

AASHTOWare BrDR 7.5.0

Steel Tutorial

STL5 – Two Span Rolled Beam Example

STL5 – Two Span Rolled Beam Example

BrDR Tutorial

Topics Covered

- Steel rolled beam with cover plates input as girder system.
- Schedule based input.
- Skewed framing plan.

Steel rolled beam with cover plates input as girder system.

From the **Bridge Explorer** create a **New** bridge and enter the following description data.

RollBeamBridge

Bridge ID: RollBeamBridge NBI structure ID (8): RollBeamBridge

Template Superstructures
 Bridge completely defined Culverts
 Substructures

Description Description (cont'd) Alternatives Global reference point Traffic Custom agency fields

Name: Rolled Beam Bridge Year built:

Description: 2 span, steel rolled beam bridge

Location: Length: ft

Facility carried (7): Route number: -1

Feat. intersected (6): Mi. post:

Default units: US Customary

Bridge association... BrR BrD BrM

OK Apply Cancel

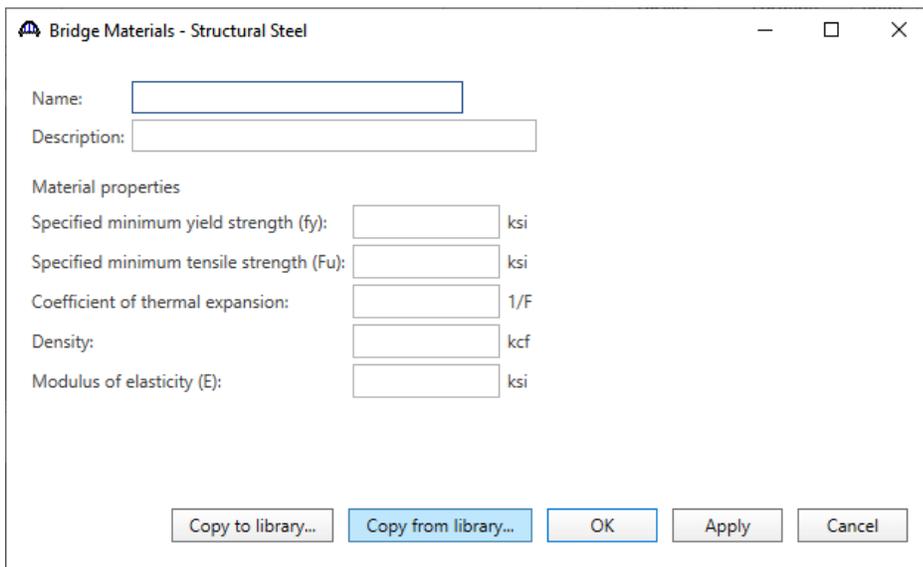
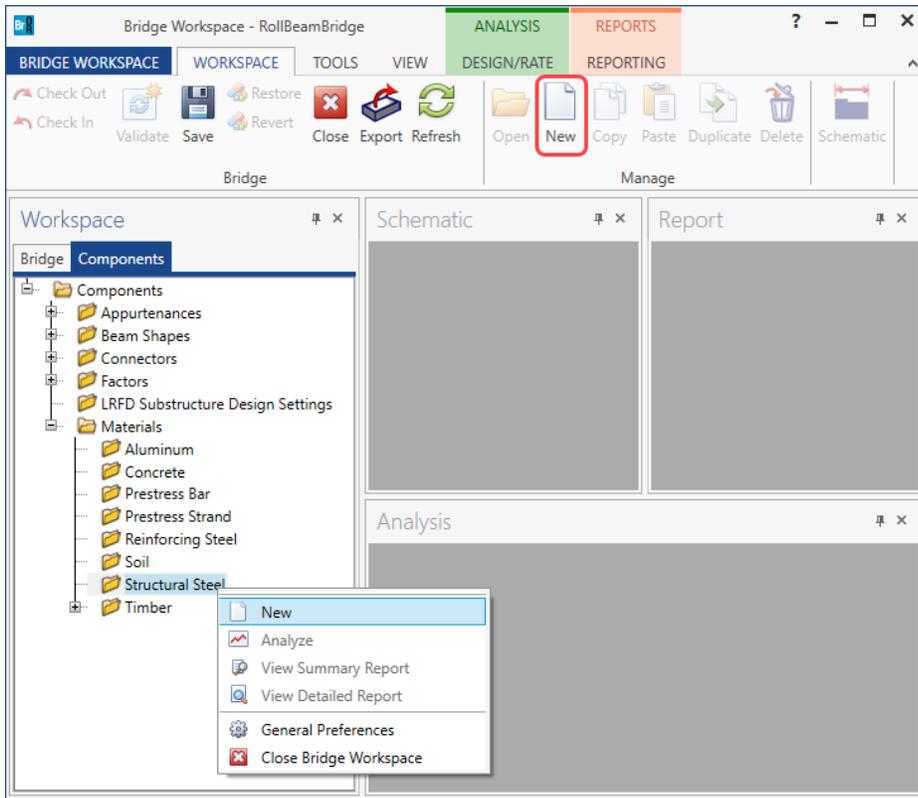
Click **OK** to apply the data and close the window.

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Bridge Materials

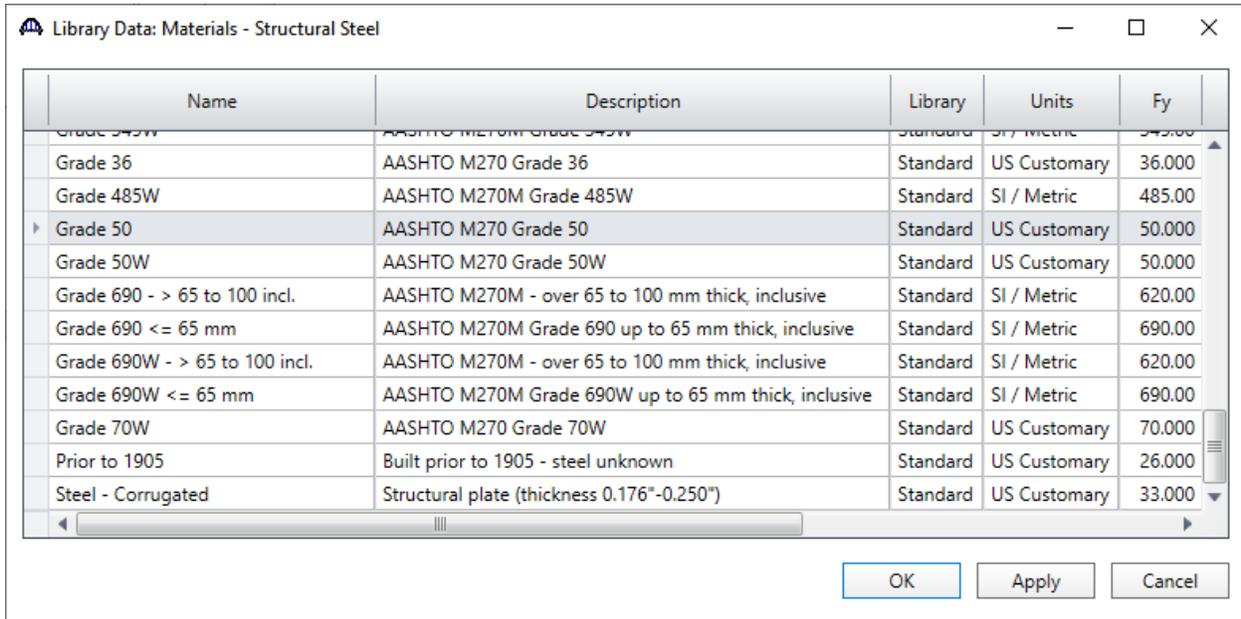
To enter the materials used by members of the bridge, in the **Components** tab of the **Bridge Workspace**, click on the **+** button to expand the tree for **Materials**.

To add a new steel material, in the **Components** tab of the **Bridge Workspace**, click on **Materials, Structural Steel**, and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or right mouse click on **Structural Steel** and select **New**). The window shown below will open.

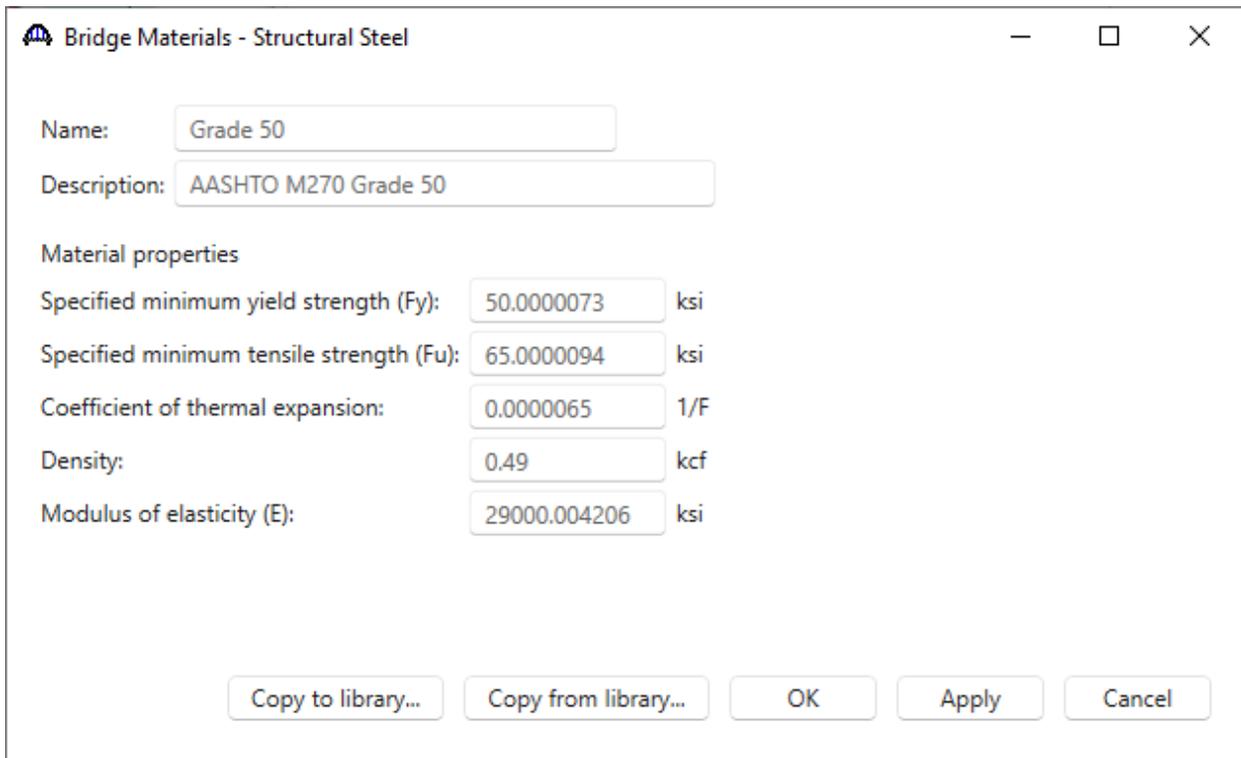


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Add the structural steel material by clicking the **Copy from library...** button. The following window opens.



Select the **AASHTO M270 Grade 50** material and click **OK**. The selected material properties are copied to the Bridge Materials – Structural Steel window as shown below.



Click **OK** to apply the data and close the window.

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Add the following reinforcement material and deck concrete using the same techniques.

Bridge Materials - Reinforcing Steel

Name:

Description:

Material properties

Specified yield strength (fy): ksi

Modulus of elasticity (Es): ksi

Ultimate strength (Fu): ksi

Type

Plain

Epoxy

Galvanized

Click **OK** to apply the data and close the window.

Bridge Materials - Concrete

Name:

Description:

Compressive strength at 28 days (f'c): ksi

Initial compressive strength (f'ci): ksi

Composition of concrete:

Density (for dead loads): kcf

Density (for modulus of elasticity): kcf

Poisson's ratio:

Coefficient of thermal expansion (α): 1/F

Splitting tensile strength (fct): ksi

LRFD Maximum aggregate size: in

Std modulus of elasticity (Ec): ksi

LRFD modulus of elasticity (Ec): ksi

Std initial modulus of elasticity: ksi

LRFD initial modulus of elasticity: ksi

Std modulus of rupture: ksi

LRFD modulus of rupture: ksi

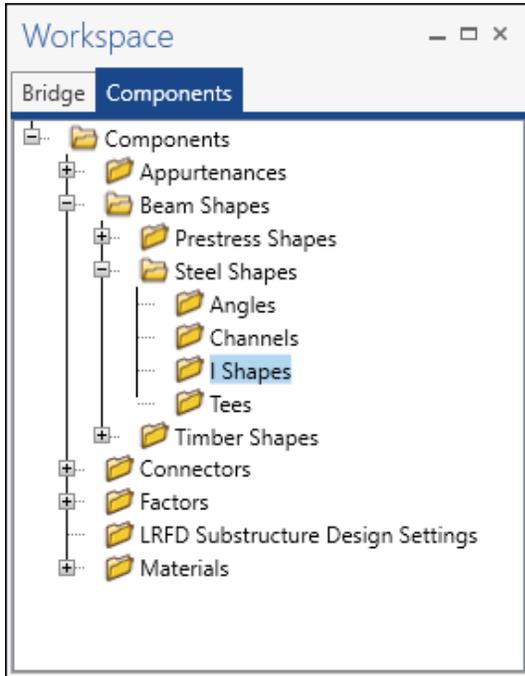
Shear factor:

Click **OK** to apply the data and close the window.

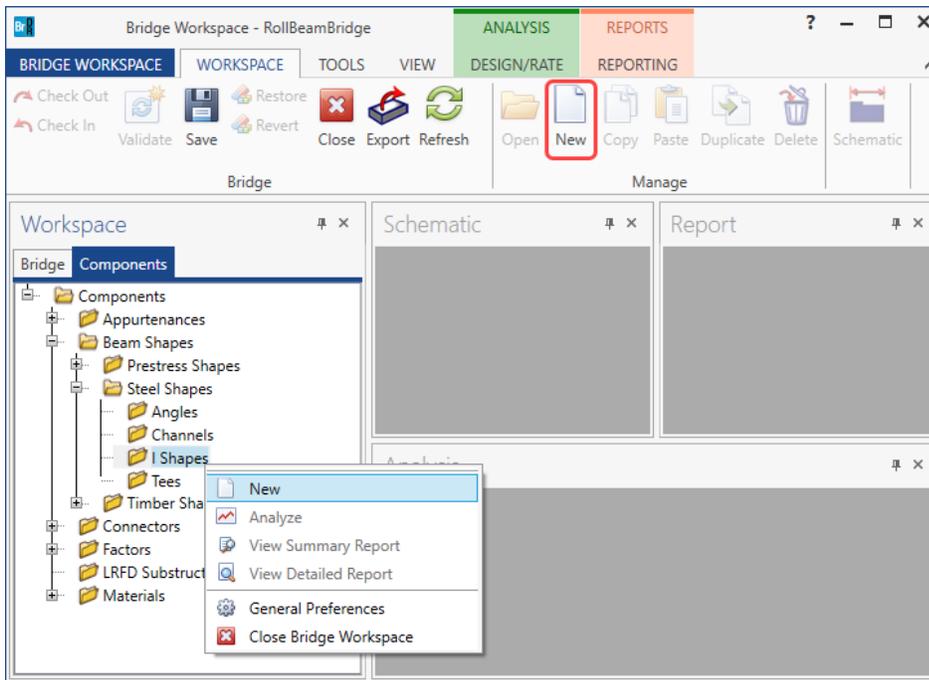
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Beam Shapes

To enter a steel rolled beam shape used in this bridge expand the tree labeled **Beam Shapes** and **Steel Shapes** as shown below.



Click on the **I Shapes** node in the **Components** tree and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or right mouse click on **I Shapes** and select **New** or double click on **I Shapes** in the **Components** tree). The window shown below will open.



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The dialog box 'Steel I Shape' contains the following elements:

- Name:** [Empty text box]
- Description:** [Empty text box]
- Rolled shape type:**
 - W shape
 - M shape
 - S shape
 - HP shape
- Dimensions / Properties:** A schematic diagram of an I-beam with dimension lines and input boxes:
 - Top flange width: [] in
 - Top flange thickness: [] in
 - Web thickness: [] in
 - Bottom flange width: [] in
 - Bottom flange thickness: [] in
 - Web height: [] in
 - Distance from web centerline to flange edge: [] in
 - Distance from web centerline to flange edge: [] in
 - Distance from web centerline to flange edge: [] in
 - Distance from web centerline to flange edge: [] in
- Buttons:** Copy to library..., Copy from library..., OK, Apply, Cancel

Select the **Rolled shape type** as **W shape** and click the **Copy from library...** button. The **Steel Shape Selection** window will appear. This window displays all of the steel shapes available in the library. The list can be sorted by clicking on any of the column headers (e.g. **Shape, Year, Depth** etc.). Select **W18x119** and click **OK**.

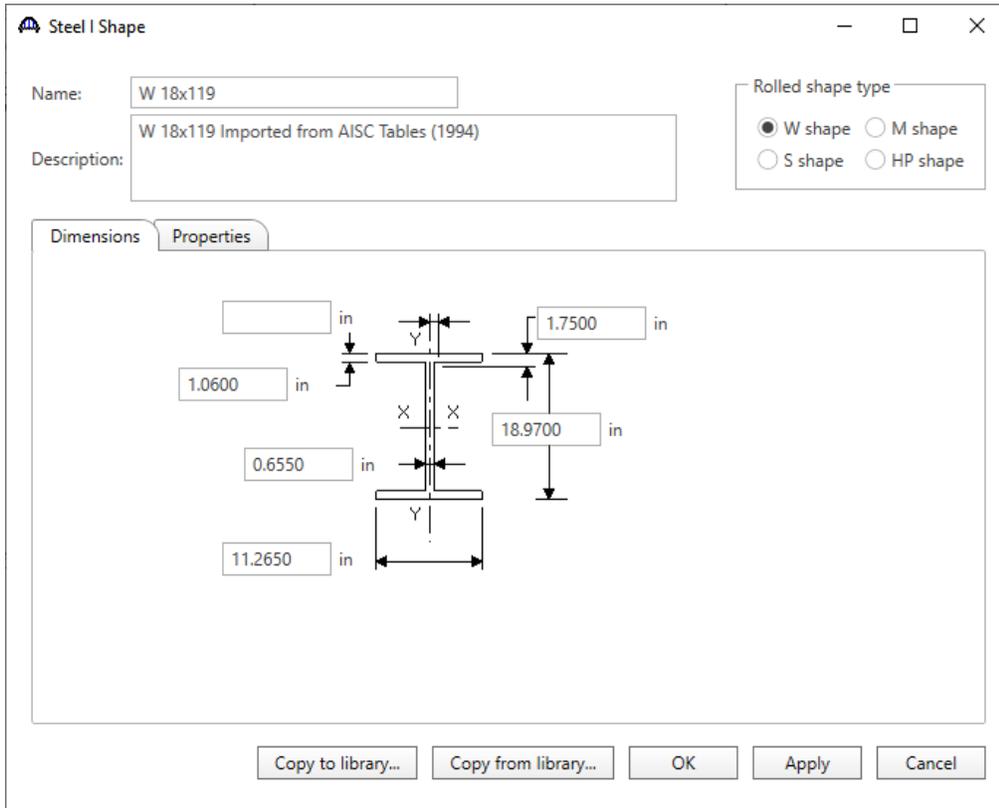
The 'Steel Shape Selection' dialog box includes the following controls and data:

- Library:**
 - Standard
 - Agency defined
- Unit system:**
 - SI
 - US
- Table:**

Shape	Year	Depth (in)	Load (lb/ft)	Sxx (in ³)
W 14x426	2011	18.7000	426.000	705.882
W 18x106	1994	18.7300	106.000	203.951
▶ W 18x119	1994	18.9700	119.000	230.891
W 14x455	2011	19.0000	455.000	756.842
W 18x119	2011	19.0000	119.000	230.526
W 14x455	1994	19.0200	455.000	756.046
W 18x130	1994	19.2500	130.000	255.584
W 18x130	2011	19.3000	130.000	254.922
- Buttons:** OK, Cancel

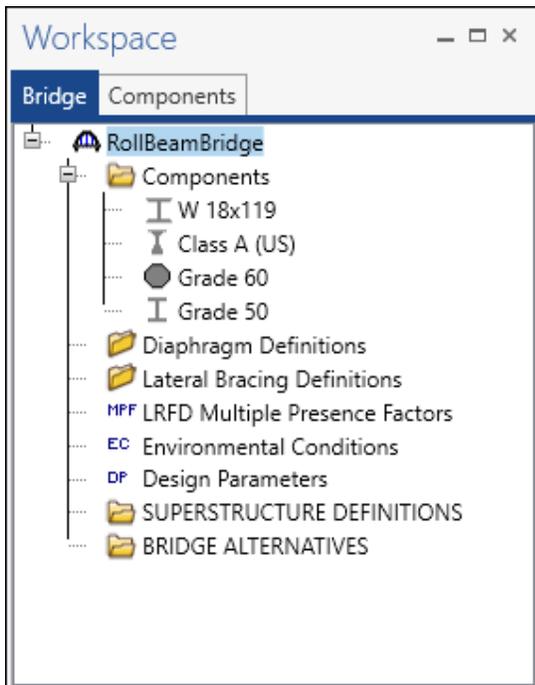
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The beam properties are copied to the **Steel I Shape** window as shown below.



Click **OK** to apply the data and close the window.

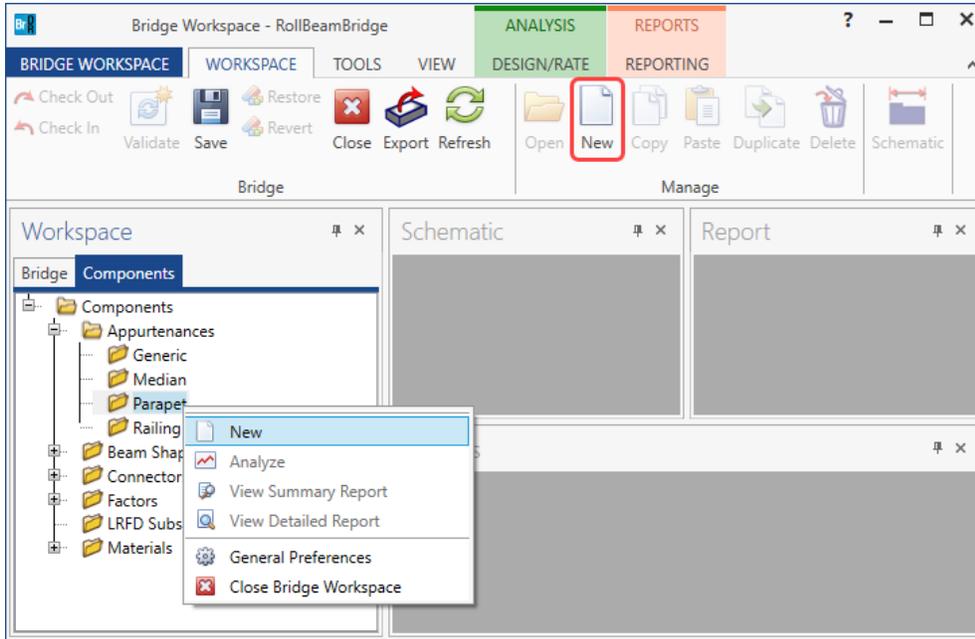
A partially expanded **Bridge Workspace** tree is shown below.



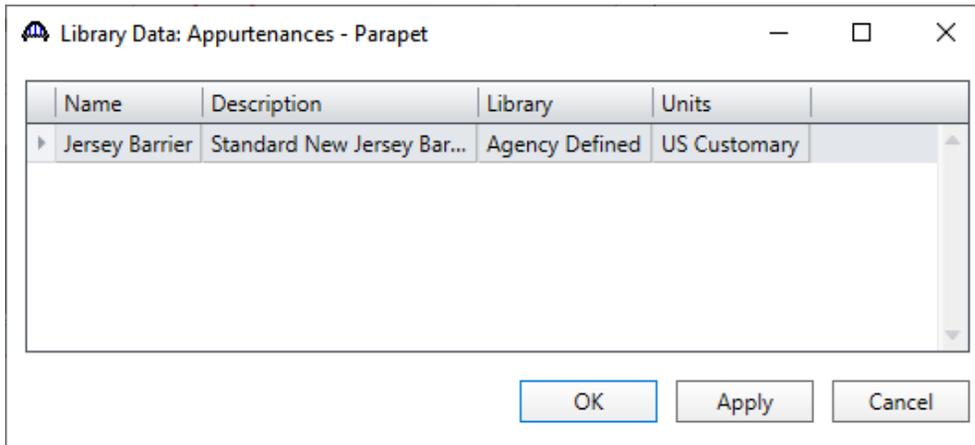
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Bridge Appurtenances

To enter the appurtenances used within the bridge expand the tree branch labeled **Appurtenances**. To define a parapet, select **Parapet** and click on **New** from the **Manage** button on the **WORKSPACE** ribbon (or double click on **Parapet** in the **Components** tree).



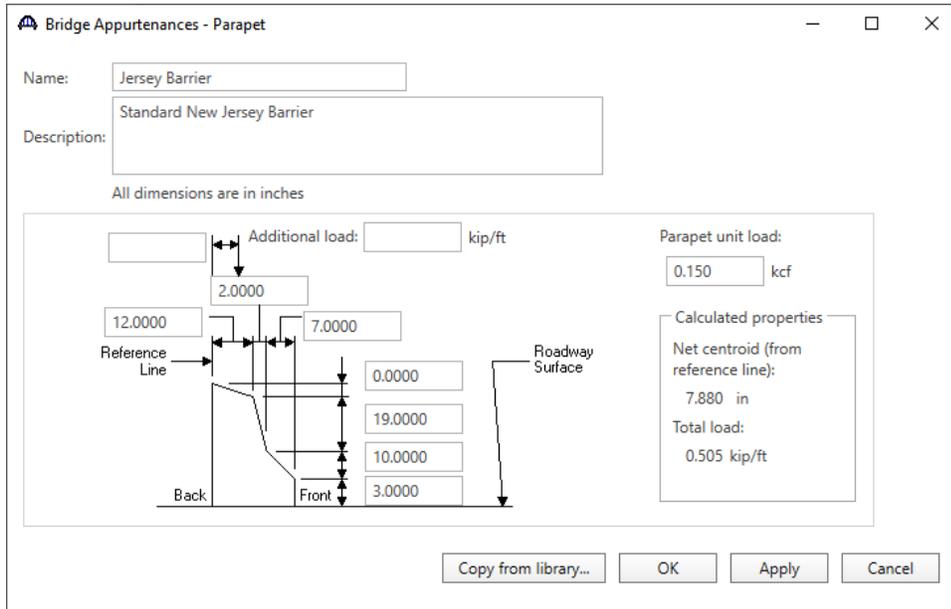
Add the parapet by clicking the **Copy from library...** button. The following window opens.



Select the **Jersey Barrier** parapet and click **OK**.

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The selected parapet details are copied to the **Bridge Appurtenances – Parapet** window as shown below.

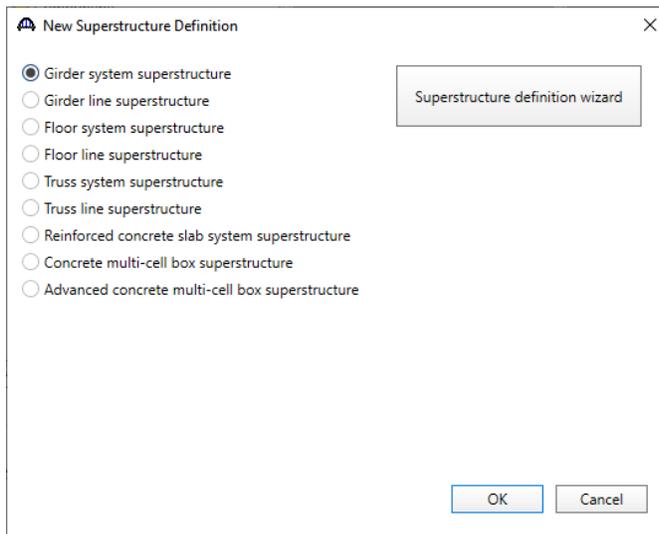


Click **OK** to apply the data and close the window.

The default standard LFRD and LFR factors will be used. Bridge Alternatives will be added after entering the Structure Definition.

Superstructure Definition

Returning to the **Bridge** tab of the **Bridge Workspace**, double click on **SUPERSTRUCTURE DEFINITIONS** (or click on **SUPERSTRUCTURE DEFINITIONS** and select **New** from the **Manage** group of the **WORKSPACE** ribbon or right mouse click on **SUPERSTRUCTURE DEFINITIONS** and select **New** from the popup menu) to create a new structure definition. The window shown below will appear.



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Select **Girder system superstructure**, click **OK** and the **Girder System Superstructure Definition** window will open. Enter the data as shown below.

Girder System Superstructure Definition

Definition Analysis Specs Engine

Name: 4 Girder, 2 Span System

Description:

Default units: US Customary

Number of spans: 2

Number of girders: 4

Enter span lengths along the reference line:

Span	Length (ft)
1	50.00
2	50.00

Modeling

Multi-girder system MCB

With frame structure simplified definition

Deck type: Concrete Deck

For PS/PT only

Average humidity: %

Member alt. types

Steel

P/S

R/C

Timber

P/T

Horizontal curvature along reference line

Horizontal curvature

Distance from PC to first support line: ft

Superstructure alignment

Curved

Tangent, curved, tangent

Tangent, curved

Curved, tangent

Start tangent length: ft

Radius: ft

Direction: Left

End tangent length: ft

Distance from last support line to PT: ft

Design speed: mph

Superelevation: %

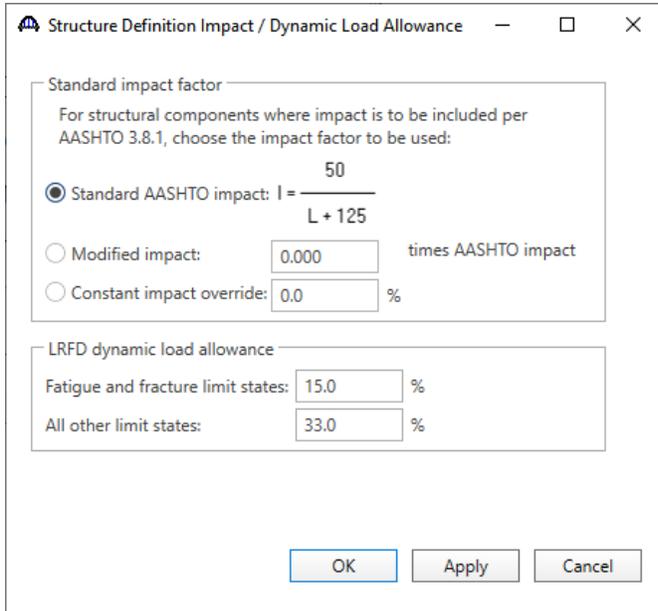
OK Apply Cancel

Click **OK** to apply the data and close the window.

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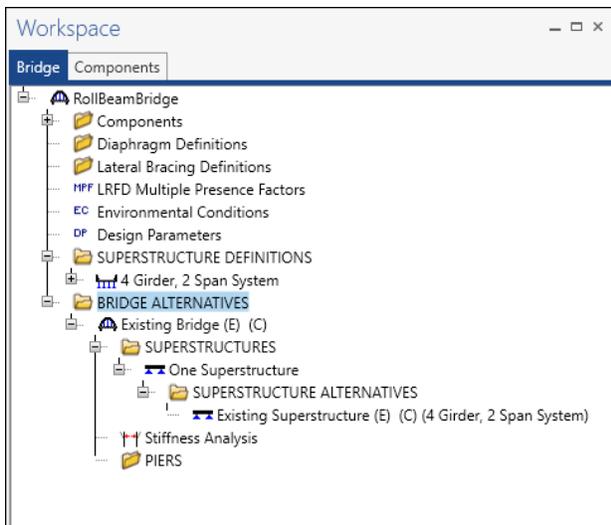
Impact/Dynamic Load Allowance

Enter the impact used for the superstructure definition by double clicking on **Impact/Dynamic Load Allowance** in the **Bridge Workspace** tree. The **Structure Definition Impact / Dynamic Load Allowance** window shown below will open. The values shown below are default values. No changes are required for this window.



BRIDGE ALTERNATIVES

Navigate to the **Bridge Alternatives** node in the **Bridge Workspace** tree and create a new **Bridge Alternative**, a new **Structure**, and a new **Structure Alternative** as shown in **STL1 tutorial**. The partially expanded **Bridge Workspace** tree is shown below.



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Load Case Description

Navigate to the **4 Girder, 2 Span System** superstructure definition and double-click on the **Load Case Description** node in the **Bridge Workspace** tree to open the **Load Case Description** window. Define the following dead load case.

Load case name	Description	Stage	Type	Time* (days)
DL2	Parapets	Composite (long term) (Stage 2)	D,DC	

*Prestressed members only

Click **OK** to apply the data and close the window.

Structure Framing Plan Detail – Layout

Double-click on **Framing Plan Detail** in the **Bridge Workspace** tree to describe the framing plan in the **Structure Plan Details** window. Enter the data as shown below.

Number of spans: Number of girders:

Layout Diaphragms Lateral bracing ranges

Girder spacing orientation
 Perpendicular to girder
 Along support

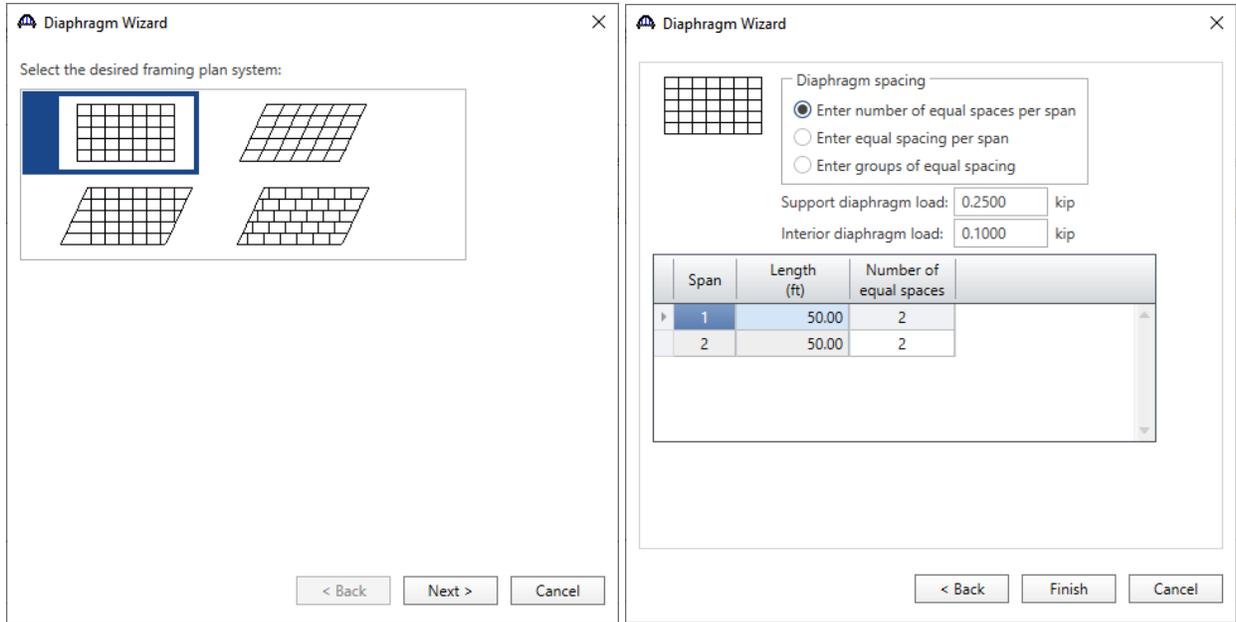
Support	Skew (degrees)
1	10.000
2	10.000
3	10.000

Girder bay	Girder spacing (ft)	
	Start of girder	End of girder
1	8.00	8.00
2	8.00	8.00
3	8.00	8.00

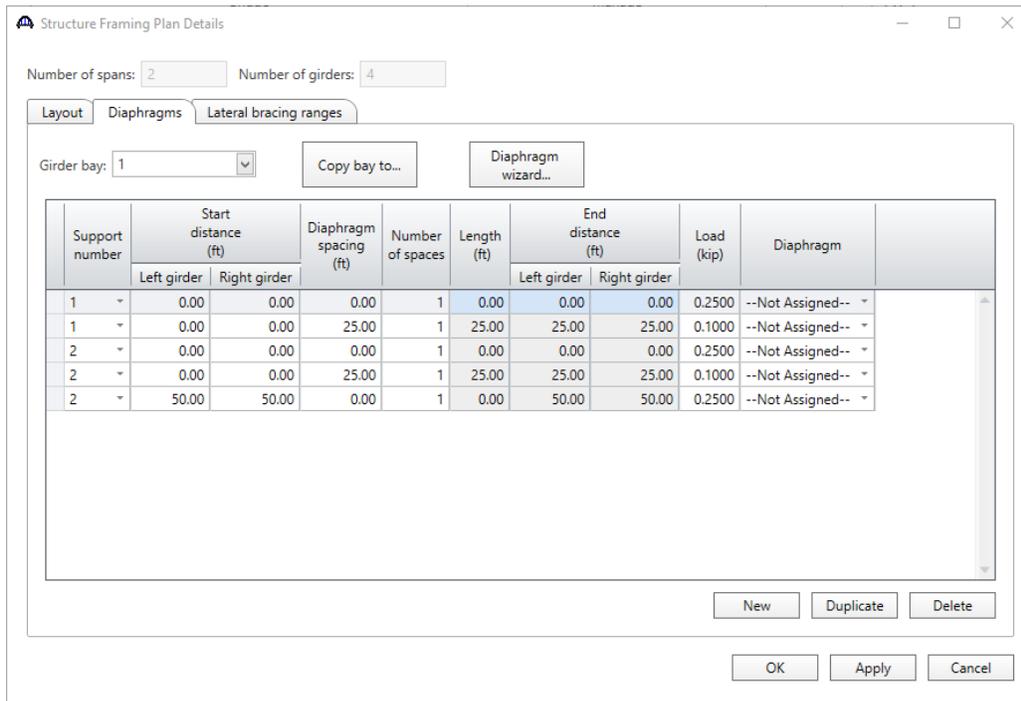
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Structure Framing Plan Detail – Diaphragms

Switch to the **Diaphragms** tab to enter diaphragm spacing. Click the **Diaphragm wizard...** button to add diaphragms for the entire structure. **Select the desired framing plan system** and click the **Next** button. Enter the following data on the window shown below.



Click the **Finish** button to add the diaphragms. The **Diaphragm Wizard** will create diaphragms for all the girder bays in the structure. The diaphragms created for **Girder bay 1** are shown below.

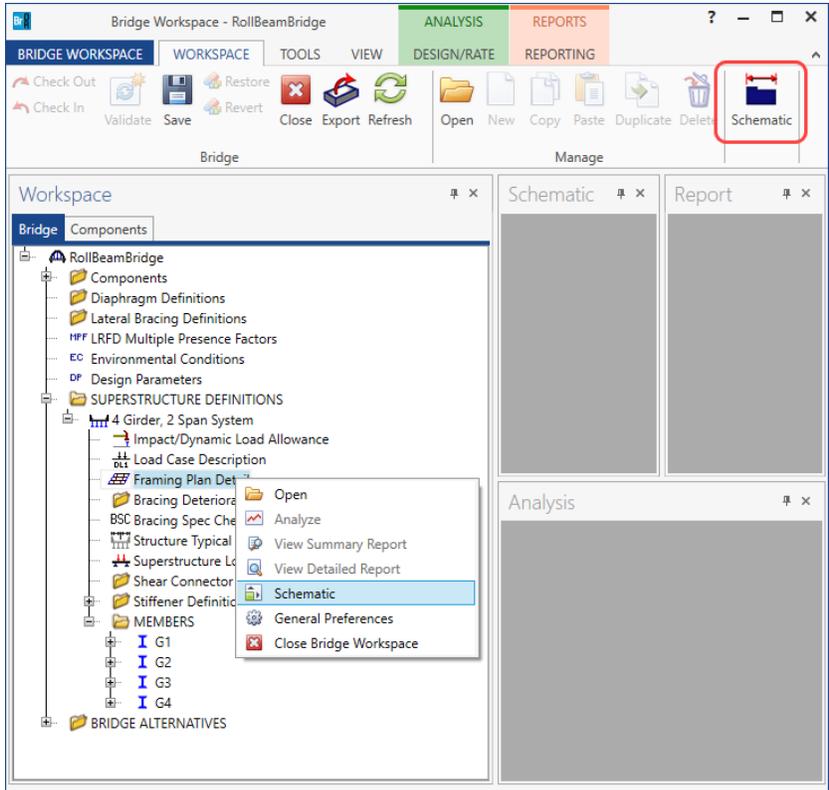


Click **OK** to apply the data and close the window.

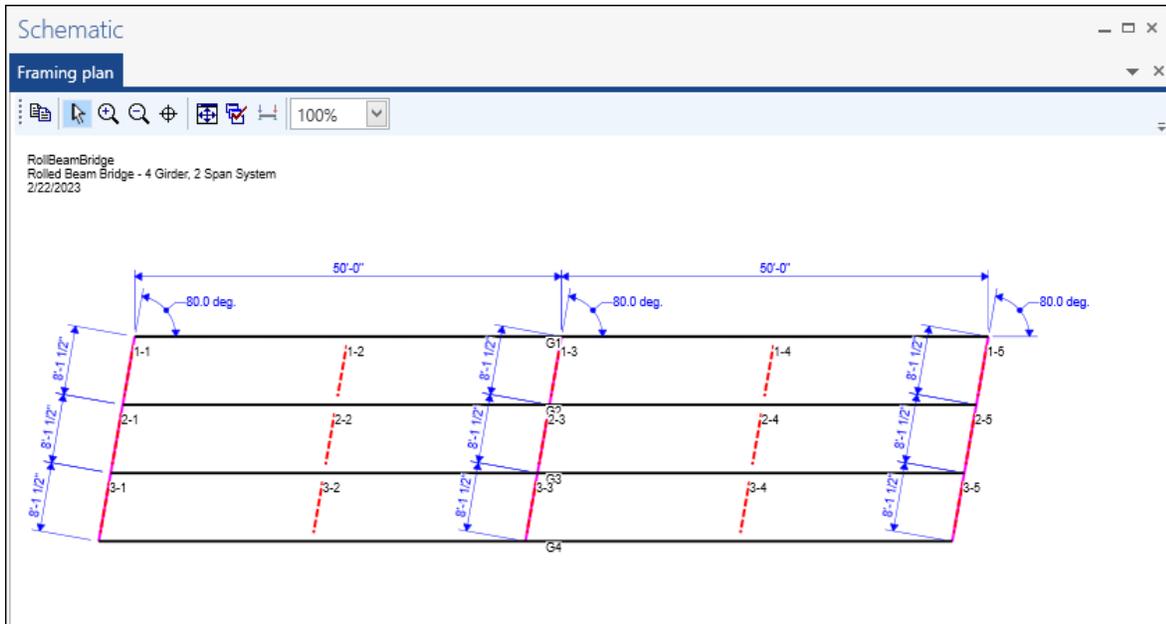
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Schematic - Framing Plan Detail

While the **Framing Plan Detail** is selected in the **Bridge Workspace** tree, open the schematic for the framing plan by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click on **Framing Plan Detail** in the Bridge Workspace and select **Schematic** from the menu).



The following schematic is displayed.



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Structure Typical Section – Deck

Next define the structure typical section by double-clicking on the **Structure Typical Section** node in the **Bridge Workspace** tree. Input the data describing the typical section as shown below.

The screenshot shows the 'Structure Typical Section' dialog box with the 'Deck' tab selected. At the top, a diagram illustrates the deck cross-section with labels for 'Left overhang', 'Deck thickness', 'Superstructure Definition Reference Line', and 'Right overhang'. Below the diagram, the 'Deck' tab is active, and the following settings are visible:

- Superstructure definition reference line is: within the bridge deck.
- Start: 16.00 ft, End: 16.00 ft
- Distance from left edge of deck to superstructure definition reference line: 16.00 ft
- Distance from right edge of deck to superstructure definition reference line: 16.00 ft
- Left overhang: 4.00 ft
- Computed right overhang: 4.00 ft

Buttons for 'OK', 'Apply', and 'Cancel' are located at the bottom right of the dialog.

Structure Typical Section – Deck (cont'd)

The **Deck (cont'd)** tab provides input options for the **Deck concrete** and the **Total deck thickness**. The material used for the deck concrete is selected from the list of bridge materials. Enter the data as shown below.

The screenshot shows the 'Structure Typical Section' dialog box with the 'Deck (cont'd)' tab selected. At the top, the same diagram as in the previous screenshot is visible. Below the diagram, the 'Deck (cont'd)' tab is active, and the following settings are visible:

- Deck concrete: Class A (US)
- Total deck thickness: 9.0000 in
- Load case: Engine Assigned
- Deck crack control parameter: 130.000 kip/in
- Sustained modular ratio factor: 3.000
- Deck exposure factor: (empty field)

Buttons for 'OK', 'Apply', and 'Cancel' are located at the bottom right of the dialog.

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Structure Typical Section – Parapets

Click the **New** button to add a row to the table. The **Name** of the parapet defaults to the only barrier described for the bridge. Change the **Load case** to **DC2** and select **Back** in the **Measure to** column (in this example, locate the parapet on the deck by referencing the back of the parapet to the left edge of the deck). Enter **0.0** for the **Distance at start** and **Distance at end**. Change the **Front face orientation** to **Right**. Enter another parapet as shown below. The completed tab is shown below.

Name	Load case	Measure to	Edge of deck dist. measured from	Distance at start (ft)	Distance at end (ft)	Front face orientation
Jersey Barrier	DL2	Back	Left Edge	0.00	0.00	Right
Jersey Barrier	DL2	Back	Right Edge	0.00	0.00	Left

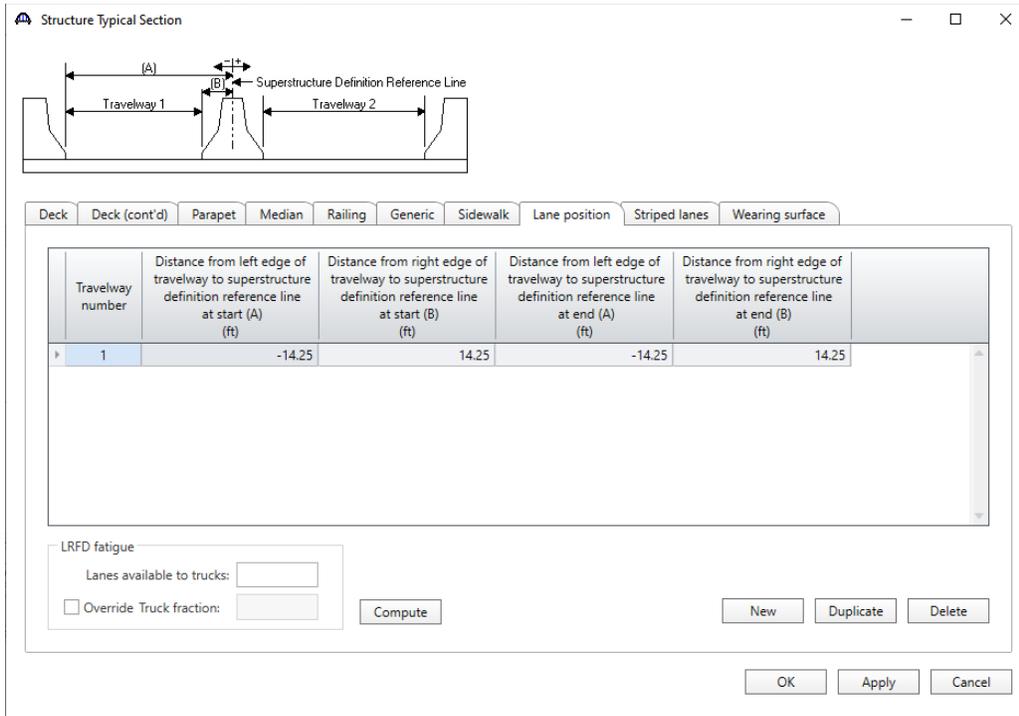
Structure Typical Section – Lane Positions

Select the **Lane position** tab and use the **Compute...** button to compute the lane positions. A window showing the results of the computation opens. Click **Apply** to apply the computed values.

Travelway number	Distance from left edge of travelway to superstructure definition reference line at start (A) (ft)	Distance from right edge of travelway to superstructure definition reference line at start (B) (ft)	Distance from left edge of travelway to superstructure definition reference line at end (A) (ft)	Distance from right edge of travelway to superstructure definition reference line at end (B) (ft)
1	-14.25	14.25	-14.25	14.25

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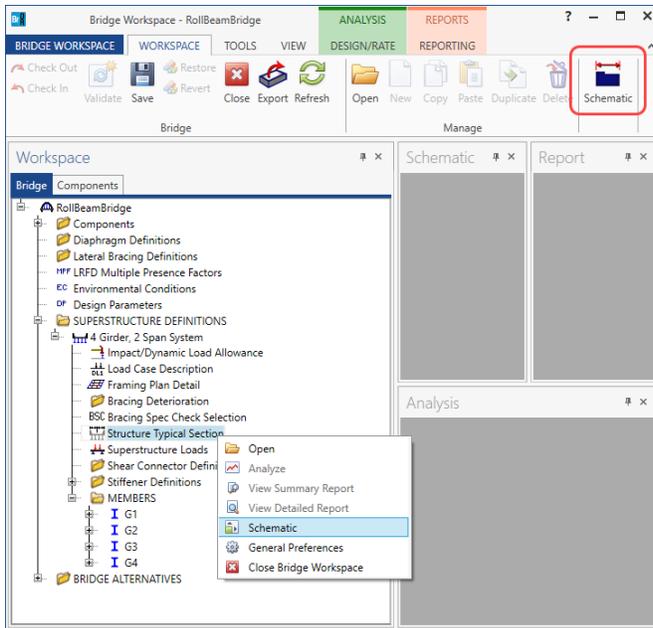
The **Lane Position** tab is populated as shown below.



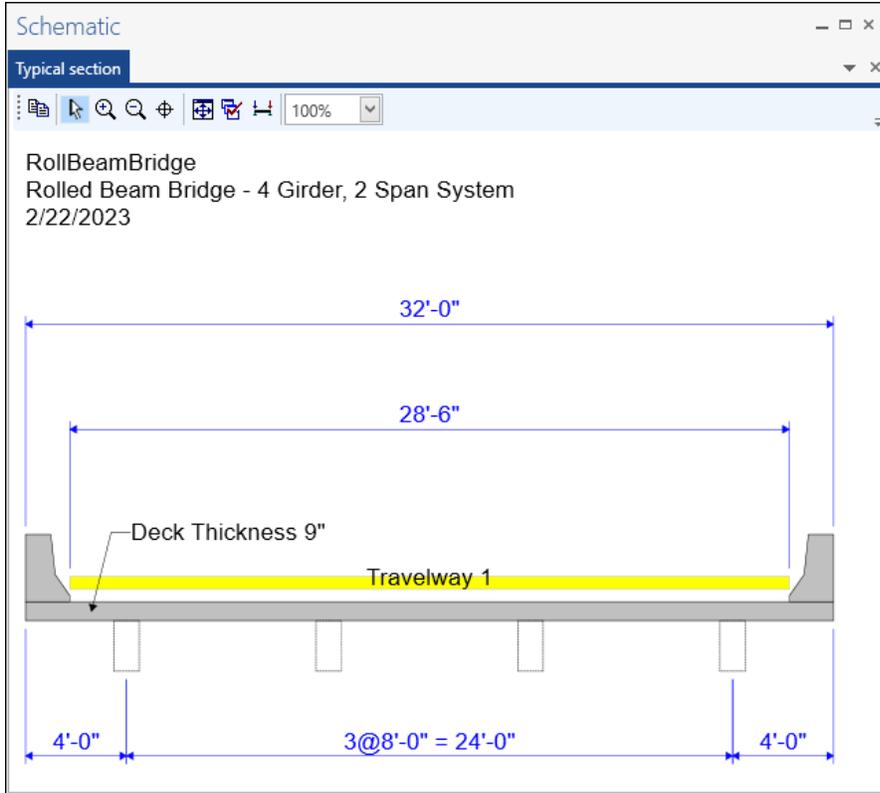
Click **OK** to apply the data and close the window.

Schematic – Structure Typical Section

While the **Structure Typical Section** is selected in the **Bridge Workspace** tree, open the schematic for the structure typical section by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click on **Structure Typical Section** in the **Bridge Workspace** and select **Schematic** from the menu).

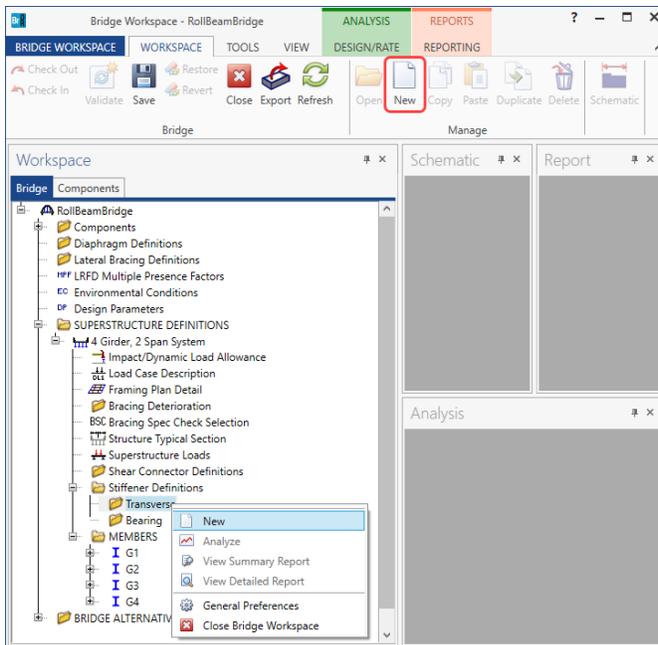


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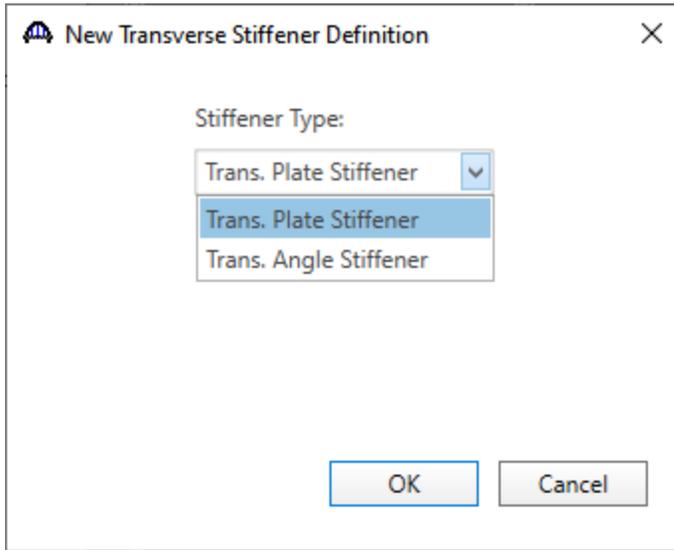
Stiffener Definitions – Transverse

Define the transverse stiffeners used by the girders. Expand the **Stiffener Definitions** node in the **Bridge Workspace** tree, select **Transverse** and click on the **New** button from the **Manage** group of the **WORKSPACE** ribbon (or right click and select **New** from the drop-down menu) as shown below.

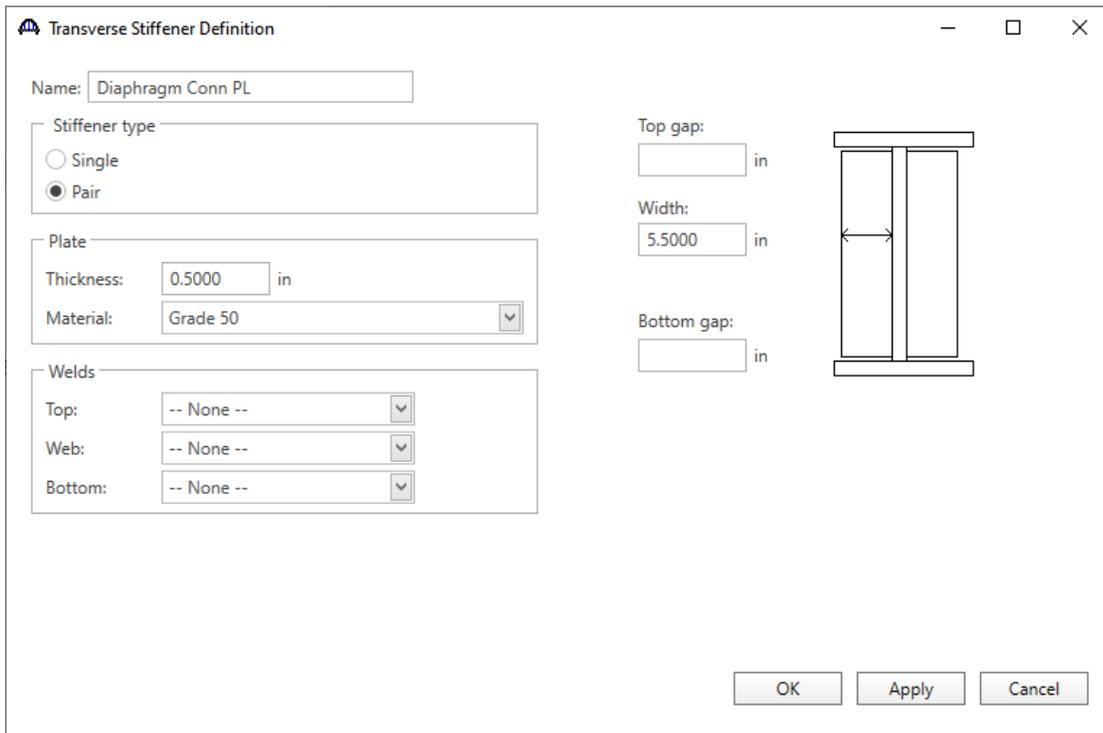


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Select **Trans. Plate Stiffener** for **Stiffener Type** in the **New Transverse Stiffener Definition** window and click **OK** to open the **Transverse Stiffener Definition** window as shown below.



Define the stiffener as shown below.

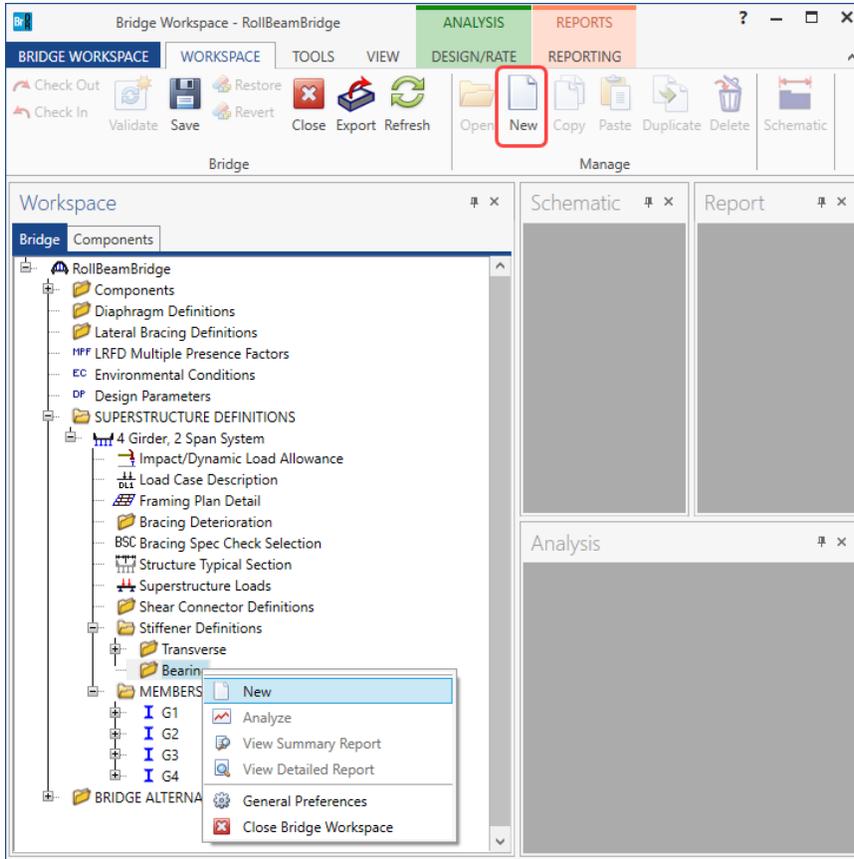


Click **OK** to apply the data and close the window.

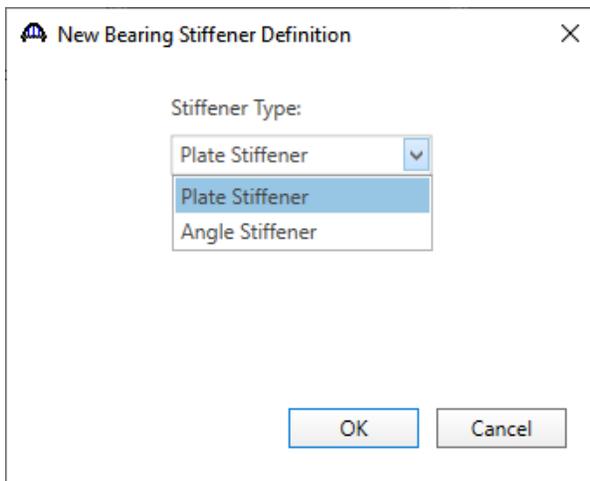
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Stiffener Definitions – Bearing

Define the bearing stiffeners used by the girders. Expand the **Stiffener Definitions** node in the **Bridge Workspace** tree, select **Bearing** and click on the **New** button from the **Manage** group of the **WORKSPACE** ribbon (or right click and select **New** from the drop-down menu) as shown below.



Select **Plate Stiffener** for **Stiffener type** in the **New Transverse Stiffener Definition** window and click **OK** to open the **Transverse Stiffener Definition** window as shown below.



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Define the stiffener as shown below.

Bearing Stiffener Definition

Name:

Plate

Thickness: in

Material:

Welds

Top:

Web:

Bottom:

in

in

in

in

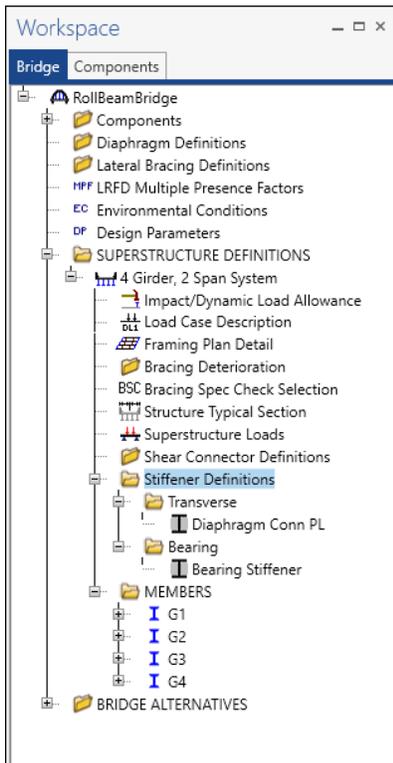
in

in

OK Apply Cancel

Click **OK** to apply the data and close the window.

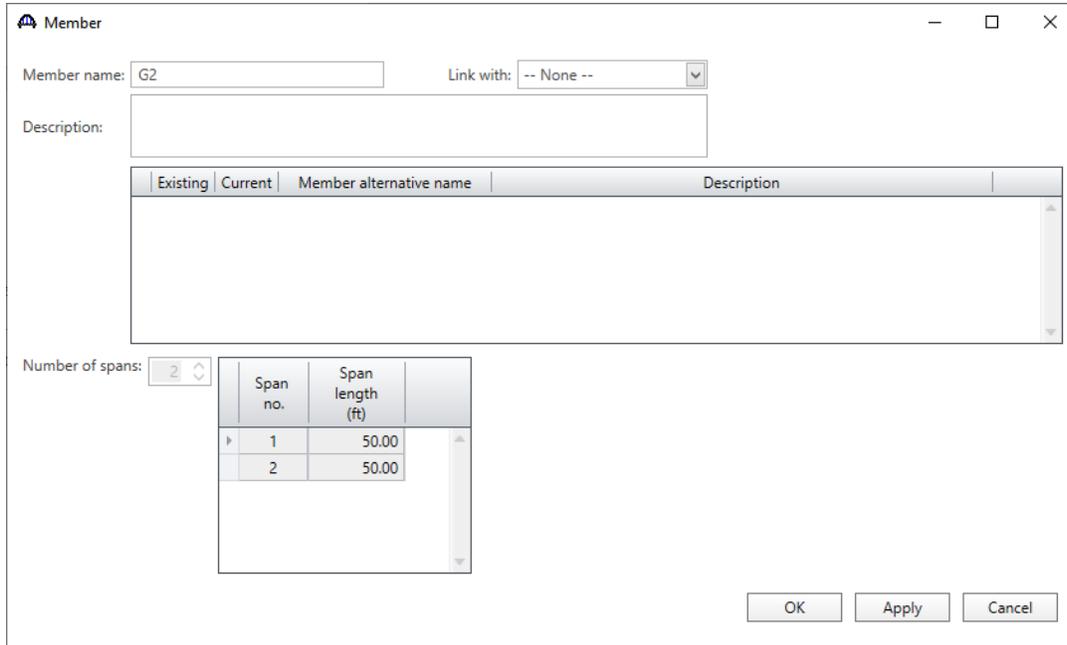
The partially expanded Bridge Workspace tree is shown below.



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Describing a member

Open the **Member** window for member **G2**. The **Member** window shows the data that was generated when the structure definition was created. No changes are required in this window. The first member alternative created will automatically be assigned as the **Existing** and **Current member alternative** for this member.



The Member window for member G2 displays the following information:

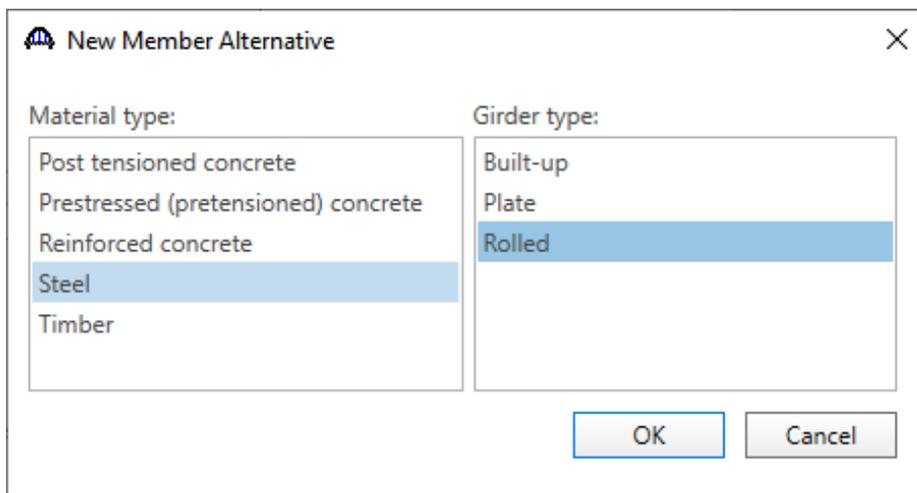
- Member name: G2
- Link with: -- None --
- Description: (empty text box)
- Number of spans: 2
- Table of spans:

Span no.	Span length (ft)
1	50.00
2	50.00

At the bottom of the window are buttons for OK, Apply, and Cancel.

Defining a Member Alternative

Double-click on **MEMBER ALTERNATIVES** in the **Bridge Workspace** tree for member **G2** to create a new member alternative. The **New Member Alternative** window shown below will open. Select **Steel** for the **Material type** and **Rolled** for the **Girder Type**.



The New Member Alternative window shows the following configuration:

- Material type: Steel
- Girder type: Rolled

Buttons for OK and Cancel are located at the bottom of the window.

Click **OK** to close the window and create a new member alternative.

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The **Member Alternative Description** window will open. Enter the data as shown below.

Member Alternative Description

Member alternative: Rolled Beam with Cover Plates

Description Specs Factors Engine Import Control options

Description:

Material type: Steel

Girder type: Rolled

Modeling type: Multi Girder System

Default units: US Customary

Girder property input method

Schedule based

Cross-section based

End bearing locations

Left: 6.0000 in

Right: 6.0000 in

Simple DL, continuous LL

Self load

Load case: Engine Assigned

Additional self load: kip/ft

Additional self load: %

Default rating method: LFR

OK Apply Cancel

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Navigate to the **Control options** tab of this window and select the options as shown below.

Member Alternative Description

Member alternative: Rolled Beam with Cover Plates

Description Specs Factors Engine Import Control options

LFRD

- Points of interest
 - Generate at tenth points
 - Generate at section change points
 - Generate at user-defined points
 - Generate at stiffeners
- Allow moment redistribution
- Use Appendix A6 for flexural resistance
- Allow plastic analysis
- Ignore long. reinf. in negative moment capacity
- Consider deck reinf. development length
- Must consider user input lateral bending stress
- Consider concurrent moments in Cb calculation
- Distribution factor application method
 - By axle
 - By POI

LRFR

- Points of interest
 - Generate at tenth points
 - Generate at section change points
 - Generate at user-defined points
 - Generate at stiffeners
- Allow moment redistribution
- Use Appendix A6 for flexural resistance
- Allow plastic analysis
- Evaluate remaining fatigue life
- Ignore long. reinf. in negative moment capacity
- Include field splices in rating
- Consider deck reinf. development length
- Consider tension-field action in stiffened web end panels
- Must consider user input lateral bending stress
- Consider concurrent moments in Cb calculation
- Distribution factor application method
 - By axle
 - By POI

LFR

- Points of interest
 - Generate at tenth points
 - Generate at section change points
 - Generate at user-defined points
- Allow moment redistribution
- Allow plastic analysis of cover plates
- Include field splices in rating
- Include bearing stiffeners in rating
- Allow plastic analysis
- Ignore long. reinf. in negative moment capacity
- Ignore overload operating rating
- Ignore shear
- Consider deck reinf. development length
- Consider tension-field action in stiffened web end panels
- Distribution factor application method
 - By axle
 - By POI

ASR

- Points of interest
 - Generate at tenth points
 - Generate at section change points
 - Generate at user-defined points
- Ignore long. reinf. in negative moment capacity
- Consider deck reinf. development length
- Consider tension-field action in stiffened web end panels

OK Apply Cancel

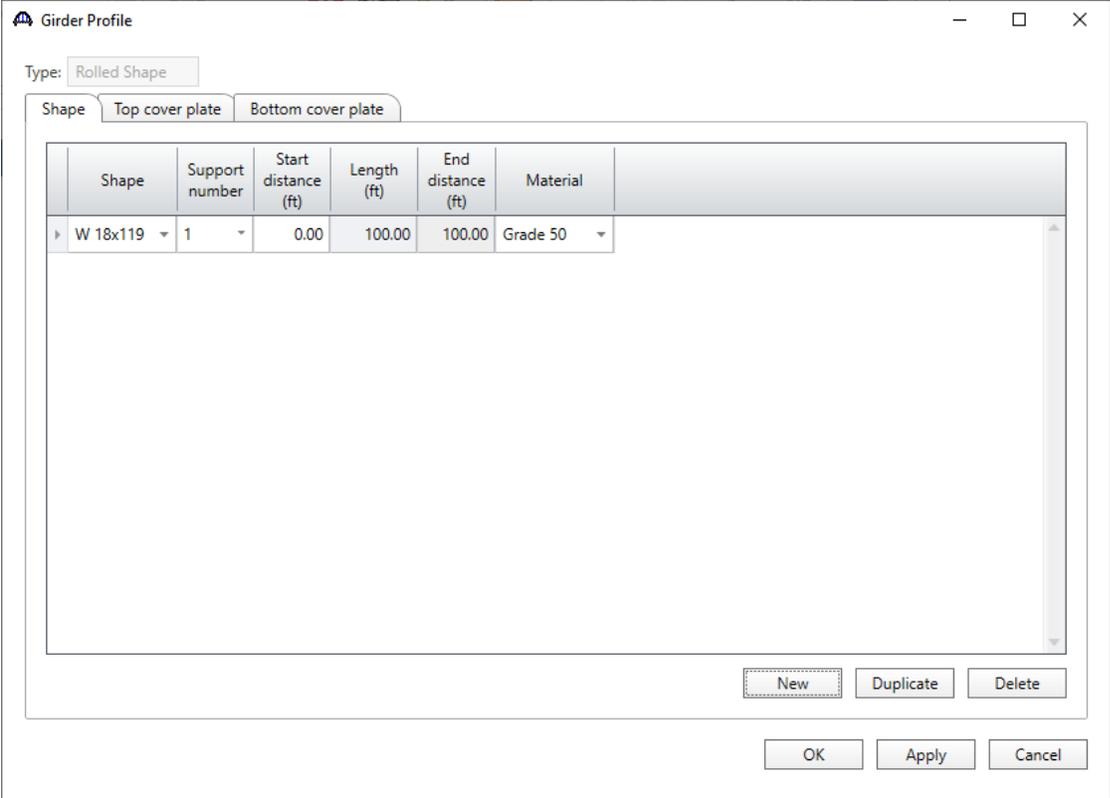
Click **OK** to close the window and create a new member alternative.

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Girder Profile

Next describe the girder profile by double clicking on the **Girder Profile** node in the **Bridge Workspace** tree. Enter the data in each tab of the **Girder Profile** window as shown below.

Shape



STL5 – Two Span Rolled Beam Example

Describe the cover plates as shown below.

Top cover plate

The dialog box 'Girder Profile' is shown with the 'Top cover plate' tab selected. The 'Welded' radio button is selected. The table below shows the data for the top cover plate:

Relative position	Begin width (in)	End width (in)	Thickness (in)	Support number	Start distance (ft)	Length (ft)	End distance (ft)	Material	Side weld	End weld at right
1	9.0000	9.0000	1.0000	1	35.00	30.00	65.00	Grade 50	-- Non	-- Non

The 'Copy to bottom cover plates' button is highlighted in blue.

Click the **Copy to bottom cover plates** button to copy the top cover plate to bottom cover plate as shown below.

Bottom cover plate

The dialog box 'Girder Profile' is shown with the 'Bottom cover plate' tab selected. The 'Welded' radio button is selected. The table below shows the data for the bottom cover plate:

Relative position	Begin width (in)	End width (in)	Thickness (in)	Support number	Start distance (ft)	Length (ft)	End distance (ft)	Material	Side weld	End weld at right
1	9.0000	9.0000	1.0000	1	35.00	30.00	65.00	Grade 50	-- Non	-- Non

The second row of the table is highlighted in blue. The 'Copy to top cover plates' button is highlighted in blue.

Click **OK** to apply the data and close the window.

STL5 – Two Span Rolled Beam Example

Deck Profile

Next open the **Deck Profile** window by double-clicking the **Deck Profile** node in the **Bridge Workspace** tree and enter the data describing the structural properties of the deck. The window is shown below.

The screenshot shows the 'Deck Profile' window with the 'Deck concrete' tab selected. The 'Type' is set to 'Rolled'. The table below contains the following data:

Material	Support number	Start distance (ft)	Length (ft)	End distance (ft)	Structural thickness (in)	Start effective flange width (Std) (in)	End effective flange width (Std) (in)	Start effective flange width (LRFD) (in)	End effective flange width (LRFD) (in)	n
Class A (US)	1	0.00	100.00	100.00	8.5000	96.0000	96.0000	96.0000	96.0000	8.000

Buttons at the bottom include 'Compute from typical section...', 'New', 'Duplicate', 'Delete', 'OK', 'Apply', and 'Cancel'.

Enter the reinforcement data as shown below.

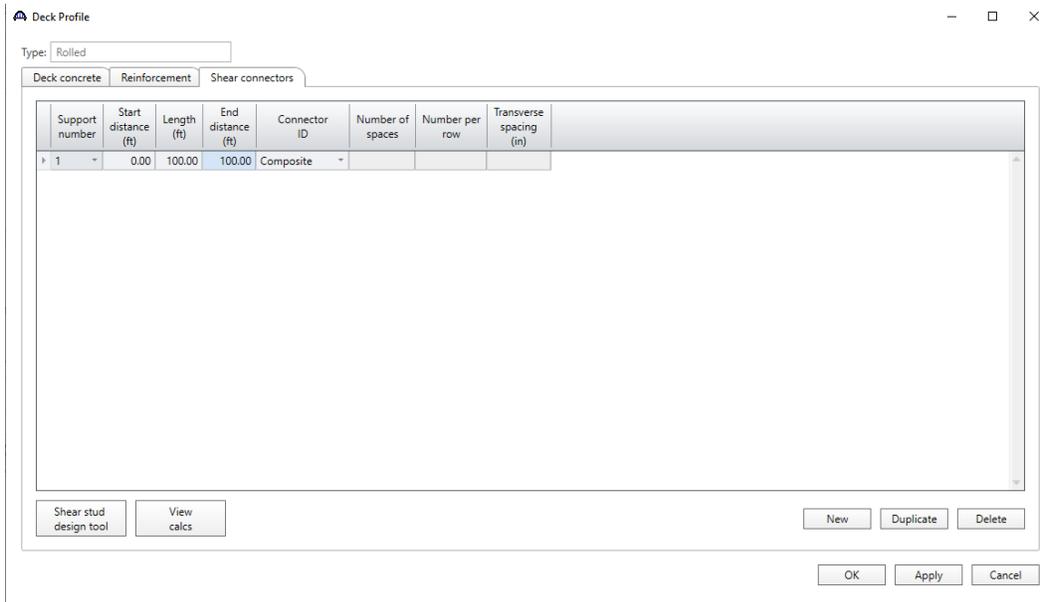
The screenshot shows the 'Deck Profile' window with the 'Reinforcement' tab selected. The 'Type' is set to 'Rolled'. The table below contains the following data:

Material	Support number	Start distance (ft)	Length (ft)	End distance (ft)	Std bar count	LRFD bar count	Bar size	Distance (in)	Row	Bar spacing (in)
Grade 60	1	35.00	30.00	65.00	8.00	8.00	6	2.5000	Top of Slab	
Grade 60	1	35.00	30.00	65.00	8.00	8.00	6	2.9375	Bottom of Slab	

Buttons at the bottom include 'New', 'Duplicate', 'Delete', 'OK', 'Apply', and 'Cancel'.

STL5 – Two Span Rolled Beam Example

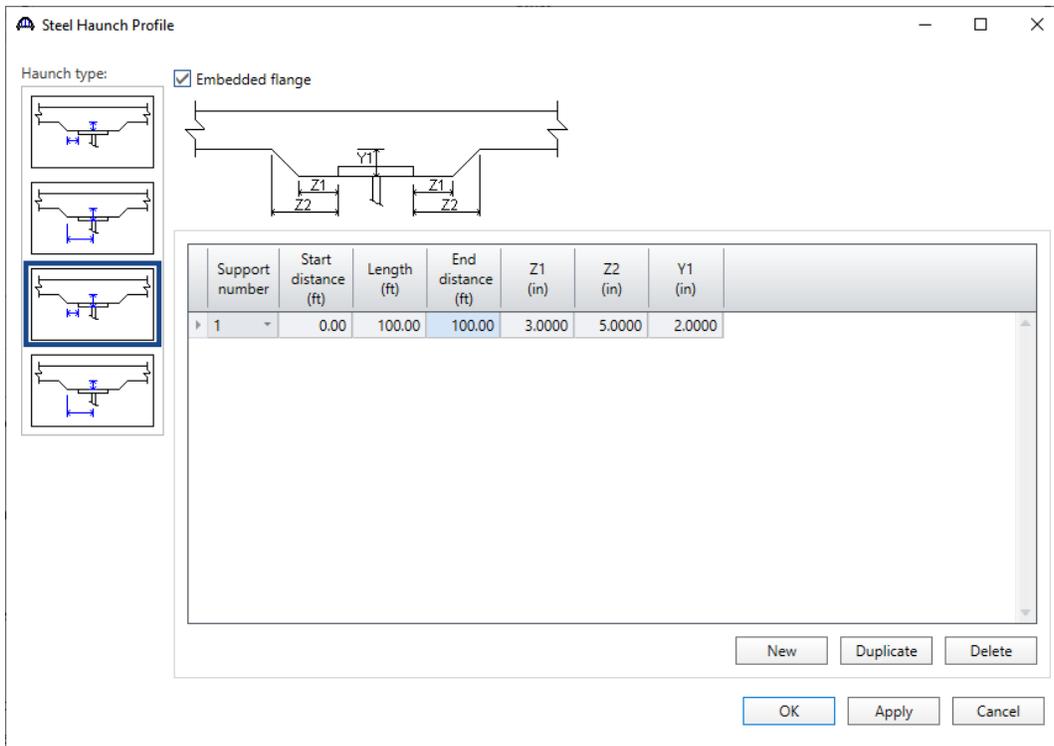
Composite regions are described in the **Shear connectors** tab as shown below.



Click **OK** to apply the data and close the window.

Haunch Profile

The haunch profile is defined by double-clicking on the **Haunch Profile** node in the **Bridge Workspace** tree. Enter data as shown below.

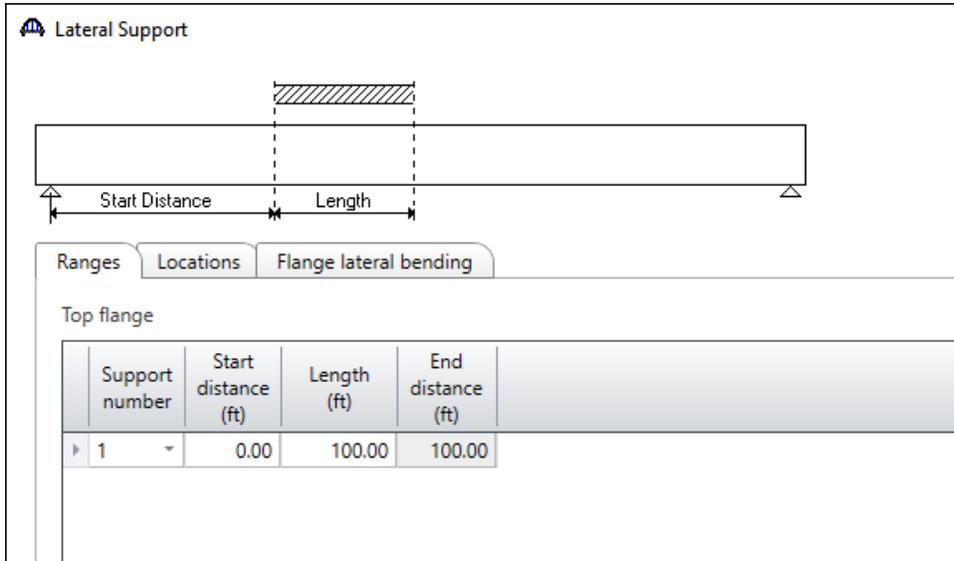


Click **OK** to apply the data and close the window.

STL5 – Two Span Rolled Beam Example

Lateral Support

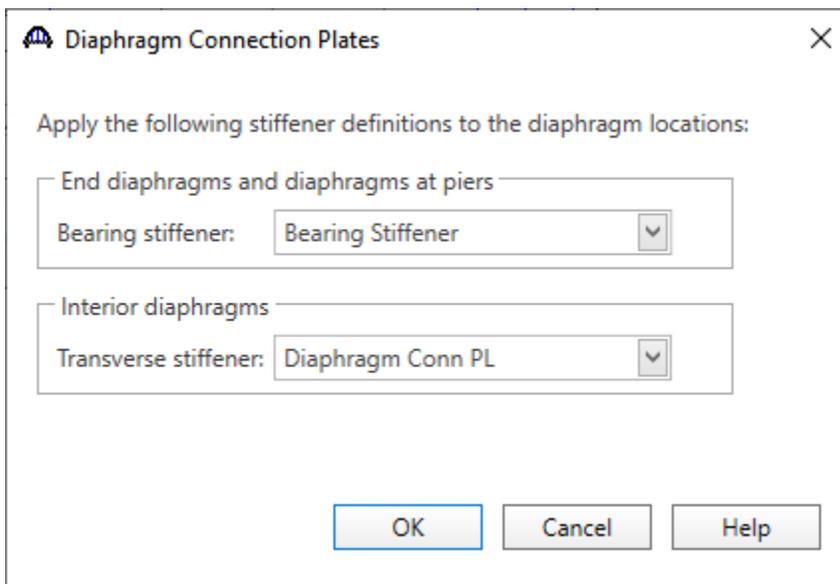
Open the **Lateral Support** window by double clicking on the **Lateral Support** node in the **Bridge Workspace** tree. Regions where the slab is considered to provide lateral support for the top flange are defined as shown below.



Click **OK** to apply the data and close the window.

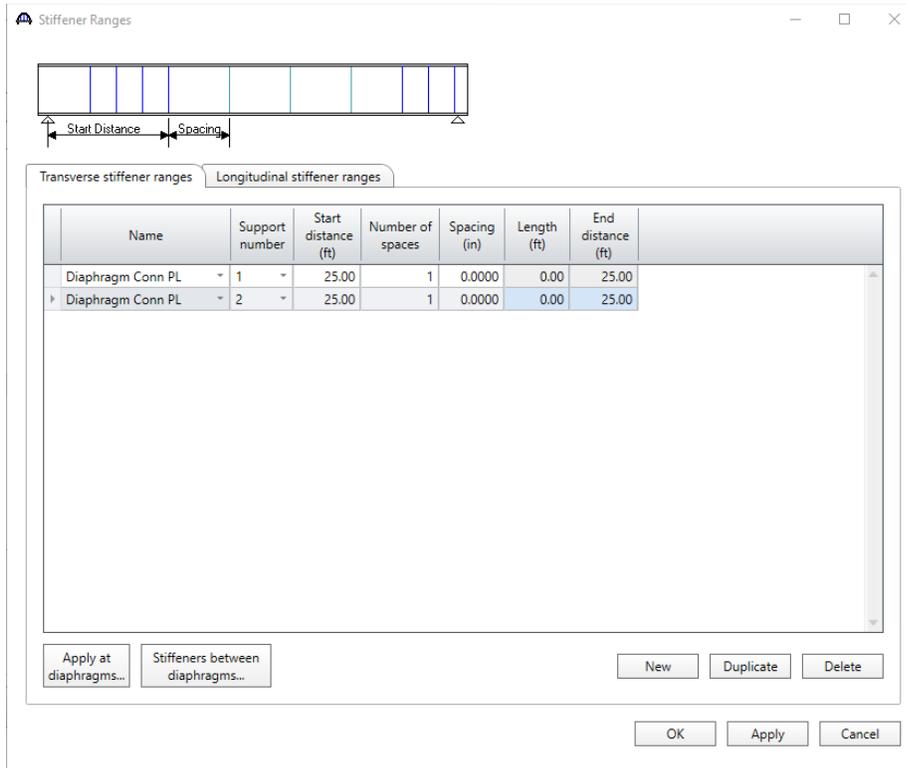
Stiffener Ranges

Double click on the **Stiffener Ranges** node in the **Bridge Workspace** to open the **Stiffener Ranges** window. Click the **Apply at diaphragms...** button to open the **Diaphragm Connection Plates** window. Click **OK** to create the following transverse stiffener locations.



STL5 – Two Span Rolled Beam Example

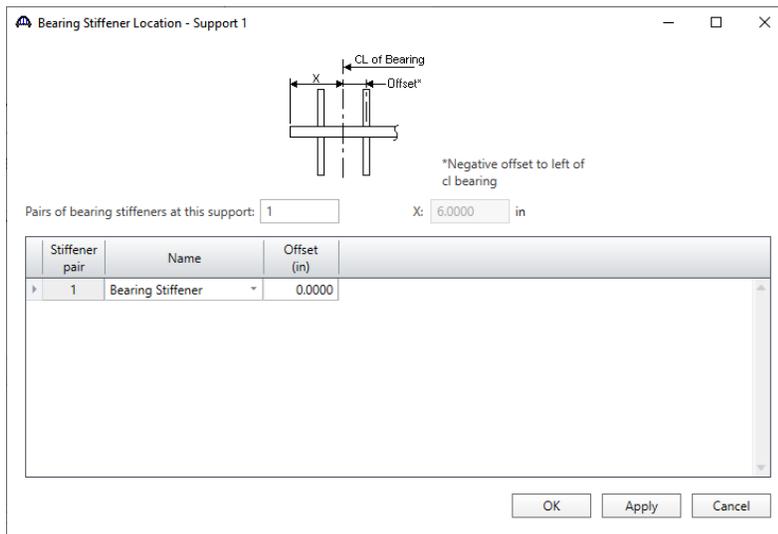
The **Stiffener Ranges** window will be updated as shown below.



This example does not have any intermediate transverse stiffeners. Click **OK** to apply the data and close this window.

Bearing Stiffener Locations

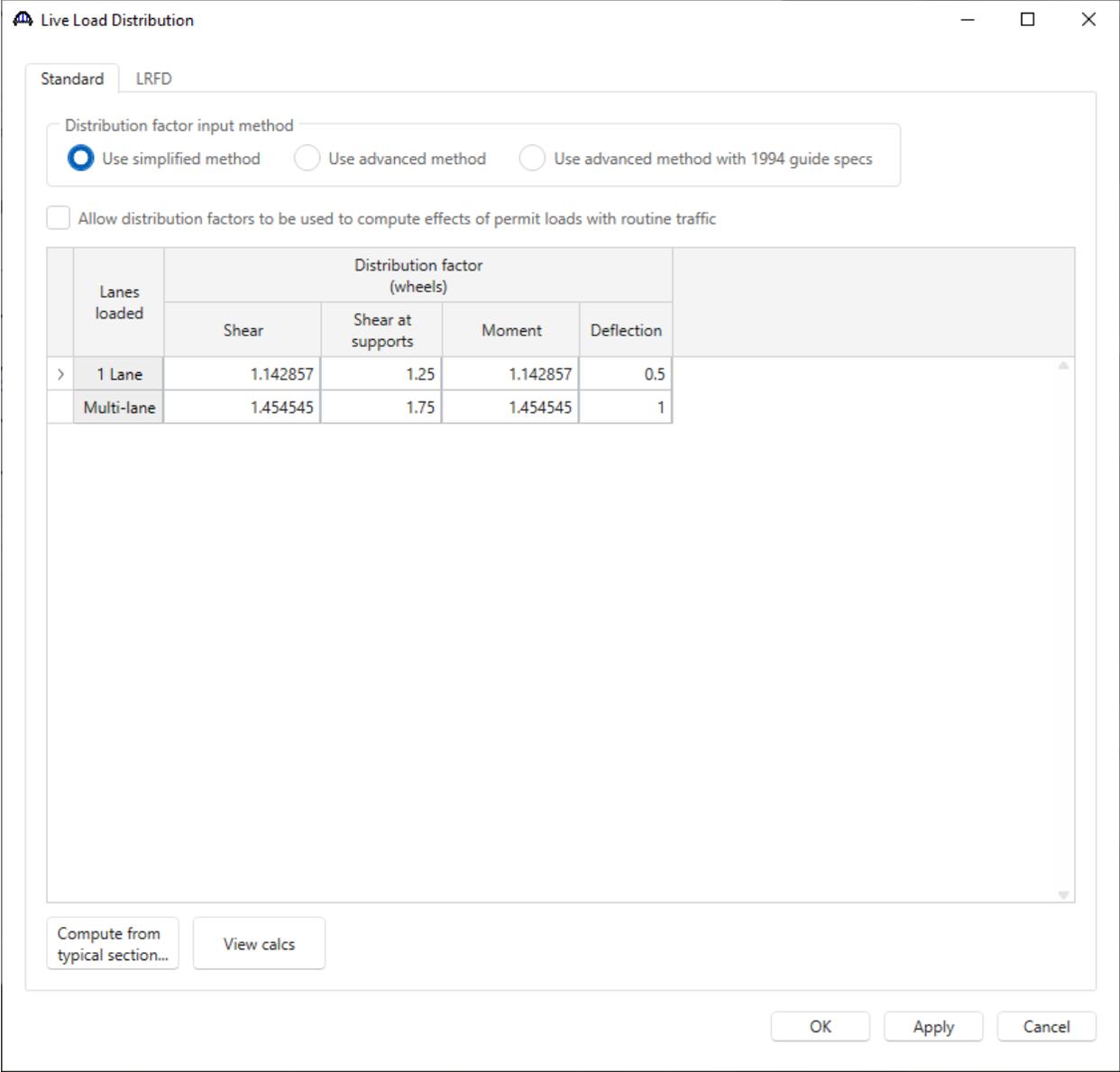
Bearing stiffener definitions were assigned to locations when the **Apply at diaphragms...** option was used on the **Stiffener Ranges** window. The **Bearing Stiffener Location – Support 1** window is opened by expanding the **Bearing Stiffener Locations** node in the **Bridge Workspace** tree and double clicking on the **Support 1** node. The assignment for support 1 is shown below. No changes are required in this window.



STL5 – Two Span Rolled Beam Example

Live Load Distribution

Open the **Live Load Distribution** window from the **Bridge Workspace** tree. Click the **Compute from typical section...** button to compute the standard live load distribution factors.



Live load distribution factor calculation details can be viewed by clicking **View Calcs** button. Click **OK** to apply the data and close the window.

STL5 – Two Span Rolled Beam Example

Schematic – Member alternative

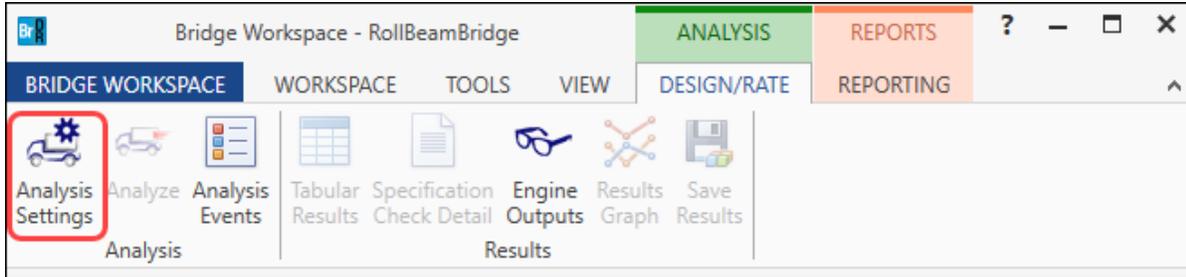
While the member alternative **Rolled Beam with Cover Plates** for member **G2** is selected in the **Bridge Workspace** tree, open the schematic for the girder profile by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click and select **Schematic** from the menu).



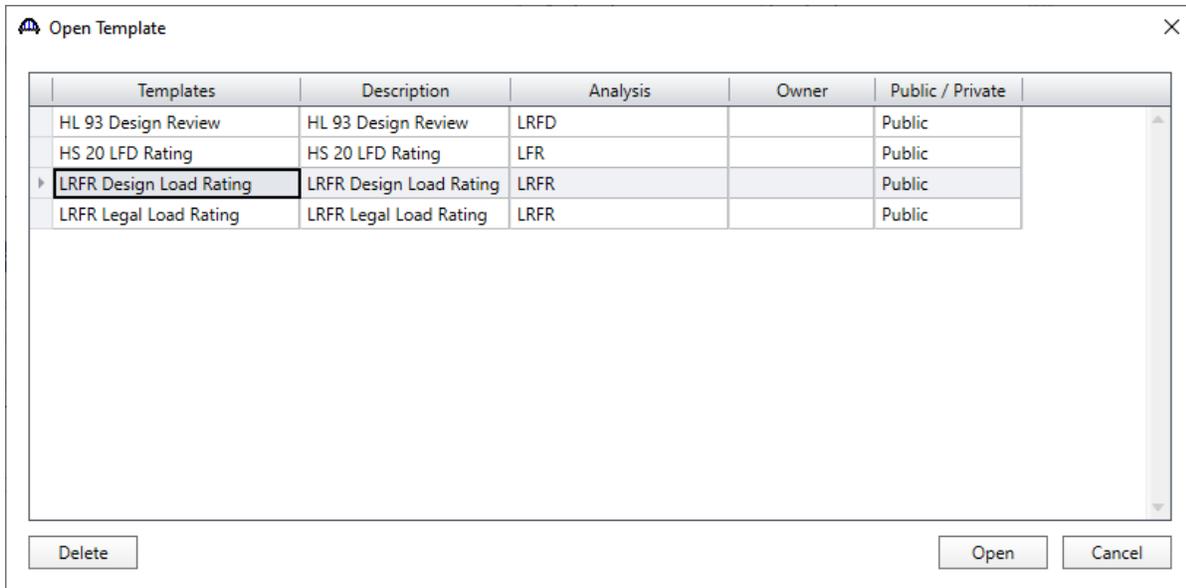
STL5 – Two Span Rolled Beam Example

LRFR Analysis

The **Rolled Beam with Cover Plates** member alternative can now be analyzed. To perform an **LRFR** rating, select the **Analysis Settings** button on the **Analysis** group of the **DESIGN/RATE** ribbon. The window shown below opens.

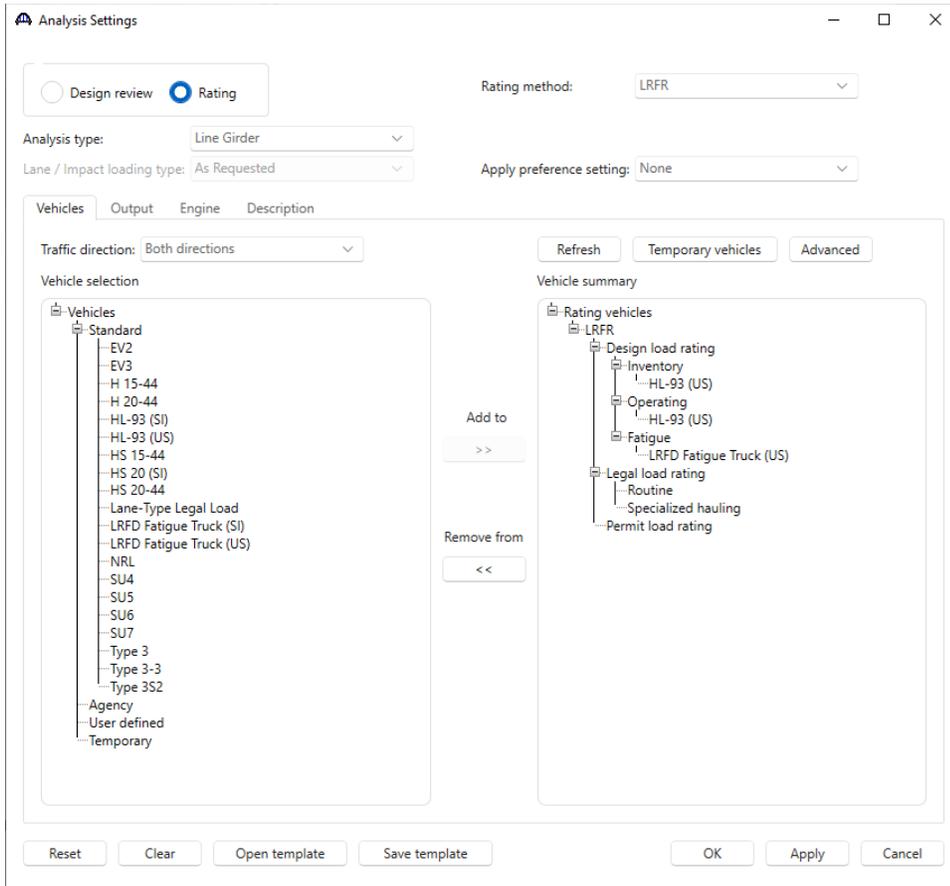


Click the **Open Template** button and select the **LRFR Design Load Rating** used in the rating and click **Open**.



STL5 – Two Span Rolled Beam Example

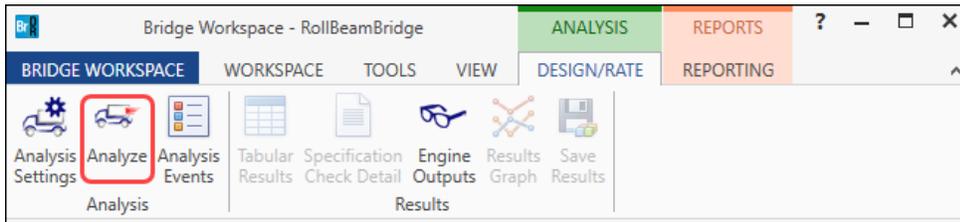
The **Analysis Settings** window will be populated as shown below.



Click **OK** to apply the analysis settings and close the window.

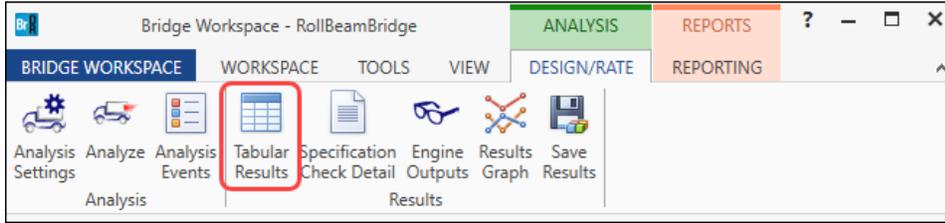
Tabular Results

Next click the **Analyze** button on the **Analysis** group of the **DESIGN/RATE** ribbon to perform the rating.



STL5 – Two Span Rolled Beam Example

When the rating analysis is finished, results can be reviewed by clicking the **Tabular Results** button on the **Results** group of the ribbon.



The window shown below will open.

The screenshot shows the 'Analysis Results - Rolled Beam with Cover Plates' window. It includes a 'Print' button, a 'Report type' dropdown set to 'Rating Results Summary', a 'Lane/Impact loading type' section with 'As requested' selected, and a 'Display Format' dropdown set to 'Single rating level per row'. Below these controls is a table with the following data:

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	10.65	0.296	25.00	1 - (50.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
HL-93 (US)	Truck + Lane	LRFR	Operating	13.81	0.384	25.00	1 - (50.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
HL-93 (US)	90%(Truck Pair + Lane)	LRFR	Inventory	10.73	0.298	40.00	1 - (80.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
HL-93 (US)	90%(Truck Pair + Lane)	LRFR	Operating	13.91	0.386	40.00	1 - (80.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Inventory	12.66	0.352	50.00	1 - (100.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	Operating	16.41	0.456	50.00	1 - (100.0)	STRENGTH-I Steel Flexure Stress	As Requested	As Requested

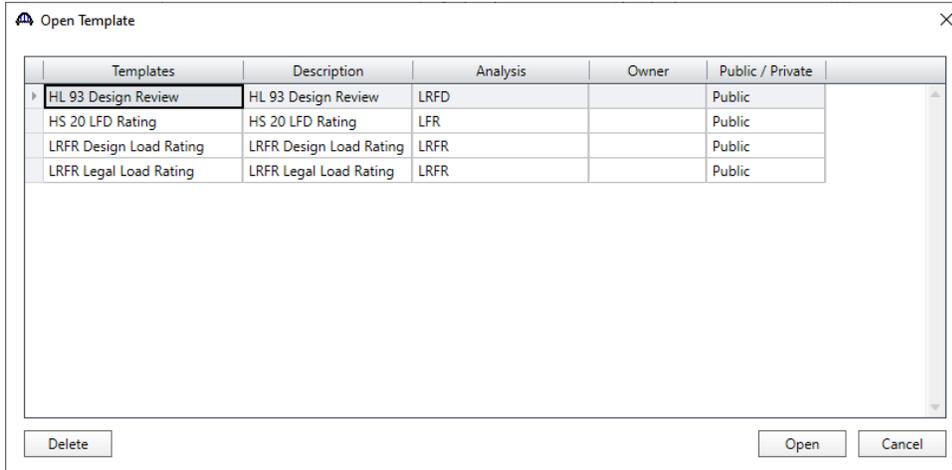
At the bottom of the window, it displays 'AASHTO LRFR Engine Version 7.5.0.3001' and 'Analysis preference setting: None'. A 'Close' button is located in the bottom right corner.

STL5 – Two Span Rolled Beam Example

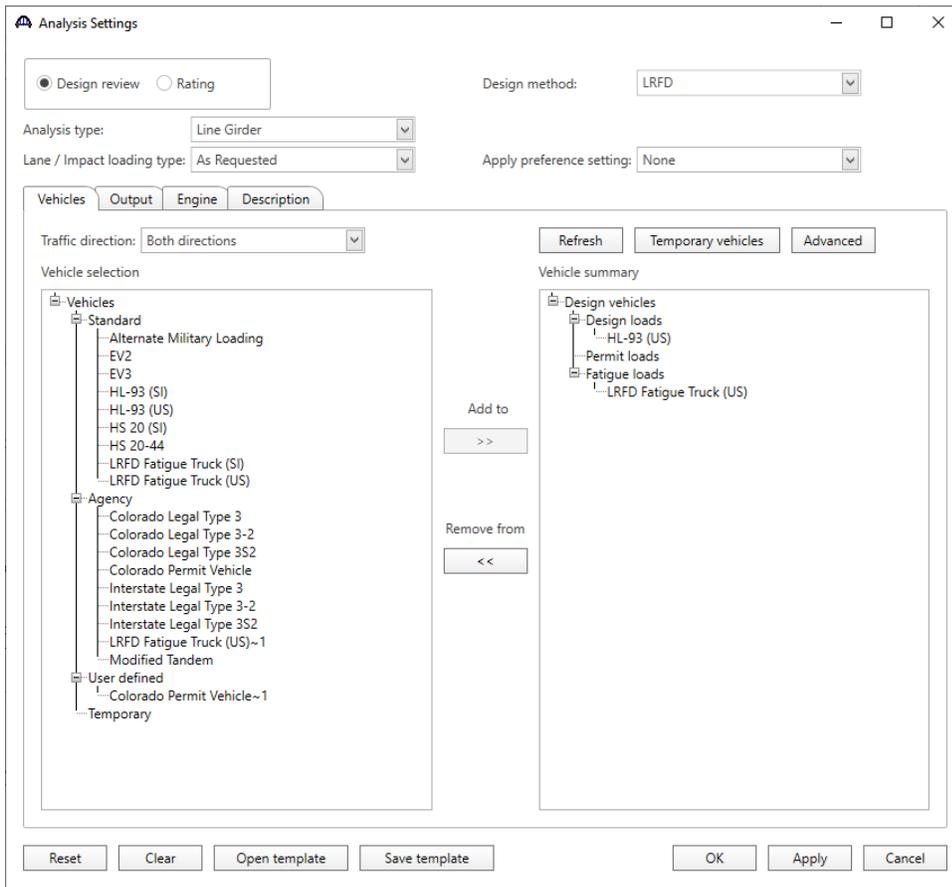
LRFD Design Review

An LRFD design review of this girder for **HL93** loading can be performed by AASHTO LRFD. To perform an LRFD design review, enter the **Analysis Settings** window as shown below.

Click the **Open Template** button and select the **LRFR Design Load Rating** to be used in the rating and click **Open**.



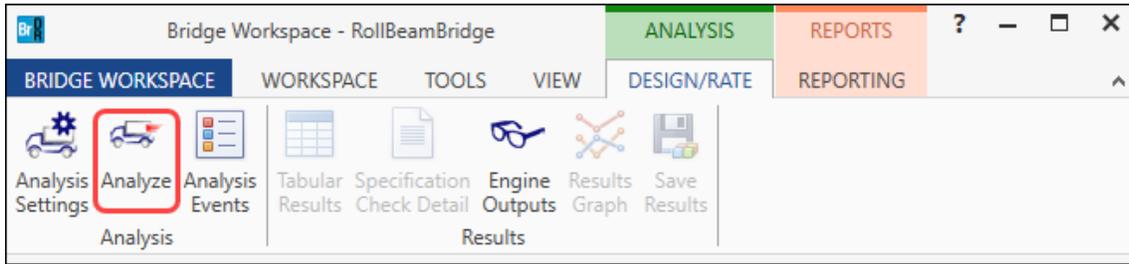
The **Analysis Settings** window will be populated as shown below.



Click **OK** to apply the data and close the window.

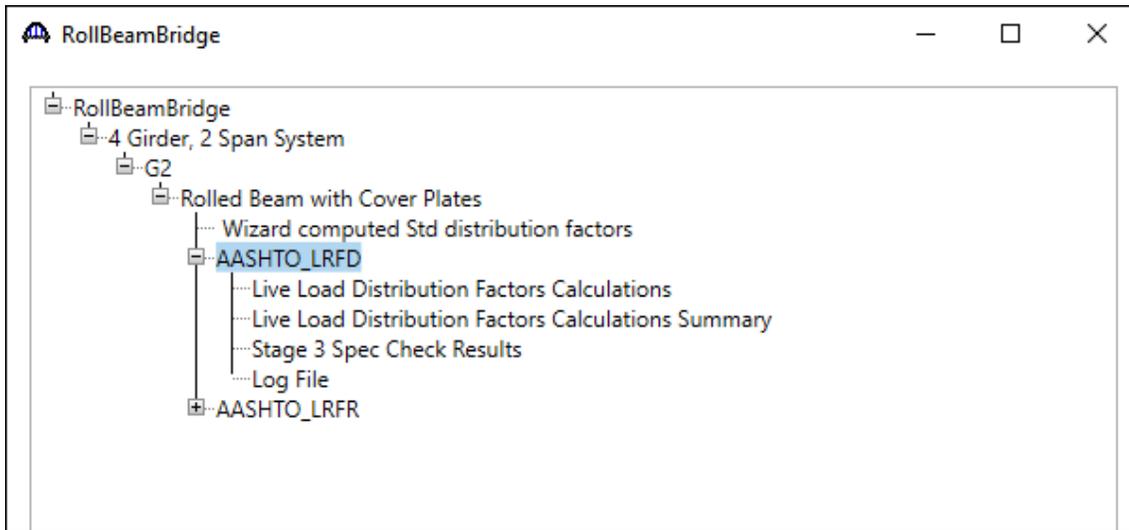
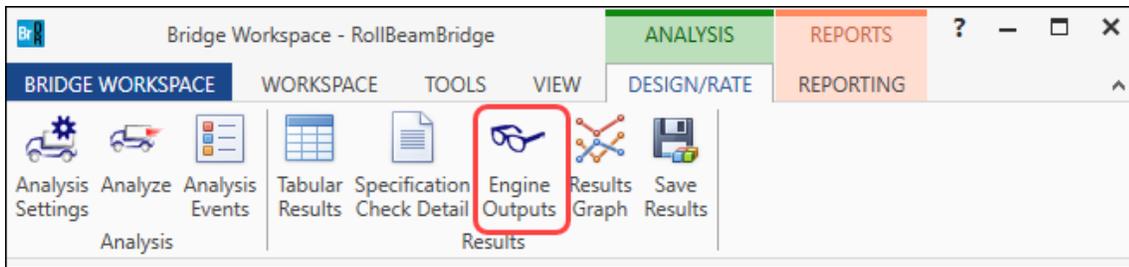
STL5 – Two Span Rolled Beam Example

Next click the **Analyze** button on the **Analysis** group of the **DESIGN/RATE** ribbon to perform the design review.



Engine Outputs

When the analysis is finished, results can be reviewed by clicking the **Engine Outputs** button from the **Results** group of the **DESIGN/RATE** ribbon to open the following window.



STL5 – Two Span Rolled Beam Example

To view the LRFD spec check results , double click on the **Stage 3 Spec Check Results** under the AASHTO_LRFD branch in this window. The following file opens.

Bridge ID : RollBeamBridge
 Bridge : Rolled Beam Bridge
 Superstructure Def : 4 Girder, 2 Span System
 Member : G2
 Analysis Preference Setting :

NBI Structure ID : RollBeamBridge
 Bridge Alt :
 Member Alt : Rolled Beam with Cover Plates

AASHTO LRFD Specification, Edition 9, Interim 0

Specification Check Summary

Article	Status
Flexure (6.10.7.1.1, 6.10.7.2.1, 6.10.8.1.1, 6.10.8.1.1, 6.10.8.1.1)	Fail
Shear (6.10.9)	Pass
Fatigue (6.10.5.3, 6.6.1.2.2)	Pass
Serviceability (6.10.4.2.2)	Pass
Constructability (6.10.3.2.1, 6.10.3.2.2, 6.10.3.2.3)	Pass
Transverse Stiffeners (6.10.11.1.2, 6.10.11.1.3)	Pass
Longitudinal Stiffeners (6.10.11.3.1, 6.10.11.3.2, 6.10.11.3.3)	NA
Bearing Stiffeners (6.10.11.2.2, 6.10.11.2.3, 6.10.11.2.4)	Pass
Shear Connector (6.10.10.1, 6.10.10.4)	NA
Field Splice (6.13.2.6, 6.13.2.7, 6.13.5.3, 6.13.6.1.3a, 6.13.6.1.3b, 6.13.6.1.3c)	NA
Minimum Negative Flexure Concrete Deck Reinforcement (6.10.1.7)	Fail
Deflection (2.5.2.6.2)	Pass

Girder Member Proportions and Compactness (Stage 3)

Location (ft)	Composite	Proportion Code	Code Check	Compact	Code Check
0.000	Yes	Pass	---	Compact	E
5.000	Yes	Pass	---	Compact	E
10.000	Yes	Pass	---	Compact	E