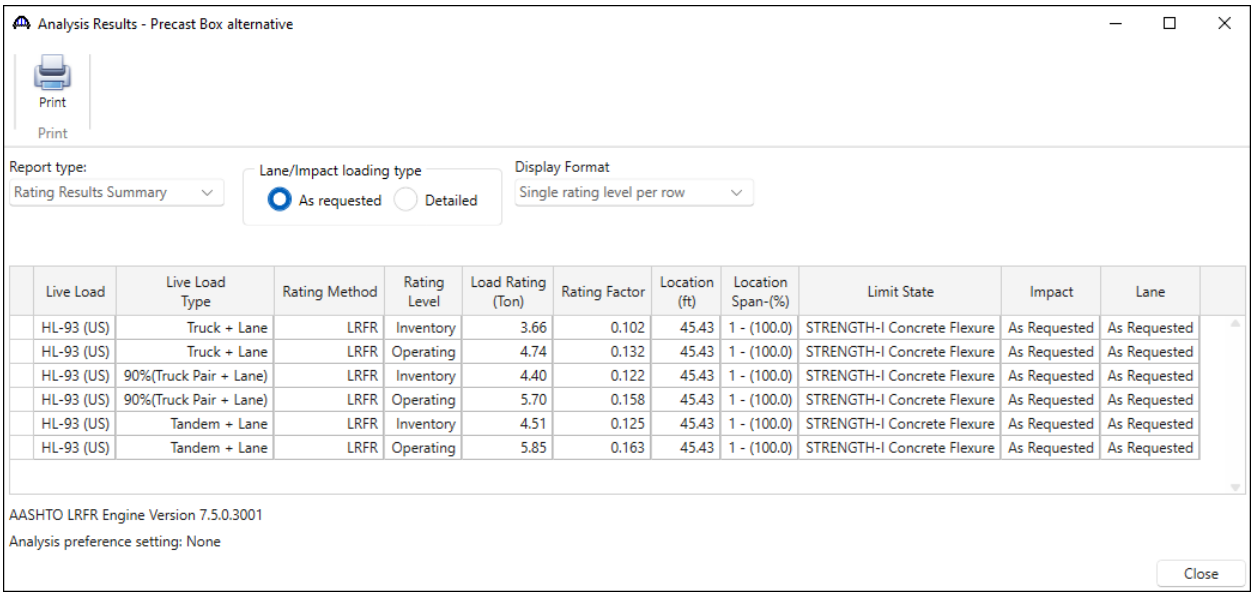
With **G2** member alternative **Precast Box alternative** selected, click the **Analyze** button on the **Analysis** group of the **DESIGN/RATE** ribbon to perform the rating.



When the rating is completed, the results can be reviewed by clicking the **Tabular Results** button on the **Results** group of the **DESIGN/RATE** ribbon.



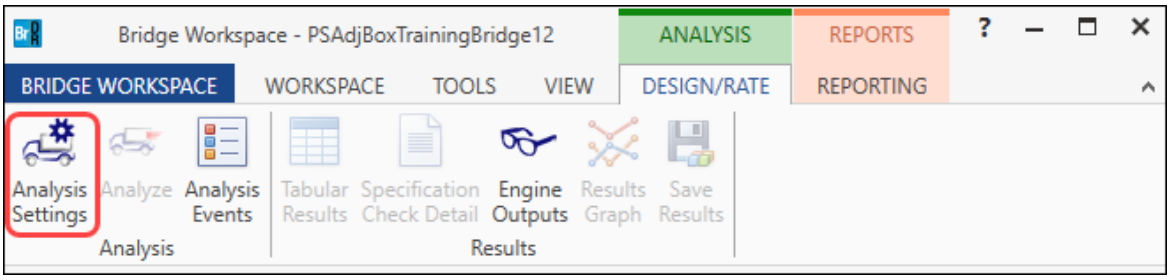
The window shown below will open.



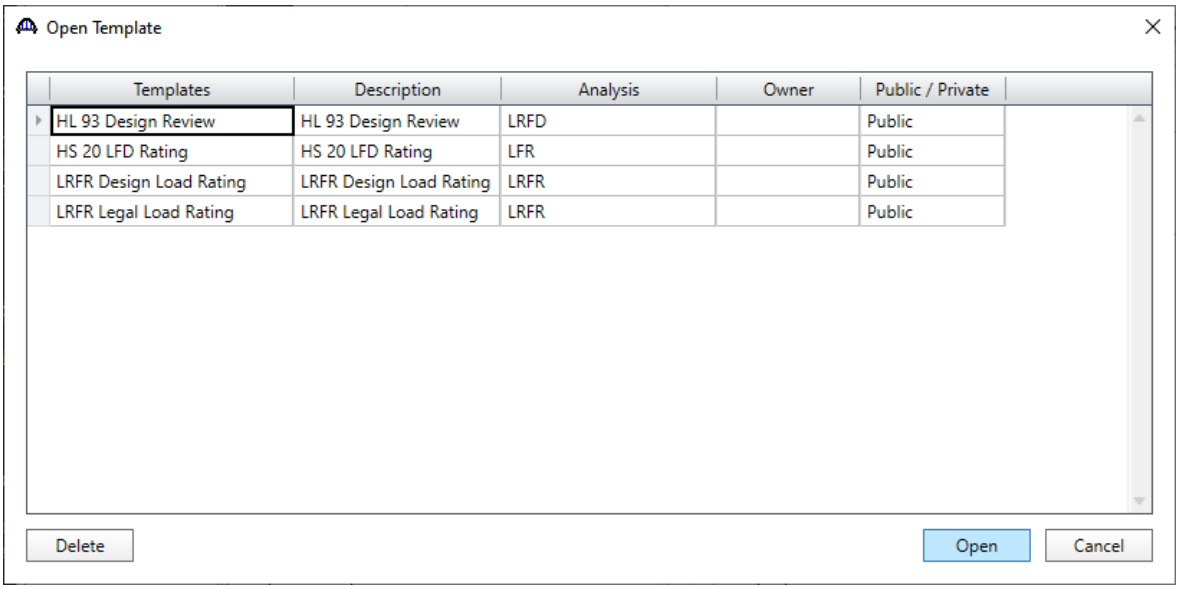
Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	Impact	Lane
HL-93 (US)	Truck + Lane	LRFR	Inventory	3.66	0.102	45.43	1 - (100.0)	STRENGTH-I Concrete Flexure	As Requested	As Requested
HL-93 (US)	Truck + Lane	LRFR	Operating	4.74	0.132	45.43	1 - (100.0)	STRENGTH-I Concrete Flexure	As Requested	As Requested
HL-93 (US)	90%(Truck Pair + Lane)	LRFR	Inventory	4.40	0.122	45.43	1 - (100.0)	STRENGTH-I Concrete Flexure	As Requested	As Requested
HL-93 (US)	90%(Truck Pair + Lane)	LRFR	Operating	5.70	0.158	45.43	1 - (100.0)	STRENGTH-I Concrete Flexure	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Inventory	4.51	0.125	45.43	1 - (100.0)	STRENGTH-I Concrete Flexure	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Operating	5.85	0.163	45.43	1 - (100.0)	STRENGTH-I Concrete Flexure	As Requested	As Requested

LRFD Design review

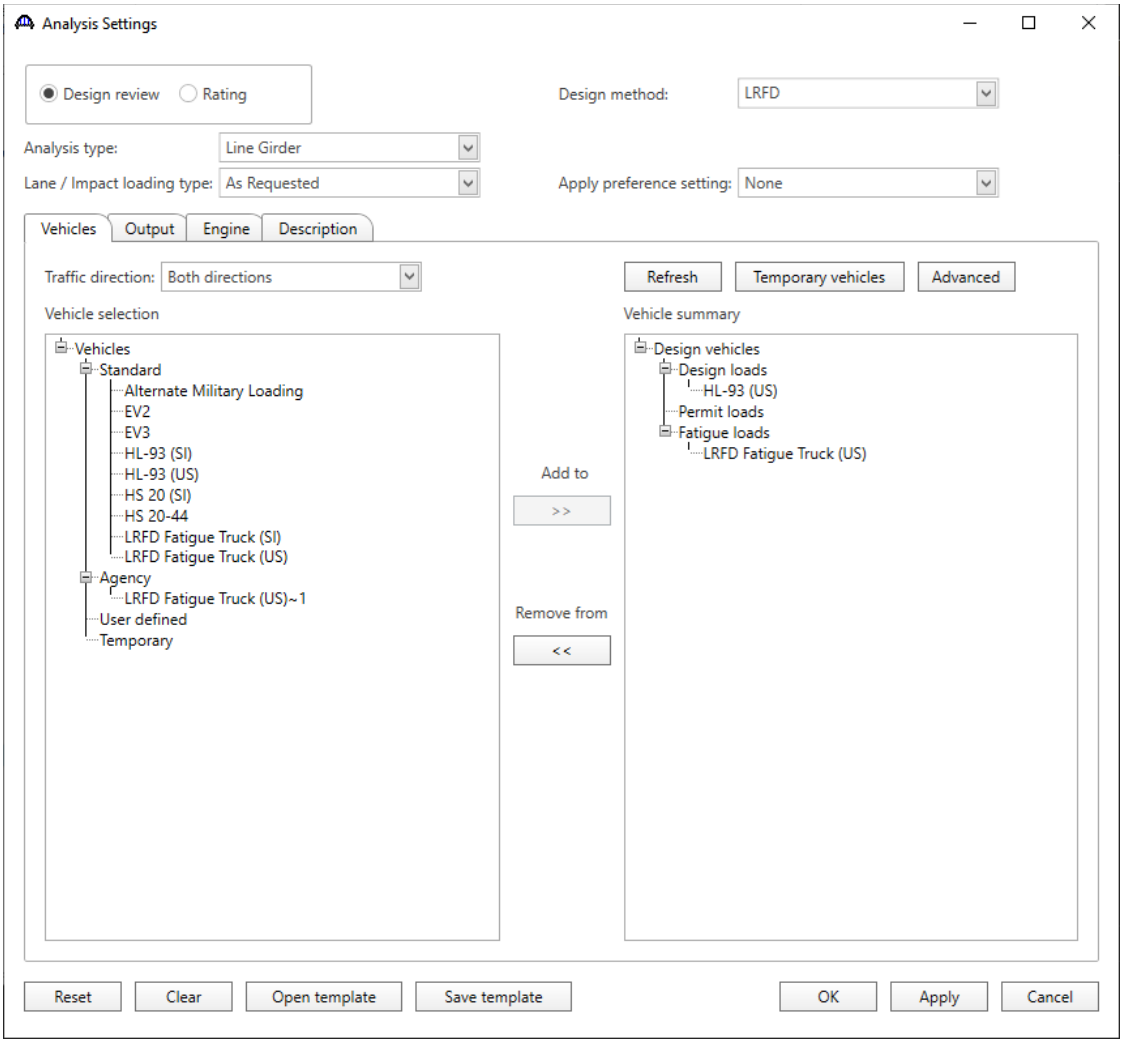
To perform an **LRFD design review of G2** of this girder for HL93 loading, select the **Analysis Settings** button on the **Analysis** group of the **DESIGN/RATE** ribbon to open the window shown below.



Click the **Open Template** button and select the **HL 93 Design Review** to be used in the rating and click **OK**.



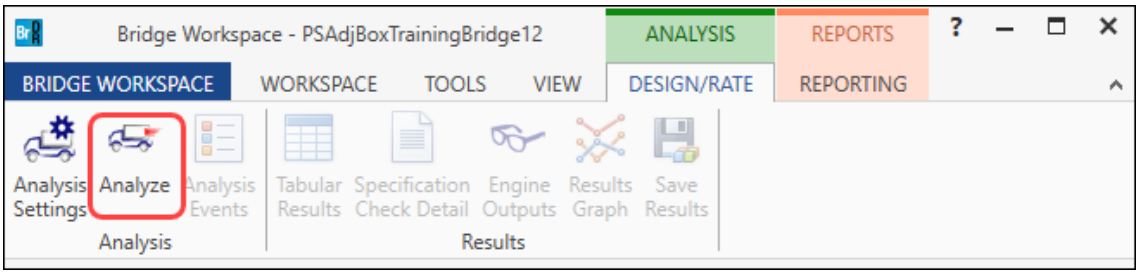
The **Analysis Settings** window will be updated as shown below.



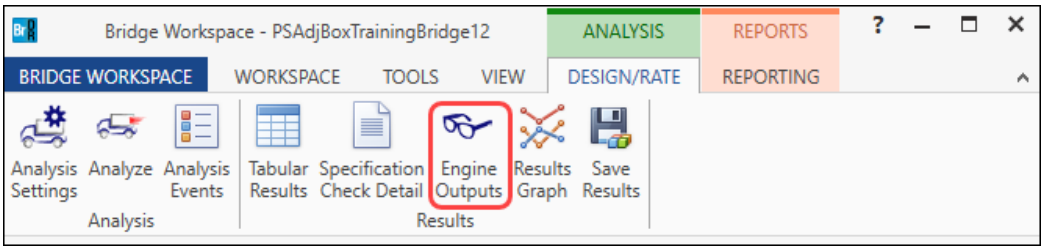
Click **OK** to apply the data and close the window.

Engine Outputs

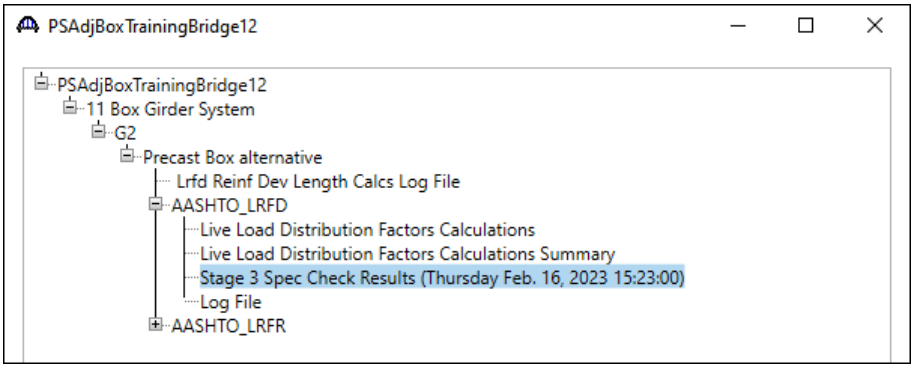
Next click the **Analyze** button on the **Analysis** group of the **DESIGN/RATE** ribbon to perform the design review.



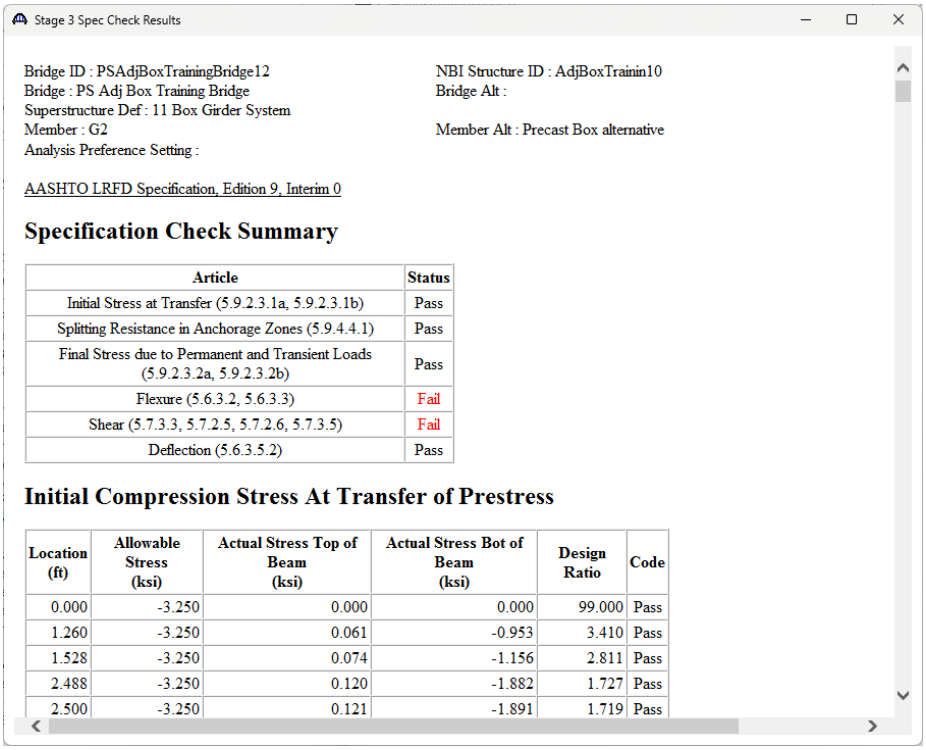
AASHTO LRFD analysis will generate a **Spec Check Results** file. When the design review is finished, results can be reviewed by clicking the **Engine outputs** button on the **Results** group of the ribbon.



The following window opens.



To view the spec check results, double click the **Stage 3 Spec Check Results** file in this window.



Stage 3 Spec Check Results

Bridge ID : PSAdjBoxTrainingBridge12
Bridge : PS Adj Box Training Bridge
Superstructure Def : 11 Box Girder System
Member : G2
Analysis Preference Setting :

NBI Structure ID : AdjBoxTrainin10
Bridge Alt :

Member Alt : Precast Box alternative

AASHTO LRFD Specification, Edition 9, Interim 0

Specification Check Summary

Article	Status
Initial Stress at Transfer (5.9.2.3.1a, 5.9.2.3.1b)	Pass
Splitting Resistance in Anchorage Zones (5.9.4.4.1)	Pass
Final Stress due to Permanent and Transient Loads (5.9.2.3.2a, 5.9.2.3.2b)	Pass
Flexure (5.6.3.2, 5.6.3.3)	Fail
Shear (5.7.3.3, 5.7.2.5, 5.7.2.6, 5.7.3.5)	Fail
Deflection (5.6.3.5.2)	Pass

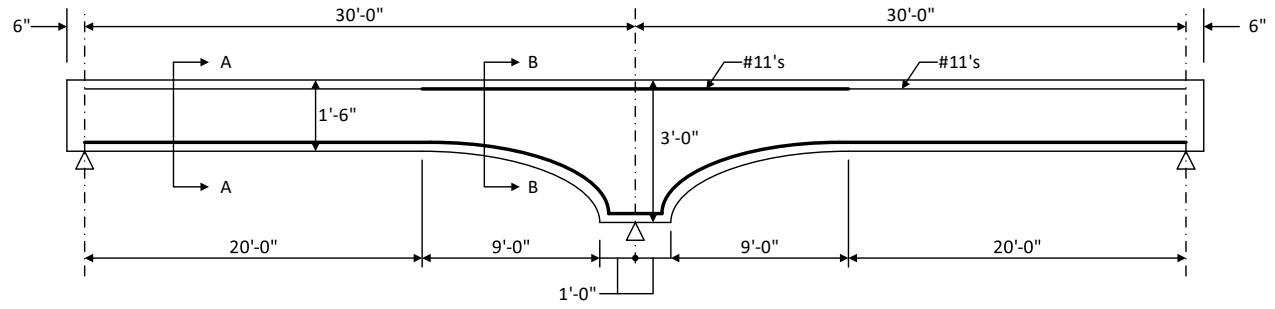
Initial Compression Stress At Transfer of Prestress

Location (ft)	Allowable Stress (ksi)	Actual Stress Top of Beam (ksi)	Actual Stress Bot of Beam (ksi)	Design Ratio	Code
0.000	-3.250	0.000	0.000	99.000	Pass
1.260	-3.250	0.061	-0.953	3.410	Pass
1.528	-3.250	0.074	-1.156	2.811	Pass
2.488	-3.250	0.120	-1.882	1.727	Pass
2.500	-3.250	0.121	-1.891	1.719	Pass

Reinforced Concrete Structure Tutorial

RC6 – Two Span Reinforced Concrete Slab System Example

Introduction – Elevation



Elevation

Section and Material Properties

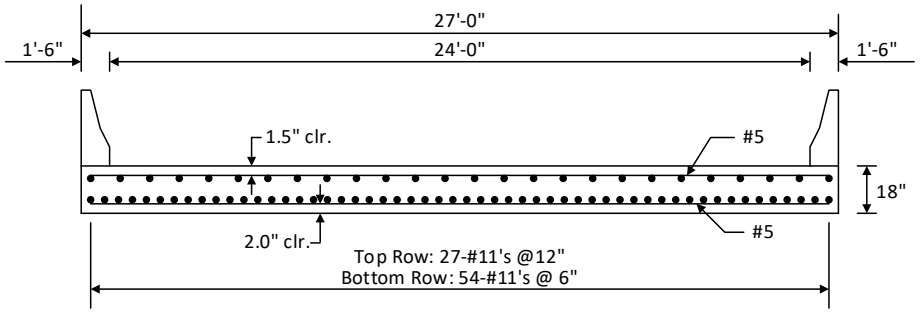
Material Properties

Slab Concrete: Class A (US) f'c = 4.0 ksi, modular ratio n = 8

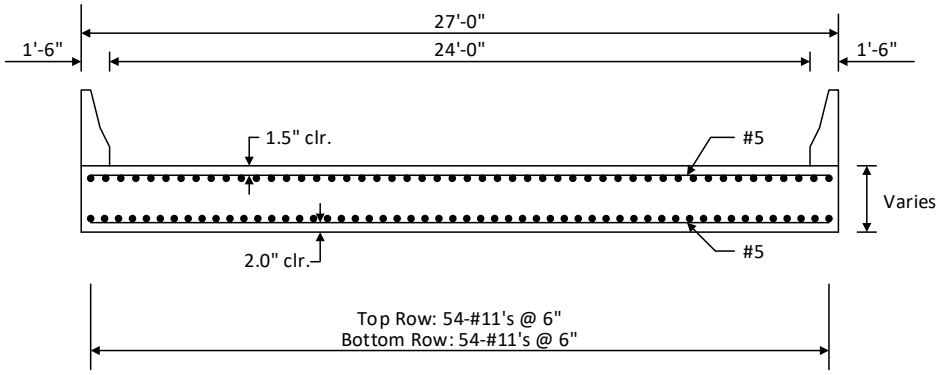
Slab Reinforcing Steel: AASHTO M31, Grade 60 with Fy = 60 ksi

Parapets

Weigh 300 lb/ft each.



Section A-A



Section B-B

BrDR Training

RC6 – Two Span Reinforced Concrete Slab System Example

Topics Covered

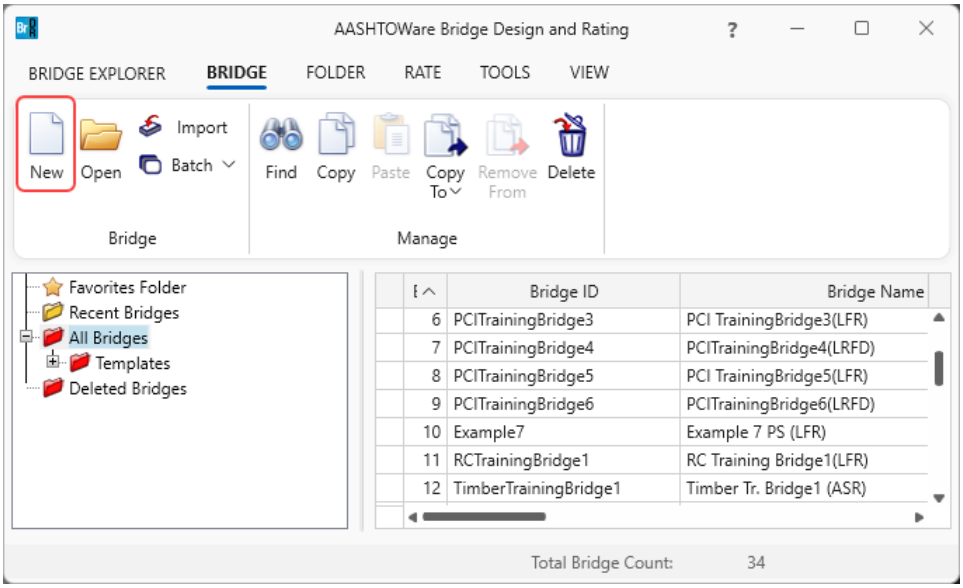
Part 1: Reinforced concrete slab system input. Slab is not integral with pier.

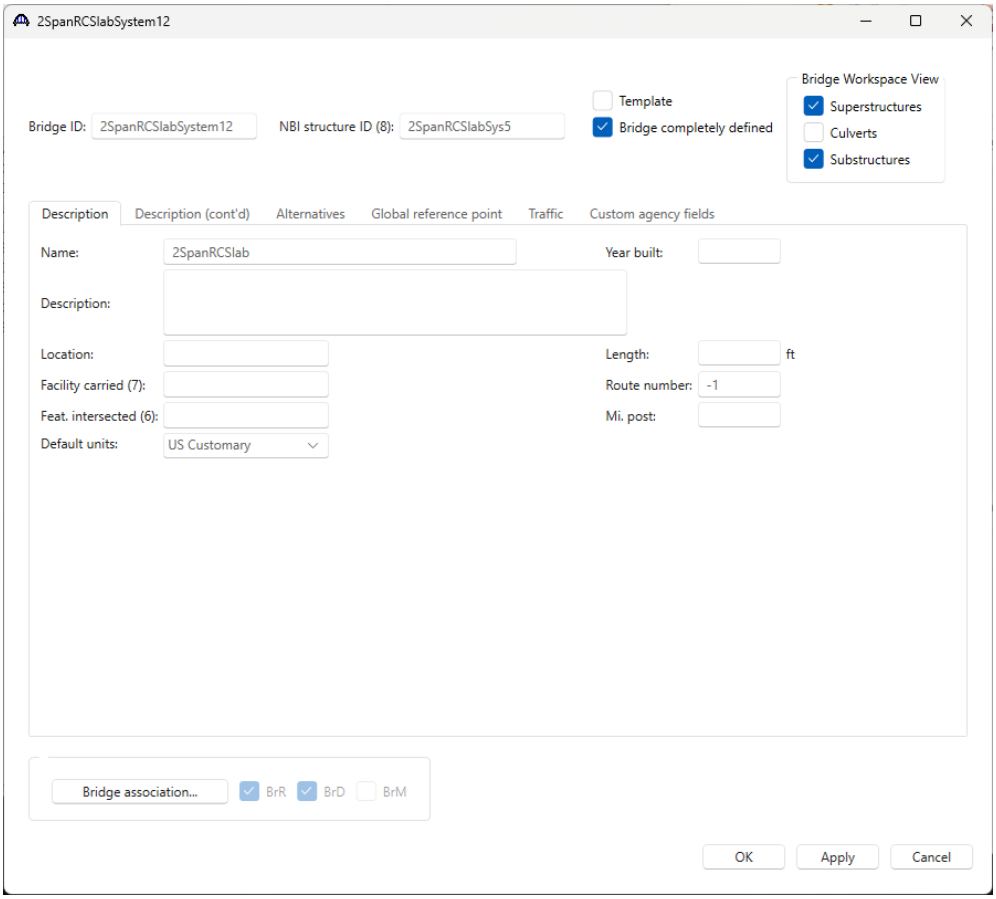
- Schedule based input of slab strip.
- Slab depth varies parabolically over the pier.

Part 2: Frame structure simplified definition slab structure type.

Reinforced concrete slab system input. Slab is not integral with pier

From the **Bridge Explorer** create a new bridge by selecting **New** from the **Bridge** ribbon and enter the following description data.

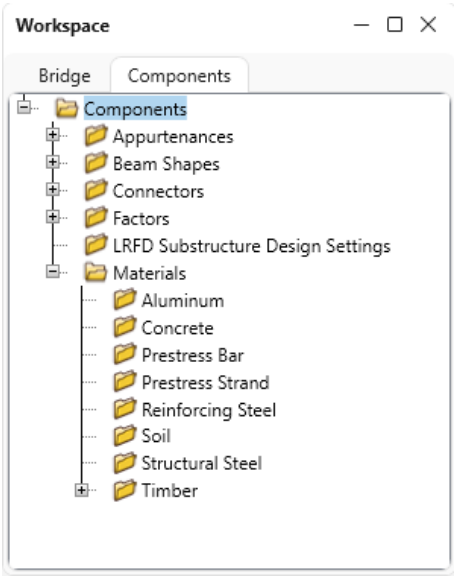




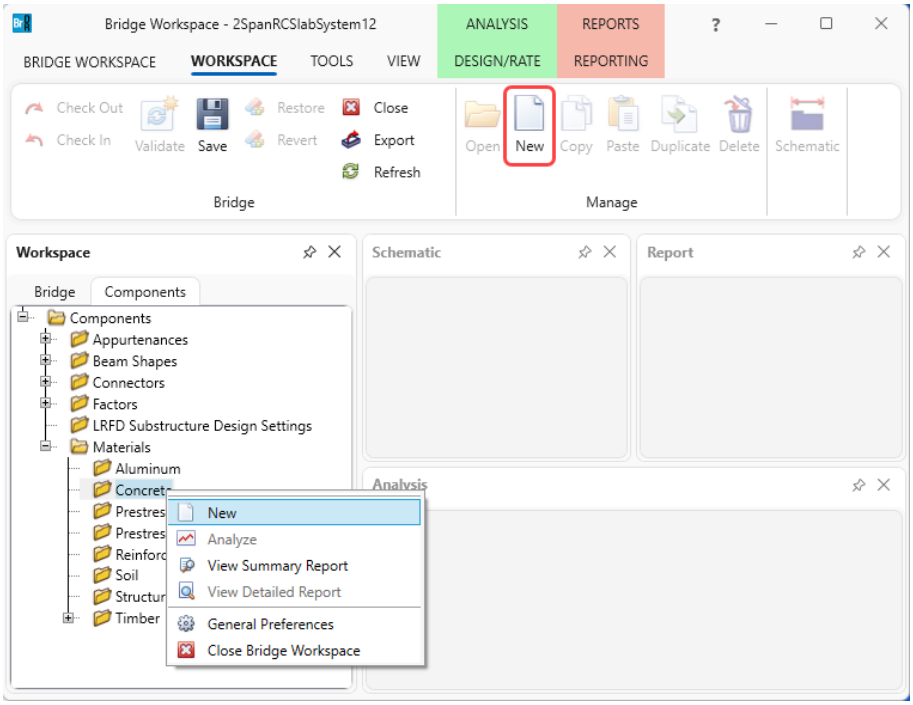
Close the window by clicking **OK**.

Bridge Components

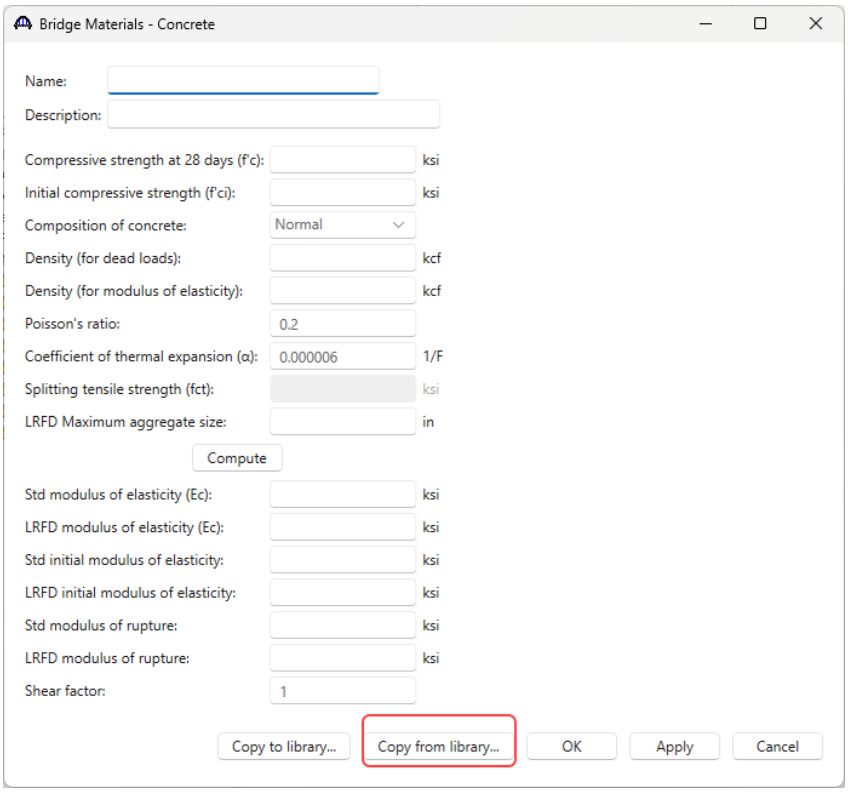
To enter the materials to be used by members of the bridge, click on the **Components** tab of **Bridge Workspace**, and expand the tree for **Materials**. The tree with the expanded **Materials** branch is shown below



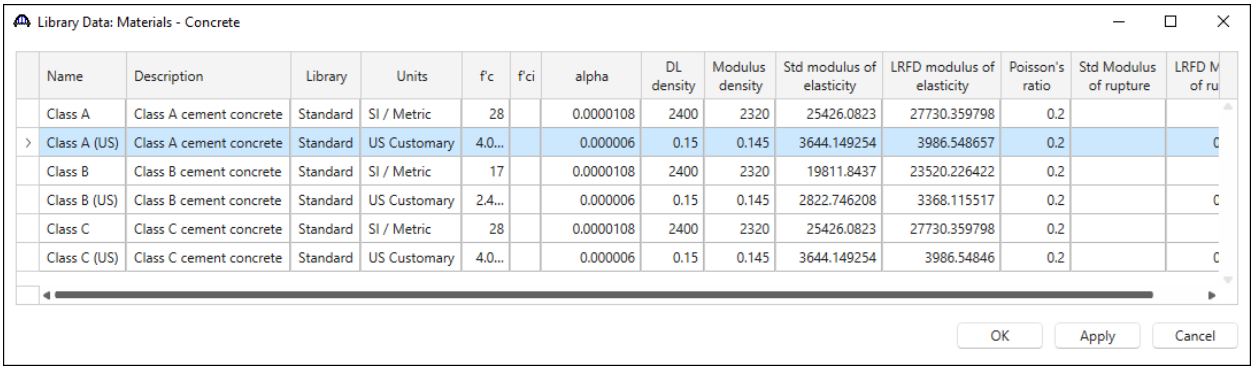
To add a new concrete material, click on **Concrete** in the **Components** tree and select **New** from the **Manage** group of the **Workspace** ribbon (or right mouse click on **Concrete** and select **New**).



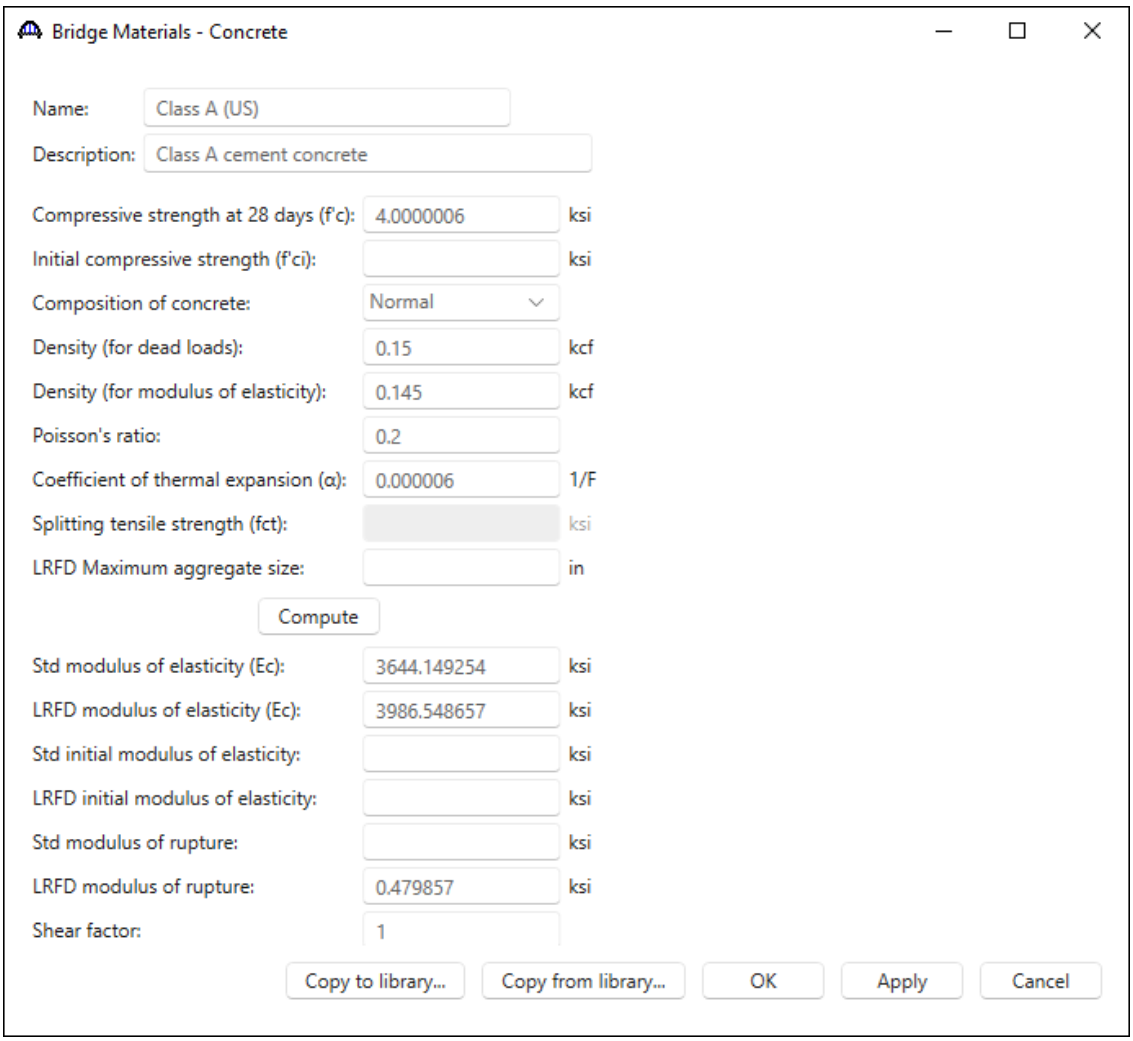
Add the concrete material by selecting from the **Concrete Materials Library** by clicking the **Copy from Library** button.



The following window opens:

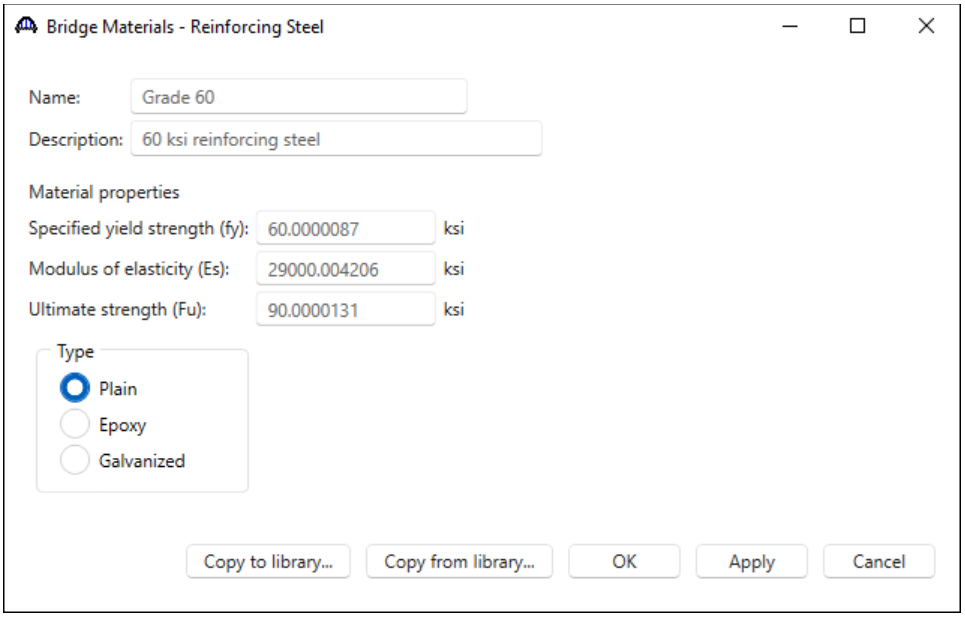


Select the **Class A (US)** material and click **OK.** The selected material properties are copied to the **Bridge Materials – Concrete** window as shown below.



Click **OK** to apply the data and close the window.

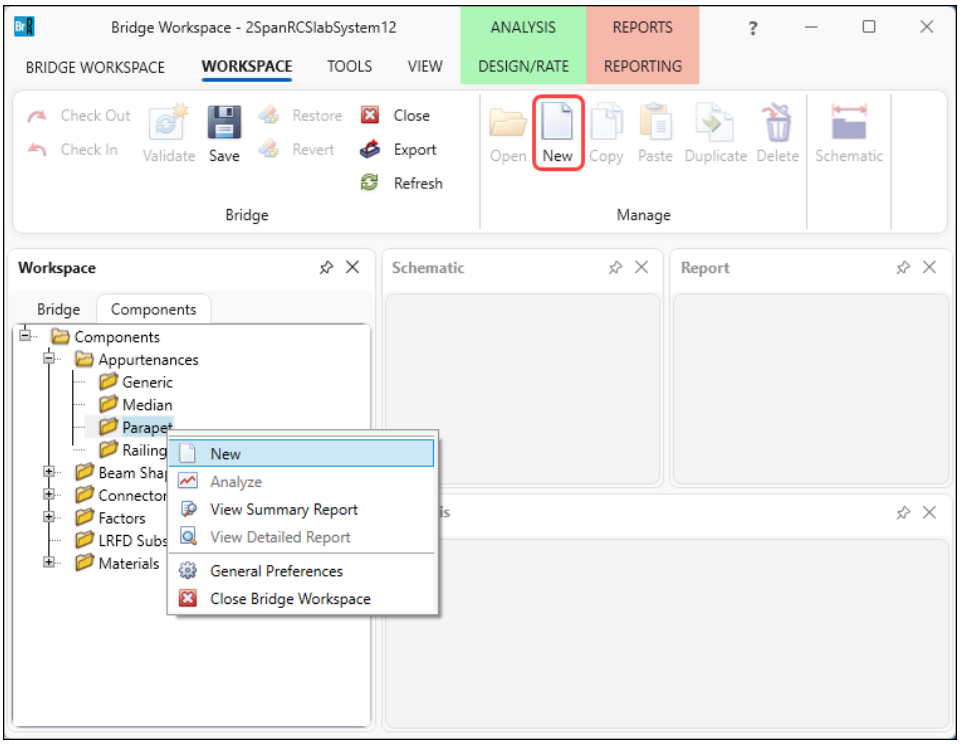
Add the following **Reinforcing Steel** in the same manner.



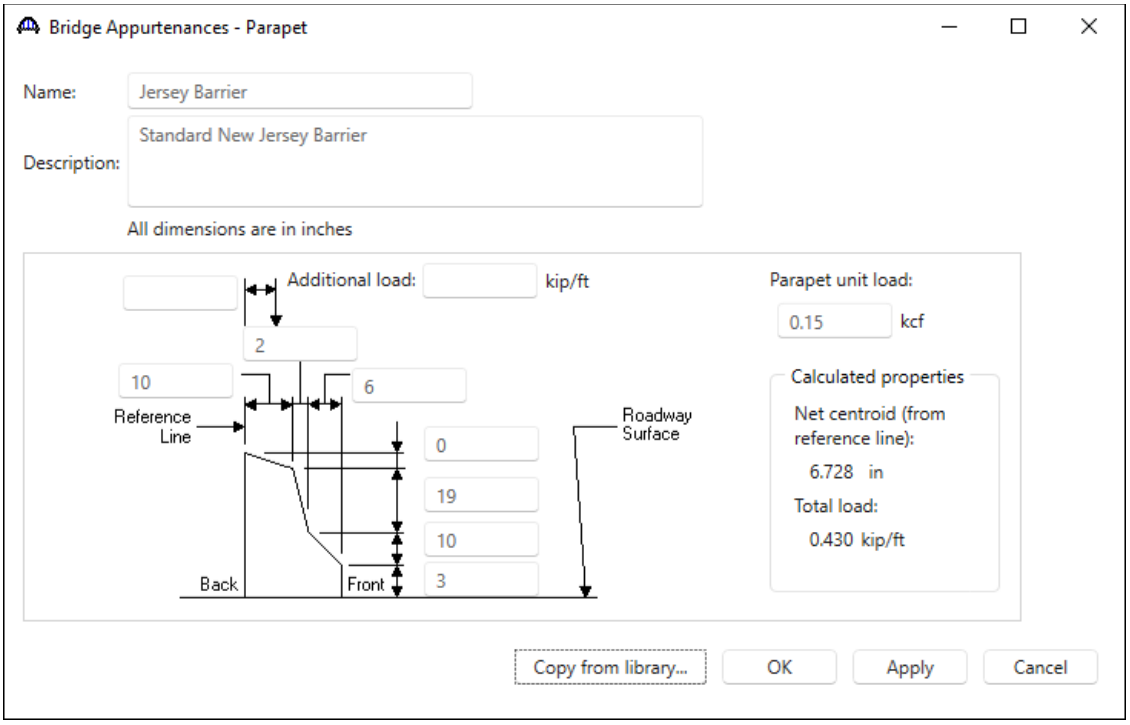
Click **OK** to apply the data and close the window.

Bridge Appurtenances

Add parapet information in a similar maner under **Appurtenances**. To enter the appurtenances to be used within the bridge expand the tree branch labeled **Appurtenances**. To define a parapet, select **Parapet** and click on **New** from the **Manage** button on the **Workspace** ribbon (double click on **Parapet** in the **Components** tree).



Enter the data as shown below.

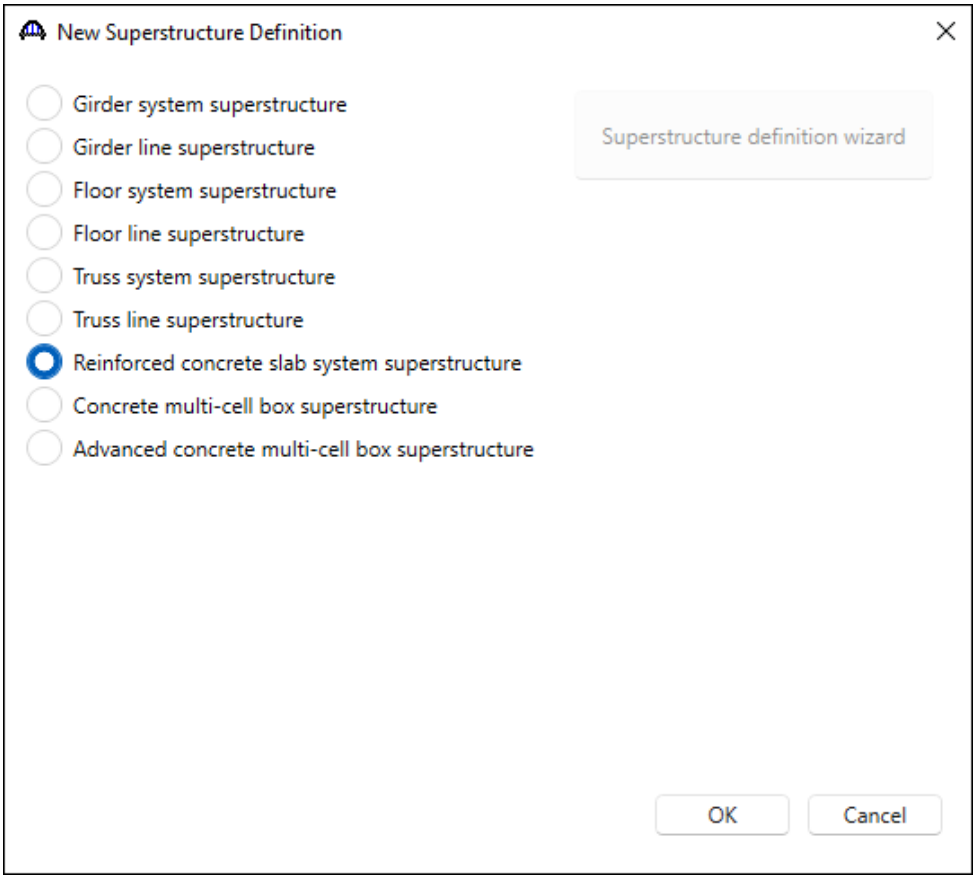


Click **OK** to apply the data and close the window.

Since a reinforced concrete slab is used, beam shapes need not be defined. The slab details will be entered later when the strip profile is defined. The default impact factors, standard LRFD and LFR factors will be used so the next step will be to define a Superstructure. A **Bridge Alternatives** will be added after a superstructure is defined.

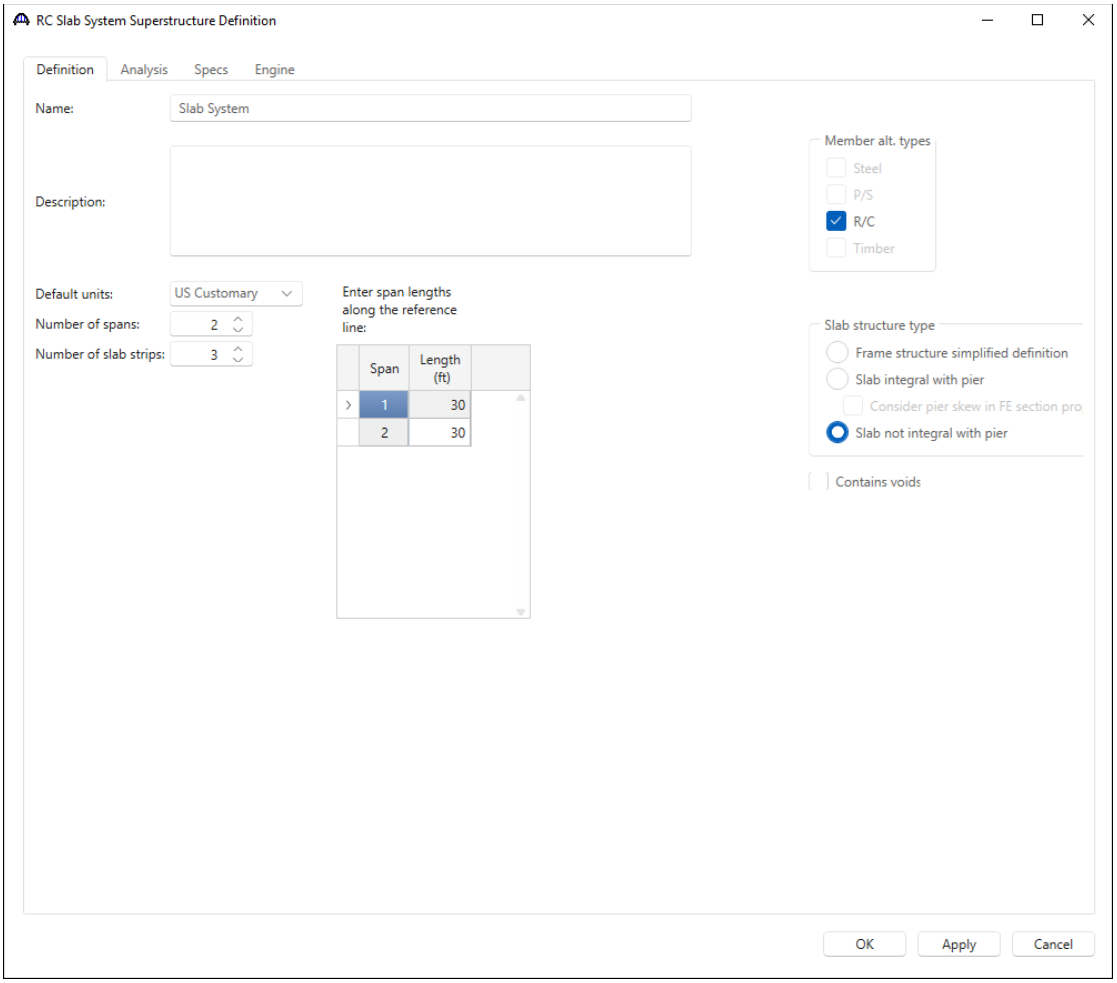
Superstructure Definition

Navigate to the **Bridge** tab in the **Bridge Workspace** tree and double-click on **SUPERSTRUCTURE DEFINITIONS** (or click on **SUPERSTRUCTURE DEFINITIONS** and select **New** from the **Manage** group of the Workspace ribbon or right mouse click on **SUPERSTRUCTURE DEFINITIONS** and select **New** from the popup menu) to create a new structure definition.



Select **Reinforced concrete slab system superstructure**, click **OK** and the **RC Slab System Superstructure Definition** window will open.

Enter data as shown below.

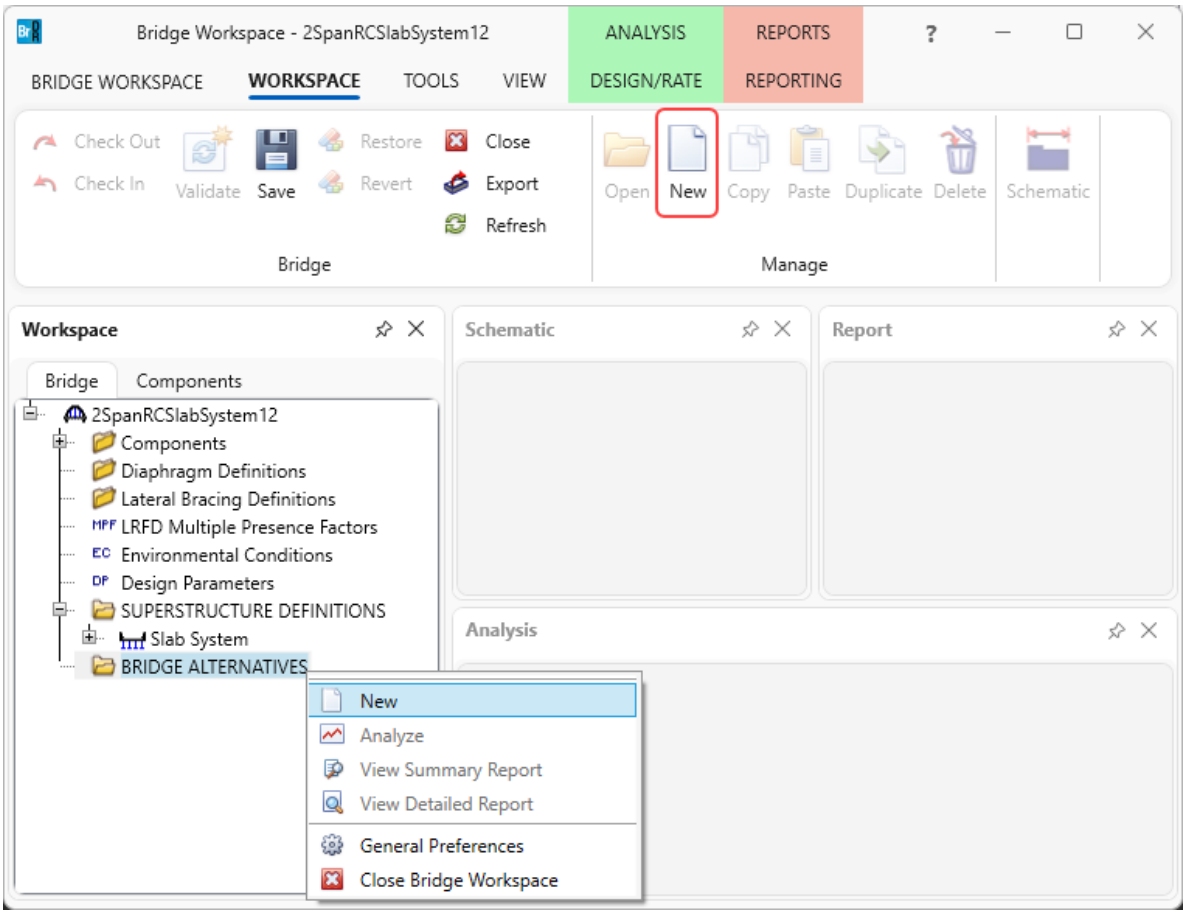


For this superstructure definition, select **Slab structure type** as **Slab not integral with pier**. The **Number of spans** is 2 and the **Number of slab** strips is 3. The width of the edge strips to 7.5 ft and the width of the interior strip to 12 ft. Enter the rest of the data as shown above and click on **OK** to apply the data and close the window.

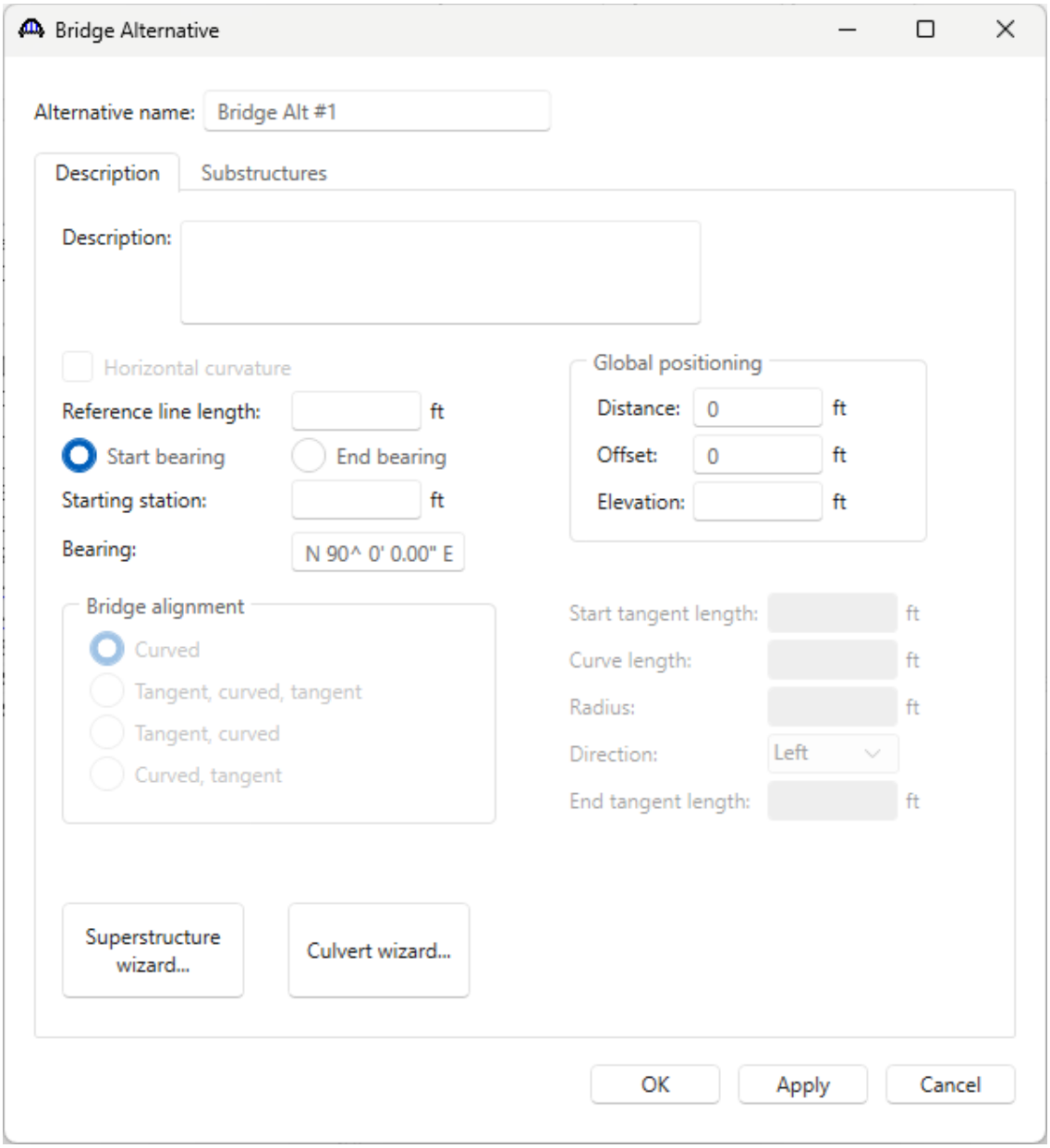
To enter a slab with voids, select **Contains voids** in the superstructure definition window which allows the user to define void patterns and assign the patterns along the slab. For this example, a solid slab will be defined so **Contains voids** should remain unchecked.

BRIDGE ALTERNATIVES

Navigate to the **BRIDGE ALTERNATIVES** node in the **Bridge Workspace** tree and create a new bridge alternative by double-clicking on **BRIDGE ALTERNATIVES** (or click on **BRIDGE ALTERNATIVES** and select **New** from the **Manage** group of the **WORKSPACE** ribbon).

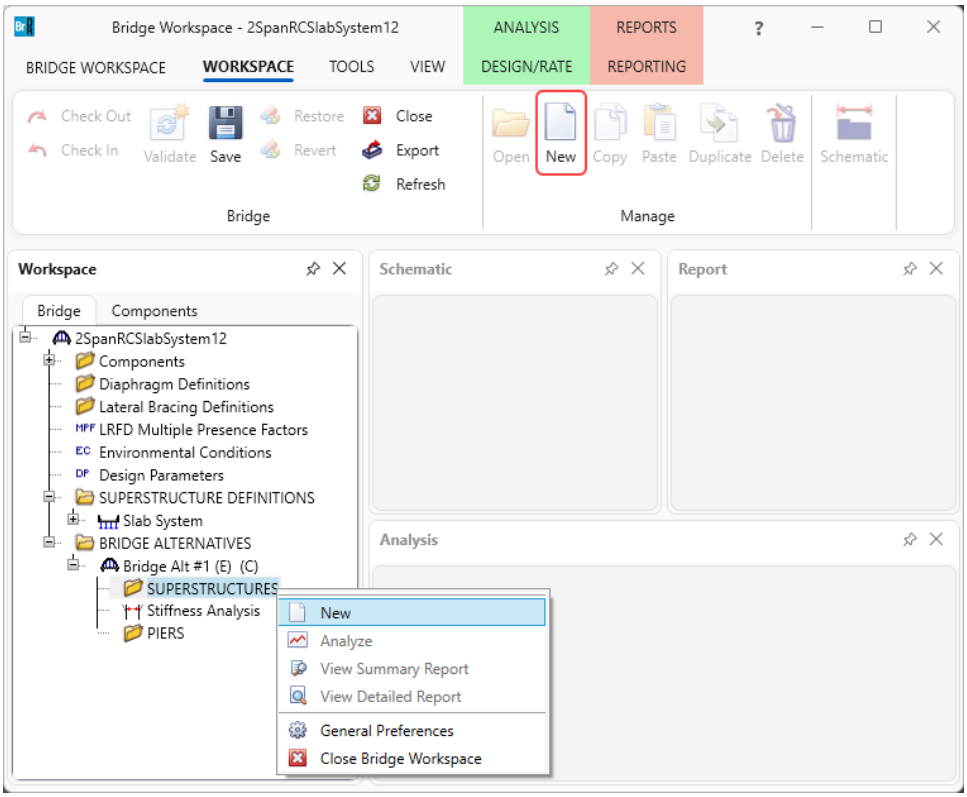


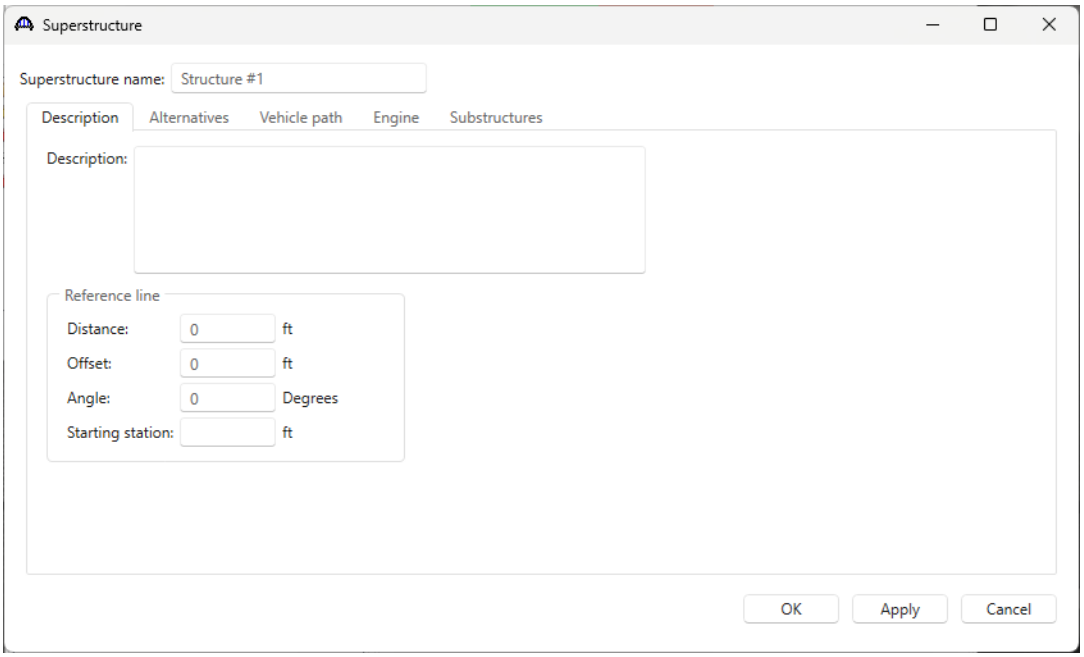
Enter the following data.



Click **OK** to apply the data and close the window.

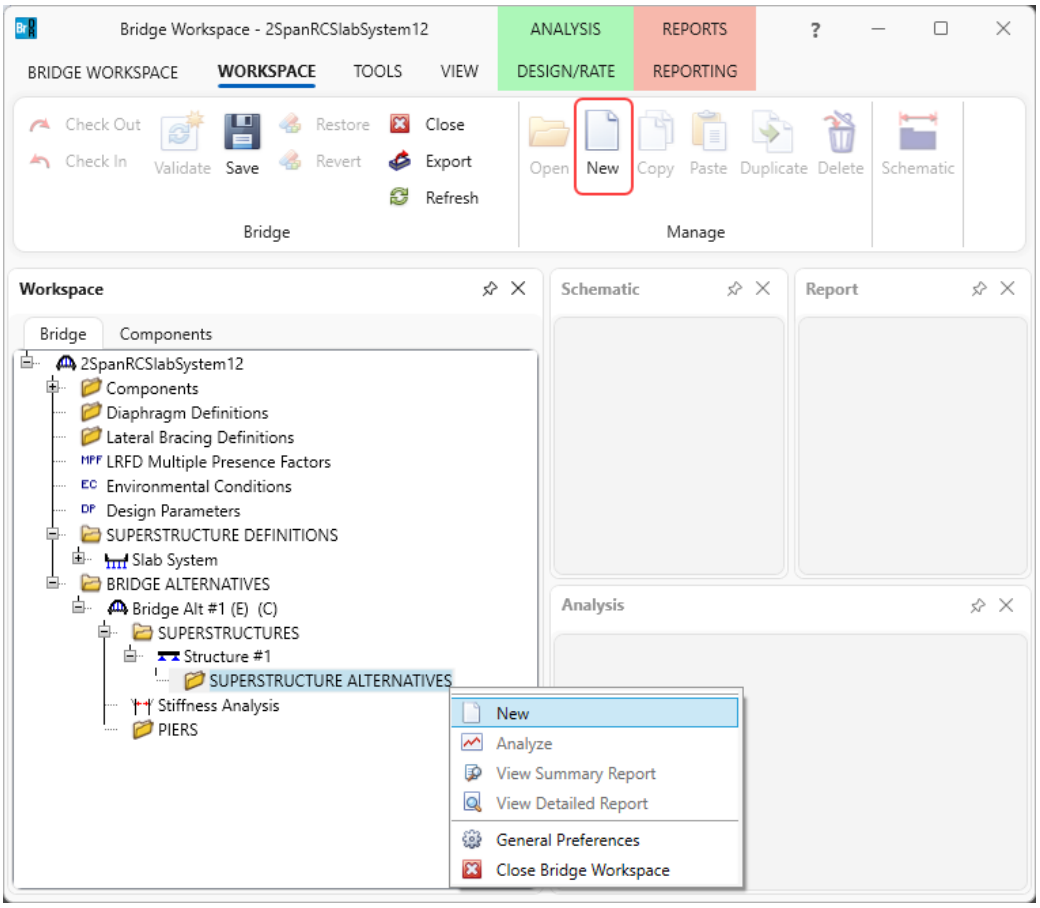
Expand the **Bridge Alt #1** node in the **Bridge Workspace** tree by clicking the ⊞ button. Double-click on the **SUPERSTRUCTURES** node (or select **SUPERSTRUCTURES**, click **New** from the **Manage** group of the **WORKSPACE** ribbon) and enter the following new superstructure.



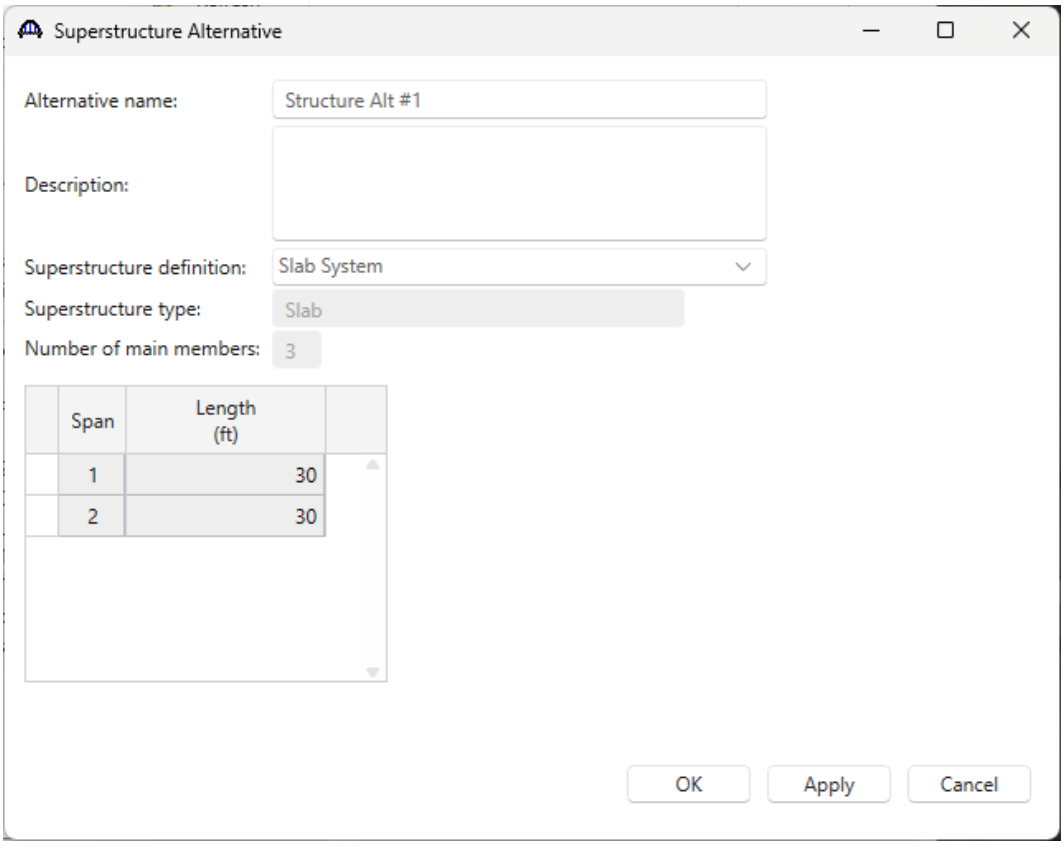


Click **OK** to apply the data and close the window.

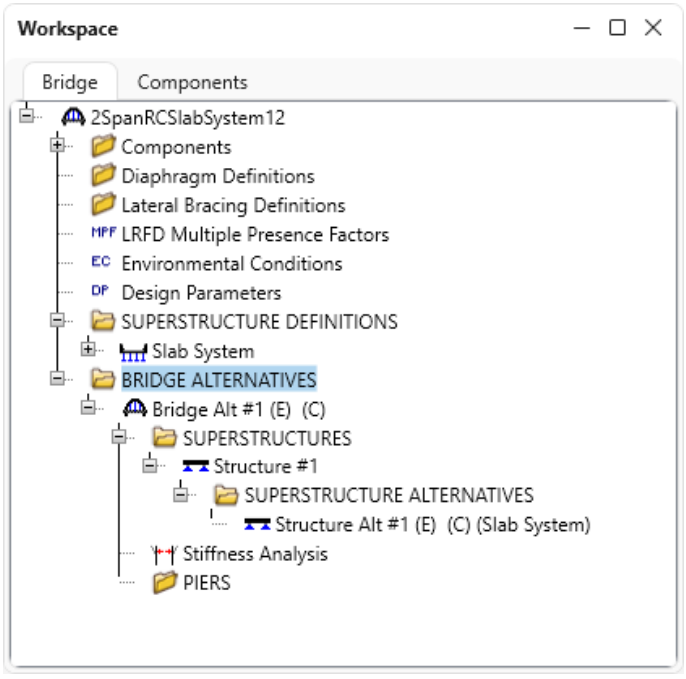
Expand the **Structure #1** node in the **Bridge Workspace** tree by clicking the ⊞ button. Double-click on the **SUPERSTRUCTURE ALTERNATIVES** node (or select **SUPERSTRUCTURE ALTERNATIVES** and click **New** from the **Manage** group of the **WORKSPACE** ribbon) and enter the following new superstructure alternative.



Select the **Superstructure definition Slab System** as the current superstructure definition for this Superstructure Alternative.

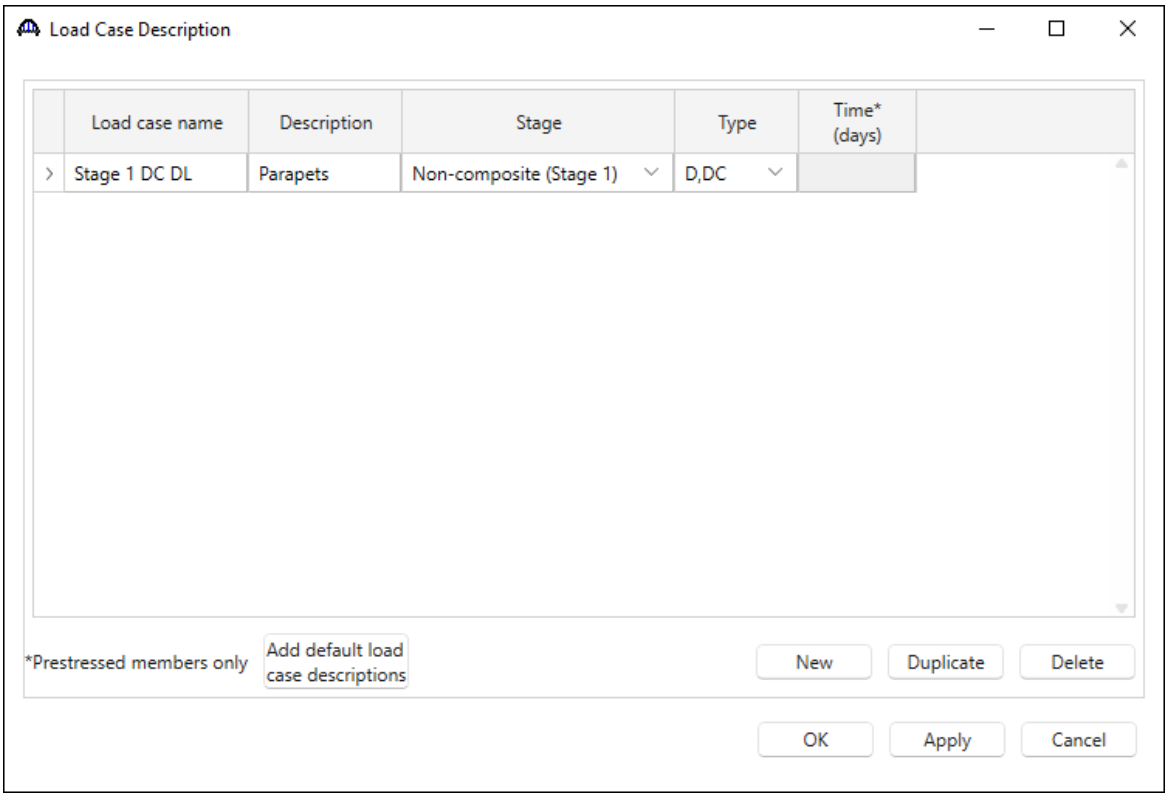


The partially expanded **Bridge Workspace tree** is shown below.



Load Case Description

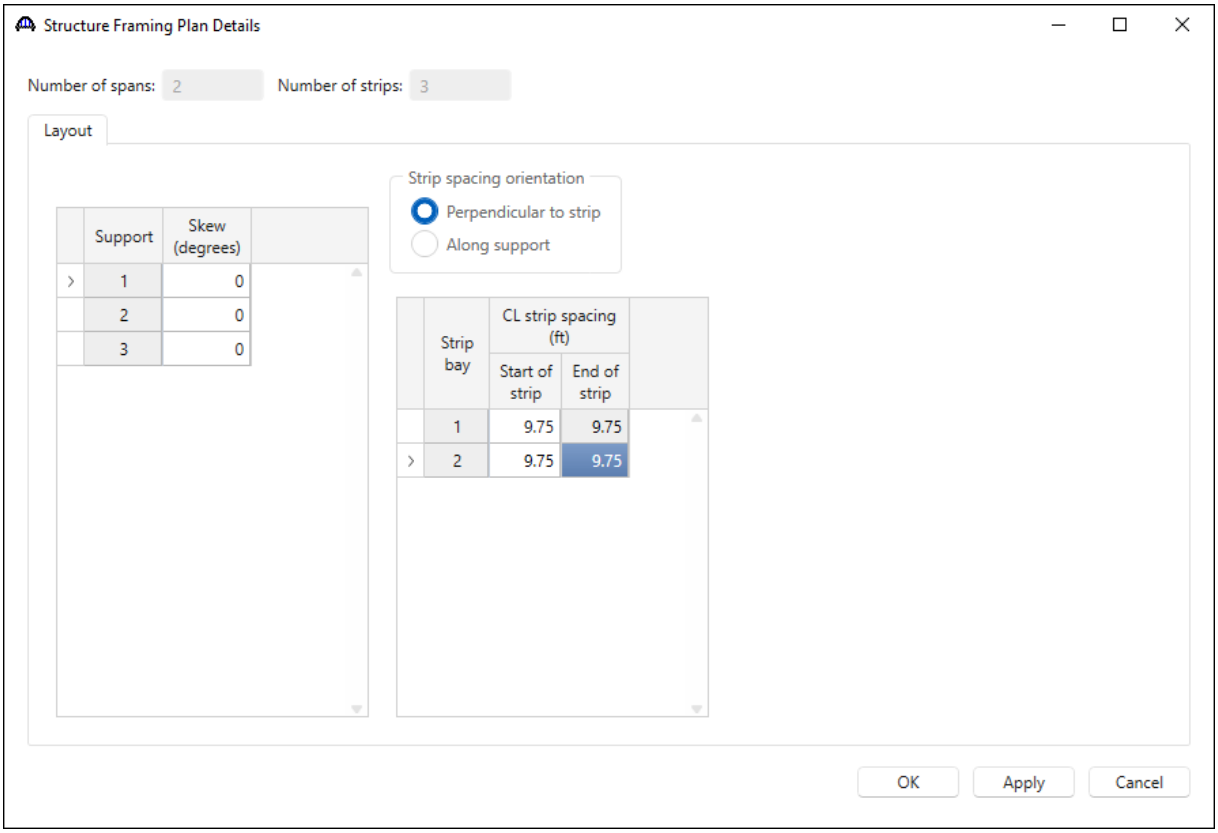
Navigate back the Superstructure definition **Slab System**. Double click on the **Load Case Description** node in the **Bridge Workspace** tree to open the **Load Case Description** window and define the dead load case to be used by the parapets. The completed **Load Case Description** window is shown below.



Click **OK** to apply the data and close the window.

Framing Plan Details - Layout

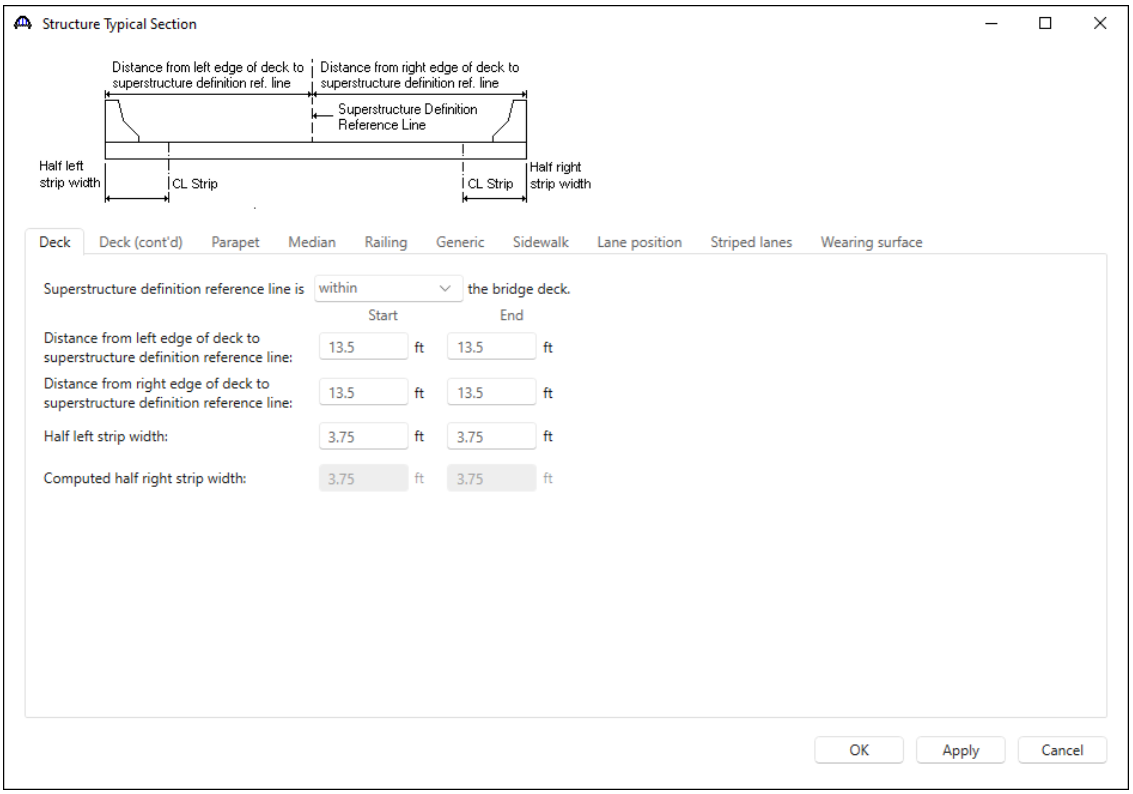
Double-click on **Framing Plan Detail** in the **Bridge Workspace** tree to describe the framing plan in the **Structure Framing Plan Details** window. Enter the data as shown below. For this example, since the width of the edge strips will be set to 7.5 ft and the width of the interior strip will be set to 12 ft, enter the **CL Strip Spacing** as **9.75 ft** for both bays.



Click **OK** to apply the data and close the window.

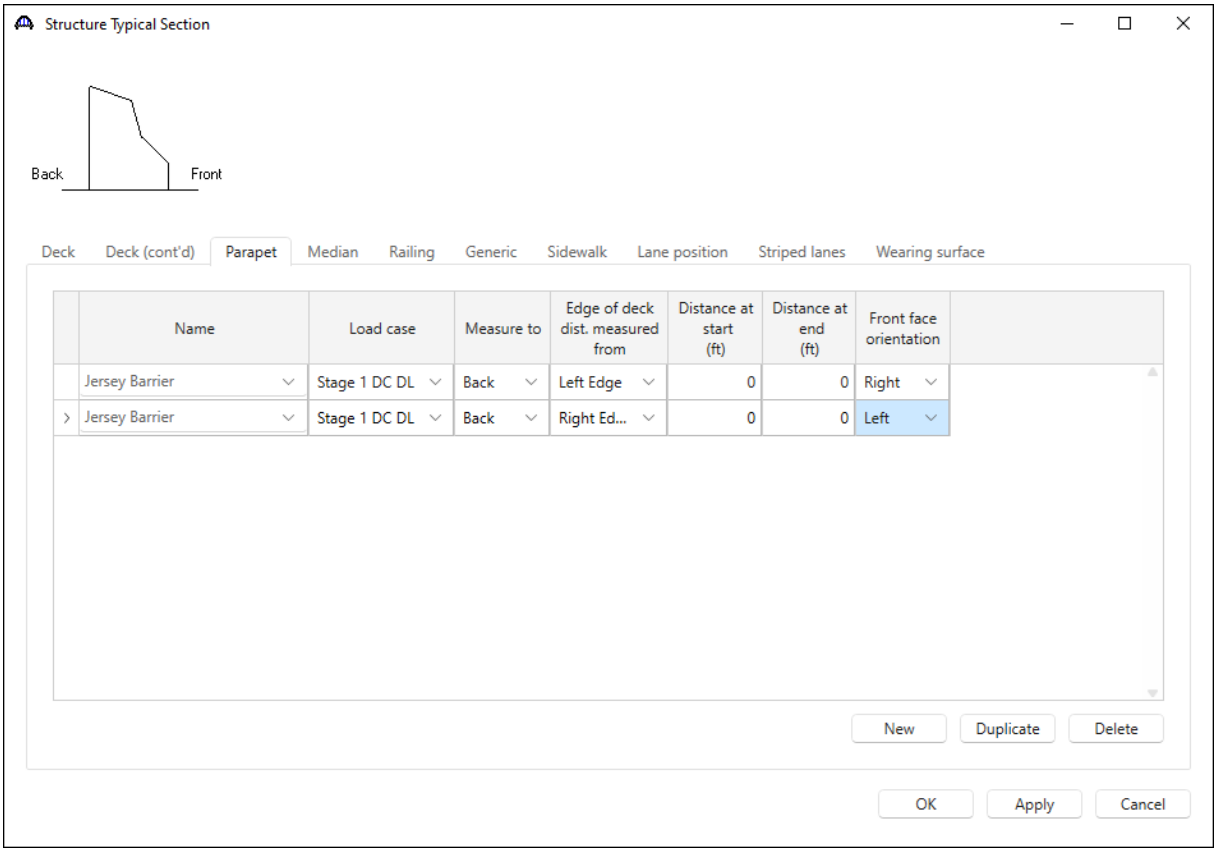
Structure Typical Section -Deck

Next, define the structure typical section by double-clicking on **Structure Typical Section** in the **Bridge Workspace** tree. Enter the data describing the typical section as shown below.



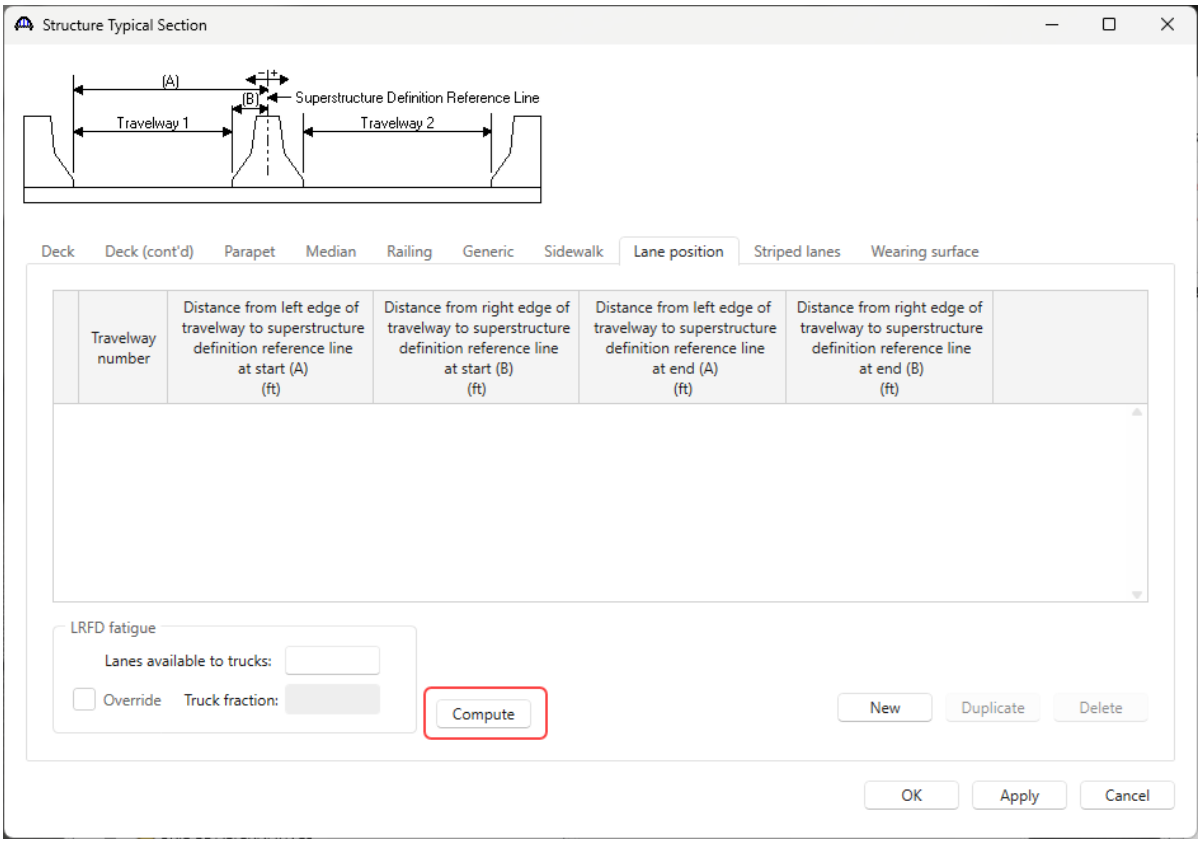
Structure Typical Section – Parapet

Switch to the **Parapet** tab and enter data as shown below.

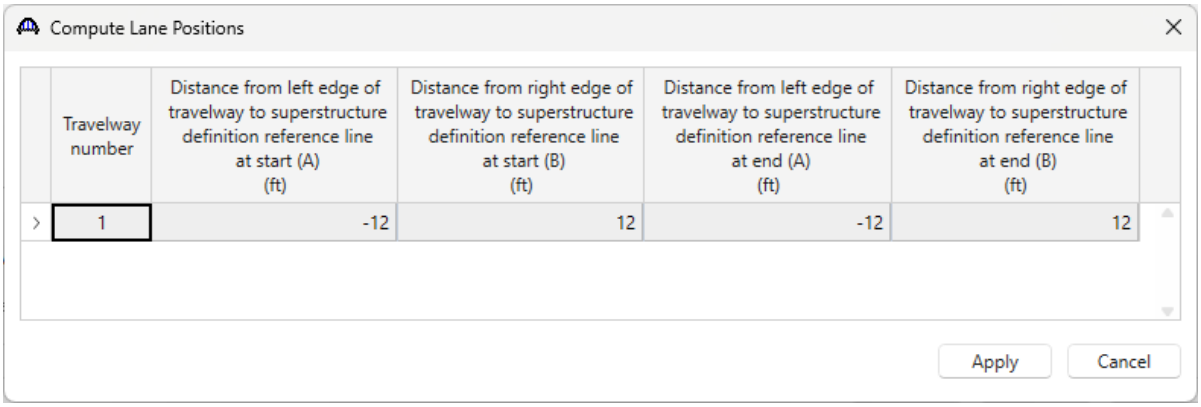


Structure Typical Section – Lane Position

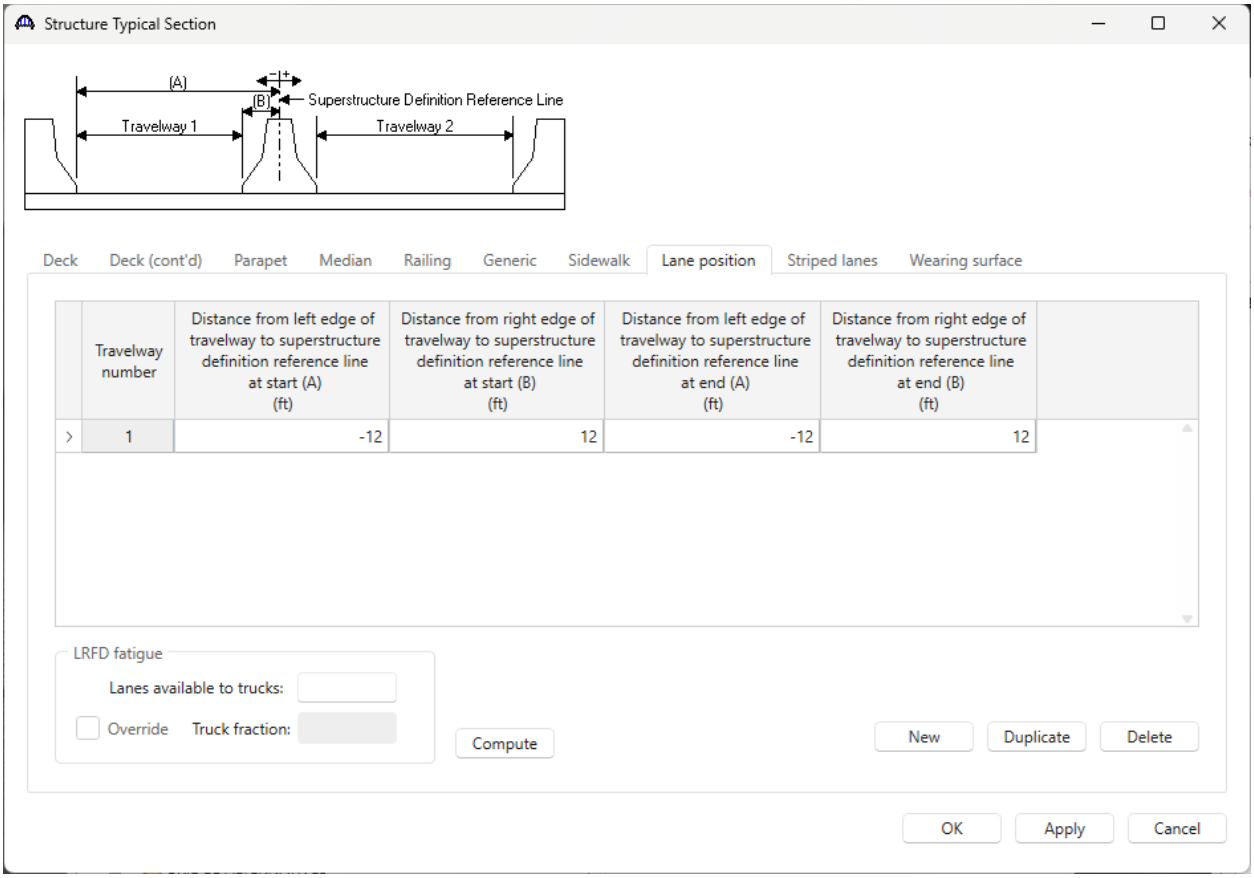
Navigate to the **Lane position** tab and click on the Compute button to compute the lane positions based on the information entered in this window.



The **Compute Lane Positions** window appears as shown below. Click **Apply** to use the computed lane positions.



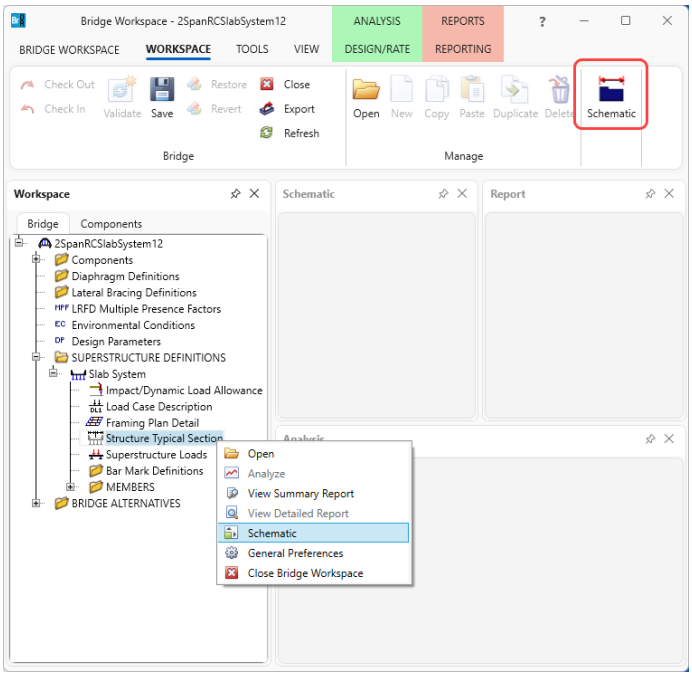
The **Lane positions** tab is populated as shown below.



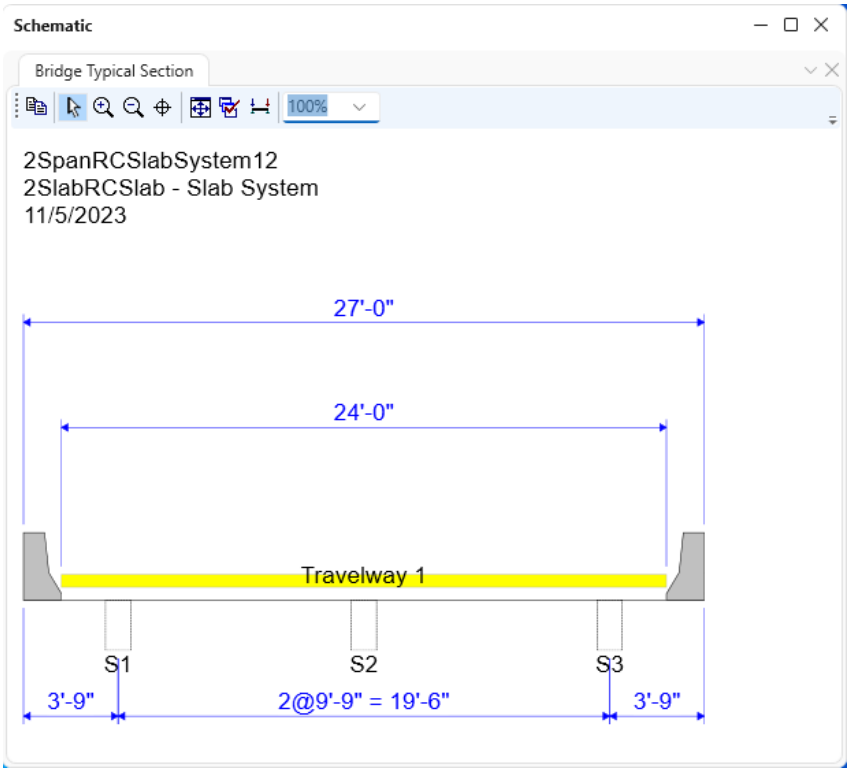
Click **OK** to apply the data and close the window.

Structure Typical Section – Schematics

Select **Structure Typical Section** in the **Bridge Workspace** tree and click on the **Schematics** button from the **Workspace** ribbon (or right click and select **Schematic**) to open **Schematic: Typical section** window as shown below.

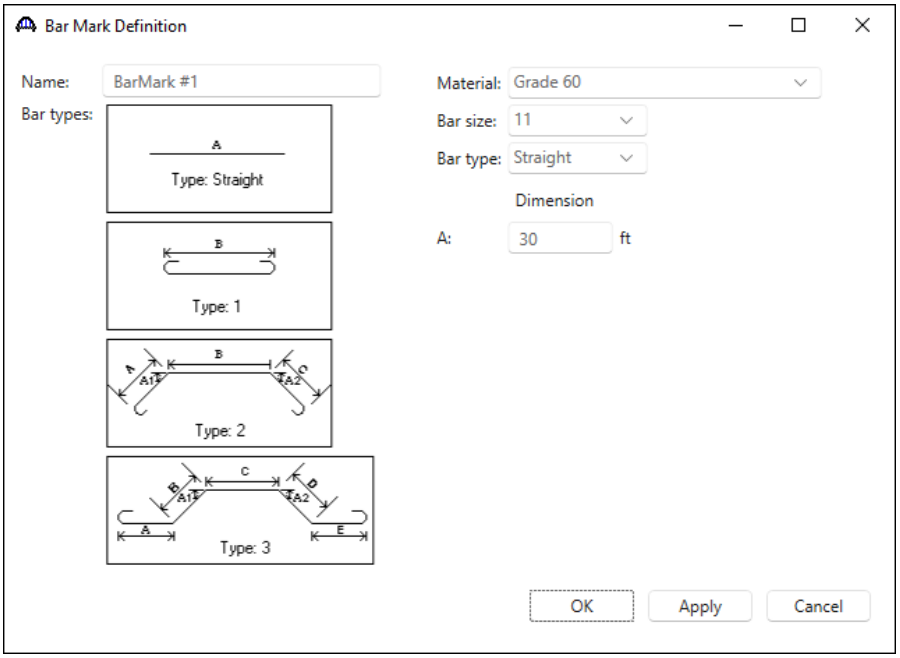


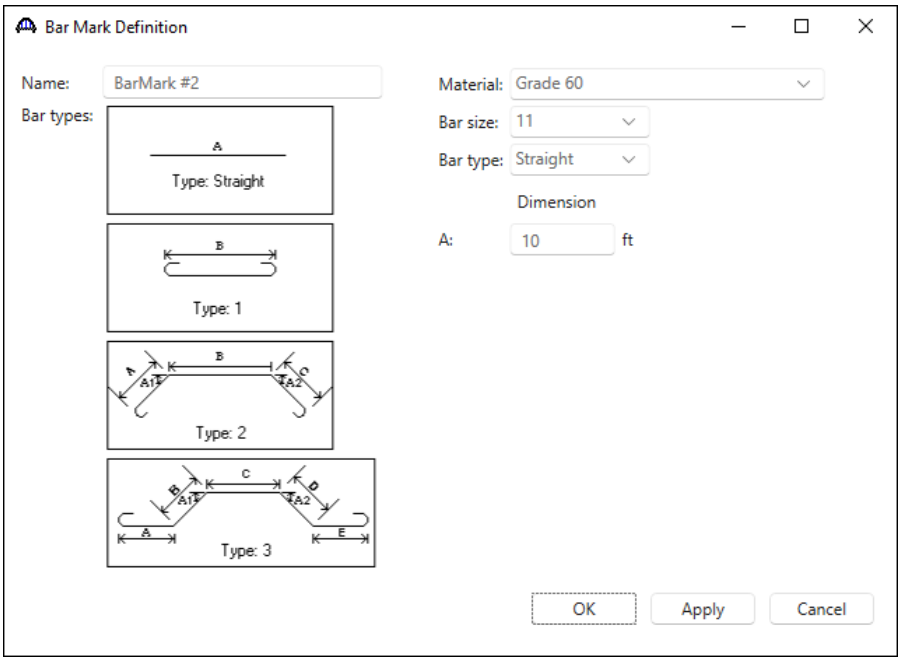
Since the slab strip profile is not yet entered, the slab strips are represented by dotted line boxes in the schematic.



Bar Mark Definitions

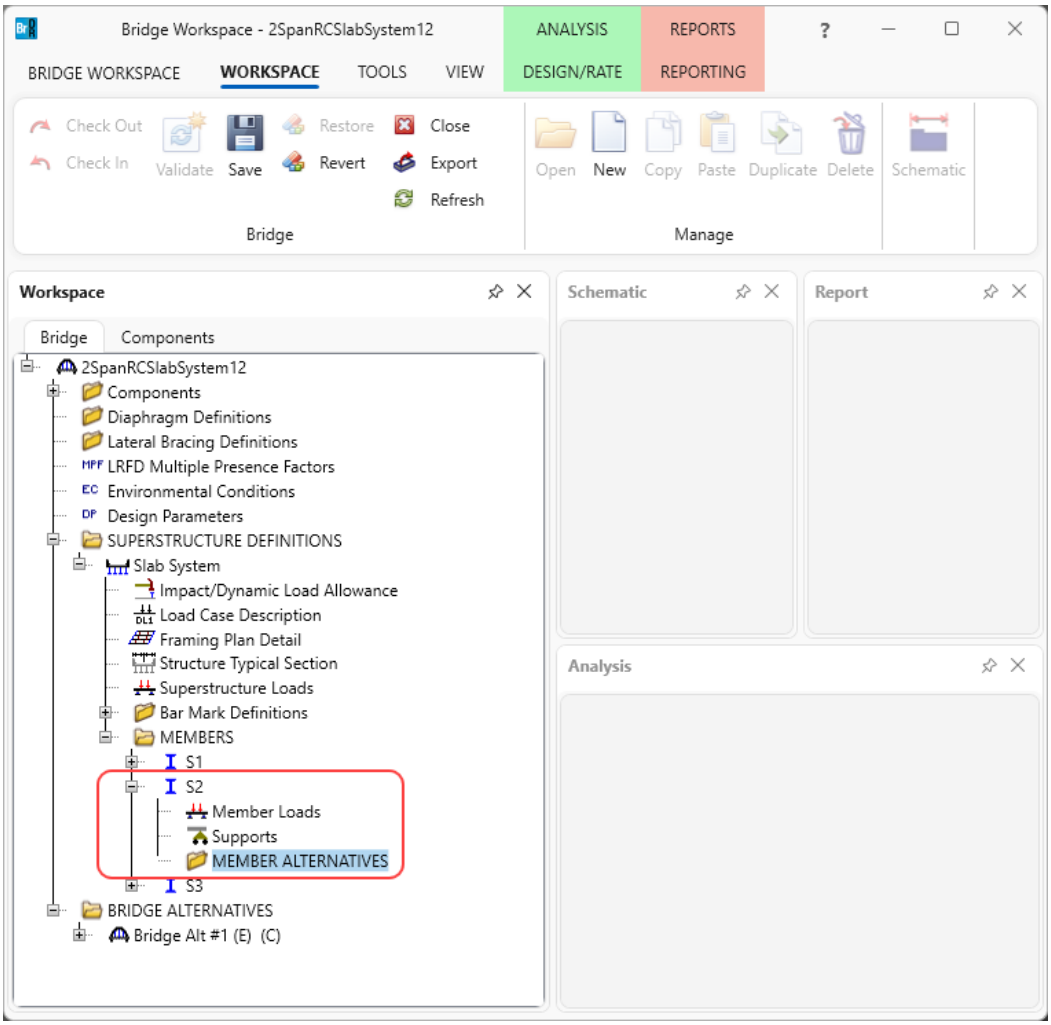
Double-click on **Bar Mark Definitions** in the **Bridge Workspace** tree to create a new **Bar Mark Definition**. Enter data for BarMark #1 as shown below. Then click on **OK** to apply the data and close the window. Create another **Bar Mark Definition** for BarMark #2 in the same manner.



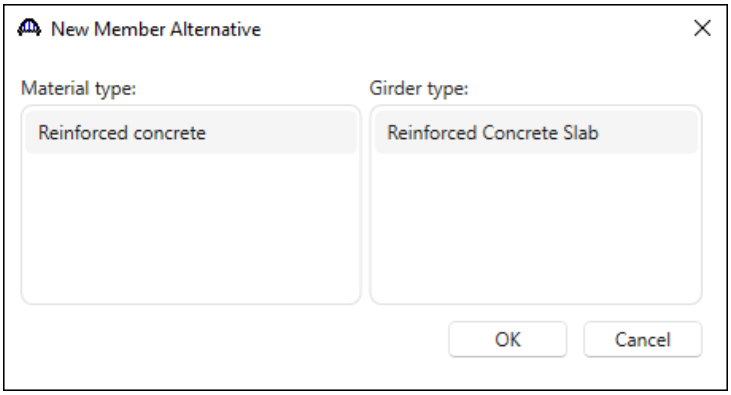


Defining a Member Alternative

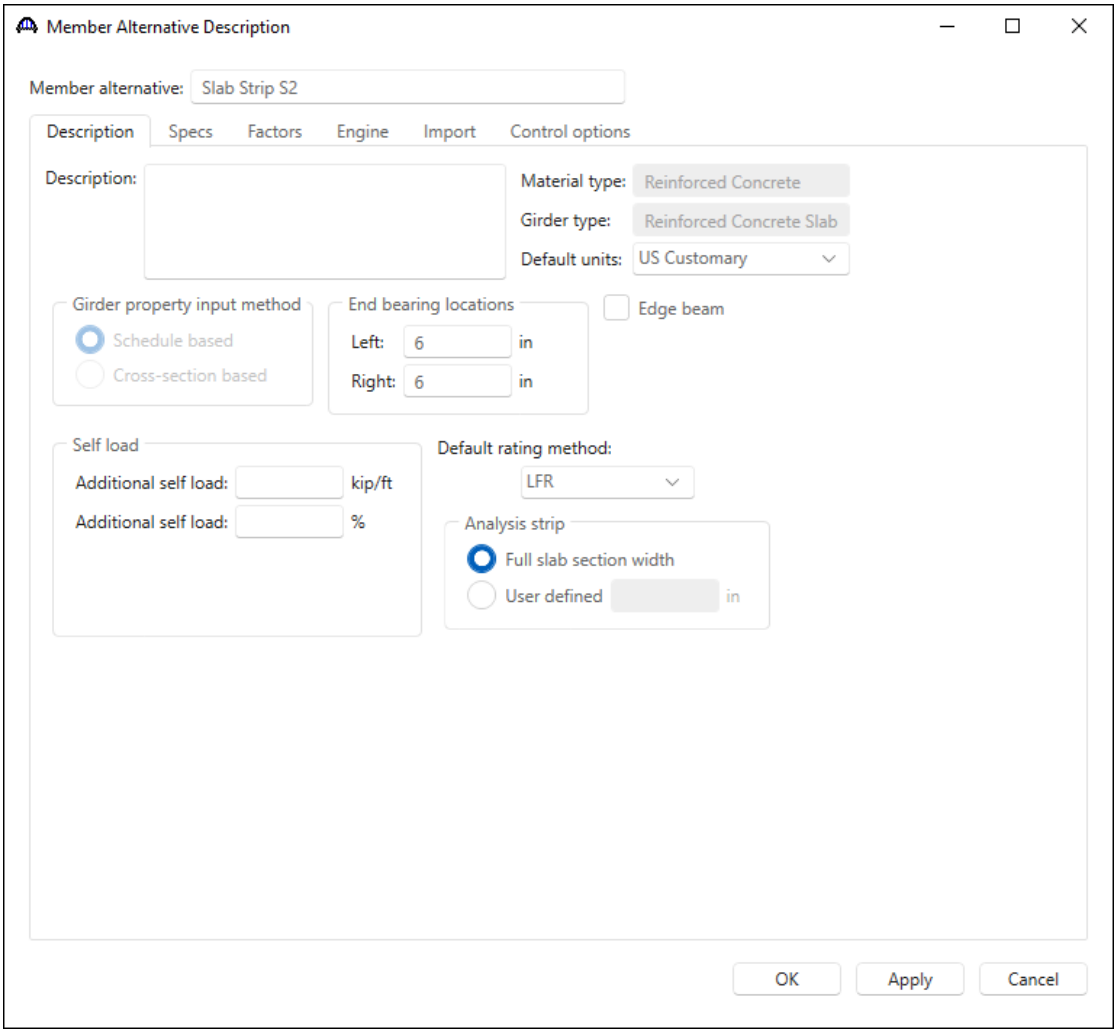
Expand the member **S2**.



Double-click **MEMBER ALTERNATIVES** in the tree under the interior strip **S2** to create a new alternative. The **New Member Alternative** window shown below will open. Select **Reinforced concrete** for the **Material type** and **Reinforced Concrete Slab** for the **Girder type**.



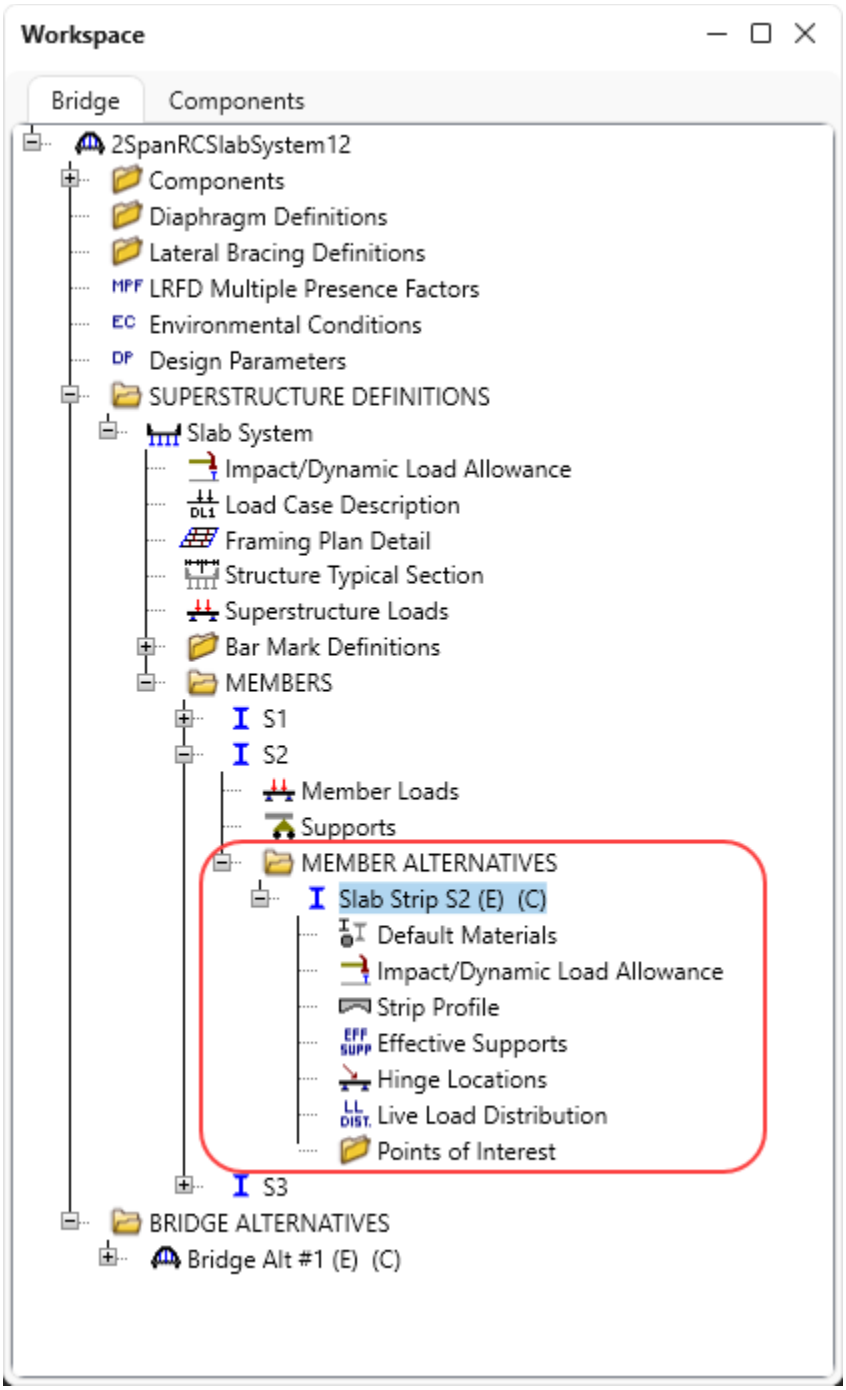
Click **OK** to close the window and create a new member alternative.



The first Member Alternative created will automatically be assigned as the **Existing** and **Current** member alternative for this member. In the **Member Alternative Description** window enter the data as shown above. The **Analysis strip** selection allows the user to specify the width of the strip for the analysis. If **User defined** is selected, an average reinforcement area per user defined width will be computed based on the reinforcement defined for the full slab section width. For this example, select **Full slab section width**. The **Edge beam** selection indicates the member alternative is an edge beam in the LRFD live load distribution factors computation. Since this is an interior strip, leave **Edge beam** unchecked.

Click **OK** to apply the data and close the window.

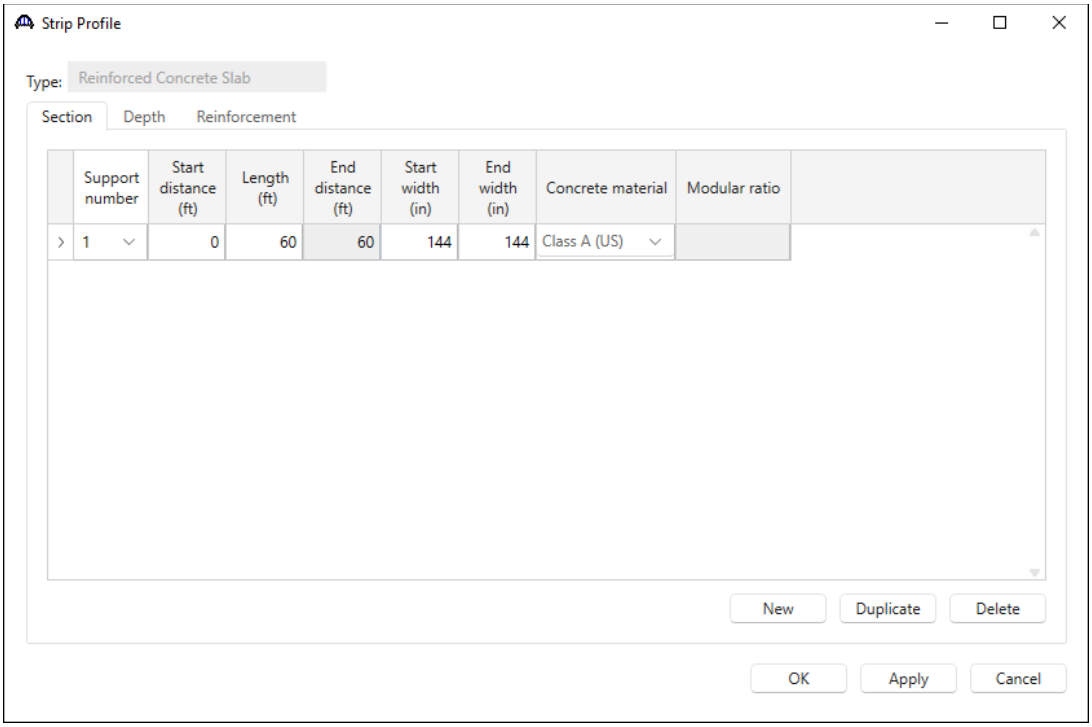
Expand the newly added member alternative. The partially expanded **Bridge Workspace** tree is shown below.



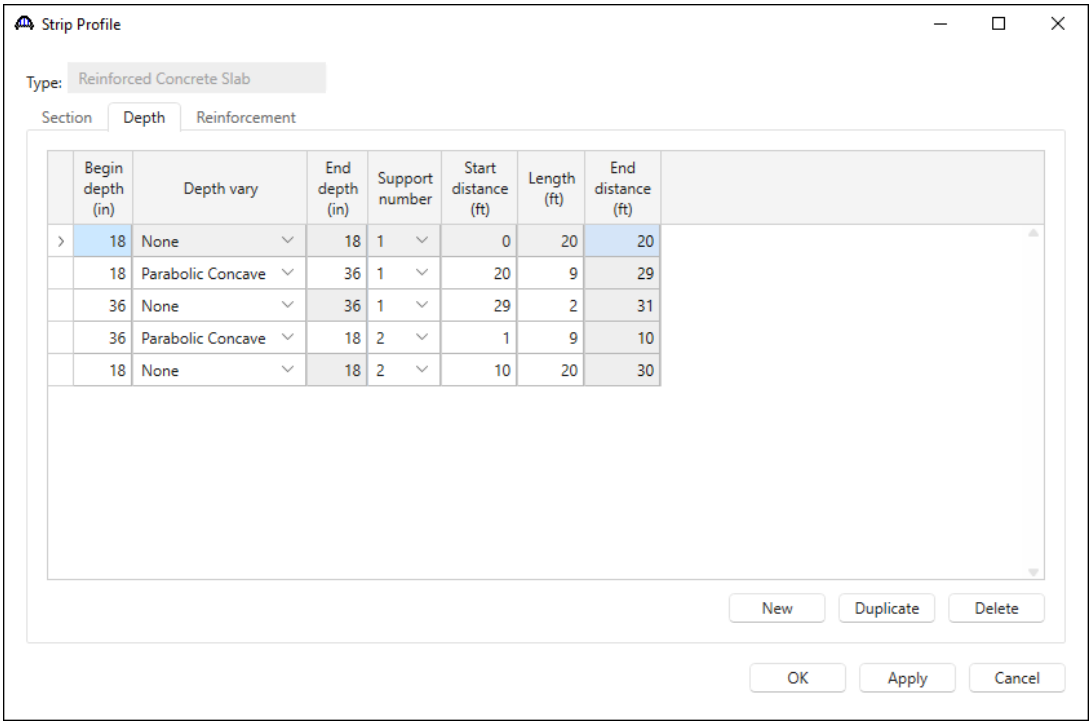
Strip Profile

Live Load Distribution factors can be computed only after **Strip Profile** information is entered. To enter **Strip Profile** information, double-click on **Strip Profile** in the **Bridge Workspace** tree to open the **Strip Profile** window. Enter the strip **Section**, **Depth and Reinforcement** details as shown below.

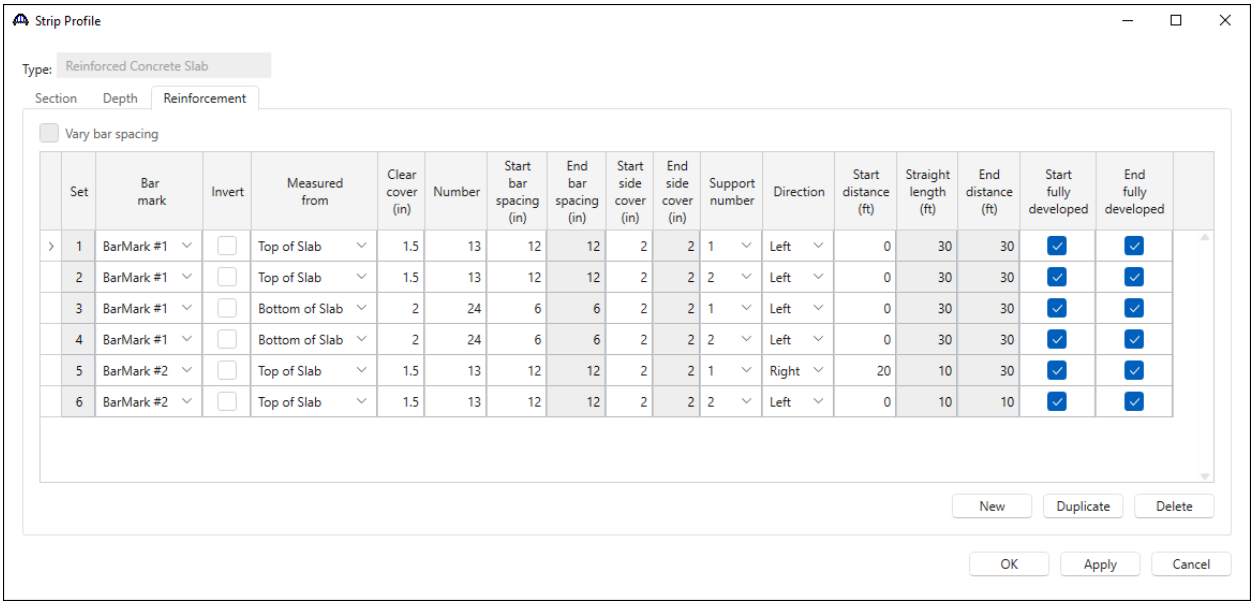
Strip Profile - Section



Strip Profile - Depth



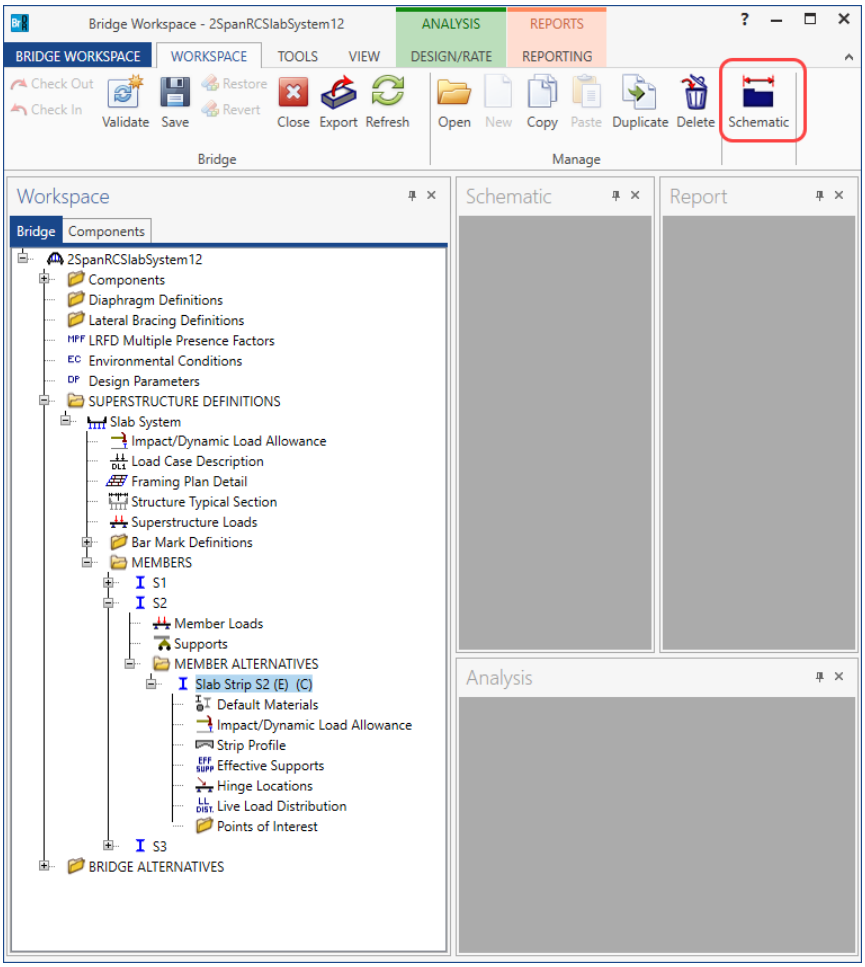
Strip Profile - Reinforcement



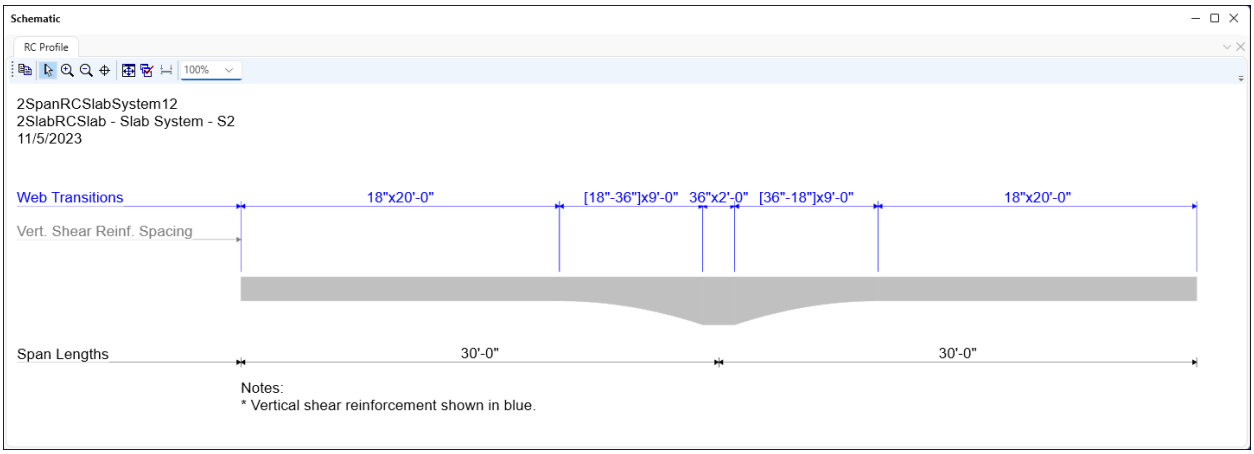
After strip profile is defined, click on **OK** to apply the data and close the window.

Strip Profile – Schematics

The profile of the slab strip can be viewed by selecting the member alternative **Slab Strip S2** and clicking on the **Schematic** button on the **Workspace** ribbon.

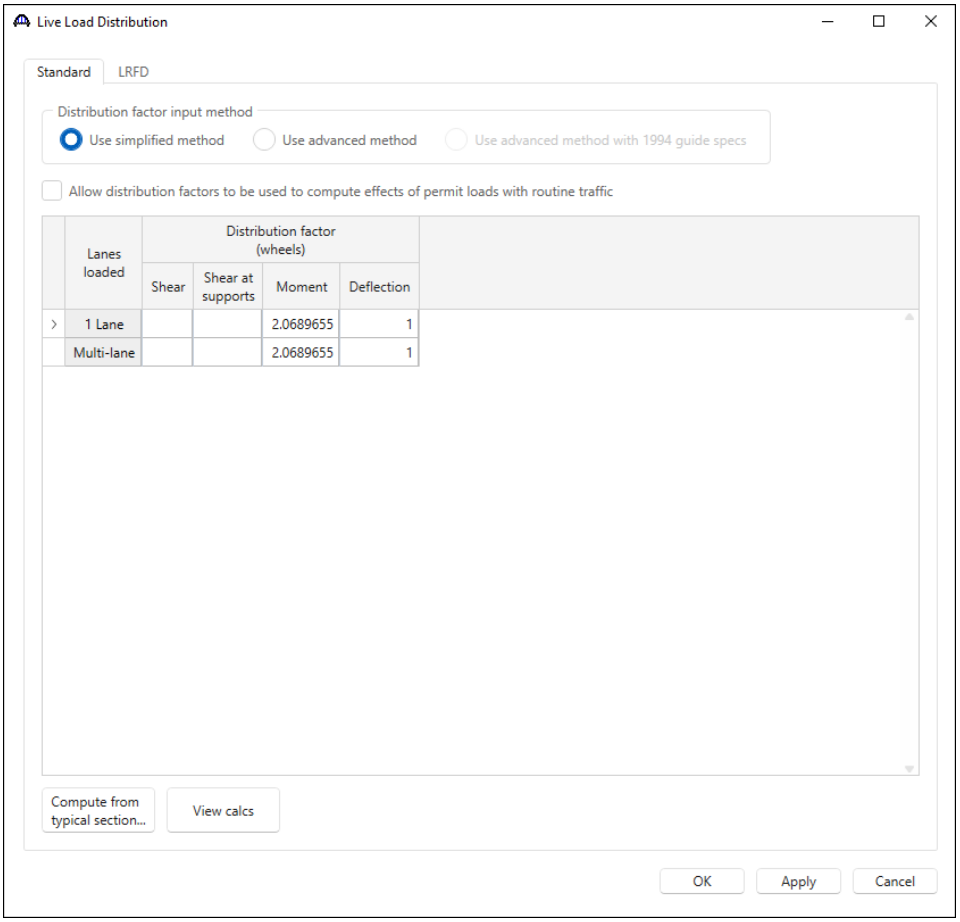


Schematic for Slab Strip S2 member alternaive is as shown below.



Live Load Distribution

Live load distribution factors for this member can now be entered. Open **Live Load Distribution** window by double-clicking the **Live Load Distribution** node in the **Bridge Workspace** tree. Under the **Standard** tab, click on the **Compute from Typical Section** button. Live load distribution factors will be populated as shown below. If live load distribution factors are not entered, the AASHTO Engine will compute the distribution factors during the analysis.



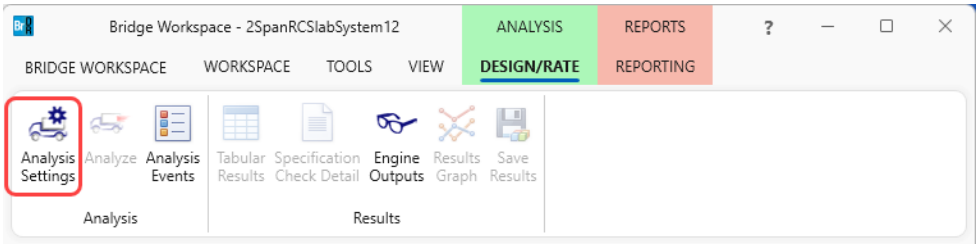
Click on **OK** to apply the data and close the window.

There is no requirement to define any **points of interest** since none of the information entered will be overridden in this example.

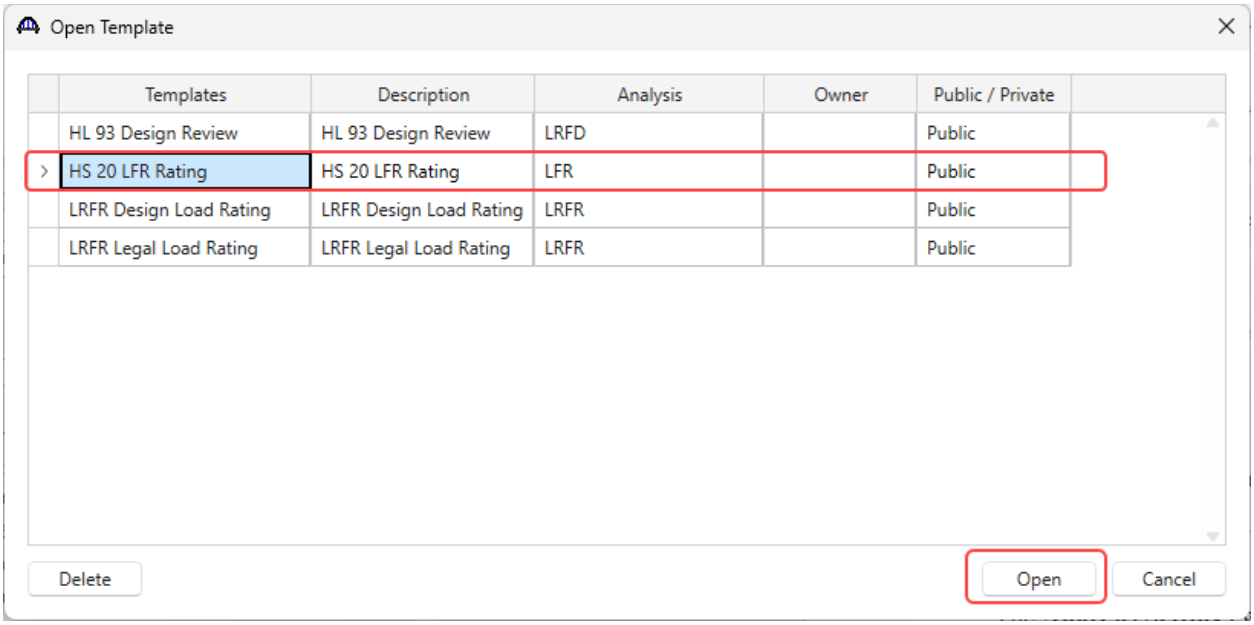
The description of this member alternative is complete. The member alternative **Slab Strip S2** can now be analyzed.

LFR Analysis

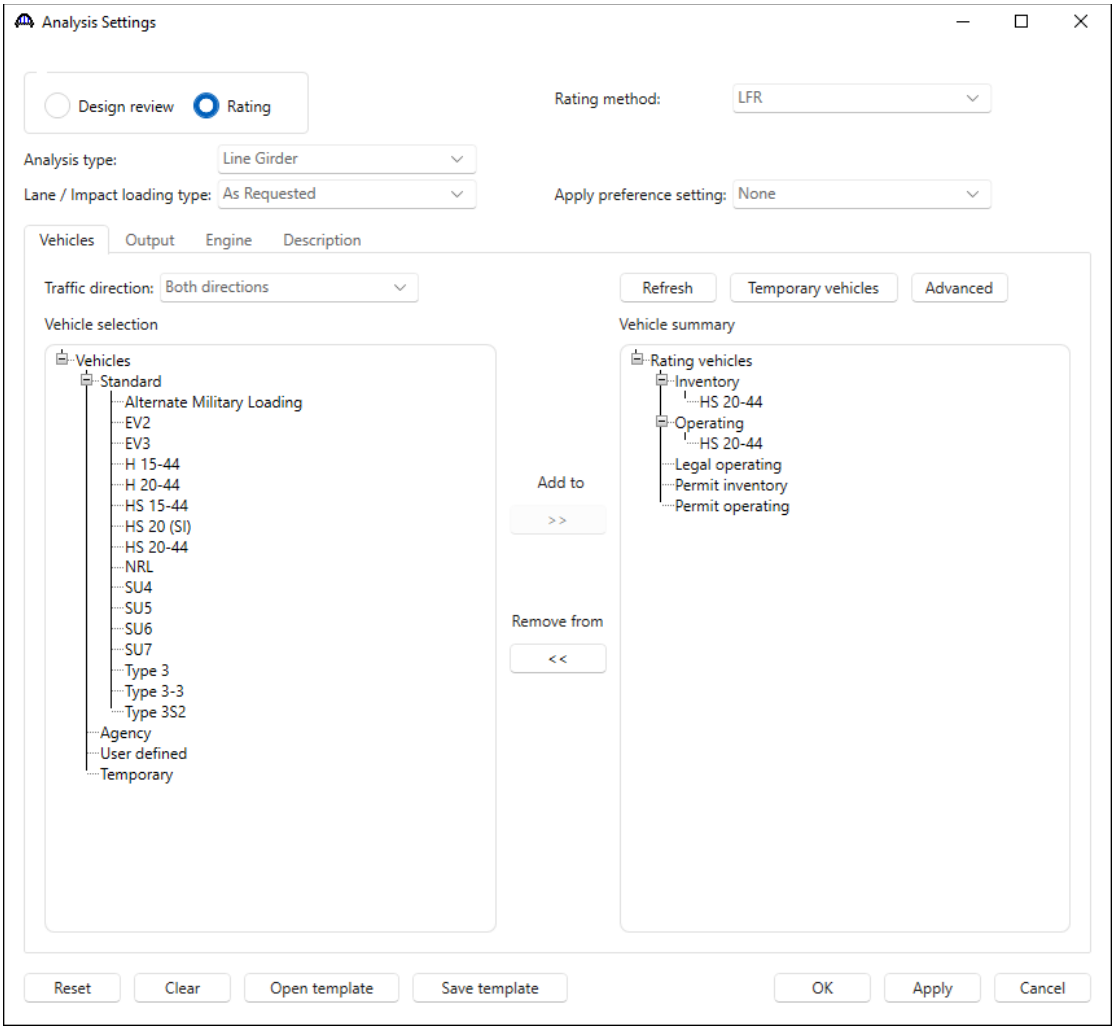
To perform an LFR analysis on the **Slab Strip S2** member alternative, select the **Analysis Settings** button on the **Analysis** group of the **DESIGN/RATE** ribbon to open the window shown below.



Click the **Open Template** button and select the **HS 20 LFR Rating** template to be used in the rating. Click **Open** to apply the settings and close the window.

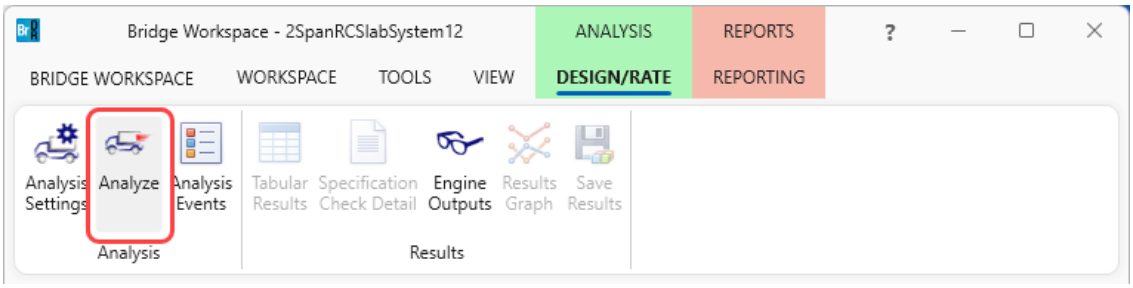


The **Analysis Settings** window will be updated as shown below.

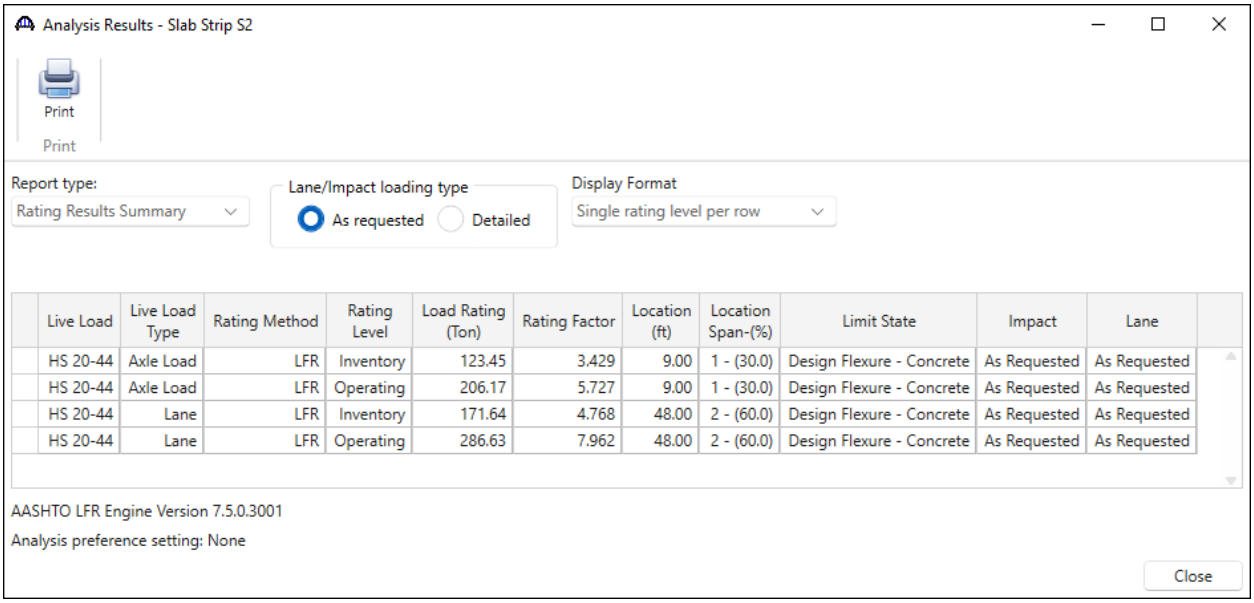


Tabular Results

With member alternative **Slab Strip S2** selected, click the **Analyze** button on the **Analysis** group of the **DESIGN/RATE** ribbon to perform the rating.



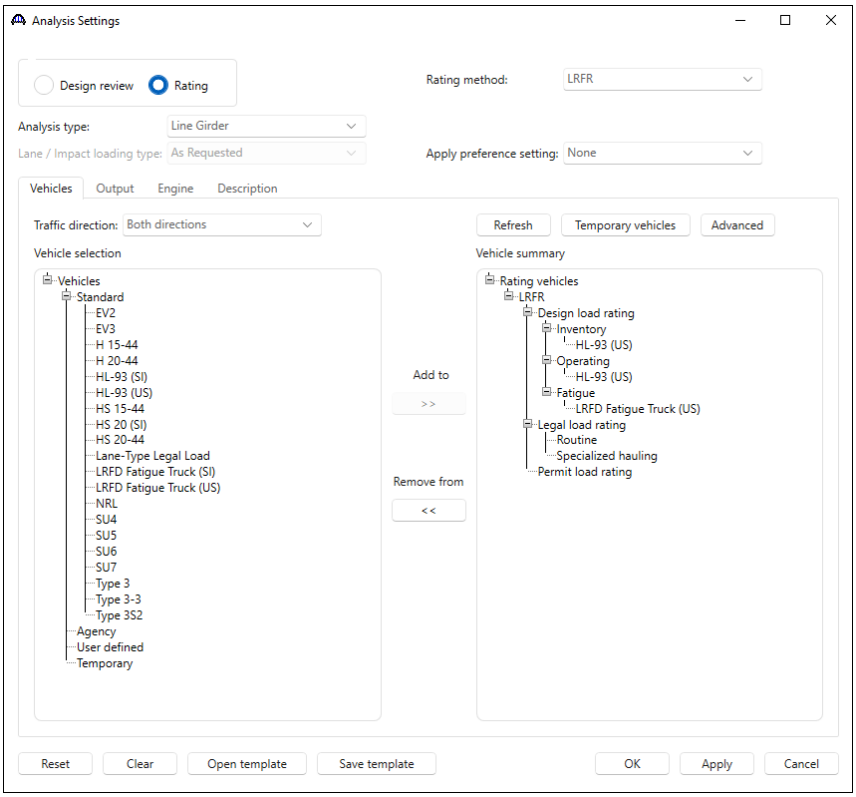
When the rating is finished, the results can be reviewed by clicking the Tabular **Results** button on the **Results** group of the ribbon. The window shown below will open.



Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	Impact	Lane
HS 20-44	Axle Load	LFR	Inventory	123.45	3.429	9.00	1 - (30.0)	Design Flexure - Concrete	As Requested	As Requested
HS 20-44	Axle Load	LFR	Operating	206.17	5.727	9.00	1 - (30.0)	Design Flexure - Concrete	As Requested	As Requested
HS 20-44	Lane	LFR	Inventory	171.64	4.768	48.00	2 - (60.0)	Design Flexure - Concrete	As Requested	As Requested
HS 20-44	Lane	LFR	Operating	286.63	7.962	48.00	2 - (60.0)	Design Flexure - Concrete	As Requested	As Requested

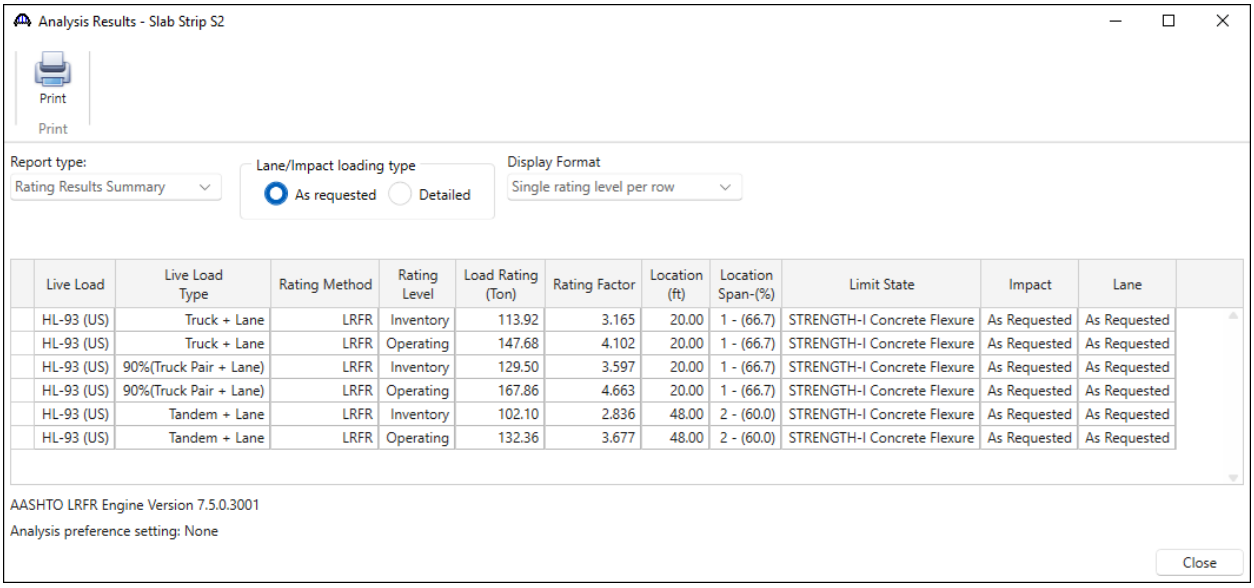
LRFR Analysis

Similarly apply the **LRFR Design Load Rating** template as shown below and perform an **LRFR** analysis on the same member alternative.



Tabular Results

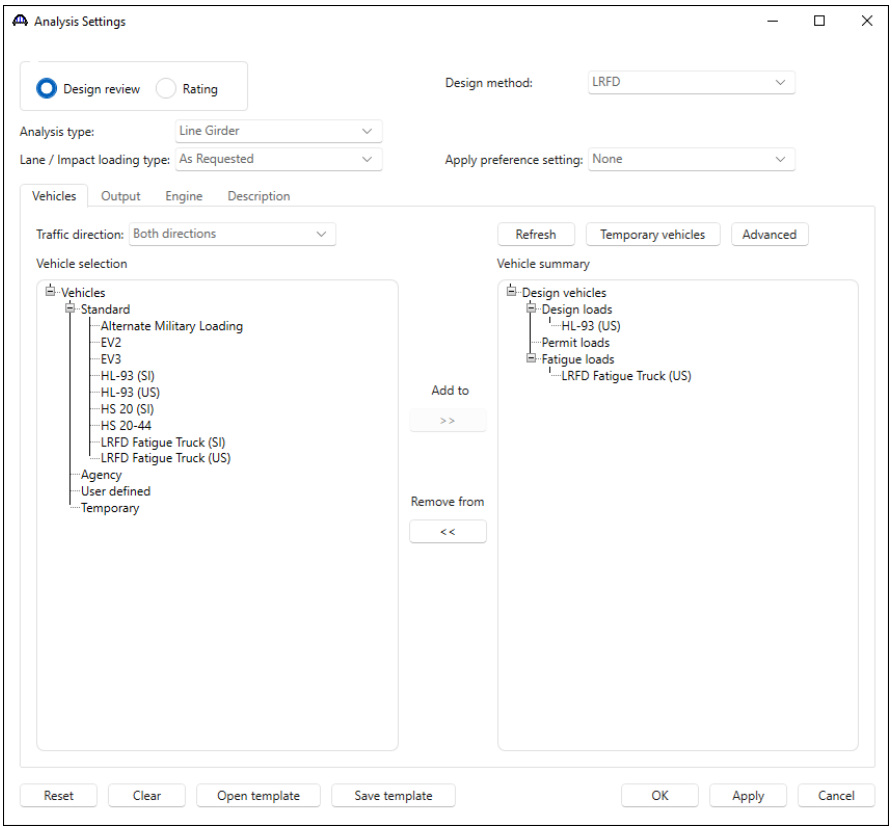
When the rating is finished the results can be reviewed by clicking the **Tabular Results** button on the **Results** group of the **DESIGN/RATE** ribbon. The window shown below will open.



Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	Impact	Lane
HL-93 (US)	Truck + Lane	LRFR	Inventory	113.92	3.165	20.00	1 - (66.7)	STRENGTH-I Concrete Flexure	As Requested	As Requested
HL-93 (US)	Truck + Lane	LRFR	Operating	147.68	4.102	20.00	1 - (66.7)	STRENGTH-I Concrete Flexure	As Requested	As Requested
HL-93 (US)	90%(Truck Pair + Lane)	LRFR	Inventory	129.50	3.597	20.00	1 - (66.7)	STRENGTH-I Concrete Flexure	As Requested	As Requested
HL-93 (US)	90%(Truck Pair + Lane)	LRFR	Operating	167.86	4.663	20.00	1 - (66.7)	STRENGTH-I Concrete Flexure	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Inventory	102.10	2.836	48.00	2 - (60.0)	STRENGTH-I Concrete Flexure	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Operating	132.36	3.677	48.00	2 - (60.0)	STRENGTH-I Concrete Flexure	As Requested	As Requested

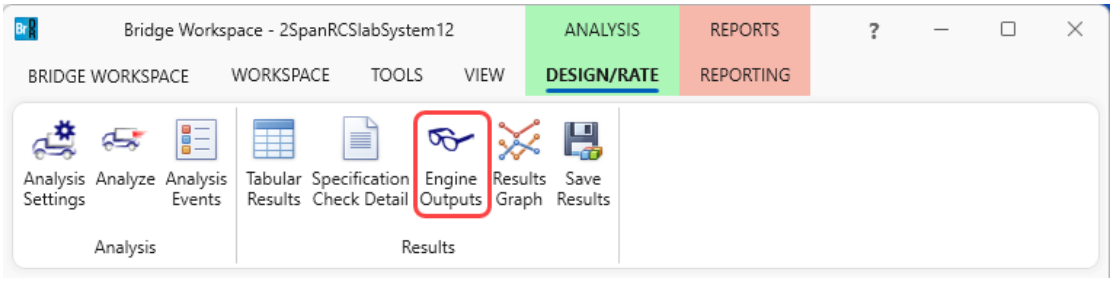
LRFD Design Review

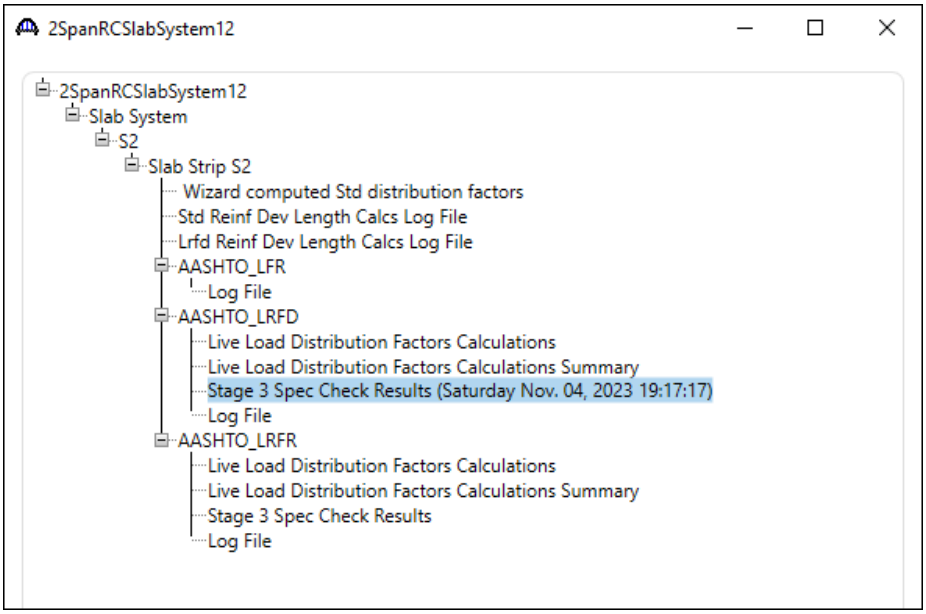
Similarly apply the **HL 93 Design Review** template as shown below and perform an **LRFD Design Review** on the same member alternative.



Engine Outputs

When the design review is complete, click the **Engine Outputs** button on **Results** group of the **DESIGN/RATE** ribbon and double-click **Stage 3 Spec Check Results** for a summary of the specification check results.





Bridge ID : 2SpanRCSlabSystem12
Bridge : 2SpanRCSlab
Superstructure Def : Slab System
Member : S2
Analysis Preference Setting :

NBI Structure ID : 2SpanRCSlabSys5
Bridge Alt :

Member Alt : Slab Strip S2

AASHTO LRFD Specification, Edition 9, Interim 0

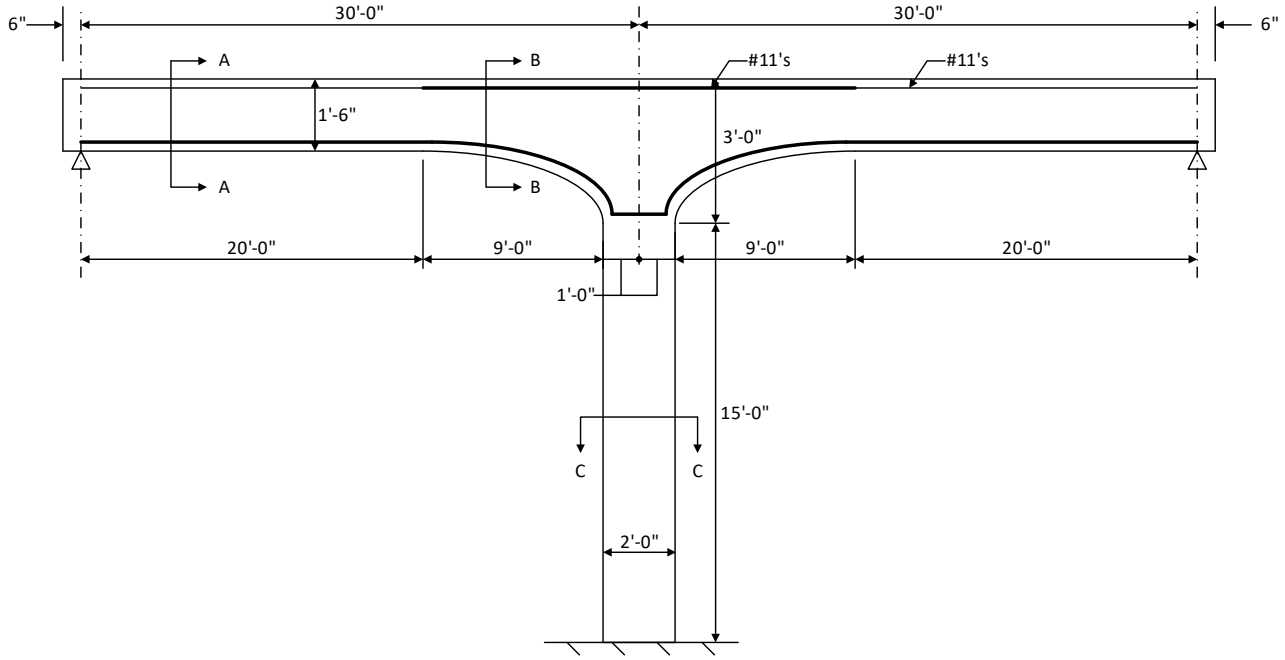
Specification Check Summary

Article	Status
Flexure (5.6.3.2, 5.6.3.3)	Pass
Crack Control (5.6.7)	Pass
Shear (5.7.3.3, 5.7.2.5, 5.7.2.6, 5.7.3.5)	Ignore by User
Fatigue (5.5.3.2)	Pass
Deflection (2.5.2.6.2)	Pass

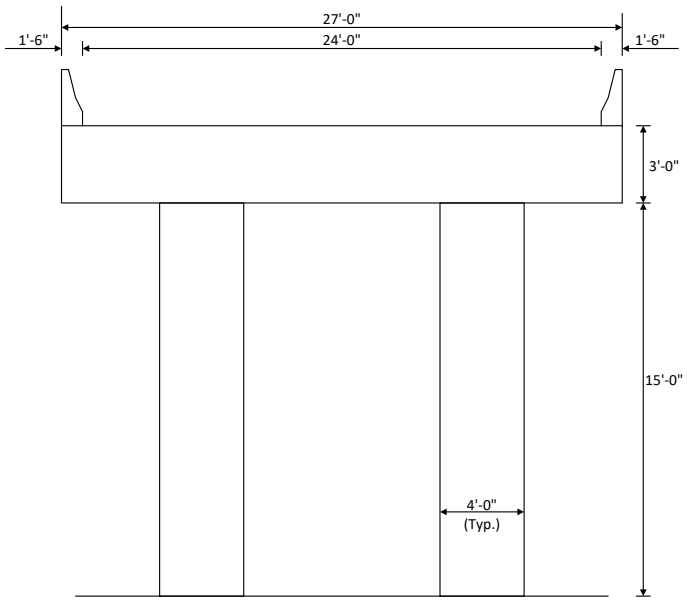
Girder Positive Flexure Analysis

Location (ft)	LS	Load Comb	Mr (kip-ft)	Mu (kip-ft)	Design Ratio Mr/Mu	Code
0.000	STR-I	1	2275.67	0.00	99.000	Pass
3.000	STR-I	2	2275.67	437.40	5.203	Pass
6.000	STR-I	2	2275.67	727.47	3.128	Pass
9.000	STR-I	2	2275.67	878.22	2.591	Pass
12.000	STR-I	2	2275.67	901.62	2.524	Pass

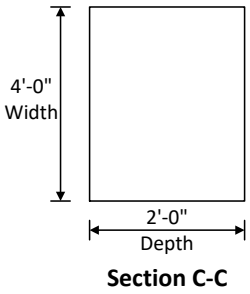
Frame structure simplified definition slab structure type



Elevation



Structure Typical Section at Pier

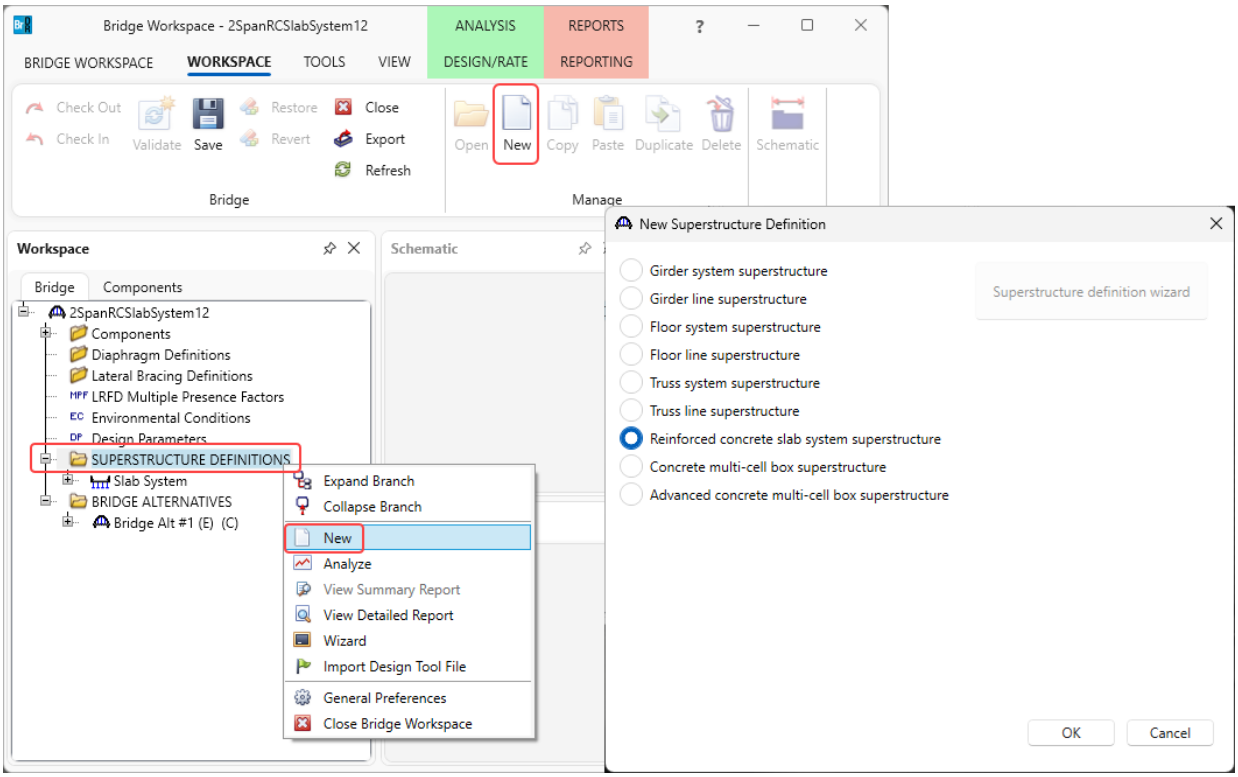


Section C-C

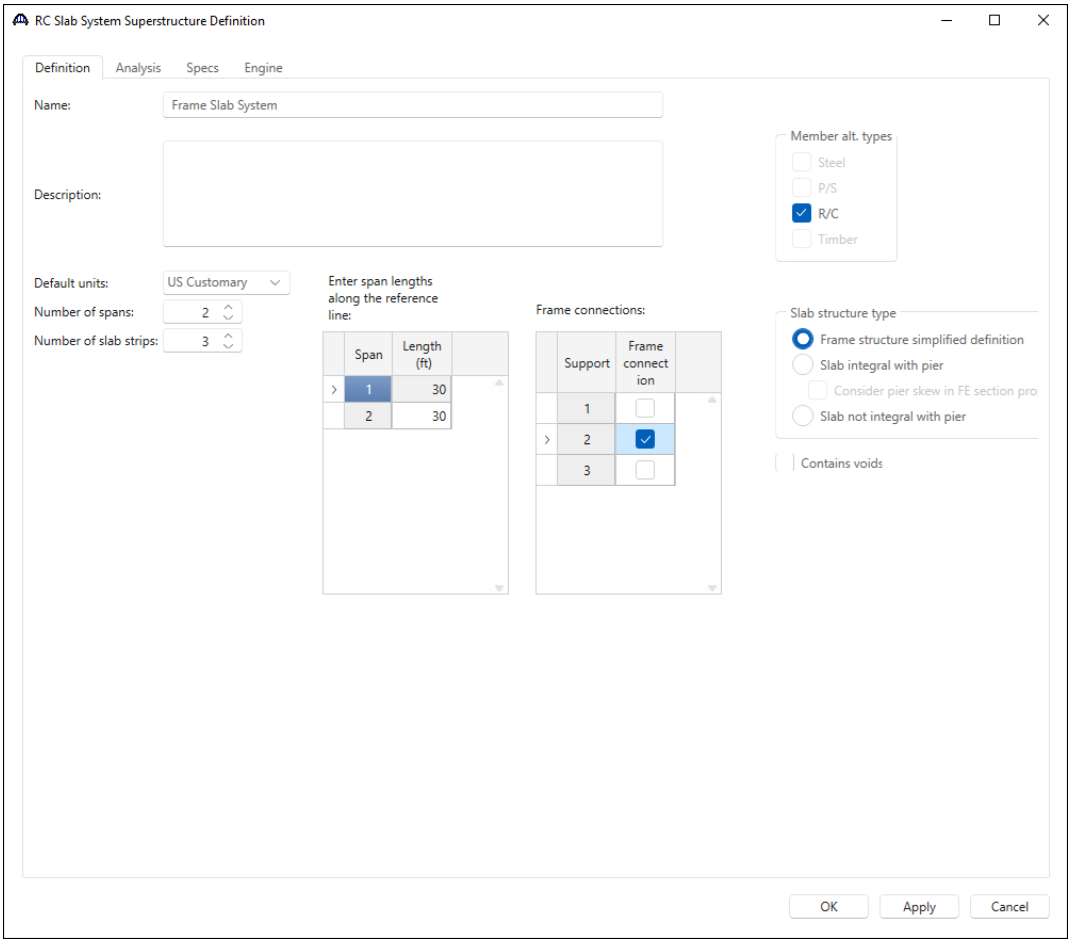
Superstructure Definitions

Slab system with frame leg support can be defined by selecting **Slab Structure Type** as **Frame structure simplified definition** in the **RC Slab System Superstructure Definition** window.

Double-click on **SUPERSTRUCTURE DEFINITIONS** in the **Bridge Workspace** tree and create a new **Reinforced Concrete Slab System** Superstructure like the one in the previous step.



Select **Frame structure simplified definition** for **Slab Structure Type** and specify **Frame Connection** for **support 2**.



Click **OK** to apply the data and close the window.

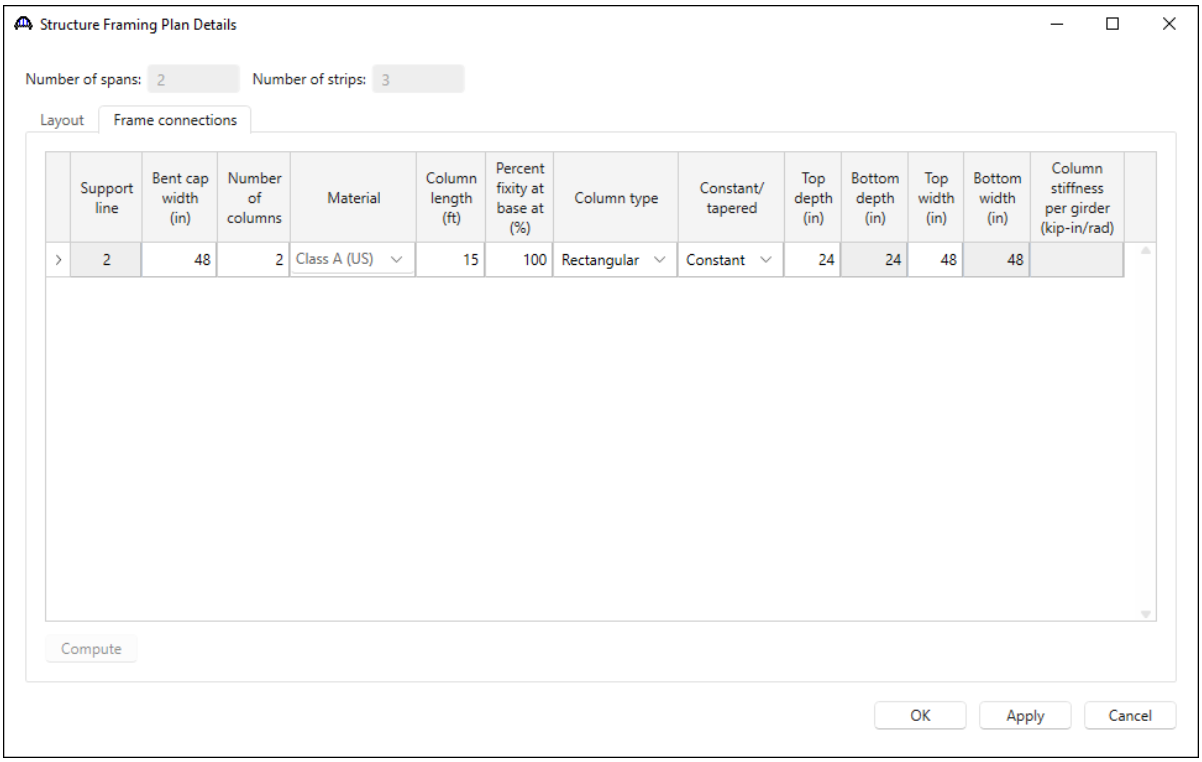
Follow the instructions in Part 1 to enter the following data for this superstructure definition.

1. Load Case Description
2. Structute Framing Plan
3. Structure Typical Section
4. BarMark #1and BarMark #2
5. Member Alternative Description
6. Strip Profile

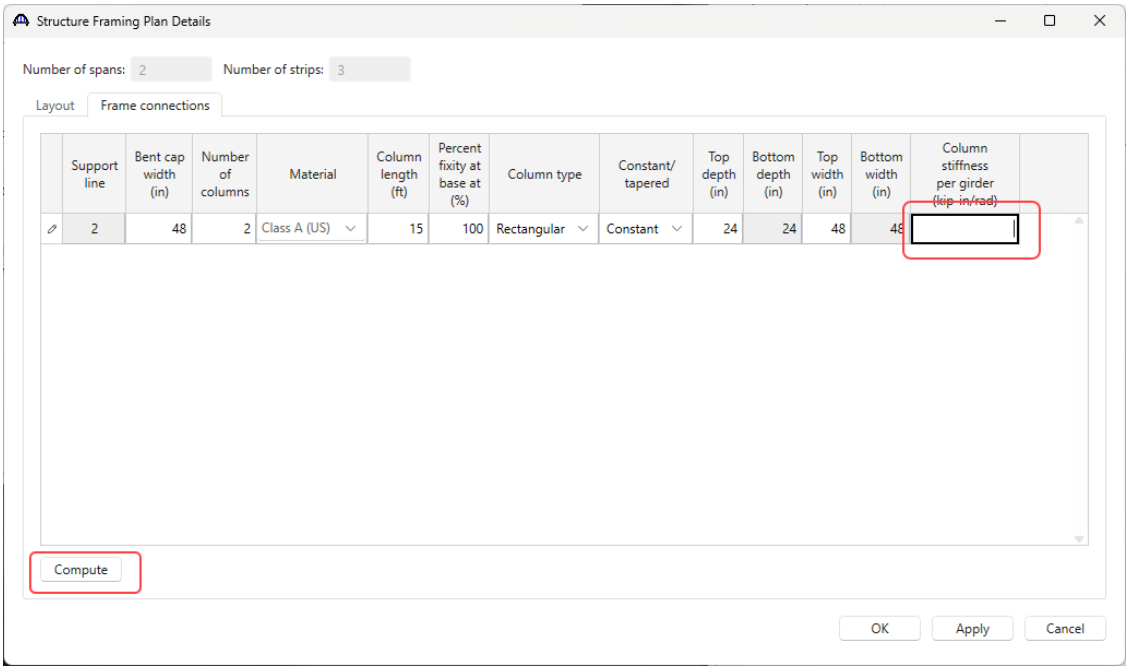
Now begin defining the windows with specific information for the **Frame structure simplified definition**.

Structure Framing Plan

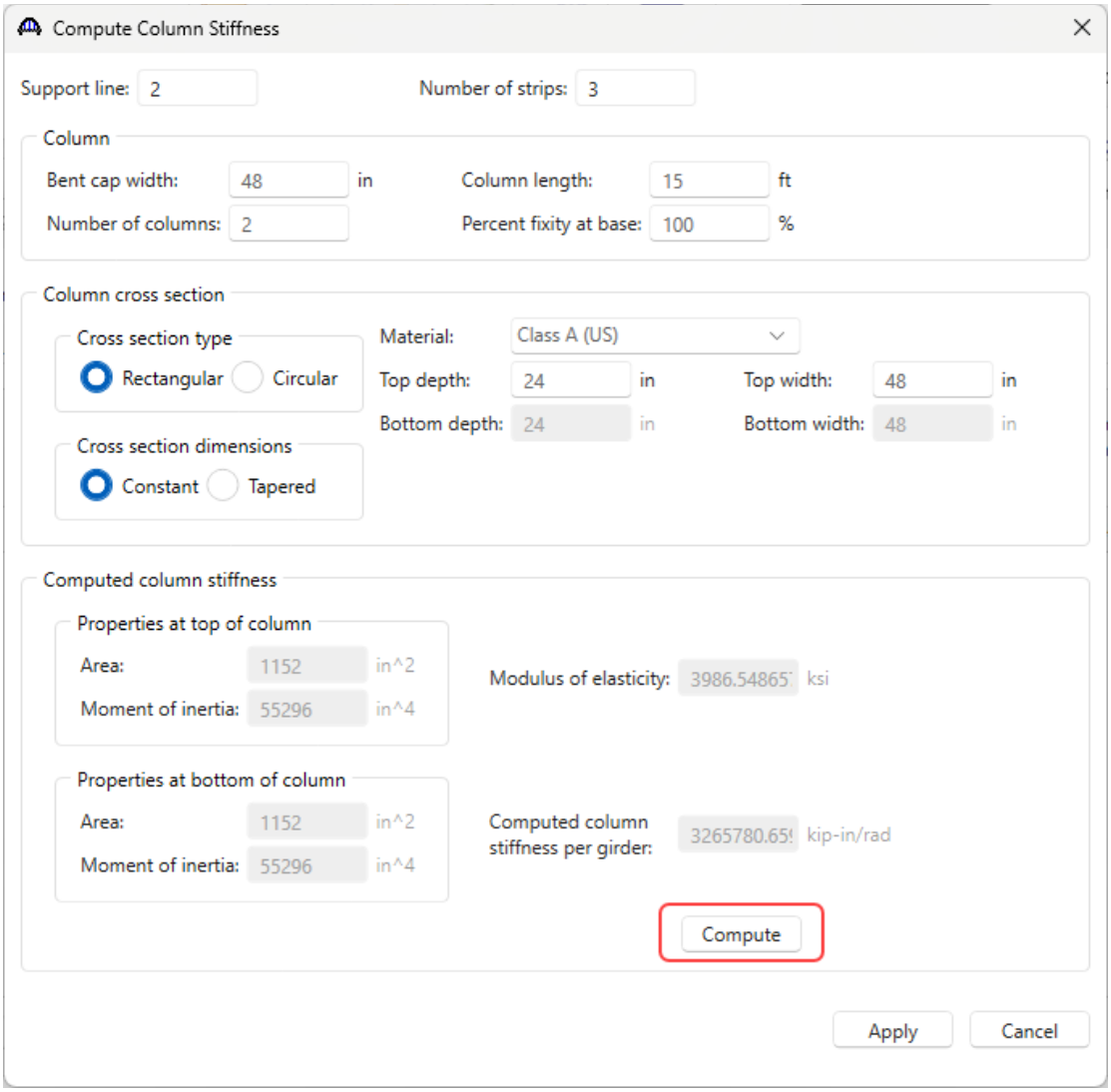
Open the **Structure Framing Plan Detail** window, switch to the **Frame connections** tab and enter the data as show below.



Place the cursor on **Column stiffness per girder** column and select the **Compute** button to open the **Compute Column Stiffness** window.

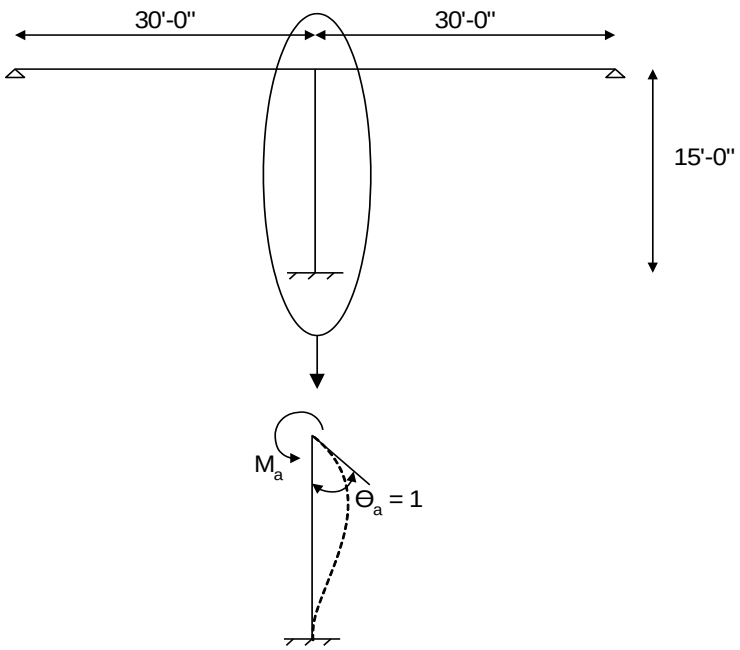


Click on the **Compute** button to compute the column stiffness coefficient.



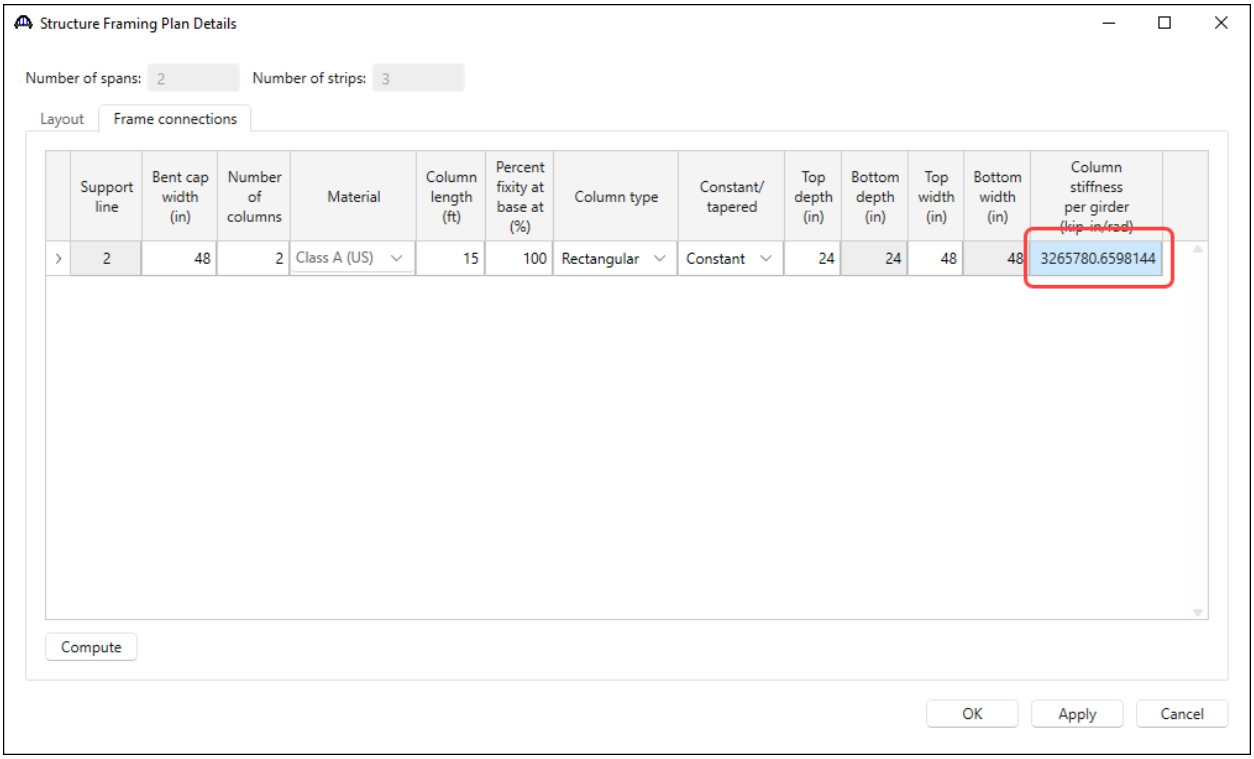
The column stiffness coefficient is computed using the Stiffness Method. In the stiffness method, a unit rotation in the Z direction is applied to the top of the column with all other displacements equal to zero. The member end loads that are required to produce this unit rotation are the stiffness coefficients. The moment applied at the top of the column to produce this unit rotation is the stiffness coefficient computed in this window.

The following diagram shows the frame leg and the moment applied to produce the unit rotation. Engineering judgment needs to be applied to determine the length of the frame leg based on the geometry and reinforcement of the frame structures the user wishes to analyze.



The moment required to produce a unit rotation at the top of the cantilever column is $M_a = 4EI/L$.

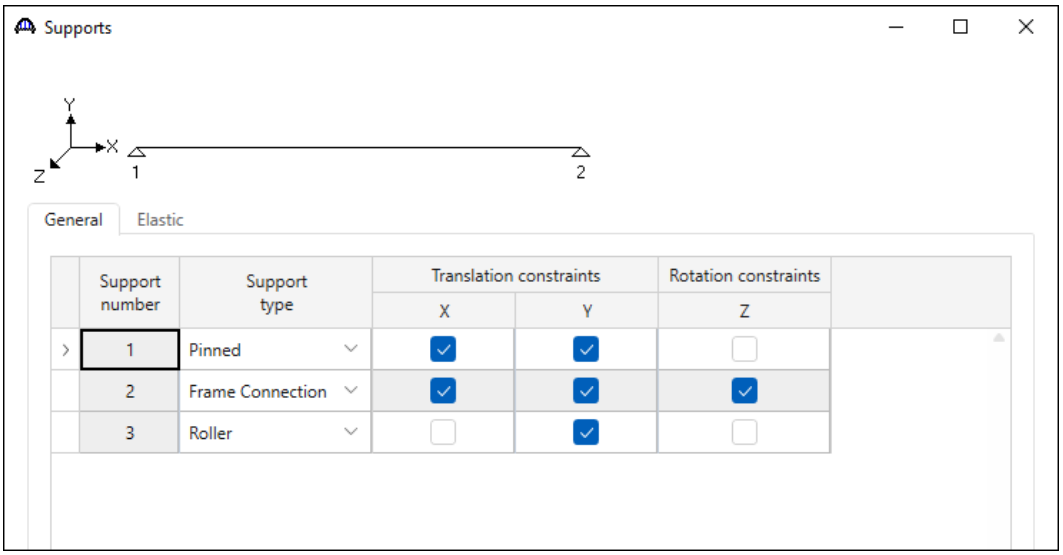
The computed column stiffness coefficient is based on the entered number of columns. Click on the **Apply** button to apply this stiffness coefficient to Support 2.

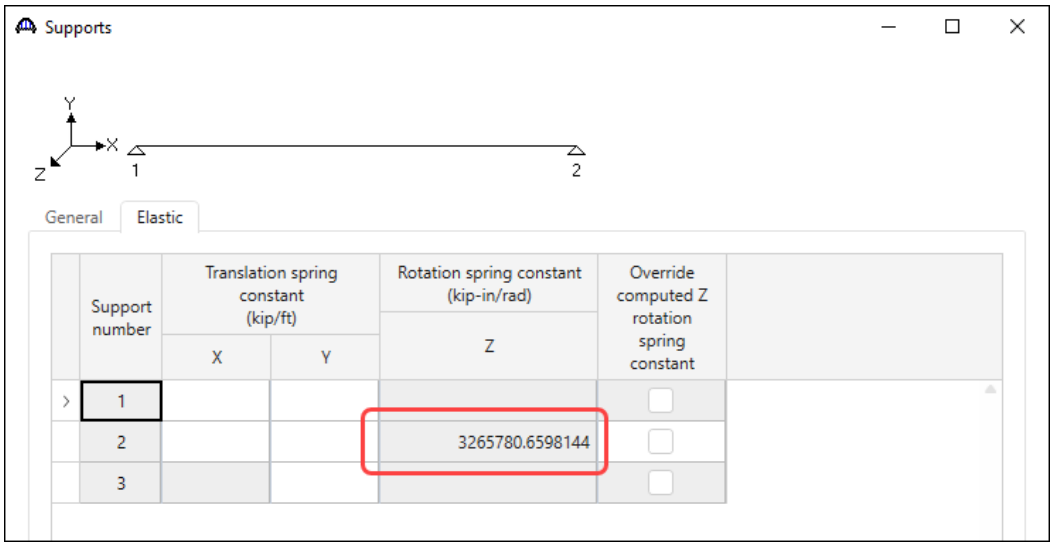


Click **OK** to apply the data and close the **Structure Framing Plan Detail** window.

Supports

For member **S2** of the **Frame Slab System** superstructure, open the **Supports** window by double-clicking **Supports** in the **Bridge Workspace** tree. **Support 2** is a frame connection with all constraints fixed. The computed column stiffness coefficient is entered in the **Elastic** tab as the **Z rotation spring constant**.



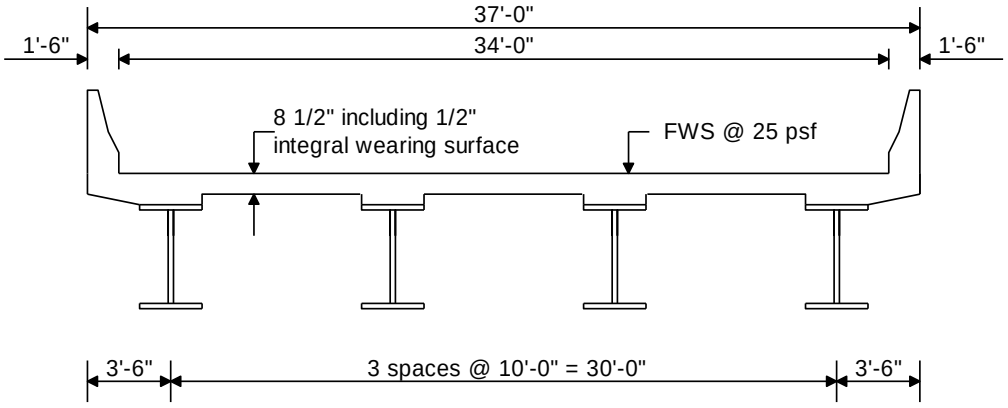


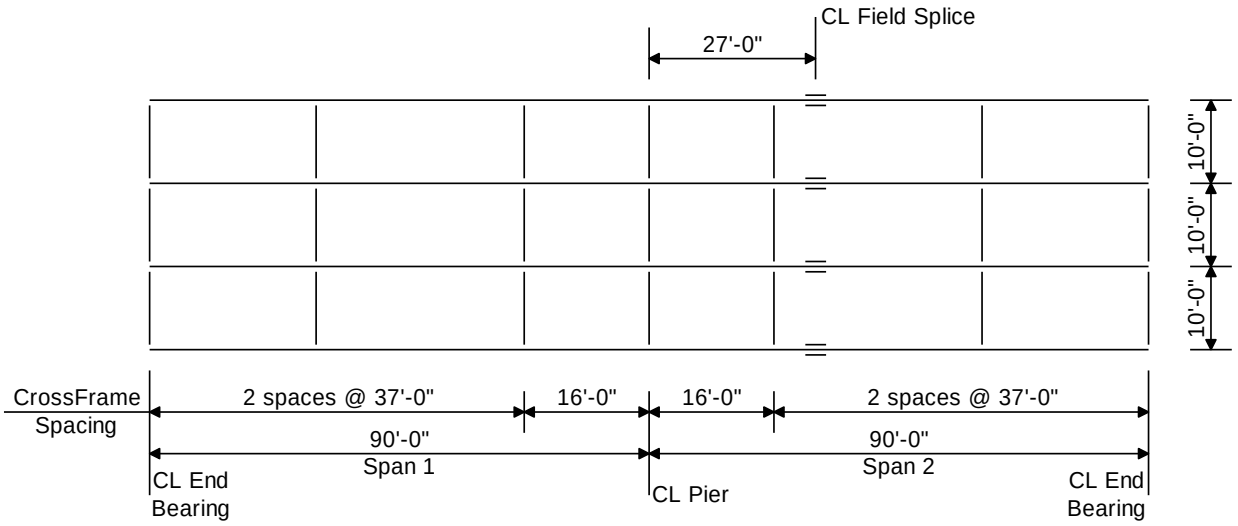
In a similar manner as performed above, an LFR, LRFR and LRFD analysis can be performed by selecting their respective templates. As this slab bridge is not designed with a framed connection at the pier, the rating and design review will not be performed in this example.

Steel Tutorial

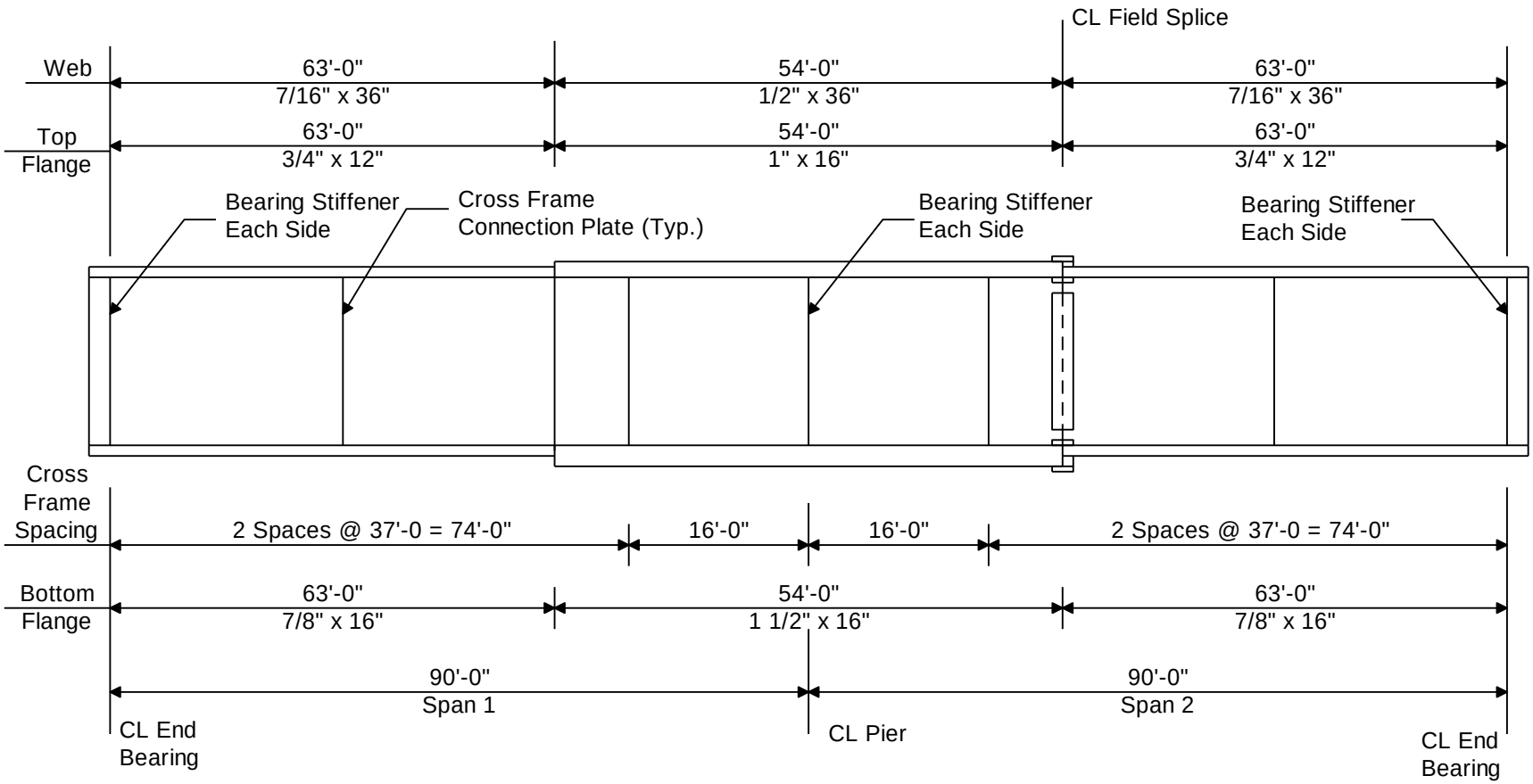
STL2 – Two Span Plate Girder Example

STL2 - Two Span Plate Girder Example

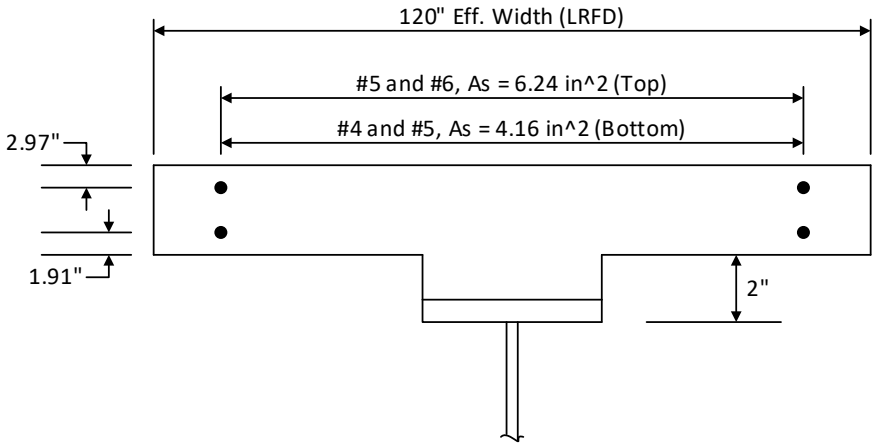




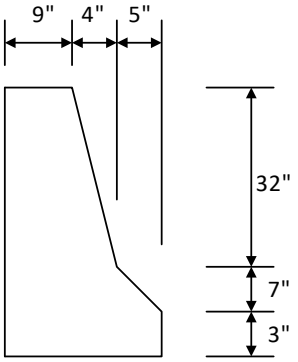
Framing Plan



Elevation of Interior Girder

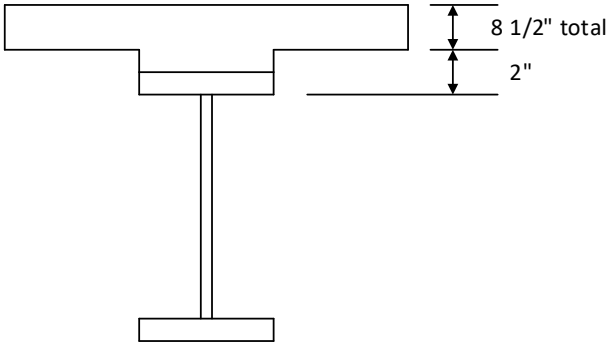


Composite Section at Pier



Weight = 536 plf

Parapet Detail



Haunch Detail

Note: The area of steel is provided in the section at the pier but the number of #4, #5, and #6 bars are not provided. For simplicity, the bars will be input using an equivalent number of #9 bars which have a unit area of 1.0 in^2.

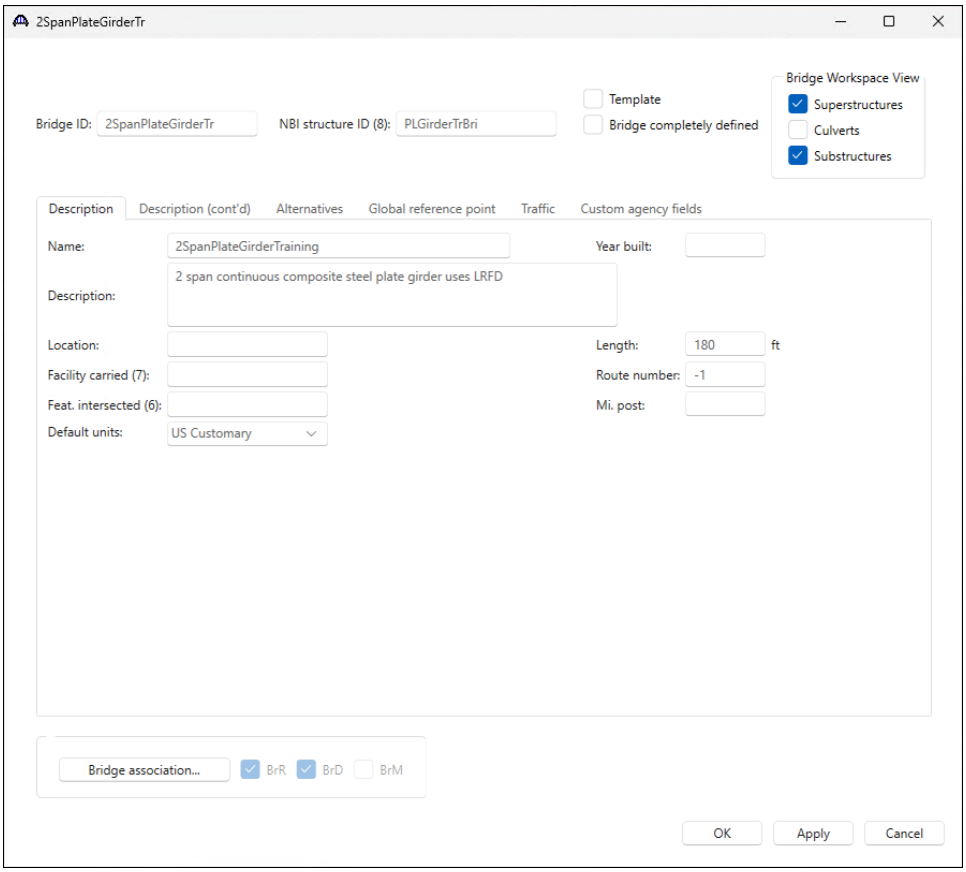
Material Properties

Structural Steel: AASHTO M270, Grade 50W uncoated weathering steel with Fy = 50 ksi
Deck Concrete: f'c = 4.0 ksi, modular ratio n = 8
Slab Reinforcing Steel: AASHTO M31, Grade 60 with Fy = 60 ksi

Cross Frame Connection Plates: 3/4" x 6"
Bearing Stiffener Plates: 7/8" x 9"

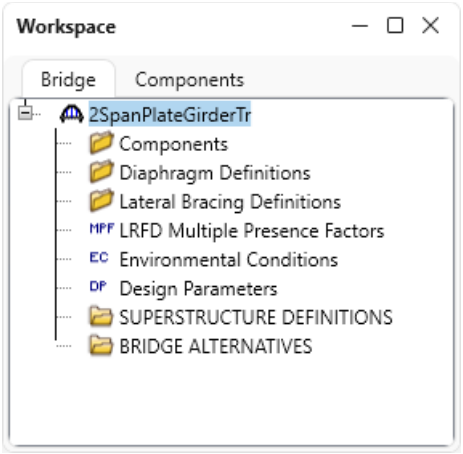
BrDR Tutorial

From the **Bridge Explorer** create a **New** bridge and enter the following description data.



Click **OK** to apply the data and close the window.

The partially expanded **Bridge Workspace** tree is shown below.

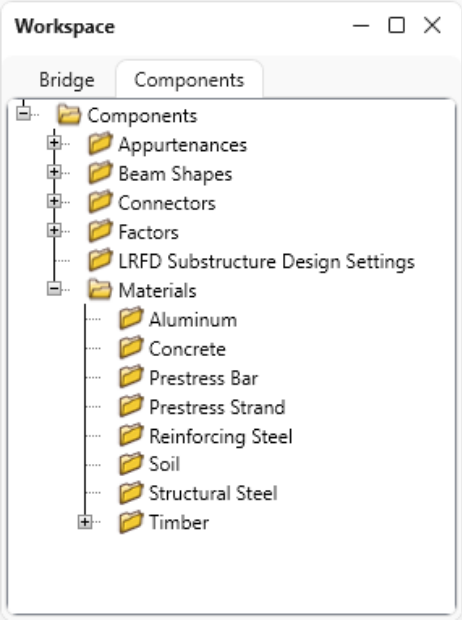


Bridge Components

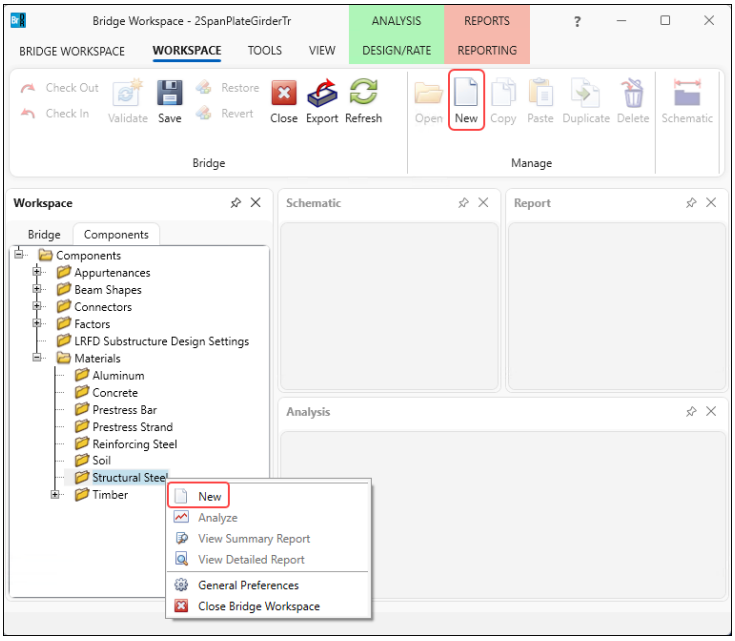
Bridge Materials

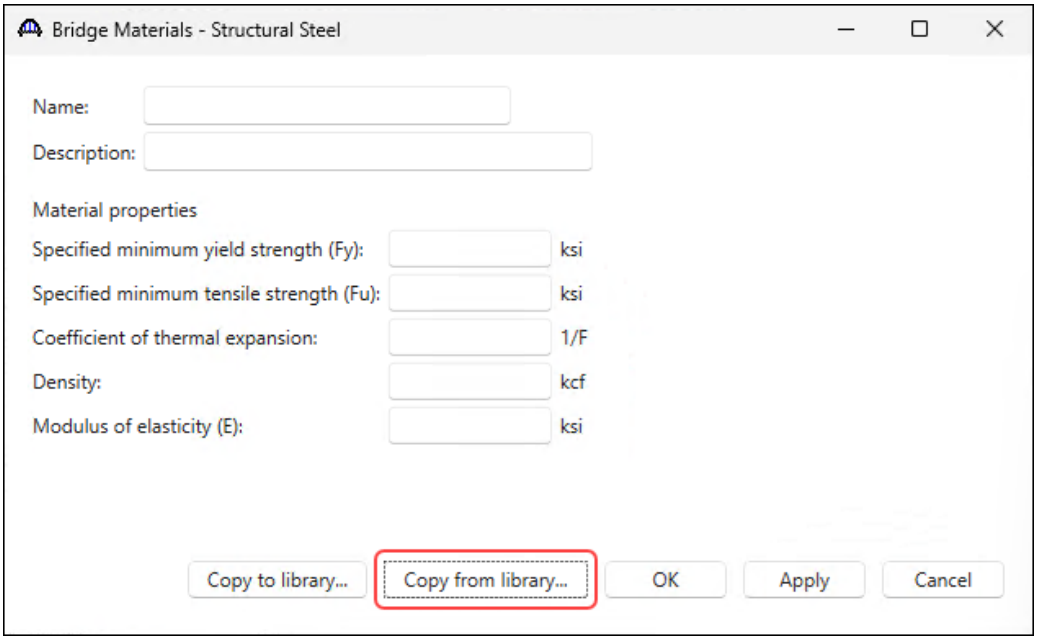
To enter the materials to be used by members of the bridge, in the **Components** tab of the **Bridge Workspace**, click on the ⊞ button to expand the tree for **Materials**.

The tree with the expanded **Materials** branch is shown below.

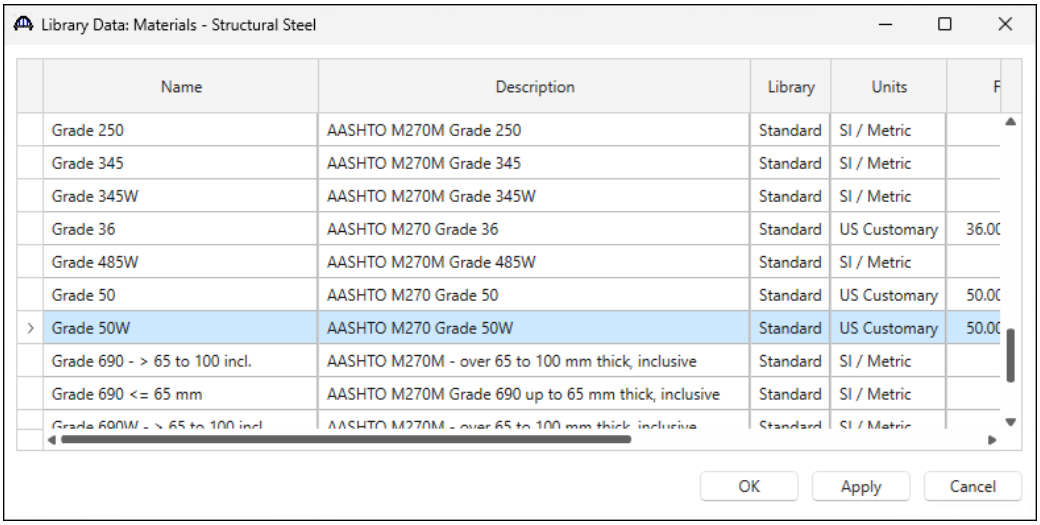


To add a new steel material, in the **Components** tab of the **Bridge Workspace**, click on **Materials**, **Structural Steel,** and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or right mouse click on **Structural Steel** and select **New**). The window shown below will open.

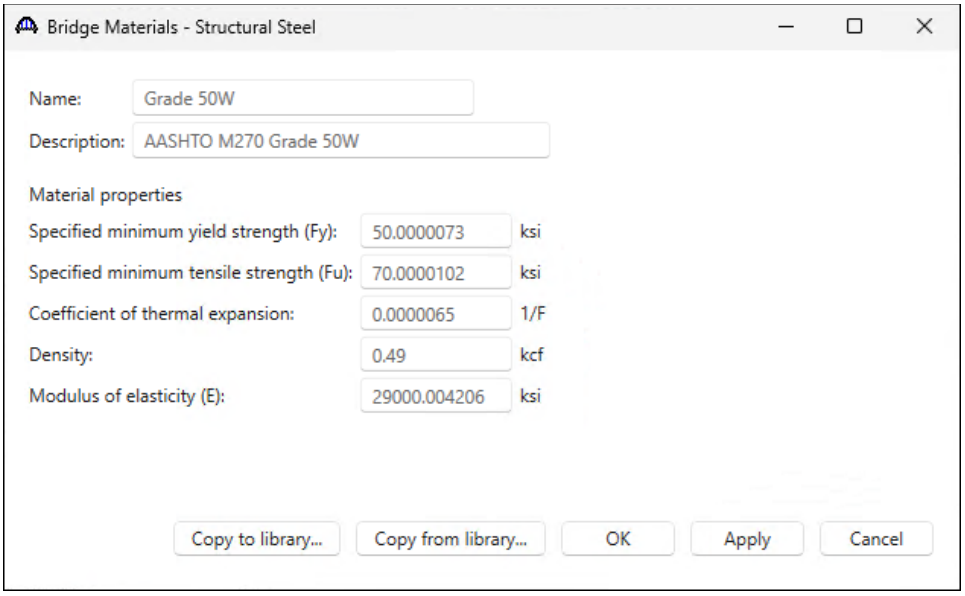




Add the structural steel material by clicking the **Copy from library…** button. The following window opens. Select the **AASHTO M270 Grade 50W** material and click **OK**.

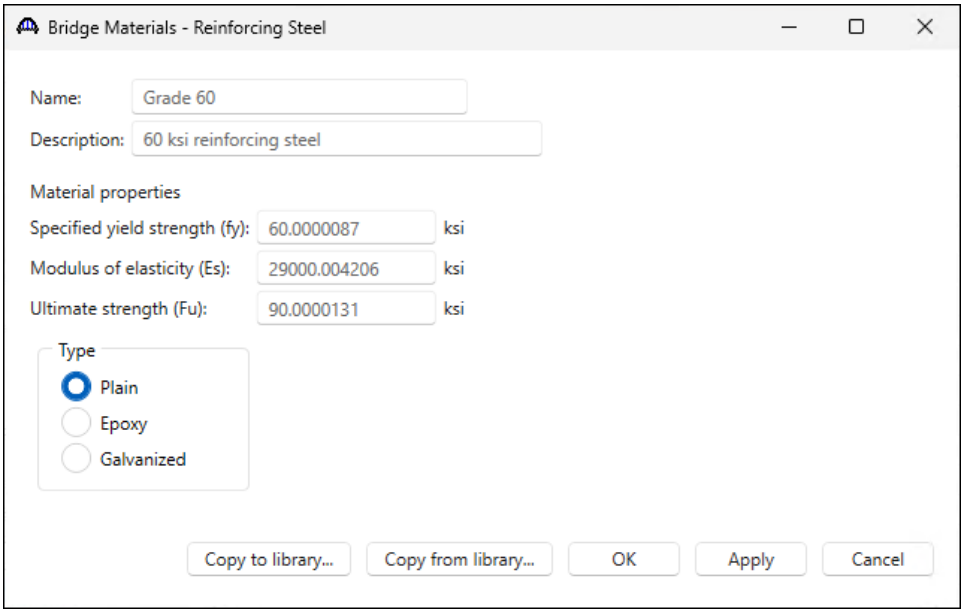


The selected material properties are copied to the Bridge Materials – Structural Steel window as shown below.

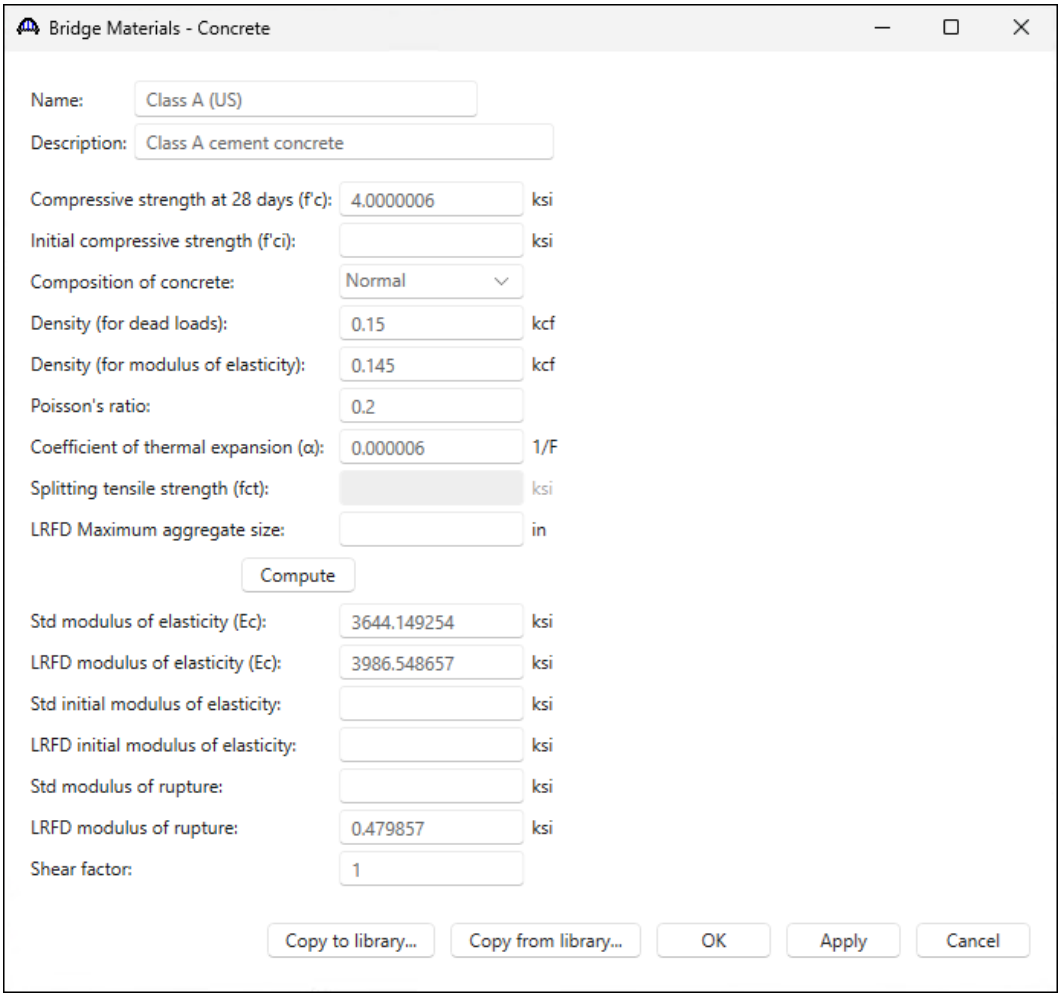


Click **OK** to apply the data and close the window.

Add the following reinforcing steel and concrete material using the same techniques.



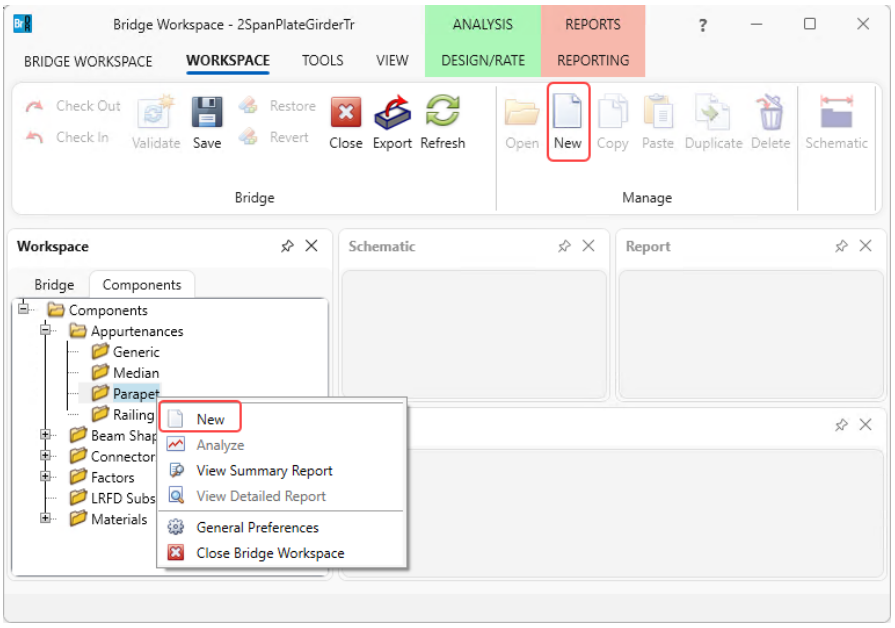
Click **OK** to apply the data and close the window.



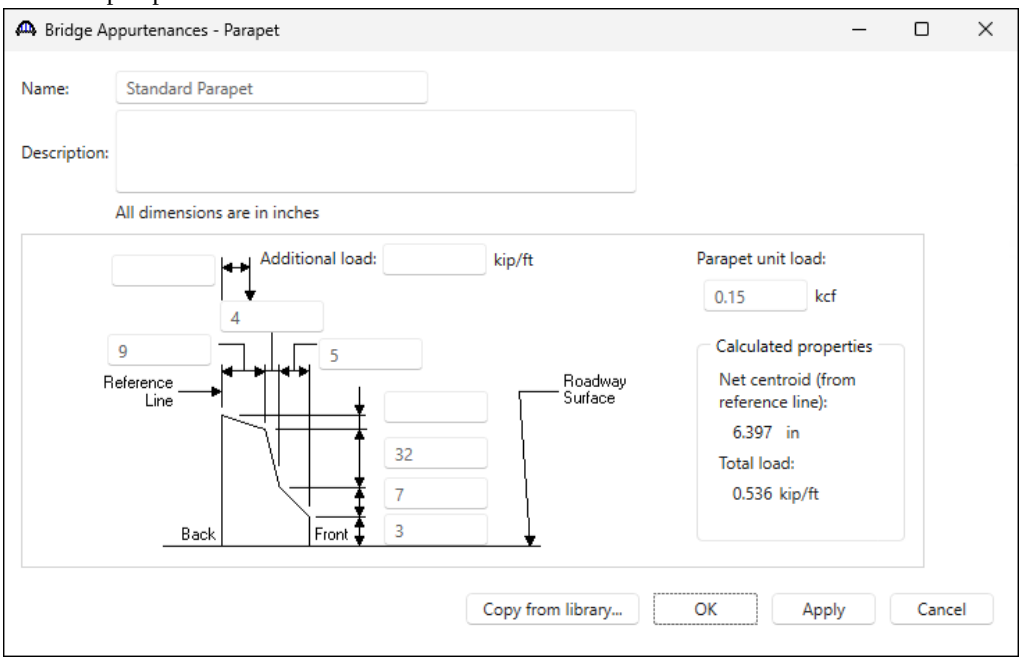
Click **OK** to apply the data and close the window.

Bridge Appurtenances

To enter the appurtenances used within the bridge, expand the tree branch labeled **Appurtenances**. To define a parapet, select **Parapet** and click on **New** from the **Manage** button on the **WORKSPACE** ribbon (or double click on **Parapet** in the **Components** tree).



Enter the parapet details as shown below.

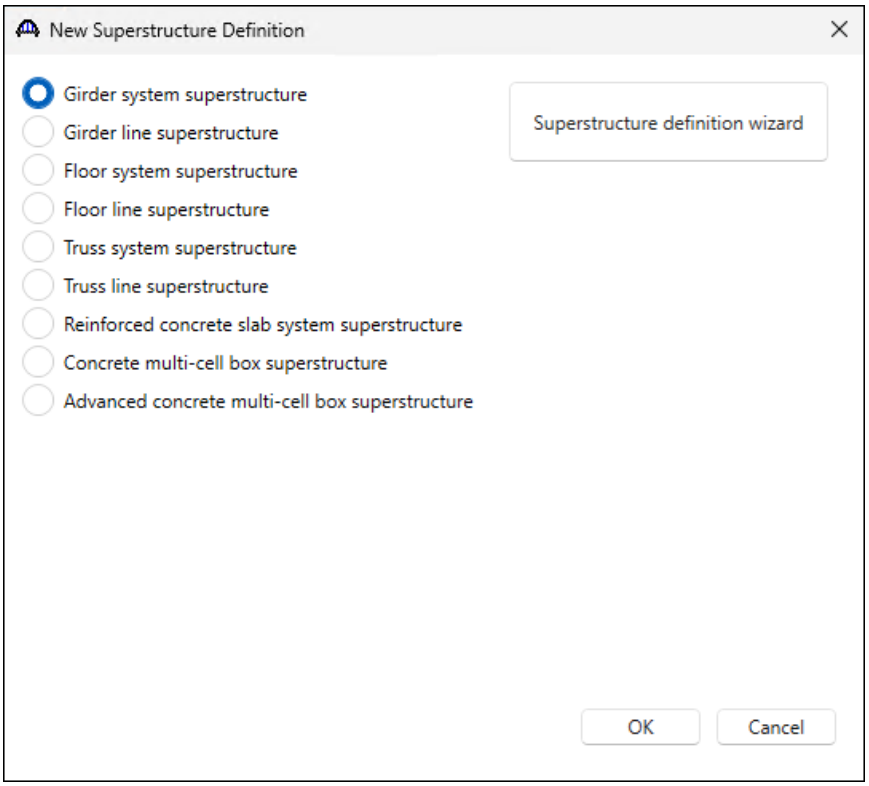


Click **OK** to apply the data and close the window.

The default standard LRFD and LFR factors will be used. Bridge alternatives will be added after entering the structure definition.

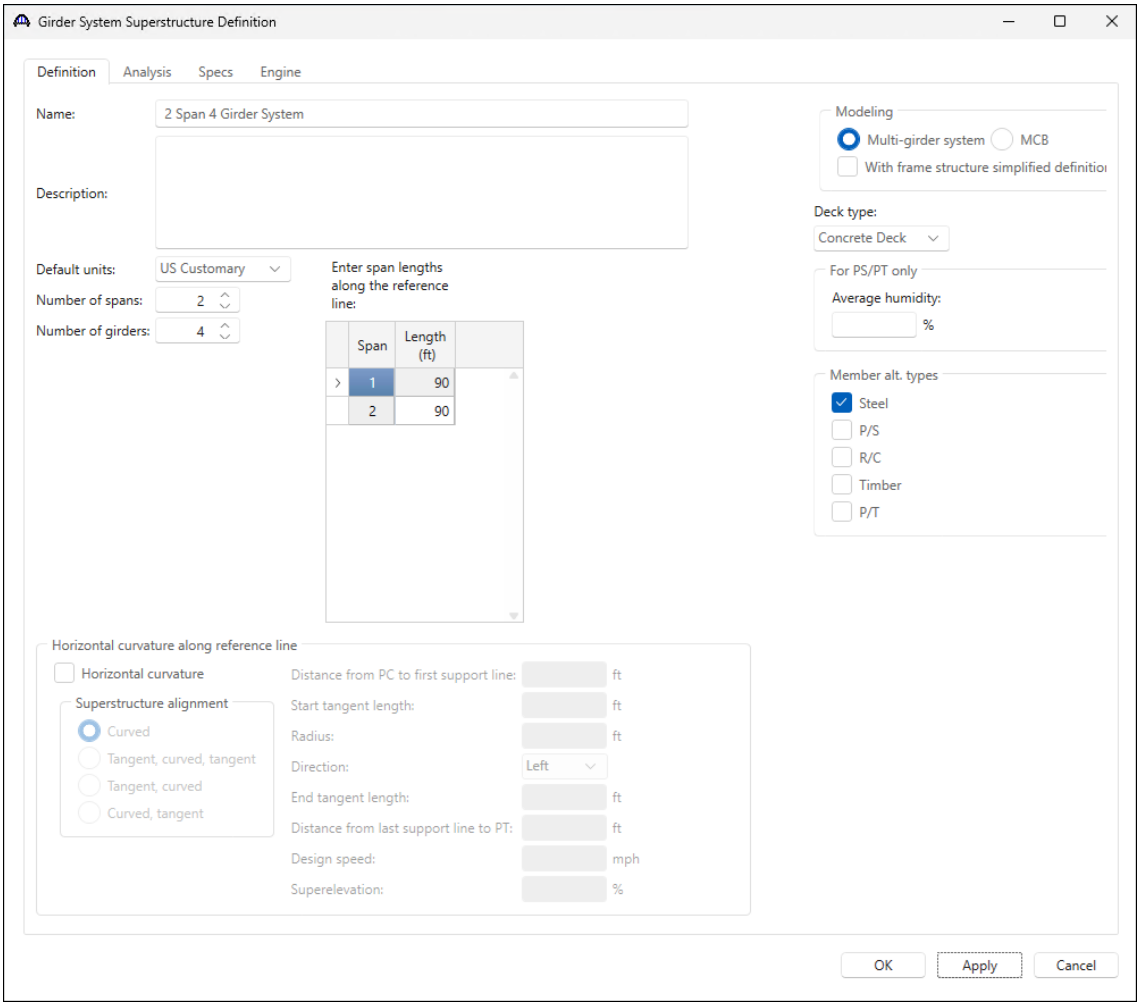
Superstructure Definition

Returning to the **Bridge** tab of the **Bridge Workspace**, double click on **SUPERSTRUCTURE DEFINITIONS** (or click on **SUPERSTRUCTURE DEFINITIONS** and select **New** from the **Manage** group of the **WORKSPACE** ribbon or right mouse click on **SUPERSTRUCTURE DEFINITIONS** and select **New** from the popup menu) to create a new structure definition. The window shown below will appear.

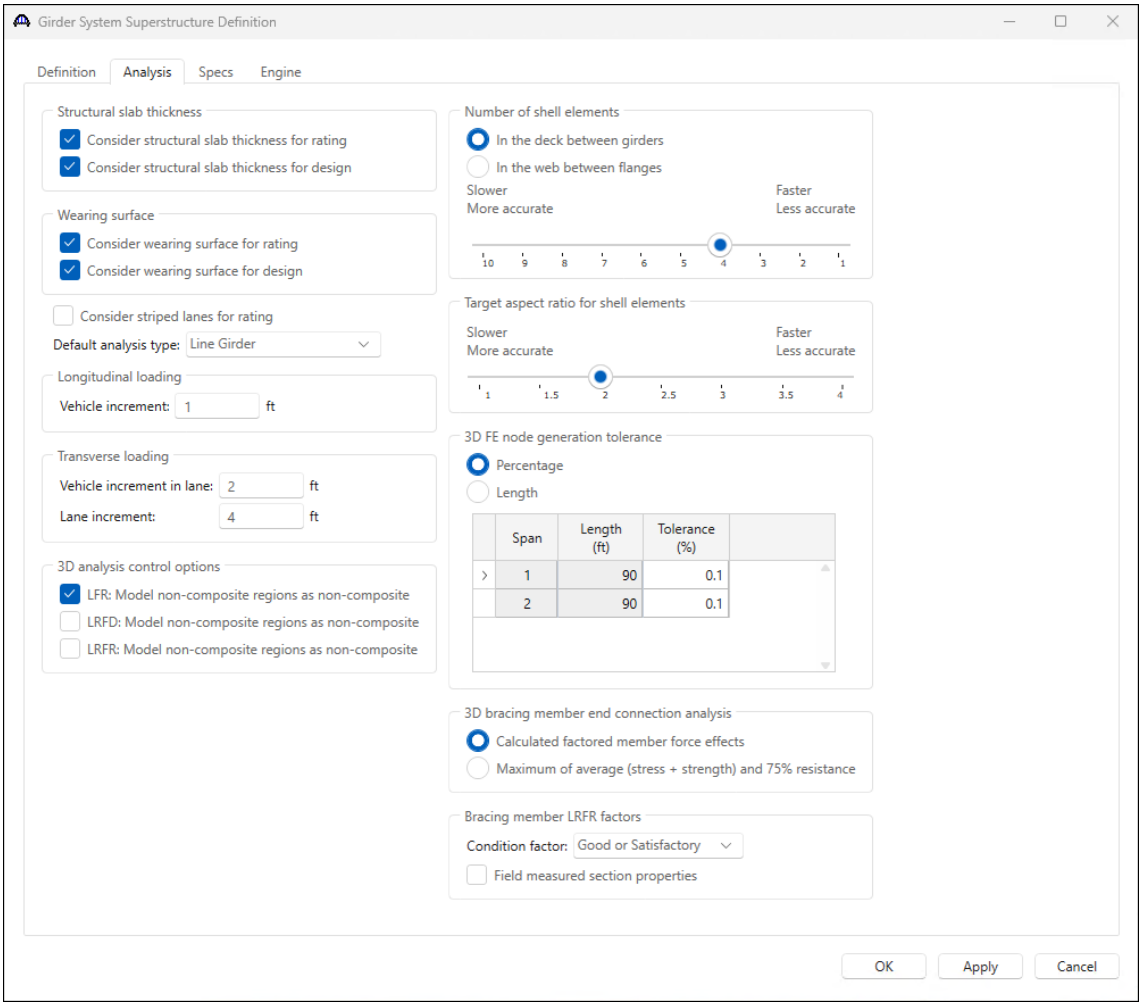


Select **Girder system superstructure**, click **OK** and the **Girder System Superstructure Definition** window will open.

Enter the data as shown below and click **Apply** to apply the data and keep the window open.



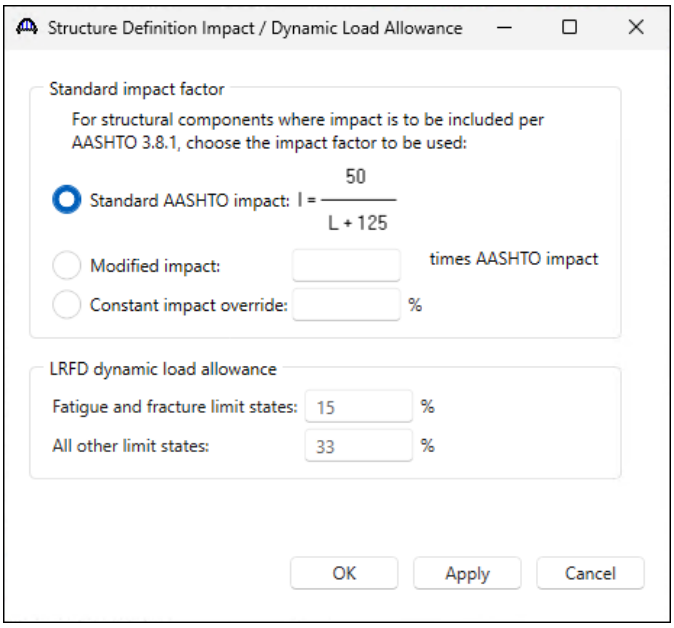
The **Analysis** tab is shown below with the default selections. For this example, the default values will not be overridden. No changes are required on this tab.



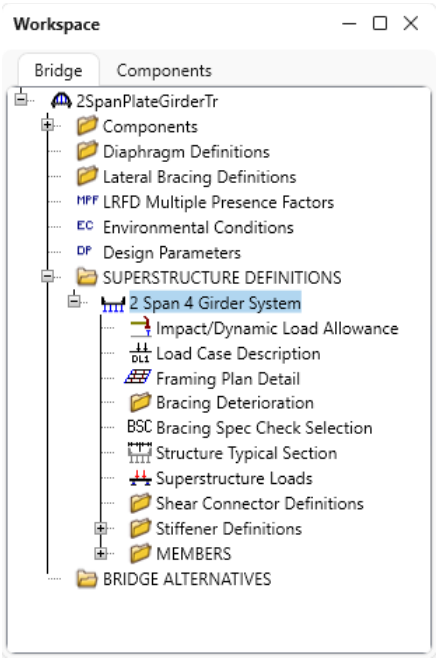
Click **OK** to apply the data and close the window.

Impact/Dynamic Load Allowance

Enter the impact to be used for the superstructure definition by double clicking on **Impact/Dynamic Load Allowance** in the **Bridge Workspace** tree. The **Structure Definition Impact / Dynamic Load Allowance** window shown below will open. The values shown below are default values. No changes are required to these values.

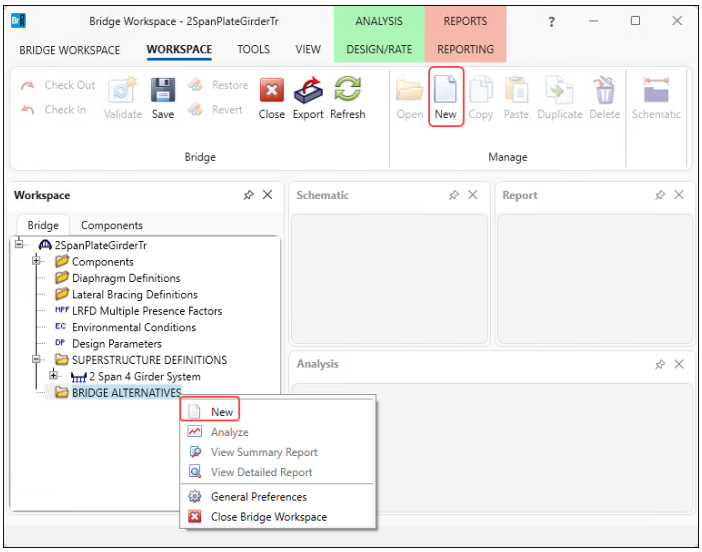


The partially expanded **Bridge Workspace** tree is shown below.

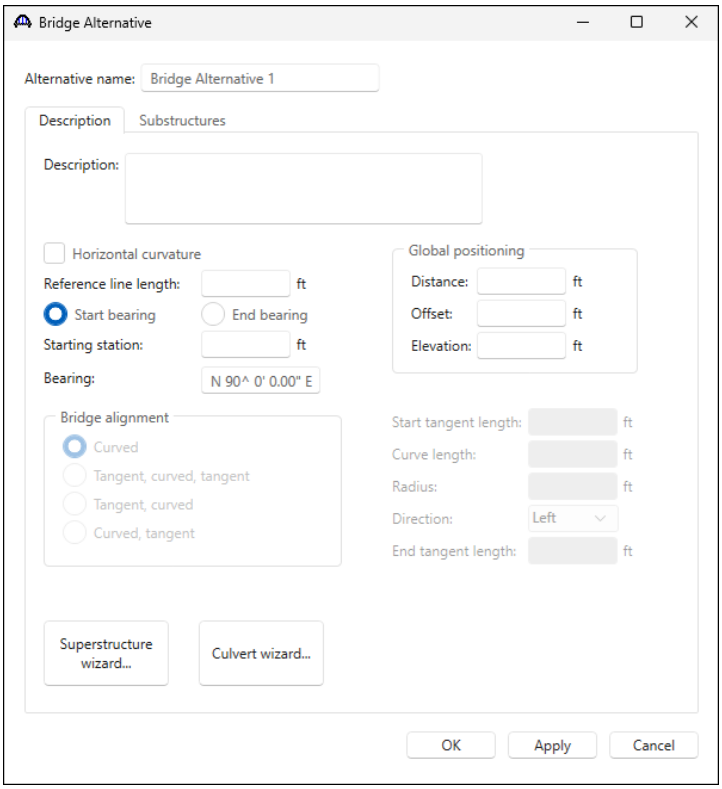


BRIDGE ALTERNATIVES

Navigate to the **BRIDGE ALTERNATIVES** node in the **Bridge Workspace** tree and create a new bridge alternative by double-clicking on **BRIDGE ALTERNATIVES** (or click on **BRIDGE ALTERNATIVES** and select **New** from the **Manage** group of the **WORKSPACE** ribbon).

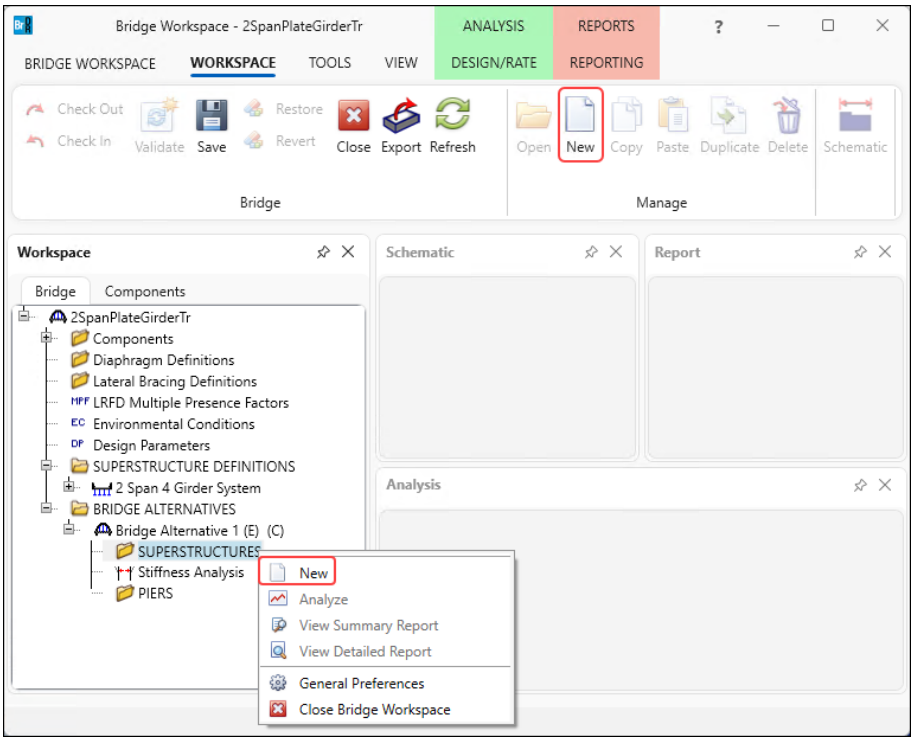


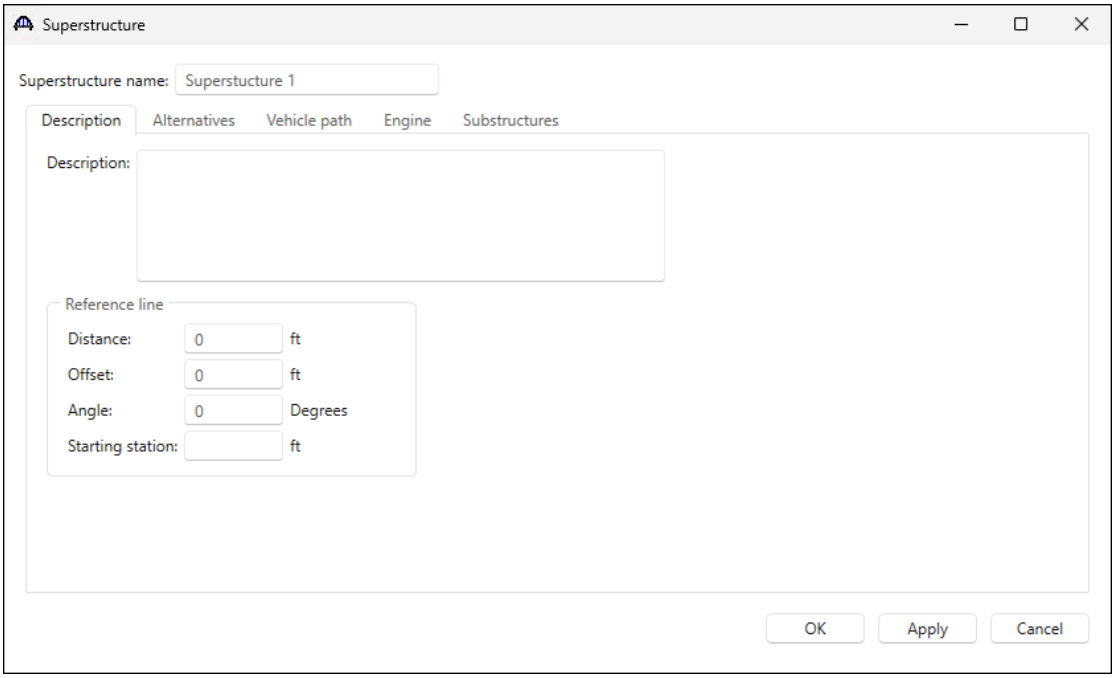
Enter the following data.



Click **OK** to apply the data and close the window.

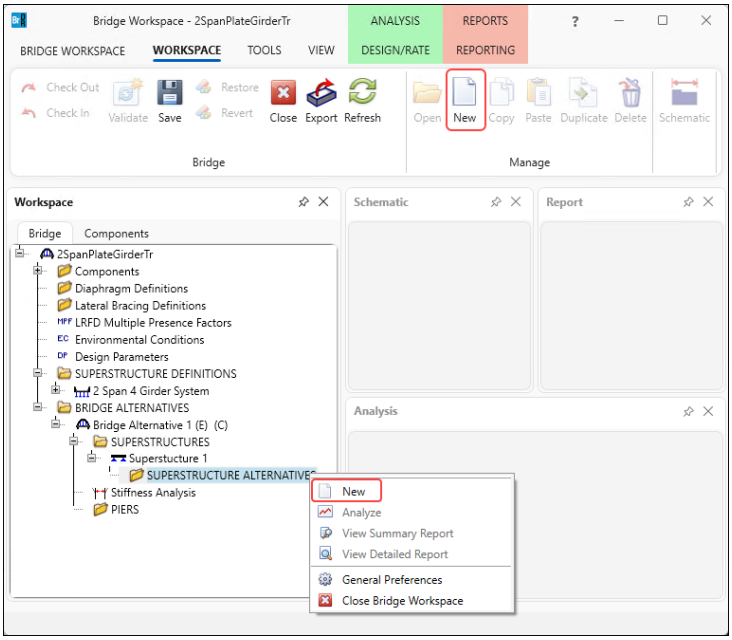
Expand the **Bridge Alternative 1** node in the **Bridge Workspace** tree by clicking the ⊞ button. Double-click on the **SUPERSTRUCTURES** node (or select **SUPERSTRUCTURES** and click **New** from the **Manage** group of the **WORKSPACE** ribbon) and enter the following new superstructure.



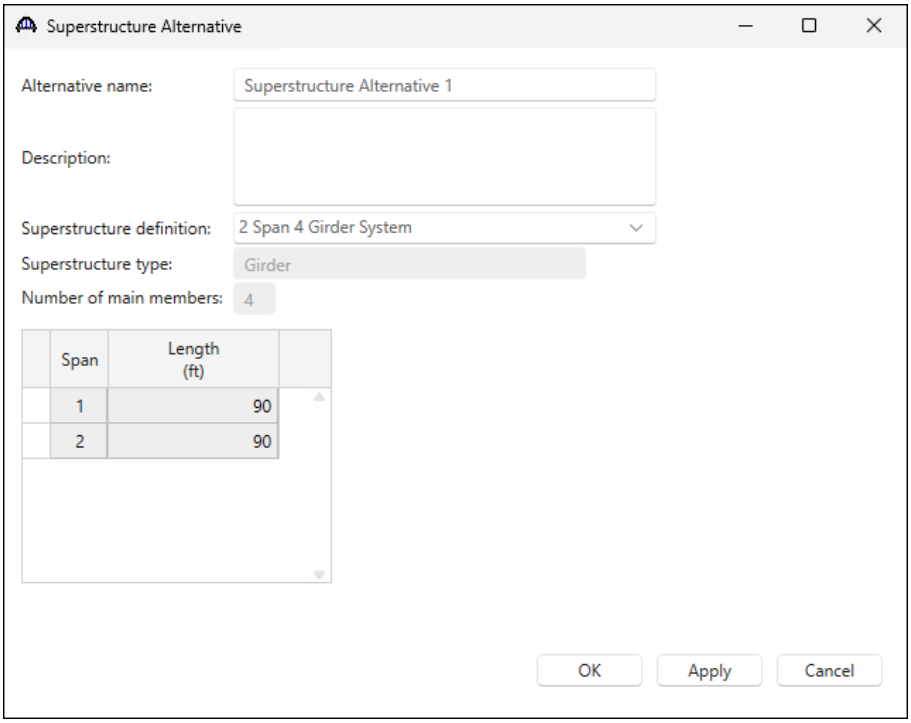


Click **OK** to apply the data and close the window.

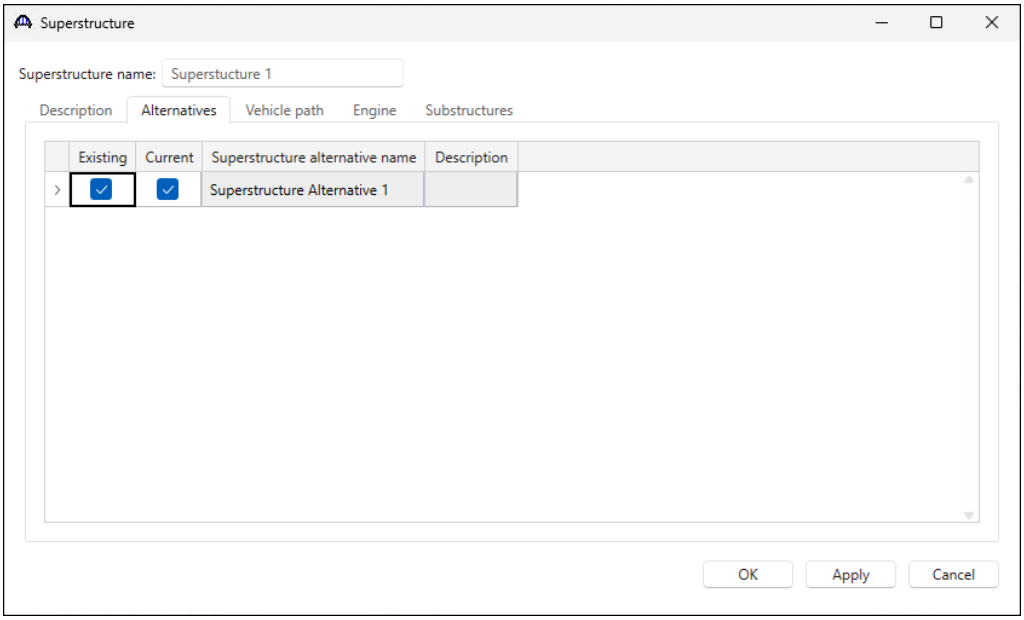
Expand the **Superstructure 1** node in the **Bridge Workspace** tree by clicking the ⊞ button. Double-click on the **SUPERSTRUCTURE ALTERNATIVES** node (or select **SUPERSTRUCTURE ALTERNATIVES** and click **New** from the **Manage** group of the **WORKSPACE** ribbon) and enter the following new superstructure alternative.



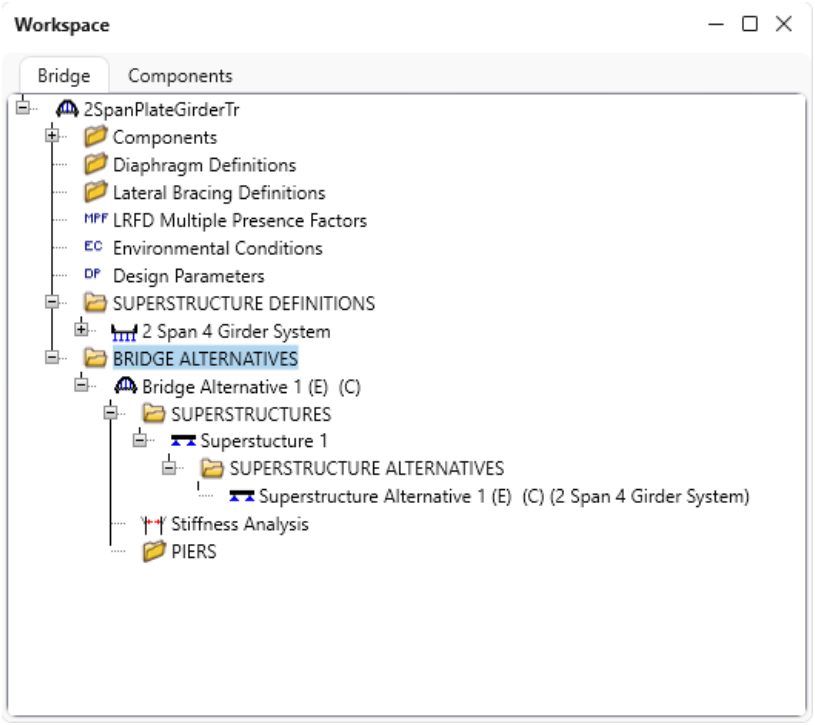
Select the **Superstructure definition 2 Span 4 Girder System** as the current superstructure definition for this Superstructure Alternative.



Re-open the **Superstructure 1** window and navigate to the **Alternatives** tab. The **Superstructure Alternative 1** linked to **2 Span 4 Girder System** is shown as the **Existing** and **Current** alternative for **Superstructure 1.**

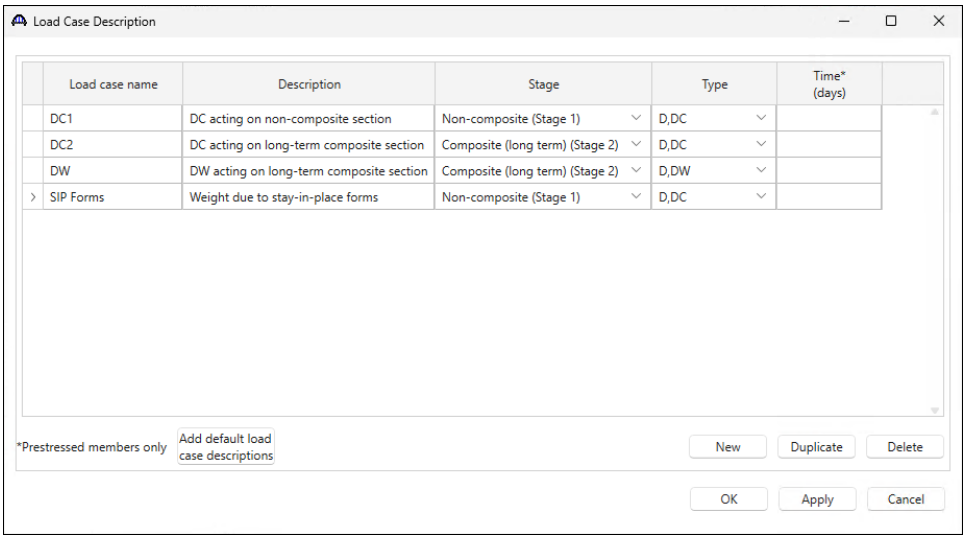


The partially expanded **Bridge Workspace** tree is shown below.



Load Case Description

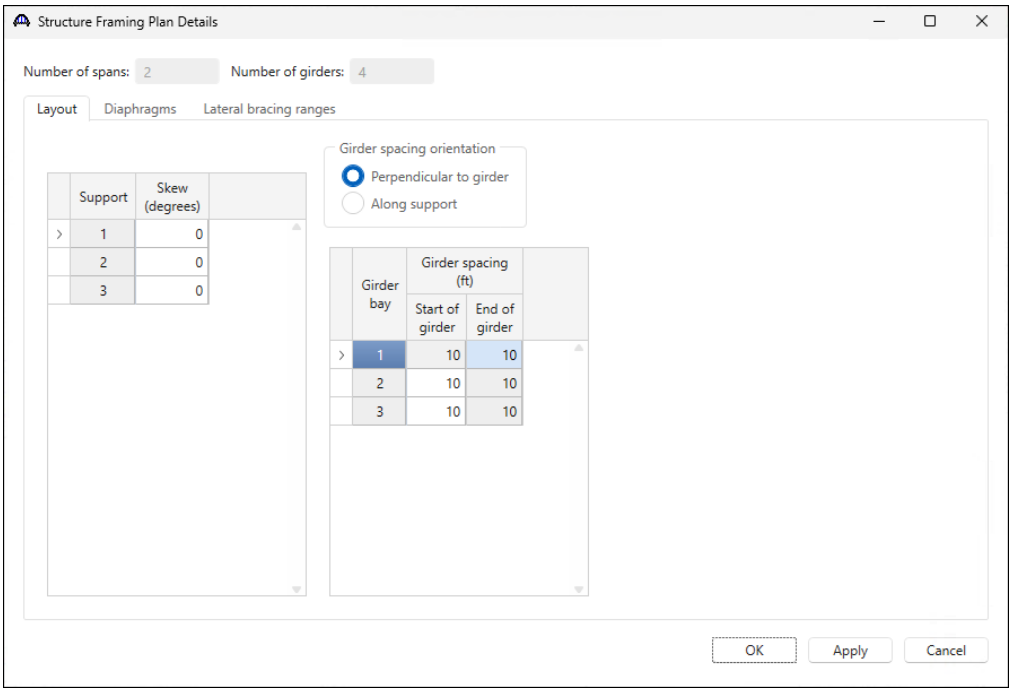
Navigate to the **2 Span 4 Girder System** superstructure definition and double-click on the **Load Case Description** node in the **Bridge Workspace** tree to open the **Load Case Description window.** Click on the **Add default load case description** button to create the following load cases.



Click **OK** to apply the data and close the window.

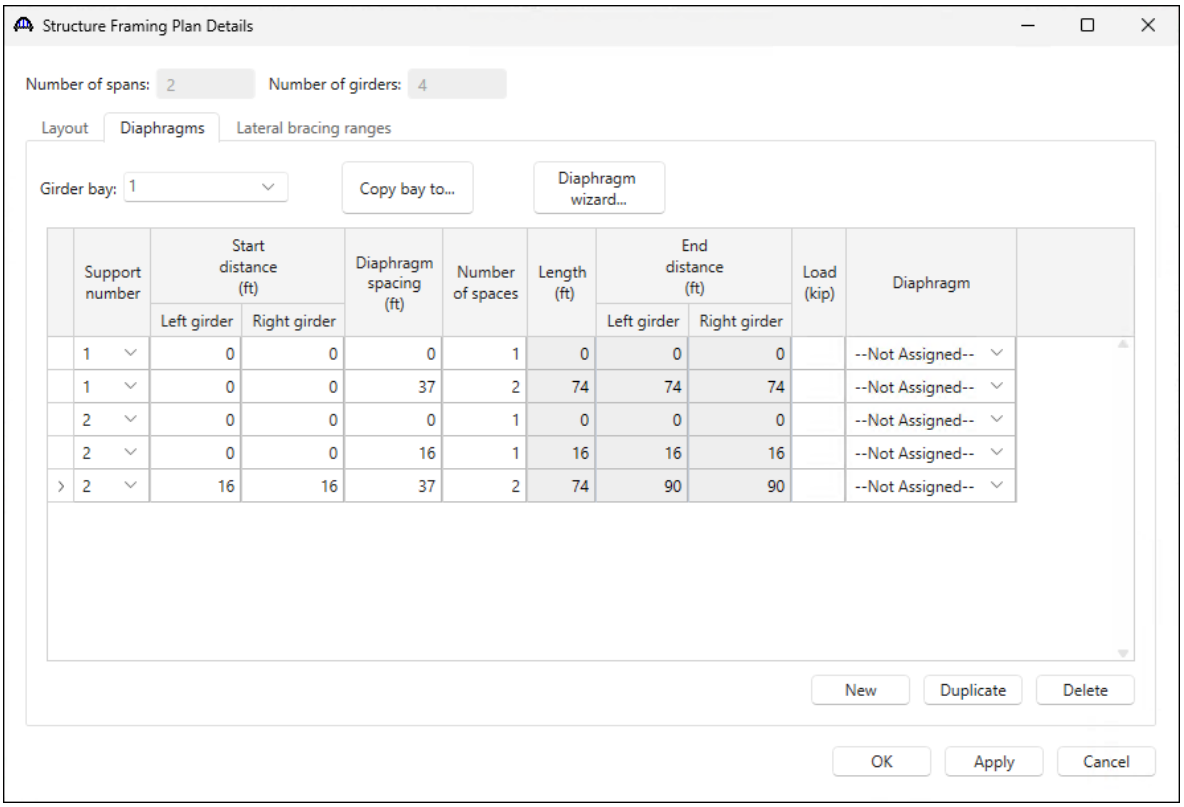
Structure Framing Plan Detail – Layout

Double-click on **Framing Plan Detail** in the **Bridge Workspace** tree to describe the framing plan in the **Structure Plan Details** window. Enter the data as shown below.

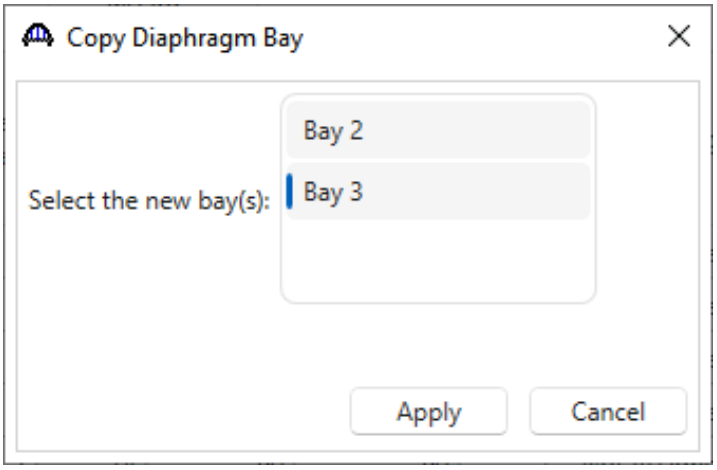


Structure Framing Plan Detail – Diaphragms

Switch to the **Diaphragms** tab to enter diaphragm spacing. Enter the following diaphragms for **Girder bay 1** as shown below and click the **Apply** button.



Click the **Copy bay to…** button to copy the diaphragms entered for bay 1 to the other bays. The following window appears. Select **Bay 2** and **Bay 3** by holding the **Ctrl** key and click **Apply**.



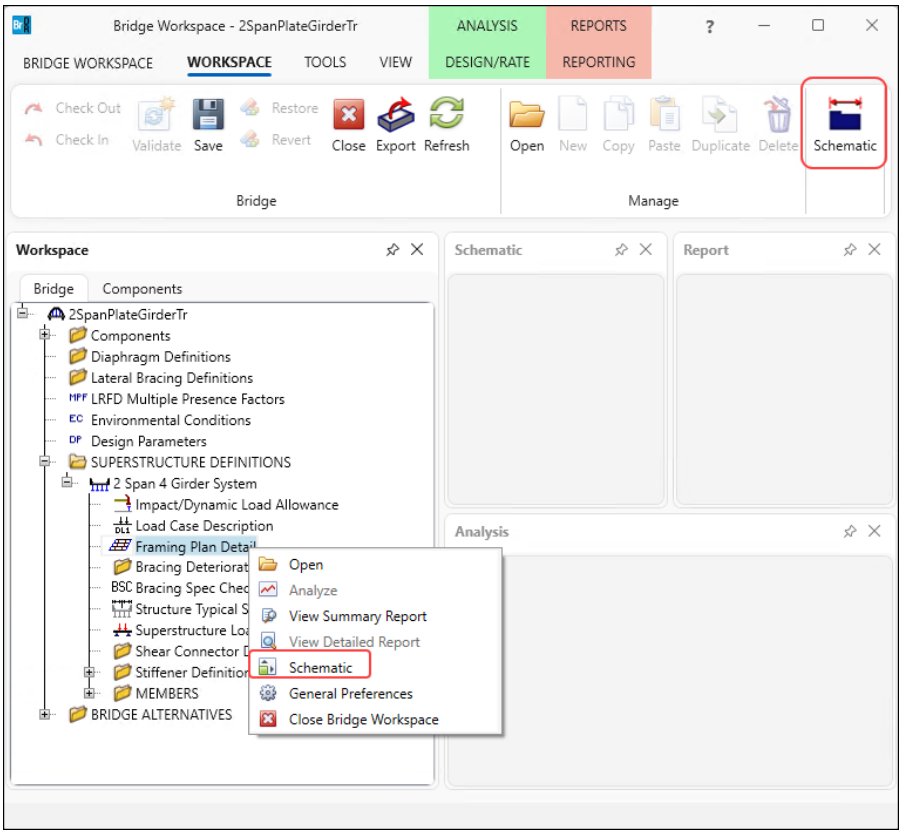
The following message appears indicating that the diaphragms have been copied. Click **OK**.



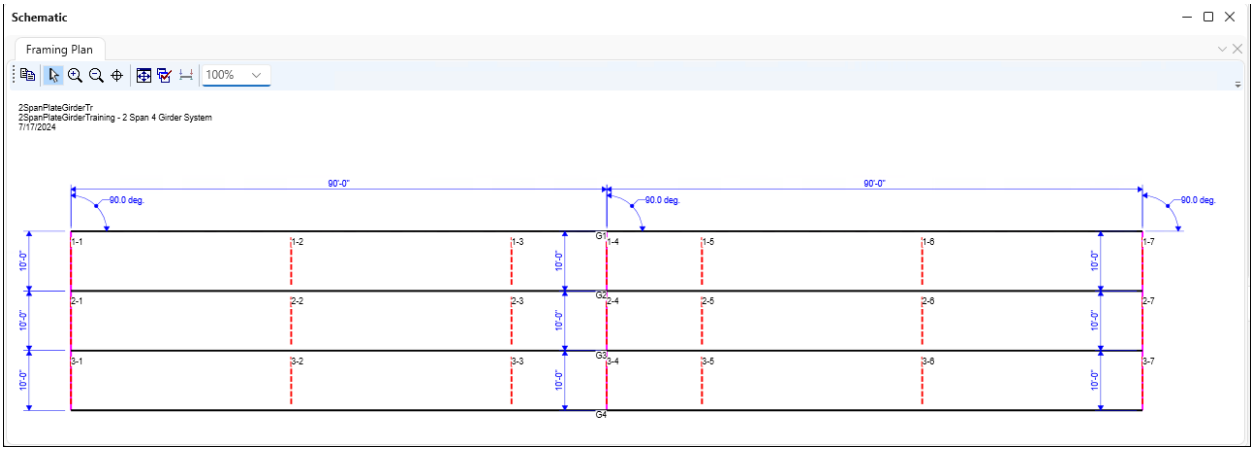
Click **OK** to apply the data and close the window.

Schematic - Framing Plan Detail

While the **Framing Plan Detail** is selected in the **Bridge Workspace** tree, open the schematic for the framing plan by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click on **Framing Plan Detail** in the Bridge Workspace and select **Schematic** from the menu).

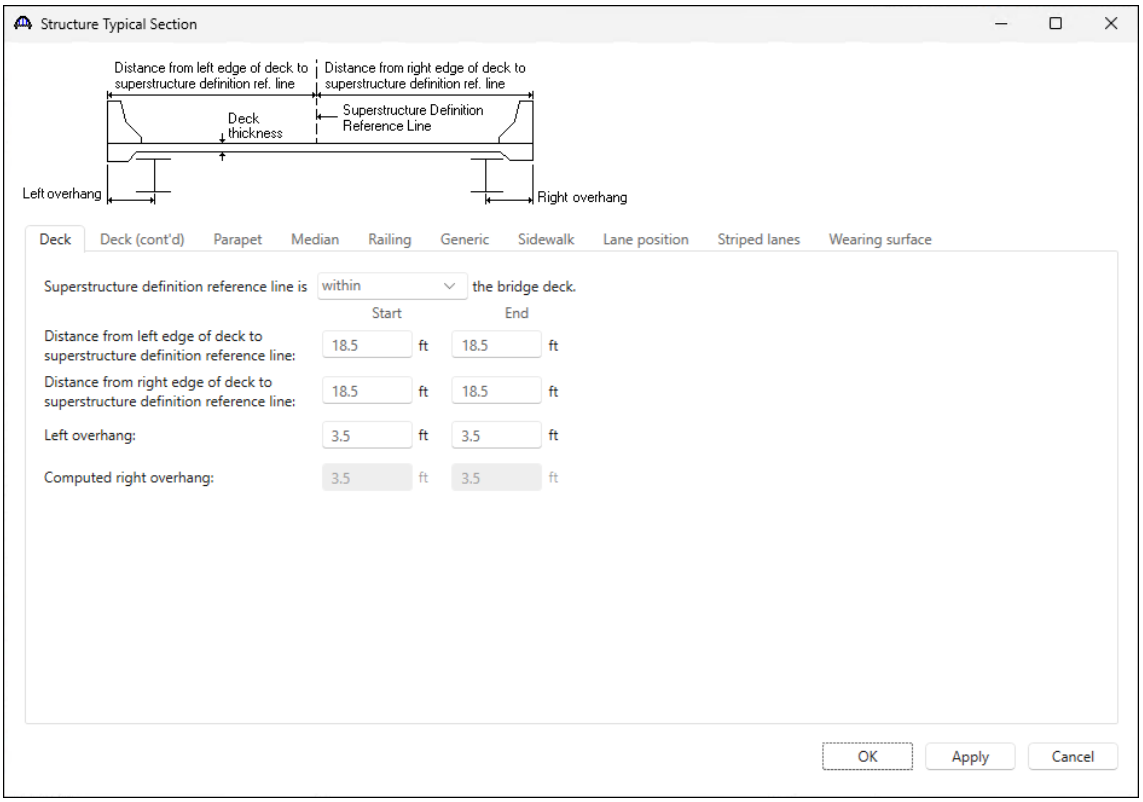


The following schematic is displayed.



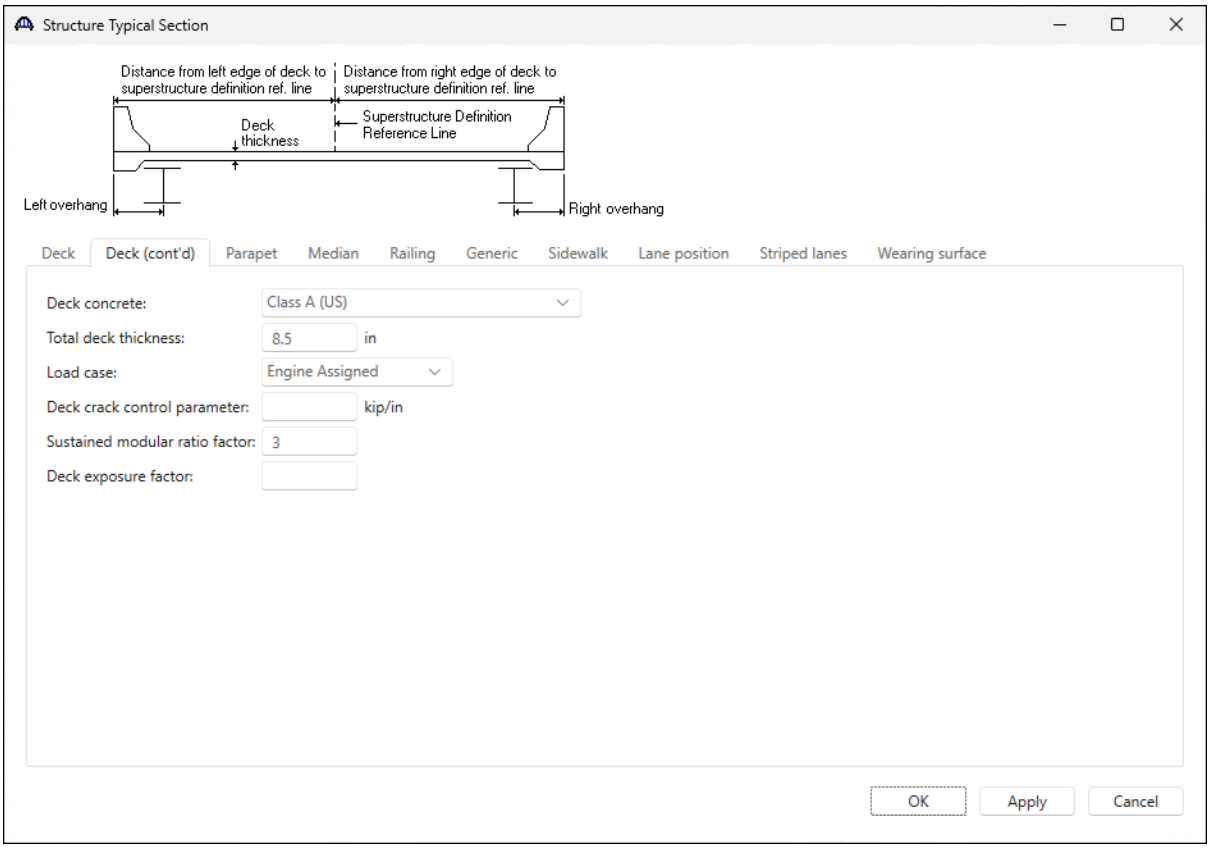
Structure Typical Section - Deck

Next define the structure typical section by double-clicking on **Structure Typical Section** node in the **Bridge Workspace** tree. Input the data describing the typical section as shown below.



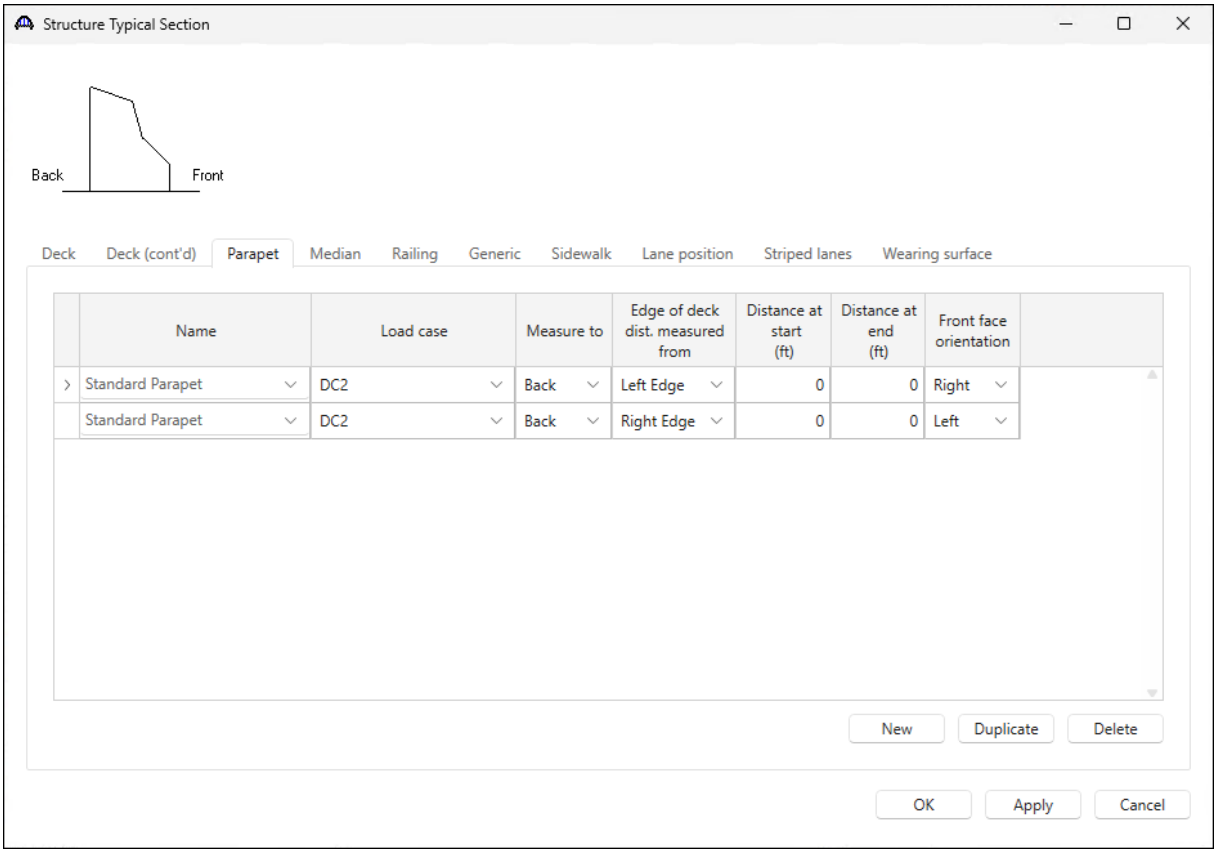
Structure Typical Section – Deck (cont'd)

The **Deck (cont'd)** tab provides input options for the **Deck concrete** and the **Total deck thickness**. The material for the deck concrete is selected from the list of bridge materials. Enter the data as shown below.



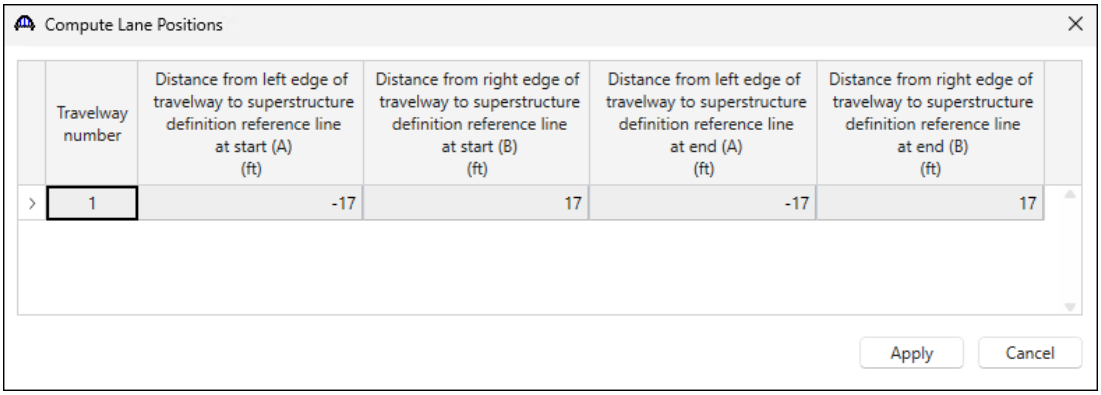
Structure Typical Section – Parapet

Navigate to the **Parapet** tab. Click the **New** button to add a row to the table. The **Name** of the parapet defaults to the only barrier described for the bridge. Change the **Load case** to **DC2** and select **Back** in the **Measure to** column (in this example, locate the parapet on the deck by referencing the back of the parapet to the left edge of the deck). Enter **0.0** for the **Distance at start** and **Distance at end**. Change the **Front face orientation** to **Right**. Enter another parapet as shown below. The completed tab is shown below.

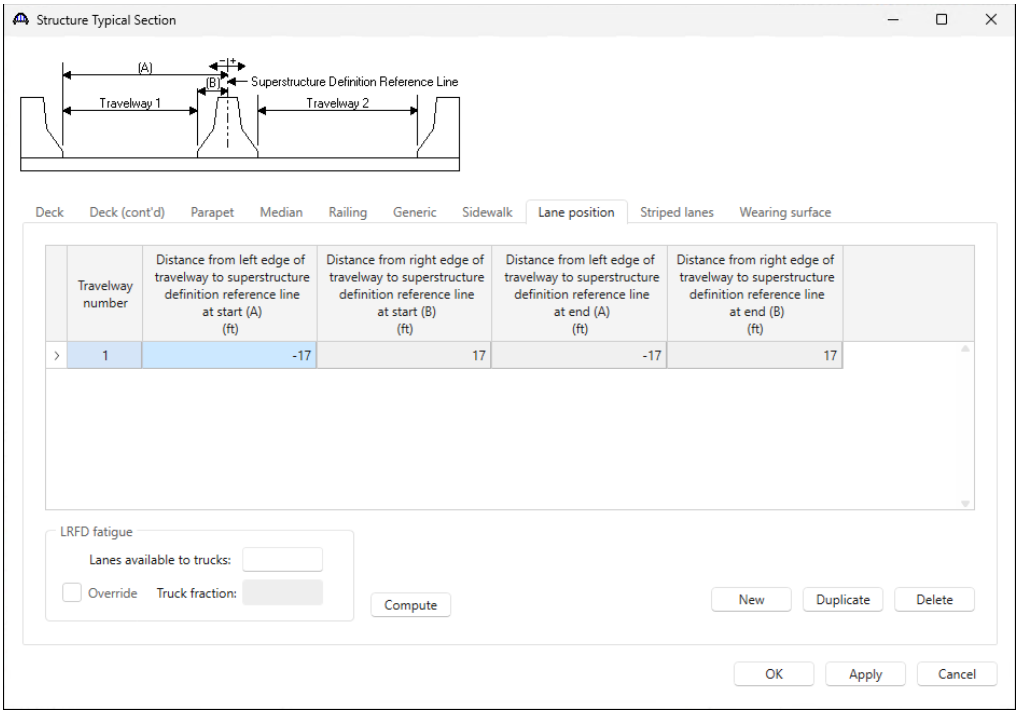


Structure Typical Section – Lane Positions

Select the **Lane position** tab and use the **Compute…** button to compute the lane positions. A window showing the results of the computation opens. Click **Apply** to apply the computed values.

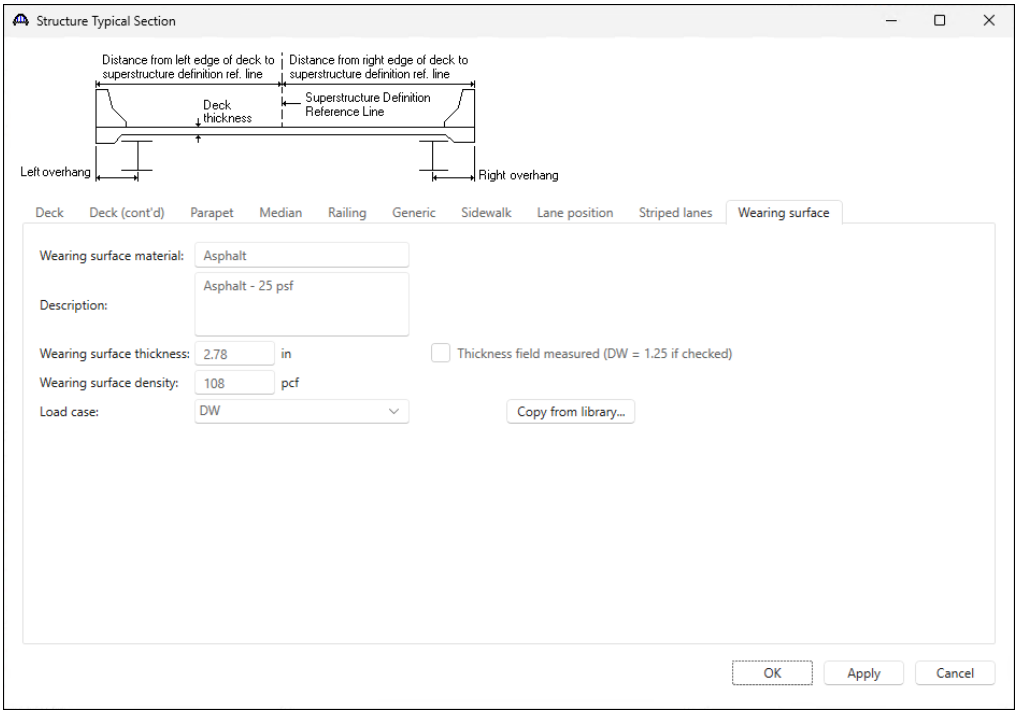


The **Lane Position** tab is populated as shown below.



Structure Typical Section – Wearing surface

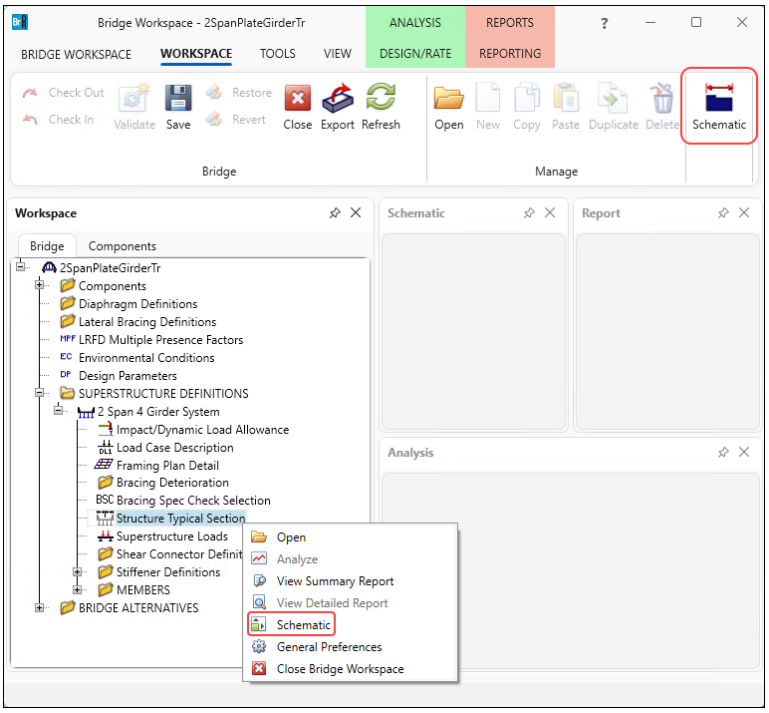
Navigate to the **Wearing surface** tab. Enter the data shown below.



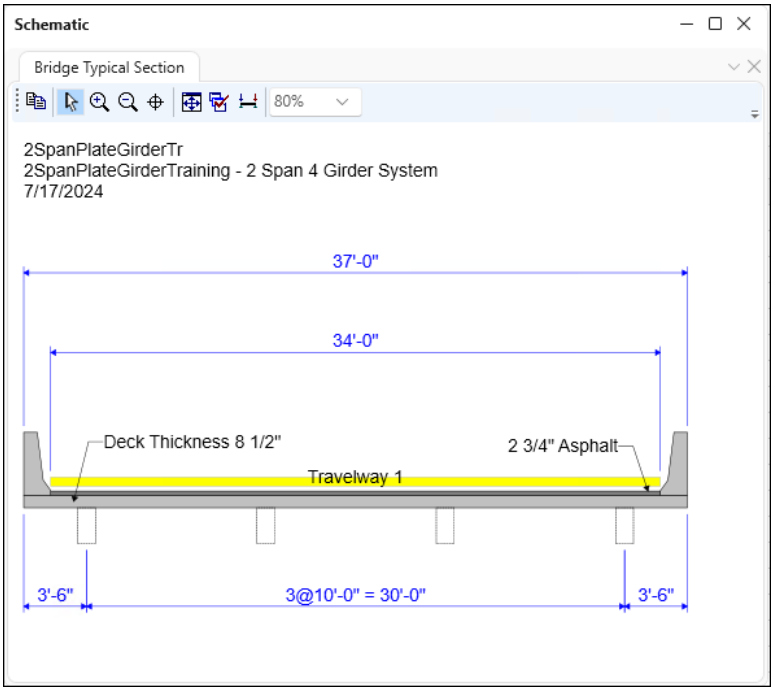
Click **OK** to apply the data and close the window.

Schematic – Structure Typical Section

While the **Structure Typical Section** is selected in the **Bridge Workspace** tree, open the schematic for the structure typical section by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click on **Structure Typical Section** in the **Bridge Workspace** and select **Schematic** from the menu).

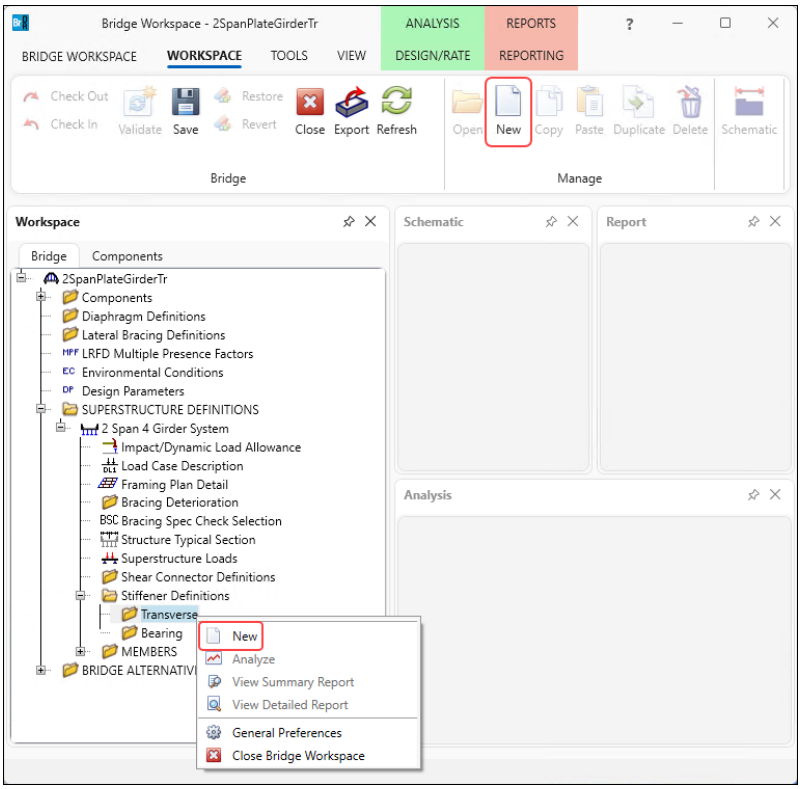


The following schematic is displayed. The girders are displayed as dashed boxes since they are not defined yet.

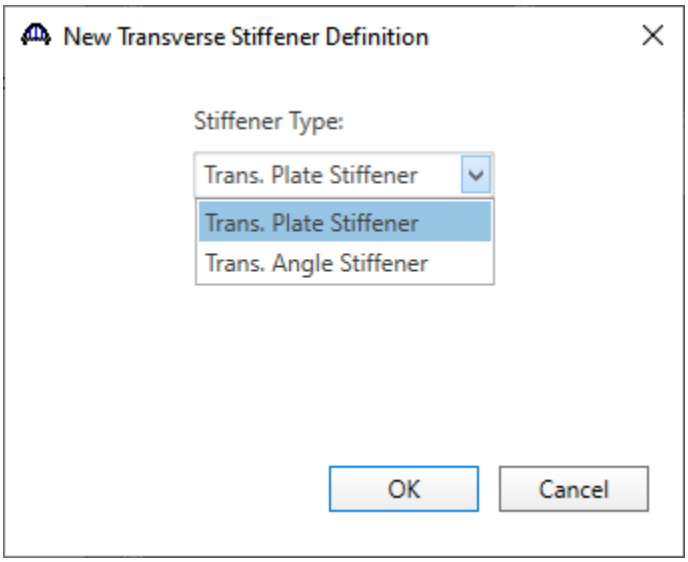


Stiffener Definitions – Transverse

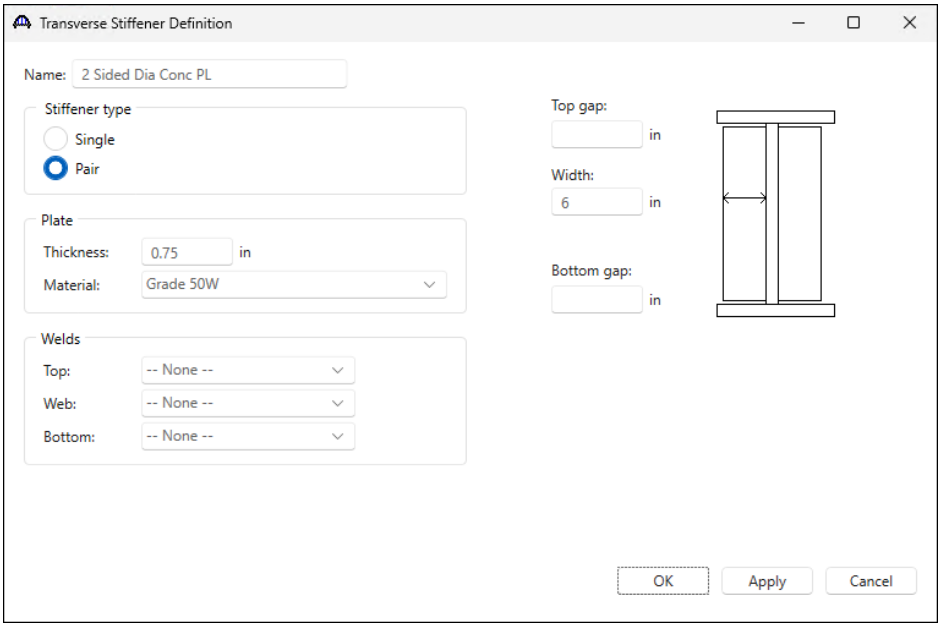
Define the transverse stiffeners to be used by the girders. Expand the **Stiffener Definitions** node in the **Bridge Workspace** tree, select **Transverse** and click on the **New** button from the **Manage** group of the **WORKSPACE** ribbon (or right click and select **New** from the drop-down menu) as shown below.



Select **Trans. Plate Stiffener** for **Stiffener Type** in the **New Transverse Stiffener Definition** window and click **OK** to open the **Transverse Stiffener Definition** window as shown below.



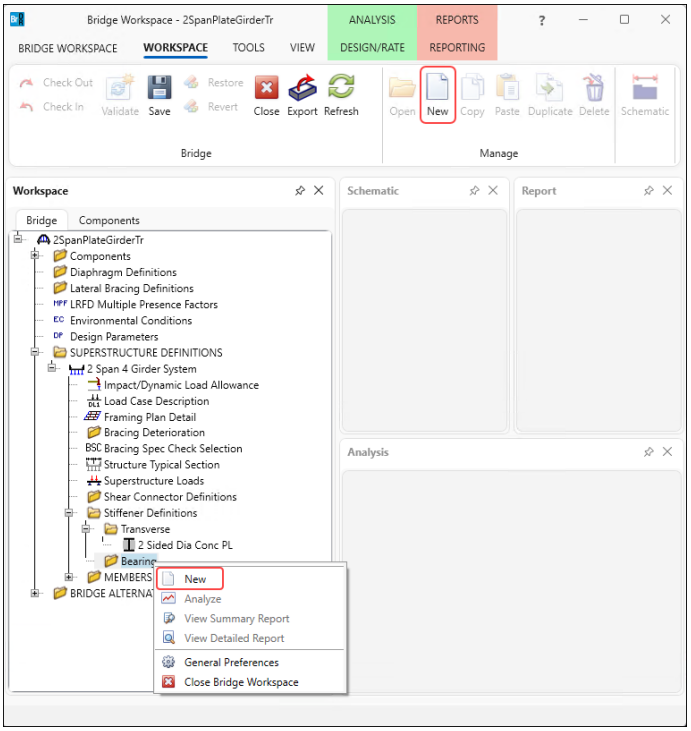
Define the stiffener as shown below.



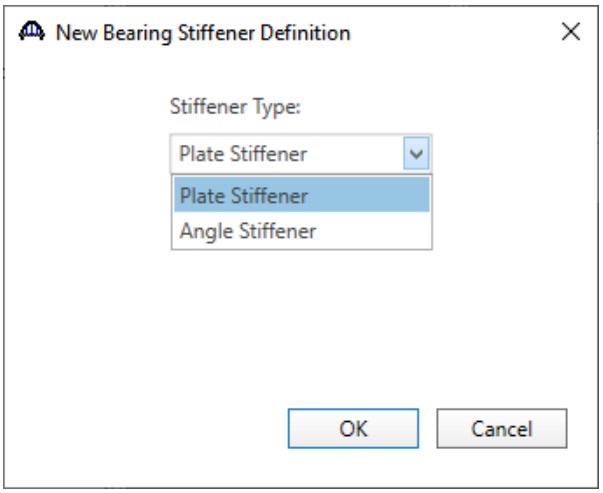
Click **OK** to apply the data and close the window.

Stiffener Definitions – Bearing

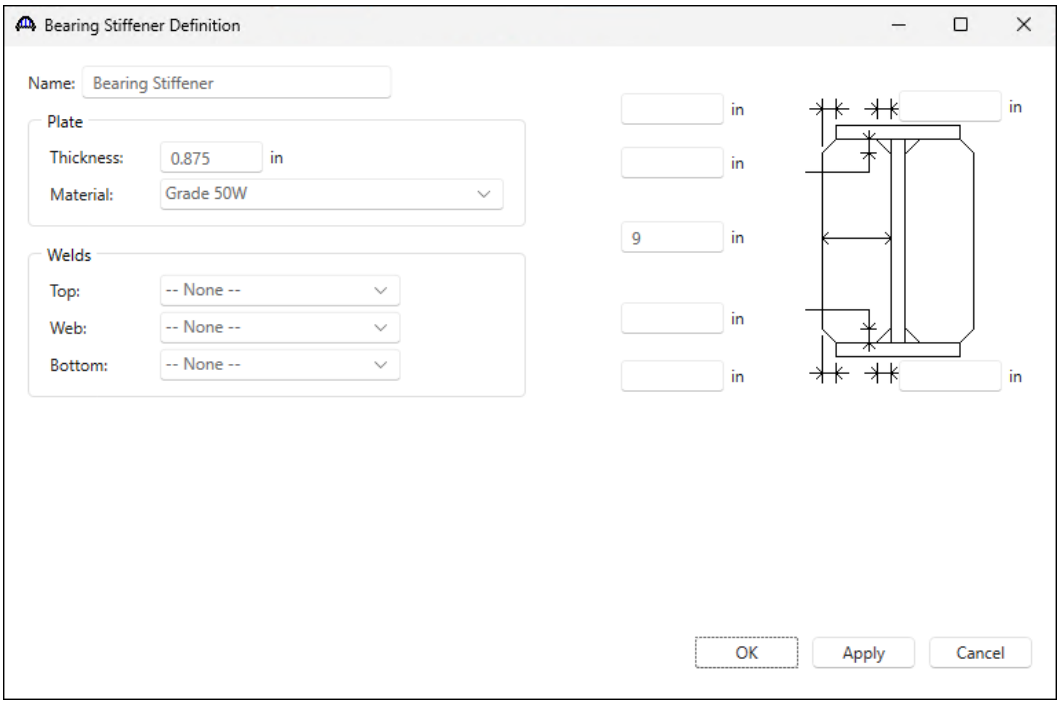
Define the bearing stiffeners to be used by the girders. Expand the **Stiffener Definitions** node in the **Bridge Workspace** tree, select **Bearing** and click on the **New** button from the **Manage** group of the **WORKSPACE** ribbon (or right click and select **New** from the drop-down menu) as shown below.



Select **Plate Stiffener** for **Stiffener type** in the **New Transverse Stiffener Definition** window and click **OK** to open the **Transverse Stiffener Definition** window as shown below.



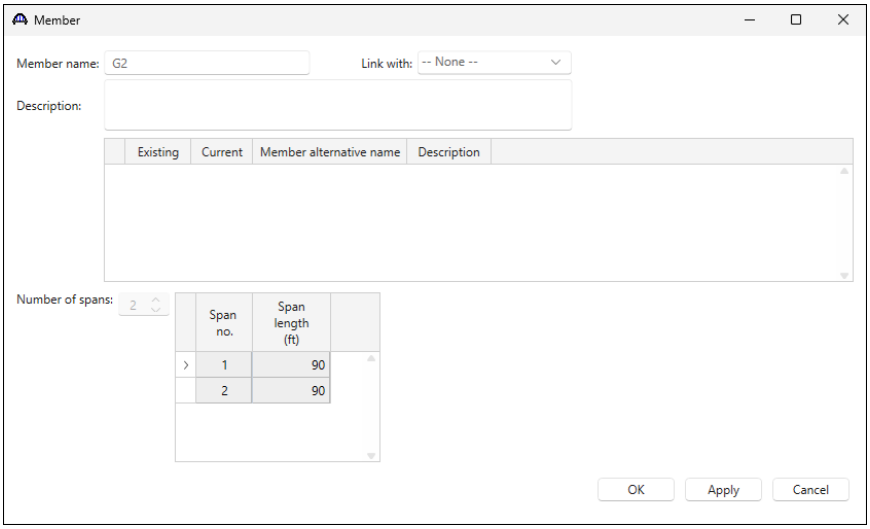
Define the stiffener as shown below.



Click **OK** to apply the data and close the window.

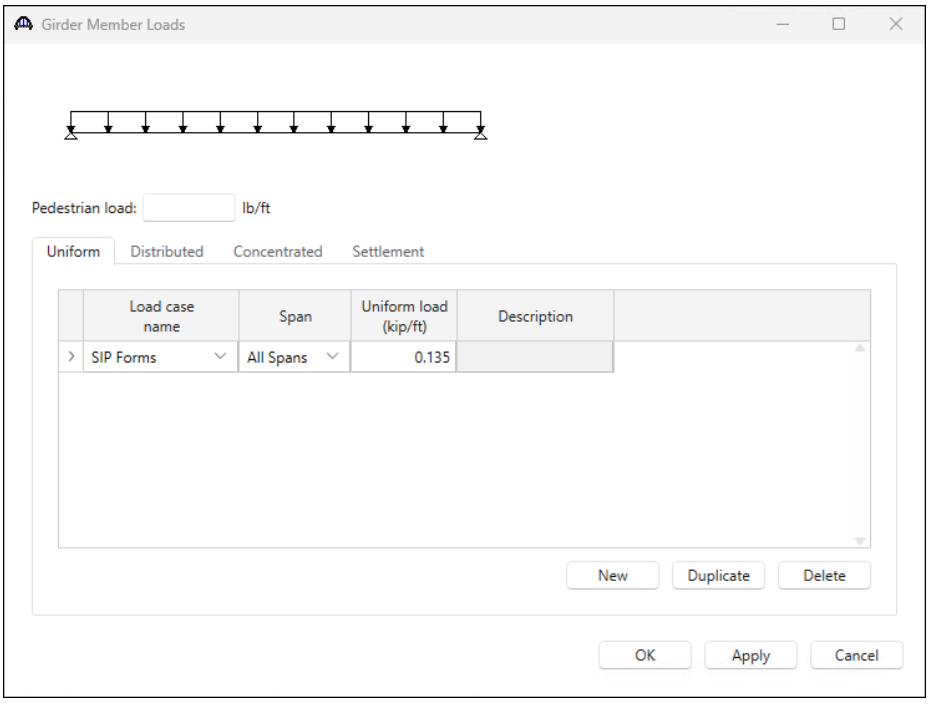
Describing a member

The **Member** window shows the data generated when the structure definition is created. Expand the **MEMBERS** folder and double click on **G2** node. No changes are required in this window. The first member alternative created will automatically be assigned as the **Existing** and **Current member alternative** for this member.



Member Loads

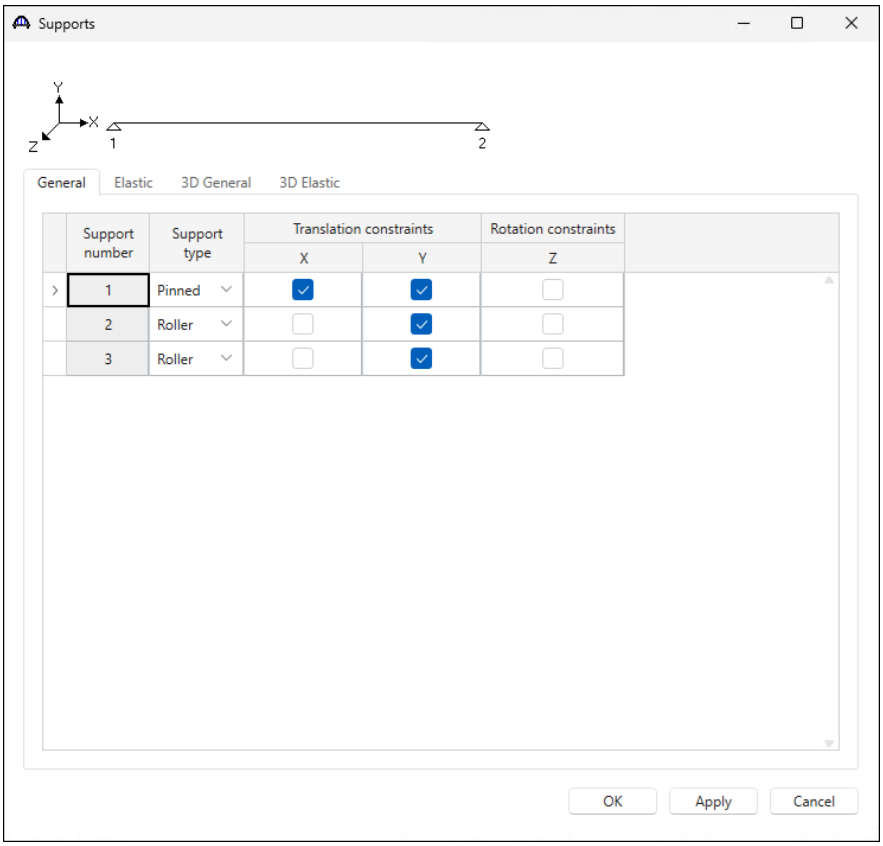
Expand the **G2** member node. Double-click on the **Member Loads** node in the **Bridge Workspace** tree to open the **Girder Member Loads** window. Add a new row and select **SIP Forms** from the options for **Load case name**. Enter the **Uniform load** due to the stay-in-place forms as shown below.



Click **OK** to apply the data and close the window.

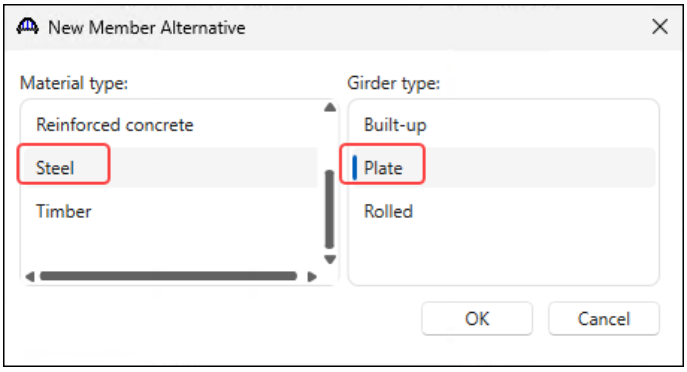
Supports

Double click on **Supports** node in the **Bridge Workspace** tree for member **G2** to open the **Supports** window. Support constraints generated when the structure definition is created and are shown below. No changes are required to this window.



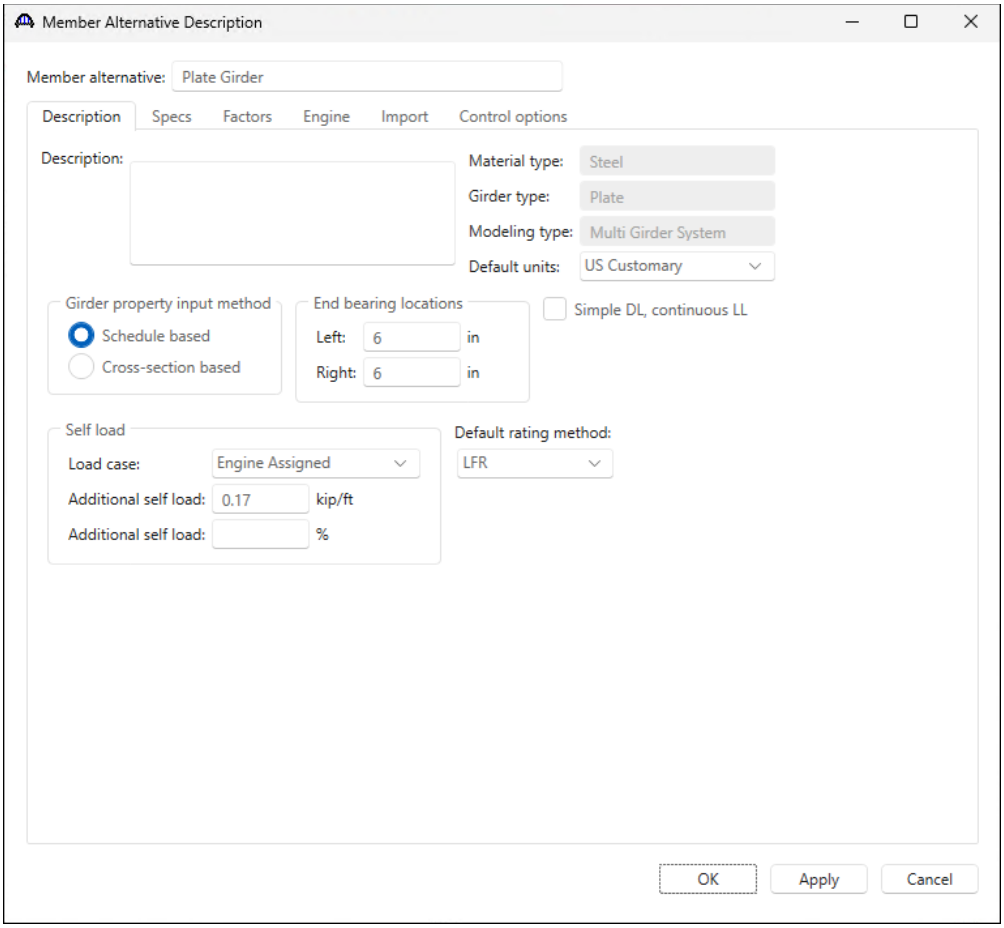
Defining a Member Alternative

Double-click on **MEMBER ALTERNATIVES** in the **Bridge Workspace** tree for member **G2** to create a new member alternative. The **New Member Alternative** window shown below will open. Select **Steel** for the **Material type** and **Plate** for the **Girder Type**.

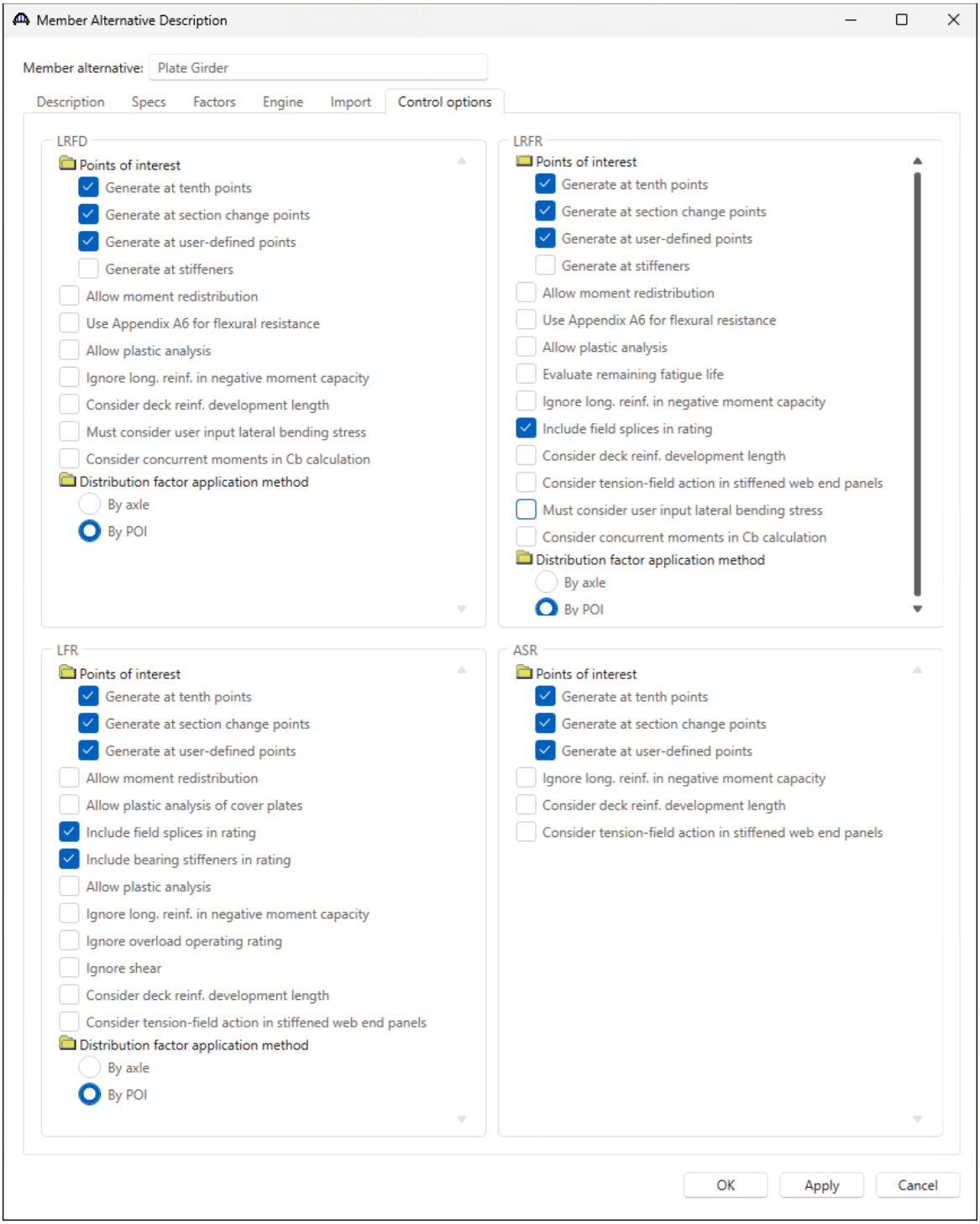


Click **OK** to close the window and create a new member alternative.

The **Member Alternative Description** window will open. Enter the data as shown below.

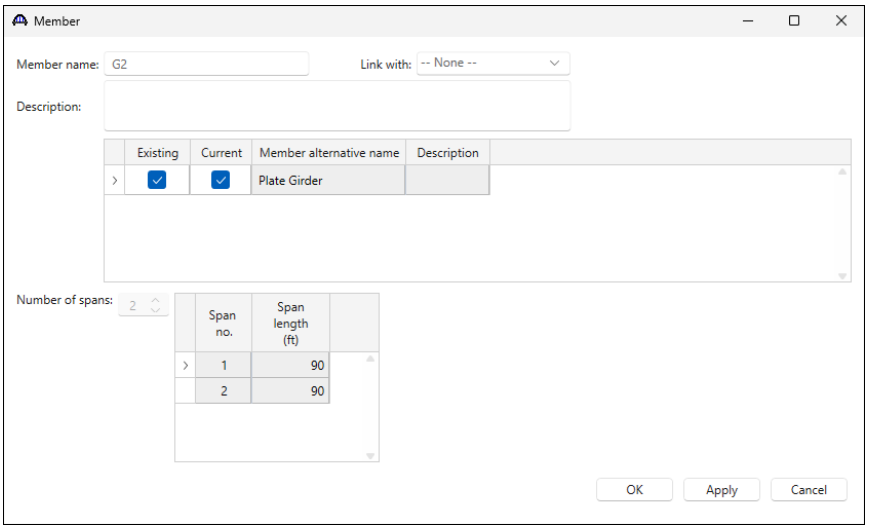


Navigate to the **Control options** tab of this window and select the options as shown below.



Click **OK** to close the window and create a new member alternative.

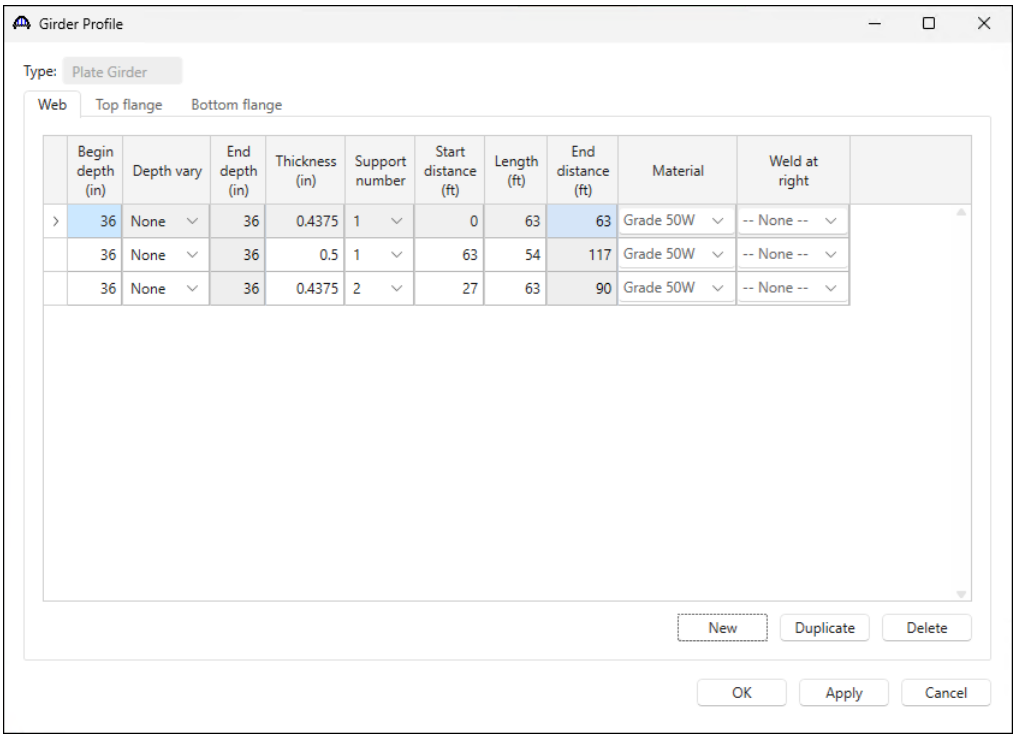
Reopen the member **G2** window. The newly added member alternative will automatically be assigned as the **Existing** and **Current** member alternative for this member.



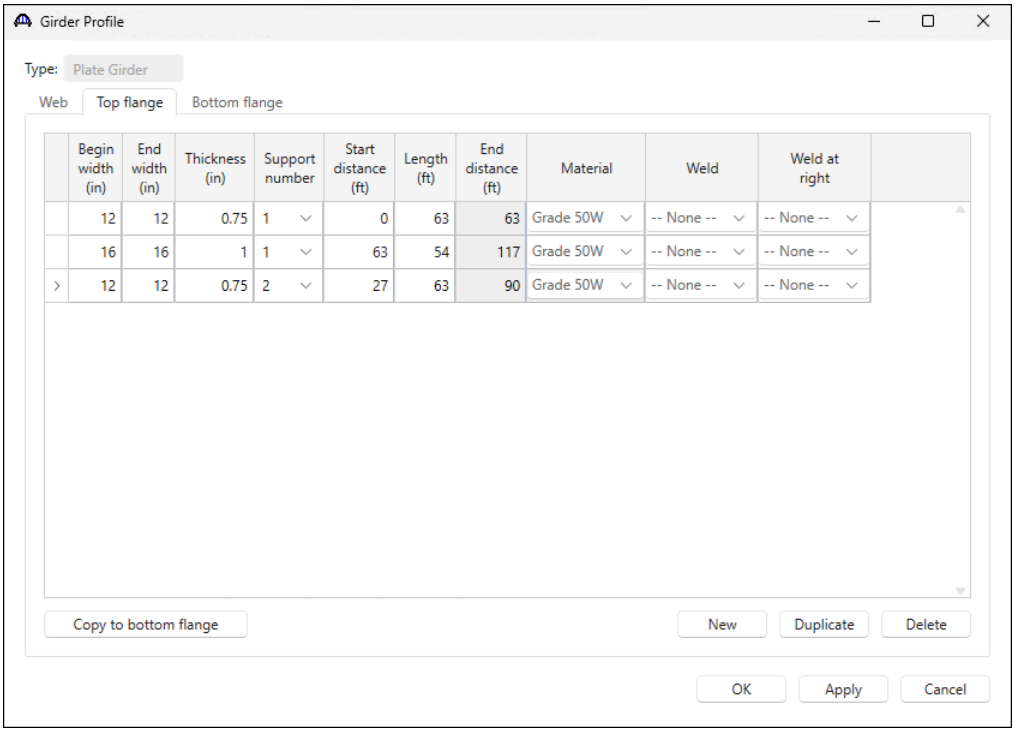
Girder Profile

Expand the newly added **Plate Girder** member alternative for member **G2**. Next describe the girder profile by double clicking on the **Girder Profile** node in the **Bridge Workspace** tree. Enter the data in each tab of the **Girder Profile** window as shown below.

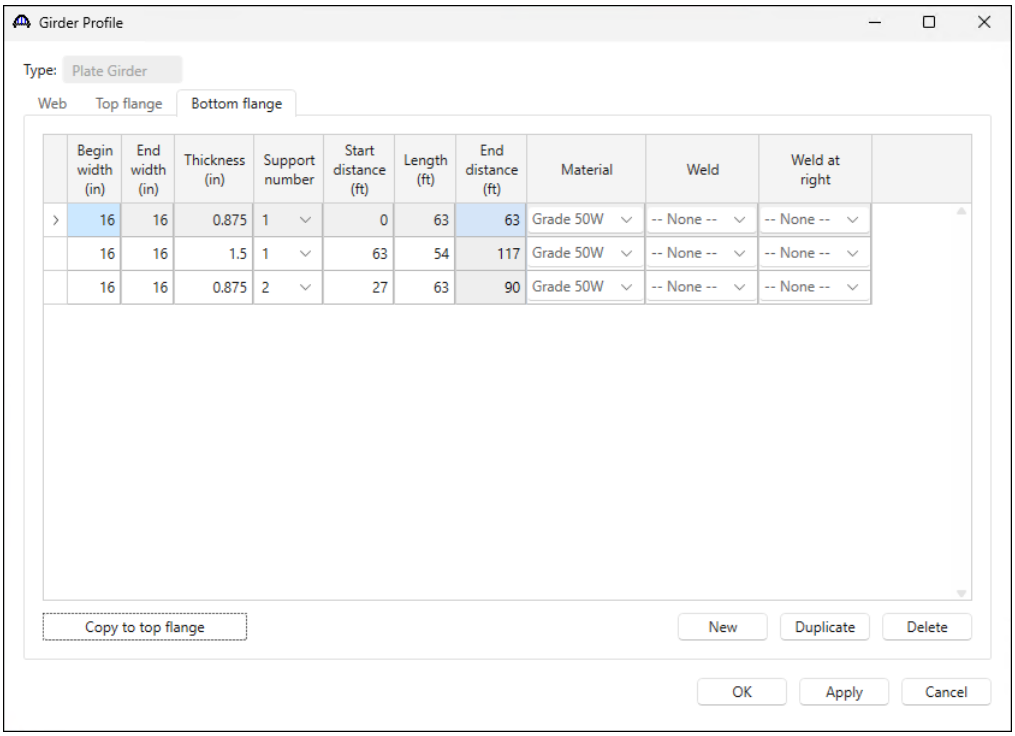
Web



Top flange



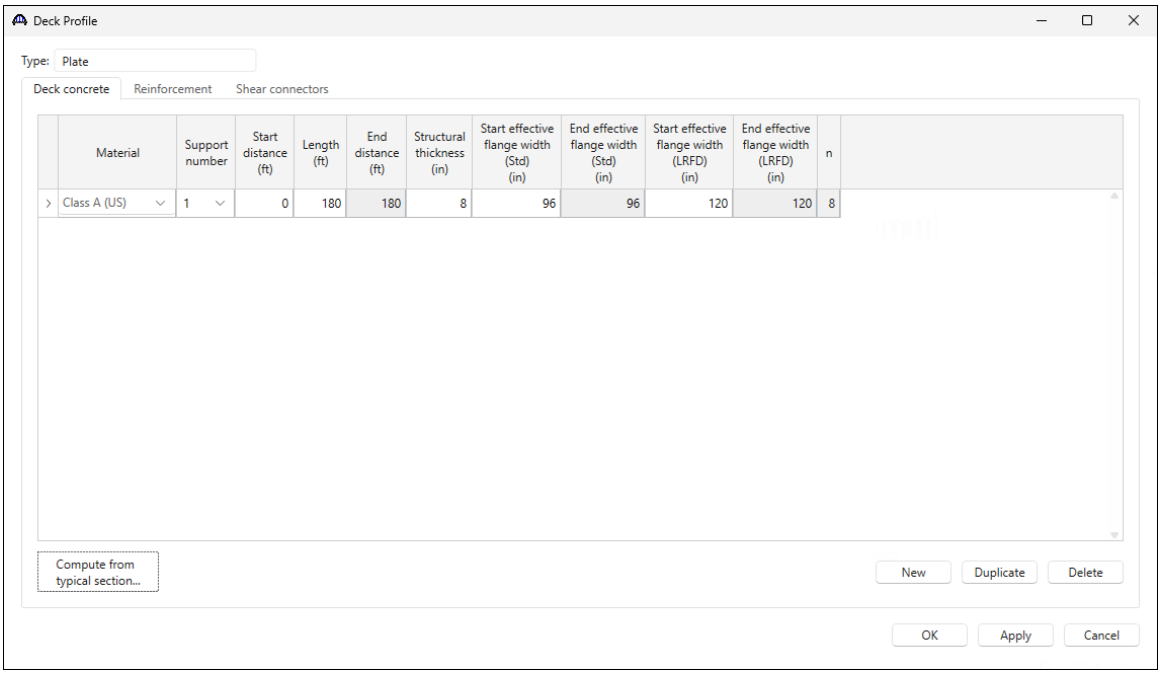
Bottom flange



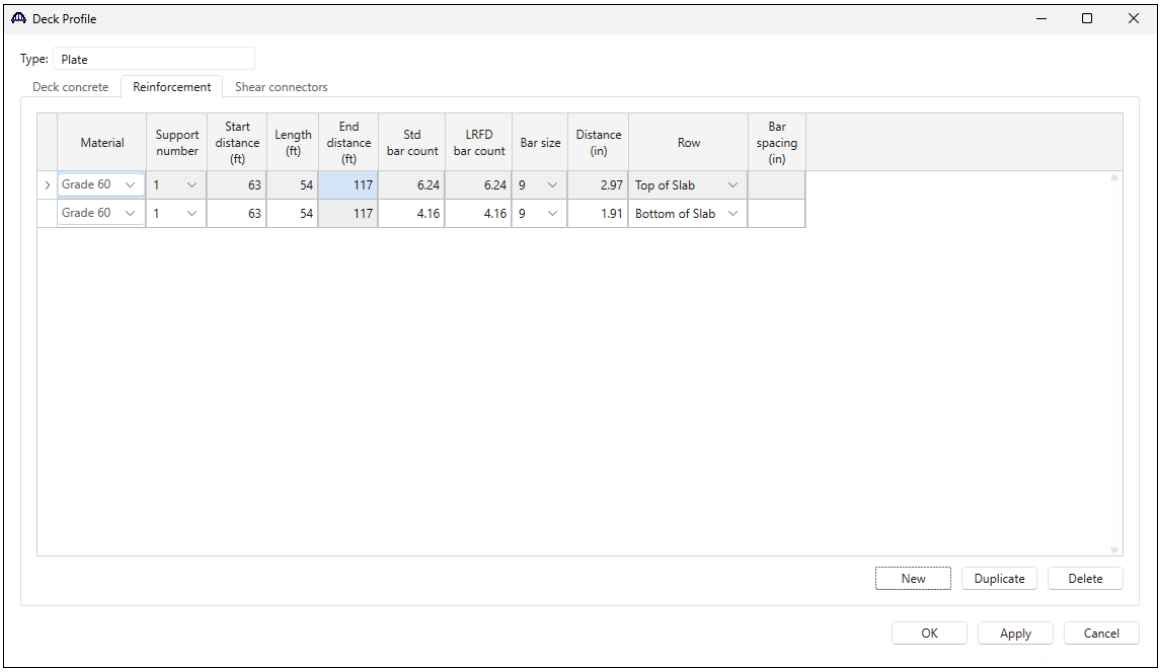
Click **OK** to apply the data and close the window.

Deck Profile

Next open the **Deck Profile** window by double-clicking the **Deck Profile** node in the **Bridge Workspace** tree and enter the data describing the structural properties of the deck. The window is as shown below.

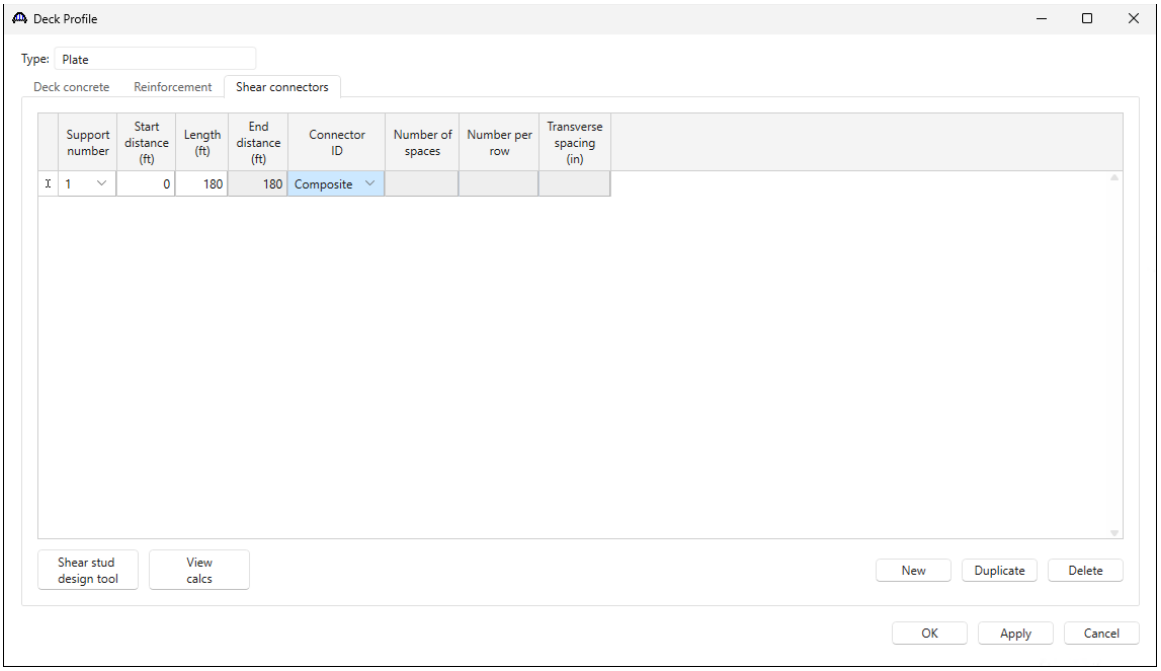


Enter the reinforcement data as shown below.



Note: As mentioned in the Note under the composite section details in Page 3 of this tutorial, for simplicity, the bars will be input using an equivalent number of #9 bars which have a unit area of 1.0 in^2.

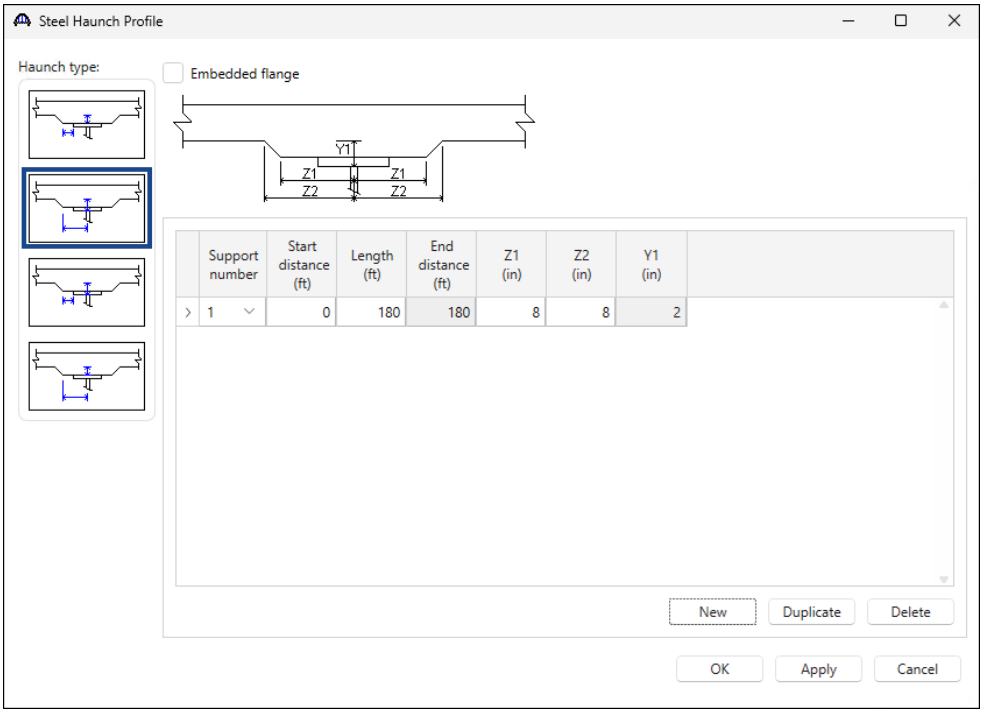
Composite regions described in the **Shear connectors** tab as shown below.



Click **OK** to apply the data and close the window.

Haunch Profile

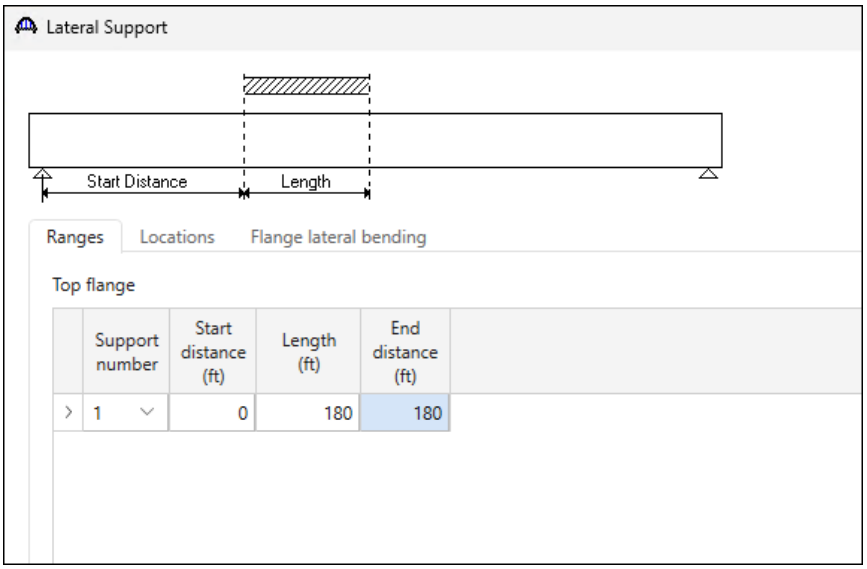
To define the haunch profile , double-click on the **Haunch Profile** node in the **Bridge Workspace** tree. Select the Haunch type and enter data as shown below.



Click **OK** to apply the data and close the window.

Lateral Support

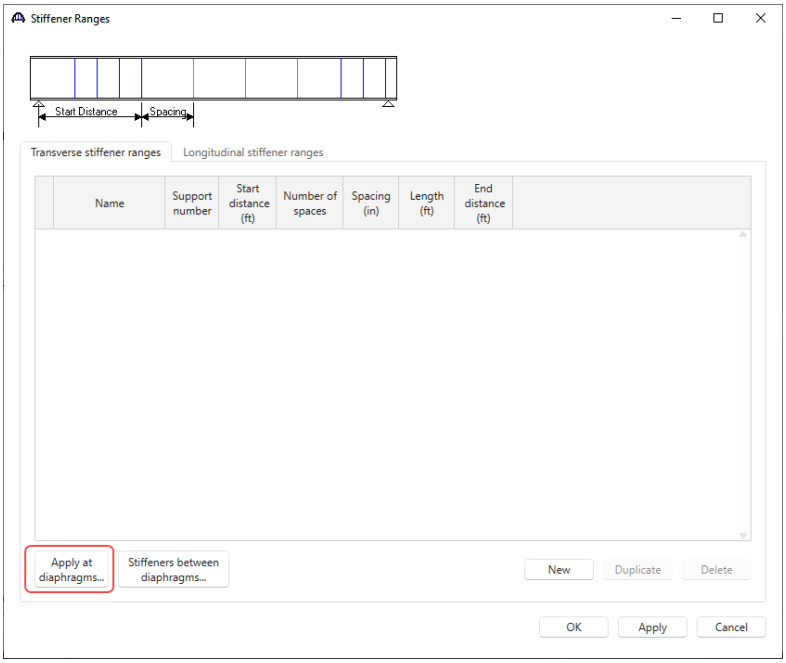
Open the **Lateral Support** window by double clicking on the **Lateral Support** node in the **Bridge Workspace** tree. Regions where the slab provides lateral support for the top flange are defined as shown below.



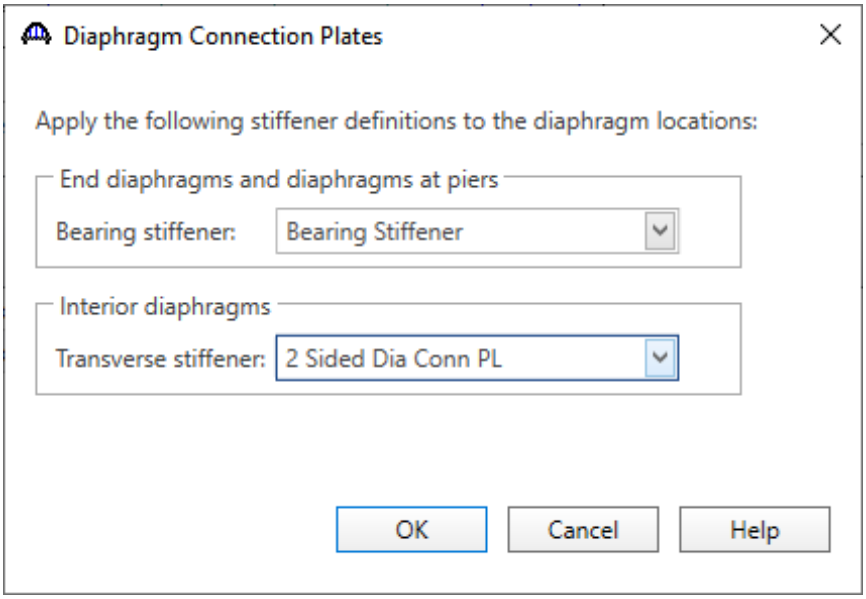
Click **OK** to apply the data and close the window.

Stiffener Ranges

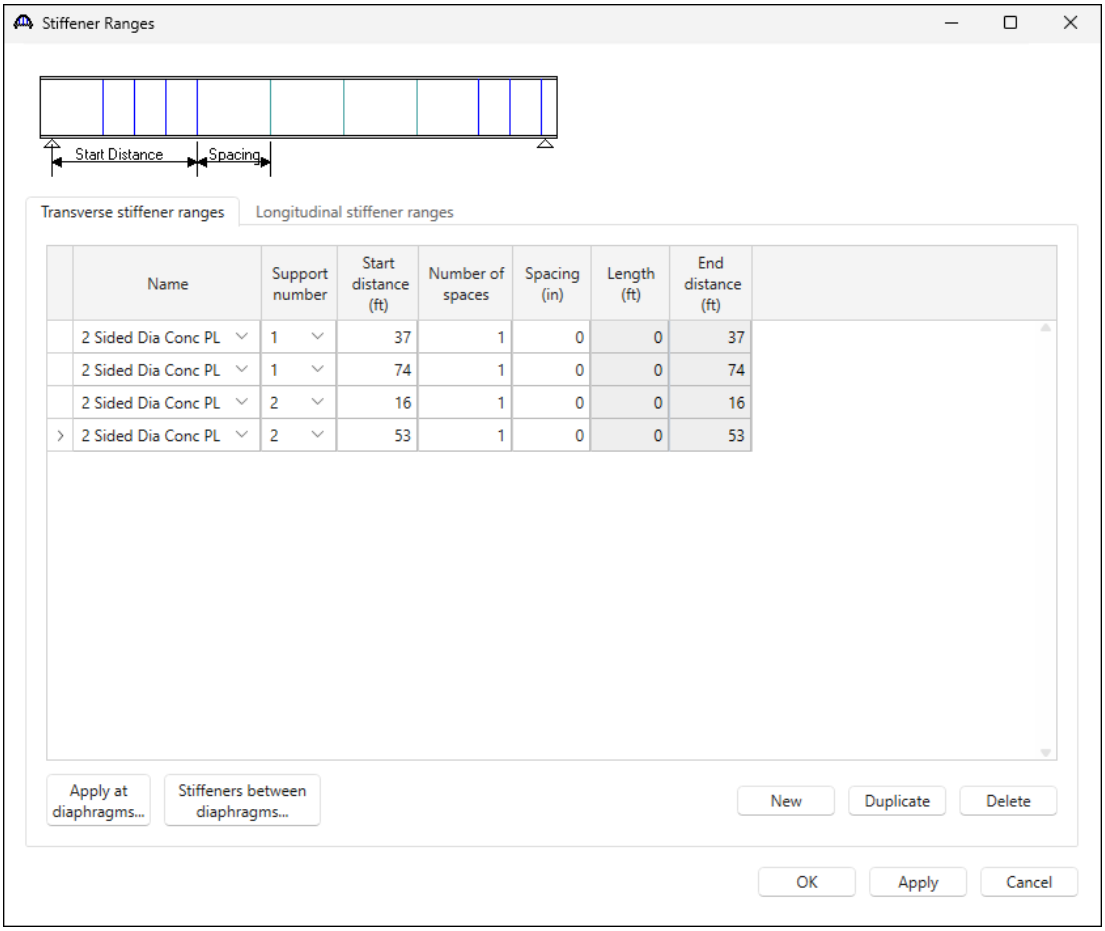
Double click on the **Stiffener Ranges** node in the **Bridge Workspace** to open the **Stiffener Ranges** window. Click the **Apply at diaphragms…** button to open the **Diaphragm Connection Plates** window.



Select the **2 Sided Conn PL** as the **Transverse Stiffener** to be applied at the interior diaphragms and click **OK.**



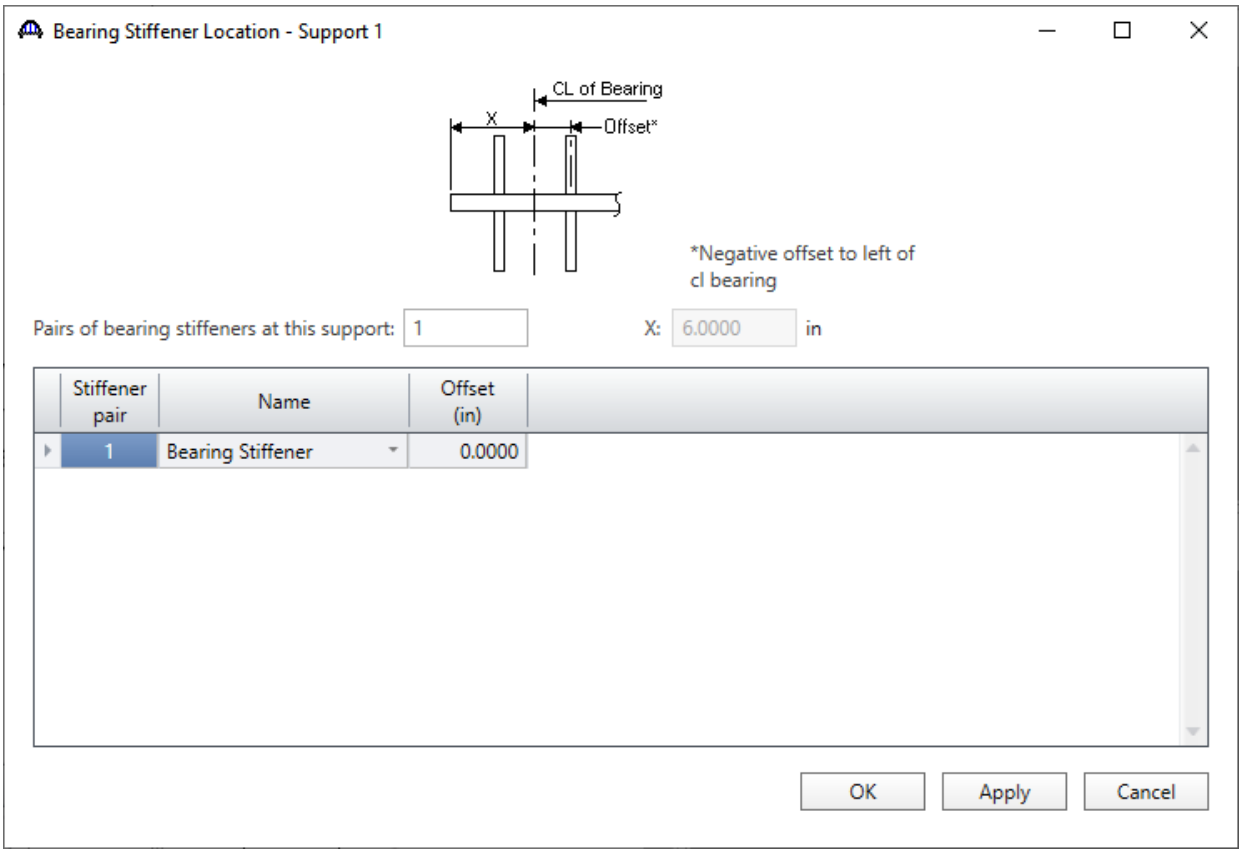
The **Stiffener Ranges** window will be updated as shown below.



This example does not have any intermediate transverse stiffeners. Click **OK** to apply the data and close the window.

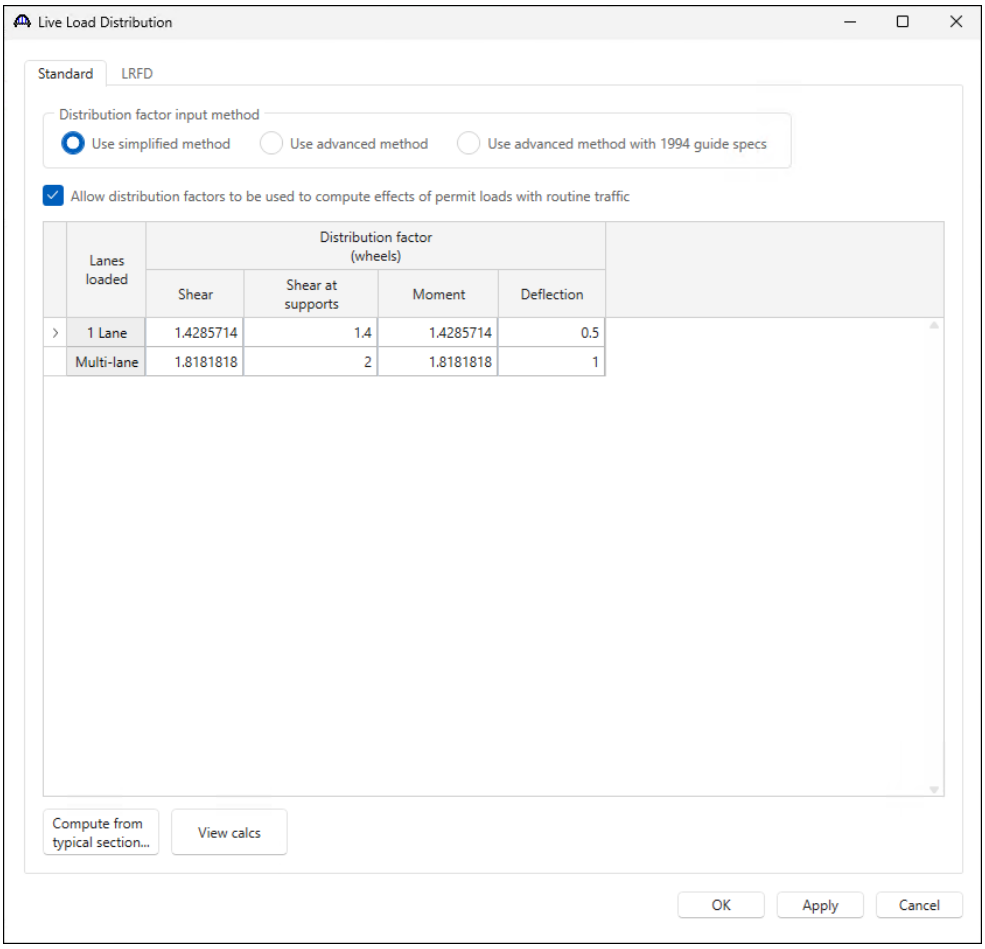
Bearing Stiffener Locations

Bearing stiffener definitions were assigned to locations when the **Apply at diaphragms…** option was used on the **Stiffener Ranges** window. The **Bearing Stiffener Location – Support 1** window is opened by expanding the **Bearing Stiffener Locations** node in the **Bridge Workspace** tree and double clicking on the **Support 1** node. The assignment for support 1 is shown below. No changes are required to this window.



Live Load Distribution

Open the **Live Load Distribution** window from the **Bridge Workspace** tree. Click the **Compute from typical section…** button to compute the standard live load distribution factors.



LRFD distribution factors are computed by the BrDR engine using the girder system structure definition.

Interior (LFR wheels)

Lanes Loaded	Shear	Shear at Support	Moment	Deflection
1 lane	1.43	1.4	1.43	0.5
Multi-lane	1.82	2.0	1.82	1.0

Interior (LRFD lanes)

Lanes Loaded	Shear	Shear at Support	Pos. Moment	Neg. Moment	Deflection
1 lane	0.76	0.76	0.480	0.499	0.3*
Multi-lane	0.952	0.952	0.692	0.720	0.5

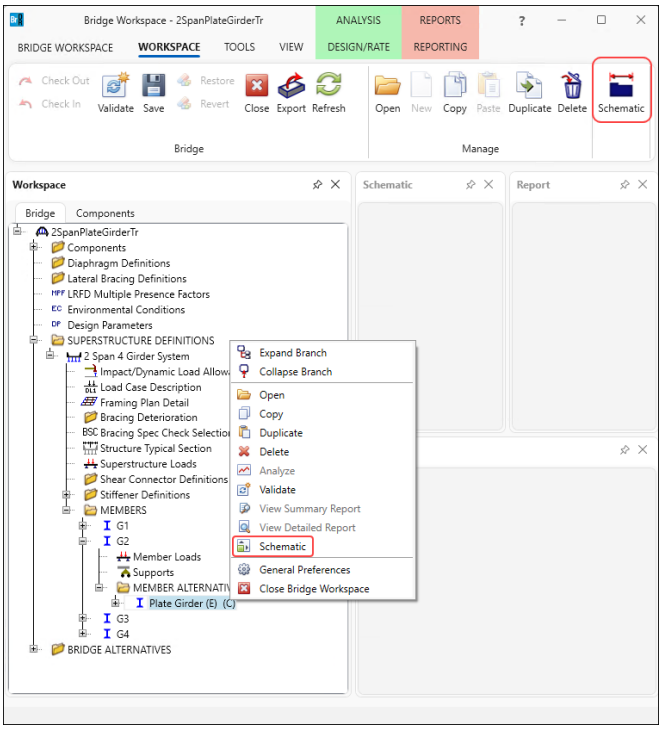
* includes 1.20 multiple presence factor

Live load distribution factor calculation details can be viewed by clicking the **View Calcs** button.

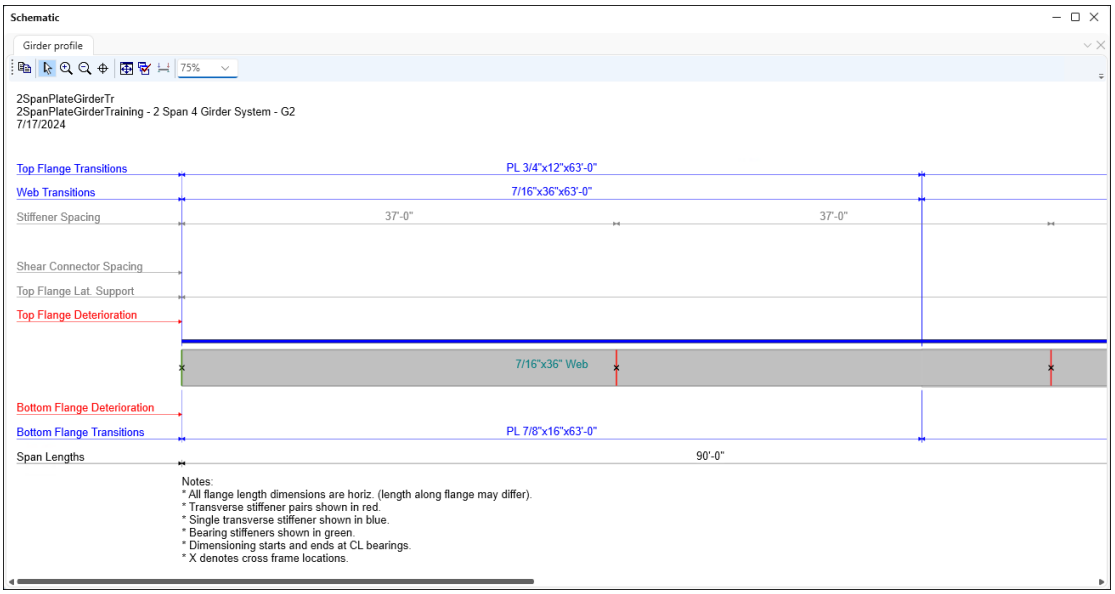
The description of an interior beam for the structure definition is complete.

Schematic – Member alternative

While the member alternative **Plate Girder** for member **G2** is selected in the **Bridge Workspace** tree, open the schematic for the girder profile by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click and select **Schematic** from the menu).

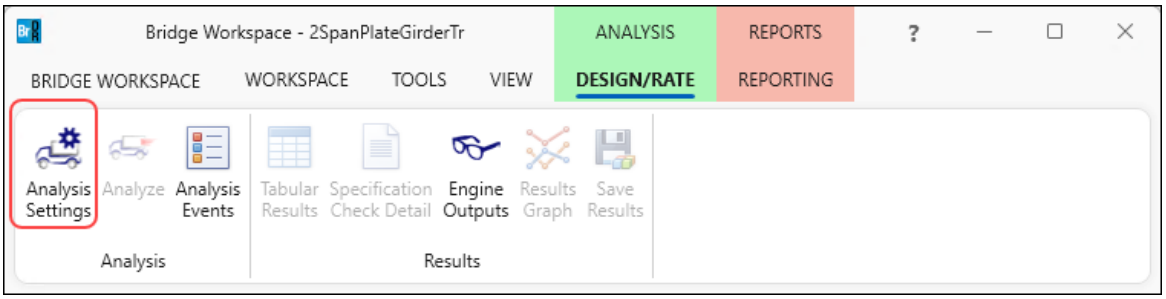


The following schematic will be displayed.

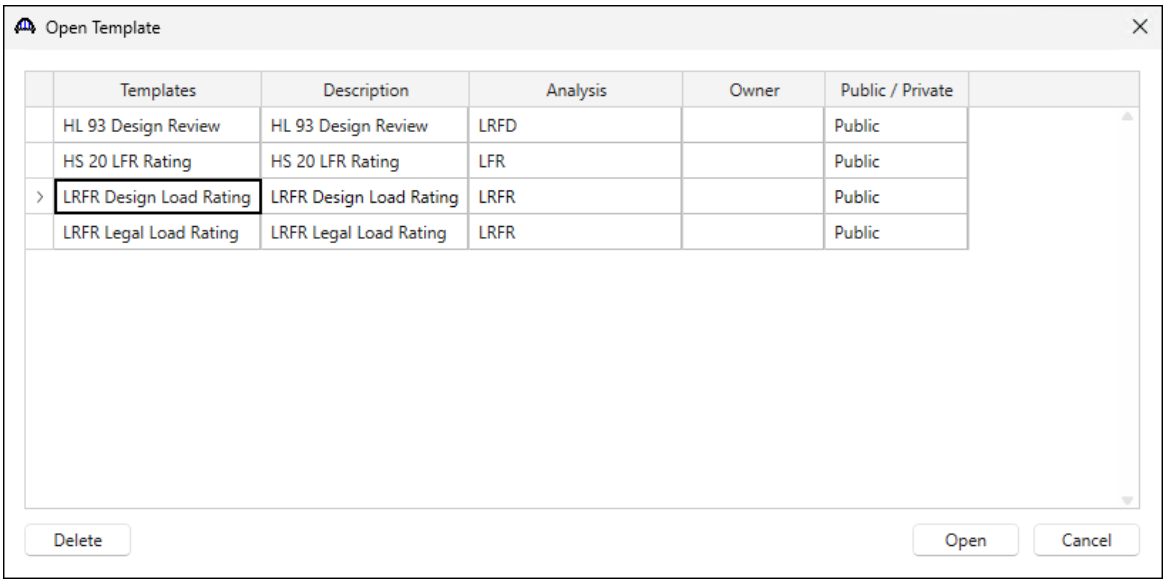


LRFR Analysis

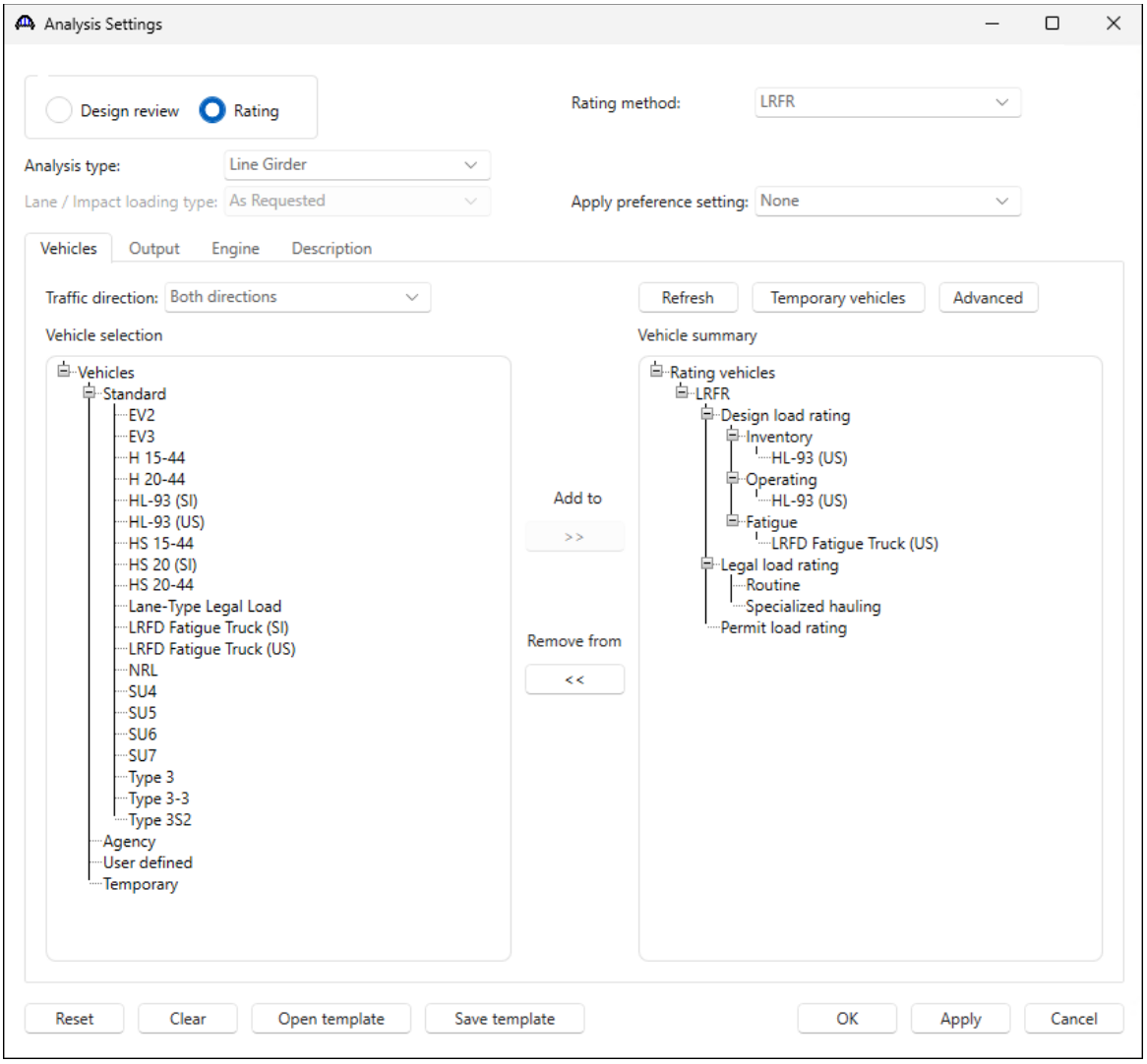
The interior member alternative can now be analyzed. To perform an **LRFR** rating, select the **Analysis Settings** button on the **Analysis** group of the **DESIGN/RATE** ribbon. The window shown below opens.



Click the **Open Template** button and select the **LRFR Design Load Rating** to use in the rating and click **Open**.



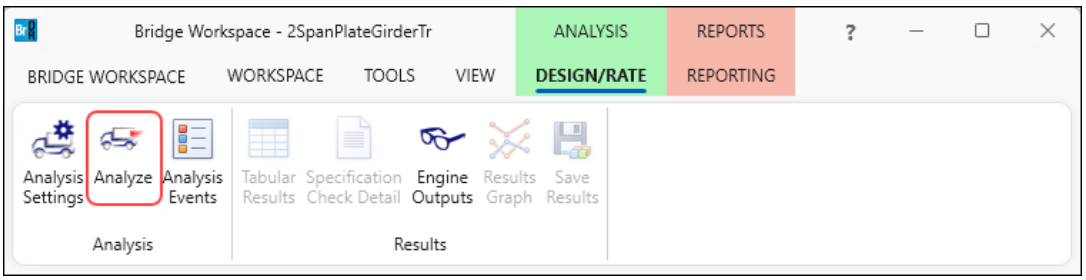
The **Analysis Settings** window will be populated as shown below.



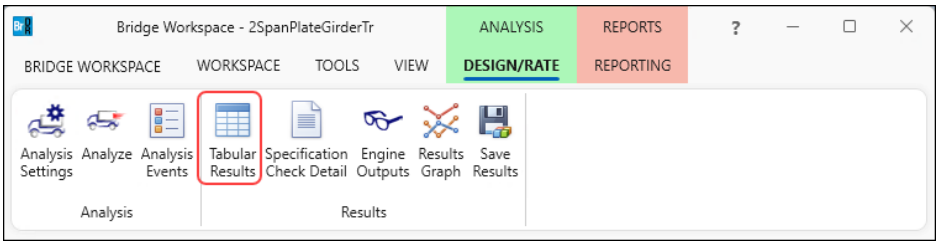
Click **OK** to apply the data and close the window.

Tabular Results

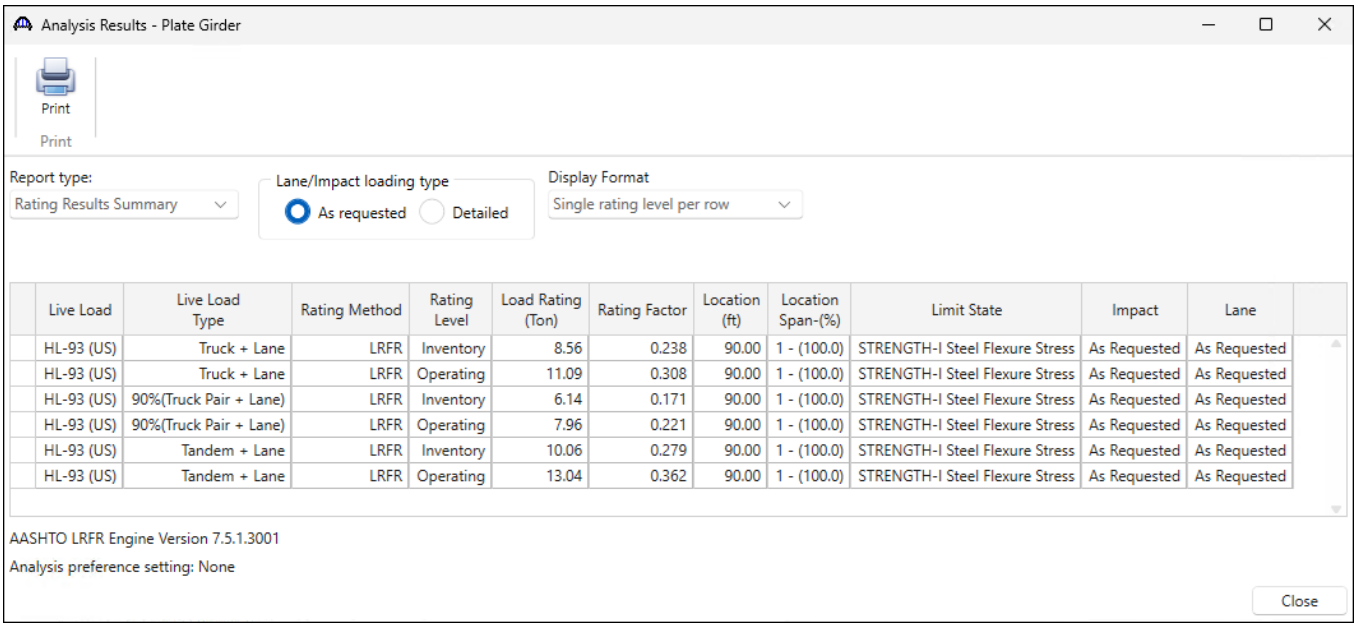
With **G2** member alternative – **Plate Girder** selected, click the **Analyze** button on the **Analysis** group of the **DESIGN/RATE** ribbon to perform the rating.



When the rating analysis is finished, results can be reviewed by clicking the **Tabular Results** button on the **Results** group of the ribbon.



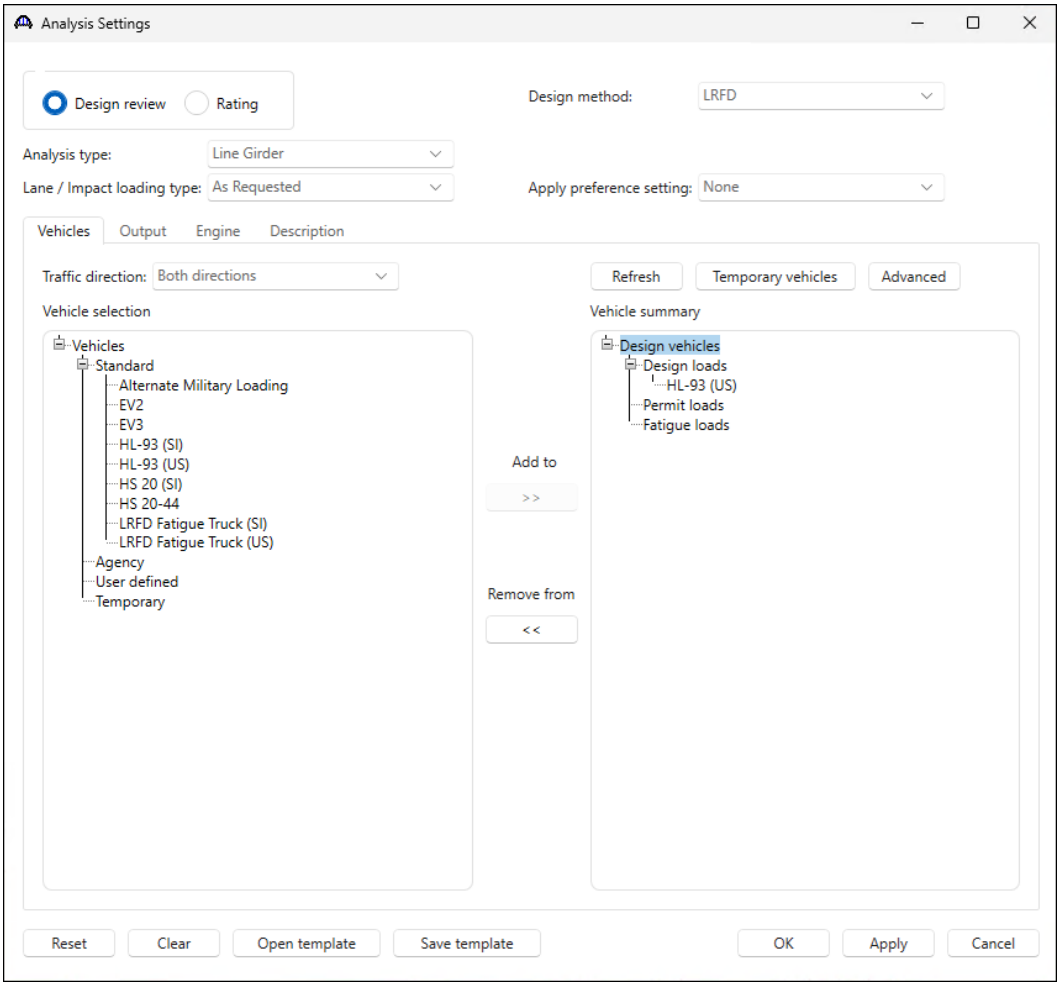
The window shown below will open. Select **Rating Results Summary** as the **Report Type** and **Single rating level per row** as the **Display Format** option to have the ratings arranged as shown below.



Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	Impact	Lane
HL-93 (US)	Truck + Lane	LRFR	Inventory	8.56	0.238	90.00	1 - (100.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
HL-93 (US)	Truck + Lane	LRFR	Operating	11.09	0.308	90.00	1 - (100.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
HL-93 (US)	90%(Truck Pair + Lane)	LRFR	Inventory	6.14	0.171	90.00	1 - (100.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
HL-93 (US)	90%(Truck Pair + Lane)	LRFR	Operating	7.96	0.221	90.00	1 - (100.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Inventory	10.06	0.279	90.00	1 - (100.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Operating	13.04	0.362	90.00	1 - (100.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested

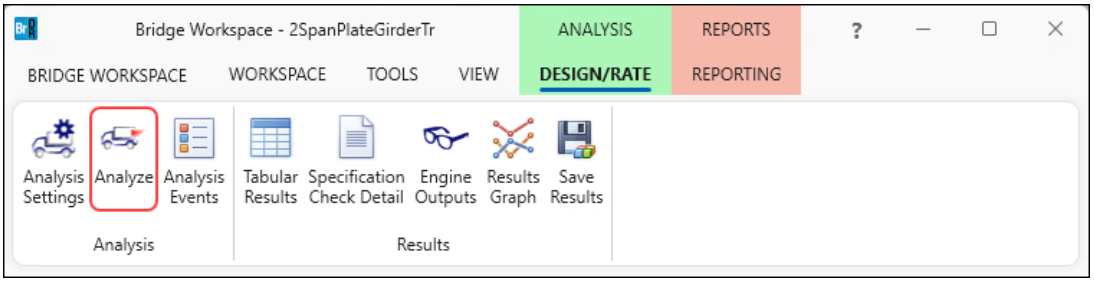
LRFD Design Review

An LRFD design review of this girder for **HL93** loading can be performed by AASHTO LRFD. To perform an LRFD design review, enter the **Analysis Settings** window as shown below.



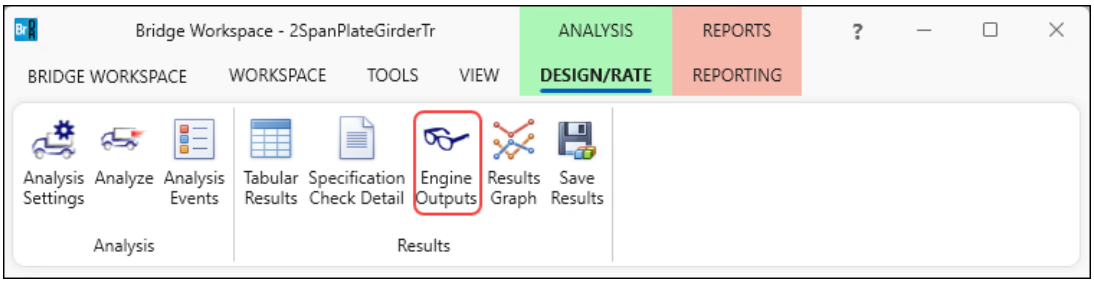
Click **OK** to apply the data and close the window.

Next click the **Analyze** button on the **Analysis** group of the **DESIGN/RATE** ribbon to perform the design review.

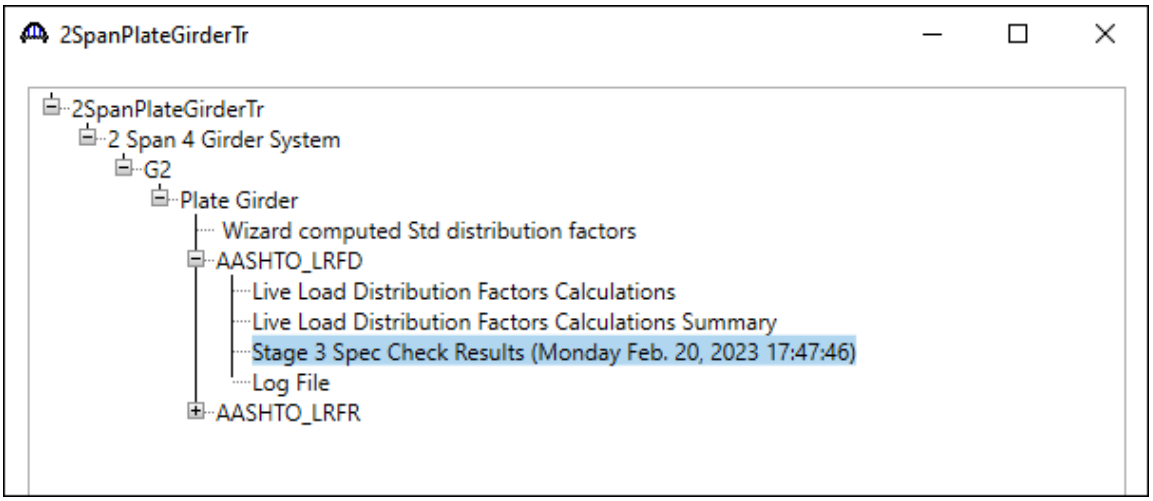


Engine Outputs

AASHTO LRFD analysis will generate a spec check results file. Click the **Engine Outputs** button from the **Results** group of the **DESIGN/RATE** ribbon to open the following window.



To view the LRFD spec check results (shown below), double click on the **Stage 3 Spec Check Results** under the **AASHTO_LRFD** branch in this window.

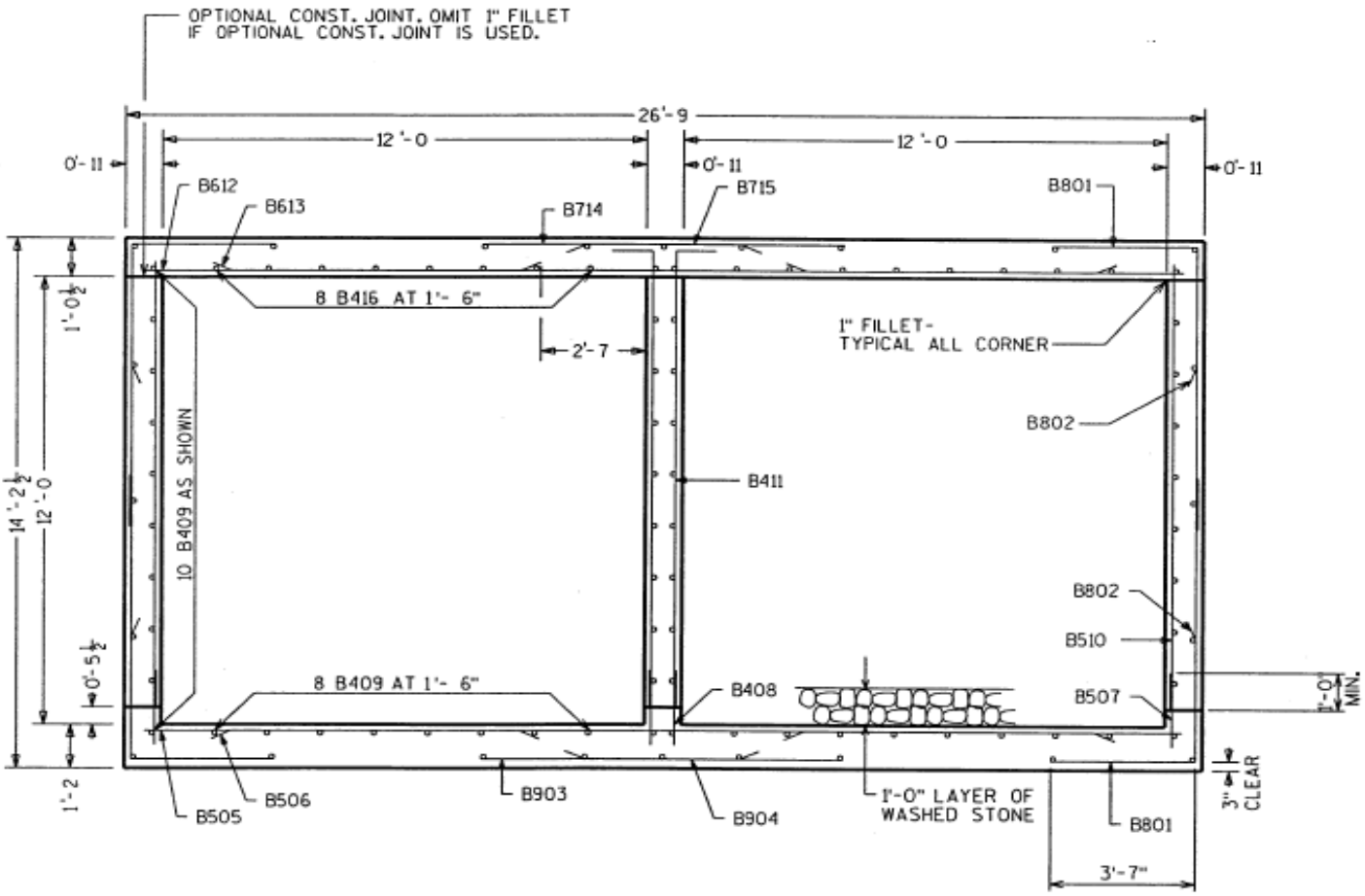


CVT1 – Culvert Tutorial

CVT1 – Two Cell RC Box Culvert Example (and Culvert Design Tool)

Topics Covered

- Enter culvert description
- Perform AASHTO Culvert LRFR analysis and review results
- Culvert Design Tool



TYPICAL SECTION THRU BOX

ALL LONGITUDINAL BARS NOT IDENTIFIED ARE B409 AS SHOWN.

BILL OF BARS

THE FIRST OR FIRST AND SECOND DIGIT OF THE MARK SIGNIFIES THE BAR SIZE.
THE DIMENSION IN THE BENT COLUMN IS THE OUT TO OUT HORIZONTAL LEG OF A "L" SHAPED BAR.

	MARK	NUMBER REQ'D.	LENGTH	BENT	CUTTING DIAG.	LOCATION
◭	B801	416	11 -2	3-7	NO	CORNERS
◭	B802	400	7-4	3-7	NO	CORNERS
◭	B903	76	9-0	NO	NO	BOTTOM SLAB TRANS.
◭	B904	72	4-10	NO	NO	BOTTOM SLAB TRANS.
◭	B505	124	25-10	NO	NO	BOTTOM SLAB TRANS.
◭	B506	240	8-2	NO	NO	BOTTOM SLAB TRANS.
	B507	296	2-0	NO	NO	WALLS-DOWELS VERT.
	B408	136	2-0	NO	NO	WALLS-DOWELS VERT.
	B409	320	33-0	NO	NO	TOP&BOTTOM SLAB & WALL
	B510	296	12 -4	NO	NO	WALLS VERT.
	B411	136	13 -4	1-0	NO	WALLS VERT.
◭	B612	84	25-10	NO	NO	TOP SLAB TRANS.
◭	B613	160	8-2	NO	NO	TOP SLAB TRANS.
◭	B714	116	9-0	NO	NO	TOP SLAB TRANS.
◭	B715	112	4-10	NO	NO	TOP SLAB TRANS.
	B416	64	33-0	NO	NO	TOP SLAB LONGIT.
	B417	4	26-4	NO	NO	HEADERS HORIZ.
	B318	72	3-1	YES	NO	HEADER STIRRUPS VERT.
	B519	267	4-0	NO	NO	VERT.CONST.JOINT

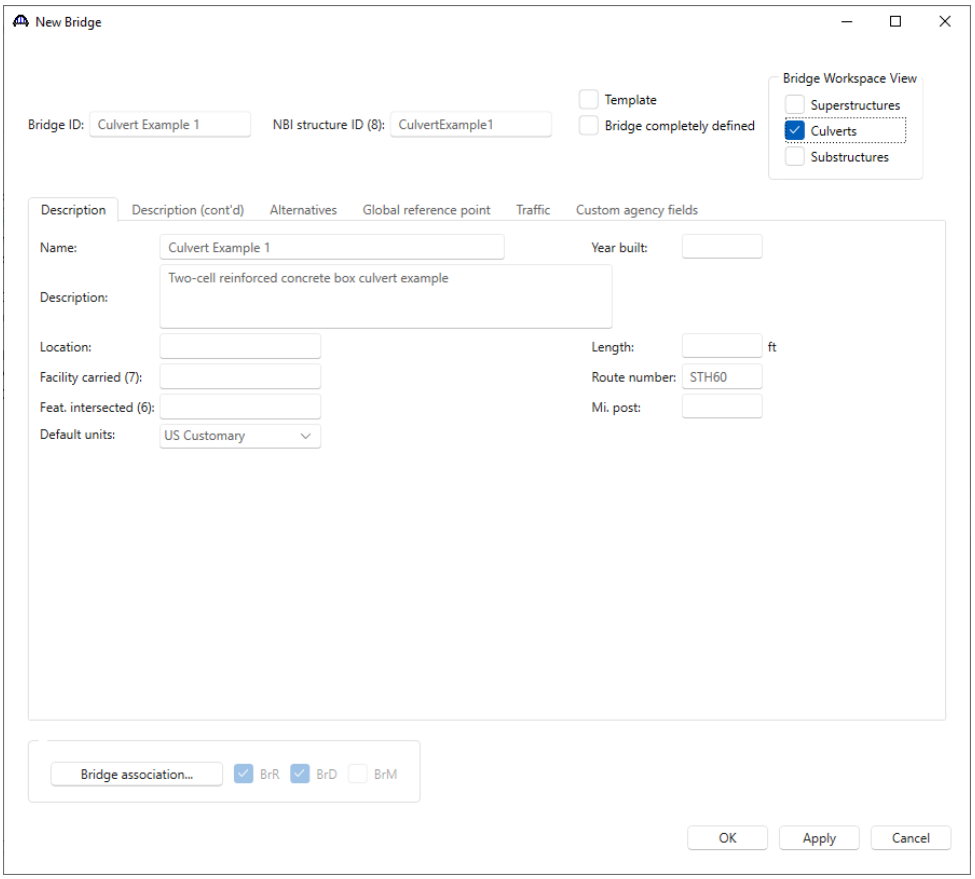
◭ B801 BARS MAY BE SUBSTITUTED FOR B802 BARS
B903 BARS MAY BE SUBSTITUTED FOR B904 BARS
B505 BARS MAY BE SUBSTITUTED FOR PAIRS OF B506 BARS
B612 BARS MAY BE SUBSTITUTED FOR PAIRS OF B613 BARS
B714 BARS MAY BE SUBSTITUTED FOR B715 BARS.

Material Properties:

- Culvert concrete – Class A, f'c = 3.5 ksi
- Reinforcing steel – Grade 60, Fy = 60 ksi
- Soil – 120 pcf, ϕ = 30 deg

Enter culvert description

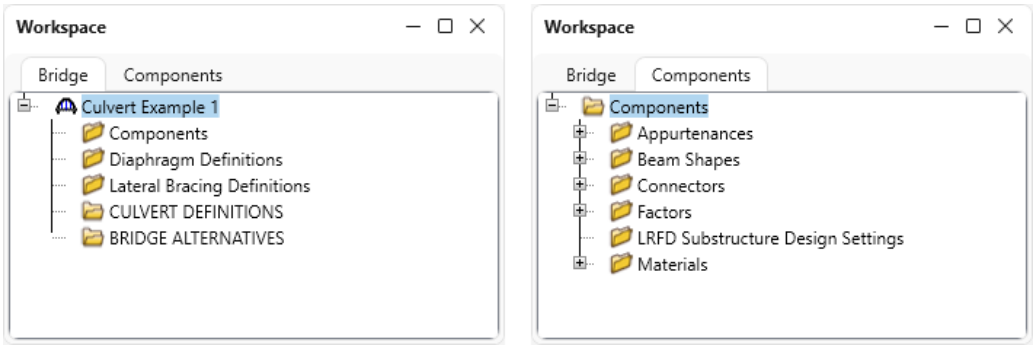
From the **Bridge Explorer** create a **new bridge** and enter the following description data.



The **Superstructures** and **Culverts** checkboxes specify the types of structures the bridge contains. These checkboxes filter what to display in the **Bridge Workspace** tree.

Close the window by clicking **OK**.

After the bridge is created, the **Bridge Workspace** tree and **Components** tree are as shown below.

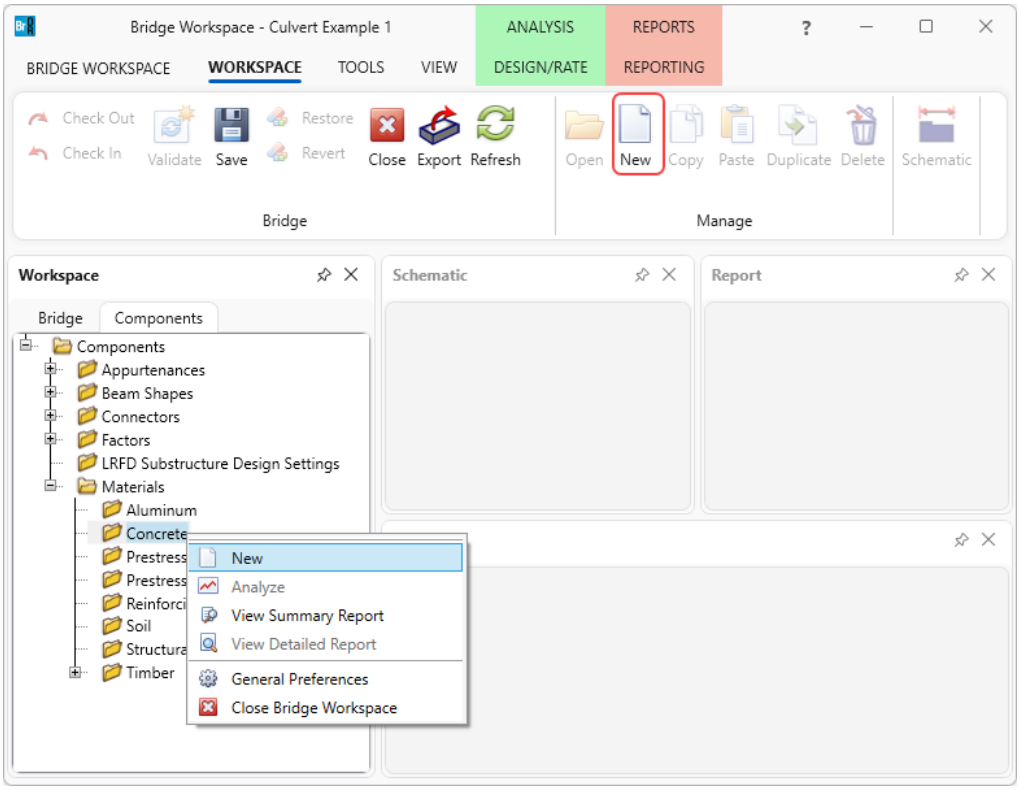


The **Bridge Workspace** tree is organized according to the definition of a bridge with data shared by many of the bridge components shown in the **Components** tab. A bridge can be described by working from top to bottom within the tree.

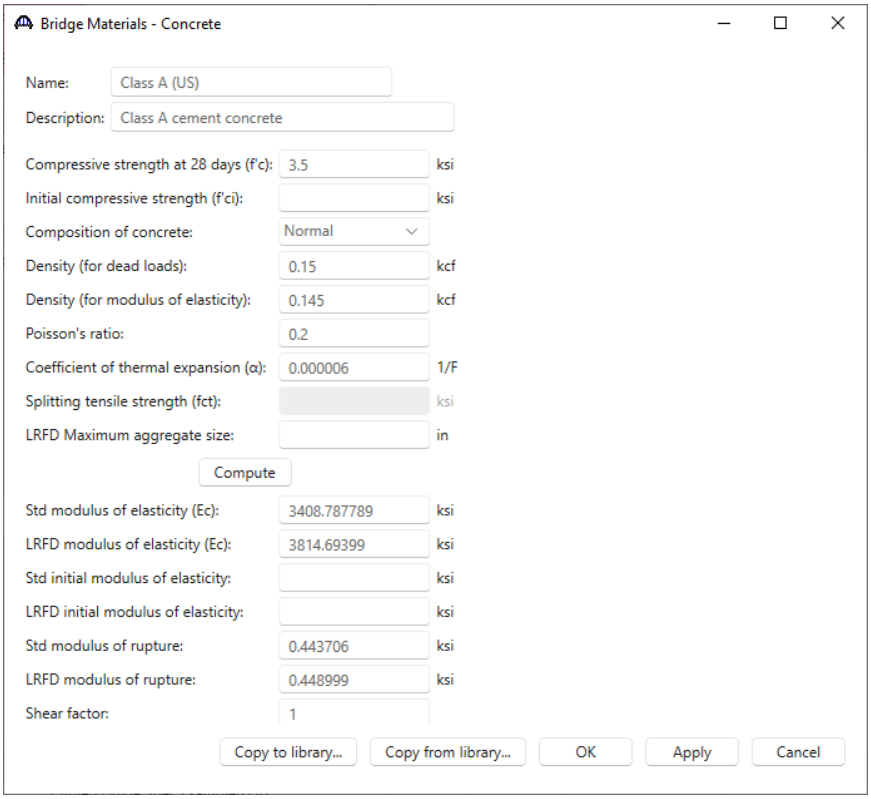
Bridge Materials

To enter the materials for the culvert, in the **Components** tab, expand the tree for **Materials**.

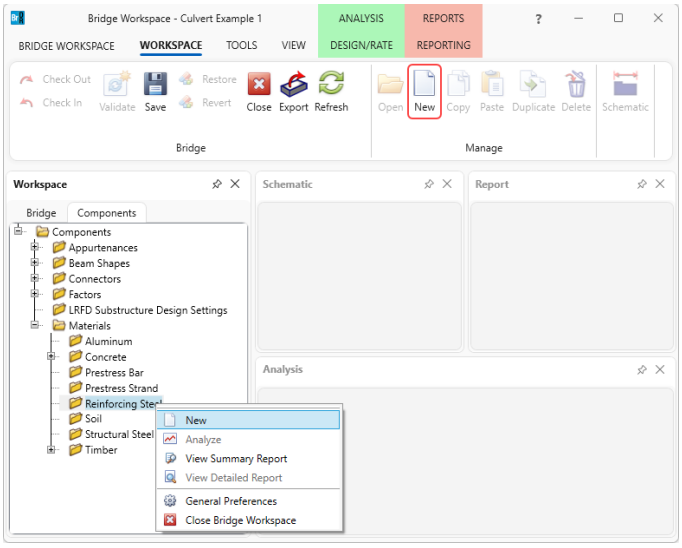
To add a concrete material, double-click on the **Concrete** folder in the **Components tab** (or select **Concrete** and click on the **New** button from the **Manage** group of the **WORKSPACE** ribbon or right click and select **New**) to create a new concrete material as shown below.



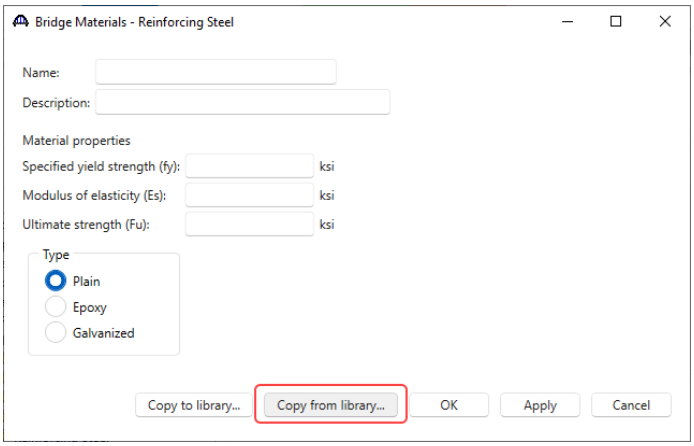
On the **Bridge Materials**-Concrete window, enter the values shown above the **Compute** button and click the **Compute** button to calculate the remaining values (**Class A(US)** in the library is slightly different from the values shown below).

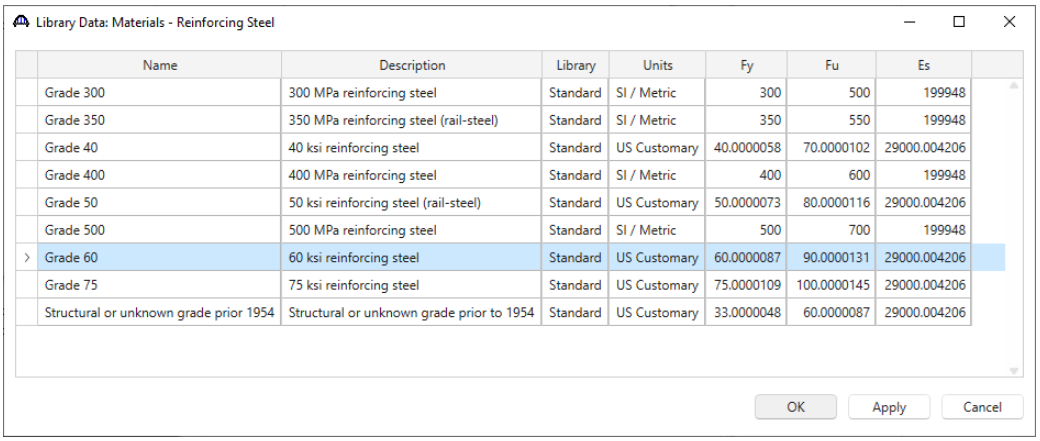


To add a reinforcing steel material, double-click on the **Reinforcing Steel** folder in the **Components** tab (or select **Reinforcing Steel** and click on the **New** button from the **Manage** group of the **WORKSPACE** ribbon or right click and select **New**) to create a new reinforcing steel material as shown below.

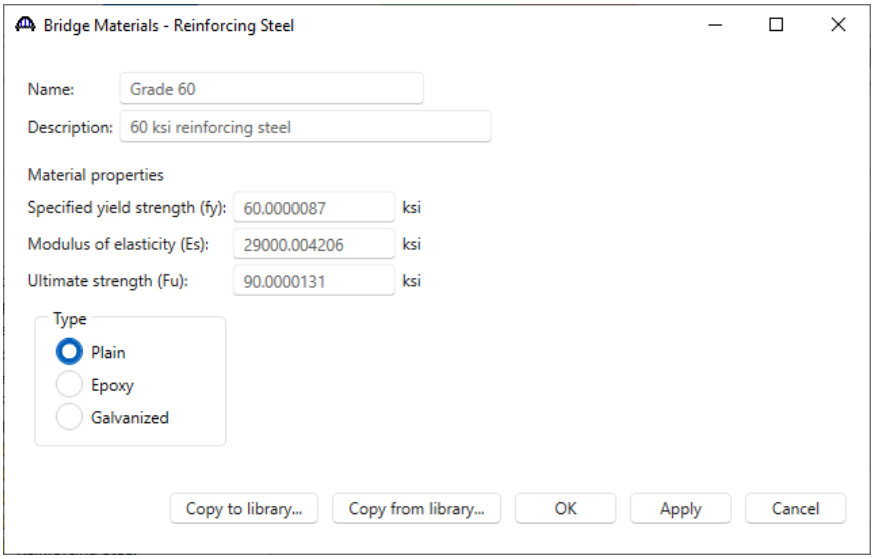


On the **Bridge Materials-Reinforcing Steel** window, **click** on the **Copy from library…** button and copy the **Grade 60** reinforcing steel to be used in the bridge as shown below.



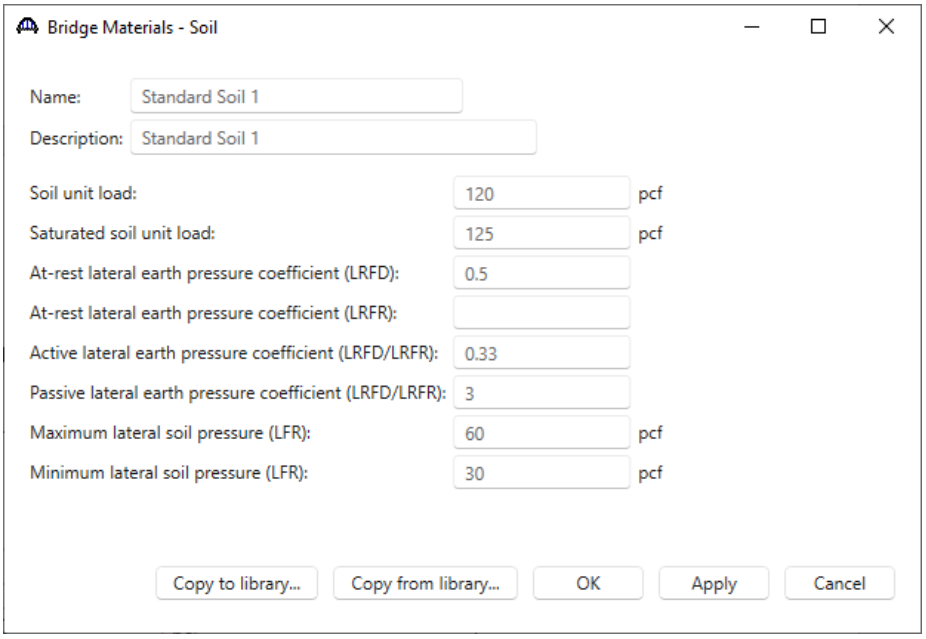


The **Bridge Materials – Reinforcing Steel** window will be updated with material information as shown below.



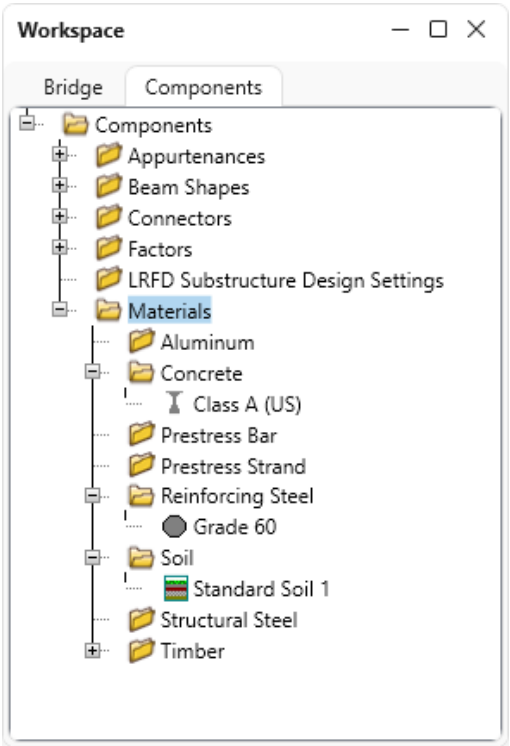
Click **OK** to add the reinforcing steel material and close the window.

Similarly, add a new soil material by copying the **Standard Soil 1** from the library. The **Bridge Materials – Soil** window with material information updated is shown below.



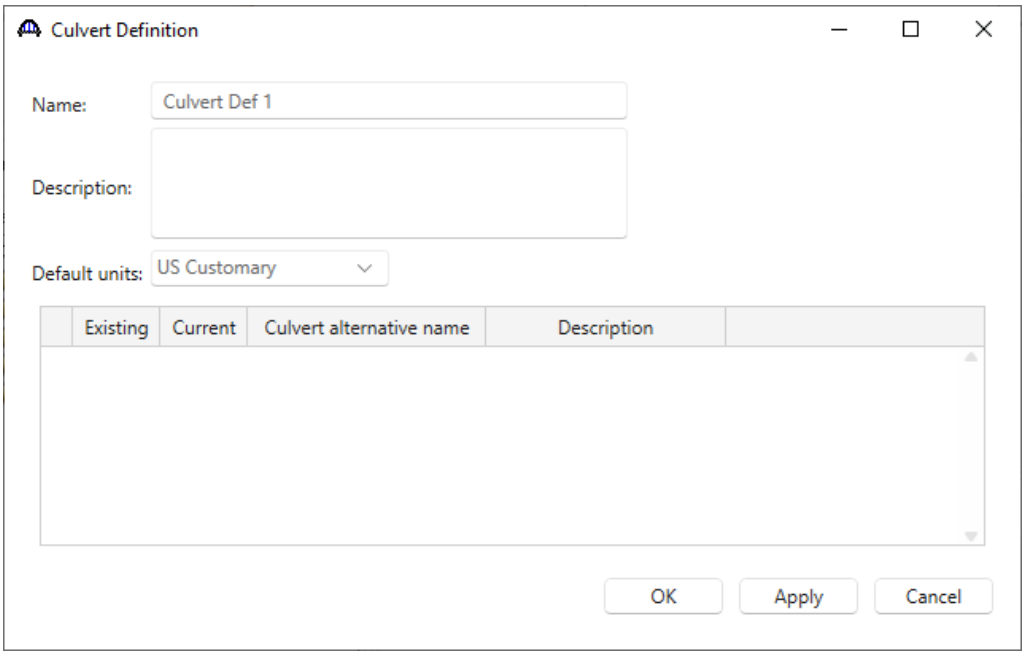
Click **OK** to add the soil material and close the window.

The **Components** tree updated with the three materials to be used by the culvert is shown below.



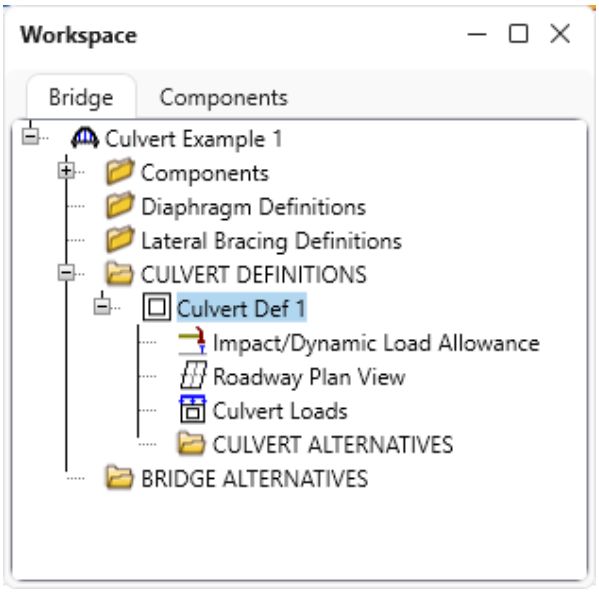
Culvert Definition

Navigate to the **Bridge** tab of the **Bridge Workspace**. Double click on the **CULVERT DEFINITIONS** folder to create a new culvert definition. Enter the Culvert Definition **Name** as show below. The first Culvert Alternative added will automatically be assigned as the **Existing** and **Current** Culvert Alternative for this Culvert Definition.



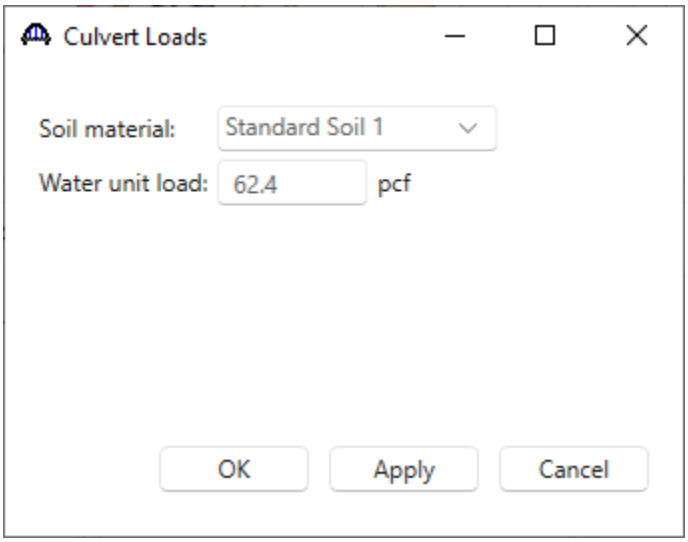
Click **OK** to apply the data and close the window.

Click on the + button of the newly added culvert definition to expand the culvert definition tree as shown below.



Culvert Loads

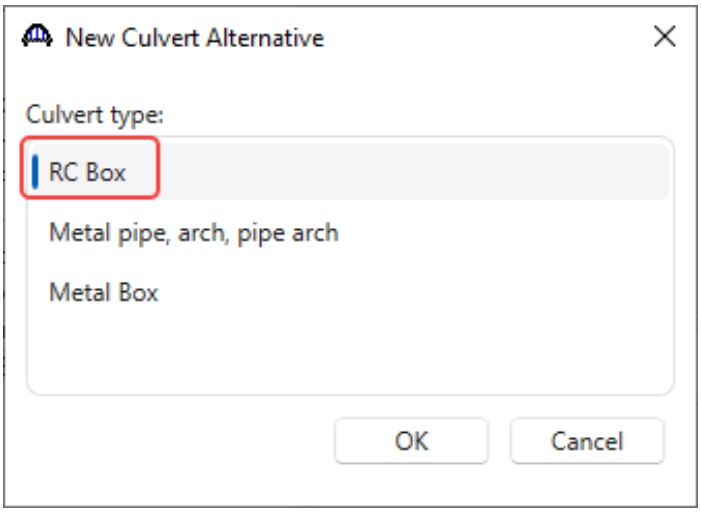
Double-click on the **Culvert Loads** node to open the **Culvert Loads** window. For this example, the default values specified in this window will be used. No change is required.



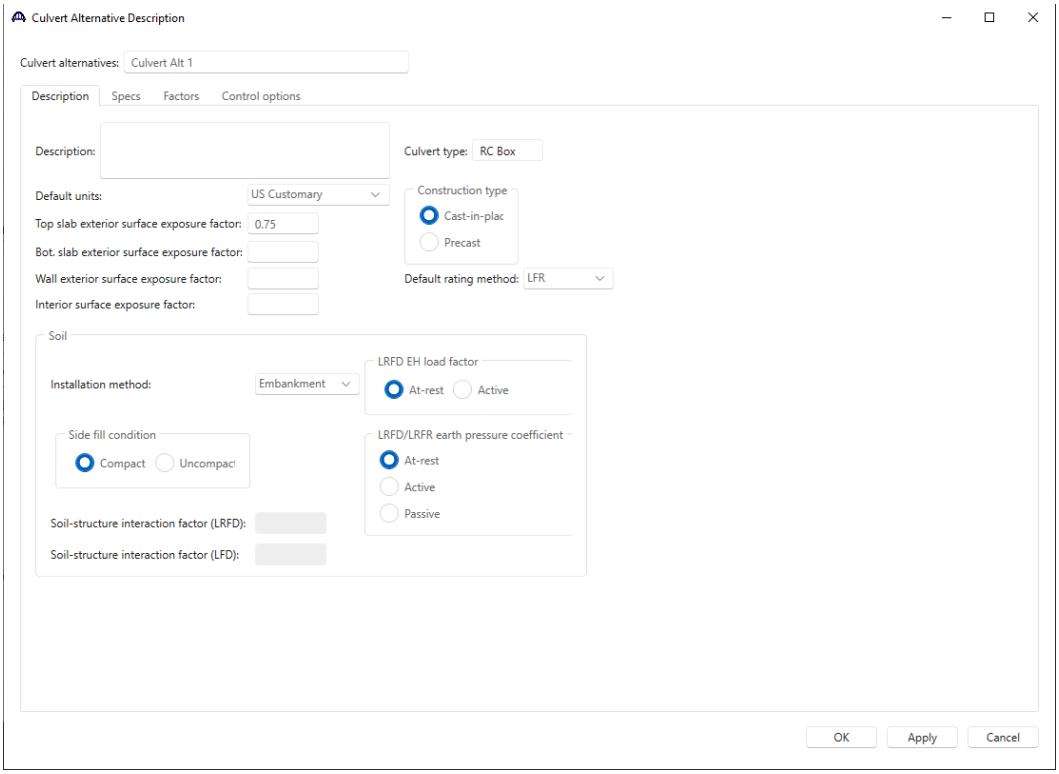
Click **OK** to close the window.

Culvert Alternative

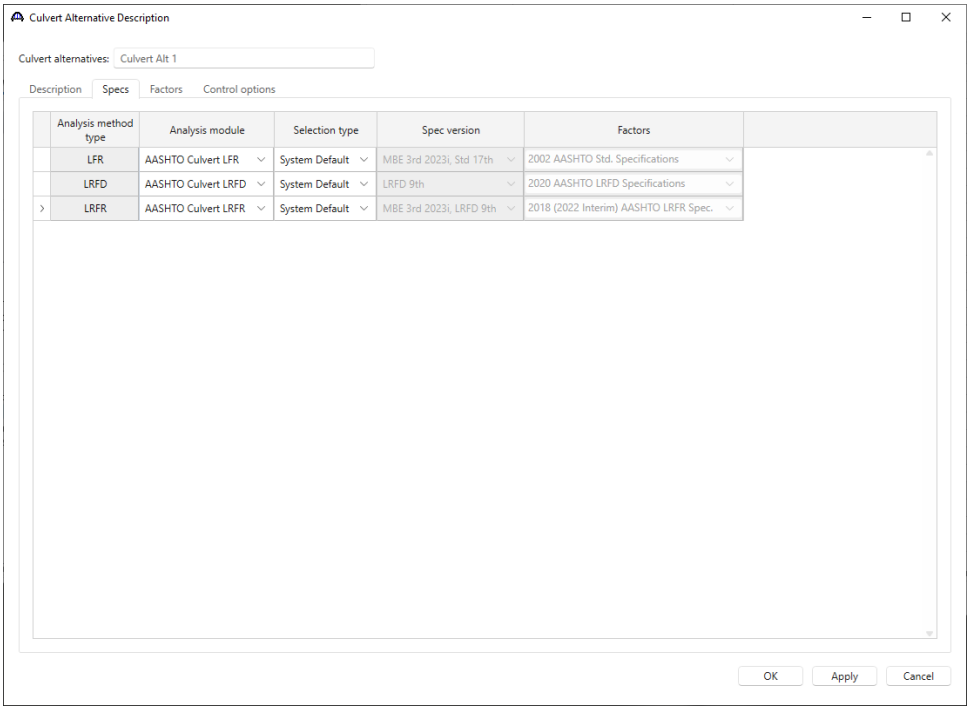
Double-click on the **CULVERT ALTERNATIVES** folder to create a new culvert alternative for **Culvert Def 1**. Select **RC Box** in the **New Culvert Alternative** window and click **OK** to open the **Culvert Alternative Description** window as shown below.



In the **Culvert Alternative Description** window, enter the data as shown below.

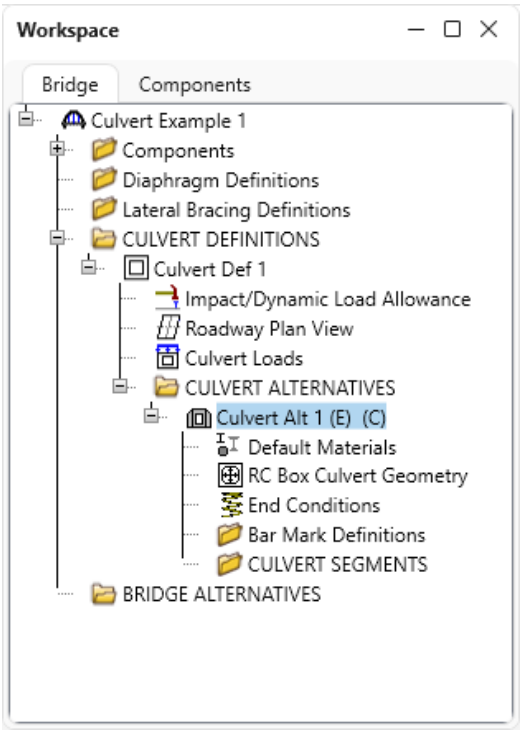


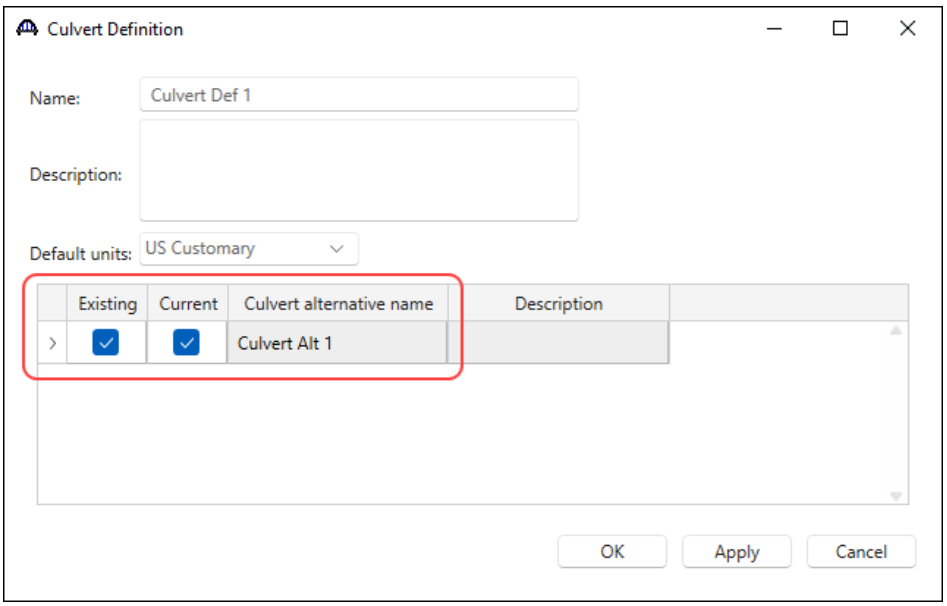
Navigate to the **Specs** tab of this window. **AASHTO Culvert LRFR** is selected as the analysis module for **LRFR** analysis.



Click **OK** to apply the data and close the window.

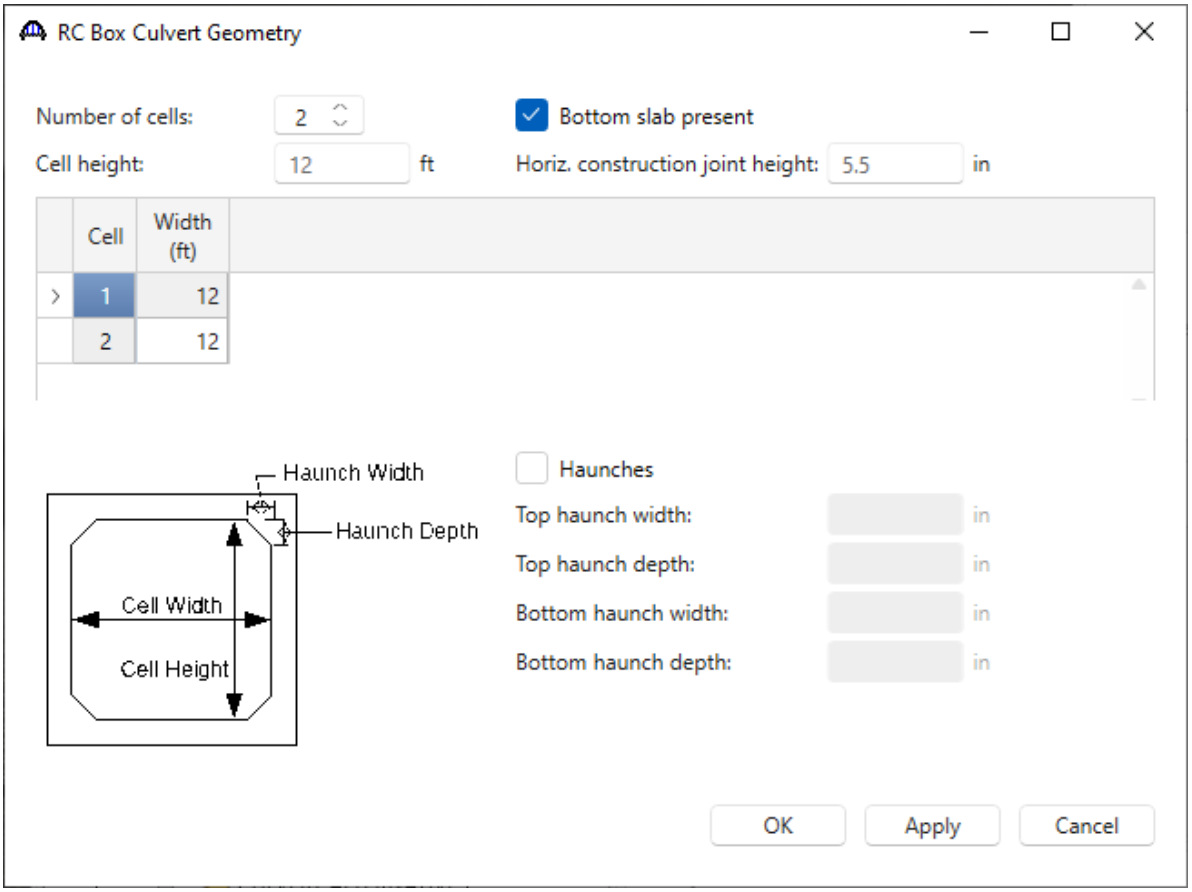
The expanded tree for **Culvert Alt 1** is shown below. Note that the **Culvert Alt 1** is automatically assigned as the **Existing** and **Current** alternative shown by the **(E)** and **(C)** in the name. This culvert alternative is also updated as **Existing** and **Current** alternative in the **Culvert Definition** window as shown below.





RC Box Culvert Geometry

Double-click on the **RC Box Culvert Geometry** node in the **Bridge Workspace** tree. Enter the data as shown below.

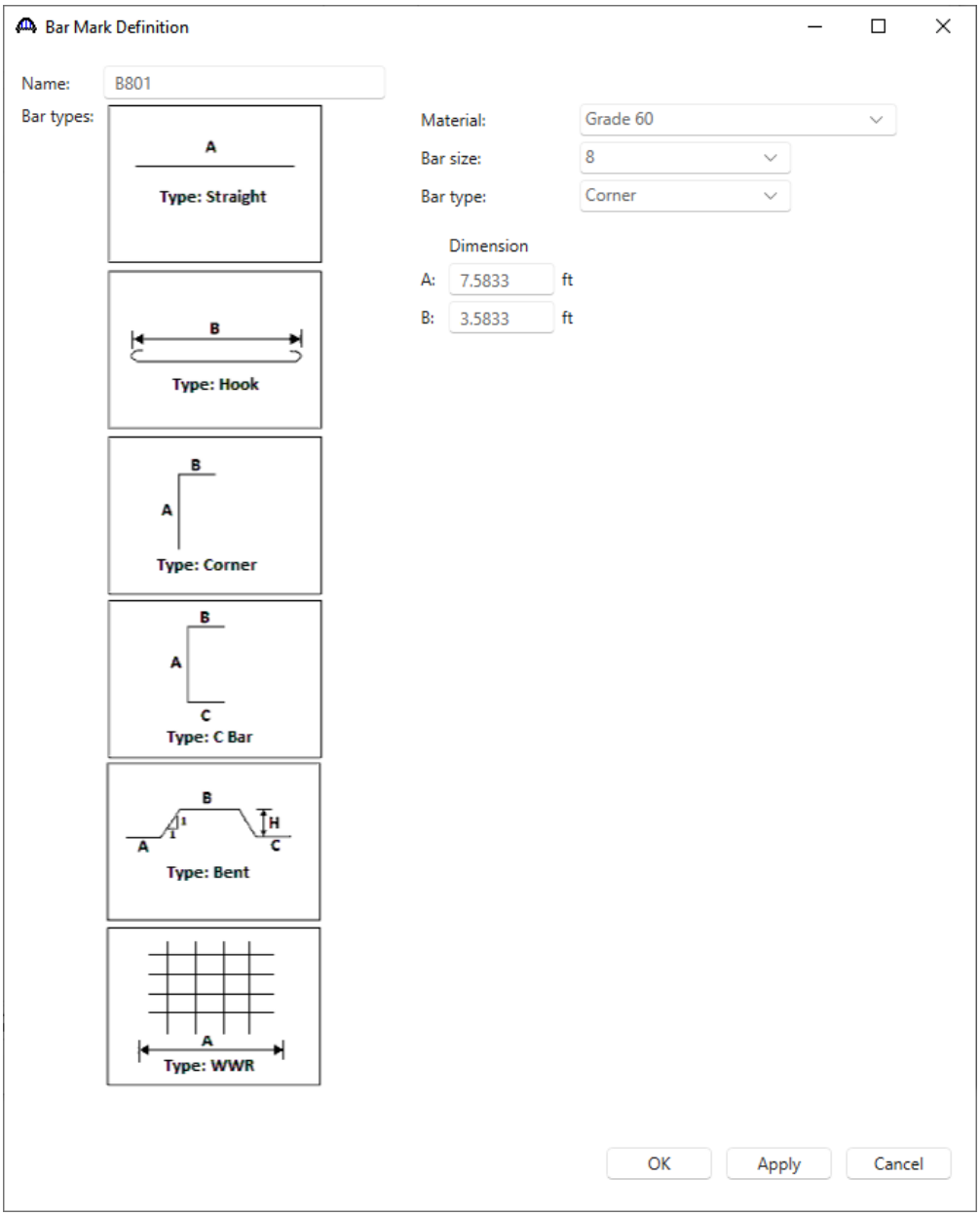


Click **OK** to apply the data and close the window.

Bar Mark Definitions

Double-click on the **Bar Mark Definitions** folder in the **Bridge Workspace** tree to create a new bar mark definition for **Culvert Alt 1**. Enter the data for B801 as shown below.

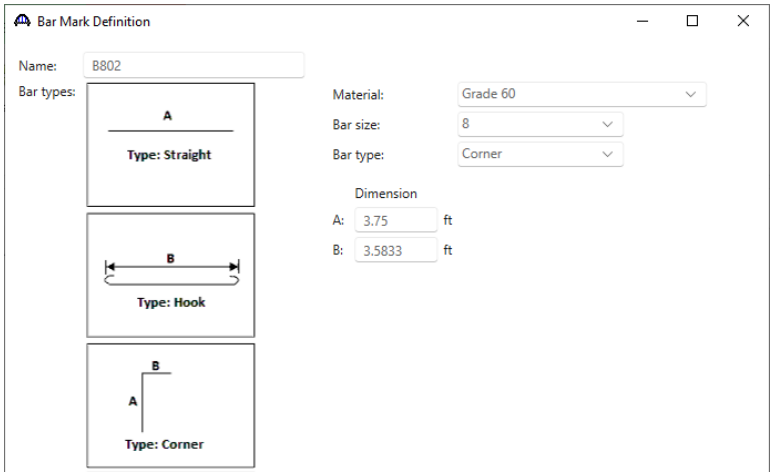
MARK	NUMBER REQ'D.	LENGTH	BENT	CUTTING DIAG.	LOCATION
B801	416	11 -2	3-7	NO	CORNERS



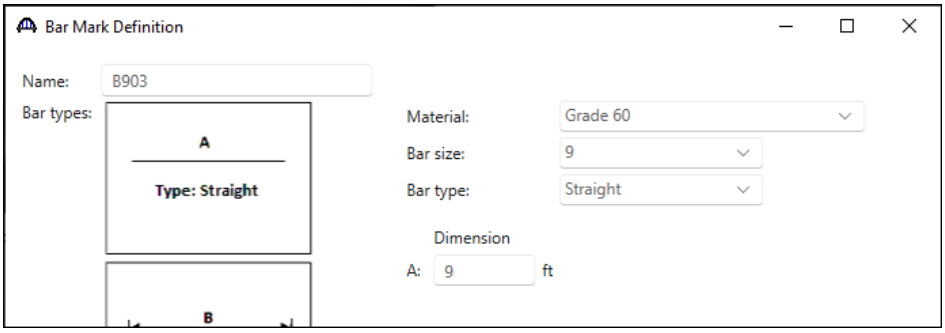
Click **OK** to apply the data and close the window.

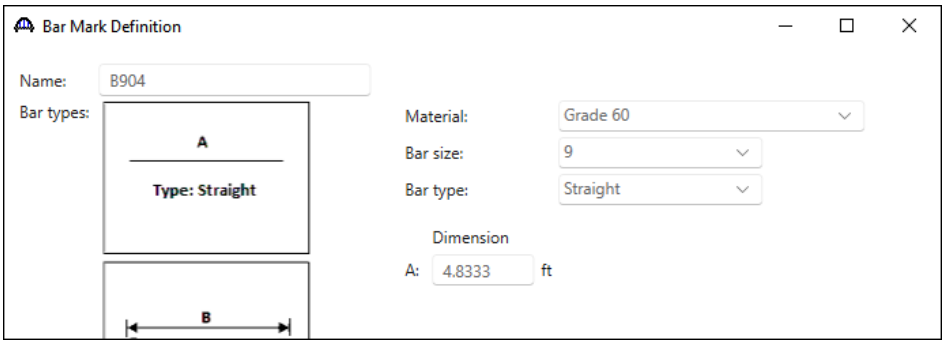
Repeat this process and add the following transverse bar mark definitions.

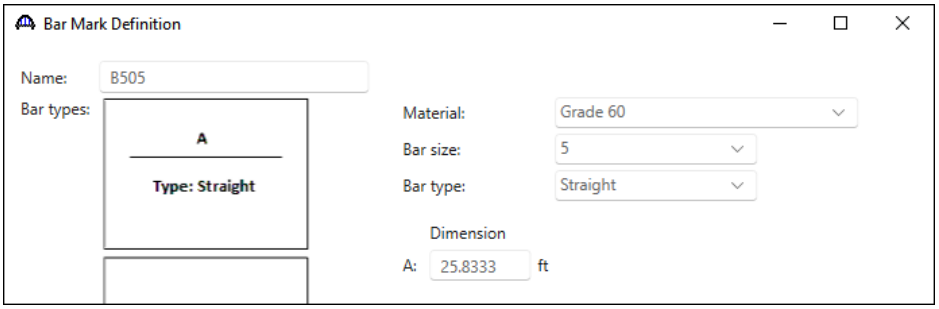
MARK	NUMBER REQ'D.	LENGTH	BENT	CUTTING DIAG.	LOCATION
B802	400	7-4	3-7	NO	CORNERS

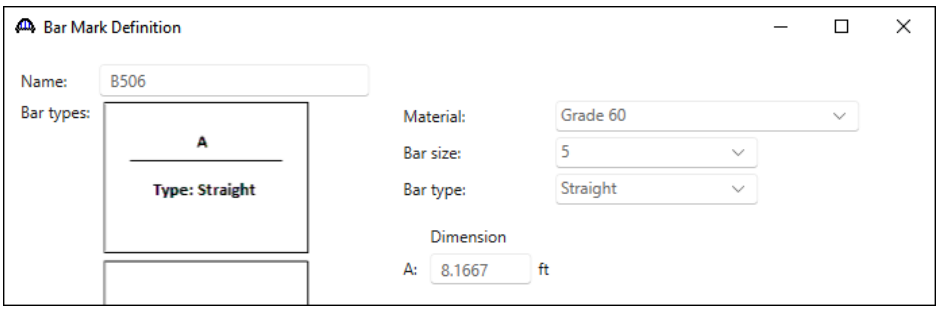


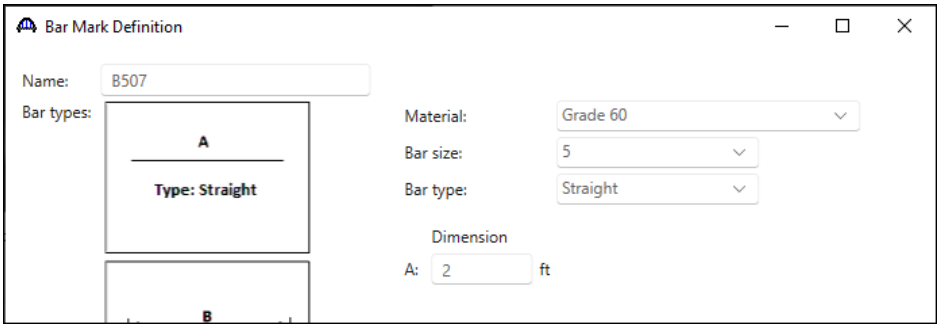
MARK	NUMBER REQ'D.	LENGTH	BENT	CUTTING DIAG.	LOCATION
B903	76	9-0	NO	NO	BOTTOM SLAB TRANS.
B904	72	4-10	NO	NO	BOTTOM SLAB TRANS.
B505	124	25-10	NO	NO	BOTTOM SLAB TRANS.
B506	240	8-2	NO	NO	BOTTOM SLAB TRANS.
B507	296	2-0	NO	NO	WALLS-DOWELS VERT.
B408	136	2-0	NO	NO	WALLS-DOWELS VERT.
B510	296	12-4	NO	NO	WALLS VERT.
B411	136	13-4	1-0	NO	WALLS VERT.
B612	84	25-10	NO	NO	TOP SLAB TRANS.
B613	160	8-2	NO	NO	TOP SLAB TRANS.
B714	116	9-0	NO	NO	TOP SLAB TRANS.
B715	112	4-10	NO	NO	TOP SLAB TRANS.

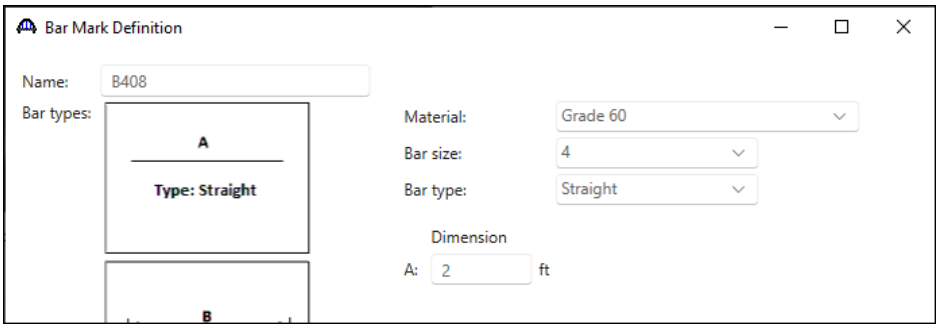


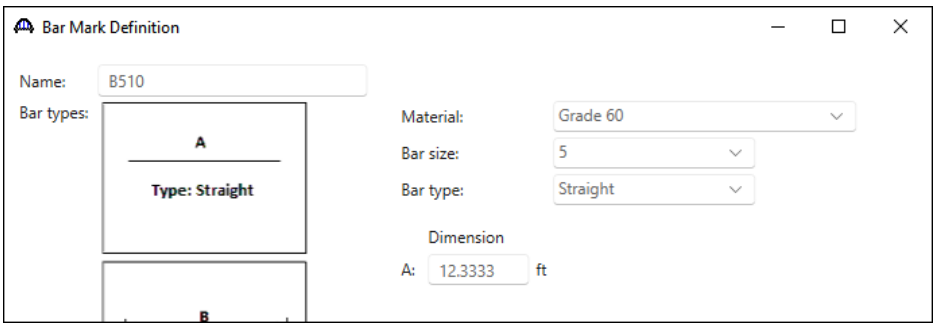

Bar Mark Definition
Name: B904
Bar types:
A
Type: Straight
B
Material: Grade 60
Bar size: 9
Bar type: Straight
Dimension
A: 4.8333 ft

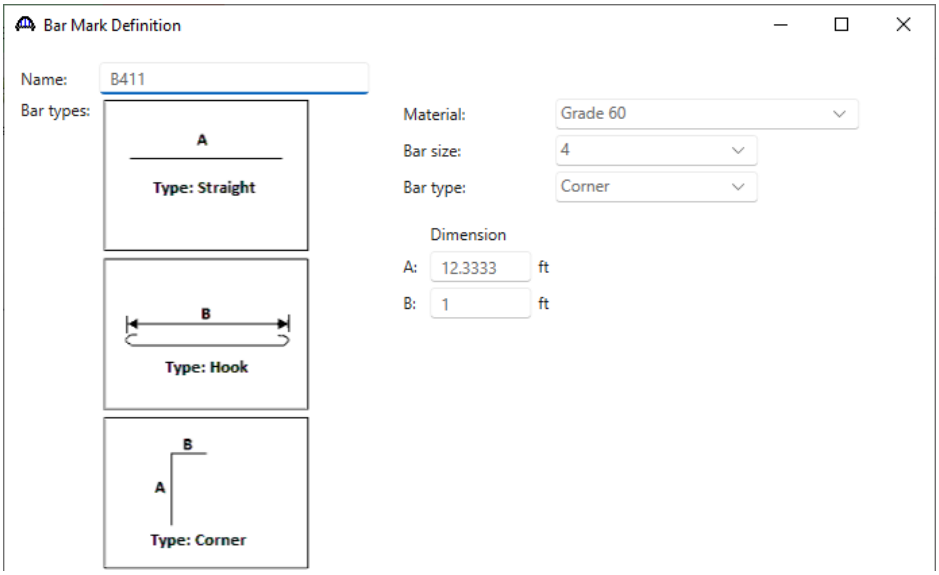

Bar Mark Definition
Name: B505
Bar types:
A
Type: Straight
Material: Grade 60
Bar size: 5
Bar type: Straight
Dimension
A: 25.8333 ft

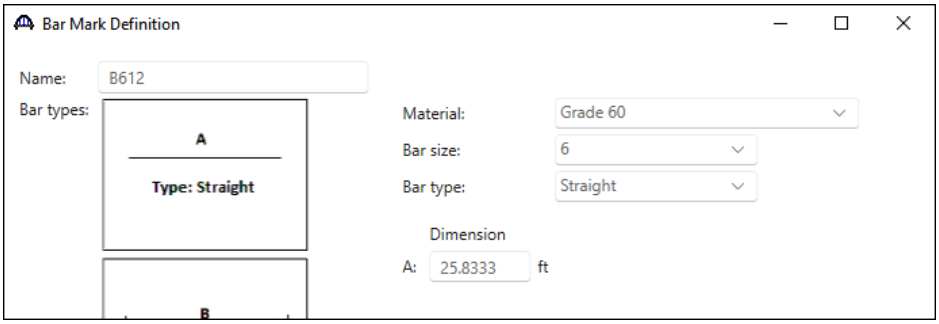

Bar Mark Definition
Name: B506
Bar types:
A
Type: Straight
Material: Grade 60
Bar size: 5
Bar type: Straight
Dimension
A: 8.1667 ft

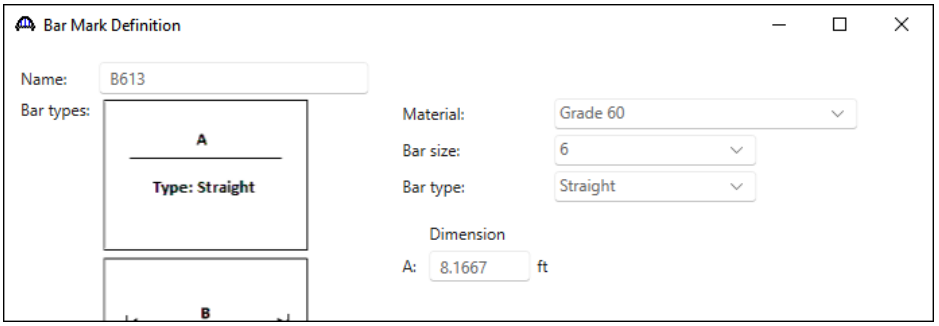

Bar Mark Definition
Name: B507
Bar types:
A
Type: Straight
B
Material: Grade 60
Bar size: 5
Bar type: Straight
Dimension
A: 2 ft

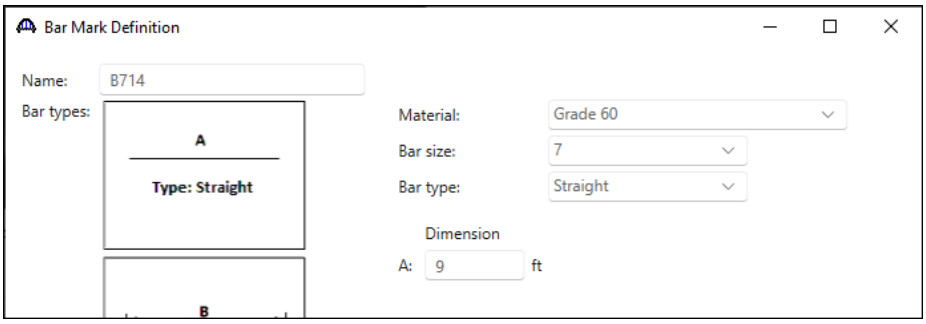

Bar Mark Definition
Name: B408
Bar types:
A
Type: Straight
B
Material: Grade 60
Bar size: 4
Bar type: Straight
Dimension
A: 2 ft

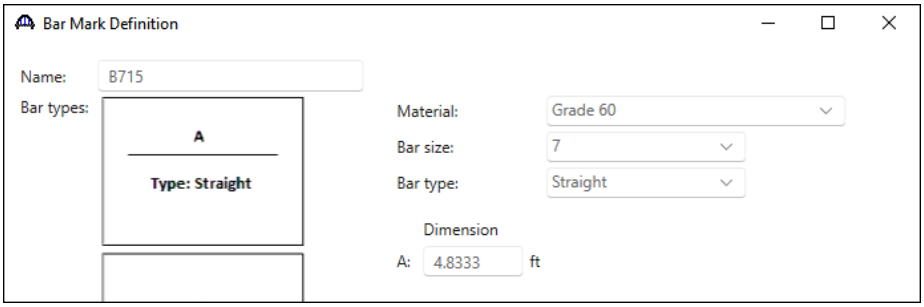

Bar Mark Definition
Name: B510
Bar types:
A
Type: Straight
B
Material: Grade 60
Bar size: 5
Bar type: Straight
Dimension
A: 12.3333 ft


Bar Mark Definition
Name: B411
Bar types:
A
Type: Straight
B
Type: Hook
B
A
Type: Corner
Material: Grade 60
Bar size: 4
Bar type: Corner
Dimension
A: 12.3333 ft
B: 1 ft


Bar Mark Definition
Name: B612
Bar types:
A
Type: Straight
B
Material: Grade 60
Bar size: 6
Bar type: Straight
Dimension
A: 25.8333 ft

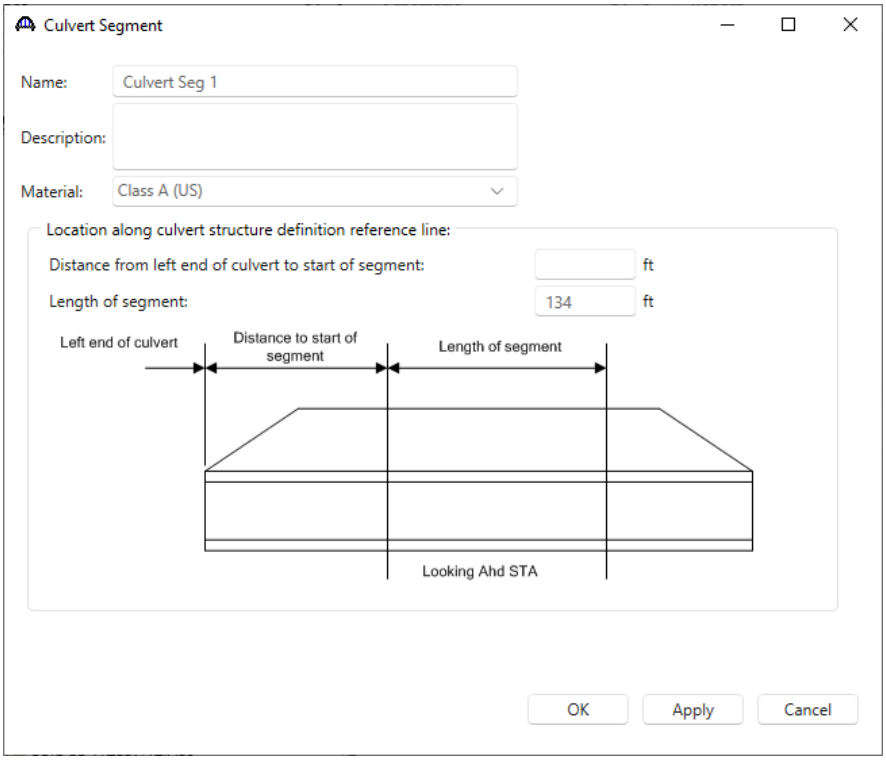

Bar Mark Definition
Name: B613
Bar types:
A
Type: Straight
B
Material: Grade 60
Bar size: 6
Bar type: Straight
Dimension
A: 8.1667 ft





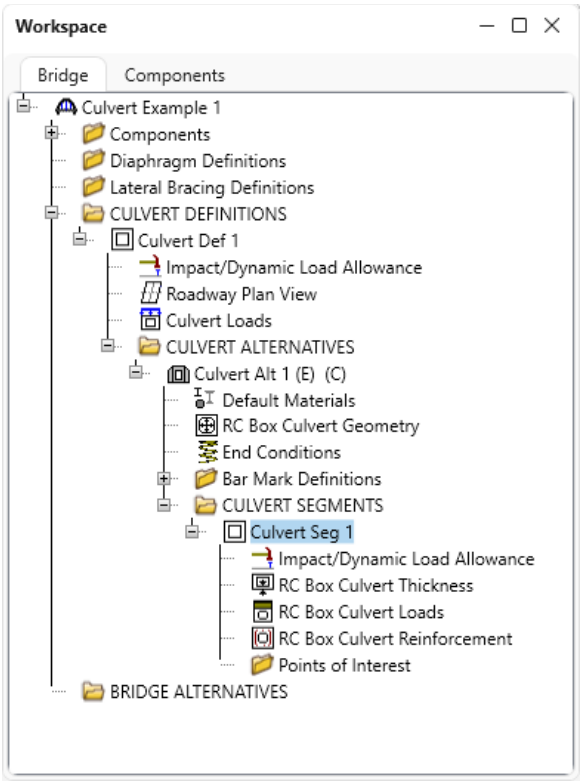
Culvert Segments

Double-click on the **CULVERT SEGMENTS** folder to create a new culvert segment for **Culvert Alt 1**. A culvert alternative may have one or more culvert segments. Enter the data as show below.



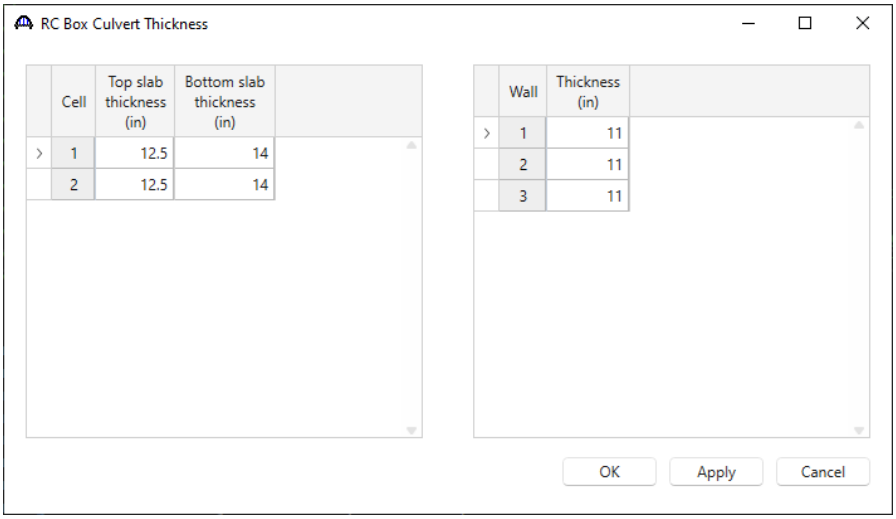
Click **OK** to create a new culvert segment and close the window.

The expanded tree for **Culvert Seg 1** is shown below.



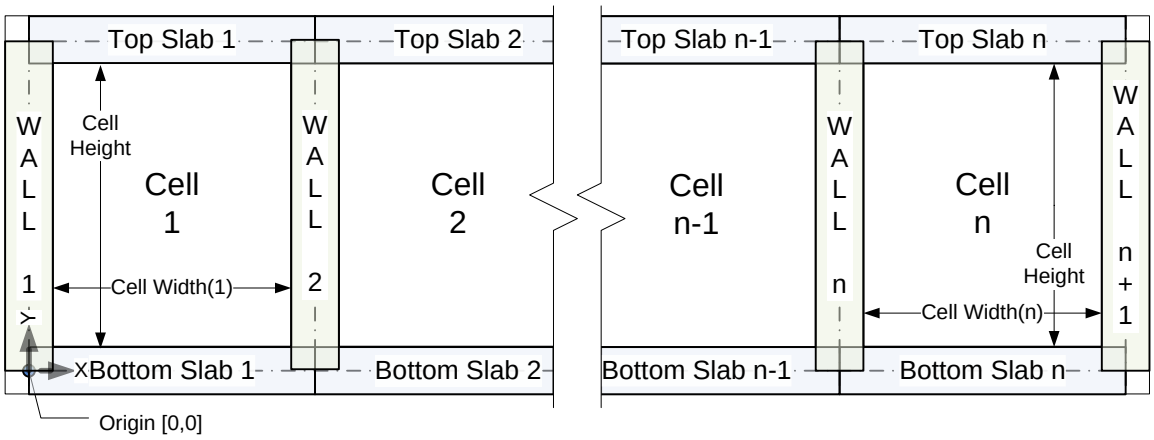
RC Box Culvert Thickness

Double-click on the **RC Box Culvert Thickness** node in the **Bridge Workspace** tree. Enter the slab and wall thicknesses as shown below.



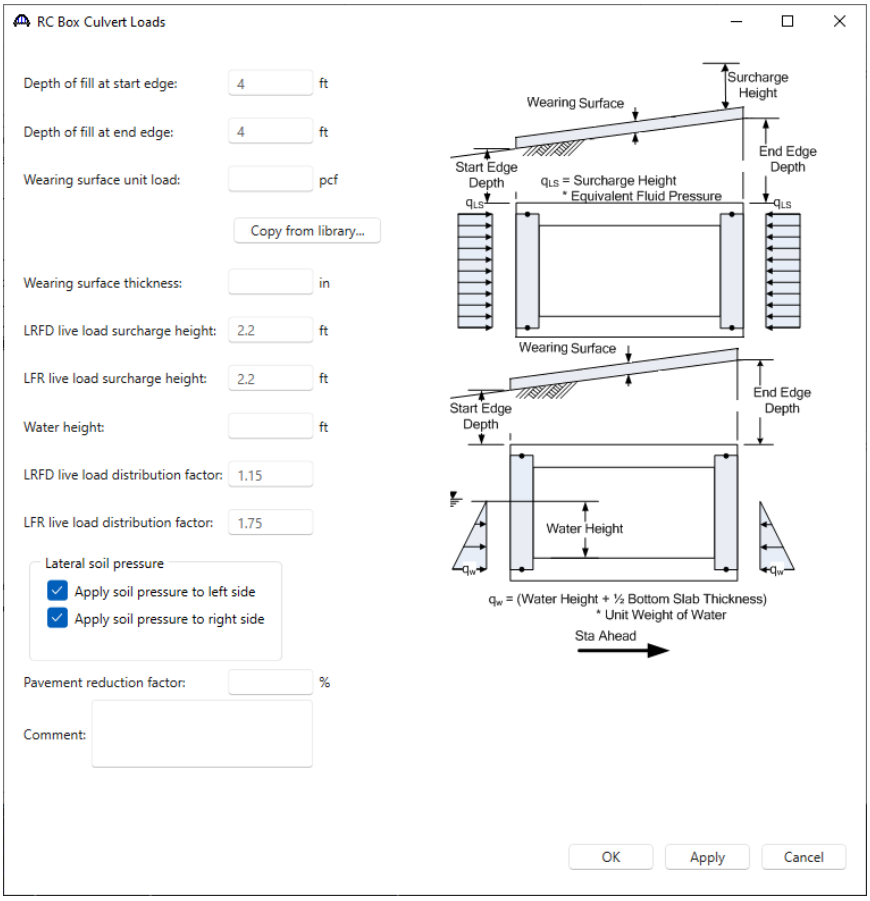
Click **OK** to apply the data and close the window.

The following shows the components for a box culvert with n cells.



RC Box Culvert Loads

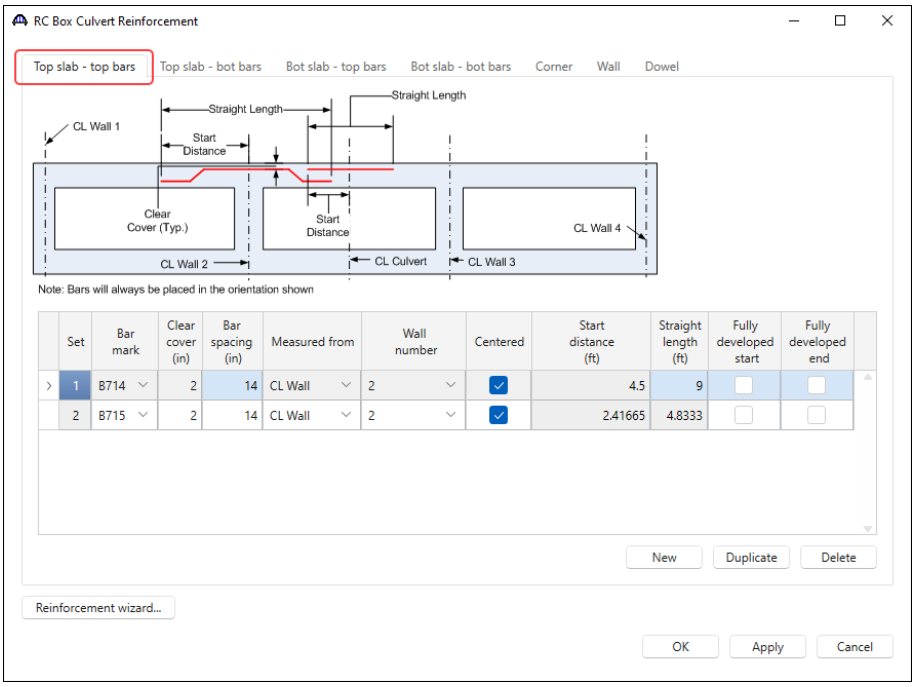
Double-click on **RC Box Culvert Loads** in the **Bridge Workspace** tree. Enter the culvert loads for **Culvert Seg 1** as shown below. Select the checkboxes under **Lateral soil pressure** shown below to apply soil pressure to both sides of the culvert. These checkboxes are provided to allow for the case where a culvert is widened by placing another culvert directly next to it so that side does not have lateral earth pressure.



Click **OK** to apply the data and close the window.

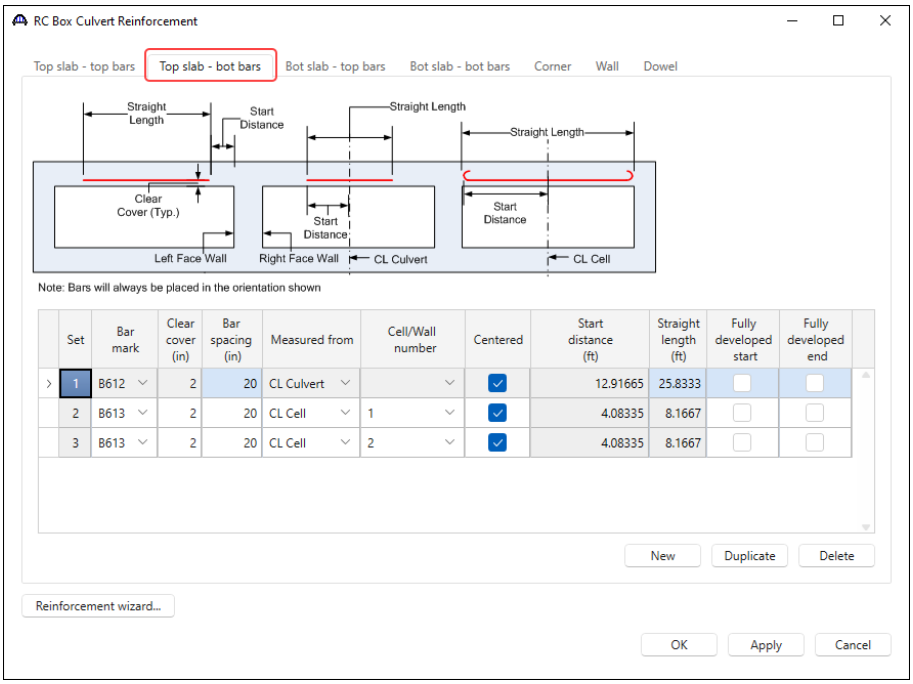
RC Box Culvert Reinforcement

Double-click on the **RC Box Culvert Reinforcement** node in the **Bridge Workspace** tree. Enter the reinforcement data as shown below for each location.

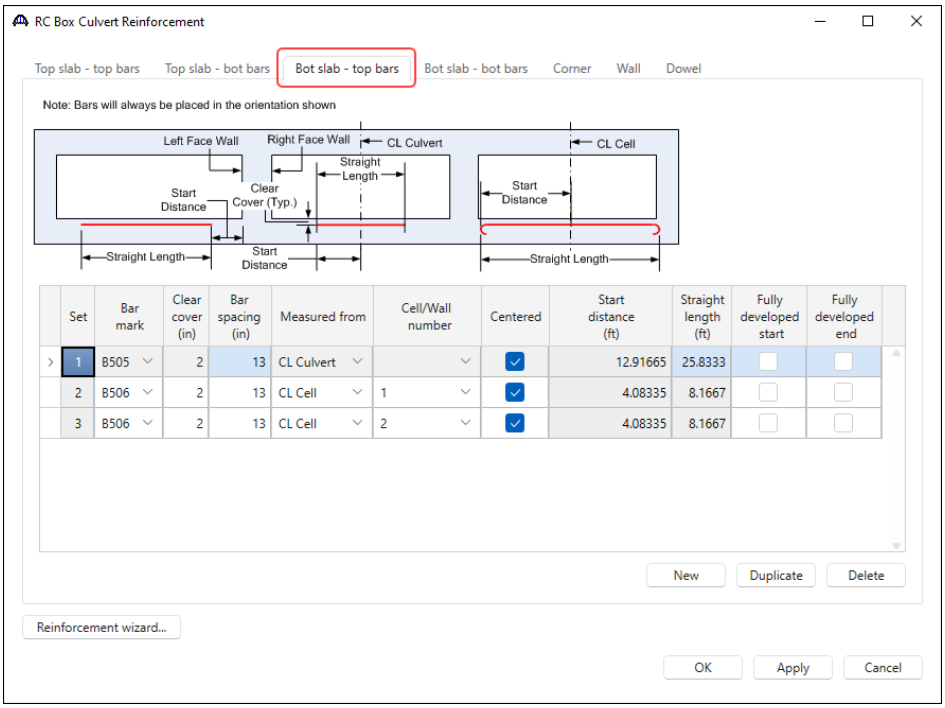


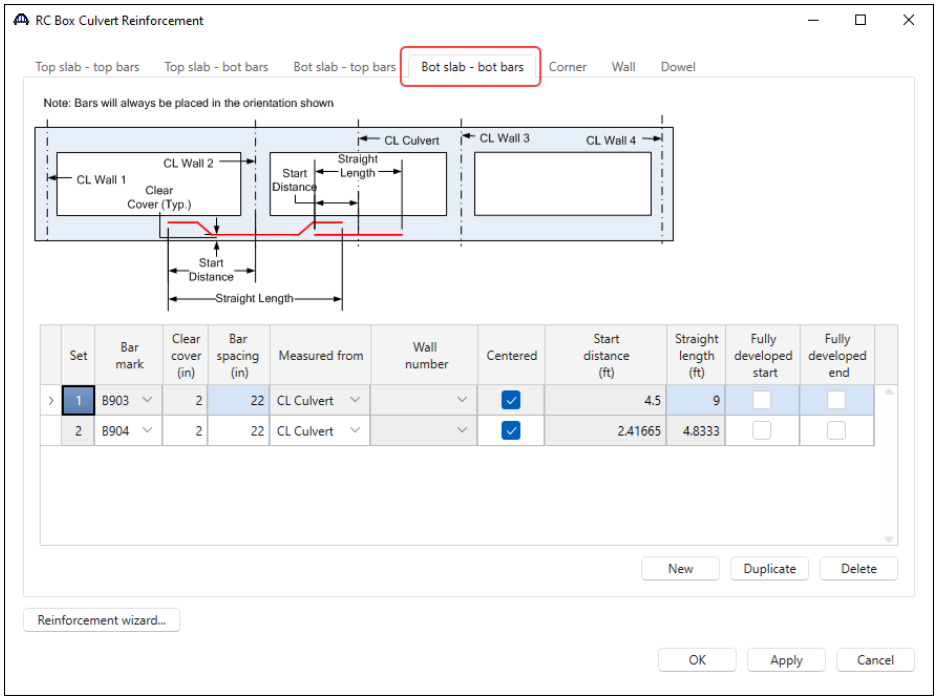
Click **Apply** to apply the data and not close the window.

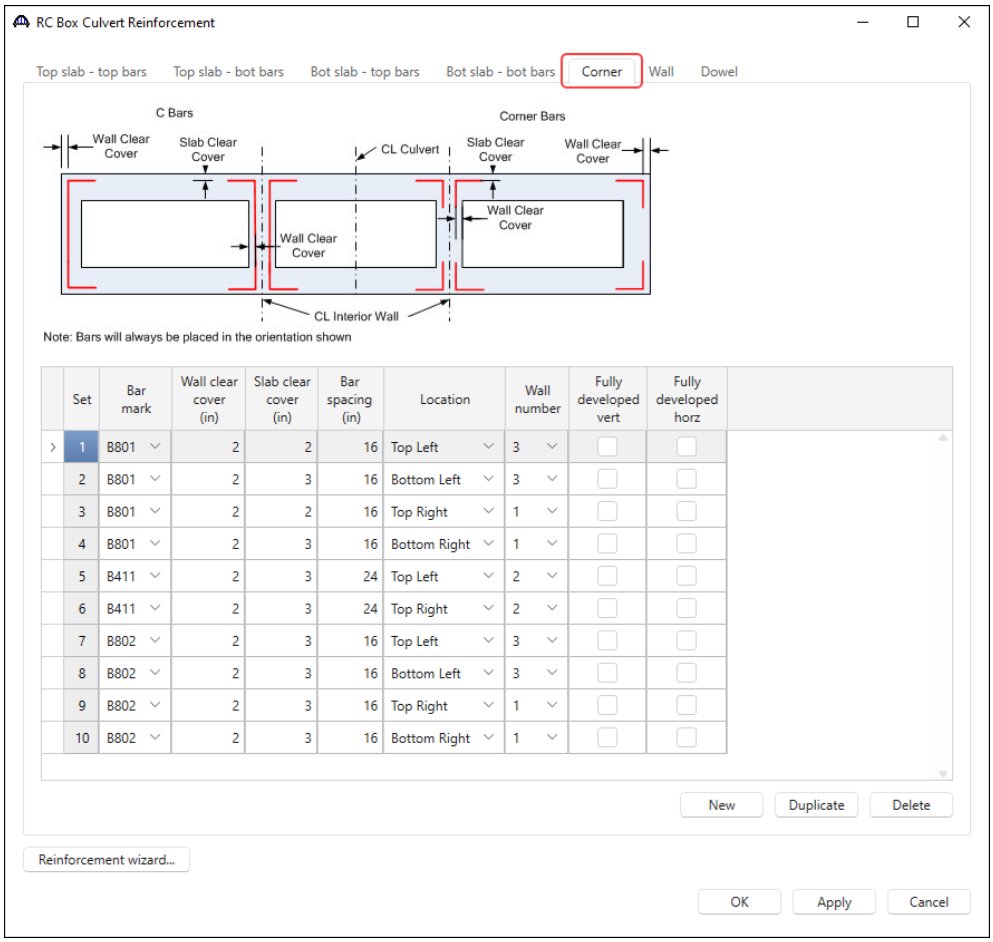
Navigate to the **Top slab - bot bars** tab to add more reinforcement details.

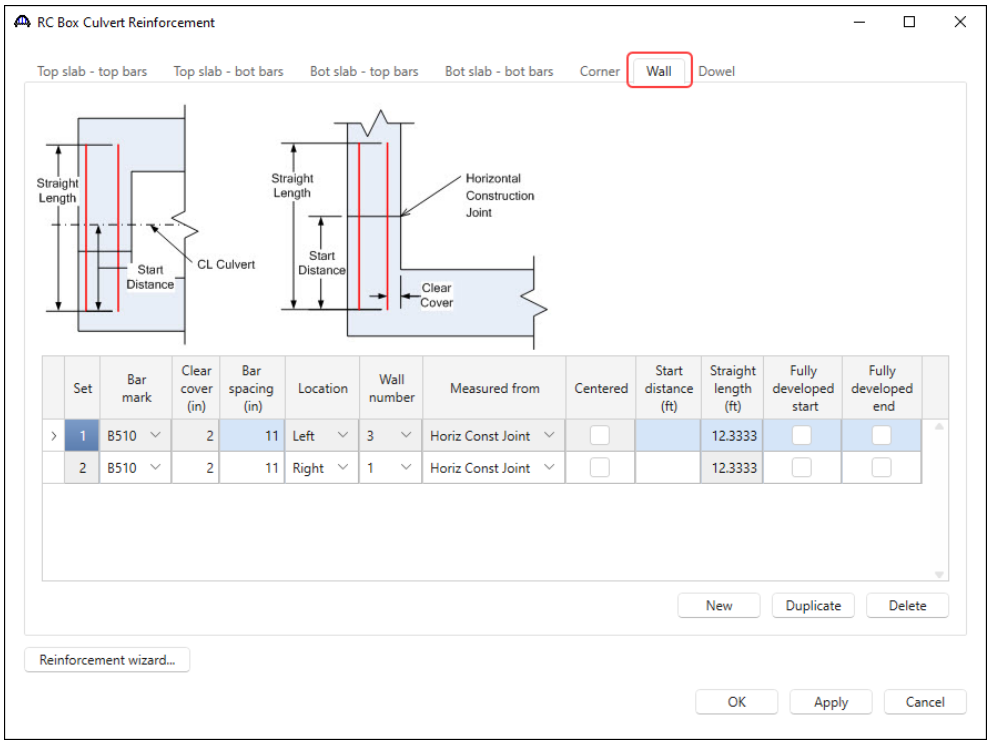


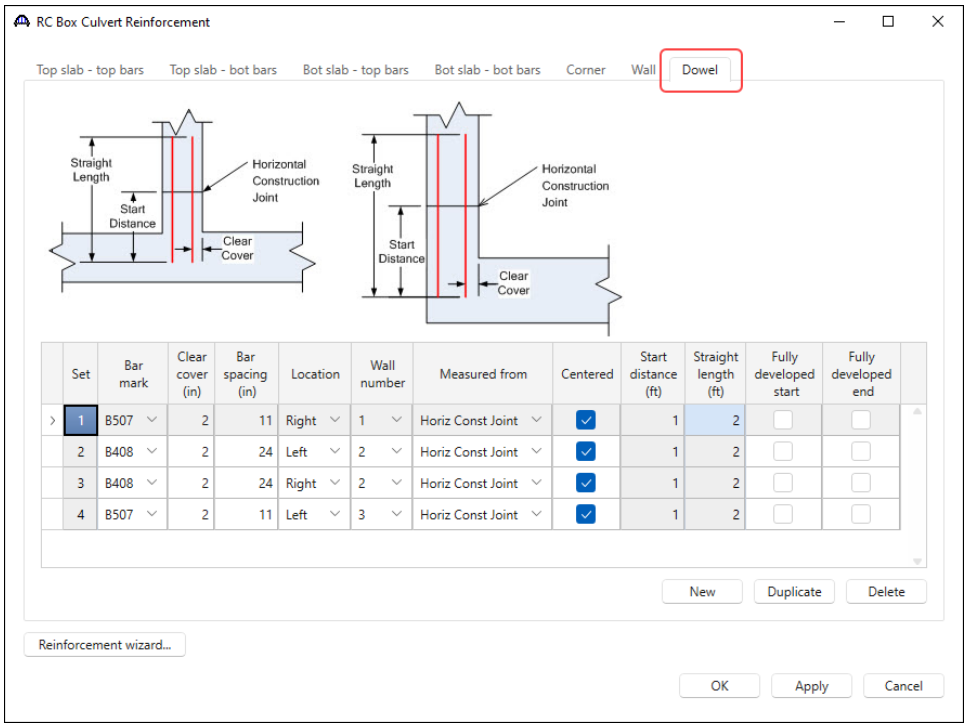
Similarly, add reinforcement in each location as shown below.





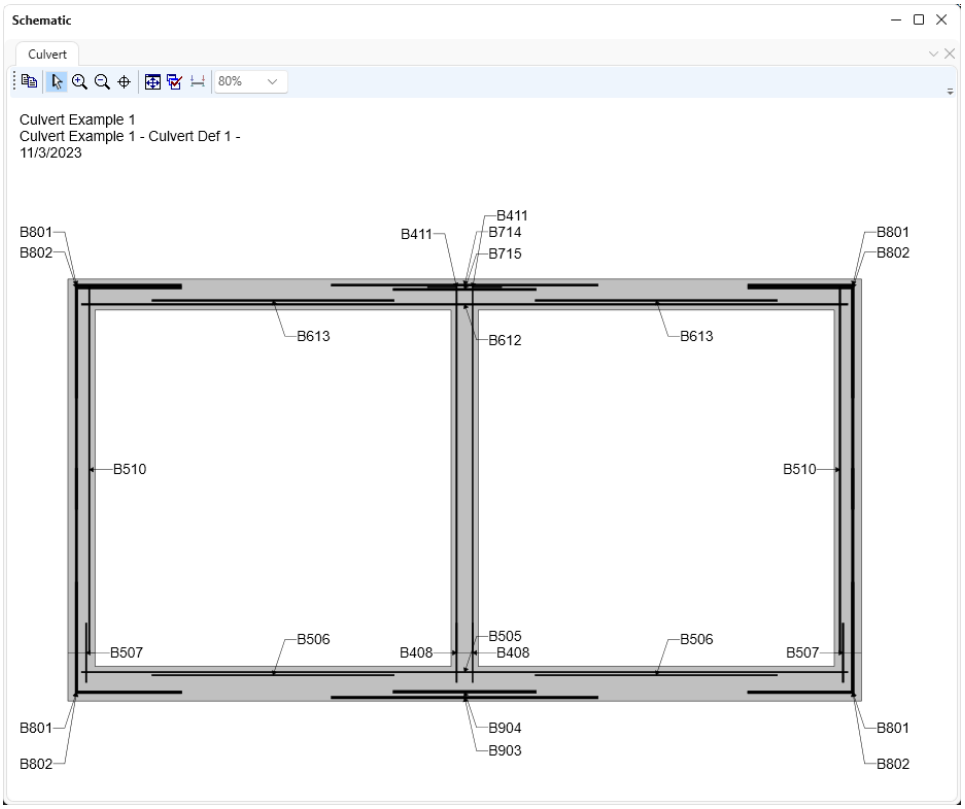

RC Box Culvert Reinforcement
Top slab - top bars
Top slab - bot bars
Bot slab - top bars
Bot slab - bot bars
Corner
Wall
Dowel
C Bars
Corner Bars
Wall Clear Cover
Slab Clear Cover
CL Culvert
Slab Clear Cover
Wall Clear Cover
Wall Clear Cover
Wall Clear Cover
CL Interior Wall
Note: Bars will always be placed in the orientation shown
Set
Bar mark
Wall clear cover (in)
Slab clear cover (in)
Bar spacing (in)
Location
Wall number
Fully developed vert
Fully developed horz
1 B801 2 2 16 Top Left 3
2 B801 2 3 16 Bottom Left 3
3 B801 2 2 16 Top Right 1
4 B801 2 3 16 Bottom Right 1
5 B411 2 3 24 Top Left 2
6 B411 2 3 24 Top Right 2
7 B802 2 3 16 Top Left 3
8 B802 2 3 16 Bottom Left 3
9 B802 2 3 16 Top Right 1
10 B802 2 3 16 Bottom Right 1
New
Duplicate
Delete
Reinforcement wizard...
OK
Apply
Cancel


RC Box Culvert Reinforcement
Top slab - top bars
Top slab - bot bars
Bot slab - top bars
Bot slab - bot bars
Corner
Wall
Dowel
Straight Length
Start Distance
CL Culvert
Straight Length
Horizontal Construction Joint
Start Distance
Clear Cover
Set
Bar mark
Clear cover (in)
Bar spacing (in)
Location
Wall number
Measured from
Centered
Start distance (ft)
Straight length (ft)
Fully developed start
Fully developed end
1 B510 2 11 Left 3 Horiz Const Joint 12.3333
2 B510 2 11 Right 1 Horiz Const Joint 12.3333
New
Duplicate
Delete
Reinforcement wizard...
OK
Apply
Cancel



Schematic – RC Box Culvert Reinforcement

Click on **RC Box Culvert Reinforcement** and select **Schematic** from the **WORKSPACE** ribbon (or right click and select **Schematic** from the drop down menu) to view the schematic showing reinforcement details for this bridge.

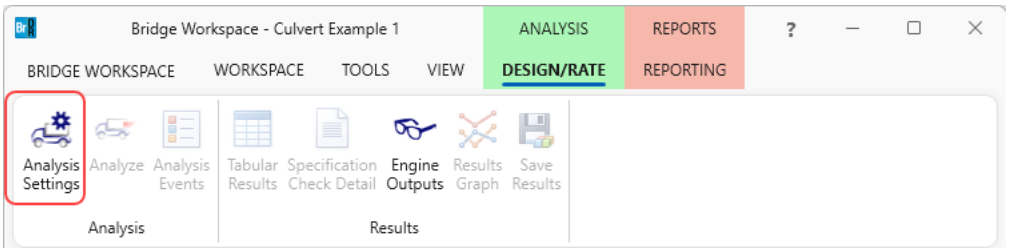


The description of the two-cell reinforced concrete box culvert is complete.

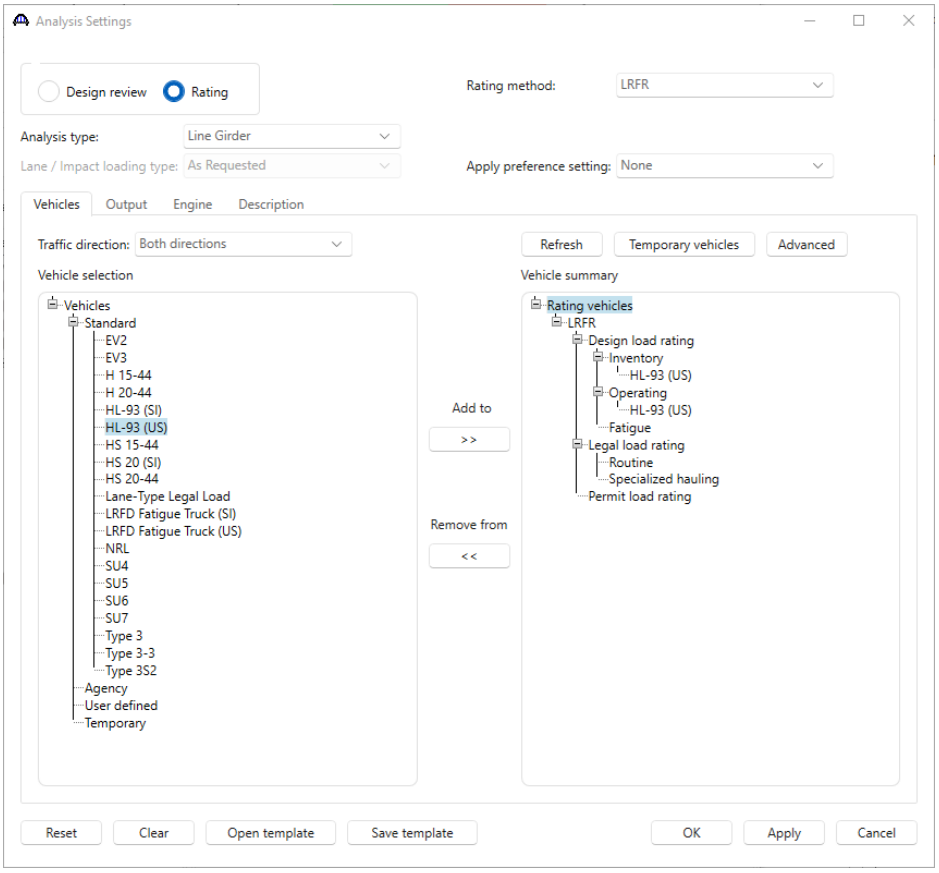
Perform AASHTO Culvert LRFR analysis and review results.

LRFR Analysis

To perform an LRFR Design Load Rating, click the **Analysis Settings** button from the **Analysis** group of the **DESIGN/RATE** ribbon.

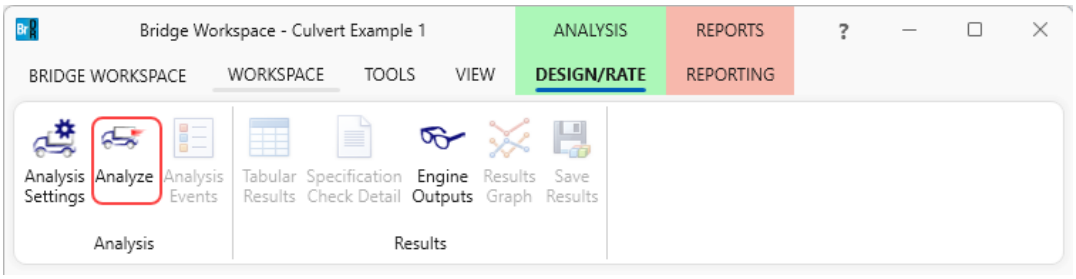


Apply the analysis settings as shown below.



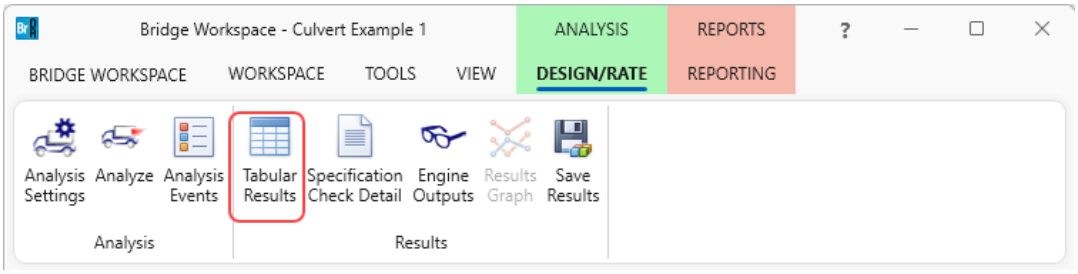
Click **OK** to apply the data and close the window.

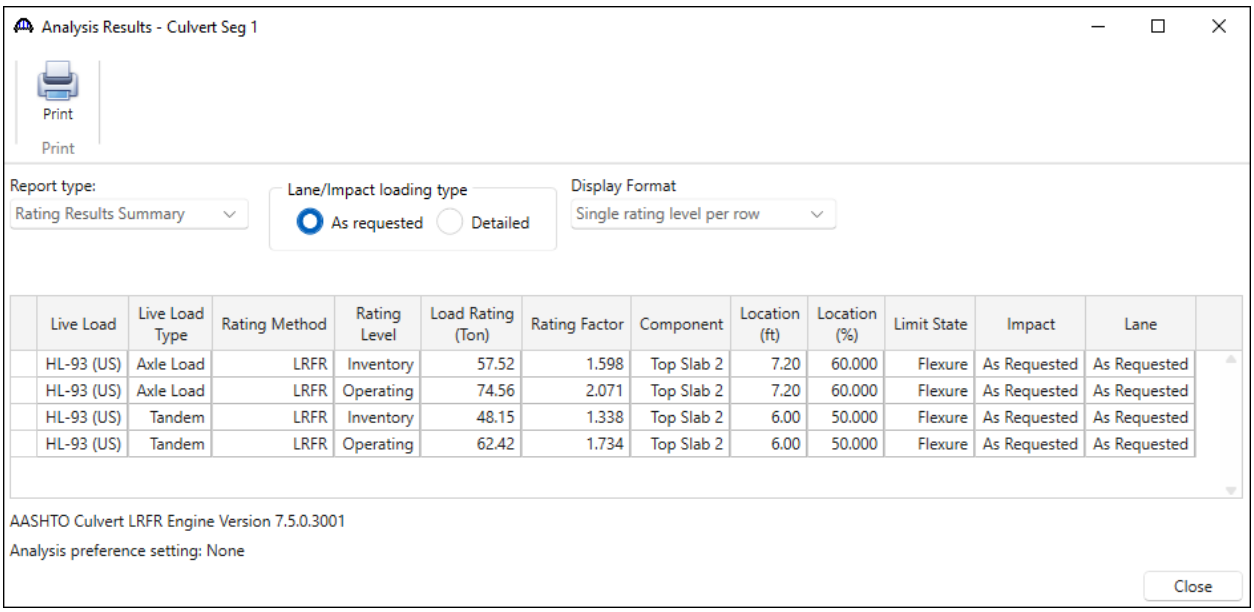
With **Culvert Seg 1** selected in the **Bridge Workspace** tree, click the **Analyze** button from the **Analysis** group of the **DESIGN/RATE** ribbon to start the rating process.



Tabular Results

When the rating is finished, results can be reviewed by clicking the **Tabular Results** button from the **Results** group of the **DESIGN/RATE** ribbon. The window shown below will open.

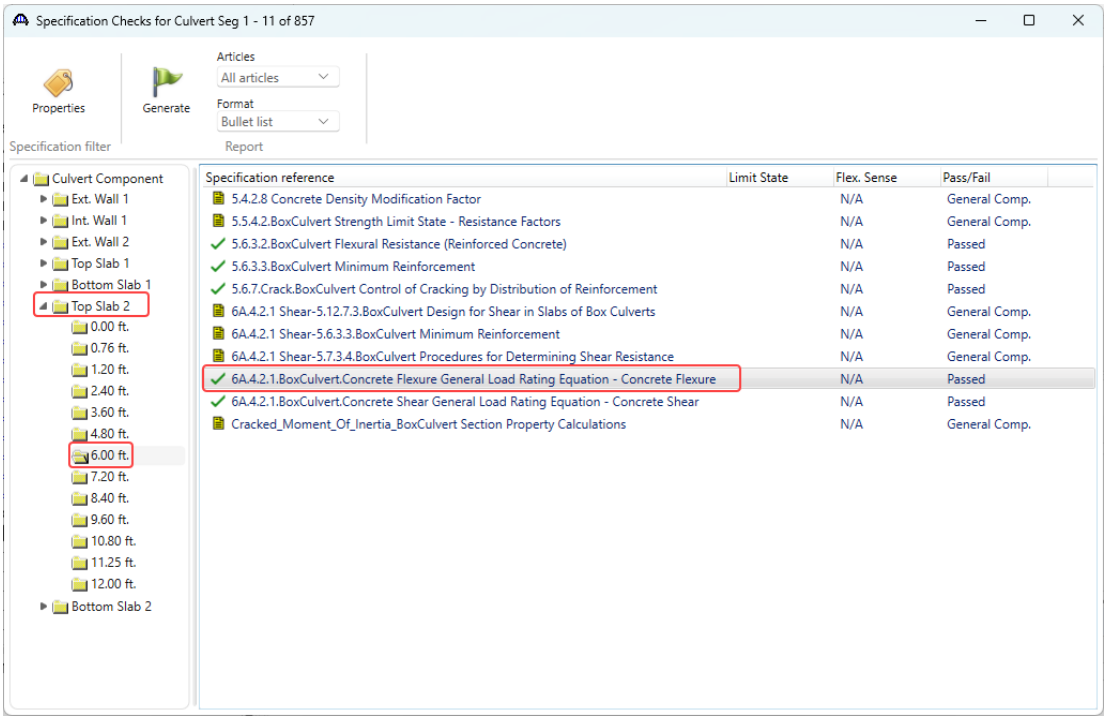




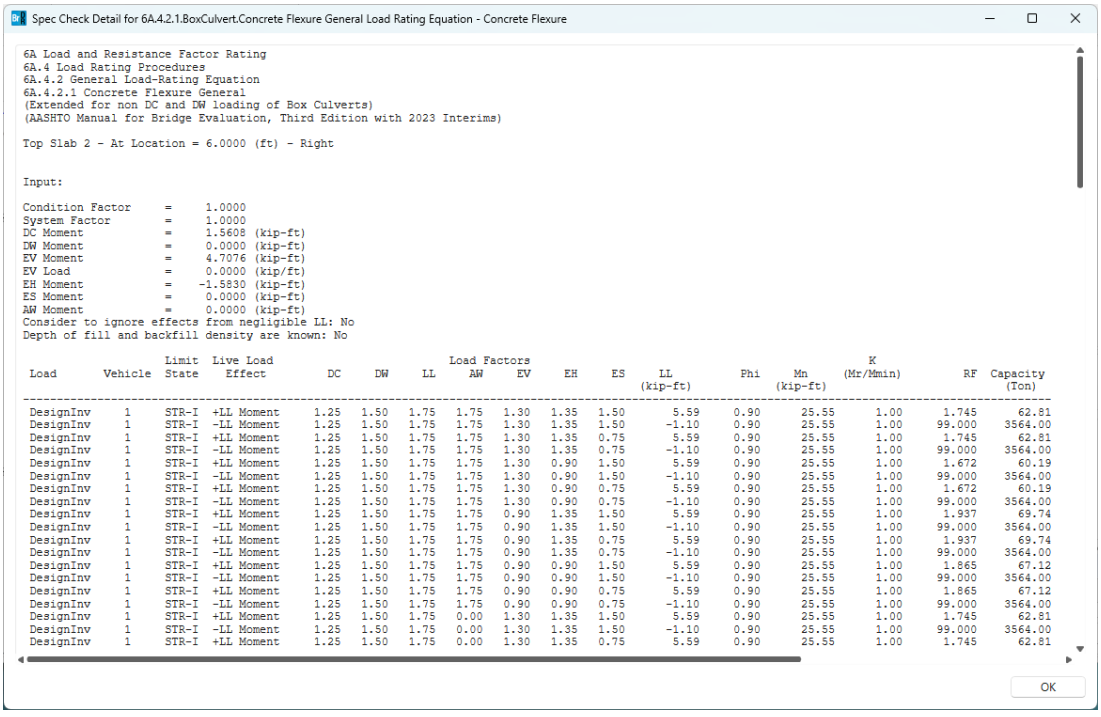
Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Component	Location (ft)	Location (%)	Limit State	Impact	Lane
HL-93 (US)	Axle Load	LRFR	Inventory	57.52	1.598	Top Slab 2	7.20	60.000	Flexure	As Requested	As Requested
HL-93 (US)	Axle Load	LRFR	Operating	74.56	2.071	Top Slab 2	7.20	60.000	Flexure	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Inventory	48.15	1.338	Top Slab 2	6.00	50.000	Flexure	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Operating	62.42	1.734	Top Slab 2	6.00	50.000	Flexure	As Requested	As Requested

Specification Check Detail

To review detailed rating results at the controlling location, click the **Specification Check Detail** button in the ribbon to open the **Specification** window. Expand the tree for **Top Slab 2** and select the **6.00 ft.** folder.

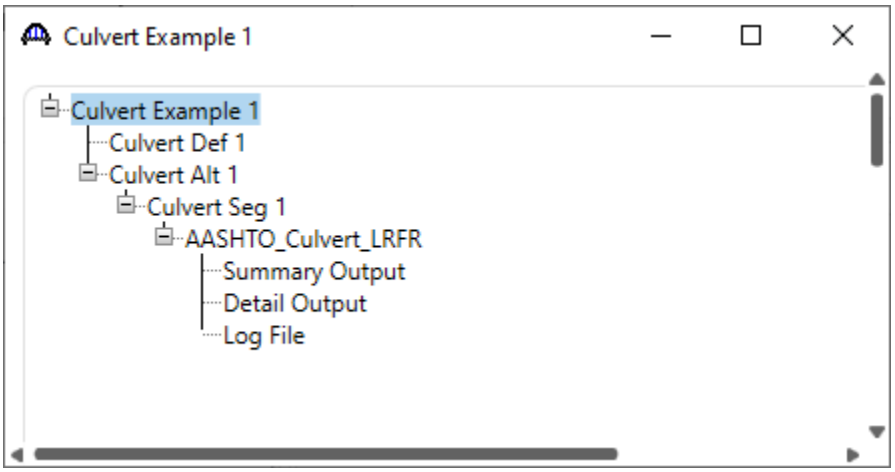


Double-click on the **6A.4.2.1 BoxCulvert Concrete Flexure General Load Rating Equation - Concrete Flexure** specification reference to open the **Spec Check Detail** window.



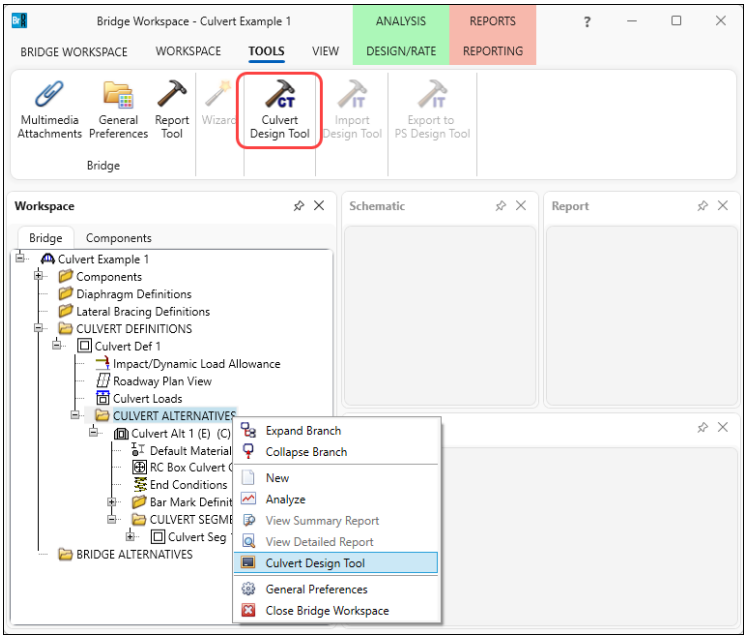
Engine Outputs

To review engine outputs, select the **Engine Outputs** button in the ribbon. Double-clicking on the **Summary Output** or **Detail Output** will open the engine output file in a separate window.

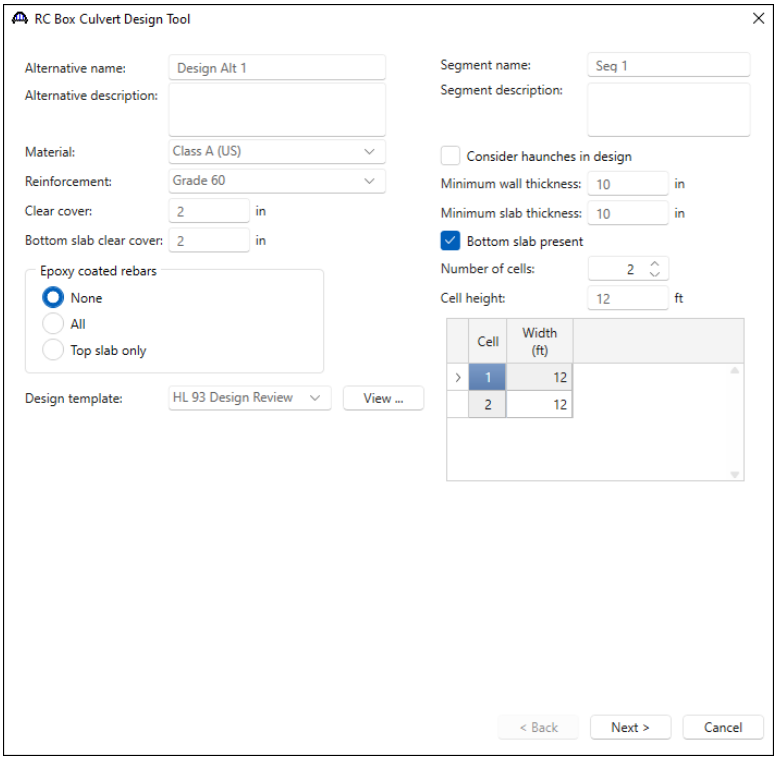


Culvert Design Tool

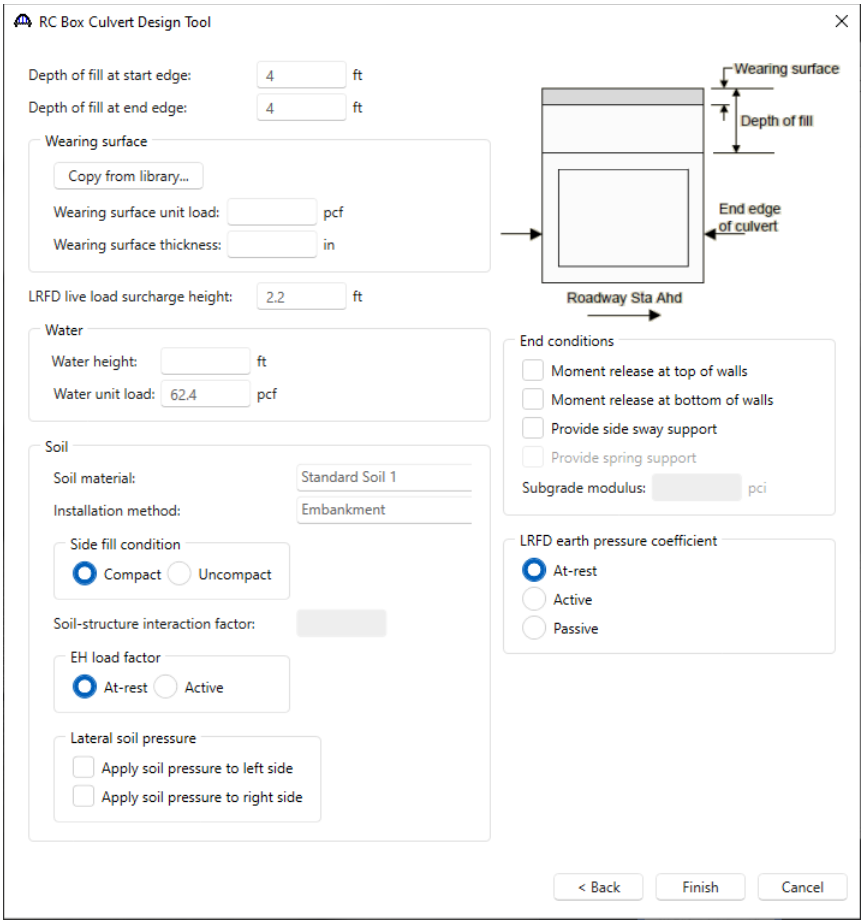
Select the **CULVERT ALTERNATIVES** folder in the **Bridge Workspace** tree. Click the **Culvert Design Tool** button in the **TOOLS** ribbon (or right click and select **Culvert Design Tool**) to open the **RC Box Culvert Design Tool** as shown below.



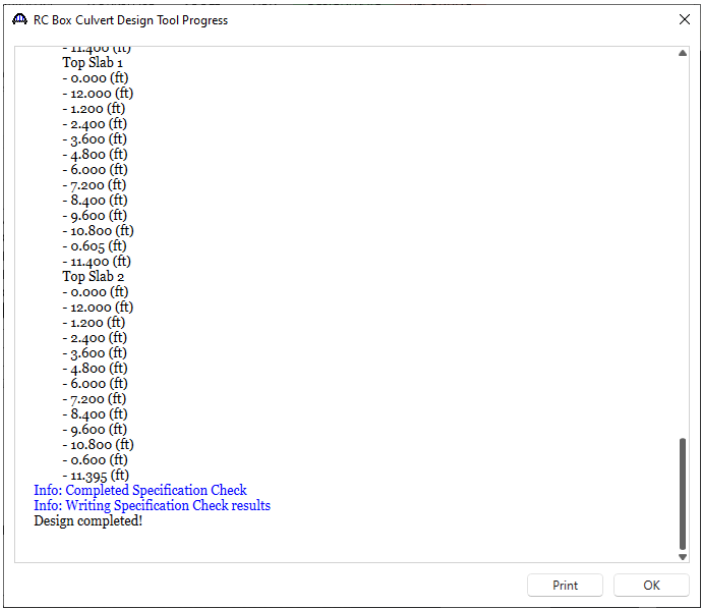
Enter the data as shown below and click the **Next** button.



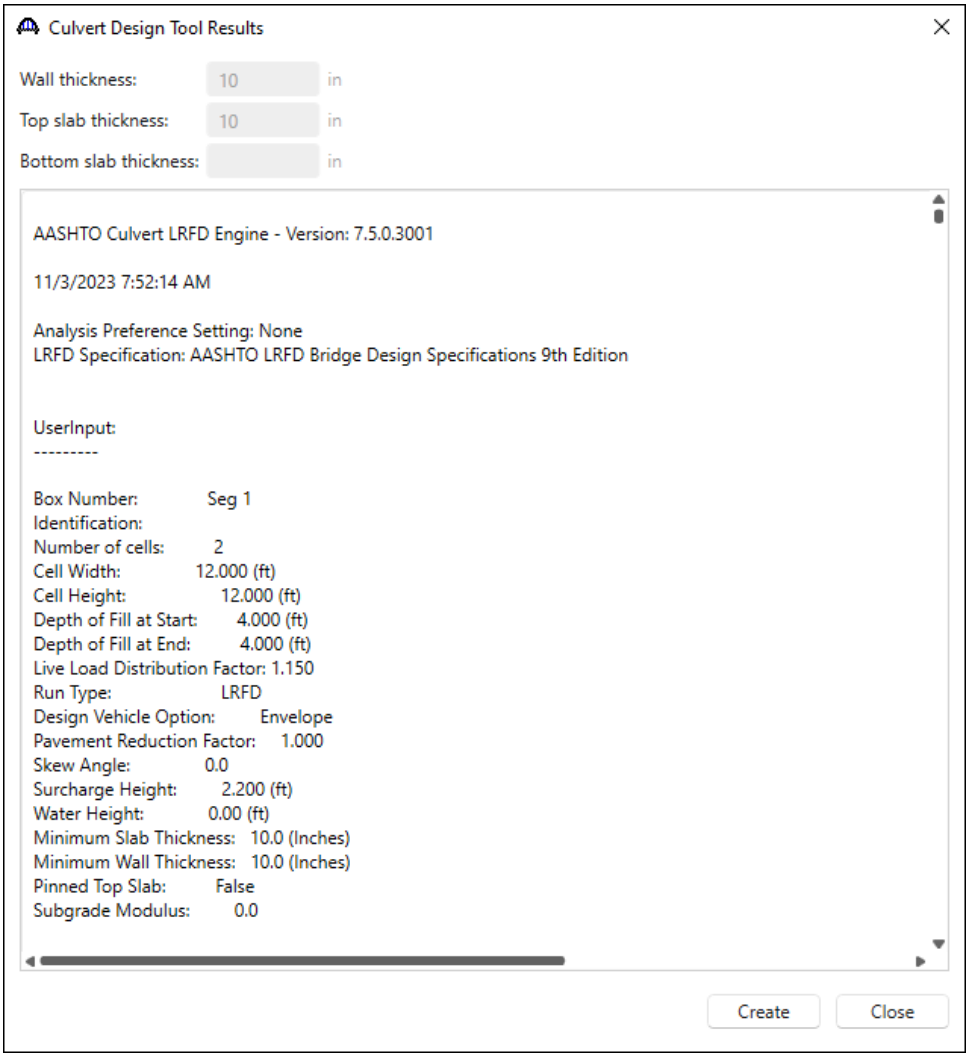
Enter the data as shown below.



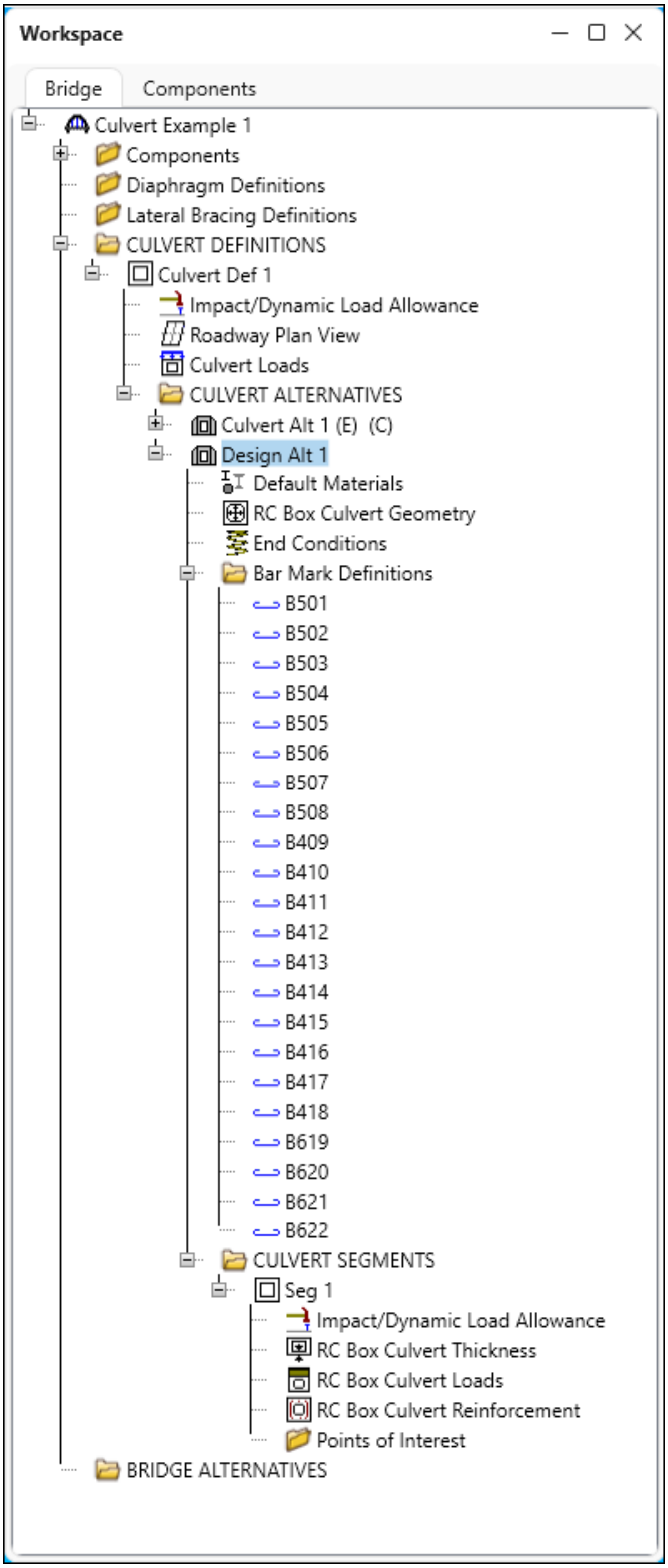
Click **Finish** to start the design process. Click **OK** to close the **RC Box Culvert Design Tool Progress** window after the design is completed.



The **Culvert Design Tool Results** window is shown below. Click **Create** to accept the design and click **Close** to close the window.

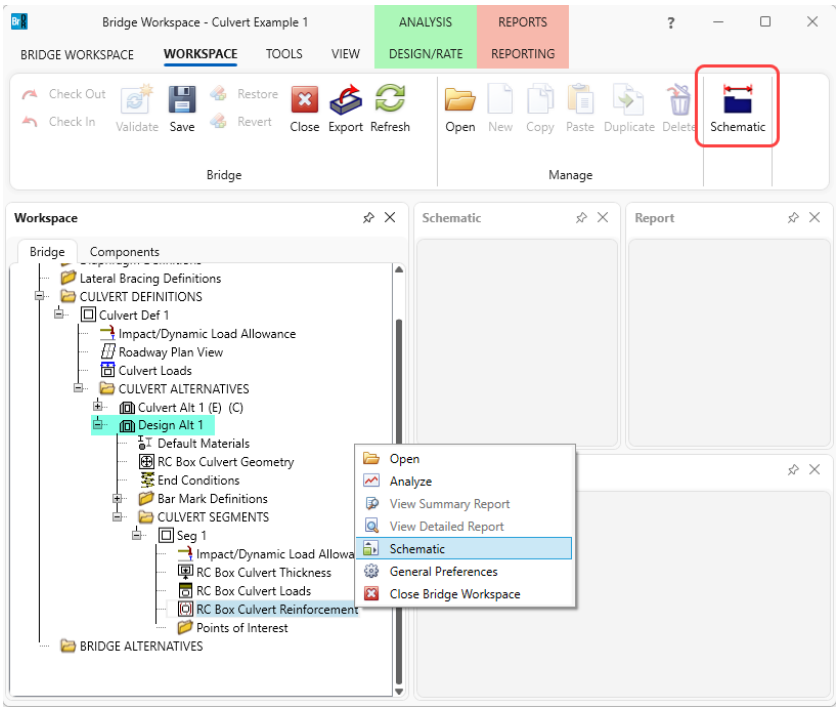


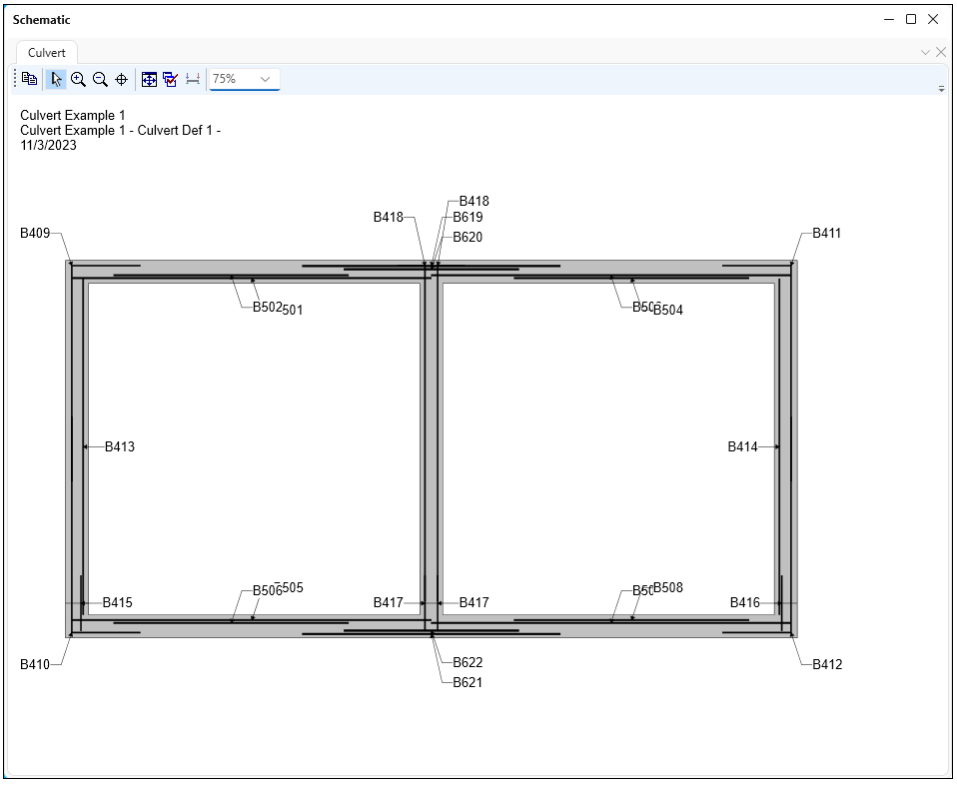
The **Bridge Workspace tree** with the **Design Alt 1** is shown below.



Schematic - RC Box Culvert Reinforcement

Select the **RC Box Culvert Reinforcement** node under **Design Alt 1** in the **Bridge Workspace** tree. Click the **Schematic** button from the **WORKSPACE** ribbon (or right click and select **Schematic**) to review the reinforcement data.





Culvert Tutorial

CVT2 – Corrugated Metal Pipe Culvert Example

CVT2 – Corrugated Metal Pipe Culvert Example

Topics Covered

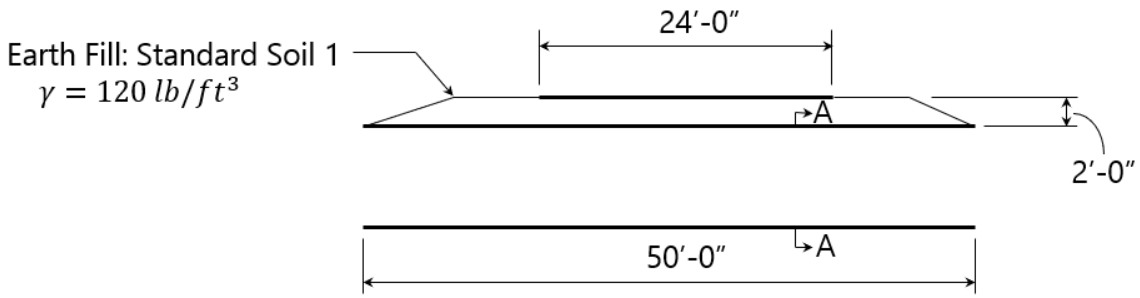
- Metal Pipe Culvert Alternatives
- LFR Rating
- LRFR Rating
- MBE 2022 approved ballot item specification updates

Overview of Metal Pipe Culvert features

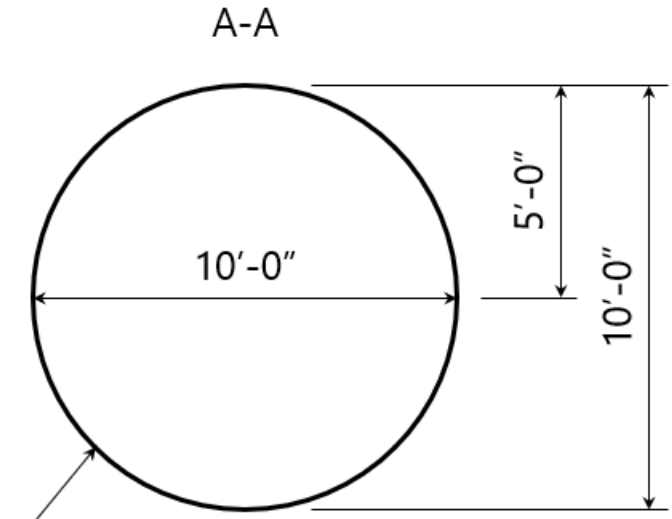
- Metal pipe culverts implemented in BrDR version 7.3.0 in September 2022
- Metal pipe culverts support LFR and LRFR rating methods
- Metal pipe culverts can be rated for wall capacity and plastic moment
- Single and multilane loading options available

This tutorial describes the data entry for a corrugated metal pipe culvert using the metal pipe culvert alternative in BrDR version 7.5.0.

Elevation



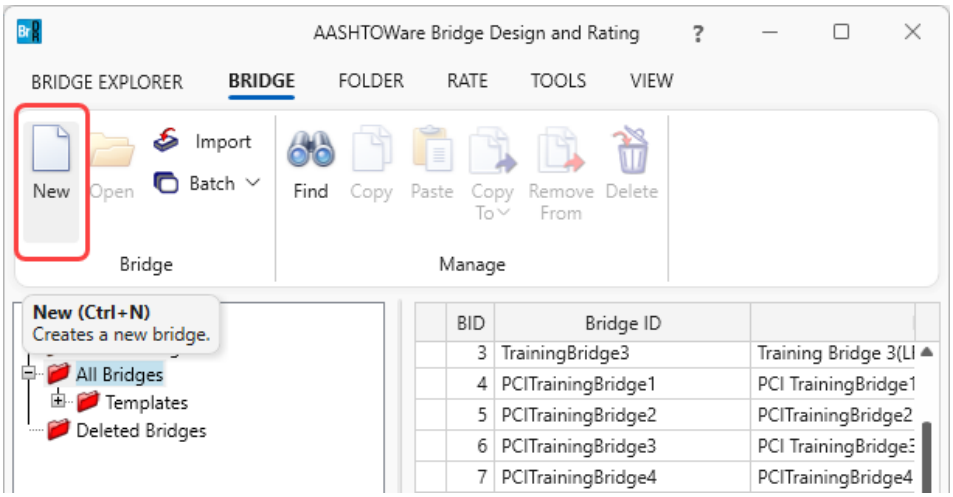
Cross Section

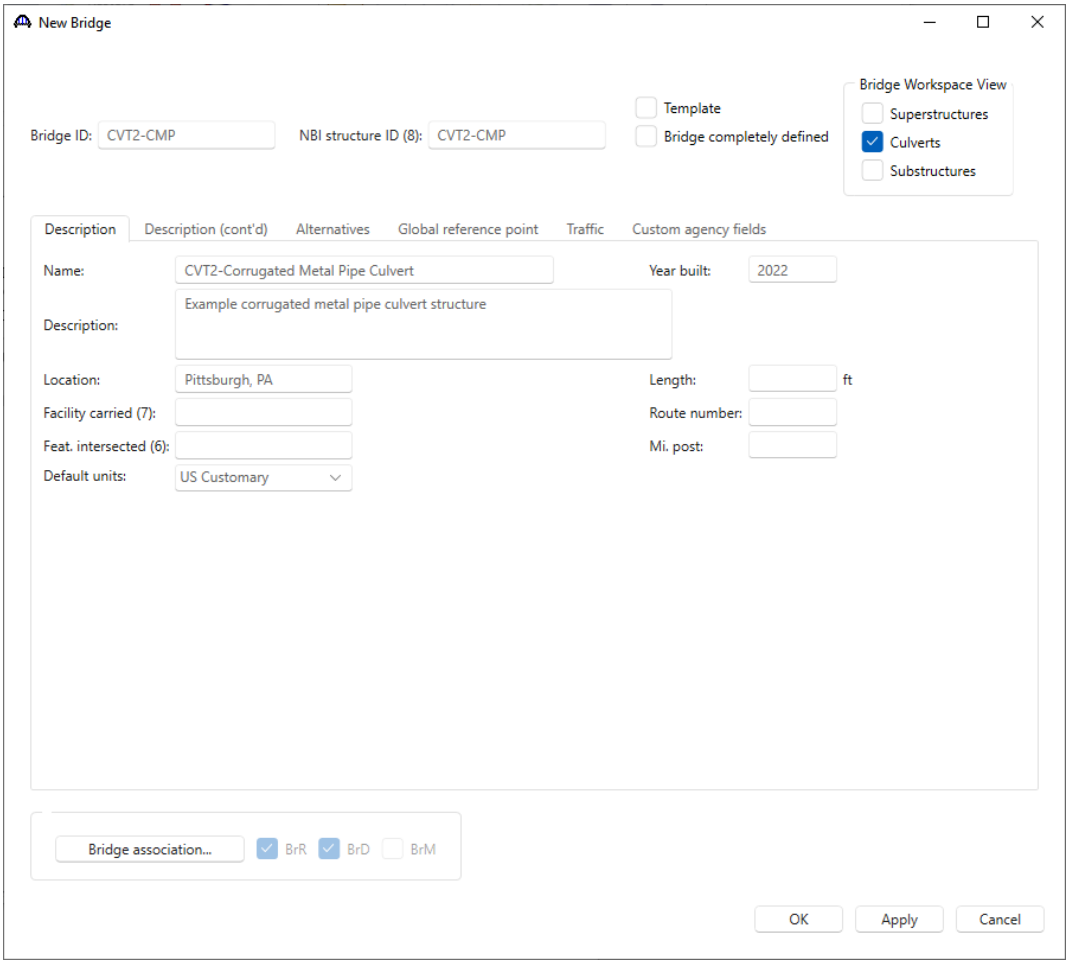


5 x 1 Corrugated stl. Pipe
$t = 0.109\ in$
$A = 1.390\ in^2/ft$
$r = 0.3677\ in$
$I = 15.650\ * 10^{-3}\ in^4/in$
$Mp = 2.660\ kip - ft/ft$
$Seam\ Strength = 62.0\ kip/ft$

Corrugated Metal Pipe Data Entry

From the **Bridge Explorer** create a new bridge by clicking on the **New** button in the **Bridge** group of the **BRIDGE** ribbon and enter the description data as shown below.

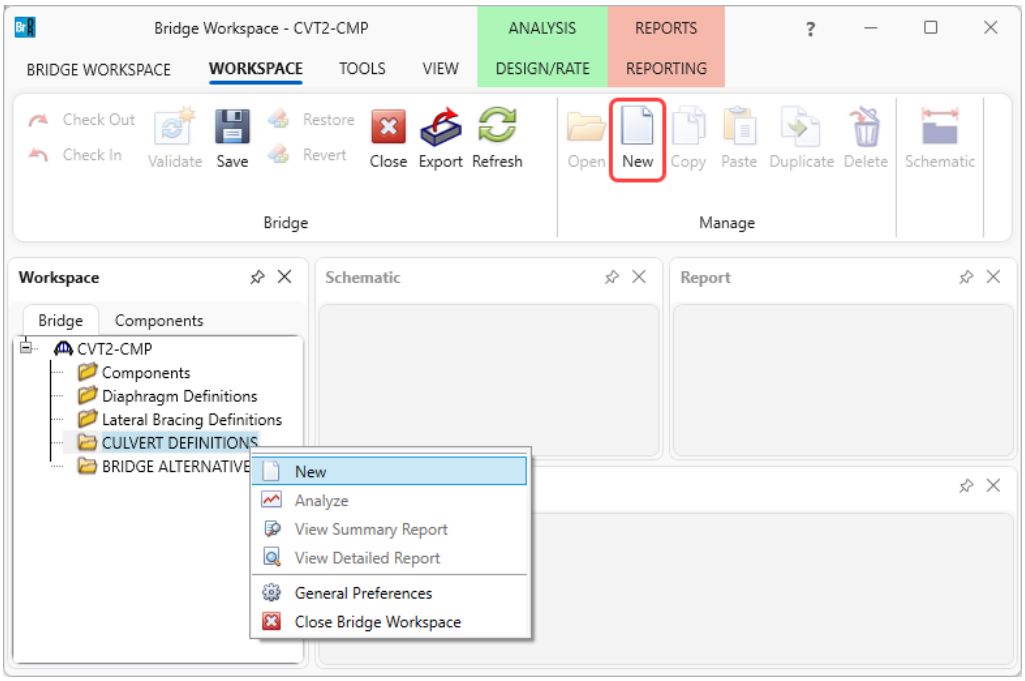


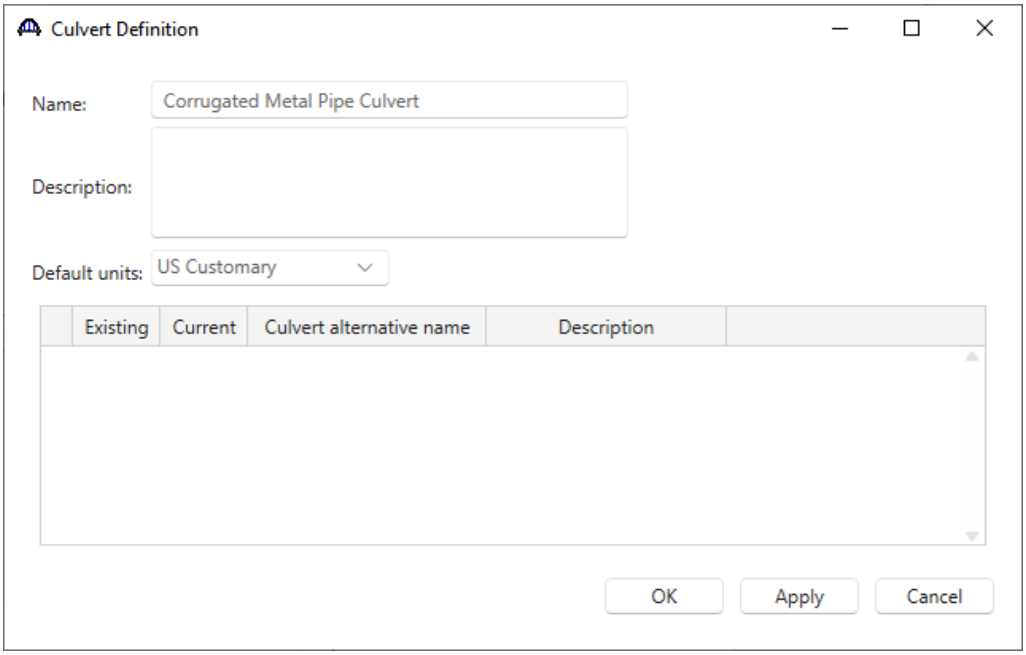


Close the window by clicking **OK**.

Culvert Definition

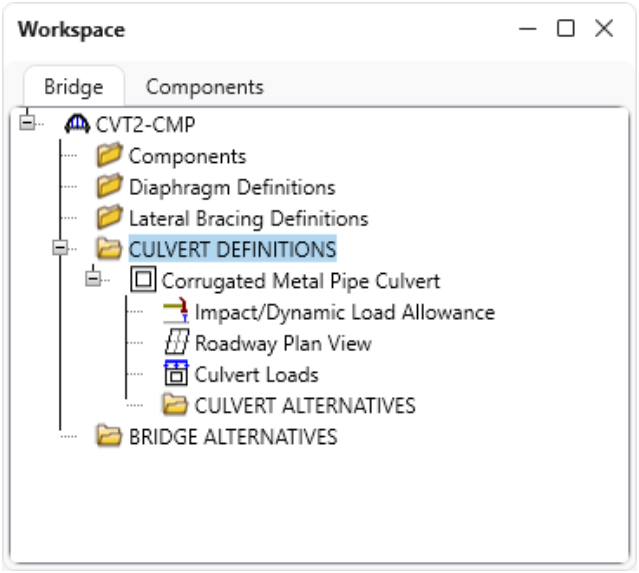
To create a new culvert definition, click on **CULVERT DEFINITIONS** in the **Bridge Workspace** tree and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or double click on the **CULVERT DEFINITION,** or right click and select **New).** Enter the Culvert Definition **Name** as show below.





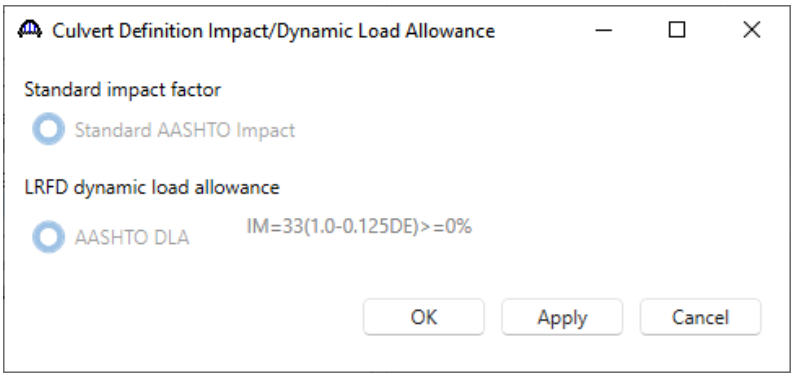
Click **OK** to apply the data and close the window.

Expand the tree for the new culvert structure definition as shown below.



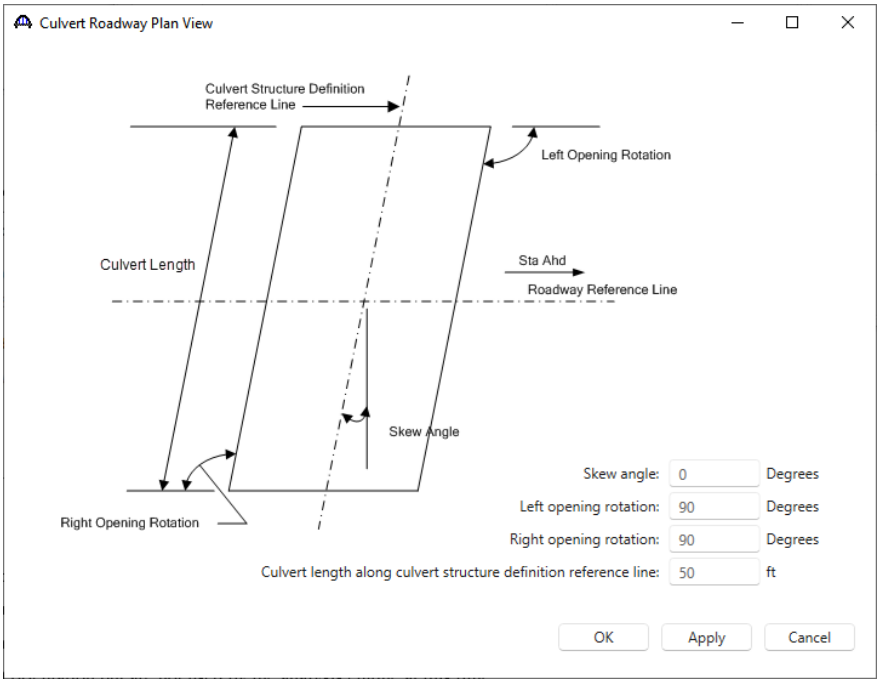
Impact/Dynamic Load Allowance

Impact (LFD) and Dynamic Load Allowance (LRFD) cannot be modified for culvert structure definition, therefore, no additional input can be entered on the **Culvert Definition Impact/Dynamic Load Allowance** window.



Culvert Roadway Plan View

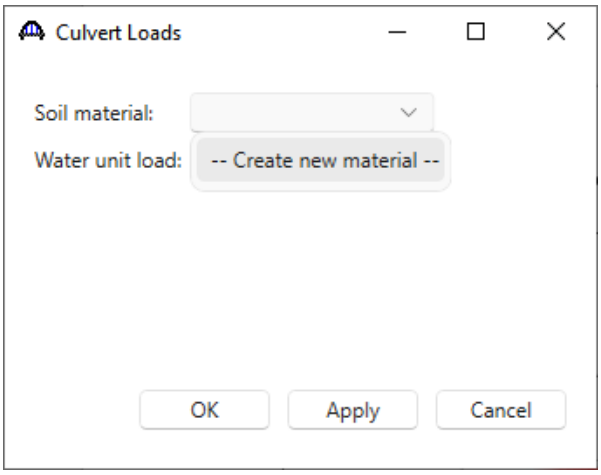
Double click on the **Roadway Plan View** node in the **Bridge Workspace** tree to open the **Culvert Roadway Plan View** window. Enter the culvert orientation details as shown below. The **Culvert length along culvert structure definition reference line** must be input for the live load pressure distribution calculations. The other input items help define the culvert orientation but are not used by the analysis engine at this time.



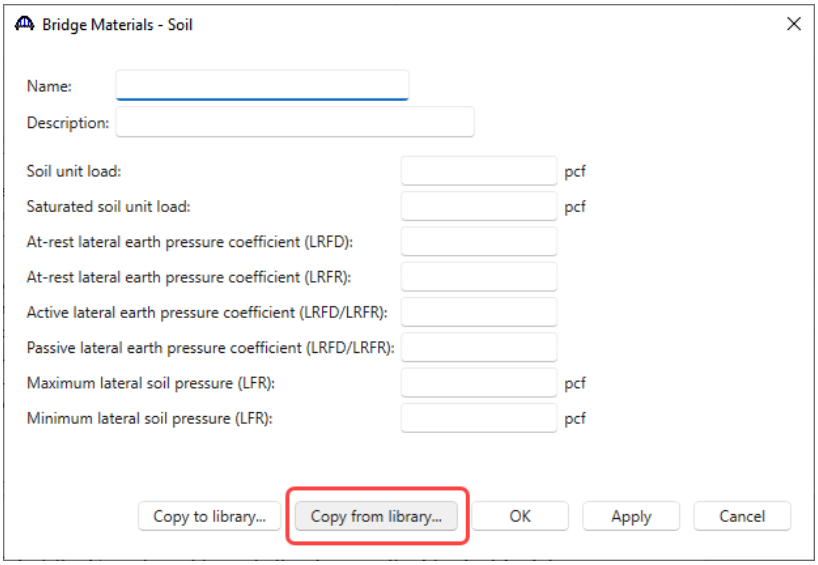
Click **OK** to apply the data and close the window.

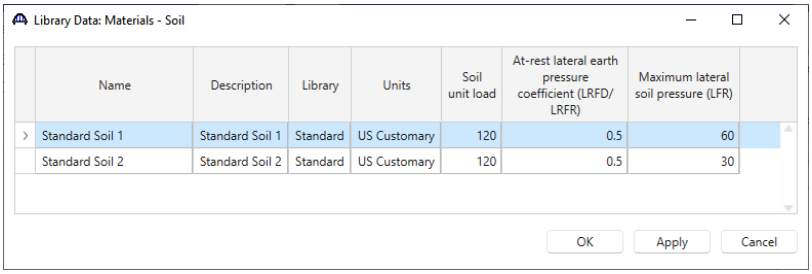
Culvert Loads

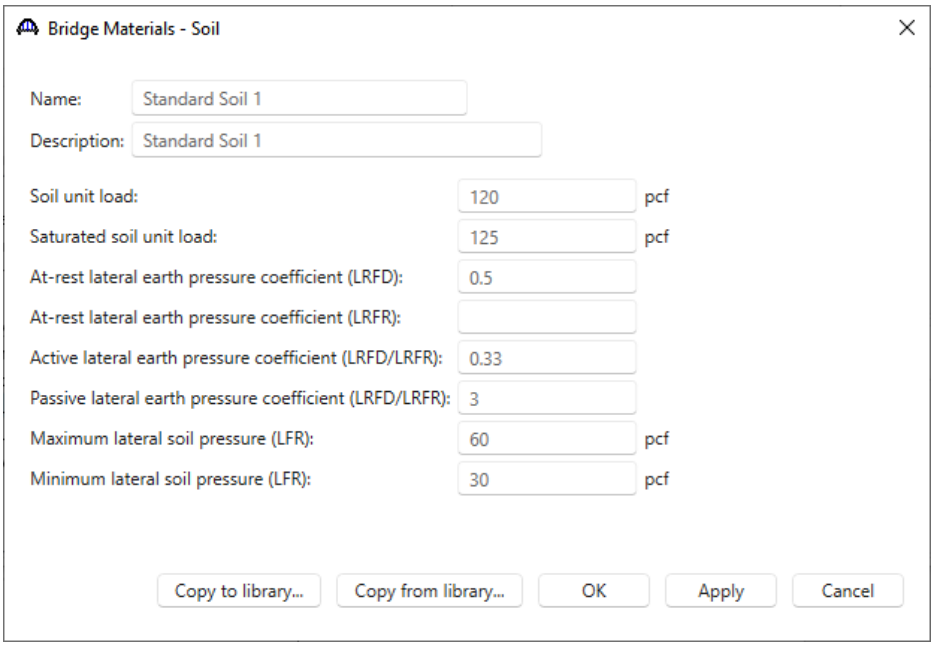
Double-click on the **Culvert Loads** node to open the **Culvert Loads** window. Define the water unit load and soil material in the **Culvert Loads** window. If the soil material is already defined within this bridge, it will show up in the dropdown list of **Soil material.** In this case, since a soil material is not defined, use the **Create new material** option to add a new soil material definition as shown below.



The **Bridge Materials - Soil** window opens as shown below. Select the **Copy from library** button to copy the **Standard Soil 1** definition from the BrDR library.

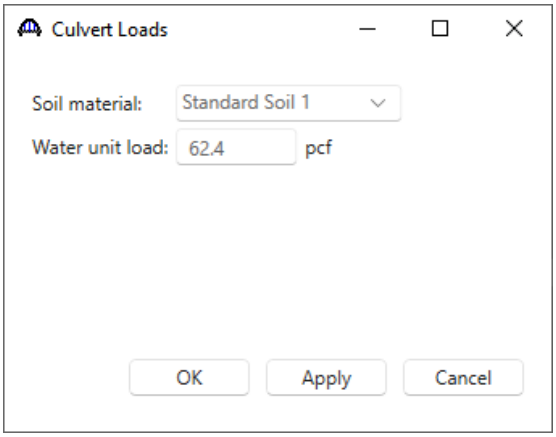






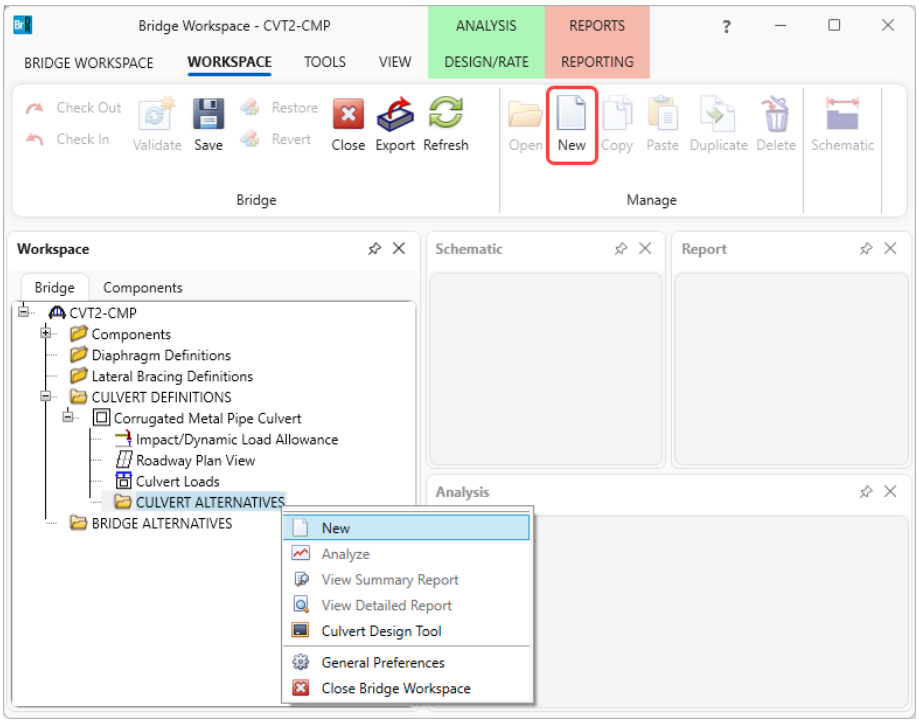
Click **OK** to create and apply this soil material in the Culvert Loads window.

Save the **Culvert Loads** window with the soil material definition and water unit load. The water unit load will populate by default as 62.4 lb/ft^3.



Culvert Alternative

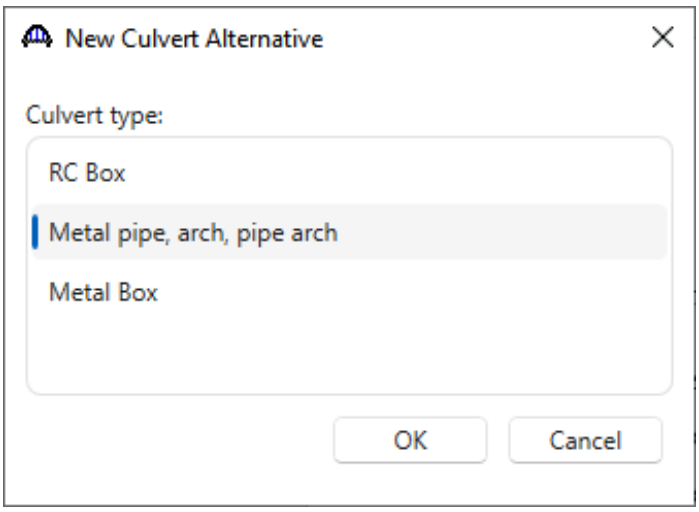
To create a new culvert alternative, click on **CULVERT ALTERNATIVES** in the **Bridge Workspace** tree and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or double click on the **CULVERT ALTERNATIVES,** or right click and select **New).**



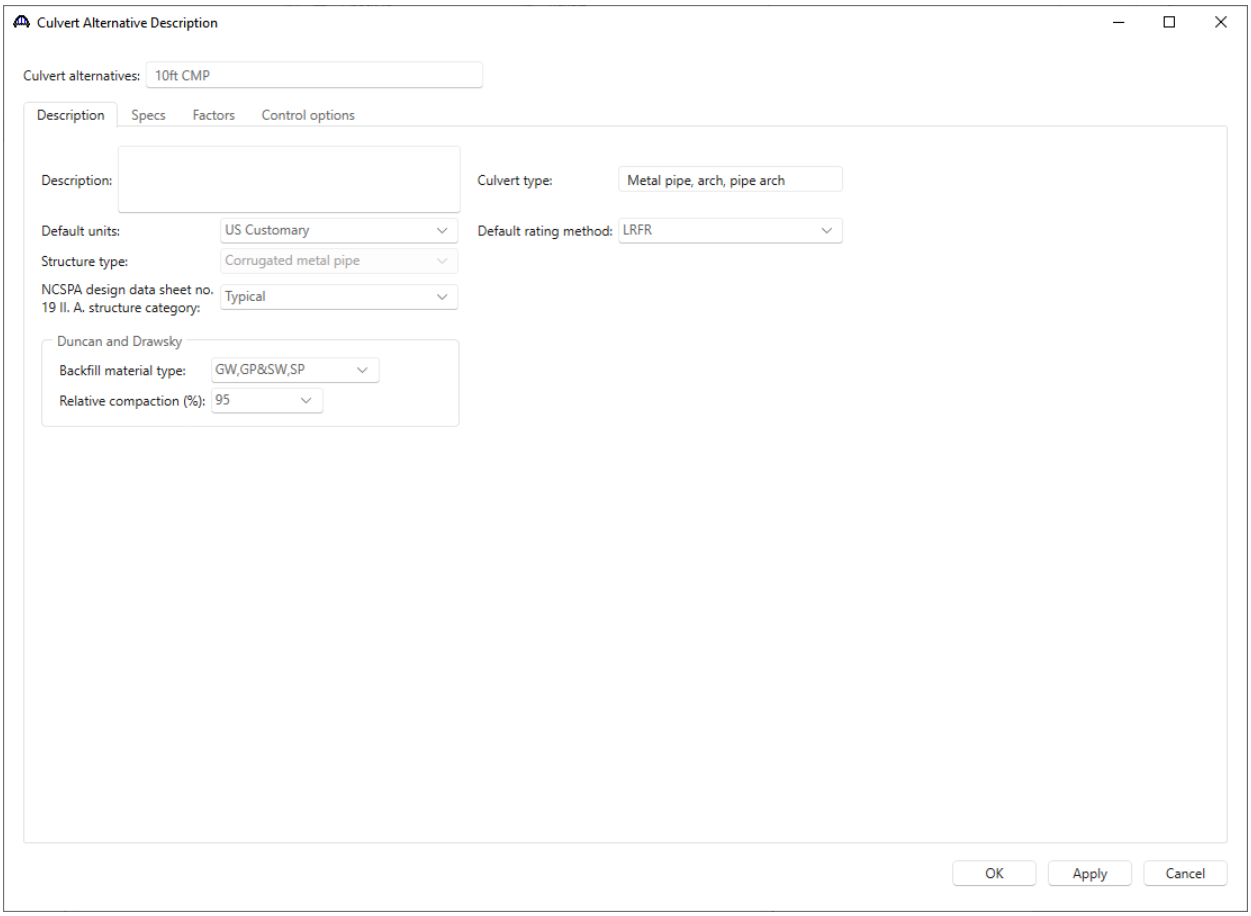
There are three culvert types available in BrDR.

1. Reinforced Concrete Box
2. Metal Pipe, arch, pipe arch
3. Metal box

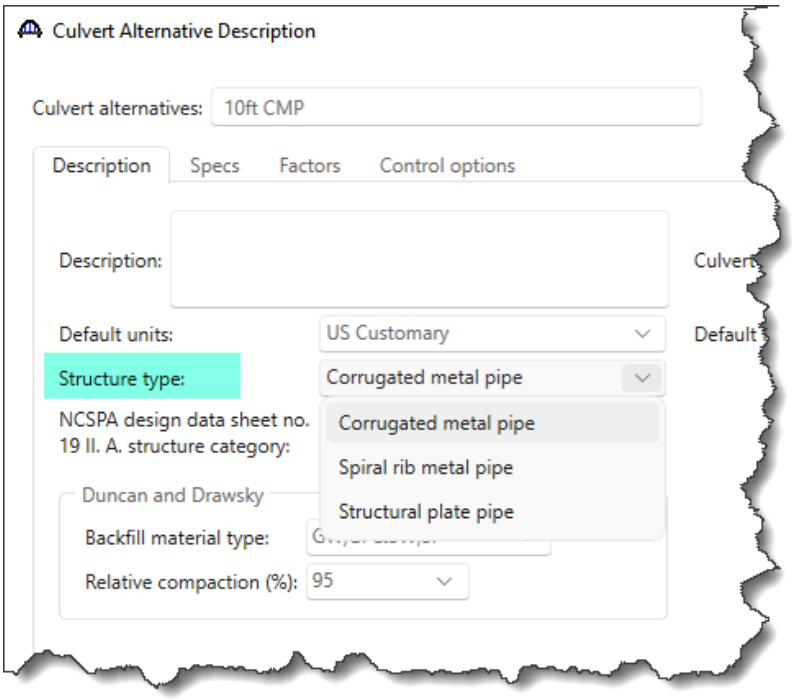
For a corrugated metal pipe culvert, select **Metal pipe, arch, pipe arch** from the available options. The culvert type selection cannot be modified after a culvert alternative is created.



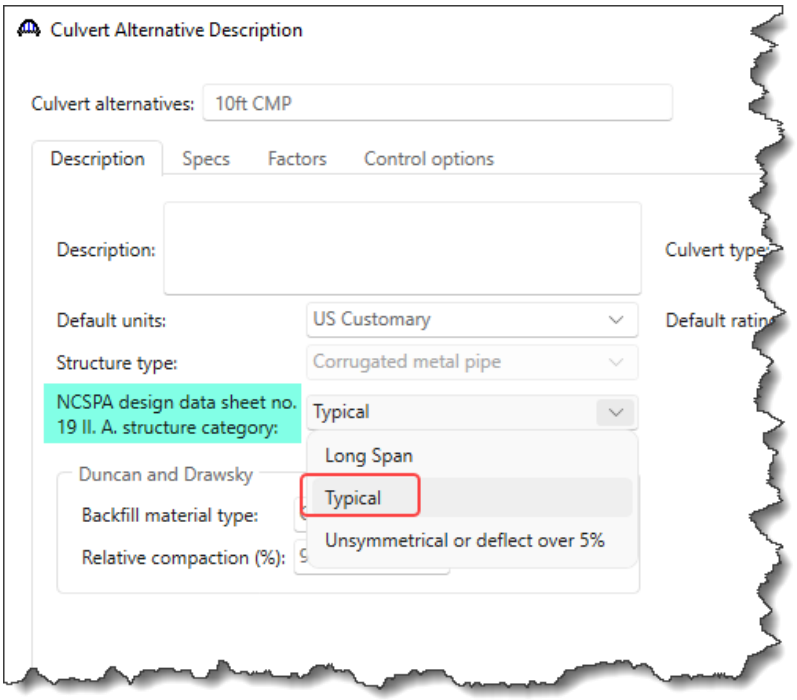
Enter the cuvlert alternative description as shown below.



Metal pipe culverts have three available **Structure types**. The type must be selected when creating a new metal pipe culvert alternative and cannot be modified after the alternative is created.

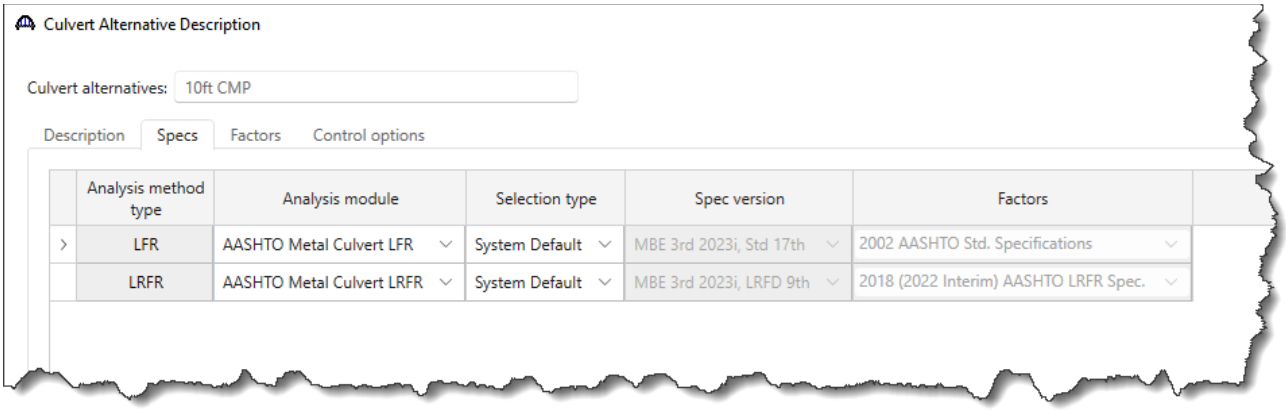


Select **Typical** under the **NCSPA design data sheet no. 19 II. A structure category**.

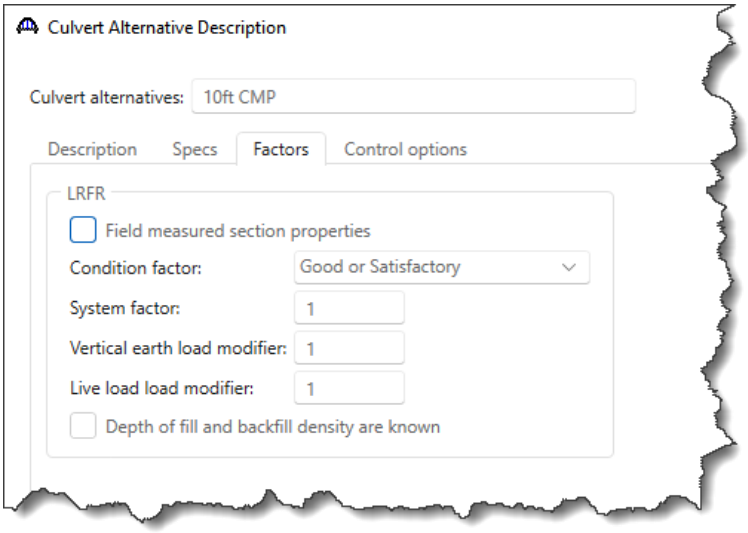


Review the information in each of the tabs of the **Culvert Alternative Description** window.

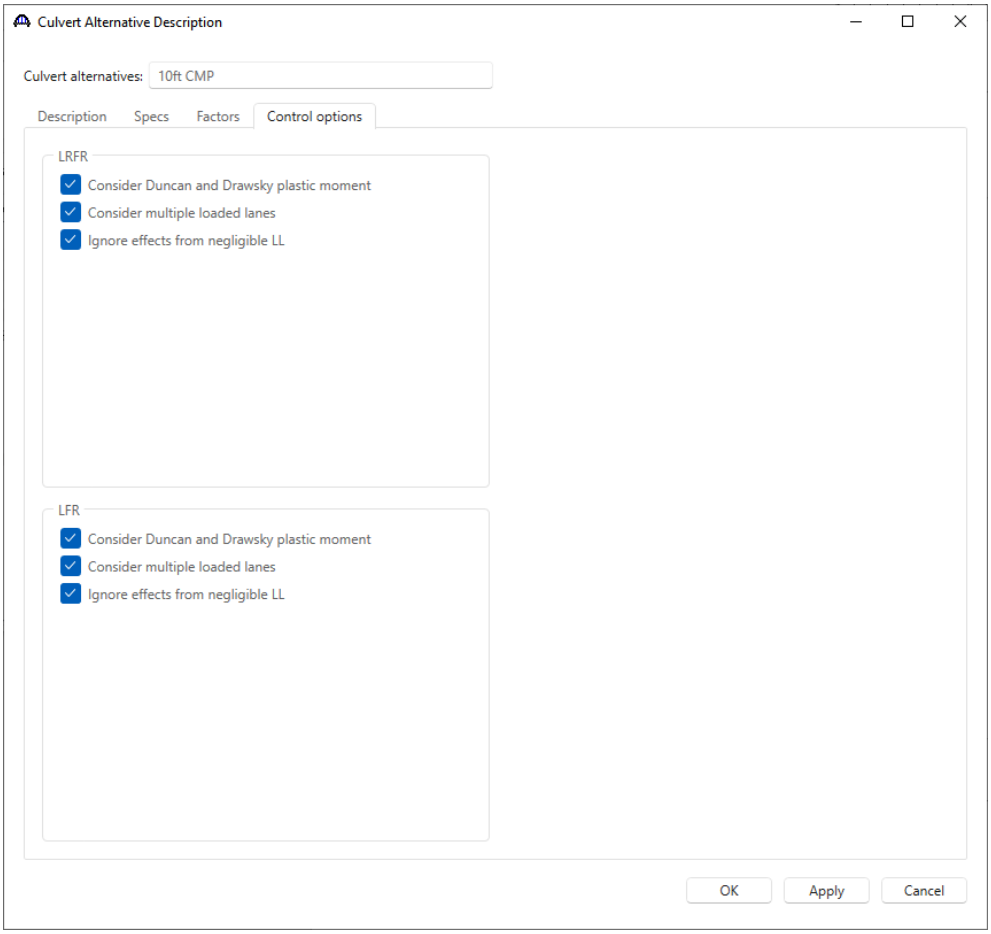
The **Specs** tab shows the analysis modules and specification versions for each analysis method type. The AASHTO metal culvert engine supports LFR and LRFR analysis method types. For both LFR and LRFR, only the MBE 3rd edition 2022 approved ballot items and newer specification versions will be available. Leave the selection set to **System Default** to use the default specification version.



The **Factors** tab provides input to modify the **LRFR** factors. The default options are reasonable to use for this example.



The **Control options** tab has advanced analysis options for LFR and LRFR analysis methods. By default, none of the options are selected. For this example, select all the control options.

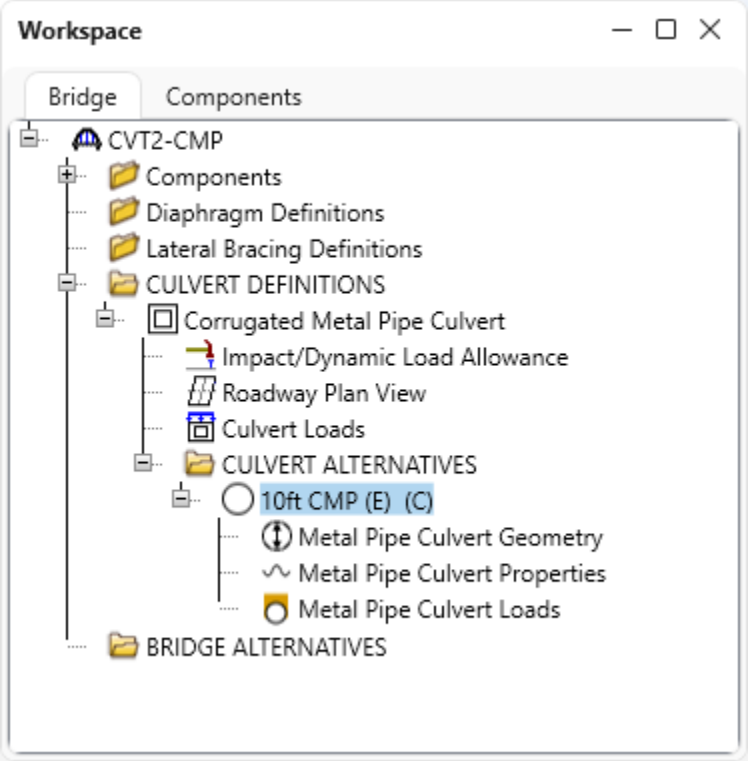


Description of Metal Pipe Culvert Alternative control options:

1. Consider Duncan and Drawsky plastic moment – Select this option to load rate a culvert alternative using the plastic moment capacity in addition to the wall capacity. The plastic moment capacity is computed according to the method described in *Design Procedures for Flexible Metal Culvert Structures* by J. M. Duncan and R. H. Drawsky (1983).
2. Consider multiple loaded lanes – This option considers multiple loaded lanes in the live load pressure calculations.
3. Ignore effects from negligible live load – Use this control option to skip the rating when live load pressure at the depth of the culvert is less than 10% of the total pressure at the depth of the culvert.

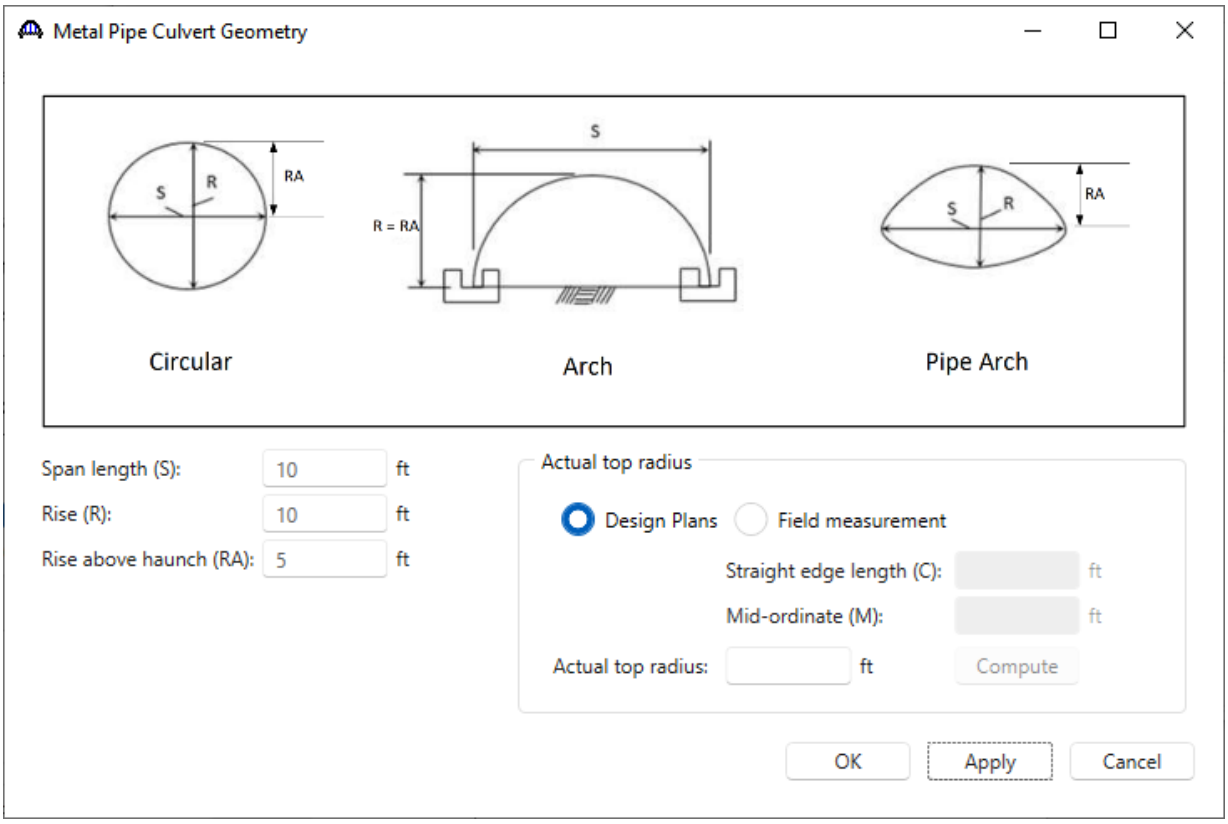
Click **OK** to create a new culvert alternative and close the window.

Expand the tree for the new culvert alternative as shown below.



Metal Pipe Culvert Geometry

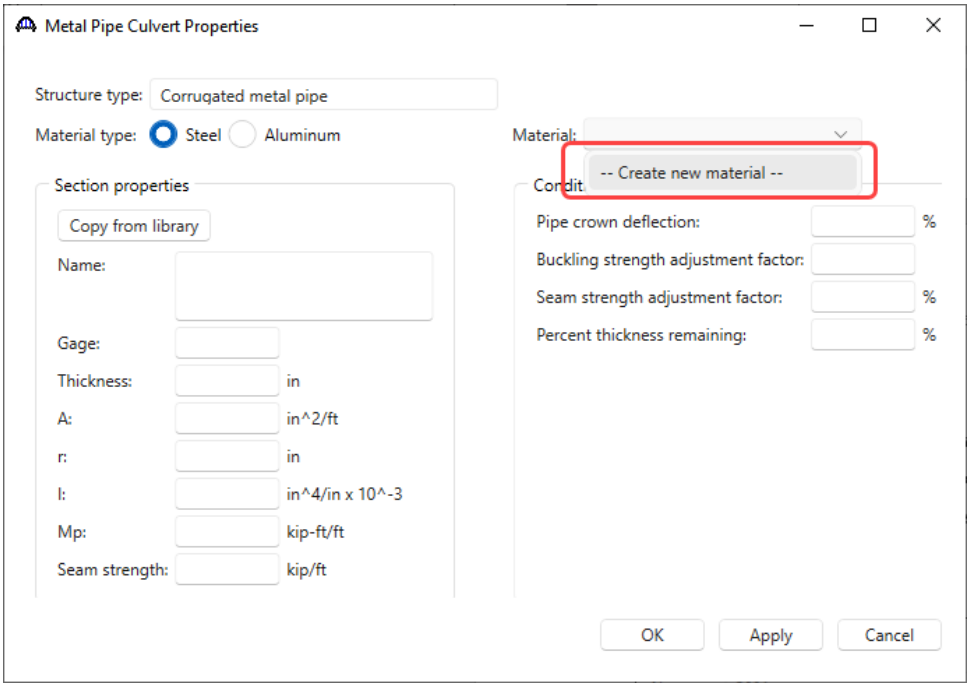
Double click on the **Metal Pipe Culvert Geometry** node in the **Bridge Workspace** tree to open the **Metal Pipe Culvert Geometry** window to enter the culvert geometry. Refer to the diagrams included in the window for the dimensions of the specific metal pipe culvert structure you are entering. For the corrugated metal pipe in this example, the dimensions correspond to the circular pipe diagram. This example is a **Typical** structure category type, but when **Long span**, or **Unsymmetrical or Deflect over 5%** are selected under the **NCSPA design data sheet no. 19 II. A structure category** in the **Culvert Alternative Description - Description** window, the actual top radius must also be input.



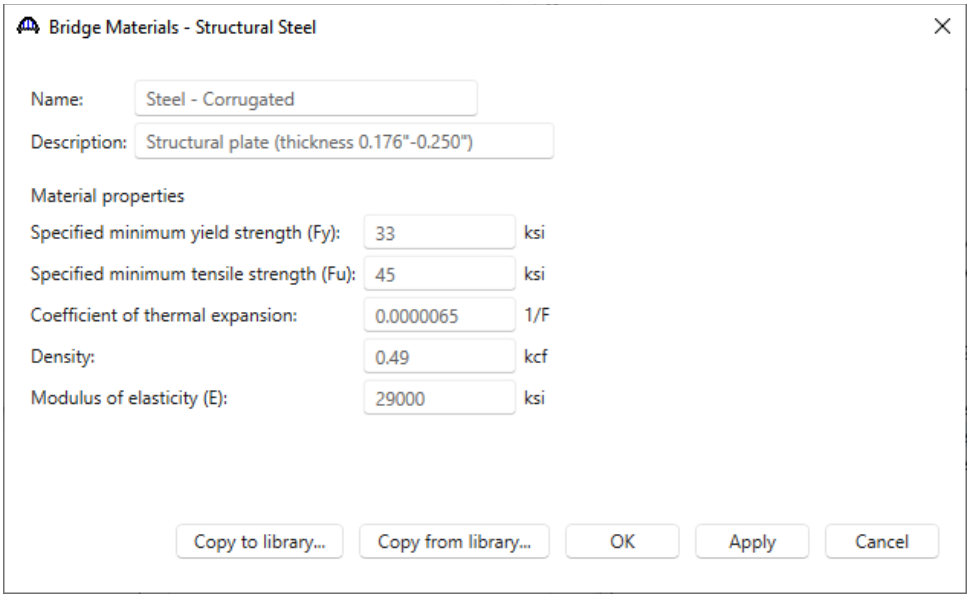
Click **OK** to apply the data and close the window.

Metal Pipe Culvert Properties

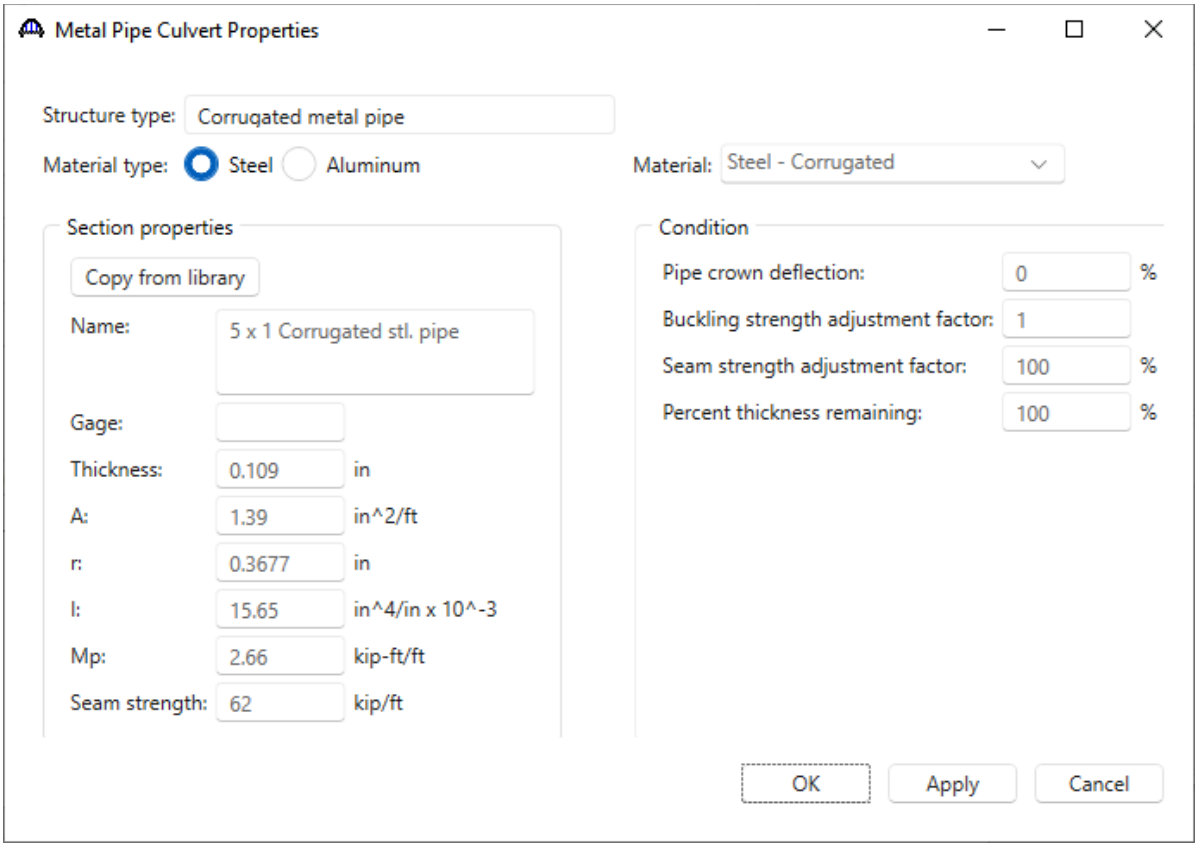
Double-click on the **Metal Pipe Culvert Properties** node in the **Bridge Workspace** tree to enter the pipe culvert section properties, material, and culvert condition. Both steel and aluminum materials are available for the metal pipe culverts. First, select **Steel** and use the **Create new material** option from the material dropdown list to define a steel material.



Use the **Copy from library…** option to copy the **Steel - Corrugated** structural steel material definition. Select OK to save the new steel material.



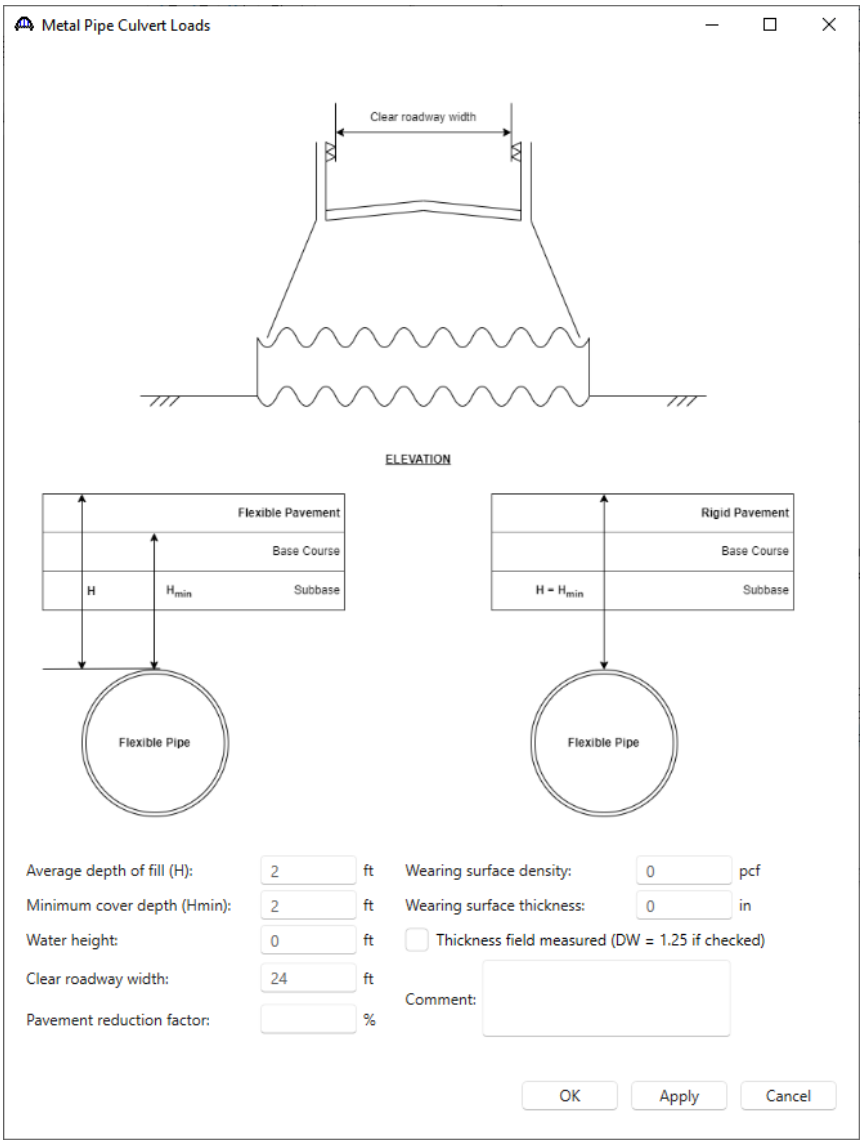
Input the section properties and condition for the corrugated steel pipe as shown below.



Click **OK** to apply the data and close the window.

Metal Pipe Culvert Loads

Double-click on the **Metal Pipe Culvert Loads** node in the **Bridge Workspace** tree to enter details about the metal pipe culvert loads in the **Metal Pipe Culvert Loads** window. Since the control option for **Consider multiple loaded lanes** is selected, the **Clear roadway width** input will be used to determine the number of lanes. The **Pavement reduction factor** is an input item introduced in the 2022 approved ballot item specification revisions. If applying the **Pavement reduction factor**, enter the factor as a percent by which you want to reduce the live load pressure. If the input is left blank, the AASHTO Metal Culvert Engine will apply a factor of 100%, or in other words 100% of the live load pressure will be applied to the culvert.

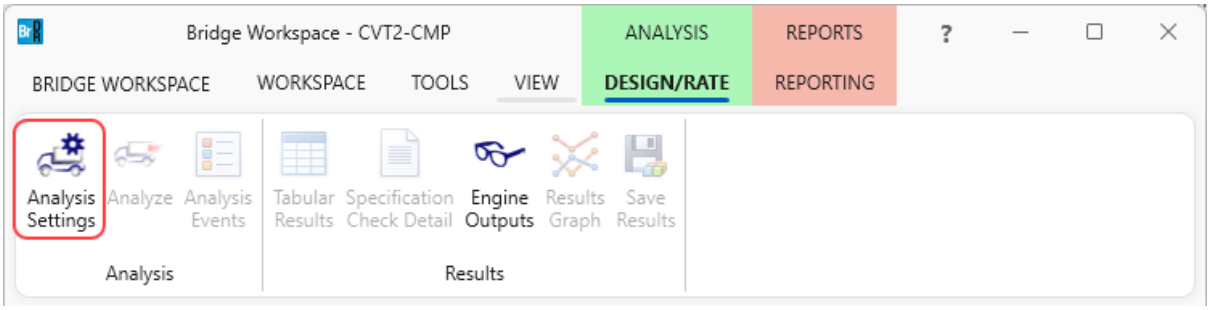


This completes the data entry for the corrugated metal pipe culvert structure.

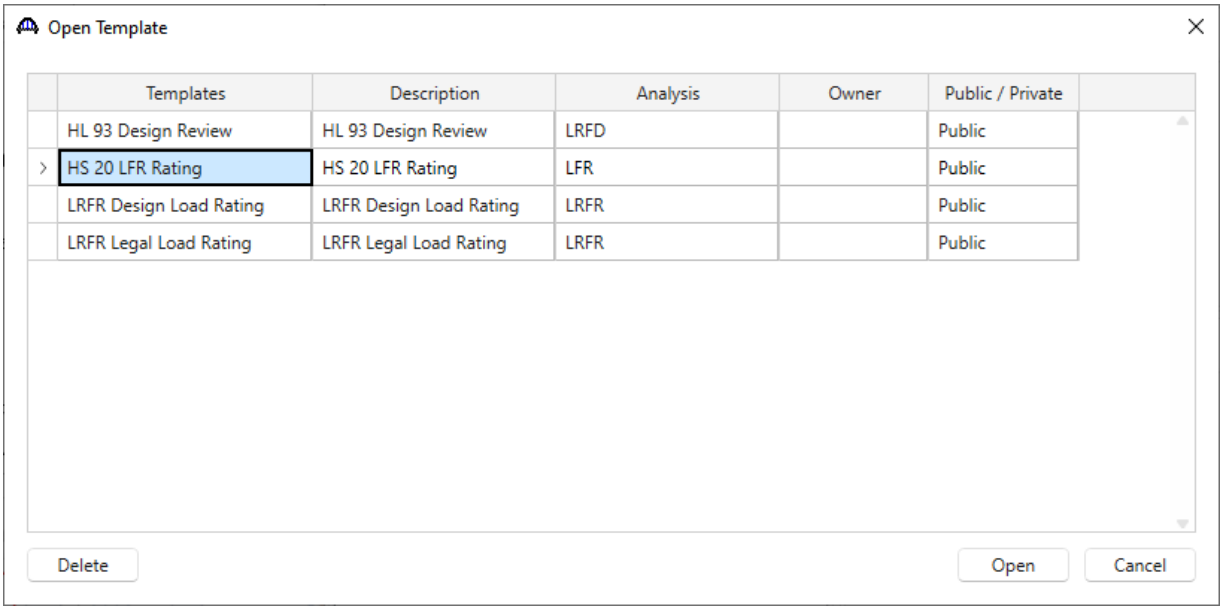
Corrugated Metal Pipe Culvert LFR Analysis.

LFR Analysis

To perform an LFR Rating, select the **10ft CMP** alternative in the **Bridge Workspace** tree and click the **Analysis Settings** button from the **Analysis** group of the **DESIGN/RATE** ribbon.

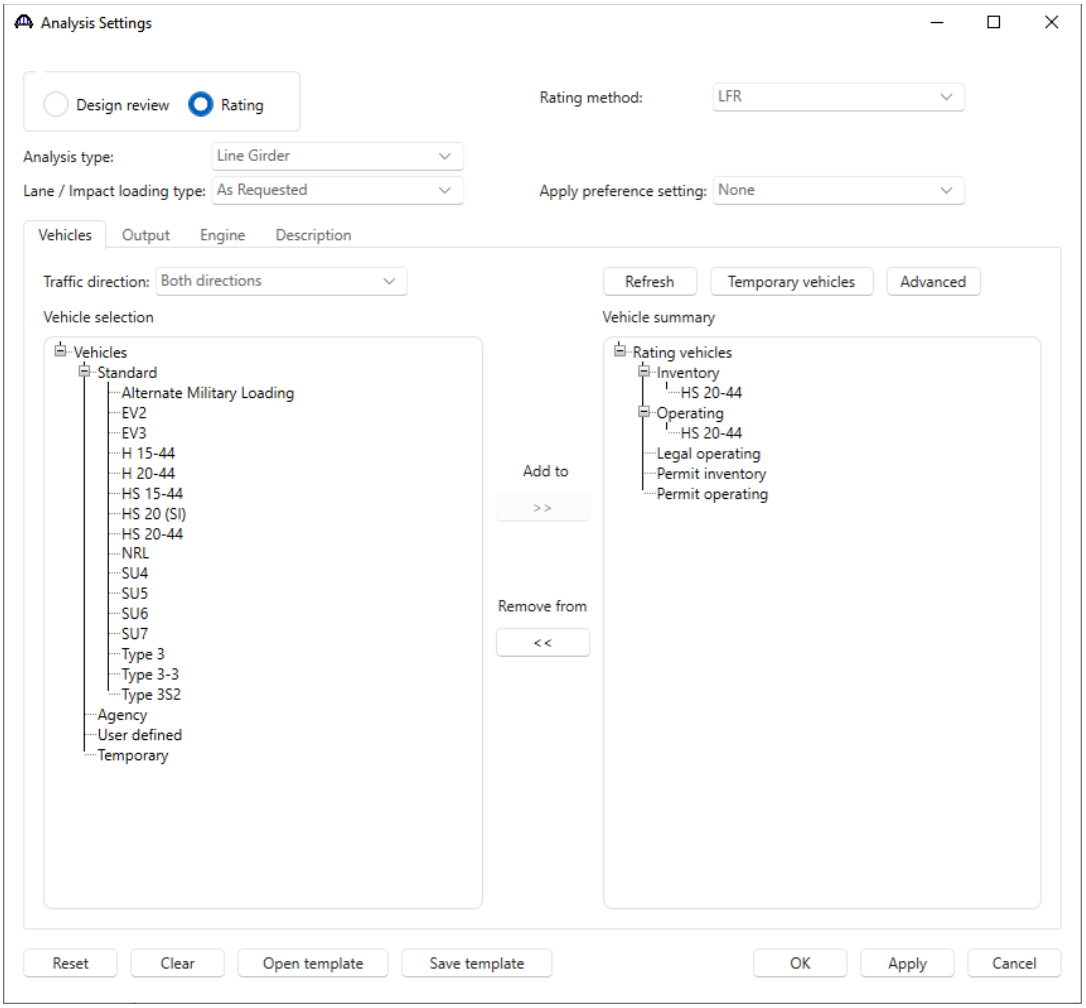


The **Analysis Settings** window will open. Click the **Open template** button and select the **HS 20 LFR Rating** to be used in the rating and click **Open**.

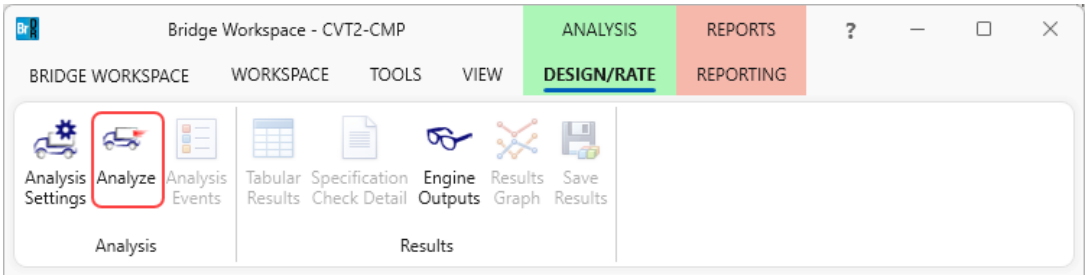


Click **OK** to apply the data and close the window.

The **Analysis Settings** window will be populated as shown below. Click **OK** to apply the data and close the window.

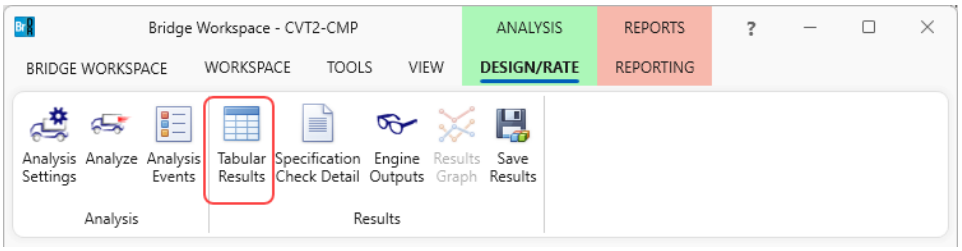


Click the **Analyze** button from the **Analysis** group of the **DESIGN/RATE** ribbon to start the rating process.

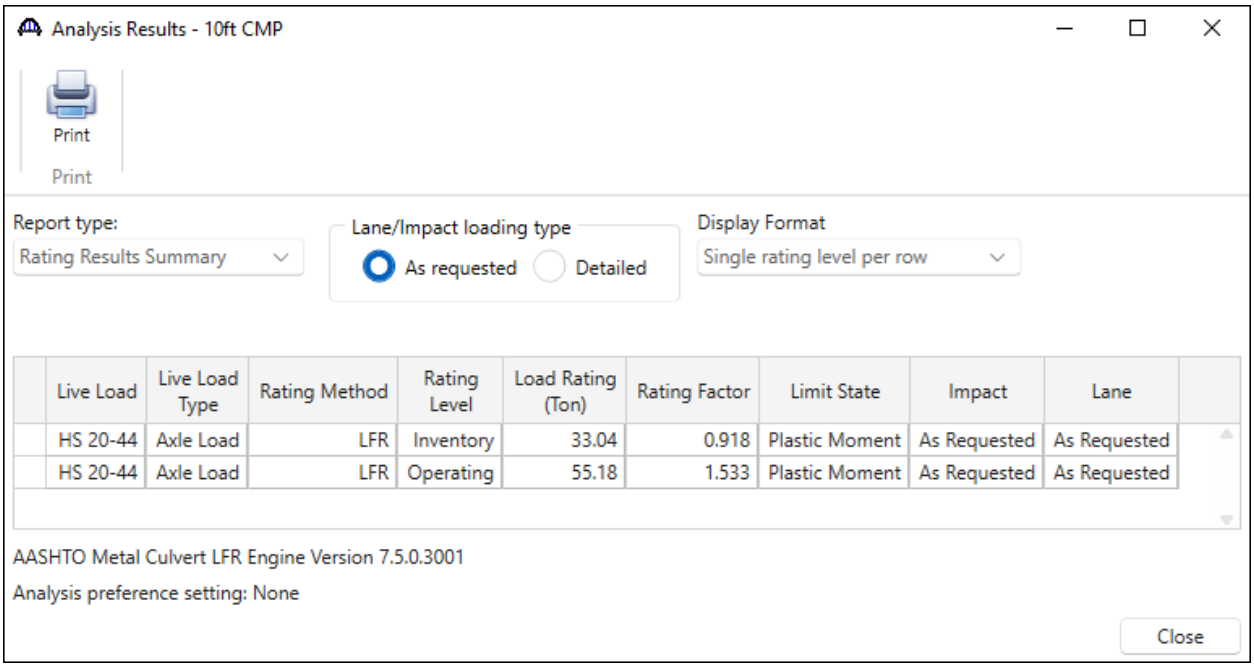


Tabular Results

When the rating is completed, results can be reviewed by clicking the **Tabular Results** button from the **Results** group of the **DESIGN/RATE** ribbon.

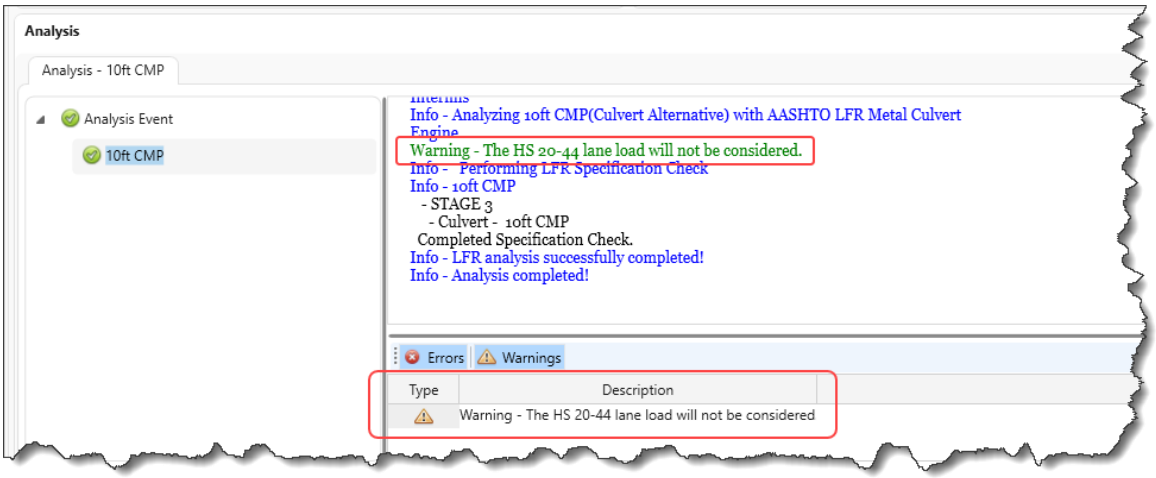


The window shown below will open. Select **Single rating level per row** as the display format to display the output in single rows as shown below. The **Rating Results Summary** is the only report type available following a metal culvert analysis.



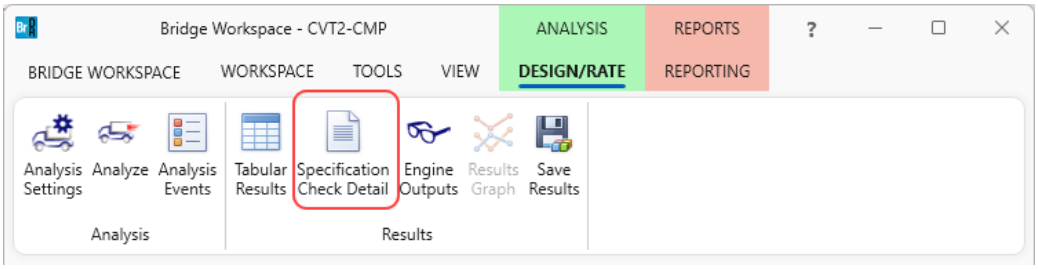
Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Limit State	Impact	Lane
HS 20-44	Axle Load	LFR	Inventory	33.04	0.918	Plastic Moment	As Requested	As Requested
HS 20-44	Axle Load	LFR	Operating	55.18	1.533	Plastic Moment	As Requested	As Requested

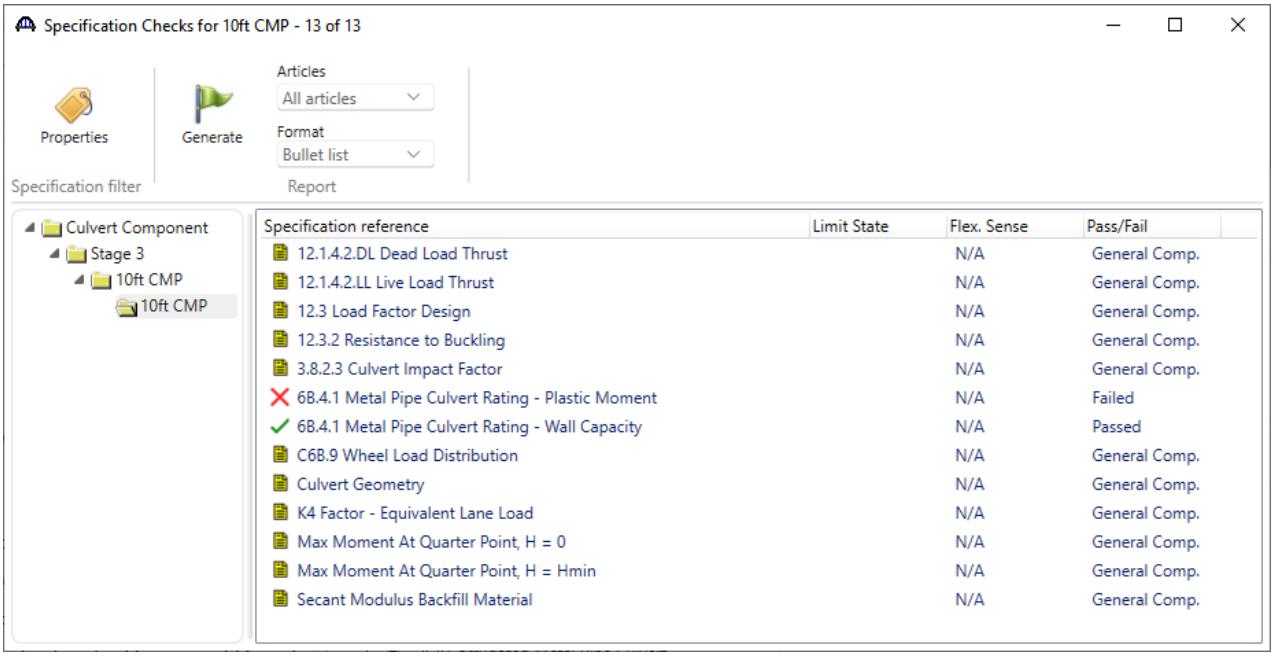
Review the **Analysis Progress** log shown below. The warning shown informs that the lane load portion of the HS 20-44 vehicle is not considered for the metal culvert analysis. Some advanced vehicle loading options are not applicable to the metal culvert analysis including lane loads, adjacent vehicles, fatigue trucks, and tandem trains.



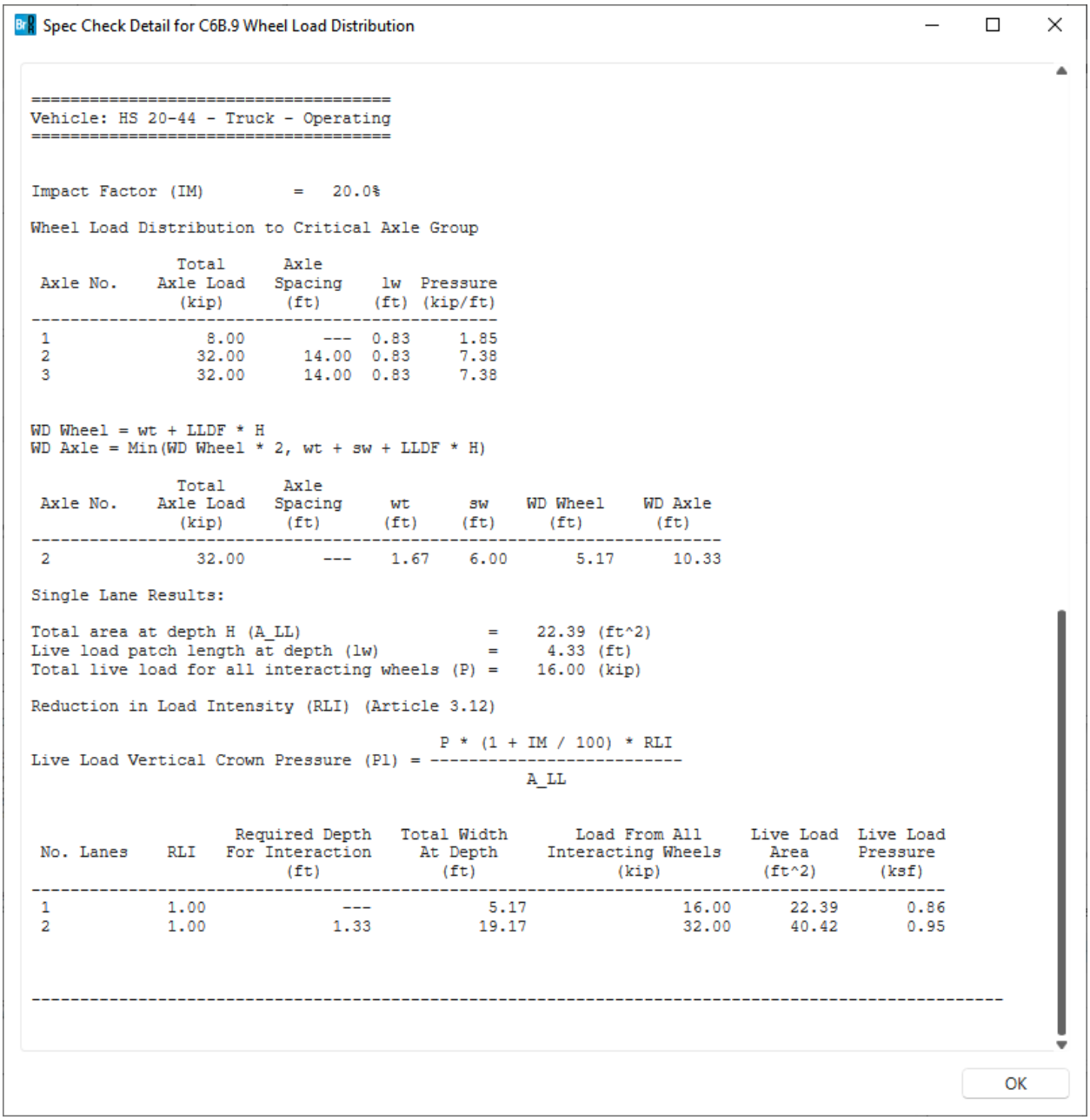
Specification Check Detail

To review detailed rating results at the controlling location, use the **Specification Check Detail** button in the ribbon to open the **Specification** window. Note that the metal culvert only has one POI for specification checking. The 6B.4.1 Metal Pipe Culvert Rating – Plastic Moment rating article and the last four calculation articles listed are included because the LFR control option for Duncan and Drawsky plastic moment was selected.





Open the **C6B.9 Wheel Load Distribution** specification article to display detailed calculations for the LFR vehicle live loading. This article includes calculations for each vehicle and each analysis category. The live load pressure calculations are shown below for the HS 20-44 truck in the operating analysis category.




```
====================================
Vehicle: HS 20-44 - Truck - Operating
====================================


Impact Factor (IM)         =   20.0%

Wheel Load Distribution to Critical Axle Group

               Total      Axle
 Axle No.    Axle Load   Spacing     lw  Pressure
               (kip)      (ft)      (ft) (kip/ft)
-----------------------------------------------
 1               8.00        ---  0.83     1.85
 2              32.00      14.00  0.83     7.38
 3              32.00      14.00  0.83     7.38


WD Wheel = wt + LLDF * H
WD Axle = Min(WD Wheel * 2, wt + sw + LLDF * H)

               Total      Axle
 Axle No.    Axle Load   Spacing     wt      sw    WD Wheel    WD Axle
               (kip)      (ft)      (ft)    (ft)     (ft)       (ft)
-------------------------------------------------------------------------
 2              32.00        ---    1.67    6.00       5.17      10.33

Single Lane Results:

Total area at depth H (A_LL)                  =    22.39 (ft^2)
Live load patch length at depth (lw)          =     4.33 (ft)
Total live load for all interacting wheels (P) =    16.00 (kip)

Reduction in Load Intensity (RLI) (Article 3.12)

                                        P * (1 + IM / 100) * RLI
Live Load Vertical Crown Pressure (Pl) = --------------------------
                                                 A_LL

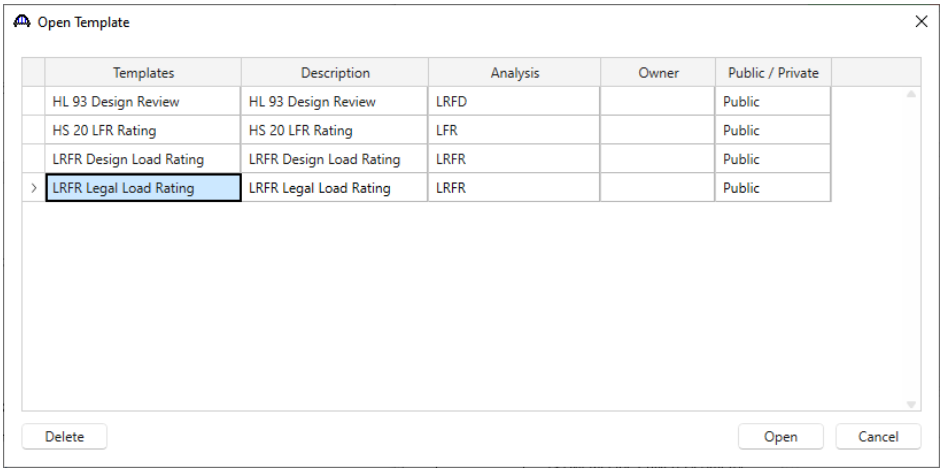

                    Required Depth   Total Width       Load From All     Live Load  Live Load
 No. Lanes    RLI   For Interaction     At Depth     Interacting Wheels     Area     Pressure
                         (ft)             (ft)              (kip)          (ft^2)      (ksf)
-------------------------------------------------------------------------------------------
 1            1.00             ---          5.17               16.00      22.39       0.86
 2            1.00            1.33         19.17               32.00      40.42       0.95


-------------------------------------------------------------------------------------------------------
```

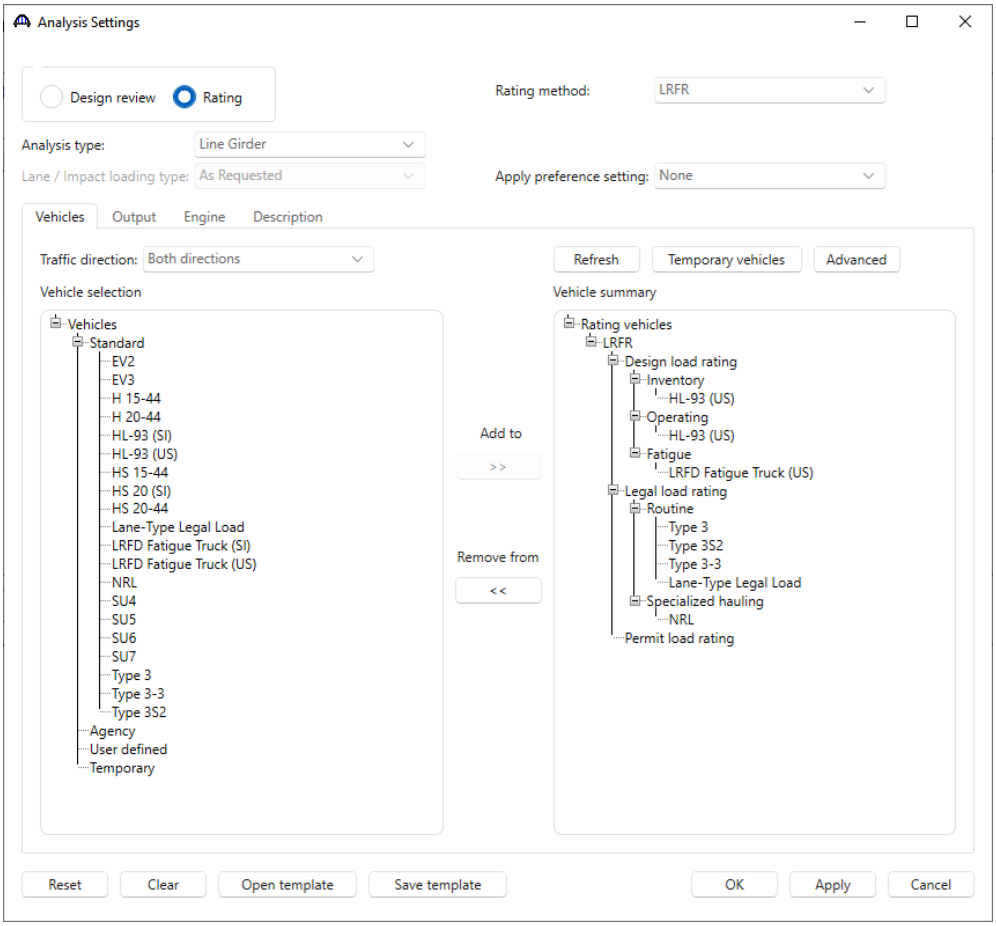
Corrugated Metal Pipe Culvert LRFR Analysis.

LRFR Analysis

Close the spec check window and reopen the **Analysis Settings** window to test an **LRFR** analysis. Click the **Open template button** and select the **LRFR Legal Load Rating** to be used in the rating and click **Open**.

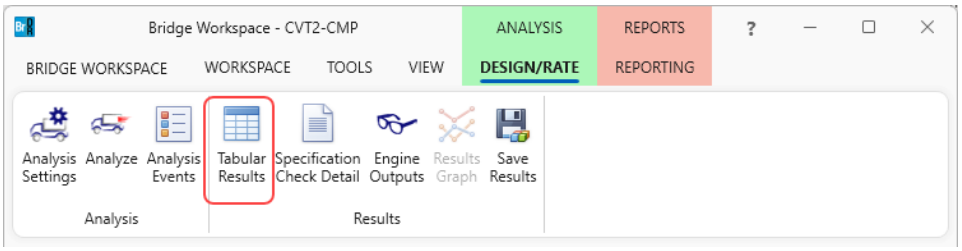


The **Analysis Settings** window will be populated as shown below.

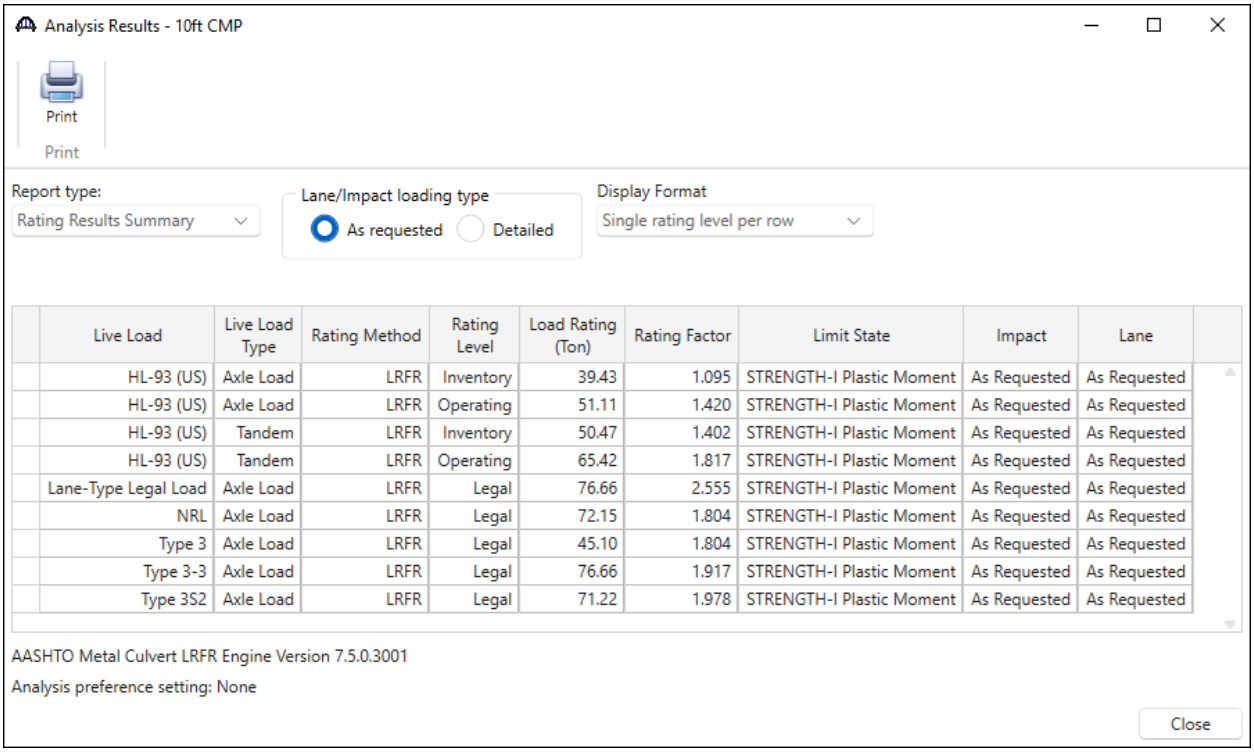


Click **OK** to apply the settings and close the window.

Click **Analyze** on the ribbon to launch the rating. When the rating analysis is complete, review the results by clicking the **Tabular Results** button on the ribbon.

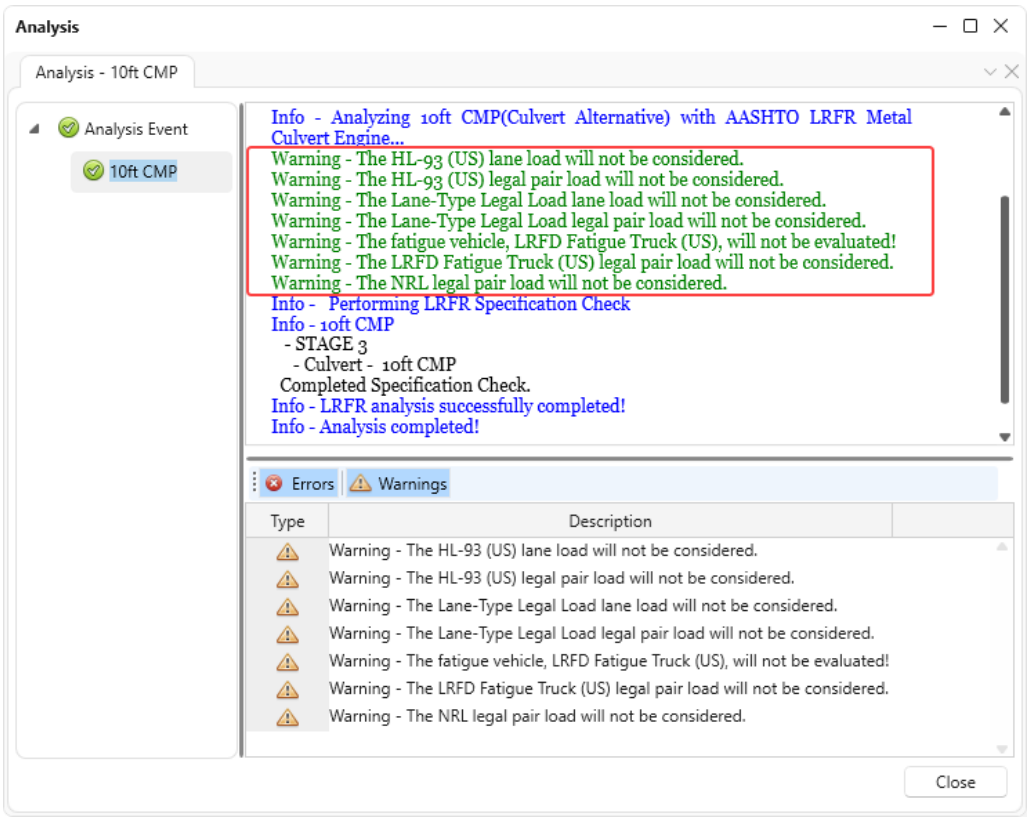


The window shown below will open. Select **Single rating level per row** as the display format to display the output in single rows as shown below. The **Rating Results Summary** is the only report type available following a metal culvert analysis.



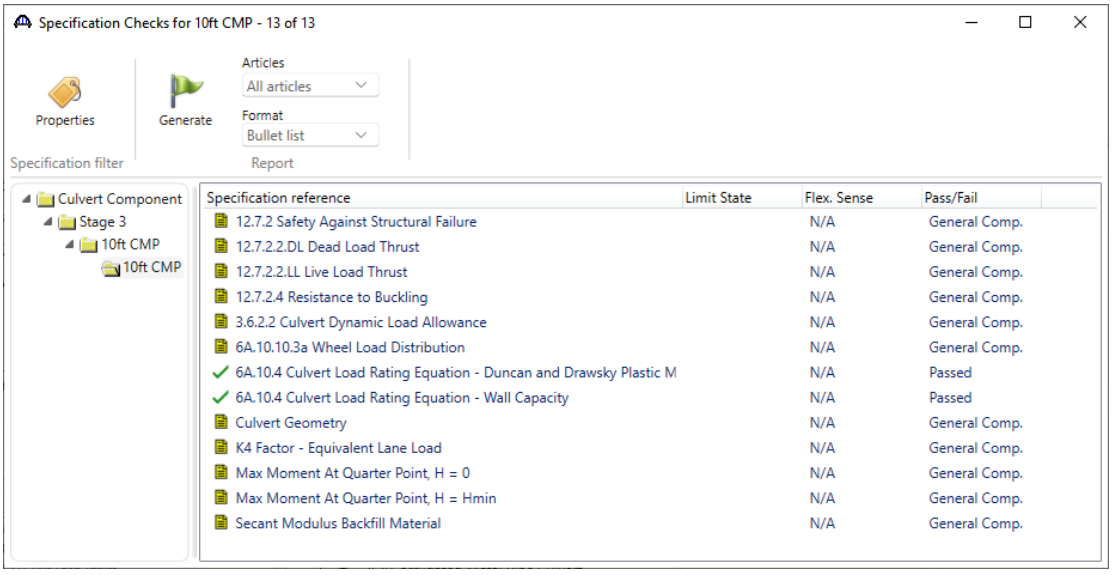
Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Limit State	Impact	Lane
HL-93 (US)	Axle Load	LRFR	Inventory	39.43	1.095	STRENGTH-I Plastic Moment	As Requested	As Requested
HL-93 (US)	Axle Load	LRFR	Operating	51.11	1.420	STRENGTH-I Plastic Moment	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Inventory	50.47	1.402	STRENGTH-I Plastic Moment	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Operating	65.42	1.817	STRENGTH-I Plastic Moment	As Requested	As Requested
Lane-Type Legal Load	Axle Load	LRFR	Legal	76.66	2.555	STRENGTH-I Plastic Moment	As Requested	As Requested
NRL	Axle Load	LRFR	Legal	72.15	1.804	STRENGTH-I Plastic Moment	As Requested	As Requested
Type 3	Axle Load	LRFR	Legal	45.10	1.804	STRENGTH-I Plastic Moment	As Requested	As Requested
Type 3-3	Axle Load	LRFR	Legal	76.66	1.917	STRENGTH-I Plastic Moment	As Requested	As Requested
Type 3S2	Axle Load	LRFR	Legal	71.22	1.978	STRENGTH-I Plastic Moment	As Requested	As Requested

Review the **Analysis Progress** log . As with the LFR analysis, the warnings shown informs that some of the selected loads are not appliable to metal culverts. See sample below.

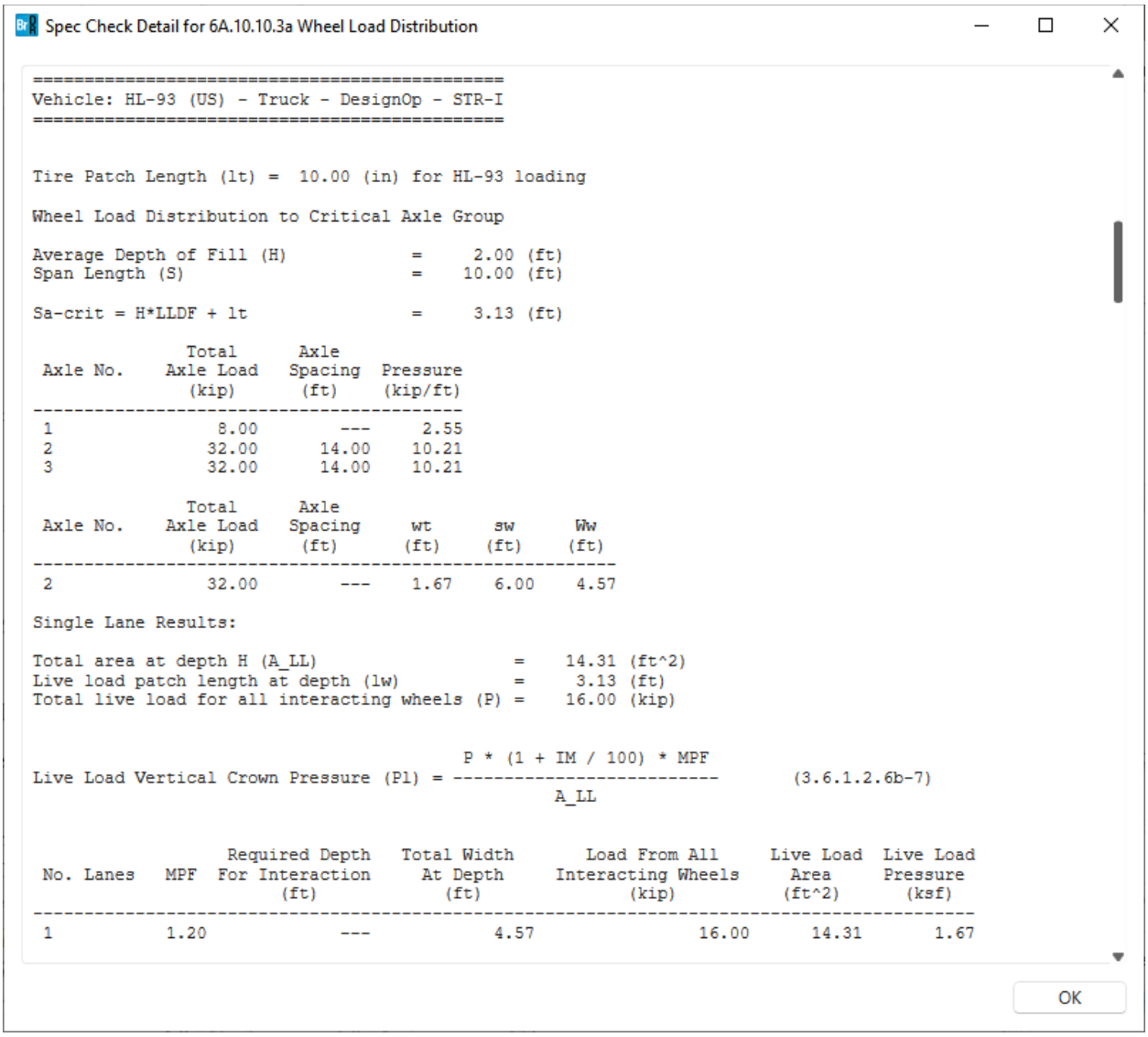


Specification Check Detail

To review detailed rating results at the controlling location, click on the **Specification Check Detail** button in the ribbon to open the **Specification Checks** window. Note that the metal culvert only has one POI for specification checking. The **6A.10.4 Culvert Load Rating Equation – Duncan and Drawsky Plastic Moment** rating article and the last four calculation articles listed are included because the LRFR control option for Duncan and Drawsky plastic moment as selected.



Open the **6A.10.10.3a Wheel Load Distribution** specification article for detailed calculations for the LRFR vehicle live loading. This article includes calculations for each vehicle and each analysis category. The live load pressure calculations are shown below for the HL-93 truck in the operating analysis category.



Culvert Tutorial

CVT3 – Metal Box Culvert Example

CVT3 – Metal Box Culvert Example

Topics Covered

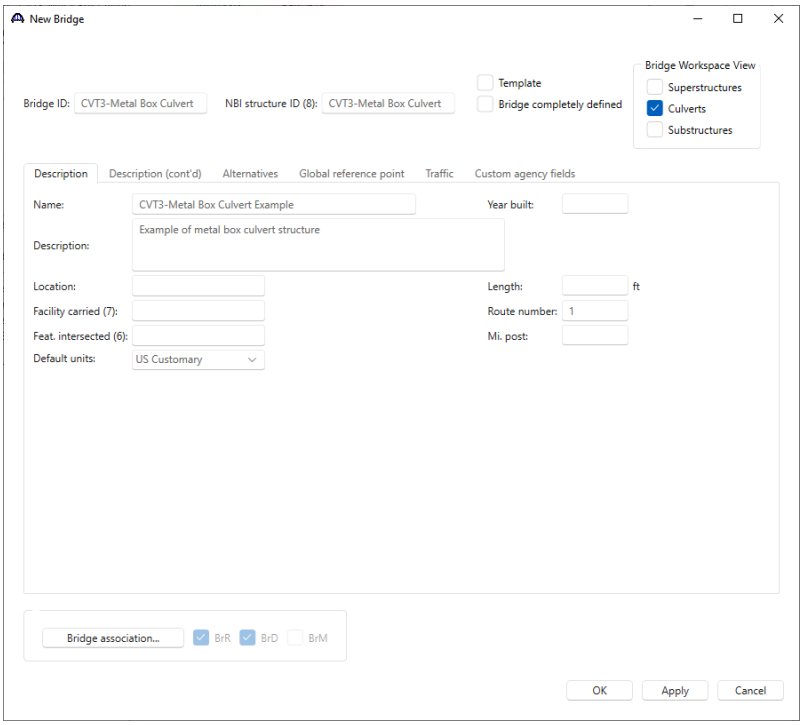
- Metal Box Culvert Alternative
- LFR Rating
- LRFR Rating
- MBE 3rd edition, 2022 interims

Overview of Metal Box Culvert features

- Metal box culverts implemented in BrDR version 7.3.0 in October 2022
- Metal box culverts support LFR and LRFR rating methods
- Metal box culverts can be rated for plastic moment
- Single and multilane loading options available

Metal Box Culvert Alternative

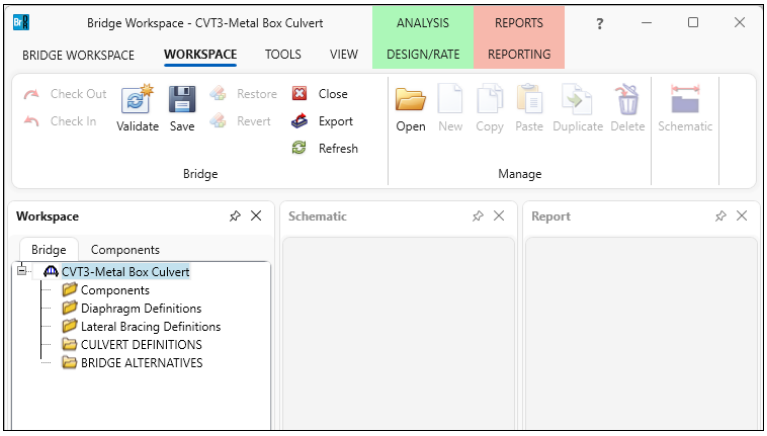
From the **Bridge Explorer** create a **new bridge** and enter the following description data.



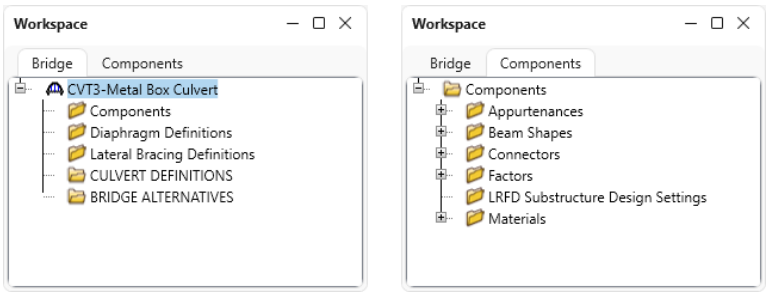
The **Superstructures** and **Culverts** checkboxes specify the types of structures the bridge contains. These checkboxes filter what to display in the **Bridge Workspace** tree. Since this bridge will only contain the metal box culvert, we only need to select culvert from the structure type check boxes.

Close the window by clicking **OK**.

To save the data to the database, click the **Save** button on the **Bridge** group of the **WORKSPACE** ribbon.



The **Bridge Workspace** tree and **Components** tree after the bridge is created is shown below.

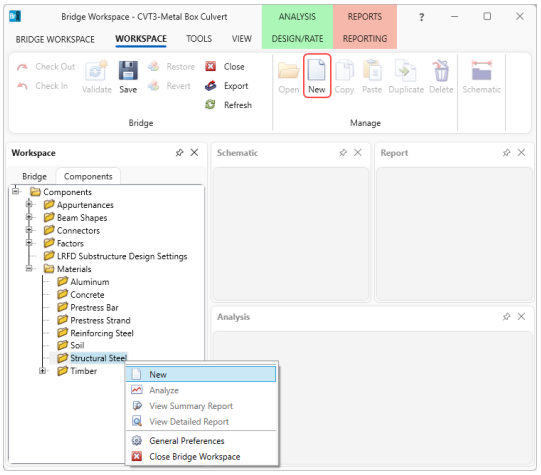


The **Bridge** tree is organized according to the definition of a bridge with data shared by many of the bridge components shown in the Components tab. A bridge can be described by working from top to bottom within the tree.

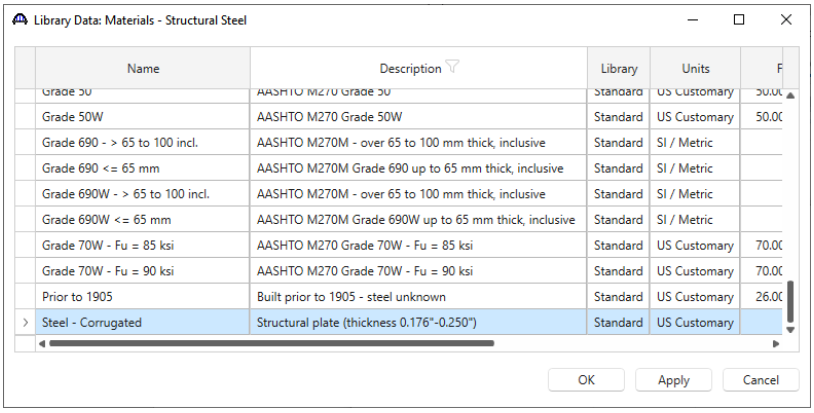
Bridge Materials

To enter the materials for the culvert, in the **Components** tab, expand the tree for **Materials**.

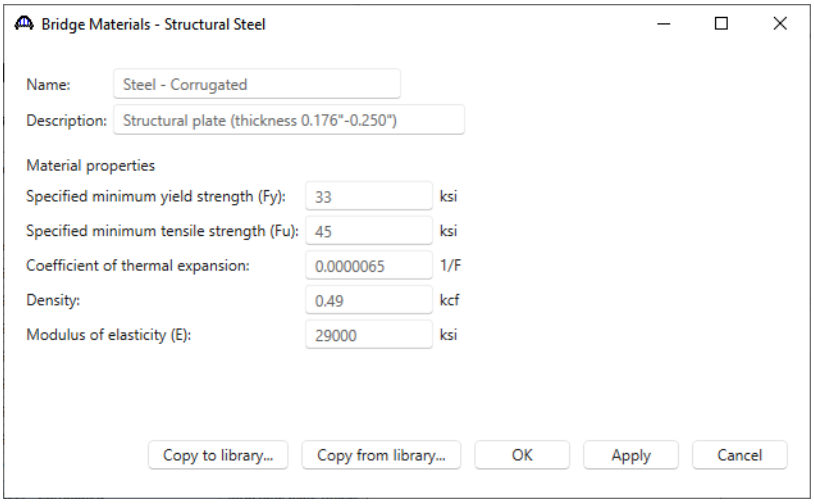
To add a structural steel material, double-click on the **Structural Steel** folder (or select **Structural Steel** and click on the **New** button from the **Manage** group of the **WORKSPACE** ribbon or right click and select **New**) to create a new structural steel material as shown below.



Click on the **Copy from library…** button and copy the **Steel-Corrugated** structural steel to be used in the bridge as shown below.

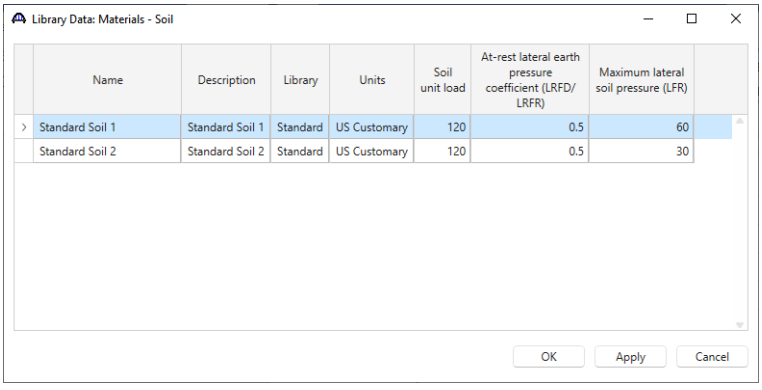


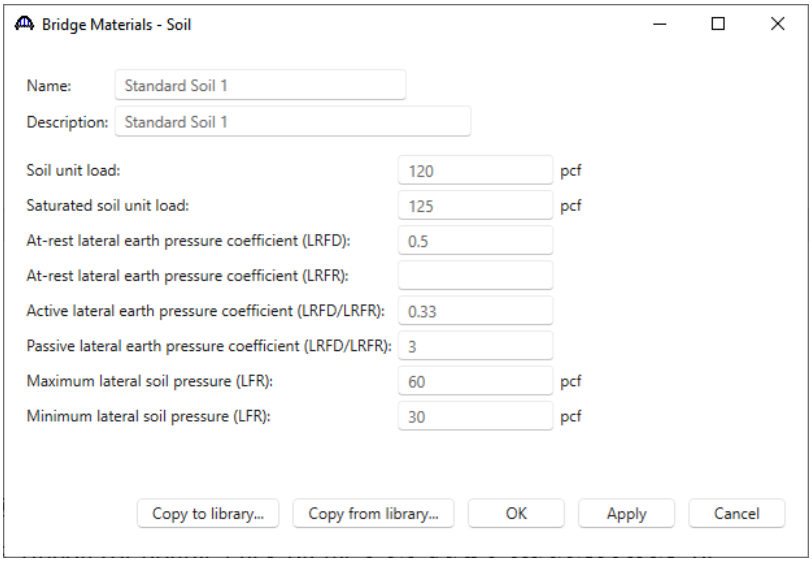
The **Bridge Materials – Structural Steel** window will be updated with material information as shown below.



Click **OK** to add the new structural steel material and close the window.

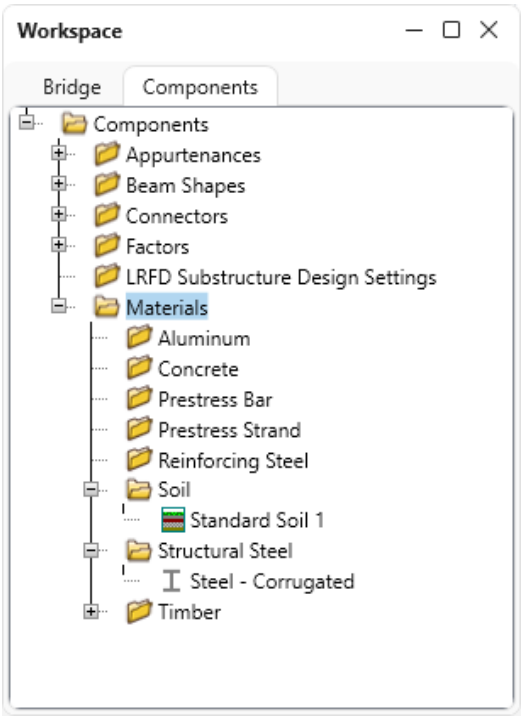
Similarly add a new soil material by double-clicking on the **Soil** folder or selecting Soil and clicking on **New** on the **Manage** group of the **WORKSPACE** ribbon or right clicking on **Soil** and selecting **New** from the menu. Click on the **Copy from library…** button to copy the **Standard Soil 1** material to the bridge.





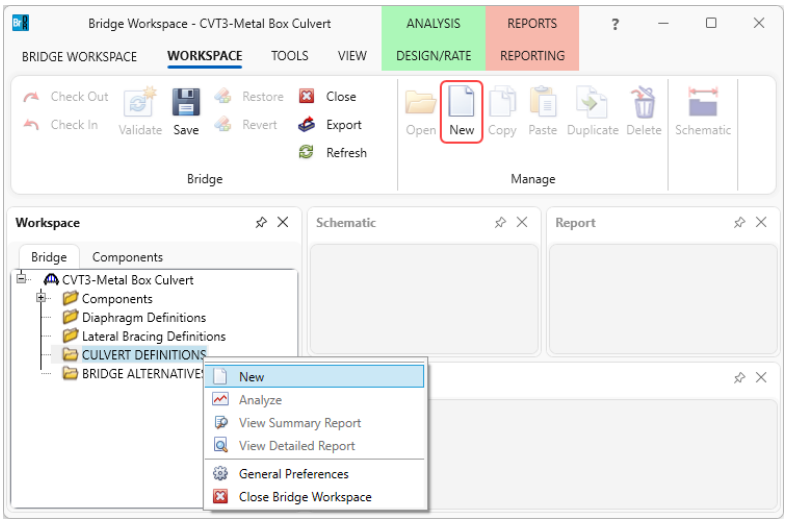
Click **OK** to add the soil material and close the window.

The **Components** tree with the materials to be used by the culvert is shown below.

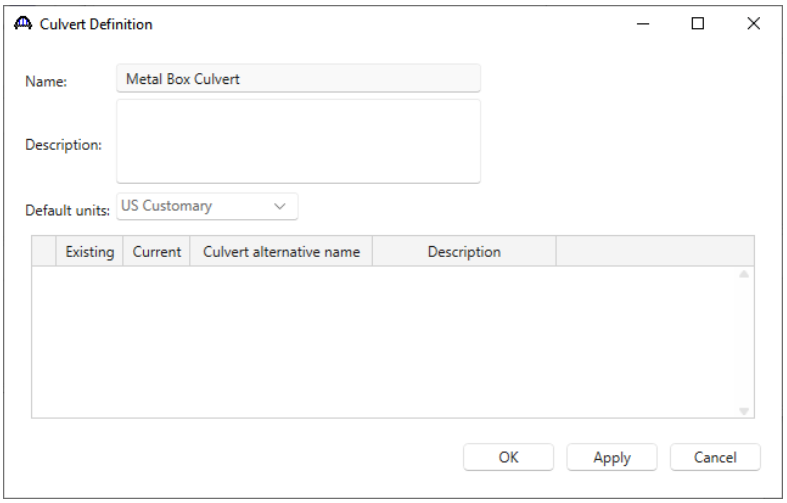


Culvert Definition

To create a new culvert definition, navigate to the **Bridge** tab of the **Bridge Workspace** tree and click on **CULVERT DEFINITIONS** in the **Bridge Workspace** tree and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or double click on the **CULVERT DEFINITION,** or right click and select **New).**

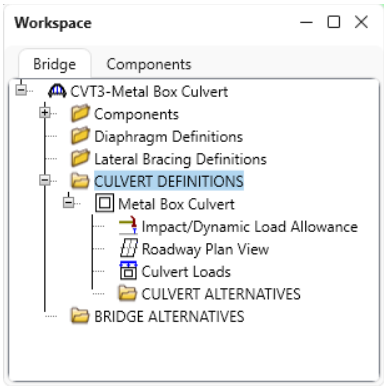


Enter the Culvert Definition **Name** as shown below. The first Culvert Alternative added will automatically be assigned as the **Existing** and **Current** Culvert Alternative for this Culvert Definition.



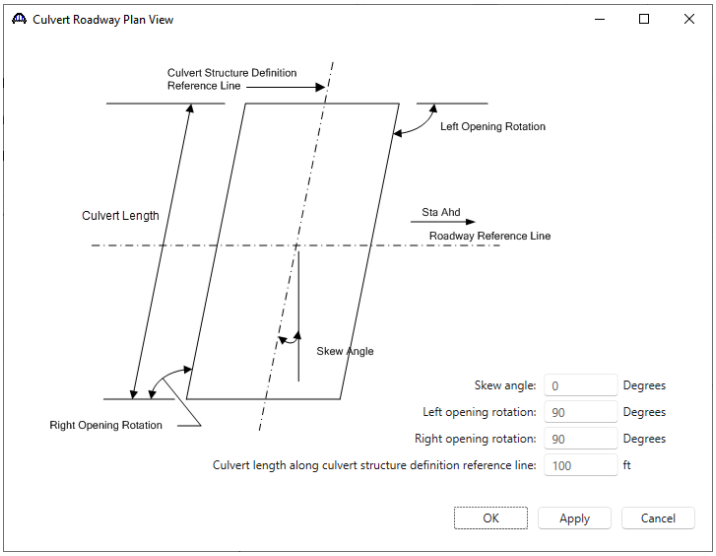
Click **OK** to apply the data and close the window.

Expand the tree for the new culvert structure definition as shown below.



Culvert Roadway Plan View

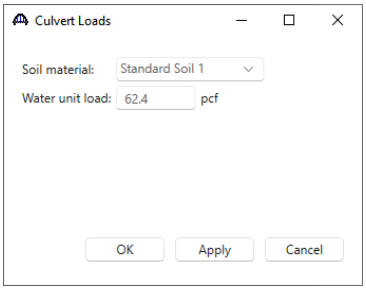
Double click on the **Roadway Plan View** node in the **Bridge Workspace** tree to open the **Culvert Roadway Plan View** window. Enter the culvert orientation details as shown below.



Click **OK** to apply the data and close the window.

Culvert Loads

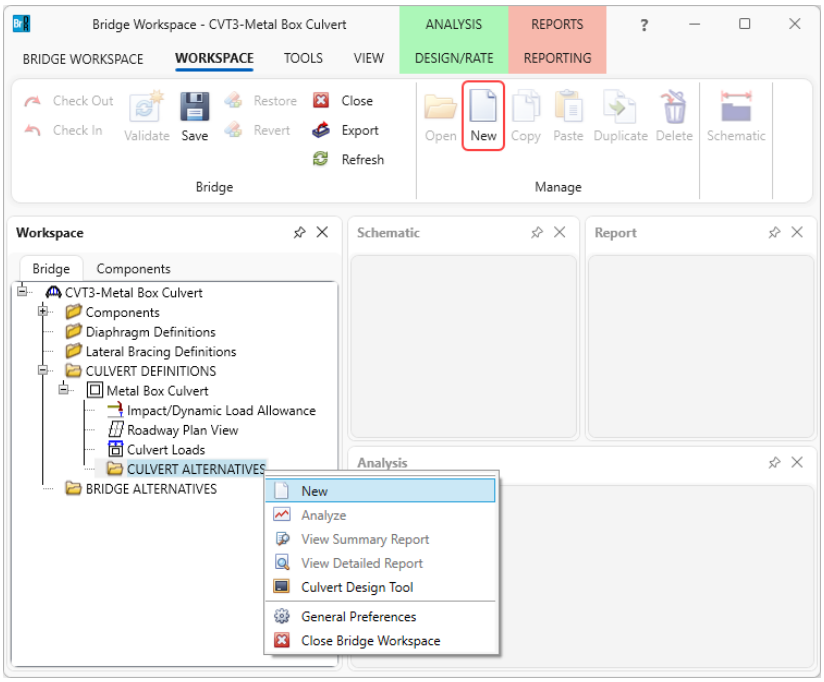
Double-click on the **Culvert Loads** node to open the **Culvert Loads** window. Select the Soil material from the drop-down menu. Water unit load will be populated by default as 62.40 pcf.



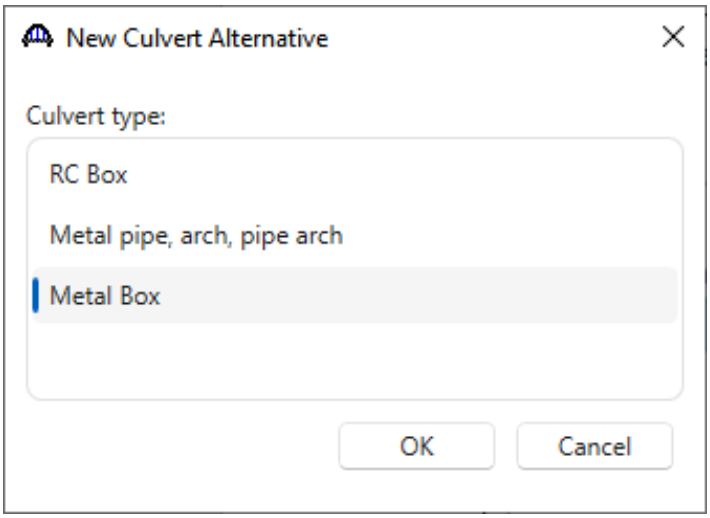
Click **OK** to apply the data and close the window.

Culvert Alternative

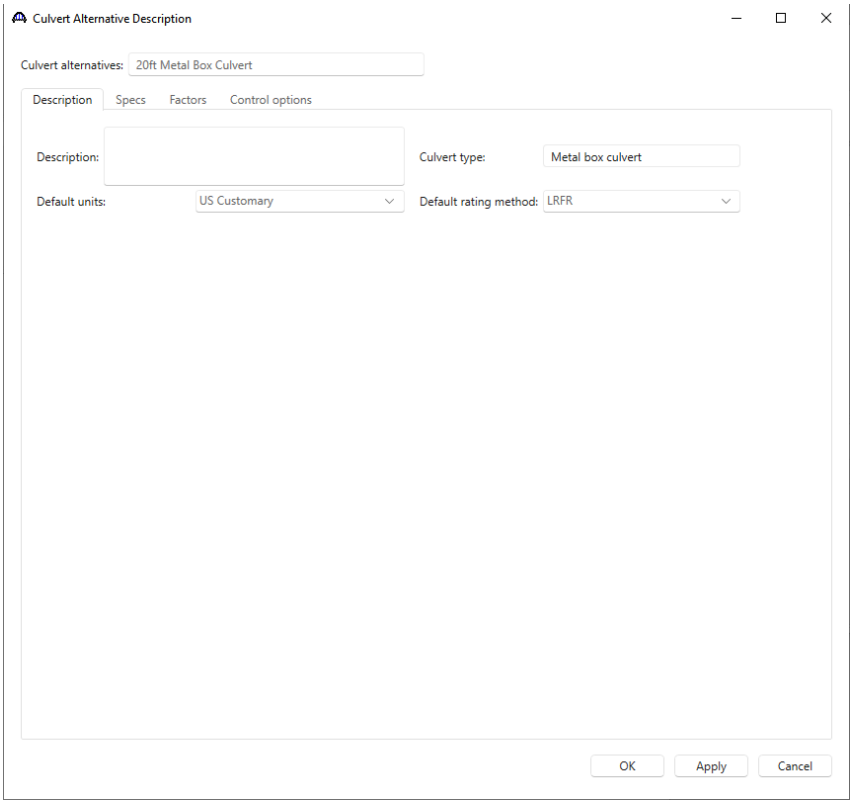
To create a new culvert alternative, click on **CULVERT ALTERNATIVES** in the **Bridge Workspace** tree and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or double click on the **CULVERT ALTERNATIVES,** or right click and select **New).**



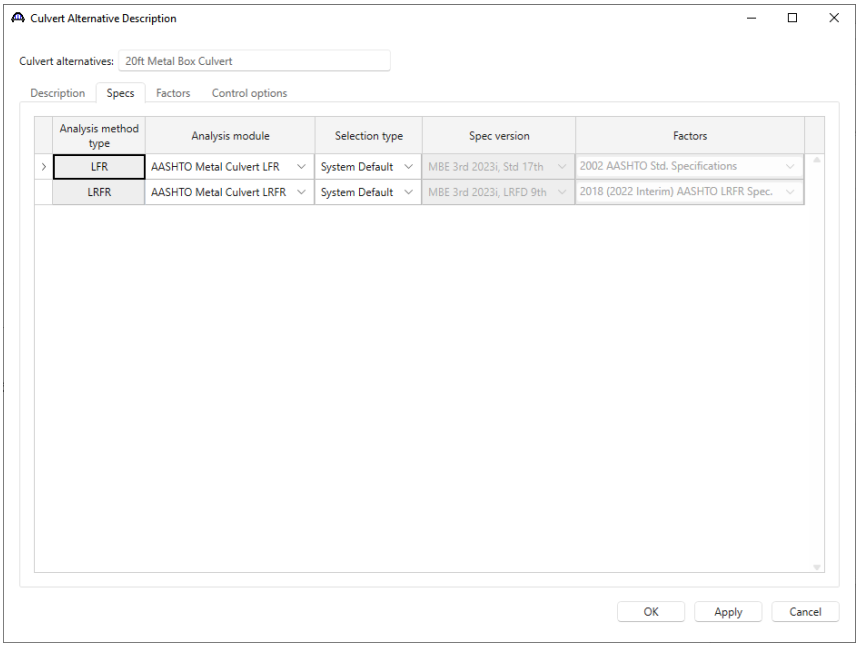
Select **Metal Box** in the **New Culvert Alternative** window and click **OK** to open the **Culvert Alternative Description** window as shown below.



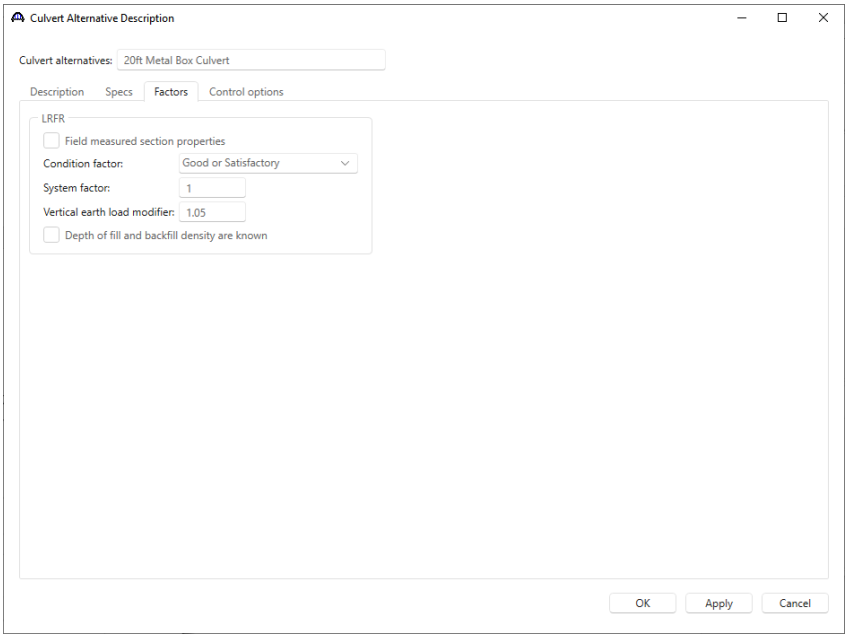
Enter the cuvlert alternative description as shown below.



Select the **Specs** tab. AASHTO Metal Culvert Engine is selected as the analysis module for both LFR and LRFR analysis.



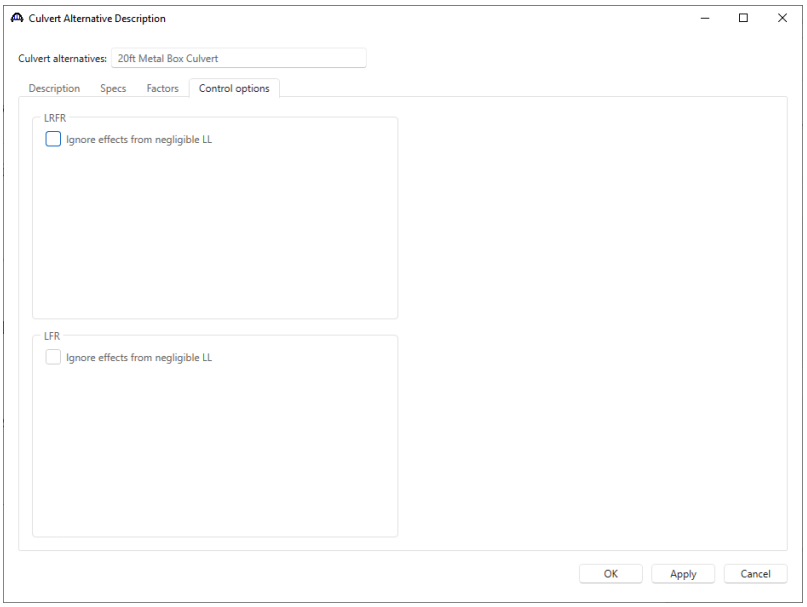
Select the **Factors** tab and enter the factors for **LRFR** as shown below.



The **Control options** tab has advanced analysis options for LFR and LRFR analysis methods. By default, none of the options are selected.

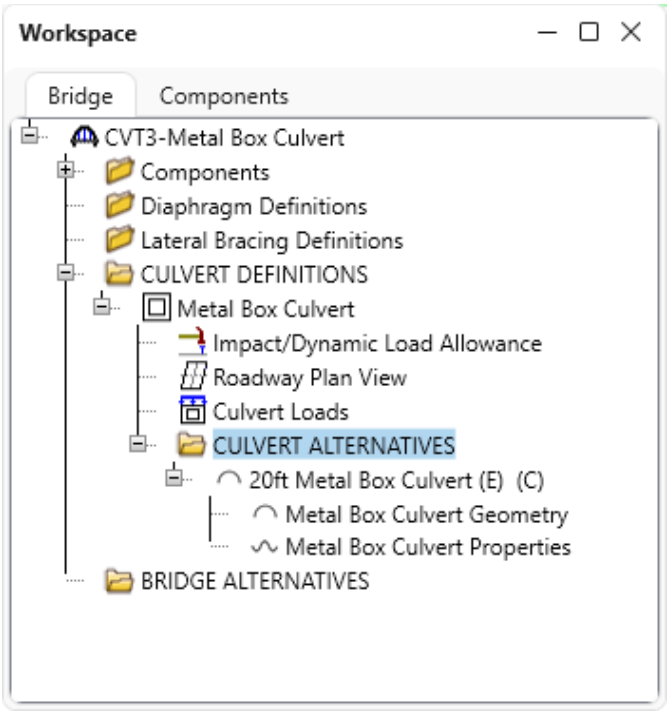
Description of Metal Box Culvert Alternative control options:

- Ignore effects from negligible live load – Use this control option to skip the rating when factored live load pressure at the depth of the culvert is less than 10% of the total factored pressure at the depth of the culvert.

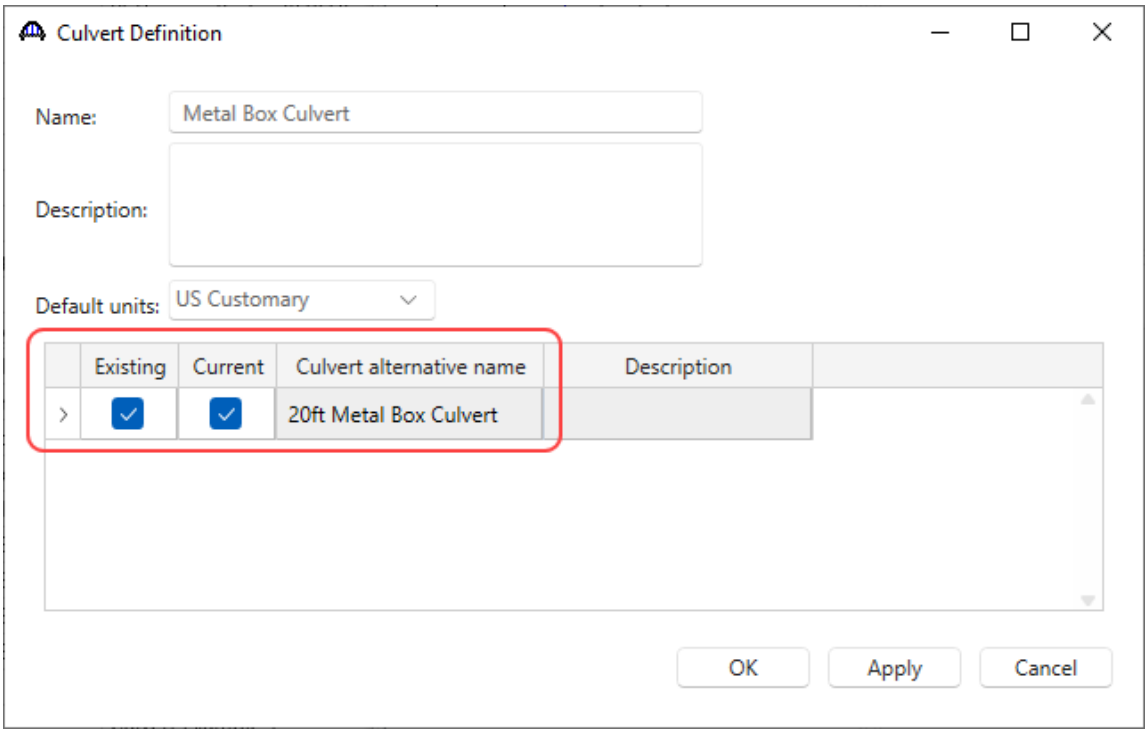


Click Ok to apply the data and close the window.

Expand the tree for the new culvert alternative as shown below.

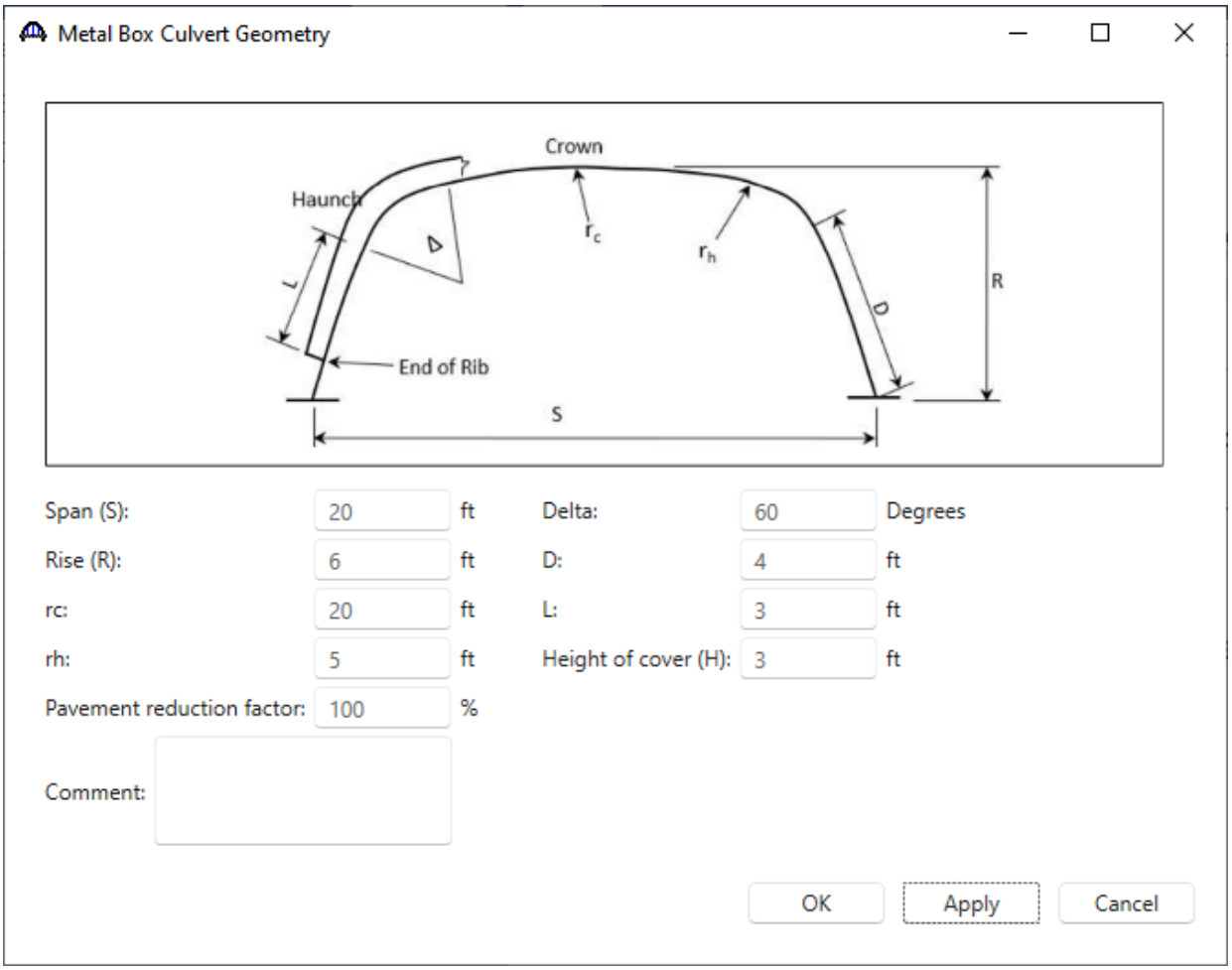


Note that the **20ft Metal Box Culvert** is automatically assigned as the **Existing** and **Current** alternative shown by the **(E)** and **(C)** in the name. This culvert alternative is also updated as **Existing** and **Current** alternative in the **Culvert Definition** window as shown below.



Metal Box Culvert Geometry

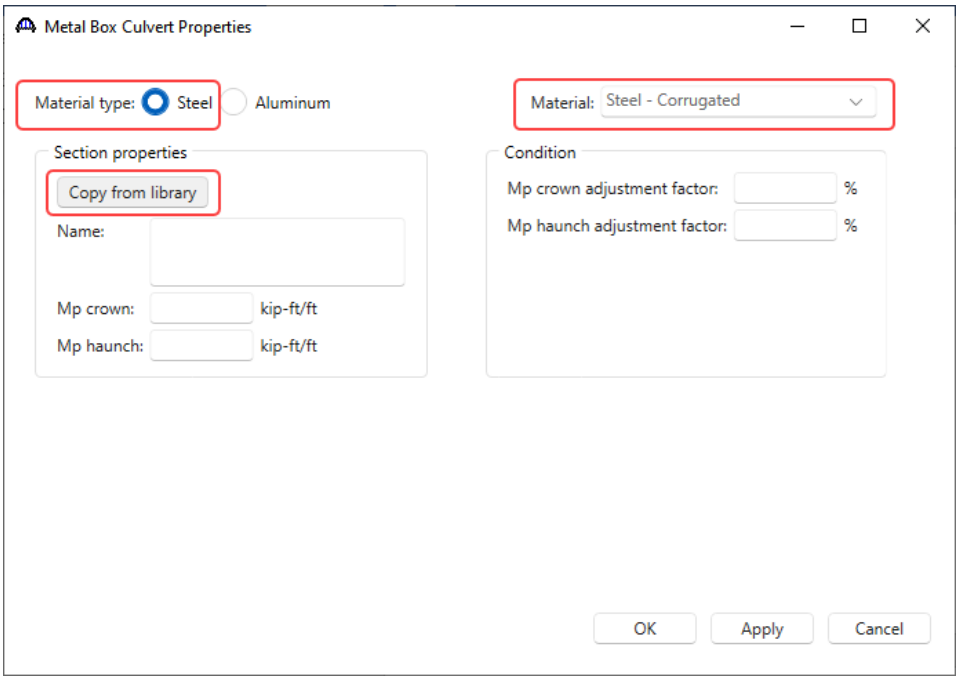
Double click on the **Metal Box Culvert Geometry** node in the **Bridge Workspace** tree to open the **Metal Box Culvert Geometry** window to enter the culvert geometry. Enter the data as shown below.



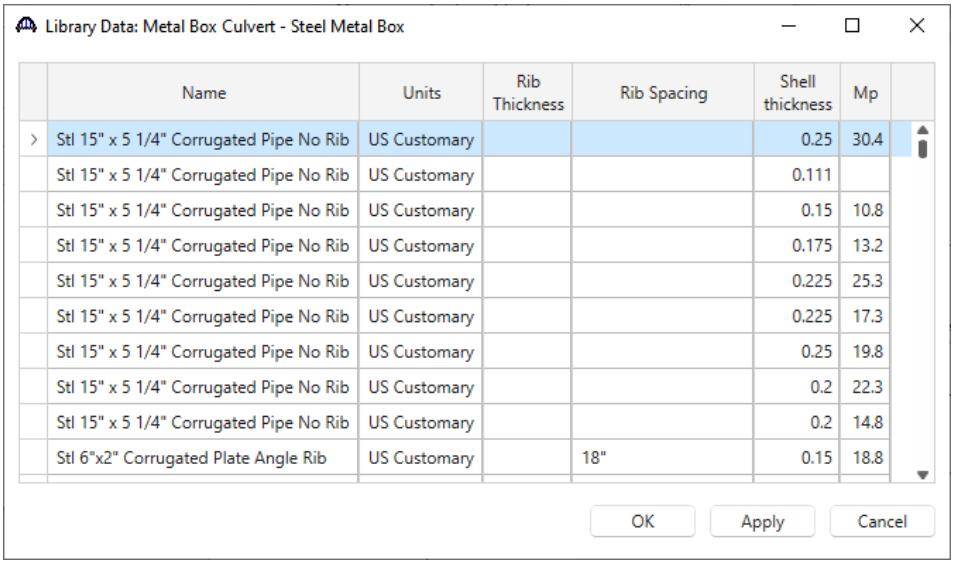
Click **OK** to apply the data and close the window.

Metal Box Culvert Properties

Double-click on the **Metal Box Culvert Properties** node in the **Bridge Workspace** tree to enter the box culvert section properties, material, and culvert condition. Both steel and aluminum materials are available for the metal box culverts. First, select the Material type as **Steel** and select **Steel - Corrugated** from its drop down menu.

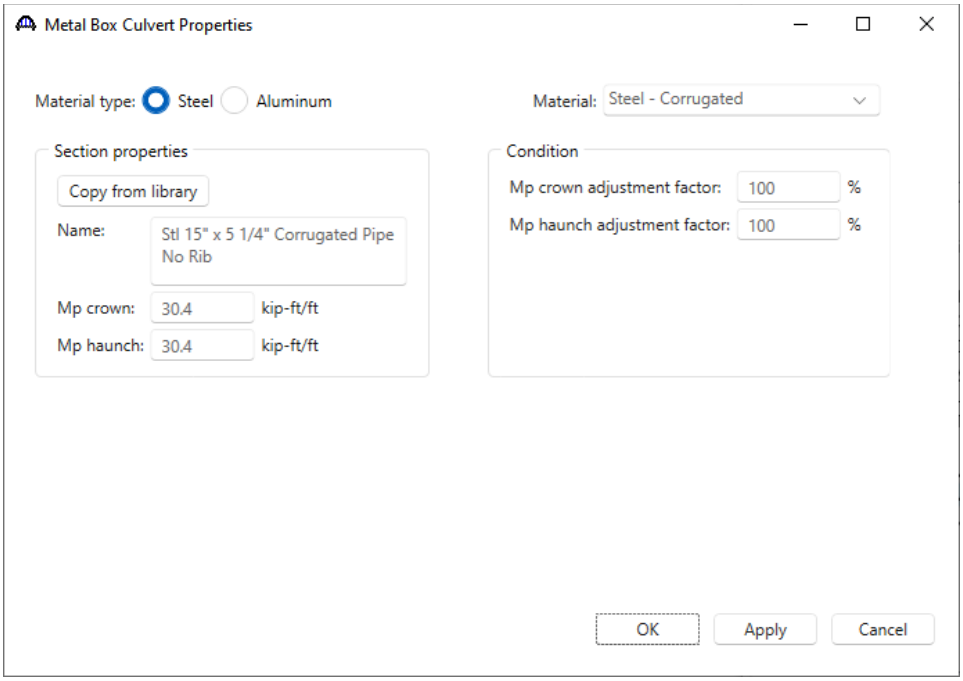


For section properties, click on the **Copy from library** button and select **Stl 15" x 5 ¼" Corrugated Box No Rib** with shell thickness 0.250 and Mp 30.40 and click **OK**



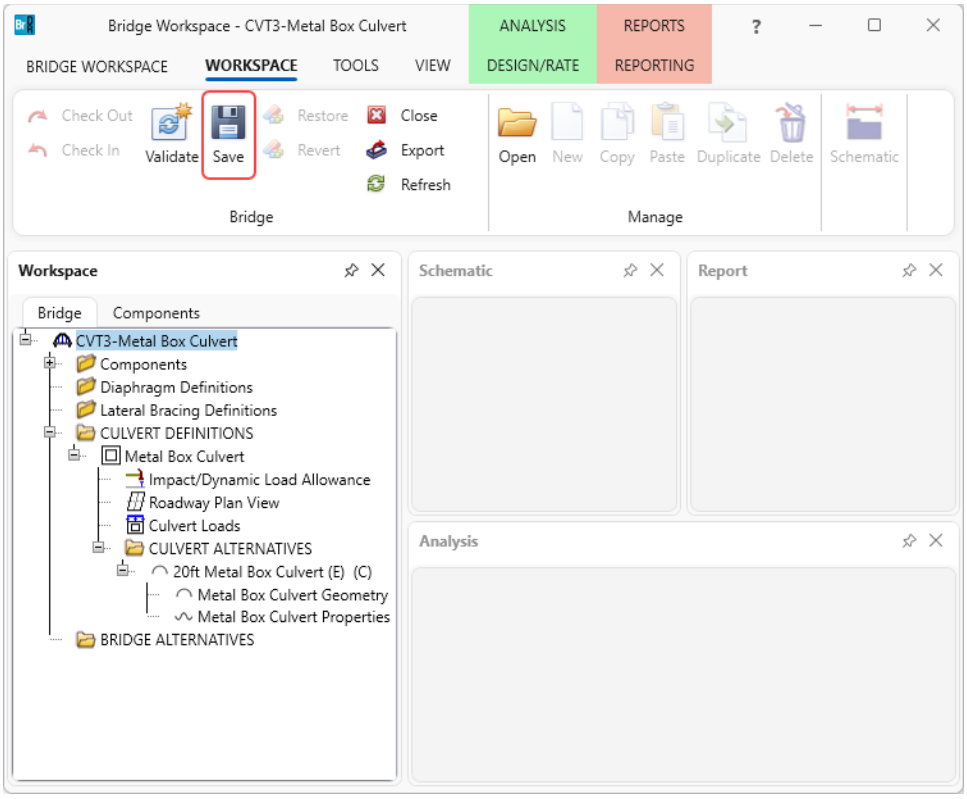
Name	Units	Rib Thickness	Rib Spacing	Shell thickness	Mp
Stl 15" x 5 1/4" Corrugated Pipe No Rib	US Customary			0.25	30.4
Stl 15" x 5 1/4" Corrugated Pipe No Rib	US Customary			0.111	
Stl 15" x 5 1/4" Corrugated Pipe No Rib	US Customary			0.15	10.8
Stl 15" x 5 1/4" Corrugated Pipe No Rib	US Customary			0.175	13.2
Stl 15" x 5 1/4" Corrugated Pipe No Rib	US Customary			0.225	25.3
Stl 15" x 5 1/4" Corrugated Pipe No Rib	US Customary			0.225	17.3
Stl 15" x 5 1/4" Corrugated Pipe No Rib	US Customary			0.25	19.8
Stl 15" x 5 1/4" Corrugated Pipe No Rib	US Customary			0.2	22.3
Stl 15" x 5 1/4" Corrugated Pipe No Rib	US Customary			0.2	14.8
Stl 6"x2" Corrugated Plate Angle Rib	US Customary		18"	0.15	18.8

Enter the data for **Condition** as shown below and click **OK** to save the data to memory and close the window.



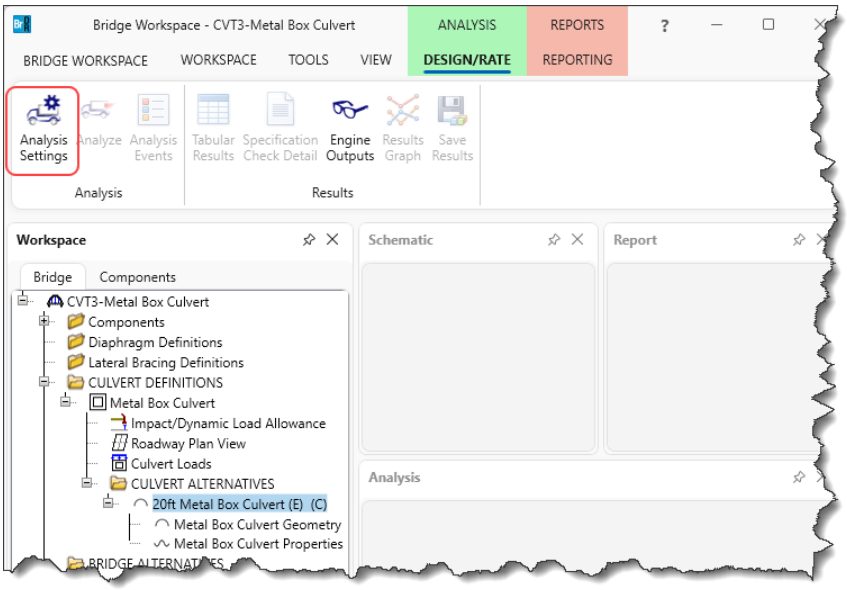
Click **OK** to apply the data and close the window.

The description of the metal box culvert is complete. To save the new culvert to the database, click the **Save** button on **WORKSPACE** ribbon.

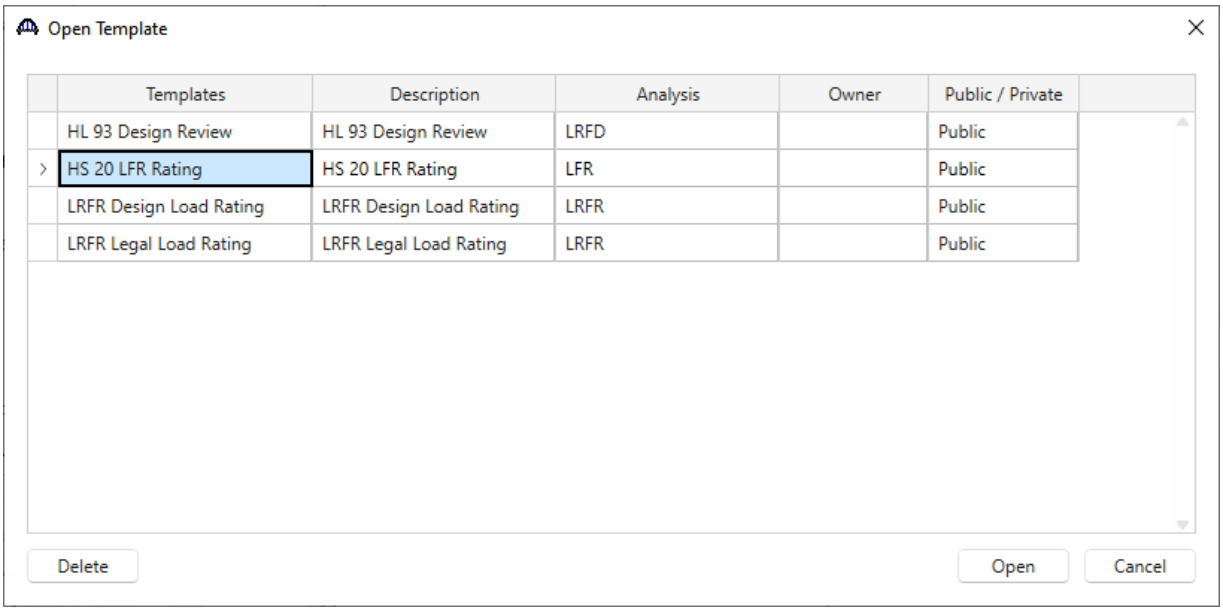


LFR Rating

To perform an LFR Rating, select the **20ft Metal Box Culvert** alternative in the **Bridge Workspace** tree and click the **Analysis Settings** button from the **Analysis** group of the **DESIGN/RATE** ribbon.

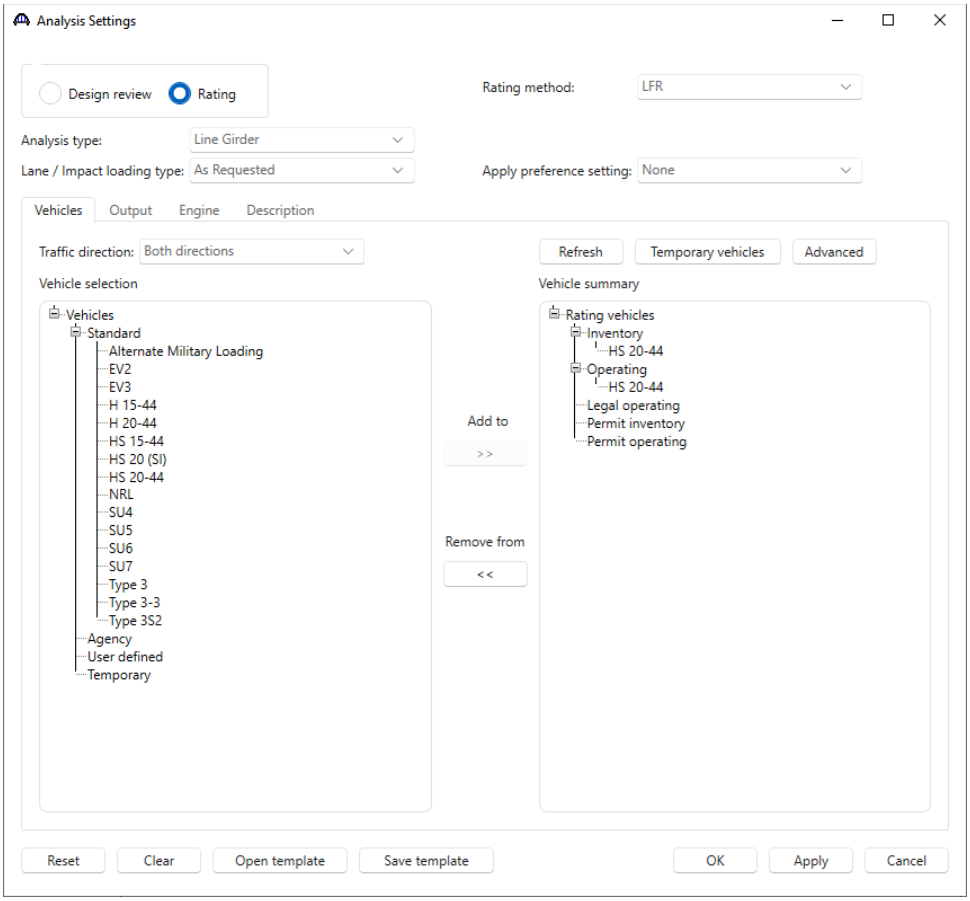


The **Analysis Settings** window will open. Click the **Open template** button and select the **HS 20 LFR Rating** to be used in the rating and click Open.

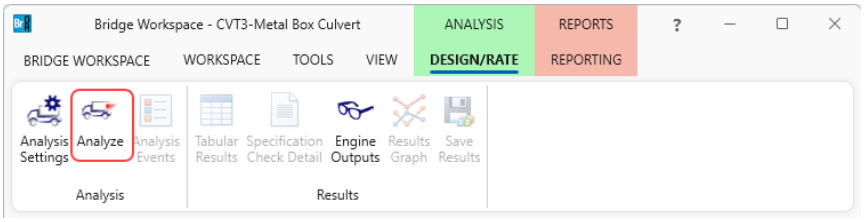


Click **OK** to apply the data and close the window.

The **Analysis Settings** window will be populated as shown below. Click **OK** to apply the data and close the window.

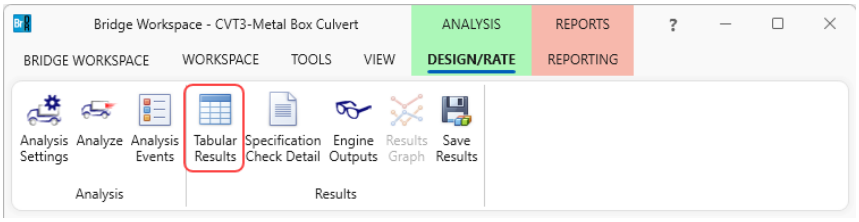


Click the **Analyze** button from the **Analysis** group of the **DESIGN/RATE** ribbon to start the rating process.

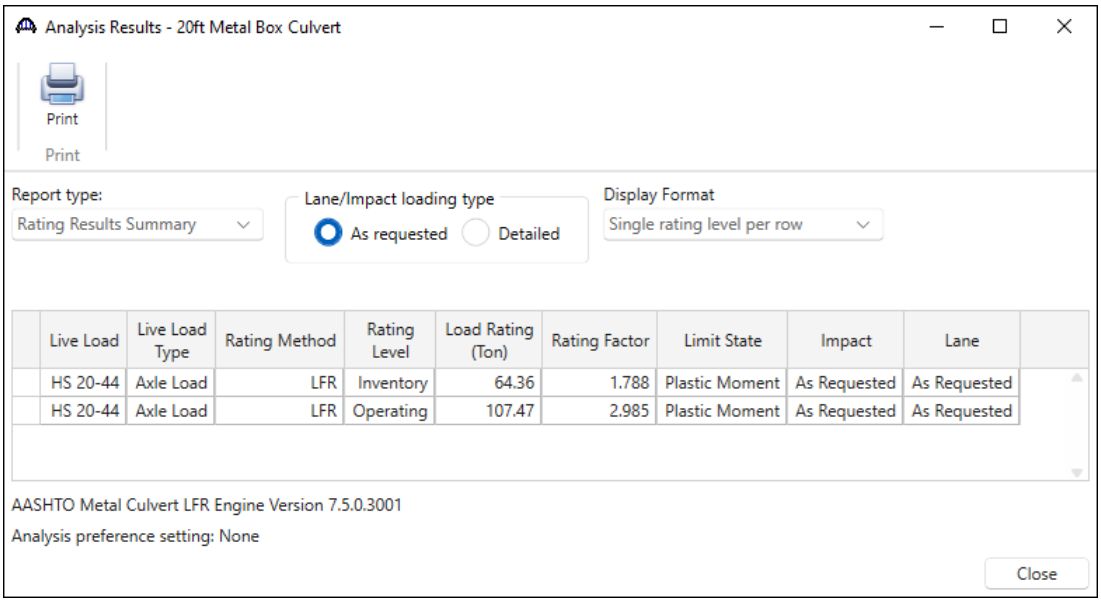


Tabular Results

When the rating is finished, results can be reviewed by clicking the **Tabular Results** button from the **Results** group of the **DESIGN/RATE** ribbon.

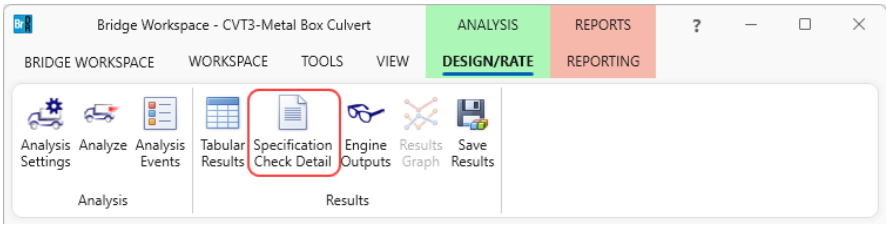


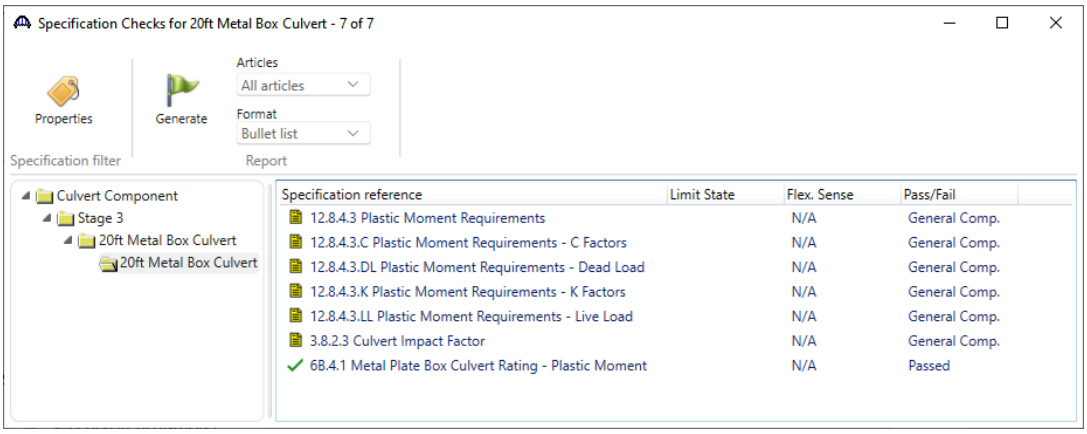
The window shown below will open. Select **Single rating level per row** as the display format to display the output in single rows as shown below.



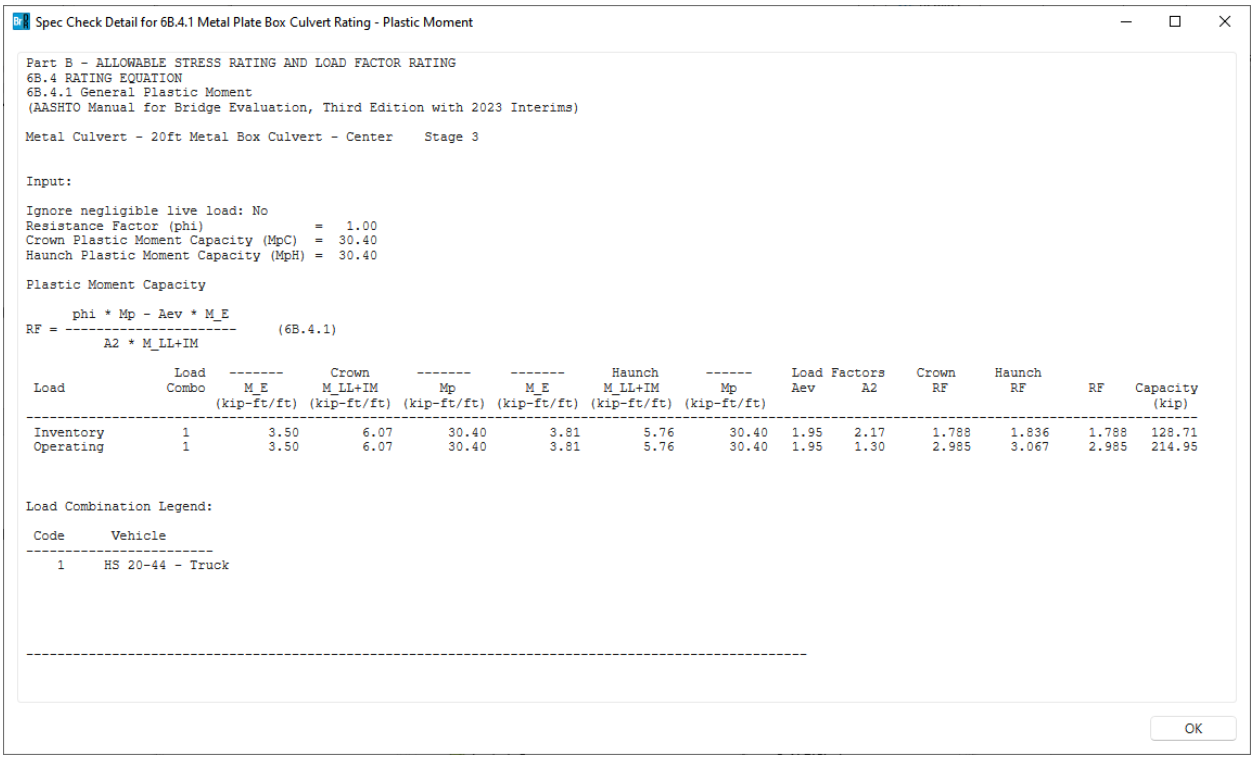
Specification Check Detail

To review detailed rating results at the controlling location, the **Specification Check Detail** button in the ribbon to open the **Specification** window.



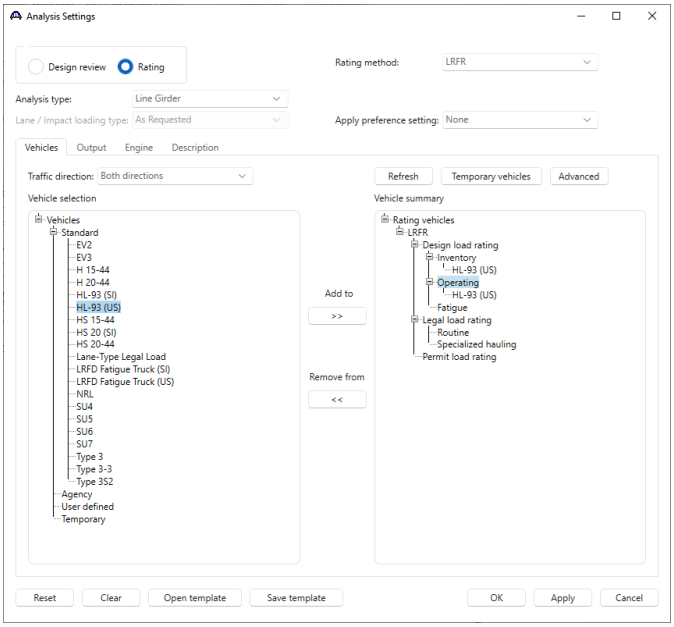


Double click on the **6B.4.1 Metal Plate Box Culvert Rating – Plastic Moment** specification article to open the Spec Check Detail window.



LRFR Analysis

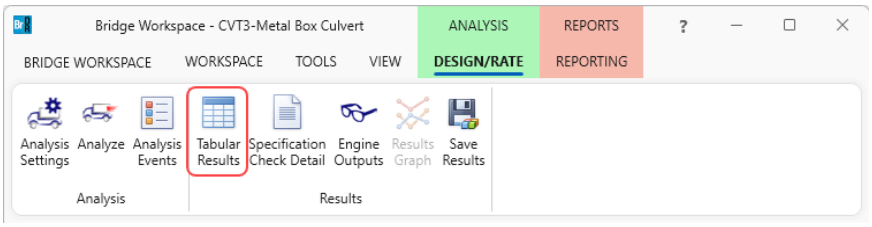
Close the spec check window and reopen the **Analysis Settings** window to test a **LRFR** analysis. Enter the analysis settings as shown below.



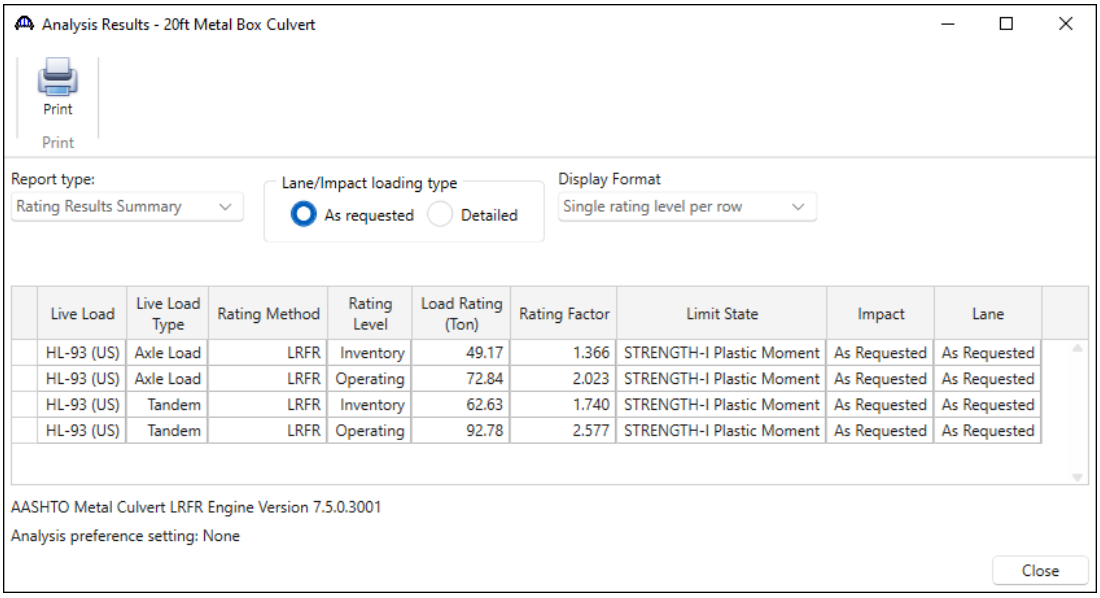
Click **OK** to apply the settings and close the window.

Tabular Results

Click **Analyze** on the ribbon to launch the rating. When the rating is complete, review the results by clicking the **Tabular Results** button on the ribbon.



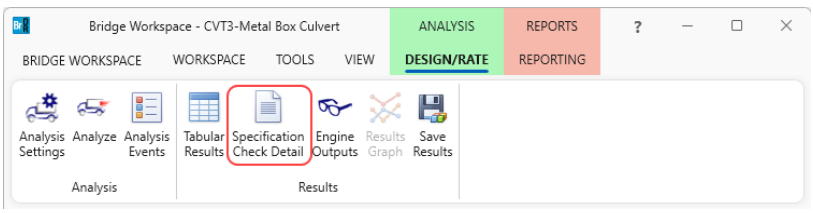
The window shown below will open. Select **Single rating level per row** as the display format to display the output in single rows as shown below.



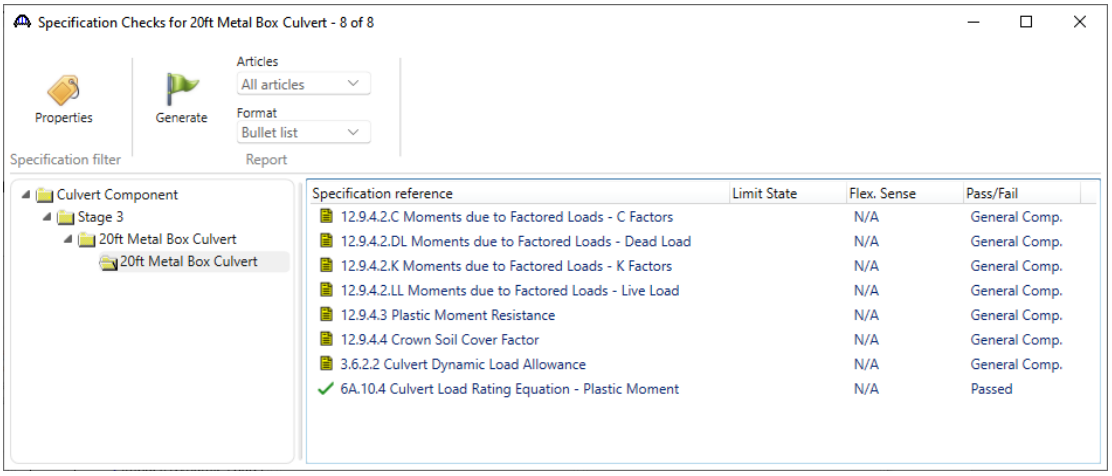
Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Limit State	Impact	Lane
HL-93 (US)	Axle Load	LRFR	Inventory	49.17	1.366	STRENGTH-I Plastic Moment	As Requested	As Requested
HL-93 (US)	Axle Load	LRFR	Operating	72.84	2.023	STRENGTH-I Plastic Moment	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Inventory	62.63	1.740	STRENGTH-I Plastic Moment	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Operating	92.78	2.577	STRENGTH-I Plastic Moment	As Requested	As Requested

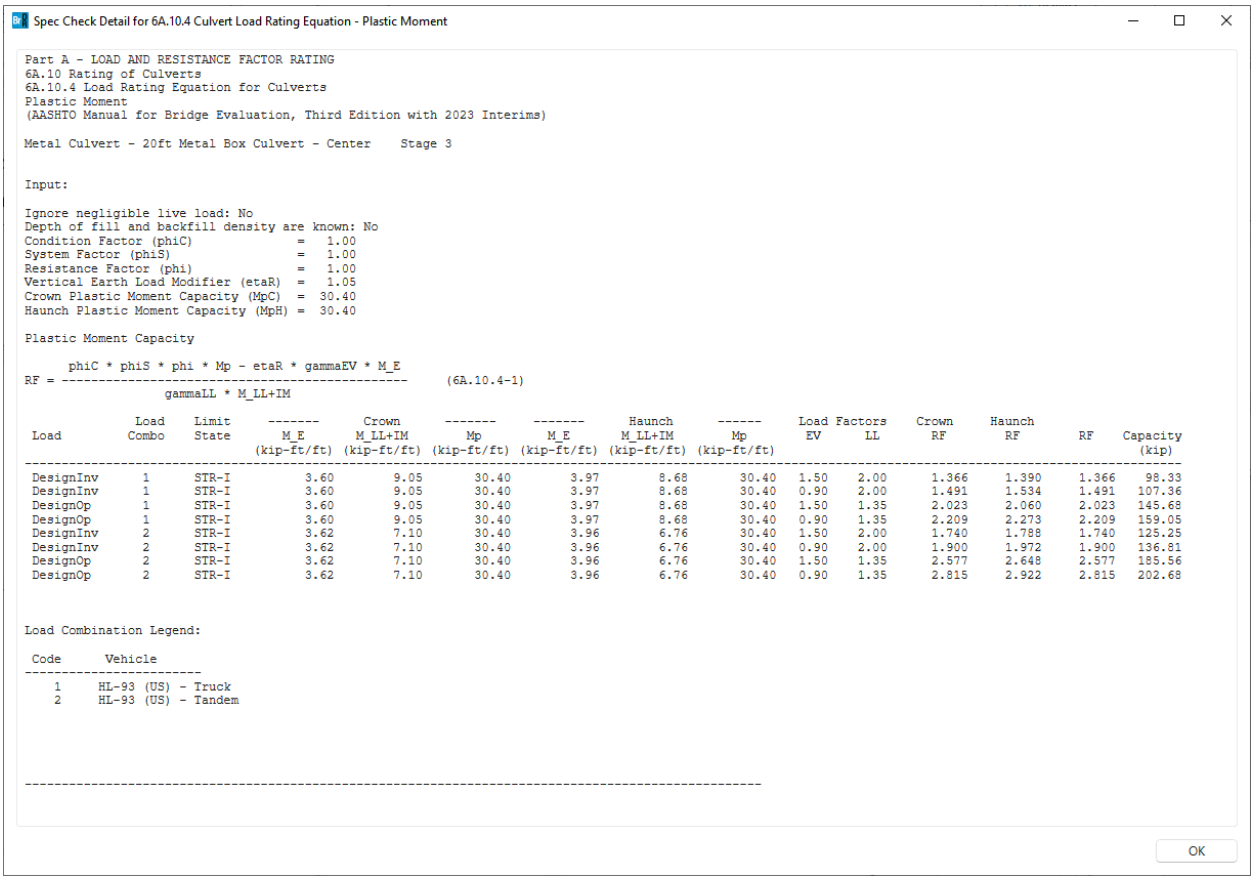
Specification Check Detail

To review detailed rating results at the controlling location, the **Specification Check Detail** button in the ribbon to open the **Specification** window.



Double-click on the **6A.10.4 Culvert Load Rating Equation – Plastic Moment** specification article to open the Spec Check Detail window.





Distribution Factor-Line Girder Analysis Tutorial

DF2 – Distribution Factor Analysis (NSG - LFR) Example

Topics covered:

- Review Distribution Factor Analysis
    - Distribution Factor Analysis Method of Solution
    - Non-standard gage vehicle description
    - Vehicle paths
- BrDR Distribution Factor Engine Properties
- Perform Distribution Factor Analysis (NSG – LFR)

Review Distribution Factor Analysis

This example describes the distribution factor analysis feature in BrDR to determine the adequacy of a superstructure for a standard gage or non-standard gage vehicle.

Distribution Factor Analysis Method of Solution

The Distribution Factor Analysis feature computes live load distribution factors for a vehicle traveling in a specified path along the length of the superstructure. This feature allows you to analyze a bridge for non-standard gage vehicles.

A 3D and a 2D finite element analysis of the superstructure is performed and moment and shear live load distribution factors are computed for a vehicle traveling along user-specified paths along the length of the superstructure. The computed distribution factors are then used to perform a rating analysis using traditional girder-line analysis techniques.

In the 3D finite element model, the deck is modeled as shell elements and the beams are modeled as frame elements. The deck is always included in the model regardless of whether the beams are composite with deck. Diaphragms are not included in the 3D finite element model.

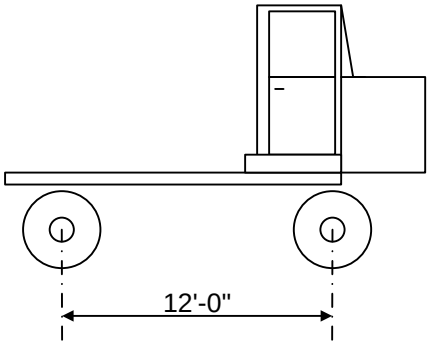
BrDR determines which nodes in the 3D FE model should be loaded with the vehicle by using the vehicle path location and vehicle wheel description entered by the user. Unit loads are placed at each of these nodes in the 3D FE model and the resulting moment and shear element forces in the beam elements are stored. Moment and shear influence surfaces are generated from these element forces. The influence surfaces are then loaded with the vehicle traveling along the user-defined vehicle path. The moments and shears in the beams due to the actual distribution of the vehicle through the deck are then computed.

A 2D finite element analysis is then performed for each beam. The 2D FE model consists of the beam modeled as frame elements. The nodes in the 2D FE model are at the same locations as the nodes in the 3D FE model.

Unit loads are placed at each node along the beam in the 2D FE model and the moment and shear influence lines are generated for the beam. These influence lines are then loaded with the axle weights of the vehicle traveling along the superstructure and the resulting moments and shears in the beam are then computed.

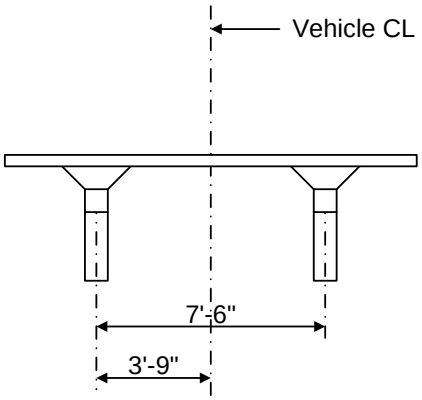
Moment and shear distribution factors are computed by dividing the 3D model moments and shears by the 2D model moments and shears. The critical distribution factor is chosen for each vehicle path by first finding the distribution factors that correspond to the maximum 3D moment, the minimum 3D moment, the maximum 3D shear and the minimum 3D shear. The critical distribution factor is the maximum of these 4 distribution factors. A traditional girder line analysis of the beam is then performed using this distribution factor.

Non-standard gage vehicle description

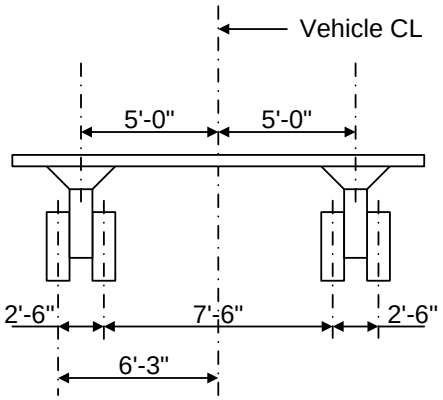


Elevation View

NSG Truck Load Data		
Front Axle	Load/Axle Line	40 kips
	Load/Tire	20 kips
Rear Axle	Load/Axle Line	48 kips
	Load/Tire	12 kips
Total Vehicle Weight		88 kips

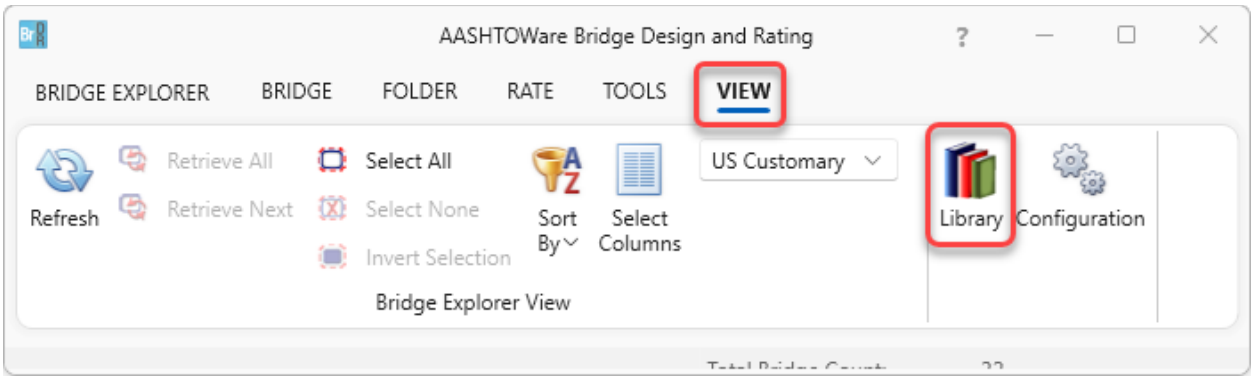


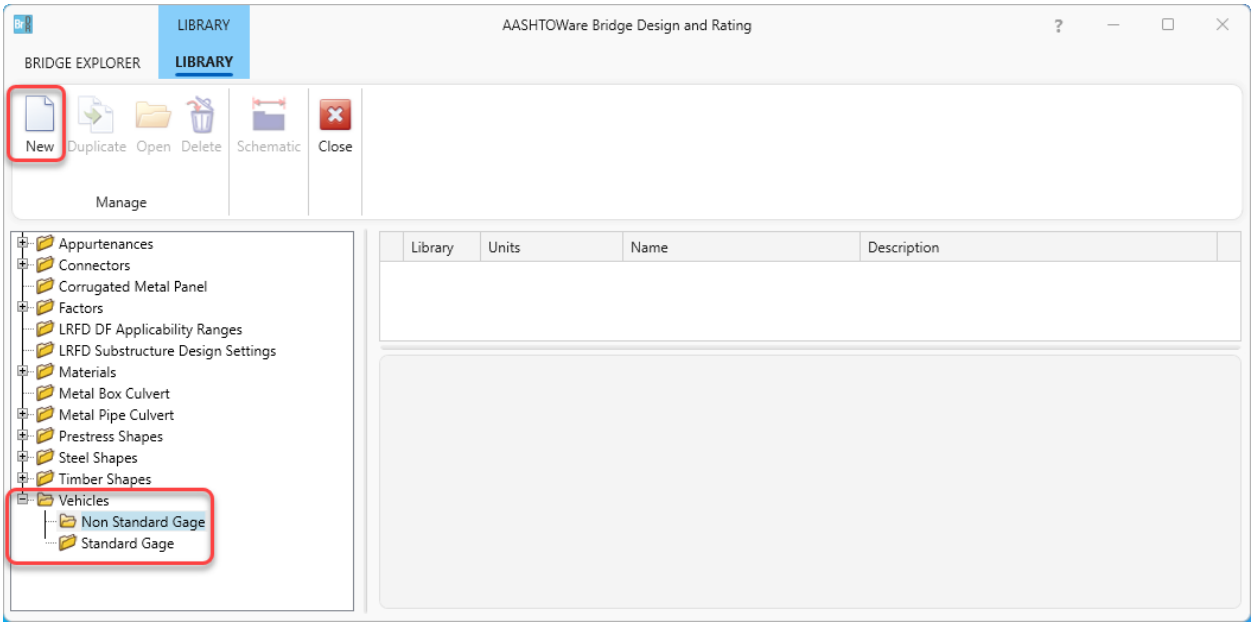
End View of Front Axle



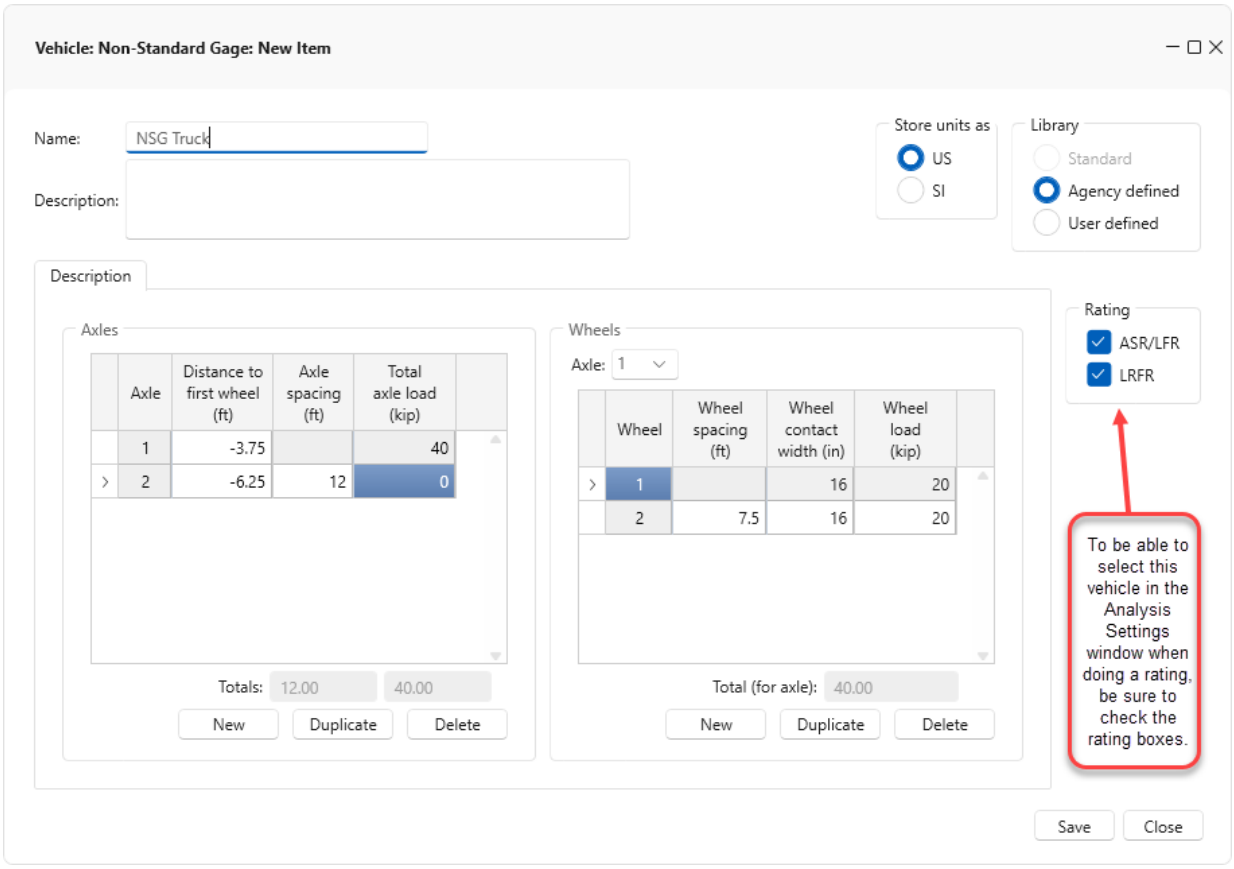
End View of Rear Axle

The preceding non-standard gage vehicle can be entered in the BrDR vehicle library as follows. Open **the Library Explorer** and select **Non-Standard Gage** in the Library tree. Select **New** from the **Manage** Group to open the **Vehicle: Non-Standard Gage: New Item** window.

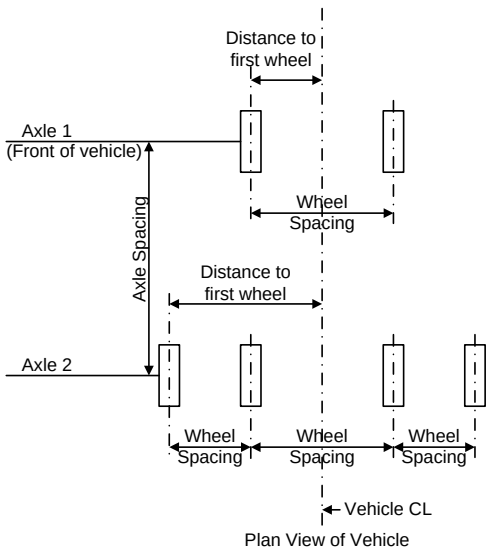




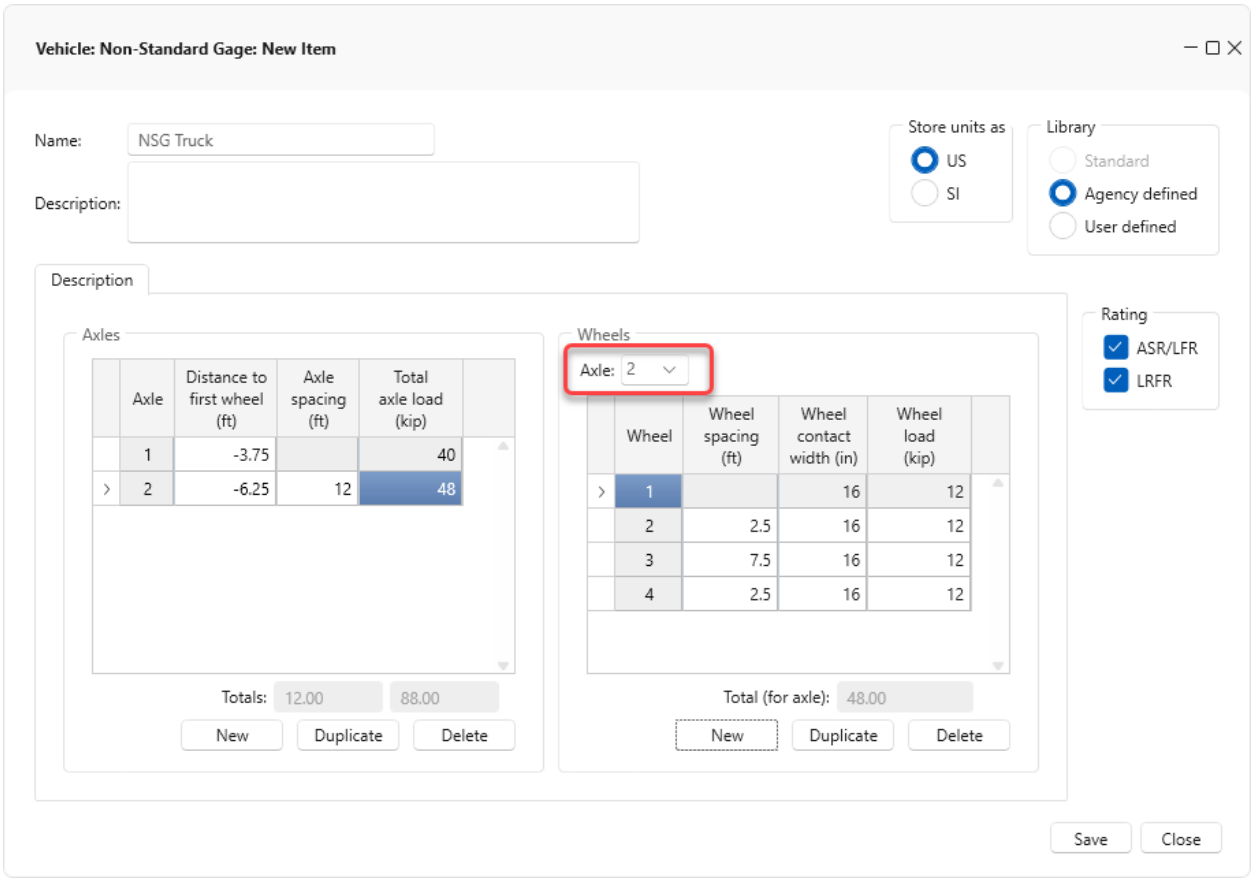
The description for the first axle of the vehicle is shown below.



When describing the axles, the **Distance to first wheel** is the distance from the centerline of the vehicle to the first wheel in the axle. This value is a negative value to signify the first wheel is to the left of the vehicle centerline. The following sketch illustrates the terminology used in this window.

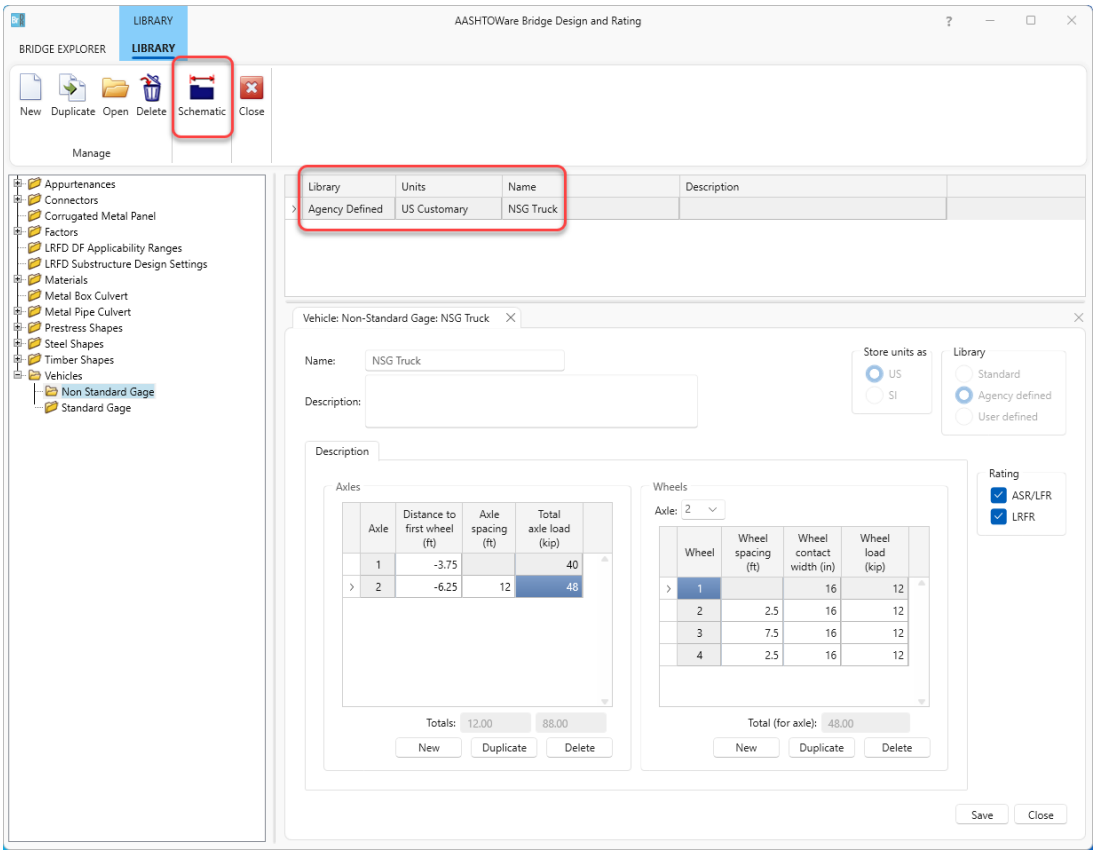


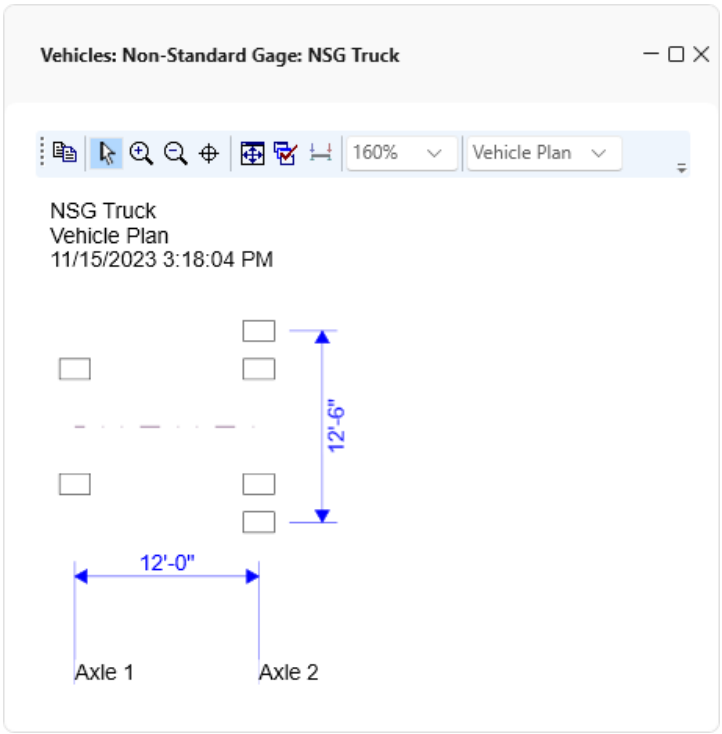
The description of the wheels in the second axle of the vehicle is shown below.

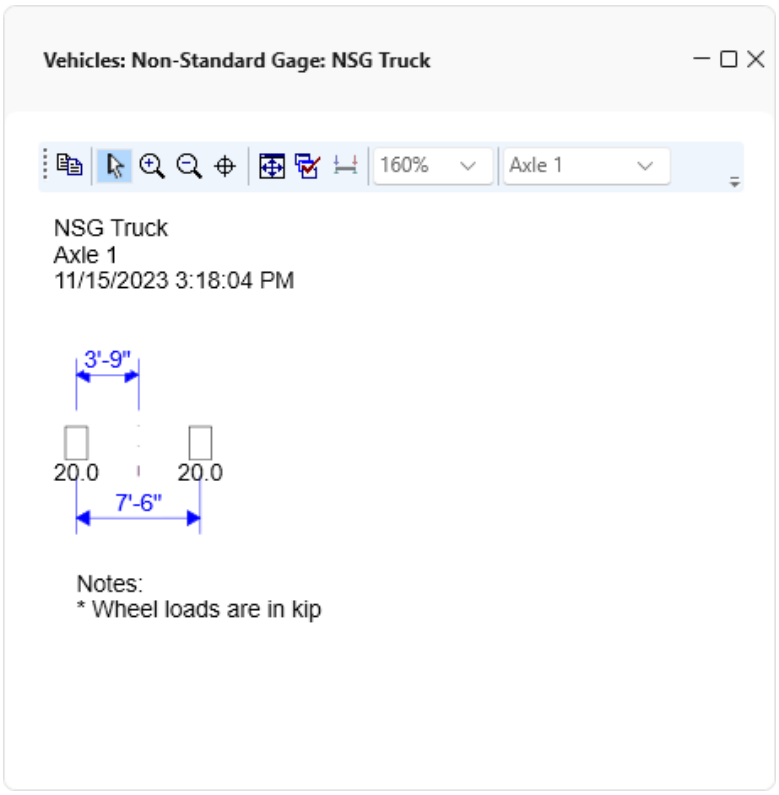


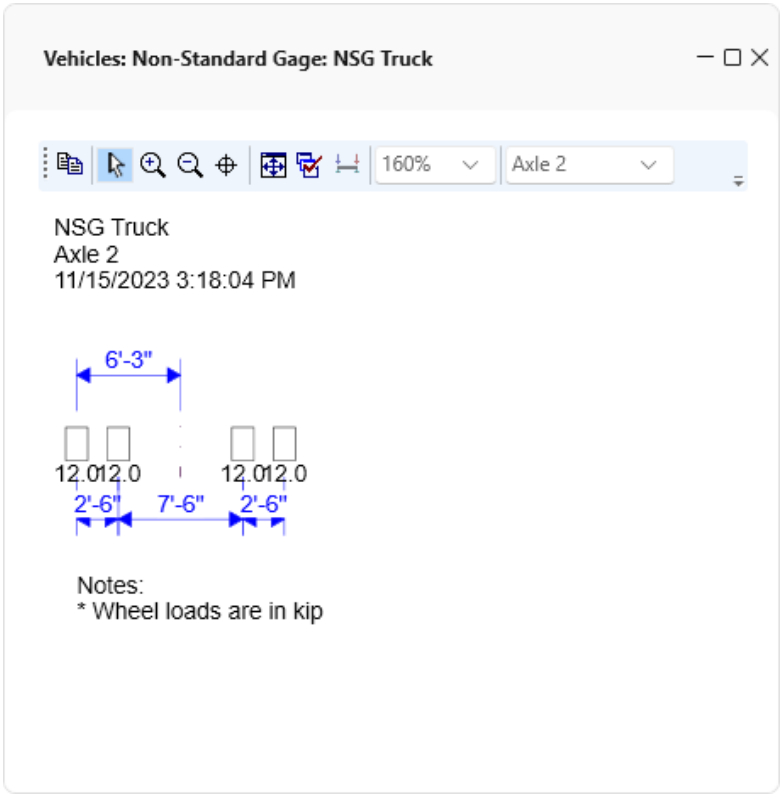
Click **Save** to save this vehicle to the library.

A **schematic** view of the vehicle and each axle is available to verify your data entry by selecting the **NSG Truck** and clicking the **Schematic** button as shown below.





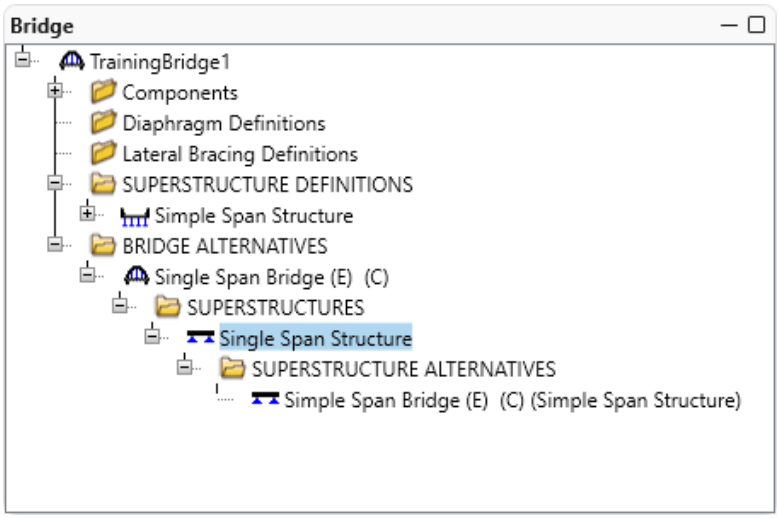

Vehicles: Non-Standard Gage: NSG Truck
160%
Axle 1
NSG Truck
Axle 1
11/15/2023 3:18:04 PM
3'-9"
20.0
20.0
7'-6"
Notes:
* Wheel loads are in kip


Vehicles: Non-Standard Gage: NSG Truck
160%
Axle 2
NSG Truck
Axle 2
11/15/2023 3:18:04 PM
6'-3"
12.0
12.0
12.0
12.0
2'-6"
7'-6"
2'-6"
Notes:
* Wheel loads are in kip

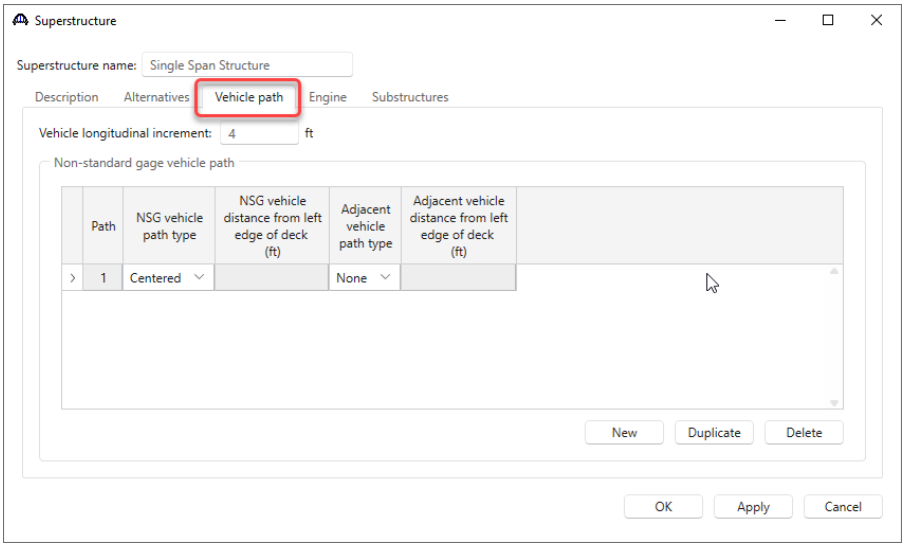
Vehicle Paths

The distribution factor analysis is performed at the **SUPERSTRUCTURES** level. When performing a distribution factor analysis on a superstructure the analysis will be performed on the superstructure definition that is assigned to the existing **SUPERSTRUCTURE ALTERNATIVE**. This is necessary since in BrDR a bridge may consist of many superstructure definitions assigned to different locations along the length of the bridge.

In this tutorial, **BID1 (TrainingBridge1)** in the **BrDR sample database** will be analyzed. Open the **Bridge Workspace** for **BID1**. The partially expanded **Bridge Workspace** for **BID1** is shown below. The distribution factor analysis for **Single Span Structure** will perform a 3D and 2D analyses of the **Simple Span Structure** which is assigned to the existing superstructure alternative.

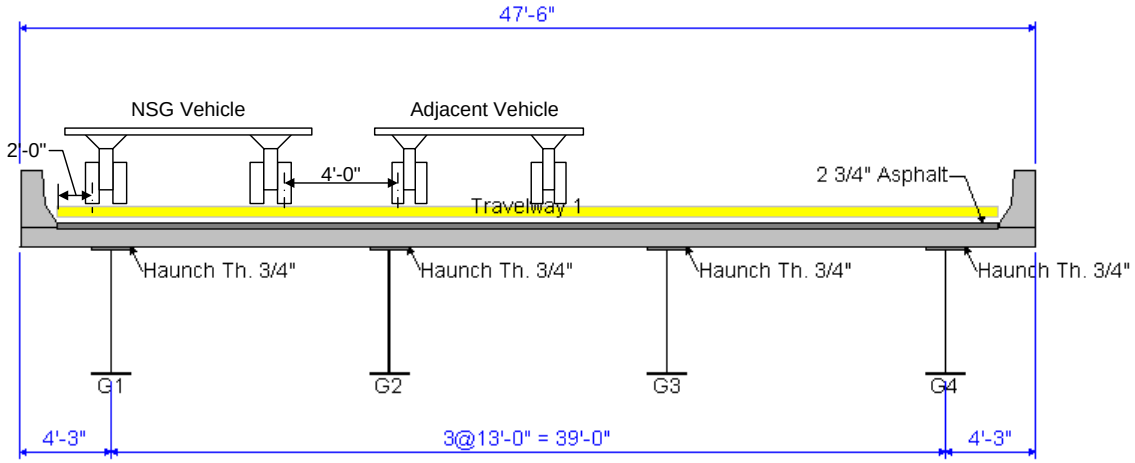


Double click on the **Single Span Structure** superstructure window and select the **Vehicle Path** tab.

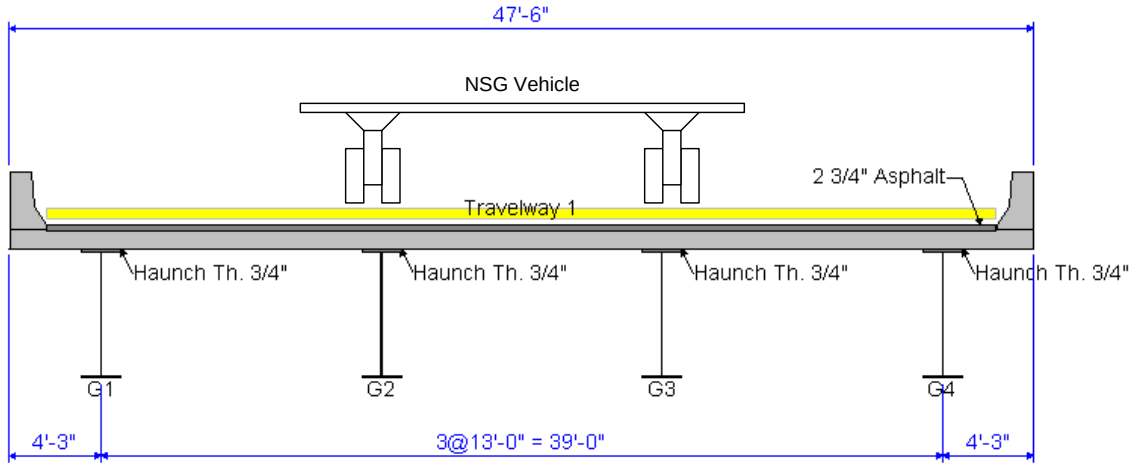


This tab controls the placement of the vehicle that will be used in the distribution factor analysis. The **Vehicle longitudinal increment** is the longitudinal length increment to use when moving the vehicle along the length of the superstructure. Note that this value can greatly affect the time required for the analysis.

The vehicle path specifies the transverse location of the non-standard gage vehicle and an adjacent vehicle to use in the analysis. The following illustrates where the vehicles would be placed if the **NSG vehicle path** is specified as **Left** and the **Adjacent vehicle path** is specified as **Right**.

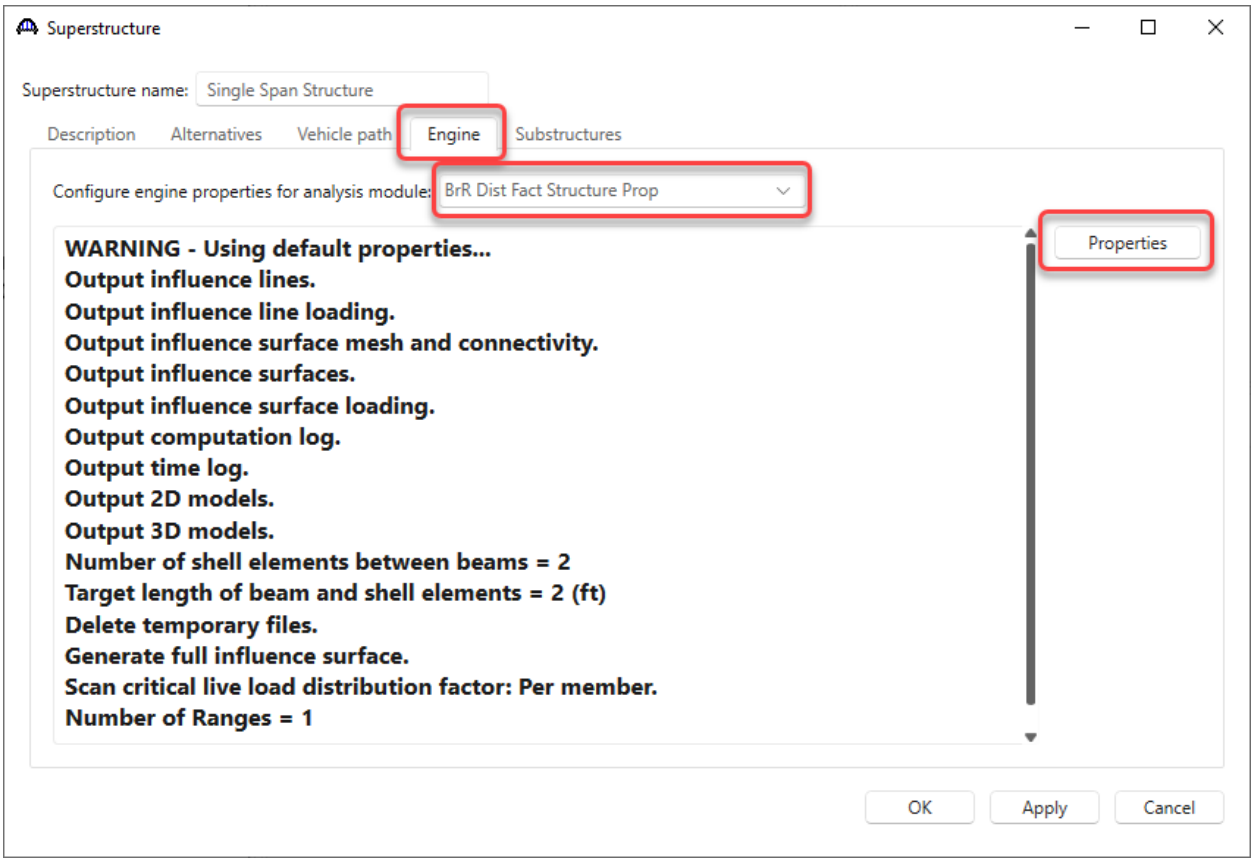


This example uses the **NSG vehicle path** specified as **Centered** and the **Adjacent vehicle path** as **None**. This path is shown below.

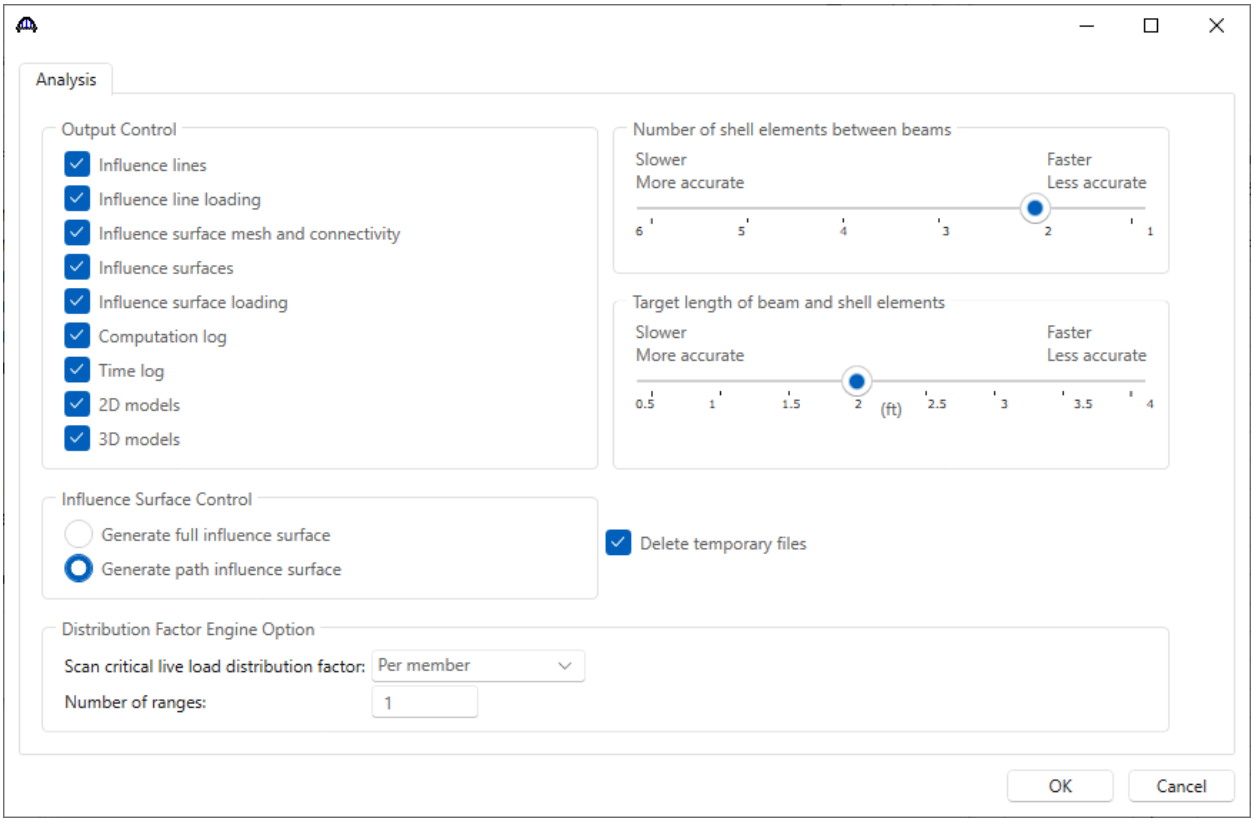


BrDR Distribution Factor Engine Properties

Select the **Engine** tab in the Single Span Structure superstructure window. The Engine tab allows you to specify properties for the analysis engine. Select **BrR Dist Fact Structure Prop** as the analysis module and then click **Properties** button.



The **Properties** button will bring up the below window



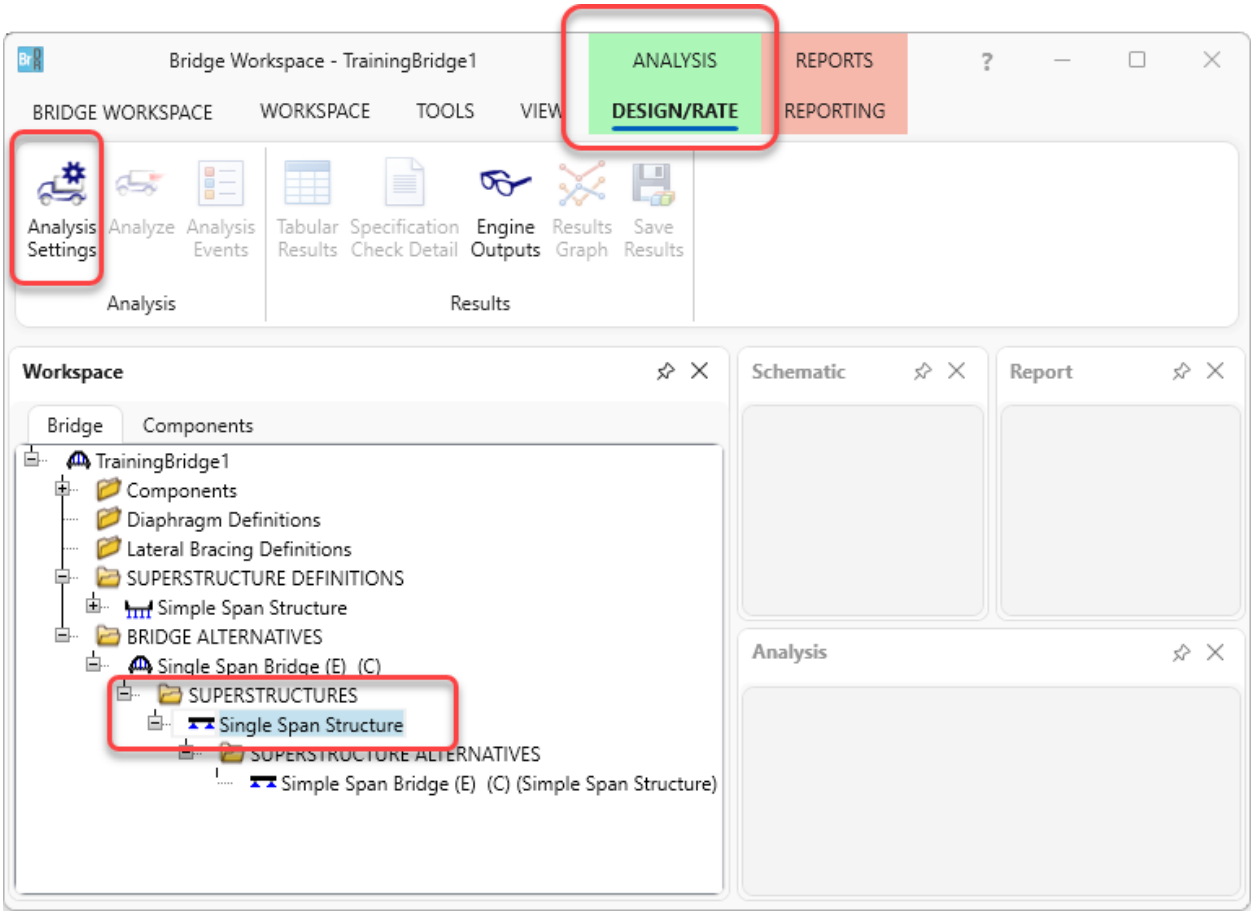
This window allows to specify the level of output needed from the analysis and allows to control how the FE models are created and loaded. The **Number of shell elements between beams** and **Target length of beam and shell elements** selections control the size of the elements in the model and greatly influence the time required for the analysis.

Select **Generate path influence surface** under **Influence Surface Control**. The **Scan critical live load distribution factor** selection allows to specify the method for determining the critical distribution factors. The **Per member** option specifies one critical moment and one critical shear distribution factors to be used for the whole member. The **One range per span** option specifies each span in the member has its own critical moment and shear distribution factors. The **Multiple ranges per span** option specifies each range in a span has its own critical moment and shear distribution factors. The length of the range is the span length divided by the entered **Number of Ranges**.

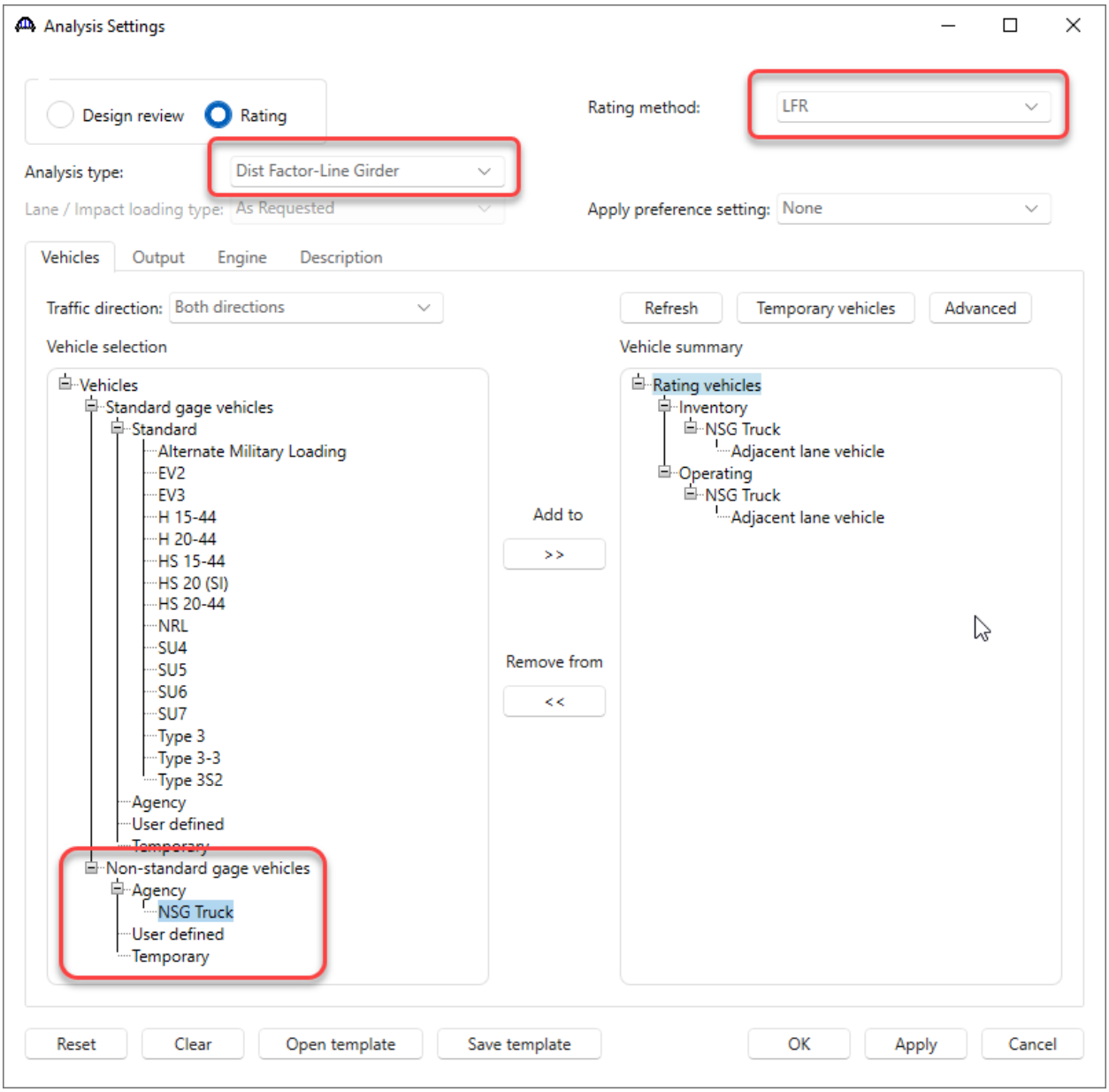
Click **OK** to close the **BrR Dist Fact Superstructure Properties** window and then click **OK** again to close the **Superstructure** window.

Perform Distribution Factor Analysis (NSG – LFR)

The distribution factor analysis can be initiated by selecting the **Single Span Structure** superstructure in the **Bridge Workspace** tree and clicking the **Analysis Settings** button in the **Analysis** Group of the **DESIGN/RATE** ribbon.

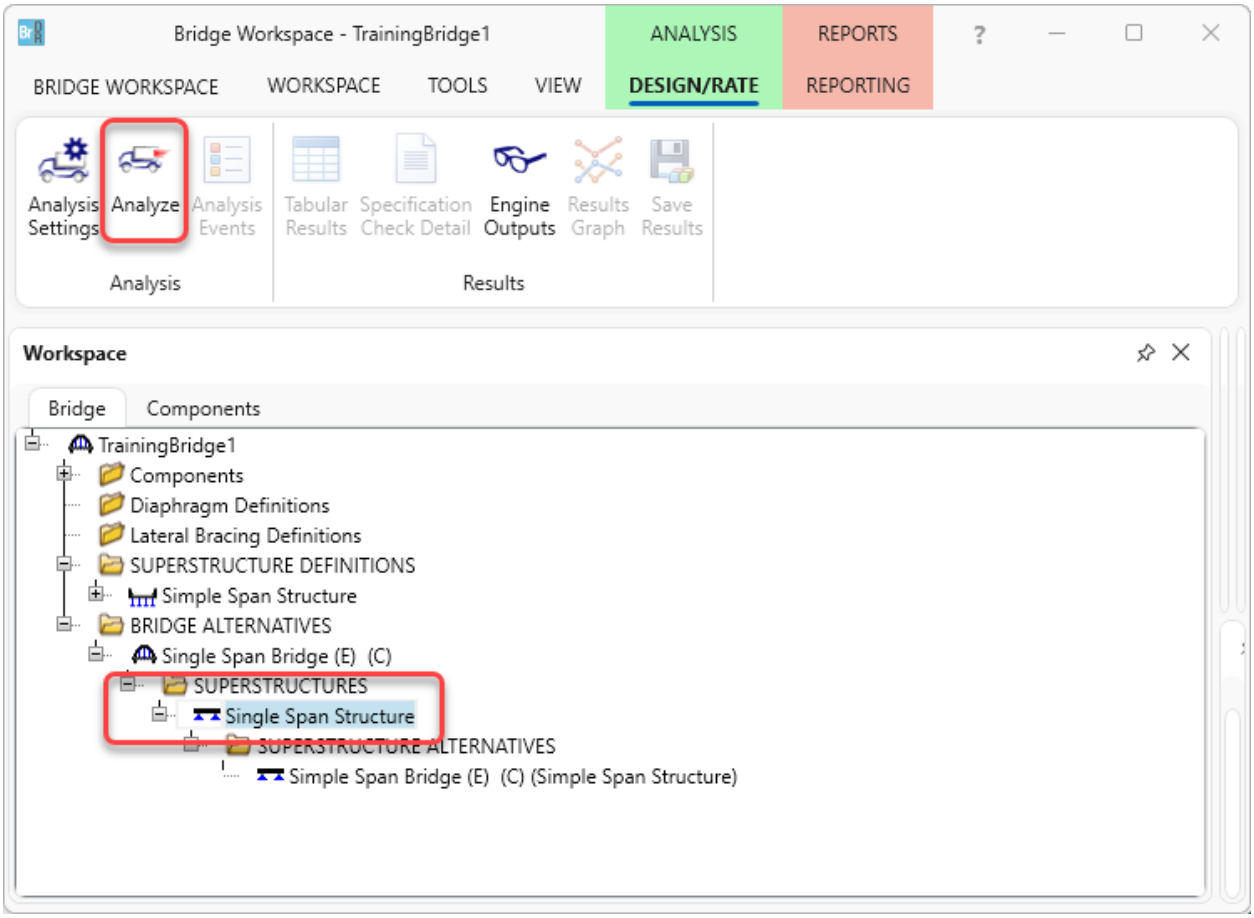


Select **Dist Factor-Line Girder** as the Analysis Type and **LFR** as the Rating Method. This will cause the distribution factor analysis to be performed and LFR analysis will be performed during the traditional line girder analysis. Then select the **NSG Truck** as the permit vehicle to use. Note that a standard gage vehicle can also be used in the analysis. A vehicle can be added in the Adjacent lane vehicle as well. However, in this example, no vehicle will be added for the adjacent lane.



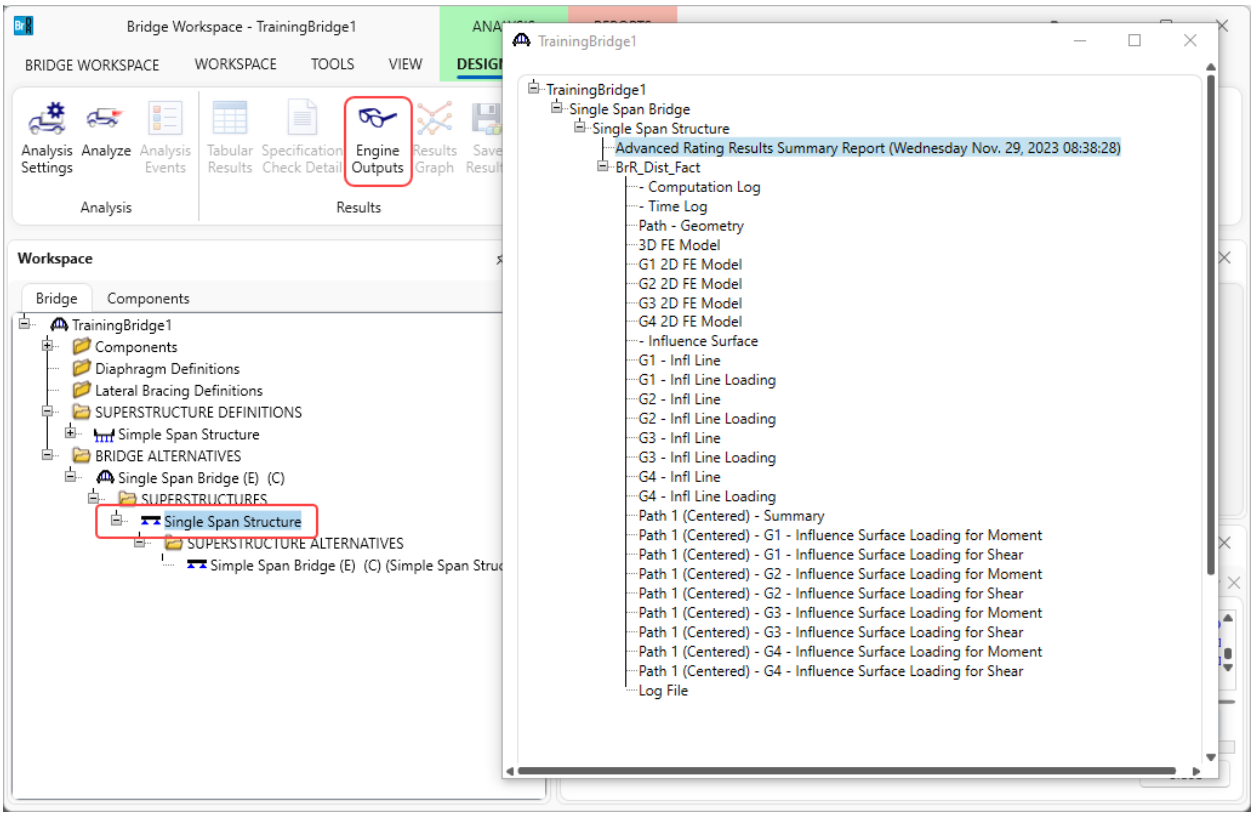
Click **OK** to save the settings and close the window.

Click the **Analyze** button in the Analysis Group to initiate the Distribution Factor-Line Girder analysis.



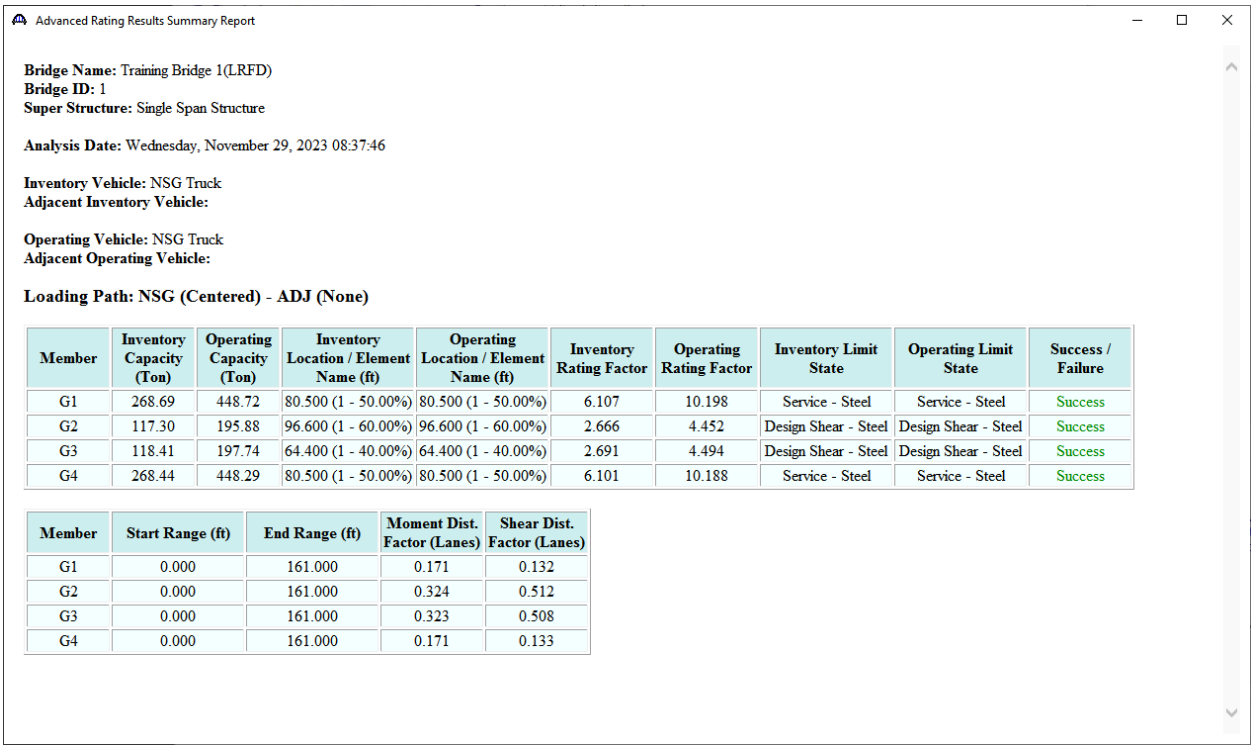
The **Analysis Progress** window will show the progress of the 3D and 2D finite element analyses. The AASHTO program is then run for the traditional girder line analysis using the distribution factors computed by the distribution factor analysis.

The output of the distribution factor analysis can be found by selecting **Engine Outputs** from the **Results** group of the **DESIGN/RATE** ribbon when the superstructure is selected in the **Bridge Workspace** tree.



The output of the distribution factor analysis includes the 3D and 2D finite element models, the influence surface and influence lines and their loading.

Double-click the **Advanced Rating Results Summary Report** for a summarized report of the rating. The critical distribution factors used for each girder are also listed in the report.



Advanced Rating Results Summary Report

Bridge Name: Training Bridge 1(LRFD)
Bridge ID: 1
Super Structure: Single Span Structure

Analysis Date: Wednesday, November 29, 2023 08:37:46

Inventory Vehicle: NSG Truck
Adjacent Inventory Vehicle:

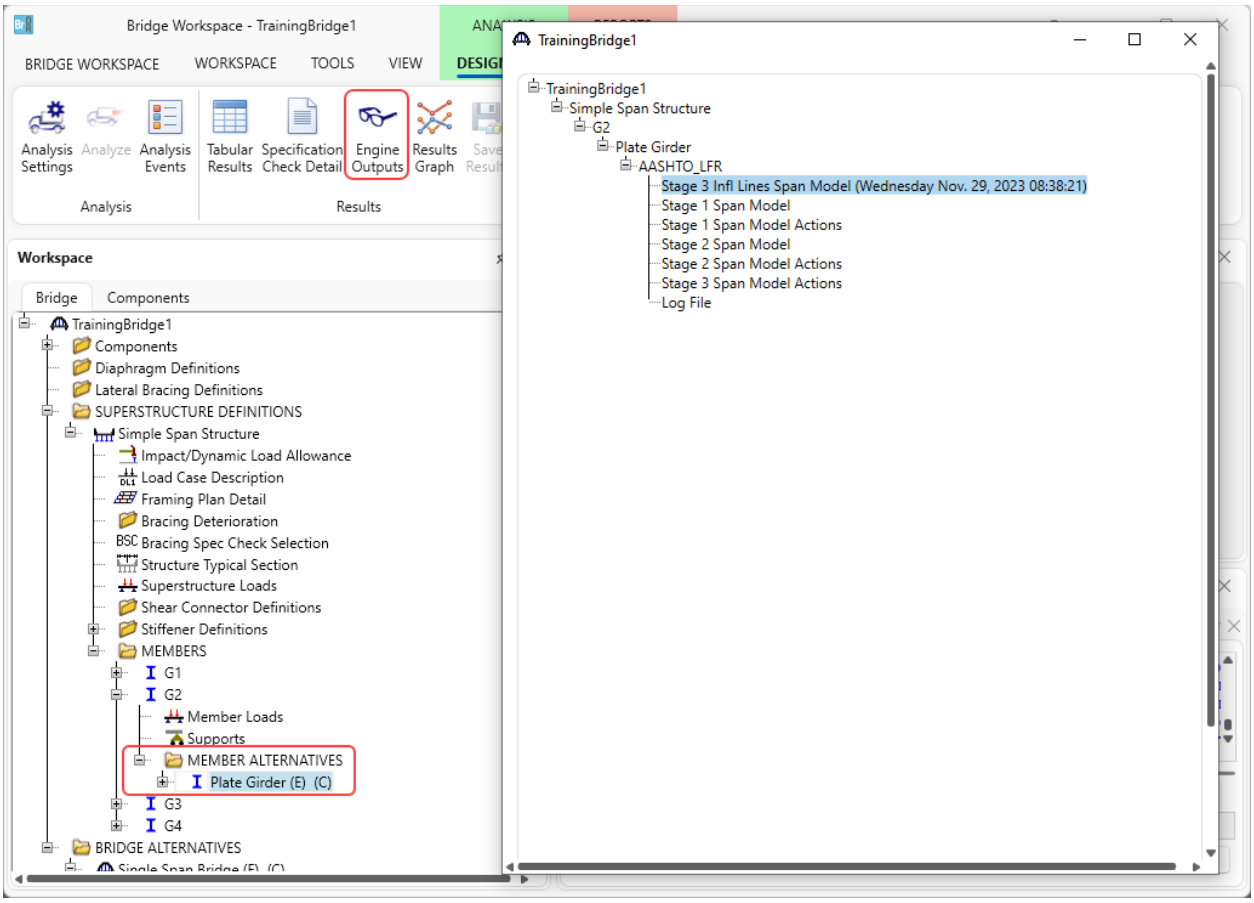
Operating Vehicle: NSG Truck
Adjacent Operating Vehicle:

Loading Path: NSG (Centered) - ADJ (None)

Member	Inventory Capacity (Ton)	Operating Capacity (Ton)	Inventory Location / Element Name (ft)	Operating Location / Element Name (ft)	Inventory Rating Factor	Operating Rating Factor	Inventory Limit State	Operating Limit State	Success / Failure
G1	268.69	448.72	80.500 (1 - 50.00%)	80.500 (1 - 50.00%)	6.107	10.198	Service - Steel	Service - Steel	Success
G2	117.30	195.88	96.600 (1 - 60.00%)	96.600 (1 - 60.00%)	2.666	4.452	Design Shear - Steel	Design Shear - Steel	Success
G3	118.41	197.74	64.400 (1 - 40.00%)	64.400 (1 - 40.00%)	2.691	4.494	Design Shear - Steel	Design Shear - Steel	Success
G4	268.44	448.29	80.500 (1 - 50.00%)	80.500 (1 - 50.00%)	6.101	10.188	Service - Steel	Service - Steel	Success

Member	Start Range (ft)	End Range (ft)	Moment Dist. Factor (Lanes)	Shear Dist. Factor (Lanes)
G1	0.000	161.000	0.171	0.132
G2	0.000	161.000	0.324	0.512
G3	0.000	161.000	0.323	0.508
G4	0.000	161.000	0.171	0.133

The results of the **AASHTO LFR** Engine line girder analysis of each girder can be viewed by selecting the **member alternative** in the **Bridge Workspace** tree (as shown below) and clicking the **Engine Outputs** button in the **Results** Group.



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