

Implementation of AASHTOWare BrR Program for Rating Iowa Bridges

BrR System and Library Data Summary

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1.0 Iowa DOT BrR System and Library Files

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



The following files are provided and will be used to import the Iowa DOT System and Library files into the program.

- 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.

🖊 💆 📴 🗧 Downloads	
File Home Share View	
← → × ↑ 🕹 > This PC > Downloads	√ Č
lowaDOT_Library_BrR_V750.brlx	
lowaDOT_System_BrR_V750.brsx	

2.0 Configuration Browser in BrR

To access the Configuration browser, click on "VIEW" in the top ribbon and select "Configuration".

BRIDGE EXPLORER BRIDGE FI	DLDER RATE TOOLS VIEW				
New Open D Batch Y Find	Copy Paste Copy Remove Delete				
Bridge	BRIDGE EXPLORER BRIDGE FOLD)ER	RATE	TOOLS VIEW	
←☆ Favorites Folder ← Recent Bridges All Bridges B- Templates - Deleted Bridges	Refresh Retrieve All Select Refresh Retrieve Next Select Invert: Bridge	All None Selectior e Explor	Sor By er View	Columns	Library Configuration
	←☆ Favorites Folder ← Ø Recent Bridges ⊕ Ø All Bridges		BID	Bridge ID	Bridge Name
	 Templates Deleted Bridges 		2	TrainingBridge2 TrainingBridge3	Training Bridge 2(LRFD) Training Bridge 2(LRFD) Training Bridge 3(LRFD)



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
- Parameters
- Custom Agency Fields Labels

Appendix A provides a detailed documentation of the data, specific 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 Import Configuration System File

Step 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".

BRIDGE EXPLORER BR	idge folder rate	TOOLS VIEW				
Bridge	 Preferences Database information Export 	Support System Data Import $\leftrightarrow \rightarrow \lor \uparrow \checkmark \to \text{This PC} \to$ Organize \checkmark New folder	Downloads	ڻ ~	Search Downloads	× م
B- Templates	 Import Help License Exit 	Abo	Date modified	Type BRSX File	78 KB	
		File name:		~	System Data export file (*.1	brsx) ~ ncel

CONFIGURATION	
BRIDGE EXPLORER CONFIGURATION	
New Rename Delete Group User User User	
manage	
🖻 🍰 Users	User ID
All Users	BrDUser
- Administrators	Delide a
	bridge
- M Rating Engineers	BrR
Routing Engineers	BrRAdmin
🖶 🗁 Access Privileges	BrRMar
- 🛱 Access Rights	BrRilser
- 🛱 Bridge Administration	billosci
Bridge Check-Out	
Bridge Description	
- Bridge Exchange	
- 🔂 Bridge List	
🙆 Bridge Locking and Unlocking	
🙆 BrM Rating Events	
🛱 BrM Rating Vehicles	
🔂 Configuration	
- 🔂 Design Events	
🔂 General Preferences	
- i Libraries	
- I Library Import	
- A Load Rating Tool	
- A Log Events	
- A Parameters	
🛱 Private Analysis Setting Template Administr	
🔂 Private Analysis Setting Templates	
🔂 Private Bridge Folders	
🔂 Private Folder Administration	
- 🛅 Public Analysis Setting Templates	
Public Bridge Folders	
- III Kating Events	
System Data Export/Import	
- A User Profile Settings	
- G User-Owned Library Entries	
Parameters	
- 🧭 System Defaults	
📁 Engine Defaults	



Step 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.

 System Data Name Description Analysis Event Template Codo Combination Settings Template System Defaults System Defaults General Preference Template Parameters Custom Agency Fields Labels 	Bit System Data Name Description > Analysis Event Template Coad Plattet Template System Defaults System Defaults Other Template System Defaults System Defaults
>>	Custom Agency Helds Labels

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.

📲 System Data Import						×
System data items:	De	tails:			Selected to import:	
🖶 🗁 System Data		Name	Description			
	>	System Defaults	System Defaults	<		
Load Palette Template System Defaults General Preference Template Prameters Canton Agency Fields Labels		4	,	>> <<	Import	

Step 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.

System data items:	Details:			Selected to import:
 System Data Analysis Event Template Load Combination Settings Template Load Palette Template System Defaults Unit Tolerance General Preference Template Parameters Custom Agency Fields Labels 	Name	Description	> < > > >>	System Data System Defaults System Defaults System Defaults Tri Tri Tri Tri Tri Tri Tri Tri

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3.0 Library Explorer in BrR

To access the Library Explorer, click on "VIEW" in the top ribbon and select "Library".

BRIDGE EXPLORER BRIDGE	GE FOLDER	RATE TOOLS	VIEW								
Bridge Favorites Folder Bridges All Bridges Bridges Deleted Bridges		BRIDGE EXPLORER	BRIDGE re All 🚺 S re Next 🗱 S () 1	FOLDER Select All Select Non Invert Selec Bridge Exp	e ction	ATE Sor By`	TOOLS	VIEW US Customary	×	Library	Configuration
			r		>	BID 1 2 3	Brin TrainingBridg TrainingBridg TrainingBridg	dge ID e1 e2 e3	Trainin Trainin Trainir	ig Bridge ig Bridge ig Bridge	Bridge Name 1(LRFD) 2(LRFD) 3(LRFD)

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 a 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.





INTERNATIONAL 3.1 Import Library File

Step 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".

Ibrary BRIDGE EXPLORER				
New Duplicate Open Delete Manage		Support Help Topics		
Corrugated Metal Panel Corrugated Metal Panel LRFD DF Applicability Ranges LRFD Substructure Design Settings Materials Metal Pipe Culvert Shere Metal Pipe Culvert Prestress Shapes Timber Shapes Shere Shapes Vehicles	Esport Esport Conse Estimate	 Cetting help using the software Library Import ← → ~ ↑ ↓ → This PC → Downloads Organize ▼ New folder Last month (1) IowaDOT_Library_BrR_V750.brlx 	v ð Search Downloads B∰ v □	× م 3
		File name:	Library export file (*.brlx) Open Cancel	×

Step 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.

Library Import				×
Library items:	Details:		Selected to ir	mport:
Appurtenances Appurtenances Appurtenances Appurtenances Appurtenances Berric Median Parapet Parapet	Name	Description	>	
				Import Close



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.

orary items:	De	tails:			Selected to import:	
🗄 🗁 Library 💧		Name	Description	>		
🖻 🗁 Appurtenances	>	Curb_8" x 2'-1 1/2" w/ 6" Overhang	IowaDOT Stand	1		
Median		ConcRail_Aesthetic	IowaDOT Aesth			
- 📁 Parapet		ConcRail_Open_2'-8" x 1'-3" (20" Block)	IowaDOT Stand			
Railing		ConcRail_Open_2'-8" x 1'-3" (19" Block)	IowaDOT Stand			
Bolt		ConcRail_Open_2'-5" x 1'-3" (15" Block)	IowaDOT Stand			
📁 Nail		ConcRail_Open_2'-5" x 1'-3" (19" Block)	IowaDOT Stand			
Corrugated Metal Panel		ConcRail_3'-6" Median Barrier	IowaDOT Stand			
LFD BLRFD		ConcRail_2'-10" Straight Barrier	IowaDOT Stand			
				>>		
Aluminum				<<		

Step 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.

ary items:	Details:		Select	ed to import:
	Name	Description	> = = = = = = = = = = = = = = = = = = =	Library Library Display Display

3.2 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.

Step 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".

BRIDGE EXPLORER UBRAR DERIDGE EXPLORER UBRAR UBRAR UBRAR UBRAR UBRAR UBRAR UBRAR	Schematic						
Manage	Preferences Database information Export	Support Ibirary Import ← → ~ ↑ □ > This PC > Windo	ws (C.) > Program Files > A	ASHTOWare → BrDR75	ٽ ~	Search BrDR75	<
Metal Box Culvert Metal Pipe Culvert	🚆 Import	Organize New folder				8== 🕶 🛄 😢	
Prestress Shapes	Help	Name	Date modified	Туре	Size		
 Image: State of Shapes Image: Shapes <l< th=""><th>E License Exit</th><th>ArcTool Engines Help Migration Wizard</th><th>2/15/2024 10:12 AM 2/15/2024 10:11 AM 4/12/2024 3:21 PM 2/15/2024 10:12 AM</th><th>File folder File folder File folder File folder</th><th></th><th></th><th></th></l<>	E License Exit	ArcTool Engines Help Migration Wizard	2/15/2024 10:12 AM 2/15/2024 10:11 AM 4/12/2024 3:21 PM 2/15/2024 10:12 AM	File folder File folder File folder File folder			
		OldRolledShapes.brtx	10/30/2023 10:57 AM	BRLX File	2,166 KB	There are the first had	
		File name:			~	Library export file (*.brlx) ~ Open Cancel	:

Step 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.

rary items:		Det	ails:				Selected to import:
Spiral Rib Metal Pipe			Name	Description		>	
📂 😥 Structural Plate Pipe		>	10WF(B10),10X5.75x21	10WF(B10),10X	î		
Prestress Shapes			10WF(B10),10X5.75x23	10WF(B10),10X			
Circular Void			10WF(B10),10X5.75x25	10WF(B10),10X			
Rectangular Void			10WF(B10),10X5.75x26	10WF(B10),10X			
E Beams			10WF(B10),10X5.75x29	10WF(B10),10X			
- Division op Flange			10WF(B10a),10X8x33	10WF(B10a),10			
···· 📁 Tee Beams			10WF(B10a),10X8x37	10WF(B10a),10			
U Beams Steel Shapes			10WF(B10a),10X8x39	10WF(B10a),10			
🥟 Angle	1		10WF(B10a),10X8x41	10WF(B10a),10			
····· 📁 Channel	11		10WF(B10a),10X8x45	10WF(B10a),10			
i i i i i i i i i i i i i i i i i i i	11		10WF(B10b),10X10x49	10WF(B10b),10			
🖃 🗁 Timber Shapes	11		10WF(B10b),10X10x54	10WF(B10b),10			
Rectangular	11		10WF(B10b),10X10x60	10WF(B10b),10		>>	1
🖉 Non Standard Gage	11		10WF(B10b),10X10x66	10WF(B10b),10			4
🖙 📁 Standard Gage	Ŧ		10WF(CB101) 10X5.75x21	10WF(CB101) 1		<<	



Step 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.

Step 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.





Step 5: Select "Copy from Library" at the bottom of the window to open up the "Steel Shape Selection window".

A Steel I Shape		Rolled shape type
Description:		S shape HP shape
Dimensions	Properties	
	Copy to library Copy from library	OK Apply Cancel

Step 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.

						e: 10WF(B10),10X5.75x21	Rolled shape type
			brary Standard Agency defi	ined Uni	t system)SI US	10WF(810),10X5.75x21 (Last Year Rolled 1948) ription:	W shape M shap S shape HP shap
Shape	Year	Depth (in)	Load (lb/ft)	Sxx (in^3)		mensions Properties	
10WF(B10),10X5.75x21	1938	9.9000	21.000	21.475	î	in the second	in
10WF(B10),10X5.75x23	1938	10.0000	23.000	24.120			
10WF(B10),10X5.75x25	1946	10.0800	25.000	26.429		× × 99000 i	
10WF(B10),10X5.75x26	1938	10.1200	26.000	27.609		0.2400 in -	
10WF(B10),10X5.75x29	1938	10.2200	29.000	30.783			
10WF(B10a), 10X8x33	1938	9.7500	33.000	35.056		5.7500 in	
				ок	Cancel	201922 - 12 Pl	

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3.3 Modify and Delete Library Items

Step 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.

w Duplicate Open Delete Schematic				
Manage				
Appurtenances	Library	Units	Name	Description
Generic Median	Agency	US Customary	Curb_8" H x 2'-1.5" W (6" Overha	lowa DOT Standard curb with 6" overhang (Area 231
📁 Parapet	Agency	US Customary	ConcRail_3'-2" Aesthetic	Iowa DOT Aesthetic concrete railing
Railing	Agency	US Customary	ConcRail_2'-8" Open (20" Block)	lowa DOT Standard Open Rail w/ 1'-8" top rail block
Corrugated Metal Panel	Agency	US Customary	ConcRail_2'-8" Open (19" Block)	lowa DOT Standard Open Rail w/ 1'-7" top rail block
Factors	Agency	US Customary	ConcRail_2'-5" Open (15" Block)	lowa DOT Standard Open Rail w/ 1'-3" top rail block
LRFD DF Applicability Ranges IRFD Substructure Design Settings	Agency	US Customary	ConcRail_2'-5" Open (19" Block)	lowa DOT Standard Open Rail w/ 1'-7" top rail block
Materials	Agency	US Customary	ConcRail_3'-6" Median Barrier	Iowa DOT Standard Median Rail
Metal Box Culvert	Agency	US Customary	ConcRail_2'-10" Separation Barrier	Iowa DOT Standard Separation Barrier
Prestress Shapes	Agency	US Customary	ConcRail_2'-10" Aesthetic	Iowa DOT Aesthetic concrete railing w/ 3/4" panels
Steel Shapes	Agency	US Customary	ConcRail_3'-6" Open (1'-1" Windo	Iowa DOT Standard Open Rail w/ 1'-1" windows
Timber Shapes				·

Step 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.

BRIDGE EXPLORER						
New Duplicate Open Pelete Schematic Close						
Manage						
E Depurtenances		Library	Units	Name	Description	
Generic Median	>	Agency	US Customary	Curb_8" H x 2'-1.5" W (6" Overha	lowa DOT Standard curb with 6" overhang (Area 231	
		Agency	US Customary	ConcRail_3'-2" Aesthetic	Iowa DOT Aesthetic concrete railing	
kailing		Agency	US Customary	ConcRail_2'-8" Open (20" Block)	lowa DOT Standard Open Rail w/ 1'-8" top rail block	
Connectors Conrugated Metal Panel		Agency	US Customary	ConcRail_2'-8" Open (19" Block)	lowa DOT Standard Open Rail w/ 1'-7" top rail block	
■ Ø Factors		Agency	US Customary	ConcRail_2'-5" Open (15" Block)	lowa DOT Standard Open Rail w/ 1'-3" top rail block	
Complete Complet		Agency	US Customary	ConcRail_2'-5" Open (19" Block)	lowa DOT Standard Open Rail w/ 1'-7" top rail block	
B Materials		Agency	US Customary	ConcRail_3'-6" Median Barrier	Iowa DOT Standard Median Rail	
Metal Box Culvert		Agency	US Customary	ConcRail_2'-10" Separation Barrier	Iowa DOT Standard Separation Barrier	
Prestress Shapes		Agency	US Customary	ConcRail_2'-10" Aesthetic	Iowa DOT Aesthetic concrete railing w/ 3/4" panels	
🗄 📁 Steel Shapes		Agency	US Customary	ConcRail_3'-6" Open (1'-1" Windo	Iowa DOT Standard Open Rail w/ 1'-1" windows	
u III IIII IIII IIIII IIIII IIIIIIIIIII						



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.

New Duplicate Open Delete Schematic Close							
- De Appurtenances		Library	Units	Name		Description	
Builder Evidence							
Parapet		Agency	US Customary	ConcRail_	3'-2" Aesthetic	Iowa DOT Aesthetic concrete railing	
🧭 Railing		Agency	US Customary	ConcRail_	2'-8" Open (20" Block)	Iowa DOT Standard Open Rail w/ 1'-8" top rail block	
Connectors		Agency	US Customary	ConcRail_	2'-8" Open (19" Block)	Iowa DOT Standard Open Rail w/ 1'-7" top rail block	
B 💋 Factors		Agency	US Customary	ConcRail_	2'-5" Open (15" Block)	Iowa DOT Standard Open Rail w/ 1'-3" top rail block	
	Library Units Name Description yagers/- VS Customary ConcRail 2:-8" Open (20° Block) Iowa DOT Standard curb with 6" overhang (Area 231 Agercy- US Customary ConcRail 2:-8" Open (20° Block) Iowa DOT Standard Open Rail wi 1:-8" top rail block Agercy- US Customary ConcRail 2:-8" Open (10° Block) Iowa DOT Standard Open Rail wi 1:-8" top rail block Agercy- US Customary ConcRail 2:-8" Open (10° Block) Iowa DOT Standard Open Rail wi 1:-7" top rail block Agercy- US Customary ConcRail 2:-8" Open (10° Block) Iowa DOT Standard Open Rail wi 1:-7" top rail block Agercy- US Customary ConcRail 2:-8" Open (10° Block) Iowa DOT Standard Open Rail wi 1:-7" top rail block Agercy- US Customary ConcRail 2:-8" Open (10° Block) Iowa DOT Standard Open Rail wi 1:-7" top rail block Agercy- US Customary ConcRail 2:-5" Open (15° Block) Iowa DOT Standard Open Rail wi 1:-7" top rail block Agercy- US Customary ConcRail Evice approx Iowa DOT Standard Open Rail wi 1:-7" top rail block Agercy- US Customary ConcRail Agercy Iowa DOT Standard Open Rail wi 1:-7" to						
B 🗭 Materials		Agency	US Customary	ConcRail	Bridge Rating		\times
🧭 Metal Box Culvert	al Panel billing Ranges: re Description Conce billing Ranges: re Description concertail 2 Agency US Customary Concertail 2 Agency US Customary Concertail Lowa DOT Standard Courb with 6" overhang (Area 231 Agency US Customary Concertail Lowa DOT Standard Open Rail w/ 1-8" top rail block Agency US Customary Concertail Lowa DOT Standard Open Rail w/ 1-3" top rail block Agency US Customary Concertail Lowa DOT Standard Open Rail w/ 1-3" top rail block Agency US Customary Concertail Lowa DOT Standard Open Rail w/ 1-3" top rail block Agency US Customary Concertail Lowa DOT Standard Open Rail w/ 1-3" top rail block Agency US Customary Concertail Lowa DOT Standard Open Rail w/ 1-3" top rail block Agency US Customary Concertail Lowa DOT Standard Open Rail w/ 1-3" top rail block Agency US Customary						
Prestress Shapes		Agency	US Customary	ConcRail	<u> </u>		
🖶 💋 Steel Shapes		Agency	US Customary	ConcRail	Overhan	sure you want to delete Curb_8 H x 2 -1.5 W (t	,
 P Timber Shapes P Vehicles 					-		
						Yes No	

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 3.1 for details on importing library files.

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INTERNATIONAL

4.0 Analysis Event Templates

The following analysis event templates are imported into the BrR library after completing Section 2.1, 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

Assumptions and restrictions for Iowa DOT BrR LFR & LRFR 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.

4.1 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 Trucks (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

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Design review O Rating	Rating meth	od: LFR	~
	Save an	alysis results	
alysis type: Line Girder 🗸 🗸			li
ne / Impact loading type: As Requested V	Apply prefer	ence setting: None	
Vehicles Output Engine Description			
Traffic direction: Both directions		Refresh Temporary vehicle	es Advanced
Vehicle selection		Vehicle summary	
 ➡ Vehicles ➡ Standard ➡ Alternate Military Loading ➡ EV2 ← EV3 ➡ H 15-44 ➡ H 50-44 ➡ H 51-544 ➡ H 520-544 ➡ H 520-544 ➡ H 520-44 ➡ SU5 ➡ SU4 ➡ SU5 ➡ SU5 ➡ SU6 ➡ SU7 ➡ Type 3.3 ➡ Type 3S2 ➡ Pogency ➡ 136k Truck "A" ➡ 136k Truck "B" ➡ 156k Truck ➡ 90k Truck ➡ Quint Axle Crane Truck ➡ SU4 WW ➡ SU5 OW ➡ SU5 OW ➡ SU6 OW ➡ SU7 OW ➡ Type 3.3 (lowa DOT) 	Add to >> Remove from <<	 □-Rating vehicles □-Inventory □-HS 20-44 □-Operating □-HS 20-44 □-Operating □-K20-44 □-Adjacent vehicle □-Adjacent vehicle □-Adjacent vehicle □-SU3 □-Adjacent vehicle □-SU3 □-Adjacent vehicle □-SU3 □-Adjacent vehicle □-Type 3-3 (lowa DOT) □-Adjacent vehicle □-Type 3S38 □-Adjacent vehicle □-Type 3S38 □-Adjacent vehicle □-Type 4S3 □-Adjacent vehicle □-Type 5-2 □-Adjacent vehicle □-Type 5-2 □-Adjacent vehicle □-Type 5-2 □-Adjacent vehicle □-Type 5-2 □-Adjacent vehicle □-Permit inventory □-Permit operating 	Permit inventory Permit operating Permit operating

Figure 1: "Analysis Settings" window for the "Iowa DOT LFR" analysis template

|--|

	Vehicle	Tandem train	Scale factor	Impact	Single Iane Ioaded	
	136k Truck "A"		1.000			
I	136k Truck "B"		1.000			
	156k Truck		1.000			
Ì	90k Truck		1.000			
Ī	EV2		1.000			
Ì	EV3		1.000			
	Fluid Milk Truck		1.000			
	HS 20-44		1.000			
	Quint Axle Crane Truck		1.000			
	Small Annual Crane Truck		1.000			
	SU4		1.000			
	SU5		1.000			
	SU6		1.000			
	SU7		1.000			
	Type 3-3 (Iowa DOT)		1.000			
	Type 3S3A		1.000			
	Type 3S3B		1.000			
	Type 4		1.000			
	Type 4S3		1.000			
	Type 5-2		1.000			

Figure 2: "Advanced" settings window for the "Iowa DOT LFR" analysis template

Template Name: Iowa DOT LRFR

Live loads included in the "lowa DOT LRFR" analysis template are listed below, per lowa 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 Trucks
 - 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.vii) 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.4.2.1a

Modifications 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





Figure 3: "Analysis Settings" window for the "Iowa DOT LRFR" analysis template

Vehicle	Tandem train	Scale factor	Impact	Single Iane Ioaded	Legal pair	Override	Legal live load factor	Frequency	Loading condition		Override	Permit live load factor	
136k Truck "A"		1.000						Single Trip 🗸 🗸 🗸	Mixed with traffic	\sim			
136k Truck "B"		1.000						Single Trip 🗸 🗸 🗸	Mixed with traffic	\sim			
156k Truck		1.000						Single Trip 🛛 🗸	Mixed with traffic	\sim			
90k Truck		1.000						Single Trip 🗸 🗸	Mixed with traffic	\sim			
EV2		1.000						Single Trip 🗸 🗸	Mixed with traffic	\sim			
EV3		1.000						Single Trip 🛛 🗸	Mixed with traffic	\sim			
Fluid Milk Truck		1.000						Single Trip 🗸 🗸	Mixed with traffic	\sim			
HL-93 (US)		1.000						Single Trip 🗸 🗸	Mixed with traffic	\sim			
Lane-Type Legal Load		1.000			\checkmark			Single Trip 🛛 🗸	Mixed with traffic	\sim			
Quint Axle Crane Truck		1.000						Single Trip 🛛 🗸	Mixed with traffic	\sim			
Small Annual Crane Truck		1.000						Single Trip 🛛 🗸	Mixed with traffic	~			
SU4		1.000						Single Trip 🗸 🗸 🗸	Mixed with traffic	\sim			
SU5		1.000						Single Trip 🛛 🗸	Mixed with traffic	\sim			
SU6		1.000						Single Trip 🗸 🗸	Mixed with traffic	\sim			
SU7		1.000						Single Trip 🛛 🗸	Mixed with traffic	\sim			
Type 3-3 (lowa DOT)		1.000						Single Trip 🗸 🗸	Mixed with traffic	\sim			
Type 3-3 Lane-Type (lowa DOT)		1.000			\checkmark			Single Trip 🗸 🗸	Mixed with traffic	\sim			
Type 3S3A		1.000						Single Trip 🛛 🗸	Mixed with traffic	\sim			
Type 3S3A Lane-Type		1.000			\checkmark			Single Trip 🗸 🗸	Mixed with traffic	\sim			
Type 3S3B		1.000						Single Trip 🛛 🗸	Mixed with traffic	\sim			
Type 3S3B Lane-Type		1.000			\checkmark			Single Trip 🛛 🗸	Mixed with traffic	\sim			
Type 4		1.000						Single Trip 🗸 🗸	Mixed with traffic	\sim			
Type 4 Lane-Type		1.000			~			Single Trip 🗸 🗸 🗸	Mixed with traffic	\sim			
Type 4S3		1.000						Single Trip 🗸 🗸	Mixed with traffic	\sim			
Type 4S3 Lane-Type		1.000			\checkmark			Single Trip 🗸 🗸	Mixed with traffic	\sim			
Type 5-2		1.000						Single Trip 🗸 🗸 🗸	Mixed with traffic	\sim			
Type 5-2 Lane-Type		1.000			\checkmark			Single Trip 🗸 🗸	Mixed with traffic	\sim			
t lane load: kip/ft xclude permit lane load from per	Adjacent v	vehicle liv location	re load fa	ctor:									

Figure 4: "Advanced" settings window for the "Iowa DOT LRFR" analysis template

4.3 Perform Rating Analysis

There are two ways to perform the rating analysis of a bridge model using the analysis templates – one is in the Bridge Explorer and the other is in the Bridge Workspace.

4.3.1 Perform Rating Analysis In Bridge Explorer

To perform a rating analysis in Bridge Explorer:

- 1. After logging into BrR, In the Bridge Explorer, "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.

B	R							A	ASHTOWare B	ridge Rating	
Ι.	BRIDGE EXPLORER BRIDG	GE FOLD	ER	RATE	TOOLS VIEW						
	New Open Batch ~	Find Copy	y Pas	ste Ca	py Remove Delete						
1	Bridge			Mana	ge						
	👾 😭 Favorites Folder			BID	Bridge ID	Bridge Name	District	County	Facility	Location	Route
16	- 📁 All Bridges		>	1	TrainingBridge1	Training Bridge 1(LRFD)	Unknown	Unknown (P)	SR 0051	Pittsburgh	0051
	IowaDOT			2	TrainingBridge2	Training Bridge 2(LRFD)	Unknown	Unknown (P)	N/A	N/A	-1
	Pelated Bridges			3	TrainingBridge3	Training Bridge 3(LRFD)	Unknown	Unknown (P)	1-79	Pittsburgh	0079
	Deleted blidges			4	PCITrainingBridge1	PCI TrainingBridge1(LFR)					-1
				-	DOT I DI DI D						

												A	ASHTOWare B	ridge Rating	
BRID	GE EXPLO	RER E	BRIDGE	FOLDE	R	RATE	TOOLS	VIEW							
Rate Rate	Update Rating: BrM	E Results	Recent R Resul	Rating Ma Its Results	anage Eve	Analy: ents	sis Open Route Routing	01 10 Precomputed Loa Data Rating Too	ad Rating Tool						
	🚖 Favorites Folder 📁 Recent Bridges				BID	E	ridge ID		Bridge Name	District	County	Facility	Location	Route	
II 🕈 🏓	All Bridge	25			>	1	TrainingBrid	ige1	Training	Bridge 1(LRFD)	Unknown	Unknown (P)	SR 0051	Pittsburgh	0051
	lowaDOT				2	2 TrainingBridge2		Training	Bridge 2(LRFD)	Unknown	Unknown (P)	N/A	N/A	-1	
	Emplates					3	TrainingBrid	ige3	Training	Bridge 3(LRFD)	Unknown	Unknown (P)	I-79	Pittsburgh	0079
	Deleteur	noges				4	PCITraining	Bridge1	PCI Train	ingBridge1(LFR)					-1



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

Design review 🔘 Rating	Rating method:
Line Circles	Save analysis results
e / Impact loading type: Detailed by Scaling	 Apply preference setting: None
Vehicles Output Engine Description Traffic direction: Both directions ~	Refresh Temporary vehicles Advanced
Vehicle selection	Vehicle summary
 Id=-Vehicles Id=-Vehicles Id=Alternate Military Loading Id=VeX <	Add to Remove from

6. Select "Iowa DOT LFR" template fo LFR analysis or "Iowa DOT LRFR" for LRFR analysis and click "Open". In this example, "Iowa DOT LFR" is selected.

lemplates	Description	Analysis	Owner	Public / Private	
HL 93 Design Review	HL 93 Design Review	LRFD		Public	
HS 20 LFR Rating	HS 20 LFR Rating	LFR		Public	
LRFR Design Load Rating	LRFR Design Load Rating	LRFR		Public	
LRFR Legal Load Rating	LRFR Legal Load Rating	LRFR		Public	
Iowa DOT LFR	BrR new analysis event.	LFR		Public	
Iowa DOT LRFR	BrR new analysis event.	LRFR		Public	



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.

Oesign review	Rating	Rating method:	LFR V	
		Save analys	is results	
alysis type:	Line Girder V			
ne / Impact loading type:	Detailed by Scaling \lor	Apply preference	e setting: None v	
Vehicles Output Er	igine Description			
Traffic direction: Both dir	ections ~	Re	fresh Temporary vehicles Advanced	
Vehicle selection		Vehicl	le summary	
	r , , , , , , , , , , , , , , , , , , ,	Add to >> Remove from <<		



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.

Analycic Event	- Location - 96.2500 (ft)	
- Anorysis event	- Location - 97.5000 (ft)	
Template V16-70 250ft	- Location - 101.2500 (II)	
- · · · · · · · · · · · · · · · · · · ·	- Location - 104.4503 (II)	
A STRUCTURES	- Location - 115 3500 (ft)	
	- Location - 125.0000 (ff)	
Implate_V16-70_250ft [4 Beam Syst]	- Location - 134.7500 (ft)	
	- Location - 144.5000 (ft)	
A O GIRDER-SYSTEM MEMBERS	- Location - 145.5416 (ft)	
	- Location - 148.7500 (ft)	
🧭 SB1 [SB1]	- Location - 152.5000 (ft)	
	- Location - 153.7500 (ft)	
🥝 SB2 [SB2]	- Location - 154.2500 (ft)	
	- Location - 162.2500 (ff)	
🥝 SB3 [SB3]	- Location - 164.0000 (ft)	
	- Location - 169.7500 (ff)	
🥝 SB4 [SB4]	- Location - 173.7500 (II)	
	- Location - 1////500 (II)	
	- Location - 181.3/50 (it)	
	- Location - 180.0000 (ft)	
	- Location - 193,7500 (ft)	
	- Location - 195,0000 (ft)	
	- Location - 196.6250 (ft)	
	- Location - 198.7500 (ft)	
	- Location - 201.8750 (ft)	
	- Location - 204.2500 (ft)	
	- Location - 211.8750 (ft)	
	- Location - 219.5000 (ft)	
	- Location - 227.1250 (ft)	
	- Location - 234.7500 (ft)	
	- Location - 242.3/50 (it)	
	- Location - 249.0000 (ft)	
	Completed Specification Check	
	Info - LFR analysis successfully completed!	
	Info - Populating dead load results for non-composite (stage 1)	
	Info - Populating dead load results for composite (long term) (stage 2)	
	Info - Populating live load results for composite (short term) (stage 3)	
	Info - Populating LFR rating summary	
	Info - Analysis completed!	
>		

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.

	Lane/impact los	ading type	Display	format:											
US customary SI / me	tric O As reques	ted Detaile	Multipl	e rating levels per	row v										
Bridge ID	Vehicle	Inventory rating ~ factor	Operating rating factor	Legal operating rating factor	Legal rating factor	Permit inventory rating factor	Permit operating rating factor	Permit rating factor	Inventory rating method	Operating rating method	Legal operating rating method	Legal rating method	Permit inventory rating method	Permit operating rating method	Perm rating m
emplate_V16-70_250ft	HS 20-44	1.008	1.683						LFR	LFR					
emplate_V16-70_250ft	Type 5-2			1.785							LFR				
emplate_V16-70_250ft	Type 4S3			2.013							LFR				
emplate_V16-70_250ft	Type 4			2.054							LFR				
emplate_V16-70_250ft	Type 3S3B			2.257							LFR				
emplate_V16-70_250ft	Type 3S3A			1.972							LFR				
emplate_V16-70_250ft	Type 3-3 (Iowa DO			1.893							LFR				
emplate_V16-70_250ft	SU7			1.530							LFR				
emplate_V16-70_250ft	SU6			1.661							LFR				
emplate_V16-70_250ft	SU5			1.843							LFR				
emplate_V16-70_250ft	SU4			2.039							LFR				
emplate_V16-70_250ft	Small Annual Cran						1.391							LFR	
emplate_V16-70_250ft	Quint Axle Crane T						1.199							LFR	
emplate_V16-70_250ft	Fluid Milk Truck						1.239							LFR	
emplate_V16-70_250ft	EV3			1.309							LFR				
emplate_V16-70_250ft	EV2			1.980							LFR				
emplate_V16-70_250ft	90k Truck						1.803							LFR	
emplate_V16-70_250ft	156k Truck						1.241							LFR	
emplate_V16-70_250ft	136k Truck "B"						1.278							LFR	
emplate V16-70 250ft	136k Truck "A"						1,353							LFR	

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.

Us customary S / metrix A requested Detailed Multiple rating levels per row Bridge ID Vehicle Immentory rating factor A requested Legal Permit inventory rating factor Permit i
Bridge ID Weide Inventory rating method Generating rating factor Legal rating factor Permit inventory rating factor Permit inventory rating factor Permit inventory rating factor Permit inventory rating factor Operating rating factor Operating rating factor Operating rating factor Permit inventory rating method Pe
Template_V16-70_250h HS 0-44 1.08 1.68 Image Image </th
Template V16-70_250ht Type 5-2 Image 5-2
Template, V16-70, 250h Type 453 Q
Template, V16-70,250h Type 4 2,054 Image: Constraint of the cons
Template, V16-70,250h Type 338 2,257 Image: V16-70,250h LFR Image: V16-70,250h Template, V16-70,250h Type 33 (lowa DO. 1,972 Image: V16-70,250h LFR Image: V16-70,250h Template, V16-70,250h Type 33 (lowa DO. 1,933 Image: V16-70,250h LFR Image: V16-70,250h Template, V16-70,250h System of units 1,843 Image: V16-70,250h LFR Image: V16-70,250h Template, V16-70,250h System of units 1,843 Image: V16-70,250h LFR Image: V16-70,250h Template, V16-70,250h System of units Image: V16-70,250h System of units Image: V16-70,250h Image: V16-70,250h
Template, V16-70, 250h Type 33A I 1.972 I
Template, Y16-70, 250h Type 3-3 (lowa DO 1.893 Image: Control of the state of the st
Template, V16-70,250h SU7 1.530 LFR
Template, V16-70,230h SU6 1.661 LFR LFR Template, V16-70,230h SU5 1.843 1.
Template, V16-70, 250h SUS 1.843 Image Image </th
Template, V16-70, 250h Image: Structure Rating Results X Template, V16-70, 250h X Template, V16-70, 250h X System of units X Template, V16-70, 250h X
Template, V16-70,230h Image: Structure Rating Results X Template, V16-70,230h System of units X Template, V16-70,20h System of units X
Template_V16-70_250ft System of units Lane/impact loading type Display format:
emplate V16-70 250ft System of units Lane/impact loading type Display format:
Template V16-70 750E
Template V16-70 250#
Template (15-70 250)
Bridge id Structure Vehicle ration factor ra
Tenny receive returny receive returny receive returny receiver returny returny receiver returny retu
Template_V10-70_250ft V Template_V16-70_250ft Template_V16-70_250ft HS 20-44 1.008 1.683

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

S	/stem of units		Lane/impa	ct loading	type	Display format:					
(🔵 US customary 🔵 SI	/ metric	🔿 As re	quested	Detailed	Multiple rating levels	per row 🗸				
	Bridge id	Str	ucture	Member	Vehicle	Inventory rating factor	Operating rating factor	Legal operating rating factor	Legal rating factor	Permit inventory rating factor	Permit opera rating fact
	Template_V16-70_250ft	Template_	V16-70_250ft	SB1	HS 20-44	1.060	1.985				
	Template_V16-70_250ft	Template_	V16-70_250ft	SB2	HS 20-44	1.008	1.683				
	Template_V16-70_250ft	Template_	V16-70_250ft	SB3	HS 20-44	1.008	1.683				
	Template_V16-70_250ft	Template_	V16-70_250ft	SB4	HS 20-44	1.060	1.985				
											-

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4.3.2 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, In the Bridge Explorer, "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.

Bridge Workspace	- TrainingBridge1		ANALYSIS	REPORTS		
BRIDGE WORKSPACE WORKS	SPACE TOOLS	VIEW	DESIGN/RATE	REPORTING		
 ✓ Check Out ✓ Check In ✓ Validate Save 	RestoreRevertClose	Export	Refresh Op	en New Copy	Paste Duplicate Delete	e Schematic
	Bridge			Ν	lanage	
Workspace Bridge Components TrainingBridge1 Components Diaphragm Definitions	\$ X	Sche	matic		< &	Report
Lateral Bracing Definition SUPERSTRUCTURE DEF Ben Imm Simple Span Structu Ben BRIDGE ALTERNATIVES Ben M Single Span Bridge	ons INITIONS ire (E) (C)					



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.

Bridge Workspace - TrainingBridge1 BRIDGE WORKSPACE TOOLS	IEW DESIGN/RATE REPORTING	? – 🗆 X
Check Dut 💣 💾 🚳 Restore 🗙 Restore A Close Restore Close Revert Revert Close Revert	xport Refresh Dependence Copy Paste Duplicate Delete	
Workspace ☆ ×	Schematic & X Report	× &
Components Components Components Components Diaphragm Definitions Diaphragm Definitions SUPERSTRUCTURE DEFINITIONS Immode Straing Page Allowance dt Load Case Description dt Load Case Description dt Praving Plan Detail OF Bracing Deterioration BSC Bracing Spec Check Selection Structure Typical Section		
Superstructure Loads Ø Shear Connector Definitions	Analysis	$\times \approx$
Image: Provide the state of the state		

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

Br R		ANAI	YSIS	REPORTS	
BRIDGE WORKSPACE	WORKSPACE TOOLS	VIEW	/RATE	REPORTING	
Analysis Settings	Tabular Specification Encesults Check Detail	→ ☆ □ gine Results Save tputs Graph Result	5		
Analysis	Result	5			
Workspace		\$	K Scl	hematic	
Bridge Components					
A TrainingBridge1 Components Diaphragm Defi Diaphrag	nitions Definitions RE DEFINITIONS Structure Dynamic Load Allowance se Description Plan Detail				



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

Design review 🔘 Rating	Rating method: LFR \checkmark	
	Save analysis results	
alysis type: Line Girder	\sim	
ne / Impact loading type: Detailed by Scaling		
/ehicles Output Engine Description		
Traffic direction: Both directions	Refresh Temporary vehicles Advanced	I
Vehicle selection	Vehicle summary	
 B-Vehicles Chandard Atternate Military Loading -EV2 -EV3 -H 15-44 -H 20-44 -HS 15-44 -HS 20-44 -NRL -NRL -SU4 	Add to	

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

Templates	Description	Analysis	Owner	Public / Private	
HL 93 Design Review	HL 93 Design Review	LRFD		Public	
HS 20 LFR Rating	HS 20 LFR Rating	LFR		Public	
LRFR Design Load Rating	LRFR Design Load Rating	LRFR		Public	
LRFR Legal Load Rating	LRFR Legal Load Rating	LRFR		Public	_
Iowa DOT LFR	BrR new analysis event.	LFR		Public	
Iowa DOT LRFR	BrR new analysis event.	LRFR		Public	

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

Analysis Settings					
Design review	Rating	Rating metho	d:	LFR	\sim
		Save ana	lysis results		
alysis type:	Line Girder 🗸 🗸				
ne / Impact loading type:	Detailed by Scaling \sim	Apply prefere	nce setting:	None	\sim
Vehicles Output E	ngine Description				
Traffic direction: Both di	irections \checkmark		Refresh	Temporary vehicles	Advanced
Vehicle selection		Veh	icle summar	у	
	itary Loading ¹ ² ³ ³ ³ ⁴ ⁵ ⁵ ⁶ ⁶ ⁶ ⁶ ⁶ ⁶ ⁶ ⁶	Add to >> Remove from <<	□ - IFS : □ - IFS :	ry cy 20-44 perating e 3-3 (lowaDOT) e 3-3 (lowaDOT) e 3-33(A e 353A e 353A e 353B e 4 e 453 e 5-2 inventory operating k Truck "A" k Truck "B" k Truck Truck d Milk Truck nt Axle Crane Truck all Annual Crane Truck	

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

DESIGN/RATE Save Results	REPORTING
Save Results	
s≫ × Sc	hematic



- 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.

BRIDGE WORKSPACE WORKSPACE TOOLS VIEW DESIGN/	SIS REPORTS RATE REPORTING	Bridge Workspace - TrainingBridge1
Analysis Analyze Analysis Settings Analyze Analysis Analysis Analyze Analysis Analysis Analyze Analysis Analysis Analyze Analysis Analysis Analyze Analysis Analysis Analyze Analysis Analysis		
Workspace > - > > ×	Schematic	☆ × Re
TrainingBridge1 TrainingBridge1 TrainingBridge1 TrainingBridge1 TrainingBridge1 TrainingBridge1 TrainingDefinitions Definitions SupersTRUCTURE DEFINITIONS TrainingPlan Detail TrainingPlan Detail Bracing Deterioration Bracing Deterioration	Analysis	
I G3	Analysis - TrainingBridge1	
Bridge Alternatives		Location - 112./000 (it) Location - 120 0 0 0 (it)
A Single Span Bridge (E) (C) B SUPERSTRUCTURES F T Single Span Structure D Superstructure ALTERNATIVES	Analysis Event Ø Analysis Event Ø TrainingBridge1	- Location - 128.8000 (ft) - Location - 144.9000 (ft) - Location - 161.0000 (ft) Completed Specification Check. Info - LFR analysis successfully completed!
SUPERSTRUCTORE ALLERNATIVES Simple Span Bridge (E) (C) (Simple Span Structu	In Single Spar	Structure [Simple Son] Info - Populating dead load results for non-composite (stage 1)



APPENDIX A

Iowa DOT BrR System Data File Settings

A1 BrR System Data: Parameters – Districts

Pa	aran	neters	X
1	Sele	ction crit	eria: District 🗸 🗸
		ID	District ^a
	>	01	01
		02	02
		03	03
		04	04
		05	05
		06	06
		07	07 ^b

A2 BrR System Data: Parameters – Counties

rameters	×	Parameters	×	Para	ameters	×	Parameters	×
election c	riteria: County	Selection crit	eria: County	Se	lection crit	eria: County	Selection	riteria: County
ID	Countya	ID	County a		ID	County a	ID	County a
> 01	Adair	26	Davis		51	Jefferson	75	Plymouth
02	Adams	27	Decatur		52	Johnson	76	Pocahontas
03	Allamakee	28	Delaware		53	Jones	77	Polk
04	Appanoose	29	Des Moines		54	Keokuk	78	Pottawattamie
05	Audubon	30	Dickinson		55	Kossuth	79	Poweshiek
06	Benton	31	Dubuque		56	Lee	80	Ringgold
07	Black Hawk	32	Emmet		57	Linn	81	Sac
08	Boone	33	Fayette		58	Louisa	82	Scott
09	Bremer	34	Floyd		59	Lucas	83	Shelby
10	Buchanan	35	Franklin		60	Lyon	84	Sioux
11	Buena Vista	36	Fremont		61	Madison	85	Story
12	Butler	37	Greene		62	Mahaska	86	Tama
13	Calhoun	38	Grundy		63	Marion	87	Taylor
14	Carroll	39	Guthrie		64	Marshall	88	Union
15	Cass	40	Hamilton		65	Mills	89	Van Buren
16	Cedar	41	Hancock		66	Mitchell	90	Wapello
17	Cerro Gordo	42	Hardin		67	Monona	91	Warren
18	Cherokee	43	Harrison		68	Monroe	92	Washington
19	Chickasaw	44	Henry		69	Montgomery	93	Wayne
20	Clarke	45	Howard		70	Muscatine	94	Webster
21	Clay	46	Humboldt		71	O'Brien	95	Winnebago
22	Clayton	47	lda		72	Osceola	96	Winneshiek
23	Clinton	48	lowa		73	Page	97	Woodbury
24	Crawford	49	Jackson		74	Palo Alto	98	Worth
25	Dallas	50	Jasper		75	Plymouth	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)



A3 BrR System Data: System Defaults

General

General	Bridge workspa	ce Superstructure analysis	Specifications	Substructure analysis	Tolerance	Custom agency field
Agency nam	ne:	IowaDOT ^a				
Default pref	ference setting:	None	~			
Multimedia	server folder:	C:\				

Bridge workspace

eneral Bridge workspace Superstructure analysis Specification	is Substructure analysis Tolerance Custom agency fields
New bridge	Library LRFD substructure design settings
System of units: US Customary 🗸	Preliminary mode design settings:
	Preliminary Design Setting (US)
PS values	Final mode design settings:
Default average humidity: 70.00 ^a %	Final Design Setting (US)
LRFD wind loads	

Substructure analysis

General Bridge workspace	Superstructure analysis	Specifications	Substructure analysis	Tolerance	Custom agency field
- Apply dypamic load allows	nca ta o				
	ice to				
Cap					
Columns/walls ^a					
Spread footing/footin	q cap				
Piles					
rites					

Notes:

^a Item modified or added for Iowa DOT BrR System File. Otherwise, they are BrR default values or items.



A3 BrR System Data: System Defaults (Cont'd)

Tolerance

Ger	eral	Bridge works	ace	Superstructure analysis	Specifications	Substructure analysis	Tolerance	Custom agency field
De	fault sys	tem of units:	US (Customary				
	Unit	Tolerance						
>	ft	0.001000						
	in	0.0000100						
	m	0.0001000						
	mm	0.01000						
	mi	0.01000						
	km	0.01000						

Custom agency fields

ene	eral Bi	ridge workspace Su	perstructure analysis	Specifications	Substructure analysis	Tolerance	Custom agency fields
	Field #	Bridge explorer label					
>	1	City ^a					
	2	TWO	_				
	3	THREE					
	4	FOUR	_				
	5	FIVE					
	6	SIX					
	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.



A4 Example of BrR Bridge Model Description Window

State Bridges

New Bridge						- 0
Bridge ID: New	Bridge	NBI structure II	D (8):		Template Bridge completely defin	Bridge Workspace View Superstructures Culverts Substructures
Description	Description (cont'd)	Alternatives	Global reference point	Traffic	Custom agency fields	
District (2):	01		~	Those	A fields will be	Note: Blank for
County:	Adair		~	sele	cted from the	template bridges –
Owner (22):	State Highway Agen	ку	\sim	droi	n-down menu	info to be entered by
				u 0		into to be entered by
Maintainer:	State Highway Agen	ю	~			load rater for
Maintainer: Admin area:	State Highway Agen	ю	~ L			load rater for individual bridges
Maintainer: Admin area: NHS Indicator:	State Highway Agen	ncy	× ×			load rater for individual bridges

County Bridges

New Bridge					- 0
Bridge ID: New B	ridge	NBI structure ID (8):	Template Bridge completely de	fined Bridge Workspace View Superstructures Culverts Substructures
Description	Description (cont'd)	Alternatives Glo	obal reference point	Traffic Custom agency fields	
District (2):	07	ĸ	~	These 4 fields will be	Note: Blank for
County:	Adair		~	selected from the	template bridges –
Owner (22):	County Hwy Agency		~	drop-down menu	info to be entered by
Maintainer:	County Hwy Agency	,	~		load rater for
Admin area:				District 7 is or LPAs	individual bridges
NHS Indicator:			~		
			\sim		



<u>City Bidges</u>

New Bridge						- 0
ridge ID: New B	Bridge	NBI structure ID (8):		Template Bridge completely	defined	Bridge Workspace View Superstructures Culverts Substructures
Description	Description (cont'd)	Alternatives Globa	al reference poin	t Traffic Custom agency fields		
District (2): County:	07 Adair	•	~	These 4 fields will be		Note: Blank for
	/ toron	\	÷	selected from the	l te	mplate bridges –
Owner (22):	City/Municipal Hwy	Agenc	~	selected from the drop-down menu	te inf	mplate bridges – o to be entered by
Owner (22): Maintainer:	City/Municipal Hwy	Agenc Agenc		selected from the drop-down menu	te inf	mplate bridges – o to be entered by load rater for
Owner (22): Maintainer: Admin area:	City/Municipal Hwy City/Municipal Hwy	Agenc Agenc		selected from the drop-down menu District 7 is or LPAs	te inf	mplate bridges – o to be entered by load rater for ndividual bridges
Owner (22): Maintainer: Admin area: NHS Indicator:	City/Municipal Hwy City/Municipal Hwy	Agenc Agenc		selected from the drop-down menu District 7 is or LPAs	te inf	mplate bridges – o to be entered by load rater for ndividual bridges

A New	Bridge e ID: New	/ Bridge	NBI structure	ID (8):		Template Bridge completely defined	 – □ > Bridge Workspace View ✓ Superstructures ✓ Culverts ✓ Substructures
Des	cription	Description (cont'd)	Alternatives	Global reference point	Traffic	Custom agency fields	
	Field	Value					
>	City	Kirksville	×				A
	TWO		$\overline{}$				
	THREE			<			
	FOUR						
	FIVE						
	SIX				Keyed	in by load rater	
	SEVEN			L			
	EIGHT						
	NINE						
	TEN						



APPENDIX B

Iowa DOT BrR Library Data File Settings

Implementation of AASHTOWare BrR Program for Rating Iowa Bridges, Iowa DOT & Iowa Highway Research Board

B1 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)	Iowa DOT Standard Open Rail w/ 1'-8" top rail block height
Agency Defined	US Customary	ConcRail_2'-8" Open (19" Block)	Iowa DOT Standard Open Rail w/ 1'-7" top rail block height
Agency Defined	US Customary	ConcRail_2'-5" Open (15" Block)	Iowa DOT Standard Open Rail w/ 1'-3" top rail block height
Agency Defined	US Customary	ConcRail_2'-5" Open (19" Block)	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 C
Agency Defined	US Customary	ConcRail_1'-11" W-Beam Railing	lowa DOT Side mounted concrete post with W-beam railing 6'-3" spacing
Agency Defined	US Customary	MetalRail_Aluminum Railing	Iowa DOT generic aluminum railing

Notes:

^c 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.



B2 BrR Library Data: Materials

Concrete

	Library	Units	Name	Description
	Agency Defined	US Customary	PS Concrete (f'c=5ksi & f'ci=4.5ksi)	Iowa DOT Prestressed concrete ^d
	Agency Defined	US Customary	f'c= 3000 psi	Iowa DOT 3000 psi Cement Concrete ^d

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
E	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	lowa DOT reinforcing steel built after year 1980 - 60 ksi

Structural Steel

1	Library	Units	Name	Description	
1	Agency Defined	US Customary	ASTM A7 Steel (Up to 1934)	Iowa DOT ASTM A7 Steel built up to year 1934	
1	Agency Defined	US Customary	ASTM A7 Steel (After 1934)	IowaDOT ASTM A7 Steel built after year 1934	

Notes:

^d For other concrete strengths, user can select this library item in the model, update the f'c and fc values, and click the "Compute" button to auto populate other material parameters. The item name can be updated as needed in the model.

B3 BrR Library Data: Prestress Shapes

Box Beams – Rectangular Void

	Library	Units	Name	Description	Year
E	Agency Defined	US Customary	IowaDOT_PPCBB_21Hx48W	IowaDOT Standards B24-16.pdf & B30-16.pdf Height: 1" Width: 48"	2016
L	Agency Defined	US Customary	lowaDOT_PPCBB_27Hx48W	IowaDOT Standards B24-16.pdf & B30-16.pdf Height: 27" Width: 48"	2016
L	Agency Defined	US Customary	lowaDOT_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	lowaDOT Standard H10 standards .pdf Height: 25" Width: Top flange: 9", Bottom flange: 16"	1954
L	Agency Defined	US Customary	IowaDOT_PPCIB_28Hx12TF	lowaDOT Standards H11 standards .pdf & PC_S.pdf Height: 28" Width: Top flange: 12", Bottom flange: 16"	1956
	Agency Defined	US Customary	IowaDOT_PPCIB_35Hx12TF	lowaDOT 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	lowaDOT Standards H12 standards .pdf, H13 standards .pdf, H14 standards .pdf, H15 sta Height: 32" Width: Top flange: 13", Bottom flange: 17"	1960
L	Agency Defined	US Customary	IowaDOT_PPCIB_BeamB_39Hx13TF	lowaDOT Standards H12 standards .pdf, H13 standards .pdf, H14 standards .pdf, H15 sta Height: 39" Width: Top flange: 13", Bottom flange: 17"	1960
Γ	Agency Defined	US Customary	IowaDOT_PPCIB_BeamC_45Hx13TF	lowaDOT Standards H12 standards .pdf, H13 standards .pdf, H14 standards .pdf, H15 sta Height: 45" Width: Top flange: 13", Bottom flange: 17"	1960
Γ	Agency Defined	US Customary	IowaDOT_PPCIB_BeamA_32Hx15TF	lowaDOT Standards H15 standards .pdf, H16 standards .pdf, H24-84 standards .pdf, H24 Height: 32" Width: Top flange: 15", Bottom flange: 19"	1969
Γ	Agency Defined	US Customary	IowaDOT_PPCIB_BeamB_39Hx15TF	lowaDOT 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	lowaDOT 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	lowaDOT 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	lowaDOT 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	lowaDOT 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	lowaDOT Standards H24SI-05 standards .pdf, H30SI-05 standards .pdf, and H30SI-12 sta Height: 54" Width: Top flange: 20", Bottom flange: 22"	2005

Tee Beams

1	Library	Units	Name	Description	Year
	Agency Defined	US Customary	IowaDOT_PPCDTB_25Hx96TF	lowaDOT Standard H17 standards .pdf Height: 25" Top Width: 96"	1973

Michael Baker

B4 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 (lowa 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 3 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 56 Kips
Agency Defined	US Customary	Type 4 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 61.1 Kips
Agency Defined	US Customary	SU4 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 60.5 Kips
Agency Defined	US Customary	SU5 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 69.4 Kips
Agency Defined	US Customary	SU6 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 77.9 Kips
Agency Defined	US Customary	SU7 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 86.8 Kips
Agency Defined	US Customary	Type 3S2 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 80.6 Kips
Agency Defined	US Customary	Type 3S3A OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 89.6 Kips
Agency Defined	US Customary	Type 3S3B OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 100.8 Kips
Agency Defined	US Customary	Type 4S3 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 107.5 Kips
Agency Defined	US Customary	Type 3-3 OW (lowa DOT)	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 89.6 Kips
Agency Defined	US Customary	Type 5-2 OW	Iowa DOT Annual All-Systems Permit Truck - Legal Load + 12% OW 107.5 Kips
Agency Defined	US Customary	Type 4 Lane-Type	lowa DOT Legal Load Lane-Type - Straight Truck 40.875 Kips (0.75 Reduction) ^e
Agency Defined	US Customary	Type 3S3A Lane-Type	lowa DOT Legal Load Lane-Type- Truck + Semi Trailer 60 Kips (0.75 Reduction) ^e
Agency Defined	US Customary	Type 3-3 Lane-Type (lowa DOT)	Iowa DOT Legal Load Lane Type - Truck + Full Trailer 60 Kips (0.75 Reduction) ^e
Agency Defined	US Customary	Type 3S3B Lane-Type	lowa DOT Legal Load Lane-Type - Truck + Semi Trailer 67.5 Kips (0.75 Reduction) ^e
Agency Defined	US Customary	Type 4S3 Lane-Type	lowa DOT Legal Load Lane-Type - Truck + Semi Trailer 72 Kips (0.75 Reduction) ^e
Agency Defined	US Customary	Type 5-2 Lane-Type	Iowa DOT Legal Load Lane-Type - Truck + Full Trailer 72 Kips (0.75 Reduction) ^e

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.