

## TR-832 Implementation of AASHTOWare BrR Program for Rating Iowa Bridges

### Status on Template Completion (12/5/2024)

Research project TR-832 is creating BrR templates for Iowa's standard bridges. Research is expected to complete by January 2026.

The final project will provide the following:

- Rating Booklet – General assumptions made controlling ratings for each standard similar to what was provided previously in Phases 1-6.
- BrR Templates for the following standards up to 2017:
  - o H Standards
  - o J Standards
  - o RS Standards
  - o V Standards
  - o S, T, U, W, X, Y, and Z Standards
- BrR Example Templates for the following standards.
  - o B Standard
  - o Triple Reinforced Concrete Box (TTRCB) Standard
  - o Twin Reinforced Concrete Box (TWRCB) Standard
  - o Single Reinforced Concrete Box (RCB) Standard
  - o Corrugated Metal Pipe (CMP)
- Supporting Calculations for all BrR Templates
- Written Guidance on How to Use Templates

In the meantime, we will incrementally upload finalized files and documentation to this folder. The following is the history of what has been uploaded so far.

12/05/2024

- BrR Templates and Supporting Calcs
  - o Example\_CMP\_L48ft\_S6ft5.125in.xml & Supporting Calcs (VOID AND REPLACED 4/4/2025)
  - o Template\_B30-16\_70ft.xml & Supporting Calcs(VOID AND REPLACED 4/4/2025)
  - o Template\_H40-06\_226ft4in.xml & Supporting Calcs (VOID AND REPLACED 4/4/2025)
  - o Template\_J40-06 & J40-14\_150ft.xml & Supporting Calcs (VOID AND REPLACED 4/4/2025)
  - o Template\_TRRCB-12\_12ftSX10ftH\_24-25ft Earth Fill.xml & Supporting Calcs (VOID AND REPLACED 4/4/2025)
  - o Template\_V16-70\_250ft.xml & Supporting Calcs
- Library and System Files
  - o IowaDOT\_Library\_BrR\_V750.brIx (VOID AND REPLACED 7/29/2025)
  - o IowaDOT\_System\_BrR\_V750.brsx (VOID AND REPLACED 4/4/2025)
  - o Curb and Railing Library.pdf
- TR-832 Written Material (In-Progress)
  - o IowaDOT BrR System and Library Data Summary\_DRAFT.docx

4/4/2025

- AASHTOWare Bridge Rating Training Material
  - o CVT1-Two-Cell-RC-Box-Culvert-Example-With-BrDR-7.5.0.pdf
  - o CVT2-Corrugated-Metal-Pipe-Culvert-Example.pdf
  - o CVT3-Metal-Box-Culvert-Example.pdf
  - o DF2-Distribution-Factor-Analysis-NSG-LFR-Example.pdf
  - o Iowa DOT AASHTOWare BrR - Libraries and System Defaults Quick Start Guide - Copy.pdf
  - o Iowa DOT AASHTOWare BrR - PS I Beam Template.pdf
  - o Iowa DOT AASHTOWare BrR - RC Slab Template.pdf
  - o Iowa DOT AASHTOWare BrR - Steel Beam Template.pdf
  - o LIB1-Library-Training.pdf
  - o LIB2-Library-Export-Import.pdf
  - o PS1-Simple-Span-PS-I-Beam.pdf
  - o PS15-2-Span-Adj-Box-With-Straight-Strands.pdf
  - o RC6-Two-Span-RC-Slab-System.pdf
  - o STL2-Two-Span-Plate-Girder.pdf
- BrR Templates and Supporting Calcs
  - o Template\_J40-06 & J40-14\_150ft.xml & Supporting Calcs.pdf (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - Updated LRFR rating results using new “Iowa DOT LRFR” analysis template
    - Control Options changed to consider skew reduction factor.
    - The superstructures modeled with a monolithic pier cap were deleted to avoid confusion. Whether the bridge has monolithic or non-monolithic pier cap, the ratings for all J standards will be modeled.
    - The strip widths were updated.
  - o Example\_CMP\_L48ft\_S6ft5.125in.xml & Supporting Calcs.pdf (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - Updated LRFR rating results using new “Iowa DOT LRFR” analysis template
  - o Template\_B30-16\_70ft.xml & Supporting Calcs.pdf (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - Updated LRFR rating results using new “Iowa DOT LRFR” analysis template
  - o Template\_H40-06\_226ft-4in.xml & Supporting Calcs.pdf (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - Updated LRFR rating results using new “Iowa DOT LRFR” analysis template
  - o Template\_TRRCB-12\_12ftSX10ftH\_24-25ft Earth Fill.xml & Supporting Calcs.pdf (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - Updated LRFR rating results using new “Iowa DOT LRFR” analysis template
  - o V5B 1936 & 1947 templates and supporting calcs (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY BUT RATINGS AFFECTED BY SYSTEM FILE UPDATE; SUPPORTING CALCS VOID AND REPLACED 2/11/2026)
    - 18’ and 20’ roadways
    - 16’, 20’, 24’, 28’, 32’, 36’, and 40’ bridge lengths
  - o V7 1939 & 1946 templates and supporting calcs (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)

- 120', 150', 180', 210', and 240' bridge lengths
  - V10 1951 templates and supporting calcs (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - 125', 150', 175', 200', 250', and 300' bridge lengths
  - V10A 1957 templates and supporting calcs (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - 125', 150', 175', 200', 250', and 300' bridge lengths
  - V11 1957 and 1964 templates and supporting calcs (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - 23' 9", 30', 42' 6", 55', 67' 6", and 80' bridge lengths
  - V12 1957 and 1964 templates and supporting calcs (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - 125', 150', 175', 200', 225', 250', 278', 300', 347' 6", 417' and 445' bridge lengths
    - Some V12 bridge lengths and skews were not modeled because no bridges were found in the inventory matching that standard/skew.
  - V13 1960 templates and supporting calcs (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - 23' 9", 30', 42' 6", 55', and 67' 6" bridge lengths
  - V15 1975 templates and supporting calcs (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - 23' 9", 30', 42' 6", 55', 67' 6", and 80' bridge lengths
  - V16 1970 templates and supporting calcs (MODELS UPDATED IN 2/11/2026 FOR INFORMATION ONLY, RATINGS UNCHANGED)
    - 125', 150', 175', 200', 225', 250' (previously submitted from Michael Baker), 278', 313', 347.5, 223', 401, and 445' bridge lengths
    - Some V16 bridge lengths and skews were not modeled because no bridges were found in the inventory matching that standard/skew.
- Library and System Files
  - IowaDOT\_System\_BrR\_V750\_12182024.brsx (VOID AND REPLACED 7/29/2025)
    - The 4/4/2025 version contains the following updates:
      - "Iowa DOT LRFR" analysis template – updated permit vehicles' frequency from single trip to unlimited crossing.
      - Created a new "Iowa DOT LRFR All-Systems OW" Analysis Template. Will rarely be needed but available in case user needs to rate all-systems vehicles for LRFR permit load factors instead of legal load factors.
      - General Preference Templates were added. These are not necessary. If uploaded, they will automatically fill out the Control Options of the bridge to what was used in the standards. (NOTE: Control options will still need to be checked for each bridge to make sure the selected options work for that specific bridge and the load rater's preferences.)
- TR-832 Written Material (In-Progress)
  - Iowa DOT BrR System File Updates\_12182024.docx
    - This file provides the details of the system files updates and instructions for importing them.

7/29/2025

- Library and System Files
  - o IowaDOT\_Library\_BrR\_V750\_20250722.brlx (VOID AND REPLACED 2/11/2026)
    - Added 4 bulb tee beam shapes under Prestress Shapes > I Beams > Wide Top Flange
      - IowaDOT\_PPCBT\_BeamB\_36Hx34TF
      - IowaDOT\_PPCBT\_BeamC\_45Hx34TF
      - IowaDOT\_PPCBT\_BeamD\_54Hx34TF
      - IowaDOT\_PPCBT\_BeamE\_63Hx34TF
    - Added 16 prestress concrete materials under Materials > Concrete
      - PS Concrete (f'c=5.5ksi & f'ci=5ksi)
      - PS Concrete (f'c=6ksi & f'ci=5ksi)
      - PS Concrete (f'c=6ksi & f'ci=5.5ksi)
      - PS Concrete (f'c=6.5ksi & f'ci=5.5ksi)
      - PS Concrete (f'c=7ksi & f'ci=6ksi)
      - PS Concrete (f'c=7.5ksi & f'ci=6ksi)
      - PS Concrete (f'c=7.5ksi & f'ci=6.5ksi)
      - PS Concrete (f'c=8ksi & f'ci=7ksi)
      - PS Concrete (f'c=8.5ksi & f'ci=7.5ksi)
      - PS Concrete (f'c=9ksi & f'ci=7.5ksi)
      - PS Concrete (f'c=9ksi & f'ci=8ksi)
      - PS Concrete (f'c=9.5ksi & f'ci=7.5ksi)
      - PS Concrete (f'c=9.5ksi & f'ci=8ksi)
      - PS Concrete (f'c=10ksi & f'ci=8ksi)
      - PS Concrete (f'c=10ksi & f'ci=8.5ksi)
      - PS Concrete (f'c=10.5ksi & f'ci=8ksi)
  - o IowaDOT\_System\_BrR\_V750\_20250707.brsx (VOID AND REPLACED 2/11/2026)
    - Added 5 new cells under Custom agency fields
      - Standard Template Used (DOT Field Only)
        - o This cell will be filled out for each standard template by the DOT and should NOT be changed by the user. It will have the name of the template, and the user can query in the Bridge Explorer for this field to know which bridges were modeled using a particular standard.
      - Version of Template Used (DOT Field Only)
        - o This cell will be filled out for each standard template by the DOT and should NOT be changed by the user. It will have a revision date of the template so the user knows what version of the template was used for that bridge. The user can query this field in the Bridge Explorer to see if a bridge was modeled using an outdated template that has since been altered.
      - Date Last Modified (User Field)

- This field is for the user to fill out if/when a bridge has been modified from the original model (can be used for bridges made from templates or from scratch).
- Last Modified By (User Field)
  - This field is for the user to fill out who made the modification from the original model (can be used for bridges made from templates or from scratch).
- Comments on Modifications (User Field)
  - This field is for the user to provide a brief comment on what the modification was (can be used for bridges made from templates or from scratch). Ex “standard modified for 20’ roadway” or “added deterioration to steel girder” or “added overlay” etc.

2/11/2026

- Draft of TR-832 Final Booklet
  - The final booklet for this research includes the following:
    - Overview of the project
    - Guidance on importing and using Library and System files
    - Summary of assumptions
    - Summary of standard ratings
    - List of system and library file items created for this project
    - Complete list of standard templates that were modeled as part of this project
    - Copies of ProMiles’ training material used for the in-person and virtual training
  - The parts that remain unfinished are the load rating summary tables for the remaining H, B, and truss standards that have not been finalized yet. An appendix explaining the truss API tool will also be added later.
- Library and System Files
  - IowaDOT\_Library\_BrR\_V750\_20260116.brlx
    - Updated the All-System library truck loads to 12.5% over legal limits instead of 12% to match the change in Iowa Code 321E.8 subsection 2.
  - IowaDOT\_System\_BrR\_V750\_20260202.brsx
    - System Defaults > Superstructure Analysis > Rating live load distribution factor > changed LFR/ASR to “AASHTO Manual for bridge evaluation article 6B.6.2.2” instead of the default. Changing this set the program to use 18’ roadway as the cutoff between automatically analyzing single vs multilane. Before the default was using the design spec which is 20’. Out of the existing models, this only affected the ratings for the V5B’s.
    - Added General Preference Template for the truss control options.
- BrR Templates and Supporting Calcs
  - Template\_B30-16\_70ft.xml
    - Only change was to add information in the Custom Agency Fields “Standard Template Used” and “Version of Template Used”. Ratings did not change.
  - Template\_TRRCB-12\_12ftSX10ftH\_24-25ft Earth Fill.xml

- Only change was to add information in the Custom Agency Fields “Standard Template Used” and “Version of Template Used”. Ratings did not change.
- Example\_CMP\_L48ft\_S6ft5.125in.xml
  - Only change was to add information in the Custom Agency Fields “Standard Template Used” and “Version of Template Used”. Ratings did not change.
- H10 1954 templates and supporting calcs
  - 20’ and 24’ roadways
  - 30’ and 42’ 6” bridge lengths
- H11 1958 templates and supporting calcs
  - 30’, 42’ 6”, 55’(a), 55’(b), and 67’ 6” bridge lengths
- H12 1960 templates and supporting calcs
  - 30’, 42’ 6”, 55’, 67’ 6”, and 80’ bridge lengths
- H13 1960 templates and supporting calcs
  - 30’, 42’ 6”, 55’, 67’ 6”, and 80’ bridge lengths
- H14 1960/1967 & 1979 templates and supporting calcs
  - 30’, 42’ 6”, 55’, 67’ 6”, and 80’ bridge lengths
- H15 1975 templates and supporting calcs
  - 30’, 42’ 6”, 55’, 67’ 6”, and 80’ bridge lengths
- H24 1984 templates and supporting calcs
  - 126’ 4”, 138’ 10”, 151’ 4”, 163’ 10”, 176’ 4”, 188’ 10”, 201’ 4”, 213’ 10”, 226’ 4”, and 243’ bridge lengths
- H24 1987 templates and supporting calcs
  - 126’ 4”, 138’ 10”, 151’ 4”, 163’ 10”, 176’ 4”, 188’ 10”, 201’ 4”, 213’ 10”, 226’ 4”, and 243’ bridge lengths
- H24 2006 templates and supporting calcs
  - 138’ 10”, 151’ 4”, 163’ 10”, 176’ 4”, 188’ 10”, 201’ 4”, 213’ 10”, 226’ 4”, and 243’ bridge lengths
- H24SI 2005 templates and supporting calcs
  - 46’ 8”, 55’, 67’ 6”, 80’, 90’, 100’, and 110’ bridge lengths
- H30 1987 templates and supporting calcs
  - 126’ 4”, 138’ 10”, 151’ 4”, 163’ 10”, 176’ 4”, 188’ 10”, 201’ 4”, 213’ 10”, 226’ 4”, and 243’ bridge lengths
- H30 1994 templates and supporting calcs
  - 126’ 4”, 138’ 10”, 151’ 4”, 163’ 10”, 176’ 4”, 188’ 10”, 201’ 4”, 213’ 10”, 226’ 4”, and 243’ bridge lengths
- H30 2006 templates and supporting calcs
  - 138’ 10”, 151’ 4”, 163’ 10”, 176’ 4”, 188’ 10”, 201’ 4”, 213’ 10”, 226’ 4”, and 243’ bridge lengths
- H30S 1987 templates and supporting calcs
  - 30’, 42’ 6”, 55’, 67’ 6”, and 80’ bridge lengths
- H40 2006 & 2014 templates and supporting calcs
  - 226’ 4” - Only change was to add information in the Custom Agency Fields “Standard Template Used” and “Version of Template Used” and template name was changed to include the 2014 standards. Ratings did not change.

- 138' 10", 151' 4", 163' 10", 176' 4", 188' 10", 201' 4", 213' 10", and 243' bridge lengths
- H44 2007 & 2014 templates and supporting calcs
  - 138' 10", 151' 4", 163' 10", 176' 4", 188' 10", 201' 4", 213' 10", 226' 4", and 243' bridge lengths
- J3 1952 templates and supporting calcs
  - 23' 9" and 30' bridge lengths
- J3A 1960 templates and supporting calcs
  - 24' and 30' bridge lengths
- J4 1952 templates and supporting calcs
  - 75', 100' and 125' bridge lengths
- J4A 1960 templates and supporting calcs
  - 75', 100' and 125' bridge lengths
- J5 1957 templates and supporting calcs
  - 24' and 30' bridge lengths
- J6 1957 templates and supporting calcs
  - 75', 100' and 125' bridge lengths
- J7 1960/1967/1979 templates and supporting calcs
  - 24' and 30' bridge lengths
- J8 1960/1967/1979 templates and supporting calcs
  - 75', 100' and 125' bridge lengths
- J15 1975/1979 templates and supporting calcs
  - 18', 24', and 30' bridge lengths
- J16 1969 templates and supporting calcs
  - 75', 87' 6", 100', 112' 6", and 125' bridge lengths
- J24 1984 templates and supporting calcs
  - 75', 87' 6", 100', 112' 6", and 125' bridge lengths
- J24 1987 templates and supporting calcs
  - 75', 87' 6", 100', 112' 6", and 125' bridge lengths
- J24 2006 templates and supporting calcs
  - 70', 80', 90', 100', 110', 120', 130', 140' and 150' bridge lengths
- J30 2006 templates and supporting calcs
  - 70', 80', 90', 100', 110', 120', 130', 140' and 150' bridge lengths
- J30C 1979 templates and supporting calcs
  - 75', 87' 6", 100', 112' 6", and 125' bridge lengths
- J30C 1987 templates and supporting calcs
  - 75', 87' 6", 100', 112' 6", and 125' bridge lengths
- J40 2006 & 2014 templates and supporting calcs
  - 150' - Only change was to add information in the Custom Agency Fields "Standard Template Used" and "Version of Template Used". Ratings did not change.
  - 70', 80', 90', 100', 110', 120', 130', and 140' bridge lengths
- J44 2006 & 2014 templates and supporting calcs
  - 70', 80', 90', 100', 110', 120', 130', 140' and 150' bridge lengths

- RS40 2004 templates and supporting calcs
  - 160', 180', 200', 220', 240', 260', 280', and 300' bridge lengths
- RS40 2010/2014 (Original) templates and supporting calcs
  - 160', 180', 200', 220', 240', 260', 280', 300', 320', and 340' bridge lengths
- RS40 2010/2014/2017 (Revised) templates and supporting calcs
  - 160', 180', 200', and 220' bridge lengths
  - Only skews that were revised in 2017 for diaphragm spacings.
- V1 1915 templates and supporting calcs
  - 16', 18', and 20' roadways
  - 20', 22', 24', 26', 28', 30', and 32' bridge lengths
- V1A 1928/1931 templates and supporting calcs
  - 16', 20', 24', 28', 32', 36', and 40' bridge lengths
- V1B 1928/1931/1934 templates and supporting calcs
  - 18' and 20' roadways
  - 16', 20', 24', 28', 32', 36', and 40' bridge lengths
- V1C 1928/1934 templates and supporting calcs
  - 16', 20', 24', 28', 32', 36', and 40' bridge lengths
- V2 1915 templates and supporting calcs
  - 16', 18', 20', 22', 24', 26', 28', 30', and 32' bridge lengths
- V2B 1928/1931/1934 templates and supporting calcs
  - 16', 20', 24', 28', 32', 36', and 40' bridge lengths
- V3 1915 templates and supporting calcs
  - 16', 18', and 20' roadways
  - 20', 22', 24', 26', 28', 30', and 32' bridge lengths
- V3A 1928/1931/1934 templates and supporting calcs
  - 16', 20', 24', 28', 32', 36', and 40' bridge lengths
  - The 40' bridge length was separated into 2 models. One for 1928/1931 and one for the 1934 revision.
- V3B 1928/1931 and 1934 templates and supporting calcs
  - 18' and 20' roadways
  - 20', 24', 28', 32', 36', and 40' bridge lengths
- V4 1915 templates and supporting calcs
  - 16' and 18' roadways
  - 20', 22', 24', 26', 28', 30', and 32' bridge lengths
- V4B 1928/1931/1934 templates and supporting calcs
  - Concrete and timber decks
  - 16', 20', 24', 28', 32', 36', and 40' bridge lengths
- V5B 1936 & 1947 templates and supporting calcs
  - Templates - Only change was to add information in the Custom Agency Fields "Standard Template Used" and "Version of Template Used".
  - Supporting Calcs – Templates were reanalyzed with the new system file settings. The rating factors were updated for 1936's 18' roadways and all of 1947's models.
- V6 1939 and 1946 templates and supporting calcs

- 120', 150', 180', 210', and 240' bridge lengths
- V7 1939 & 1946 templates
  - Only change was to add information in the Custom Agency Fields "Standard Template Used" and "Version of Template Used". Ratings did not change.
- V8 1941 and 1947 templates and supporting calcs
  - 24', 28', 32', 36', and 40' bridge lengths
- V9 1950 and 1964 templates and supporting calcs
  - 23' 9", 30', 42' 6", 55', 67' 6", and 80' bridge lengths
- V9A 1957 templates and supporting calcs
  - 23' 9", 30', 42' 6", 55', 67' 6", and 80' bridge lengths
- V10 1951 templates
  - Only change was to add information in the Custom Agency Fields "Standard Template Used" and "Version of Template Used". Ratings did not change.
- V10 1964 templates and supporting calcs
  - 125', 150', 175', 200', 225', 250', 278', 300', 347' 6", 417', 445', and 534' bridge lengths
  - Some V10 bridge lengths and skews were not modeled because no bridges were found in the inventory matching that standard/skew.
- V10A 1957 templates
  - Only change was to add information in the Custom Agency Fields "Standard Template Used" and "Version of Template Used". Ratings did not change.
- V11 1957 and 1964 templates
  - Only change was to add information in the Custom Agency Fields "Standard Template Used" and "Version of Template Used". Ratings did not change.
- V12 1957 and 1964 templates
  - Only change was to add information in the Custom Agency Fields "Standard Template Used" and "Version of Template Used". Ratings did not change.
- V13 1960 templates
  - Only change was to add information in the Custom Agency Fields "Standard Template Used" and "Version of Template Used". Ratings did not change.
- V14 1960 and 1964/1966 templates and supporting calcs
  - 1960 models - 125', 150', 175', 200', 225', 243', 250', 347' 6", 356', 401', and 445' bridge lengths
  - 1964/1966 models - 125', 150', 175', 200', 225', 250', 278', 347' 6", and 401' bridge lengths
  - Some V14 bridge lengths and skews were not modeled because no bridges were found in the inventory matching that standard/skew.
- V15 1975 templates
  - Only change was to add information in the Custom Agency Fields "Standard Template Used" and "Version of Template Used". Ratings did not change.
- V16 1970 templates
  - Only change was to add information in the Custom Agency Fields "Standard Template Used" and "Version of Template Used". Ratings did not change.
- V30C 1979 templates and supporting calcs

- 125', 150', 175', 200', 225', and 250' bridge lengths
- Some V30C bridge lengths and skews were not modeled because no bridges were found in the inventory matching that standard/skew.

3/26/2026

- BrR Templates and Supporting Calcs
  - H1 1916 templates and supporting calcs
    - 16', 18' and 20' roadways
    - 24', 26', 28', 30', 32', 34', 36', 38', and 40' bridge lengths
  - H1 1952 templates and supporting calcs
    - 42' 6", 55', and 67' 6" bridge lengths
  - H1A 1928 templates and supporting calcs
    - 24', 28', 32', 36', 40', and 44' bridge lengths
  - H2 1952 templates and supporting calcs
    - 150', 175', 200', and 250' bridge lengths
  - H16 1969 templates and supporting calcs
    - 93', 101' 4", 113' 10", 126' 4", 138' 10", 151' 4", 163' 10", 176' 4", 188' 10", 201' 4", 213' 10", 226' 4", and 243' bridge lengths
  - H17 1973 templates and supporting calcs
    - 75', 87' 6", 100', 112' 6", and 125' bridge lengths
  - H24S 1985 templates and supporting calcs
    - 30', 42' 6", 55', 67' 6", and 80' bridge lengths
  - H24S 1987 templates and supporting calcs
    - 30', 42' 6", 55', 67' 6", and 80' bridge lengths
  - H30M 1979, 1982, and 1984 templates and supporting calcs
    - 126' 4", 138' 10", 151' 4", 163' 10", 176' 4", 188' 10", 201' 4", 213' 10", 226' 4", and 243' bridge lengths
  - H30SI 2005 templates and supporting calcs
    - 42' 8", 55', 67' 6", 80', 90', 100', and 110' bridge lengths
  - H30SI 2012 templates and supporting calcs
    - 42' 8", 55', 67' 6", 80', 90', 100', and 110' bridge lengths