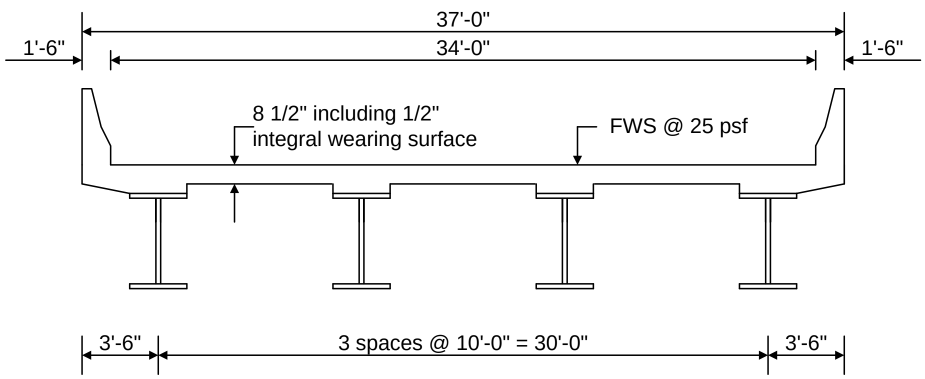
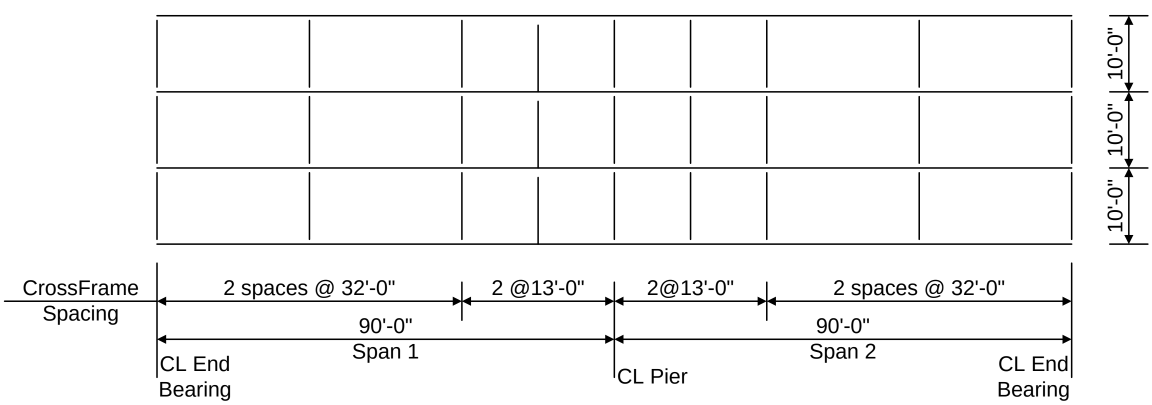
AASHTOWare BrR 6.8

Steel Tutorial

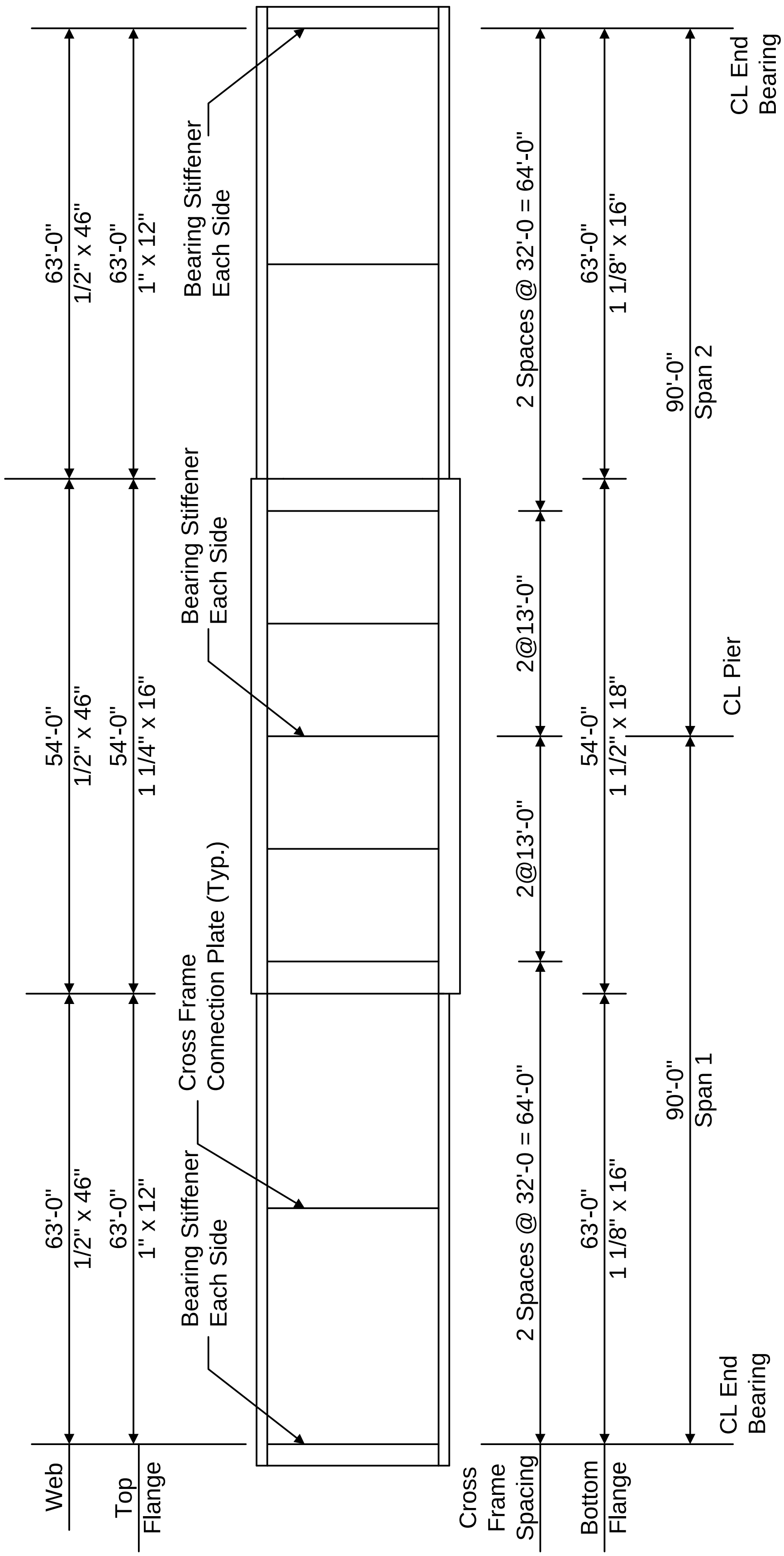
Steel Plate Girder Using LRFR Engine

STL6 - Two Span Plate Girder Example

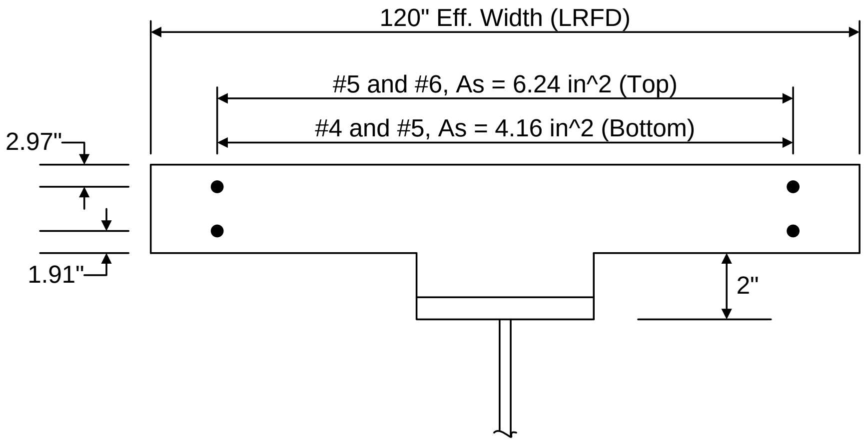




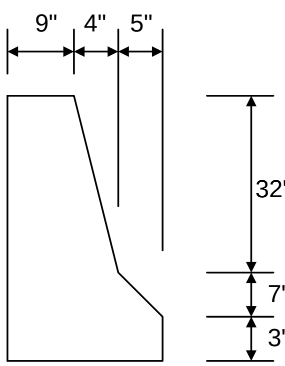
Framing Plan



Elevation of Interior Girder

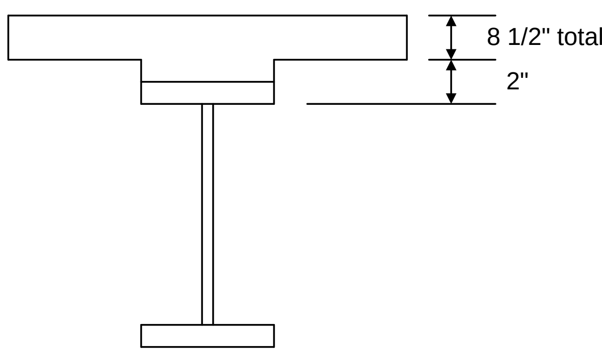


Composite Section at Pier



Weight = 536 plf

Parapet Detail



Haunch Detail

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

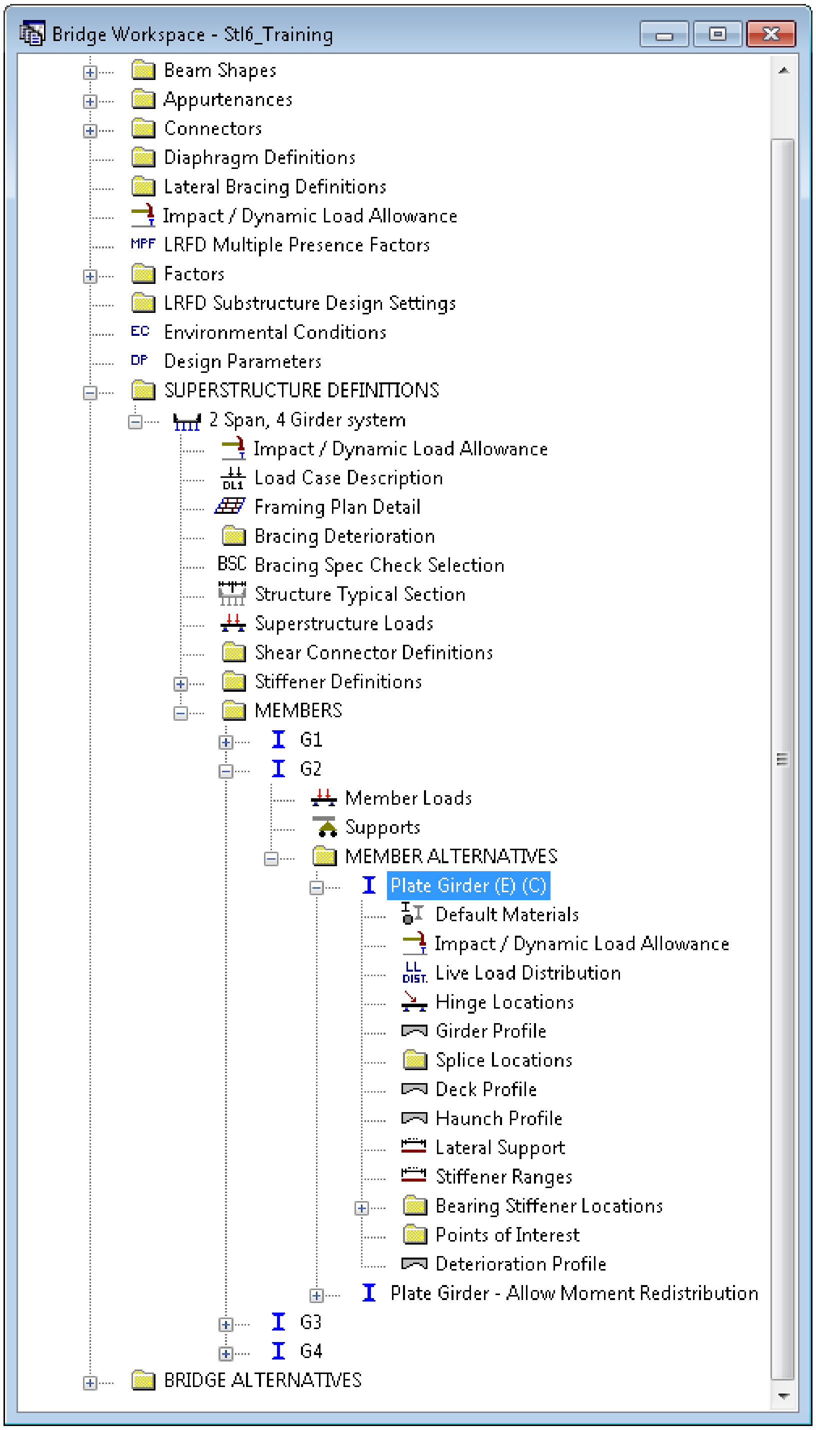
Cross Frame Connection Plates: 3/4" x 6"
Bearing Stiffener Plates: 7/8" x 9"

Topics Covered

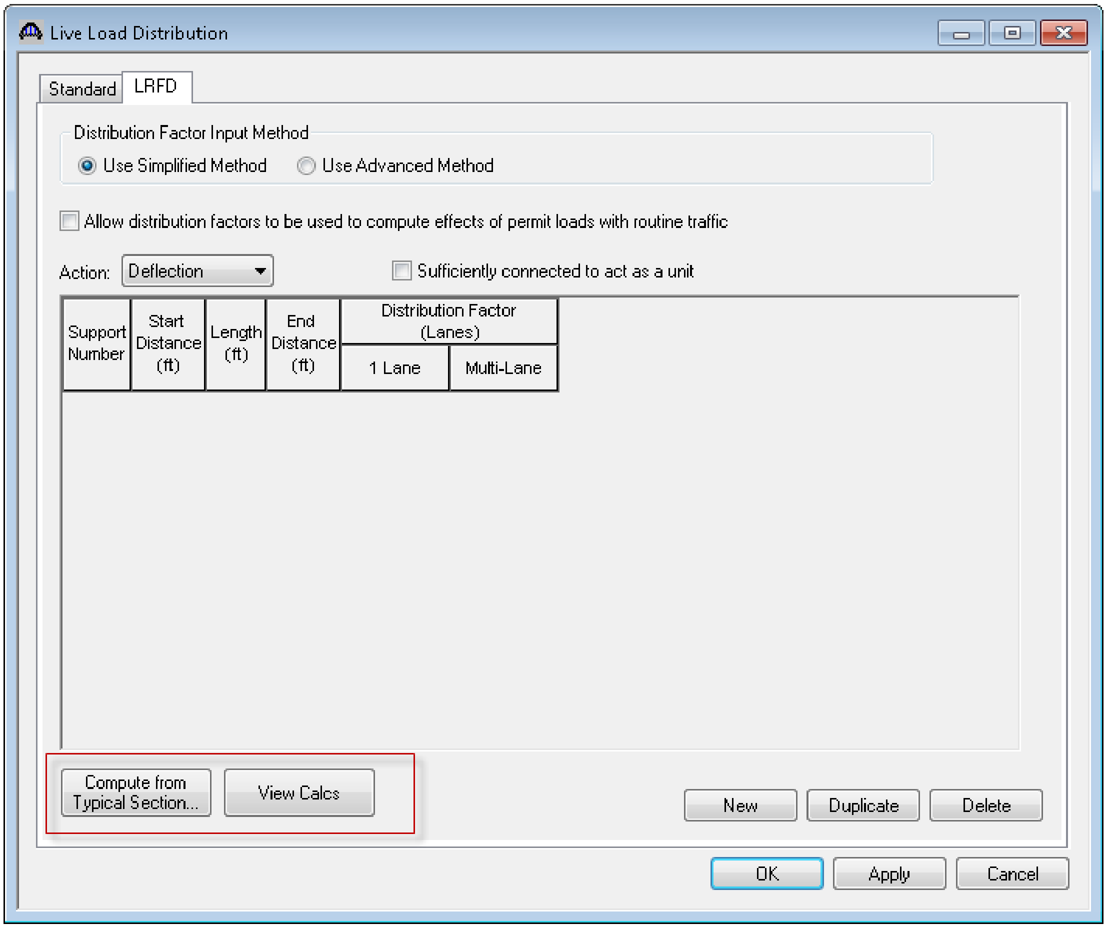
- 2 span steel plate girder input as girder system
- LRFD distribution factor calculation wizard for steel members
- Steel Member Alternative Control Options
    - Moment redistribution
    - Use Appendix A6 for flexural resistance
    - Allow plastic analysis
    - Evaluate remaining fatigue life
    - Ignore longitudinal reinforcement in negative moment capacity
- Export of steel girders to the BrR LRFR analysis engine
- BrR LRFR analysis
- Output review

Import *STL11 - Steel Plate Girder.xml* and open the Bridge Workspace for "Stl6_Training". Expand the Bridge Workspace tree to show the member alternative "Plate Girder" for Member G2.

The Bridge Workspace is shown below.

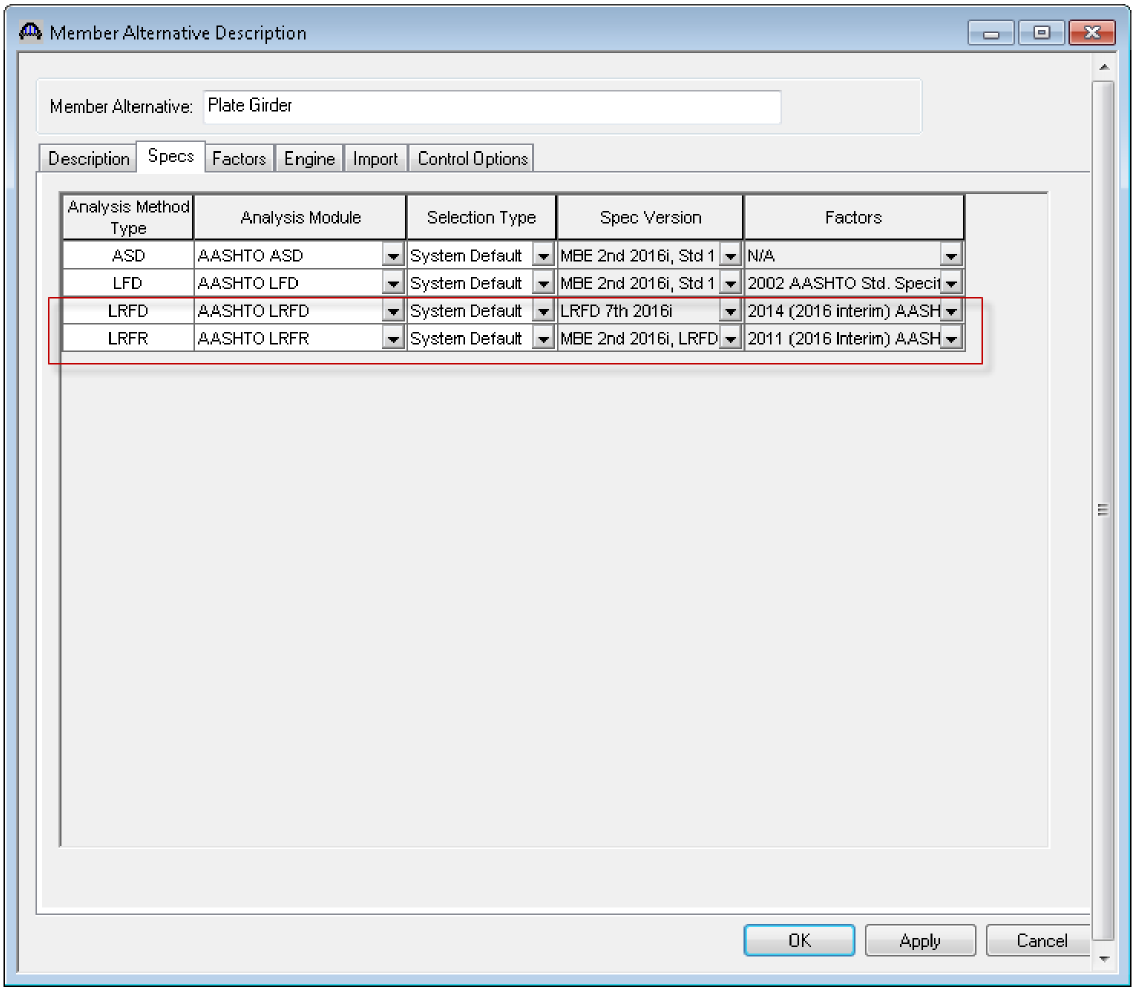


BrR can compute the LRFD live load distribution factors for steel girders with concrete decks.



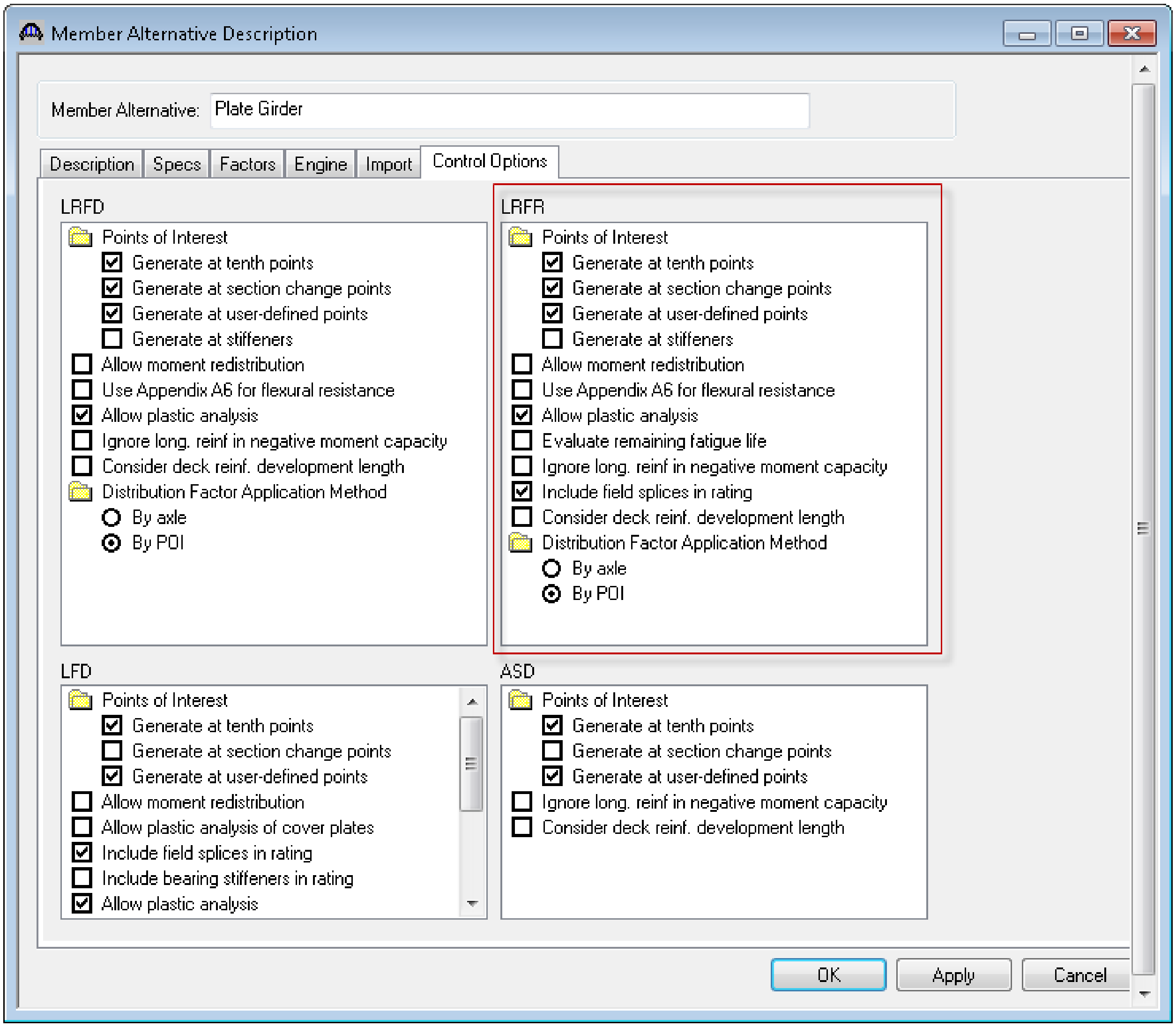
BrR Version 6.8 has the ability to compute the LRFD live load distribution factors for you. You can click the "Compute from Typical Section…" button and BrR will compute the distribution factors. If you leave these fields blank, the BrR LRFR Engine will compute the distribution factors for you at runtime. We will let the BrR LRFR Engine compute the live load distribution factors for us so we will not enter them.

Double-click the member alternative "Plate Girder" for Member G2 to open the Member Alternative Description window. Go in the Specs tab. BrR LRFR Engine is selected as the LRFR analysis module.



Analysis Method Type	Analysis Module	Selection Type	Spec Version	Factors
ASD	AASHTO ASD	System Default	MBE 2nd 2016i, Std 1	N/A
LFD	AASHTO LFD	System Default	MBE 2nd 2016i, Std 1	2002 AASHTO Std. Specit
LRFD	AASHTO LRFD	System Default	LRFD 7th 2016i	2014 (2016 interim) AASH
LRFR	AASHTO LRFR	System Default	MBE 2nd 2016i, LRFD	2011 (2016 Interim) AASH

The Control Options tab allows you to select the following analysis features.



Allow moment redistribution

This control allows you to consider moment redistribution as per Appendix B6 of the Specifications. In the moment redistribution process, some of the negative moment at the pier is redistributed along the beam. This option will first initiate the specification checks in Appendix B6.2 to determine if moment redistribution is permissible as per the specifications. If redistribution is not permissible then it will not occur even if this option is selected.

Use Appendix A6 for flexural resistance

This control allows you to consider Appendix A6 of the Specifications for flexural resistance. Using Appendix A6 can result in flexural resistances greater than the yield moment, My, for certain types of sections. The program will first check if Appendix A6 is permissible by checking the requirements in Article 6.10.6.2.3. If the use of Appendix A6 is not permissible then it will not be used even if this option has been selected.

Allow plastic analysis

This control allows you to consider the plastic moment capacity for compact, composite sections in positive flexure. If you select this option, the program will evaluate Articles 6.10.7.1.1 and 6.10.7.1.2. If you do not select this option, Articles 6.10.7.1.1 and 6.10.7.1.2 will not be evaluated and all positive flexure sections will be considered non-compact.

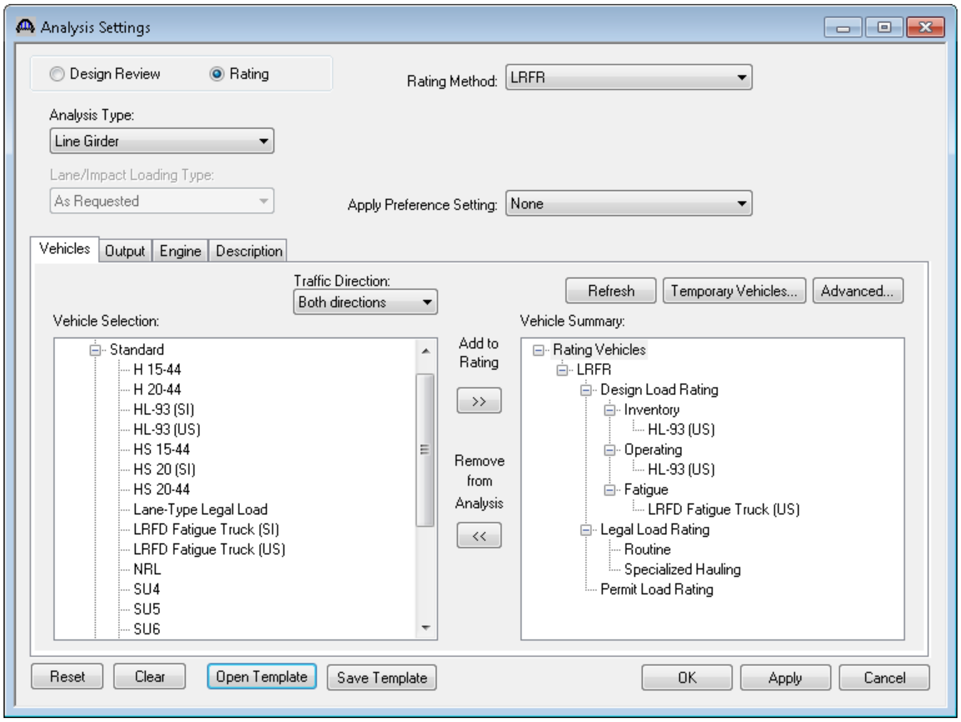
Evaluate remaining fatigue life

This control allows you to evaluate remaining fatigue life specified in MBE 7.2. If you do not select this option, MBE 7.2 will still be evaluated but remaining fatigue life will not be computed.

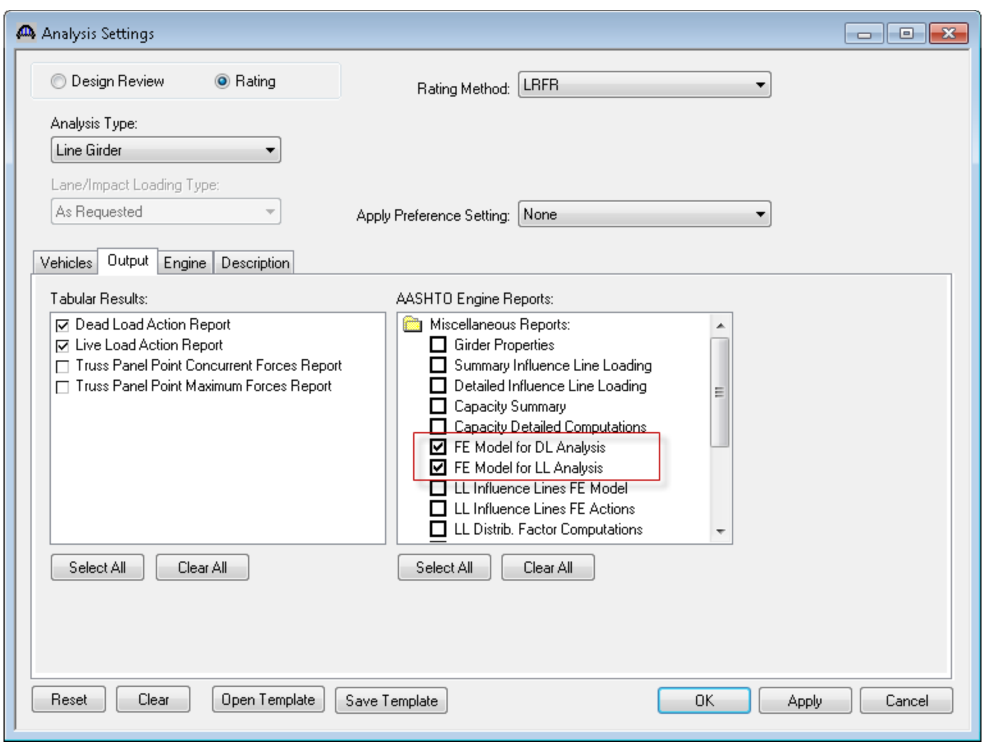
Ignore long. reinforcement in negative moment capacity

This control allows you to ignore the contribution of the longitudinal deck reinforcement when computing the negative moment capacity of the section.

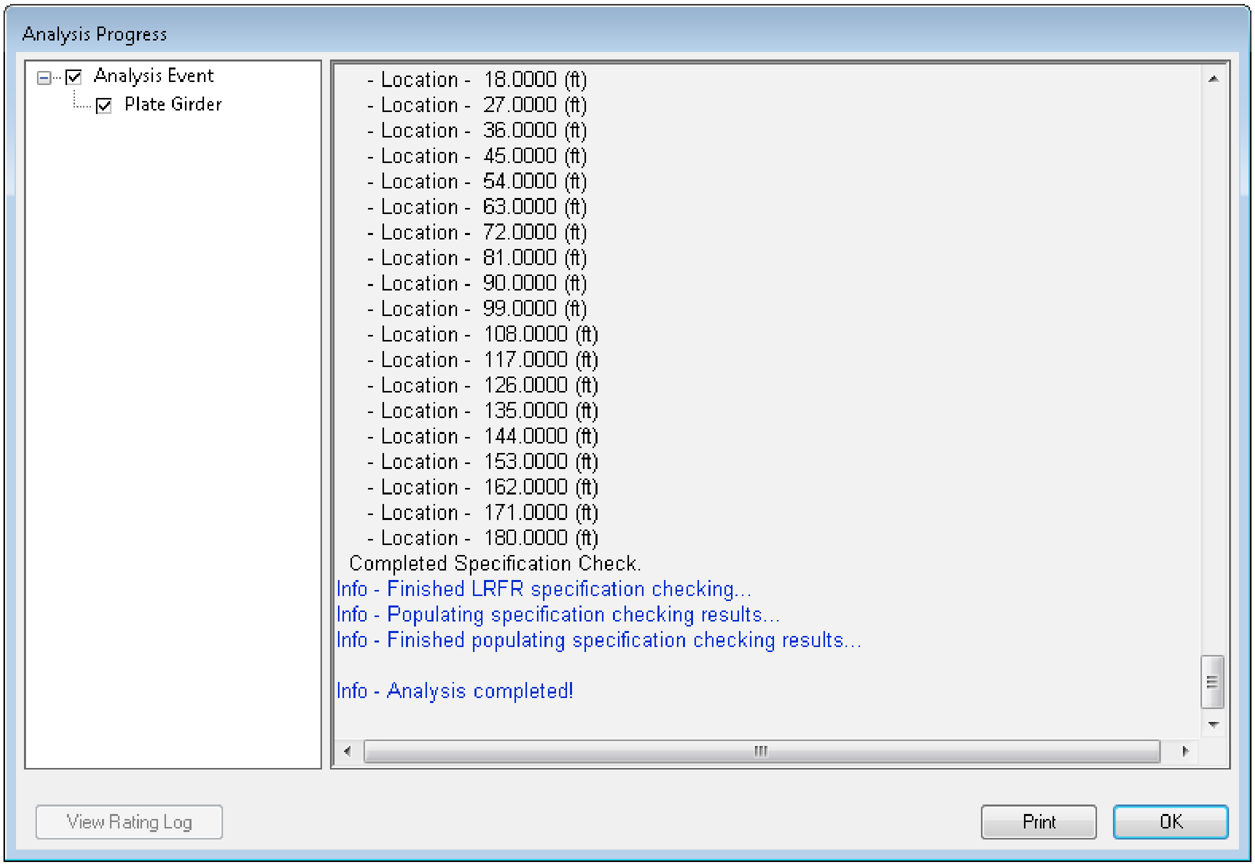
To perform a LRFR analysis, select the View Analysis Settings button on the toolbar to open the Analysis Settings window. Use the "LRFR Design Load Rating" template to select the vehicles to be used.



On the Output tab, you can select the reports that you would like to have generated during the analysis.



Next click the Analyze button on the toolbar to perform the LRFR analysis. The Analysis Progress dialog will appear and should be reviewed for any warning messages.



The following steps are performed when doing a LRFR analysis of a steel girder using the BrR LRFR analysis engine:

1. Finite element models are generated for the dead load and live load analyses. A Stage 1 FE model is generated for the beam dead load and non-composite dead loads. A Stage 2 FE model is generated for dead loads applied to the long-term composite section properties. A Stage 3 FE model is generated for the live load analysis.

   Stage 2 FE model contains section properties corresponding to the sustained modular ratio factor entered in BrR (e.g. 3n). Stage 3 FE model contains section properties corresponding to the modular ratio (n). The FE models will take into account the presence of shear connectors when setting the composite properties in the FE models. Regions that do not contain shear connectors will use non-composite section properties in the Stage 2 and 3 FE models.

   In addition to the points selected on the Member Alternative Description window's Control Options tab, the model generated by the export to the BrR LRFR analysis engine will always contain node points at brace point locations and locations midway between the brace points. Only the articles required to compute stresses are processed at these points if the point is not being processed for one of the options chosen on this tab. The stresses at these locations are required when determining the flexural capacity of the steel girders.

2. The specification checks require for the LRFR analysis will be performed. The specification checking occurs in two phases. The first phase determines the type of flexure present at each point for each controlling load combination. This is necessary because the flexural articles to be considered in the Specification are dependent on the type of the flexure the beam is subject to. The second phase performs the specification checks taking into consideration the flexure type determined in the first phase.

   Phase 1:

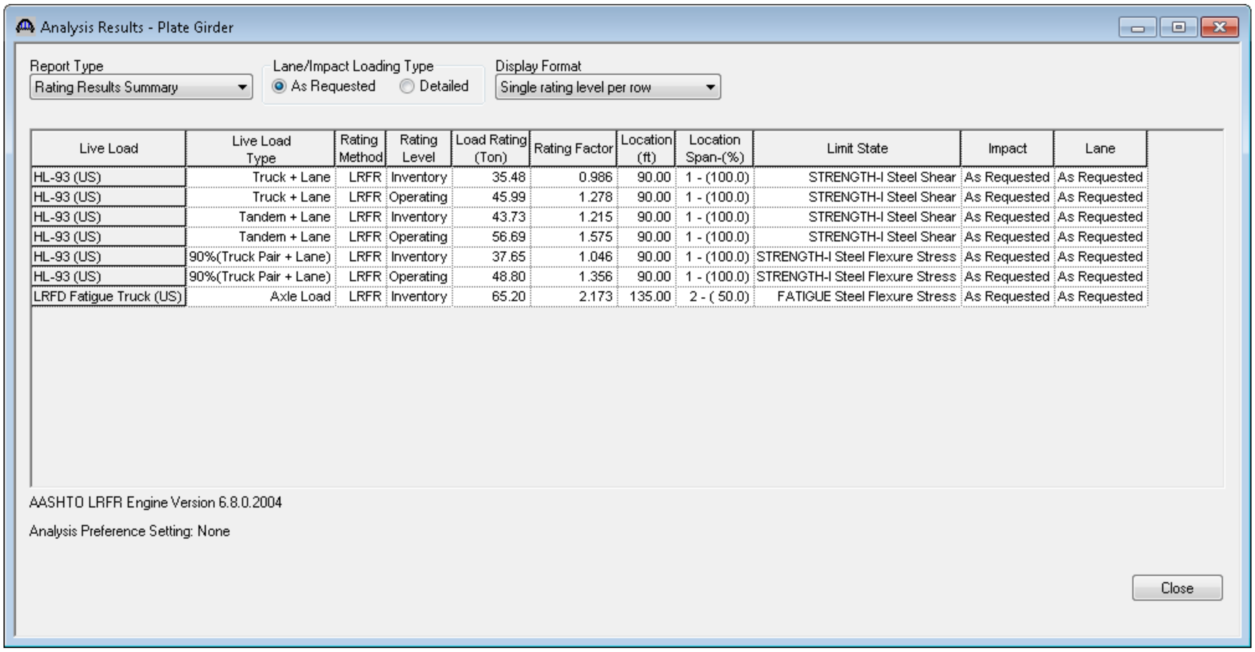
   Positive flexure is defined as the bending condition that produces compressive stress (denoted by a negative sign in the program) in the slab for composite construction or the top flange for non-composite construction. Negative flexure is defined as the bending condition that produces tensile stress (denoted by a positive sign) in the slab or top flange. As per Article 6.10.1.1.1b, the stress in the top of the slab (or top flange for non-composite construction) is first computed using the positive flexure section properties. If this stress is compressive, the stresses in each component of the beam (slab, longitudinal reinforcement, flanges, cover plates, and web) are computed using the positive flexure section properties. If the stress in the top of the slab (or top flange for non-composite construction) is tensile, the stresses in each component of the beam are computed using the negative section properties.

   If the resulting computed stress in the bottom flange is tensile, the beam is considered to be in positive flexure for the load combination. If the resulting computed stress in the bottom flange is compressive, the beam is considered to be in negative flexure for the load combination.

   Phase 2:

   The remaining articles are evaluated taking into consideration the flexure type determined in the first phase.

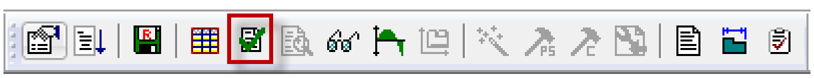
Click the View analysis report button on the toolbar to open the Analysis Results window. The Rating Results Summary is shown below.



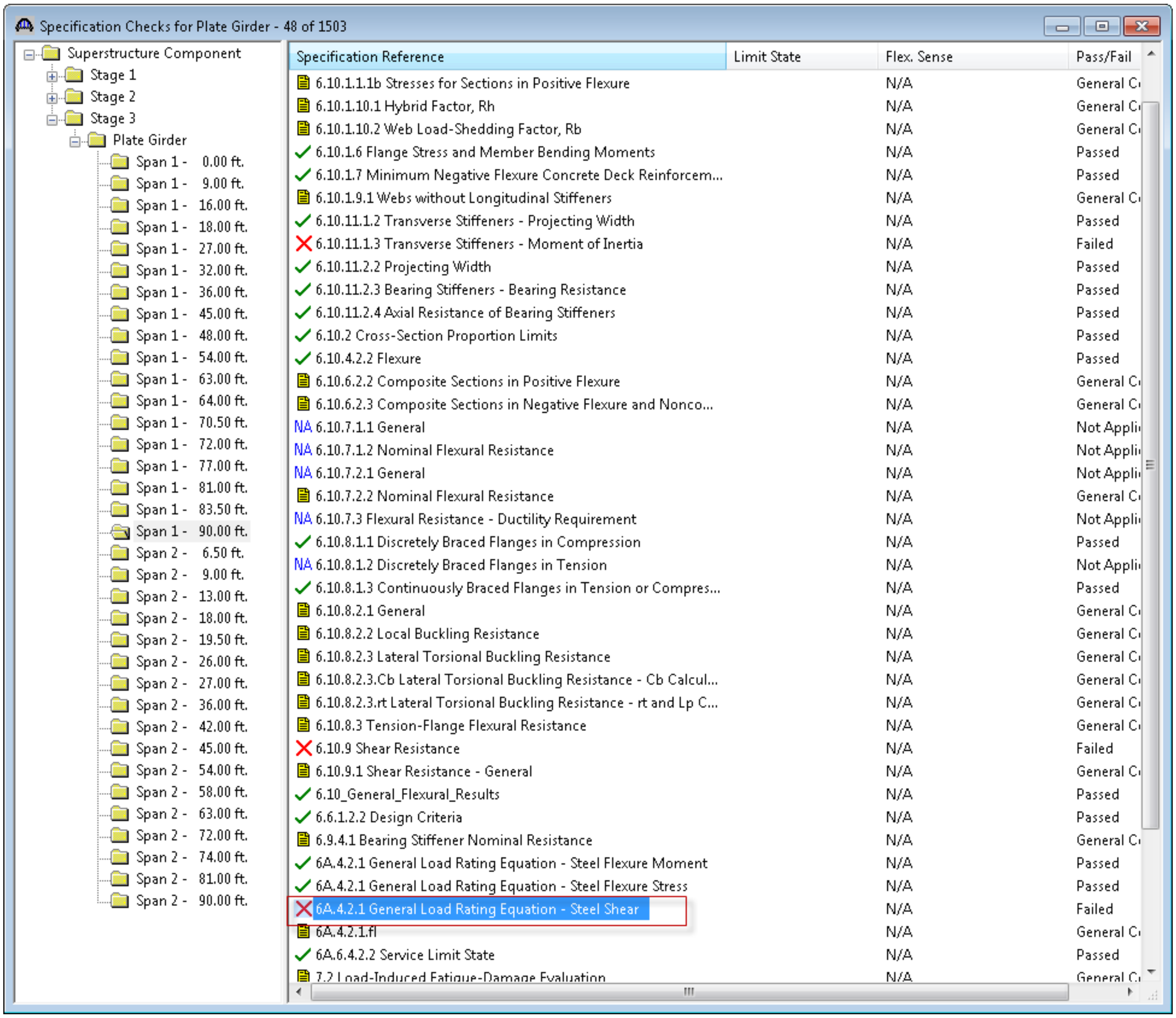
Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	Impact	Lane
HL-93 (US)	Truck + Lane	LRFR	Inventory	35.48	0.986	90.00	1 - (100.0)	STRENGTH-I Steel Shear	As Requested	As Requested
HL-93 (US)	Truck + Lane	LRFR	Operating	45.99	1.278	90.00	1 - (100.0)	STRENGTH-I Steel Shear	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Inventory	43.73	1.215	90.00	1 - (100.0)	STRENGTH-I Steel Shear	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Operating	56.69	1.575	90.00	1 - (100.0)	STRENGTH-I Steel Shear	As Requested	As Requested
HL-93 (US)	90%(Truck Pair + Lane)	LRFR	Inventory	37.65	1.046	90.00	1 - (100.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
HL-93 (US)	90%(Truck Pair + Lane)	LRFR	Operating	48.80	1.356	90.00	1 - (100.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
LRFD Fatigue Truck (US)	Axle Load	LRFR	Inventory	65.20	2.173	135.00	2 - (50.0)	FATIGUE Steel Flexure Stress	As Requested	As Requested

The critical inventory rating factor for "Truck + Lane" is 0.986. The controlling location is at the pier and the limit state is Strength-I Shear.

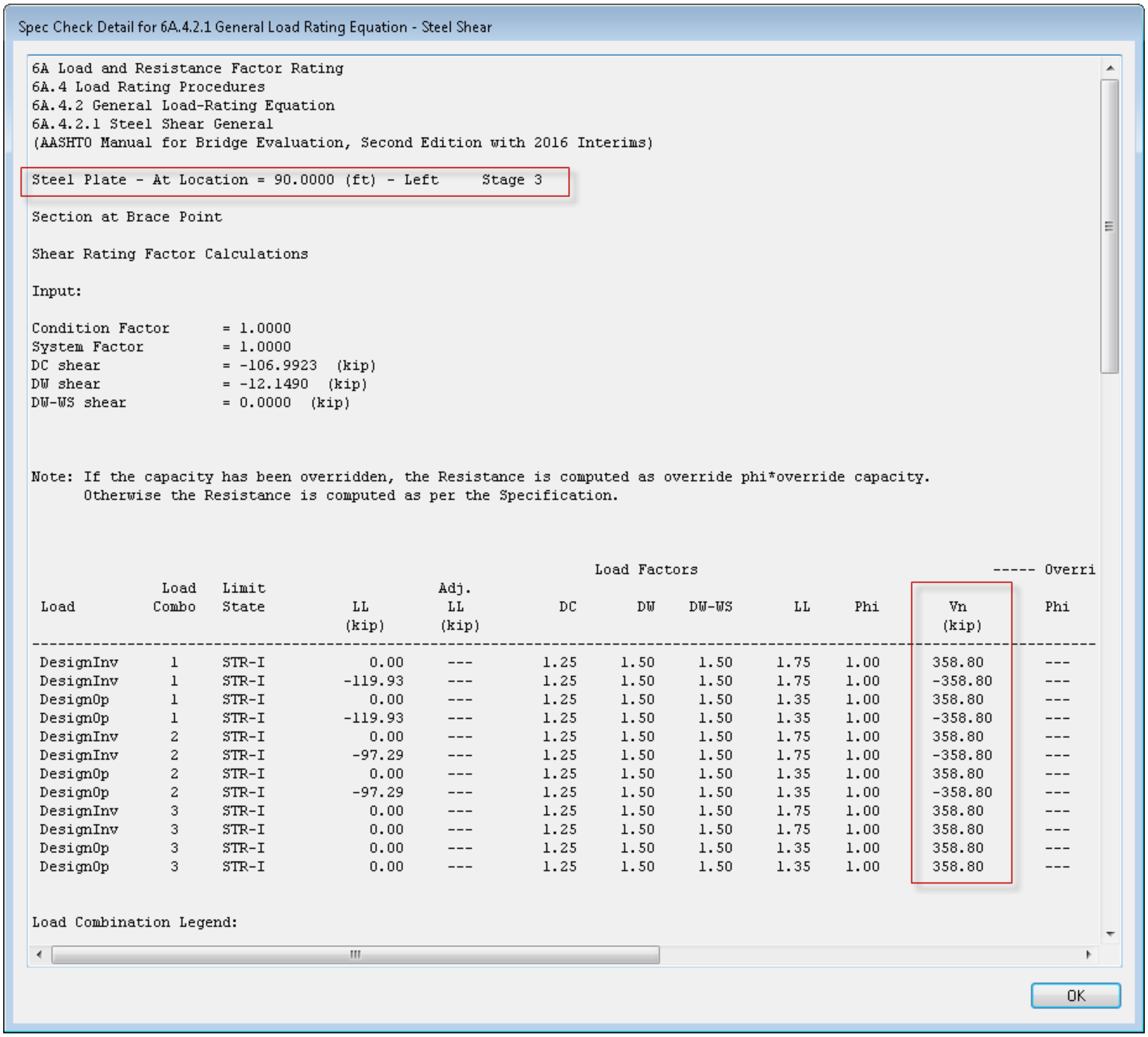
To review the specification checks at the pier, click the View Spec Check button on the toolbar to open the Specification Checks window.



Expand the Superstructure Component tree to show the specification checks for Stage 3 at Span 1 - 90.00 ft.


Specification Checks for Plate Girder - 48 of 1503
Superstructure Component
Stage 1
Stage 2
Stage 3
Plate Girder
Span 1 - 0.00 ft.
Span 1 - 9.00 ft.
Span 1 - 16.00 ft.
Span 1 - 18.00 ft.
Span 1 - 27.00 ft.
Span 1 - 32.00 ft.
Span 1 - 36.00 ft.
Span 1 - 45.00 ft.
Span 1 - 48.00 ft.
Span 1 - 54.00 ft.
Span 1 - 63.00 ft.
Span 1 - 64.00 ft.
Span 1 - 70.50 ft.
Span 1 - 72.00 ft.
Span 1 - 77.00 ft.
Span 1 - 81.00 ft.
Span 1 - 83.50 ft.
Span 1 - 90.00 ft.
Span 2 - 6.50 ft.
Span 2 - 9.00 ft.
Span 2 - 13.00 ft.
Span 2 - 18.00 ft.
Span 2 - 19.50 ft.
Span 2 - 26.00 ft.
Span 2 - 27.00 ft.
Span 2 - 36.00 ft.
Span 2 - 42.00 ft.
Span 2 - 45.00 ft.
Span 2 - 54.00 ft.
Span 2 - 58.00 ft.
Span 2 - 63.00 ft.
Span 2 - 72.00 ft.
Span 2 - 74.00 ft.
Span 2 - 81.00 ft.
Span 2 - 90.00 ft.
Specification Reference | Limit State | Flex. Sense | Pass/Fail
6.10.1.1.1b Stresses for Sections in Positive Flexure | N/A | General C
6.10.1.10.1 Hybrid Factor, Rh | N/A | General C
6.10.1.10.2 Web Load-Shedding Factor, Rb | N/A | General C
6.10.1.6 Flange Stress and Member Bending Moments | N/A | Passed
6.10.1.7 Minimum Negative Flexure Concrete Deck Reinforcem... | N/A | Passed
6.10.1.9.1 Webs without Longitudinal Stiffeners | N/A | General C
6.10.11.1.2 Transverse Stiffeners - Projecting Width | N/A | Passed
6.10.11.1.3 Transverse Stiffeners - Moment of Inertia | N/A | Failed
6.10.11.2.2 Projecting Width | N/A | Passed
6.10.11.2.3 Bearing Stiffeners - Bearing Resistance | N/A | Passed
6.10.11.2.4 Axial Resistance of Bearing Stiffeners | N/A | Passed
6.10.2 Cross-Section Proportion Limits | N/A | Passed
6.10.4.2.2 Flexure | N/A | Passed
6.10.6.2.2 Composite Sections in Positive Flexure | N/A | General C
6.10.6.2.3 Composite Sections in Negative Flexure and Nonco... | N/A | General C
NA 6.10.7.1.1 General | N/A | Not Appli
NA 6.10.7.1.2 Nominal Flexural Resistance | N/A | Not Appli
NA 6.10.7.2.1 General | N/A | Not Appli
6.10.7.2.2 Nominal Flexural Resistance | N/A | General C
NA 6.10.7.3 Flexural Resistance - Ductility Requirement | N/A | Not Appli
6.10.8.1.1 Discretely Braced Flanges in Compression | N/A | Passed
NA 6.10.8.1.2 Discretely Braced Flanges in Tension | N/A | Not Appli
6.10.8.1.3 Continuously Braced Flanges in Tension or Compres... | N/A | Passed
6.10.8.2.1 General | N/A | General C
6.10.8.2.2 Local Buckling Resistance | N/A | General C
6.10.8.2.3 Lateral Torsional Buckling Resistance | N/A | General C
6.10.8.2.3.Cb Lateral Torsional Buckling Resistance - Cb Calcul... | N/A | General C
6.10.8.2.3.rt Lateral Torsional Buckling Resistance - rt and Lp C... | N/A | General C
6.10.8.3 Tension-Flange Flexural Resistance | N/A | General C
6.10.9 Shear Resistance | N/A | Failed
6.10.9.1 Shear Resistance - General | N/A | General C
6.10_General_Flexural_Results | N/A | Passed
6.6.1.2.2 Design Criteria | N/A | Passed
6.9.4.1 Bearing Stiffener Nominal Resistance | N/A | General C
6A.4.2.1 General Load Rating Equation - Steel Flexure Moment | N/A | Passed
6A.4.2.1 General Load Rating Equation - Steel Flexure Stress | N/A | Passed
6A.4.2.1 General Load Rating Equation - Steel Shear | N/A | Failed
6A.4.2.1.fl | N/A | General C
6A.6.4.2.2 Service Limit State | N/A | Passed
7.2 Load-Induced Fatigue-Damage Evaluation | N/A | General C

Next double-click the "6A.4.2.1 Steel Shear General Load Rating Equation" check. Opening this article shows the following details. Note that both the left and right sides of the point are evaluated.



Spec Check Detail for 6A.4.2.1 General Load Rating Equation - Steel Shear

6A Load and Resistance Factor Rating
6A.4 Load Rating Procedures
6A.4.2 General Load-Rating Equation
6A.4.2.1 Steel Shear General
(AASHTO Manual for Bridge Evaluation, Second Edition with 2016 Interims)

Steel Plate - At Location = 90.0000 (ft) - Left Stage 3

Section at Brace Point

Shear Rating Factor Calculations

Input:

Condition Factor = 1.0000
System Factor = 1.0000
DC shear = -106.9923 (kip)
DW shear = -12.1490 (kip)
DW-WS shear = 0.0000 (kip)

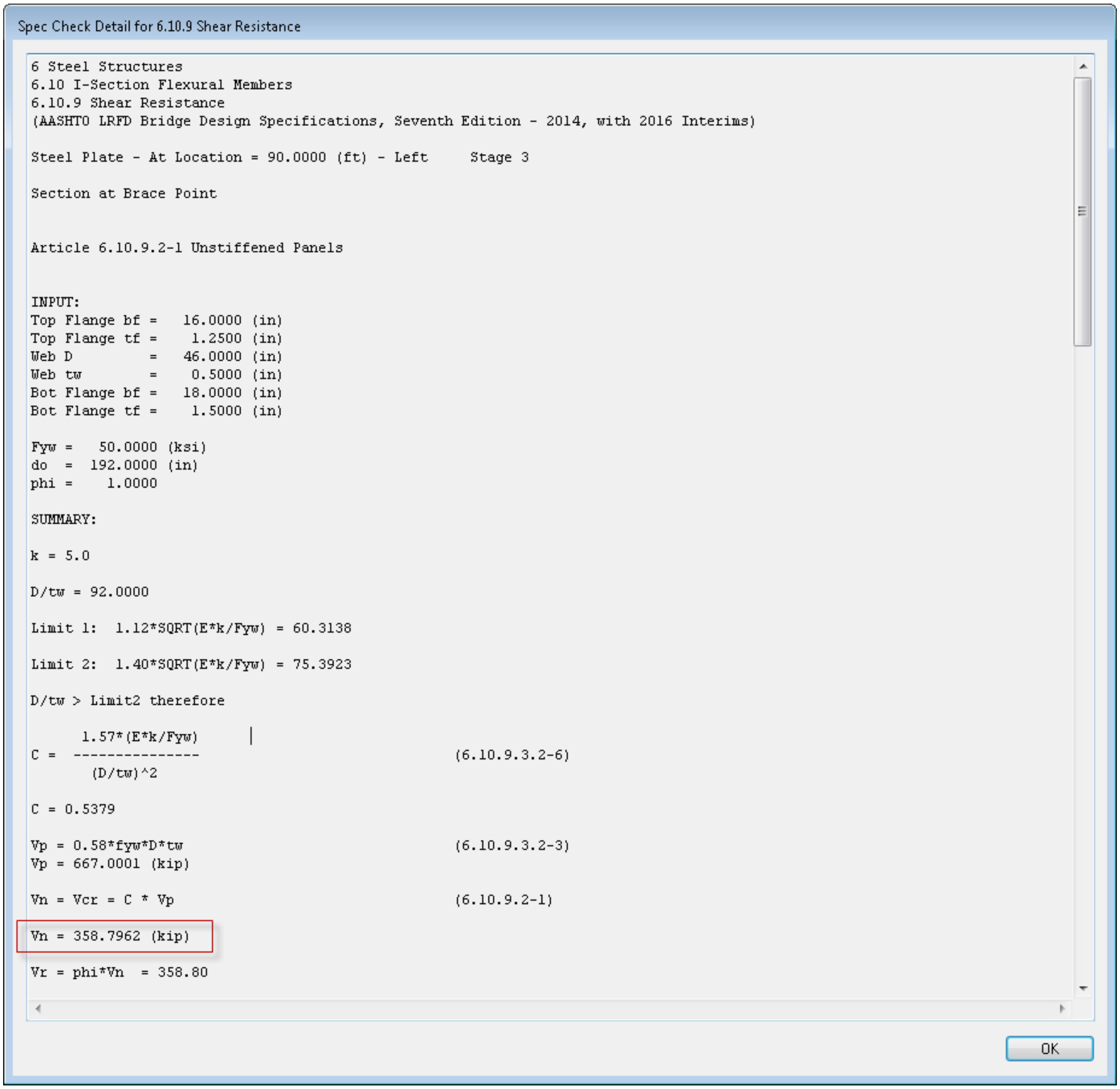
Note: If the capacity has been overridden, the Resistance is computed as override phi*override capacity.
Otherwise the Resistance is computed as per the Specification.

					Load Factors					----- Overri	
Load	Load Combo	Limit State	LL (kip)	Adj. LL (kip)	DC	DW	DW-WS	LL	Phi	Vn (kip)	Phi
DesignInv	1	STR-I	0.00	---	1.25	1.50	1.50	1.75	1.00	358.80	---
DesignInv	1	STR-I	-119.93	---	1.25	1.50	1.50	1.75	1.00	-358.80	---
DesignOp	1	STR-I	0.00	---	1.25	1.50	1.50	1.35	1.00	358.80	---
DesignOp	1	STR-I	-119.93	---	1.25	1.50	1.50	1.35	1.00	-358.80	---
DesignInv	2	STR-I	0.00	---	1.25	1.50	1.50	1.75	1.00	358.80	---
DesignInv	2	STR-I	-97.29	---	1.25	1.50	1.50	1.75	1.00	-358.80	---
DesignOp	2	STR-I	0.00	---	1.25	1.50	1.50	1.35	1.00	358.80	---
DesignOp	2	STR-I	-97.29	---	1.25	1.50	1.50	1.35	1.00	-358.80	---
DesignInv	3	STR-I	0.00	---	1.25	1.50	1.50	1.75	1.00	358.80	---
DesignInv	3	STR-I	0.00	---	1.25	1.50	1.50	1.75	1.00	358.80	---
DesignOp	3	STR-I	0.00	---	1.25	1.50	1.50	1.35	1.00	358.80	---
DesignOp	3	STR-I	0.00	---	1.25	1.50	1.50	1.35	1.00	358.80	---

Load Combination Legend:

OK

To review the Vn computation at this location, double-click the "6.10.9 Shear Resistance" check. Opening this article shows the following details.



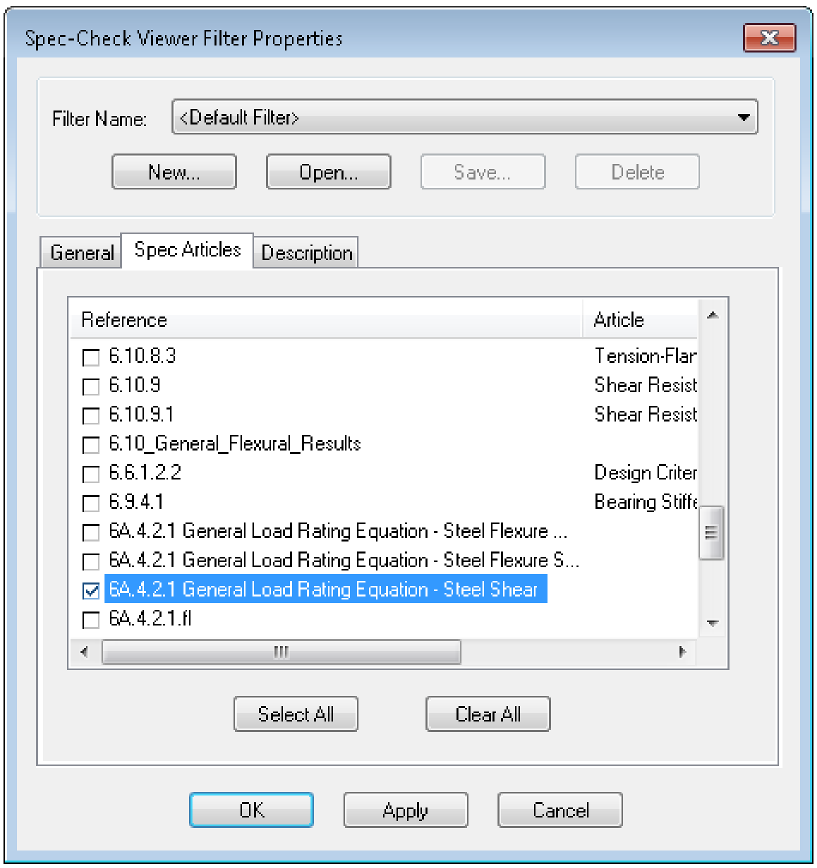
Spec Check Detail for 6.10.9 Shear Resistance

```
6 Steel Structures
6.10 I-Section Flexural Members
6.10.9 Shear Resistance
(AASHTO LRFD Bridge Design Specifications, Seventh Edition - 2014, with 2016 Interims)

Steel Plate - At Location = 90.0000 (ft) - Left     Stage 3

Section at Brace Point


Article 6.10.9.2-1 Unstiffened Panels


INPUT:
Top Flange bf =   16.0000 (in)
Top Flange tf =    1.2500 (in)
Web D         =   46.0000 (in)
Web tw        =    0.5000 (in)
Bot Flange bf =   18.0000 (in)
Bot Flange tf =    1.5000 (in)

Fyw =   50.0000 (ksi)
do  =  192.0000 (in)
phi =    1.0000

SUMMARY:

k = 5.0

D/tw = 92.0000

Limit 1:  1.12*SQRT(E*k/Fyw) = 60.3138

Limit 2:  1.40*SQRT(E*k/Fyw) = 75.3923

D/tw > Limit2 therefore

      1.57*(E*k/Fyw)
C =  ---------------                          (6.10.9.3.2-6)
       (D/tw)^2

C = 0.5379

Vp = 0.58*fyw*D*tw                            (6.10.9.3.2-3)
Vp = 667.0001 (kip)

Vn = Vcr = C * Vp                             (6.10.9.2-1)

Vn = 358.7962 (kip)

Vr = phi*Vn  = 358.80
```

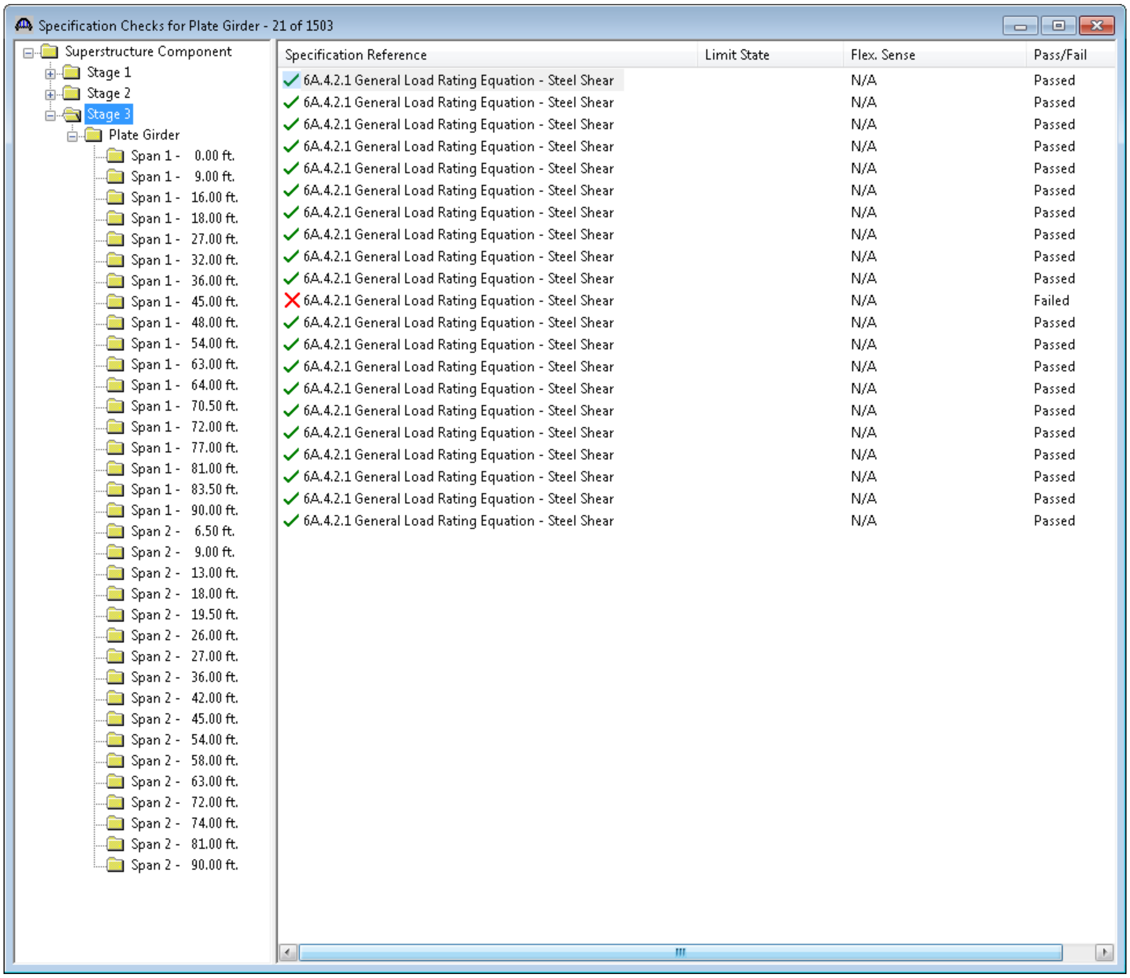
OK

To create a Spec-Check Report for the "6.4.2.1 Steel Shear General Load Rating Equation" check for all the locations, we can first use the Spec-Check Filter to limit the articles shown to just the "6A.4.2.1 Steel Shear General Load Rating Equation" check and then use the Report Tool to generate a report for this article.

Click the Filter button next to the View Spec Check button on the toolbar to open the Spec-Check Viewer Filter Properties window. Select “Clear All” and then selecting just the 6A.4.2.1 Steel Shear article. Click OK to close the Filter.

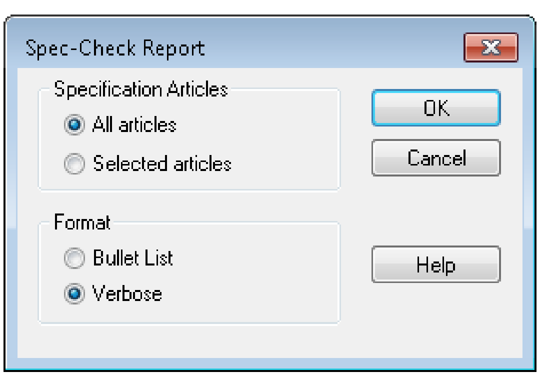


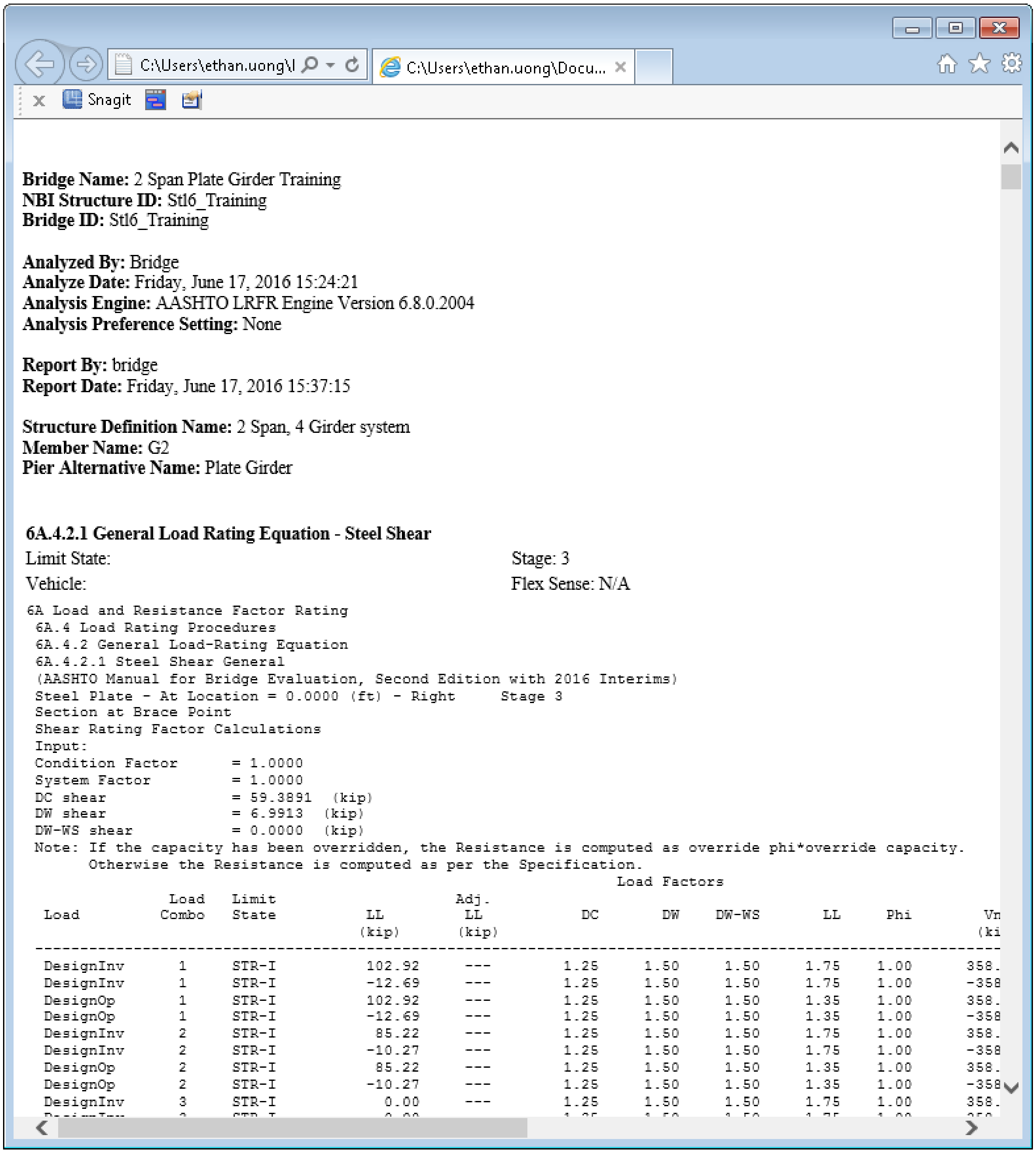
Select Stage 3 in the Superstructure Component tree to filter all "6.4.2.1 Steel Shear General Load Rating Equation" checks in Stage 3.



Click the Report Tool button on the Bridge Explorer toolbar to open the Spec-Check Report window.

Select "All articles" in "Verbose" format and click OK to generate the report.





Bridge Name: 2 Span Plate Girder Training
NBI Structure ID: Stl6_Training
Bridge ID: Stl6_Training

Analyzed By: Bridge
Analyze Date: Friday, June 17, 2016 15:24:21
Analysis Engine: AASHTO LRFR Engine Version 6.8.0.2004
Analysis Preference Setting: None

Report By: bridge
Report Date: Friday, June 17, 2016 15:37:15

Structure Definition Name: 2 Span, 4 Girder system
Member Name: G2
Pier Alternative Name: Plate Girder

6A.4.2.1 General Load Rating Equation - Steel Shear

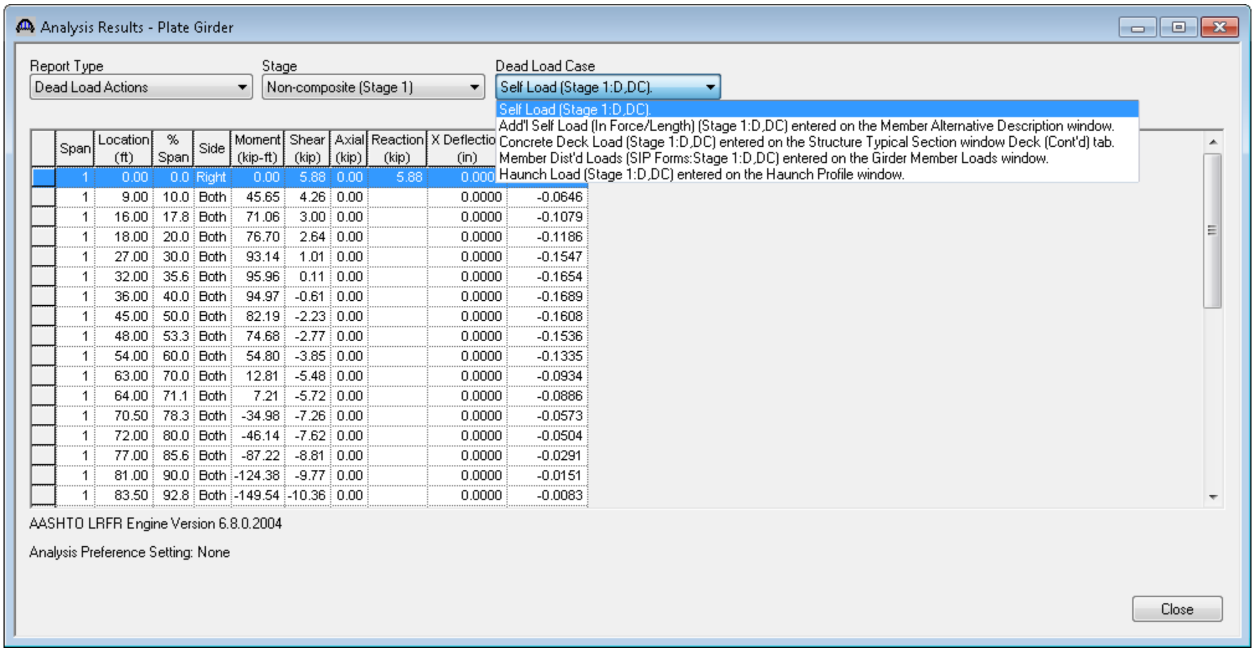
Limit State: Stage: 3
Vehicle: Flex Sense: N/A

```
6A Load and Resistance Factor Rating
 6A.4 Load Rating Procedures
 6A.4.2 General Load-Rating Equation
 6A.4.2.1 Steel Shear General
 (AASHTO Manual for Bridge Evaluation, Second Edition with 2016 Interims)
 Steel Plate - At Location = 0.0000 (ft) - Right     Stage 3
 Section at Brace Point
 Shear Rating Factor Calculations
 Input:
 Condition Factor      = 1.0000
 System Factor         = 1.0000
 DC shear              = 59.3891  (kip)
 DW shear              = 6.9913  (kip)
 DW-WS shear           = 0.0000  (kip)
 Note: If the capacity has been overridden, the Resistance is computed as override phi*override capacity.
       Otherwise the Resistance is computed as per the Specification.
```

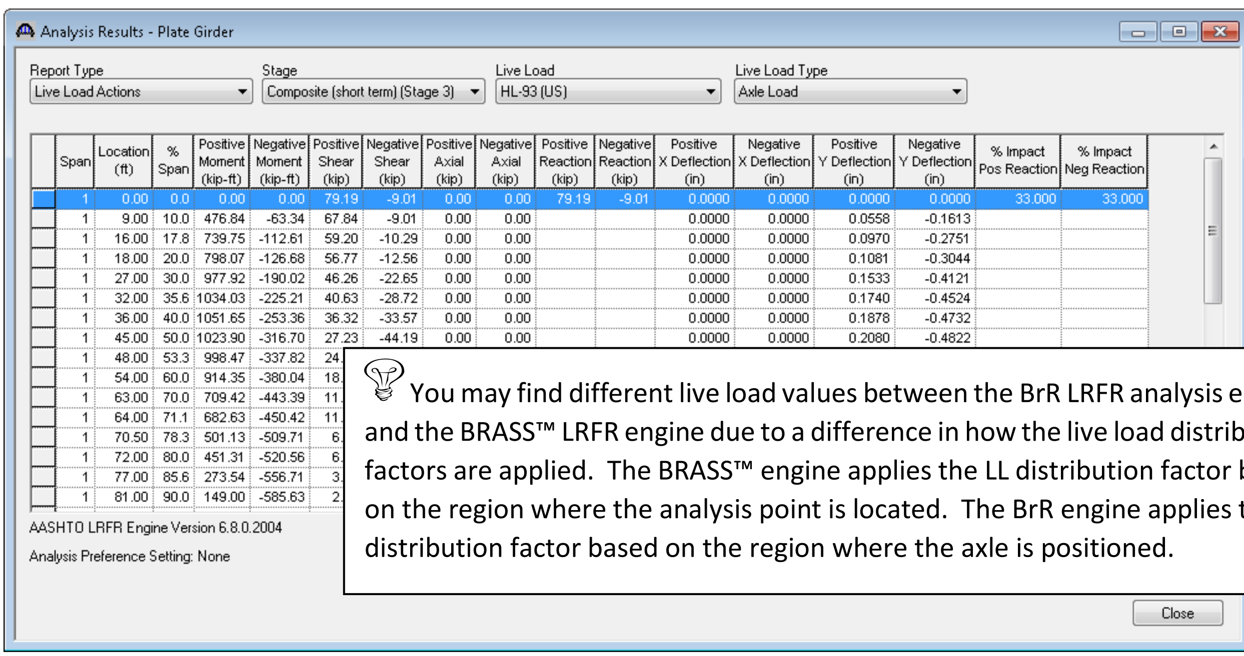
Load	Load Combo	Limit State	LL (kip)	Adj. LL (kip)	Load Factors DC	DW	DW-WS	LL	Phi	Vn (ki
DesignInv	1	STR-I	102.92	---	1.25	1.50	1.50	1.75	1.00	358.
DesignInv	1	STR-I	-12.69	---	1.25	1.50	1.50	1.75	1.00	-358
DesignOp	1	STR-I	102.92	---	1.25	1.50	1.50	1.35	1.00	358.
DesignOp	1	STR-I	-12.69	---	1.25	1.50	1.50	1.35	1.00	-358
DesignInv	2	STR-I	85.22	---	1.25	1.50	1.50	1.75	1.00	358.
DesignInv	2	STR-I	-10.27	---	1.25	1.50	1.50	1.75	1.00	-358
DesignOp	2	STR-I	85.22	---	1.25	1.50	1.50	1.35	1.00	358.
DesignOp	2	STR-I	-10.27	---	1.25	1.50	1.50	1.35	1.00	-358
DesignInv	3	STR-I	0.00	---	1.25	1.50	1.50	1.75	1.00	358.

Tabular dead load and live load analysis results are available in the Analysis Results window.

The Dead Load Case description contains the location that the load is entered.



Span	Location (ft)	% Span	Side	Moment (kip-ft)	Shear (kip)	Axial (kip)	Reaction (kip)	X Deflectio (in)	
1	0.00	0.0	Right	0.00	5.88	0.00	5.88	0.000	
1	9.00	10.0	Both	45.65	4.26	0.00		0.0000	-0.0646
1	16.00	17.8	Both	71.06	3.00	0.00		0.0000	-0.1079
1	18.00	20.0	Both	76.70	2.64	0.00		0.0000	-0.1186
1	27.00	30.0	Both	93.14	1.01	0.00		0.0000	-0.1547
1	32.00	35.6	Both	95.96	0.11	0.00		0.0000	-0.1654
1	36.00	40.0	Both	94.97	-0.61	0.00		0.0000	-0.1689
1	45.00	50.0	Both	82.19	-2.23	0.00		0.0000	-0.1608
1	48.00	53.3	Both	74.68	-2.77	0.00		0.0000	-0.1536
1	54.00	60.0	Both	54.80	-3.85	0.00		0.0000	-0.1335
1	63.00	70.0	Both	12.81	-5.48	0.00		0.0000	-0.0934
1	64.00	71.1	Both	7.21	-5.72	0.00		0.0000	-0.0886
1	70.50	78.3	Both	-34.98	-7.26	0.00		0.0000	-0.0573
1	72.00	80.0	Both	-46.14	-7.62	0.00		0.0000	-0.0504
1	77.00	85.6	Both	-87.22	-8.81	0.00		0.0000	-0.0291
1	81.00	90.0	Both	-124.38	-9.77	0.00		0.0000	-0.0151
1	83.50	92.8	Both	-149.54	-10.36	0.00		0.0000	-0.0083



Span	Location (ft)	% Span	Positive Moment (kip-ft)	Negative Moment (kip-ft)	Positive Shear (kip)	Negative Shear (kip)	Positive Axial (kip)	Negative Axial (kip)	Positive Reaction (kip)	Negative Reaction (kip)	Positive X Deflection (in)	Negative X Deflection (in)	Positive Y Deflection (in)	Negative Y Deflection (in)	% Impact Pos Reaction	% Impact Neg Reaction
1	0.00	0.0	0.00	0.00	79.19	-9.01	0.00	0.00	79.19	-9.01	0.0000	0.0000	0.0000	0.0000	33.000	33.000
1	9.00	10.0	476.84	-63.34	67.84	-9.01	0.00	0.00			0.0000	0.0000	0.0558	-0.1613		
1	16.00	17.8	739.75	-112.61	59.20	-10.29	0.00	0.00			0.0000	0.0000	0.0970	-0.2751		
1	18.00	20.0	798.07	-126.68	56.77	-12.56	0.00	0.00			0.0000	0.0000	0.1081	-0.3044		
1	27.00	30.0	977.92	-190.02	46.26	-22.65	0.00	0.00			0.0000	0.0000	0.1533	-0.4121		
1	32.00	35.6	1034.03	-225.21	40.63	-28.72	0.00	0.00			0.0000	0.0000	0.1740	-0.4524		
1	36.00	40.0	1051.65	-253.36	36.32	-33.57	0.00	0.00			0.0000	0.0000	0.1878	-0.4732		
1	45.00	50.0	1023.90	-316.70	27.23	-44.19	0.00	0.00			0.0000	0.0000	0.2080	-0.4822		
1	48.00	53.3	998.47	-337.82	24.											
1	54.00	60.0	914.35	-380.04	18.											
1	63.00	70.0	709.42	-443.39	11.											
1	64.00	71.1	682.63	-450.42	11.											
1	70.50	78.3	501.13	-509.71	6.											
1	72.00	80.0	451.31	-520.56	6.											
1	77.00	85.6	273.54	-556.71	3.											
1	81.00	90.0	149.00	-585.63	2.											

You may find different live load values between the BrR LRFR analysis engine and the BRASS™ LRFR engine due to a difference in how the live load distribution factors are applied. The BRASS™ engine applies the LL distribution factor based on the region where the analysis point is located. The BrR engine applies the LL distribution factor based on the region where the axle is positioned.

Note these values include dynamic load allowance, distribution factors and any live load scale factor entered on the Analysis Settings window.

The FE model outputs that we turned on in the Analysis Settings window is available from the Analysis Output window.