

AASHTOWare BrDR 7.5.0

Steel Tutorial

STL8 – Pin and Hanger Rolled Beam Example

STL8 – Pin and hanger Rolled Beam Example

BrDR Tutorial

Topics Covered

- Steel rolled beam with cover plates input as girder system.
- Schedule based input.
- Pin and hanger in center span
- LFR analysis

Steel rolled beam with cover plates input as girder system

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

The screenshot shows the 'New Bridge' dialog box with the following data entered:

- Bridge ID: STL8 - Pin and Hanger
- NBI structure ID (8): STL8
- Template:
- Bridge completely defined:
- Superstructures:
- Culverts:
- Substructures:
- Name: Pin and Hanger
- Year built: [empty]
- Description: [empty]
- Location: [empty]
- Length: [empty] ft
- Facility carried (7): [empty]
- Route number: [empty]
- Feat. intersected (6): [empty]
- Mi. post: [empty]
- Default units: US Customary

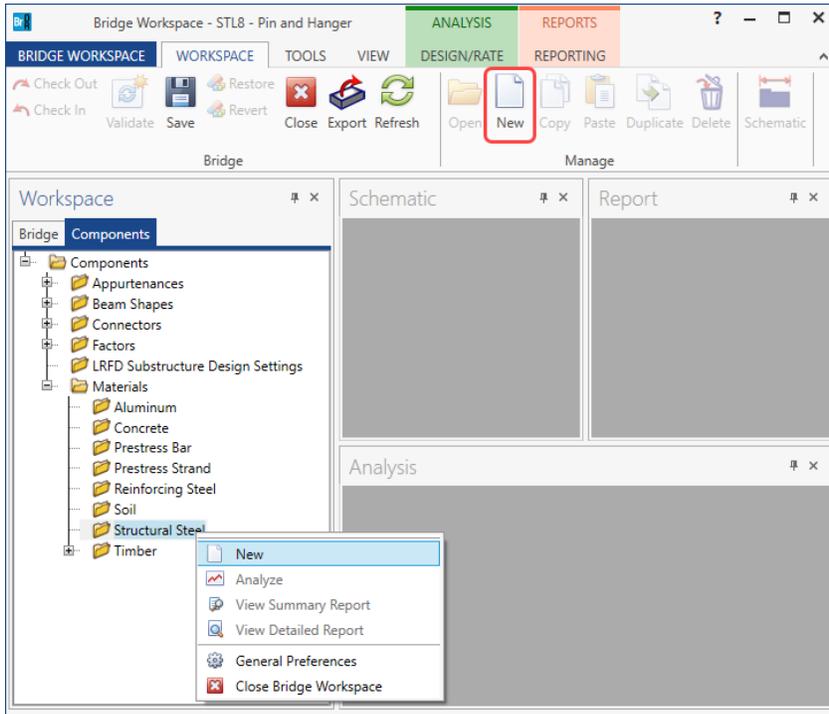
At the bottom, the 'Bridge association...' section has the following checked options: BrR, BrD, and BrM. The 'OK', 'Apply', and 'Cancel' buttons are visible at the bottom right.

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

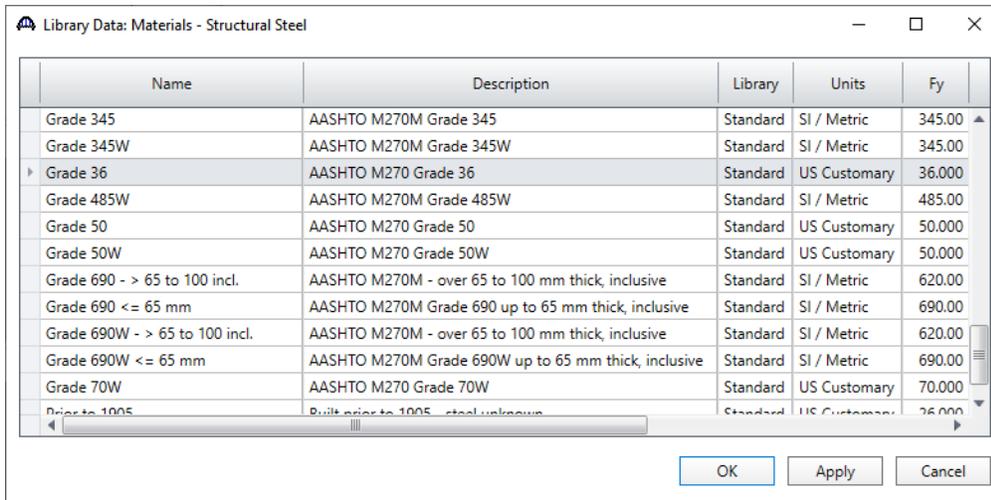
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Bridge Components

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.



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



Select the **Grade 36** material and click **OK**.

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The selected material properties are copied to the Bridge Materials – Structural Steel window as shown below.

Bridge Materials - Structural Steel

Name:

Description:

Material properties

Specified minimum yield strength (Fy): ksi

Specified minimum tensile strength (Fu): ksi

Coefficient of thermal expansion: 1/F

Density: kcf

Modulus of elasticity (E): ksi

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

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Add the **Class A (US)** concrete material using the same techniques. The window is updated as shown below.

Bridge Materials - Concrete

Name:

Description:

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

Initial compressive strength (f'ci):

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):

LRFD Maximum aggregate size:

Std modulus of elasticity (Ec): ksi

LRFD modulus of elasticity (Ec): ksi

Std initial modulus of elasticity:

LRFD initial modulus of elasticity:

Std modulus of rupture: ksi

LRFD modulus of rupture: ksi

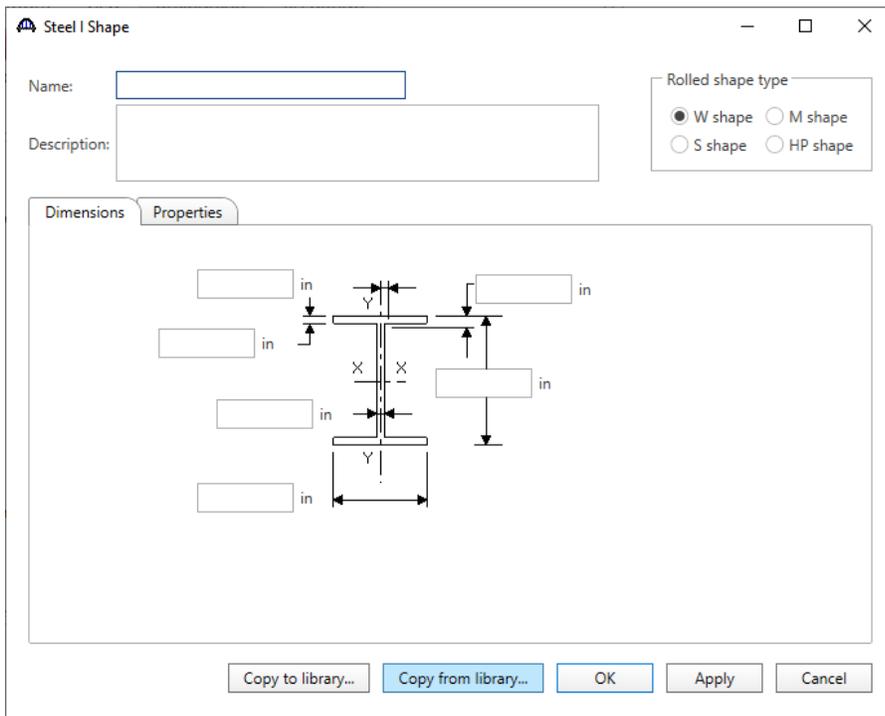
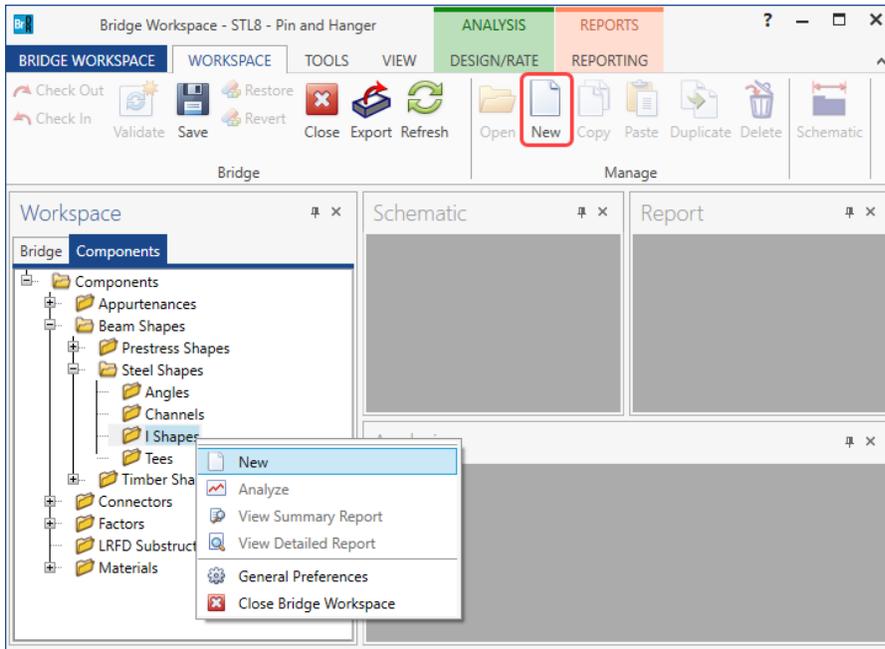
Shear factor:

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

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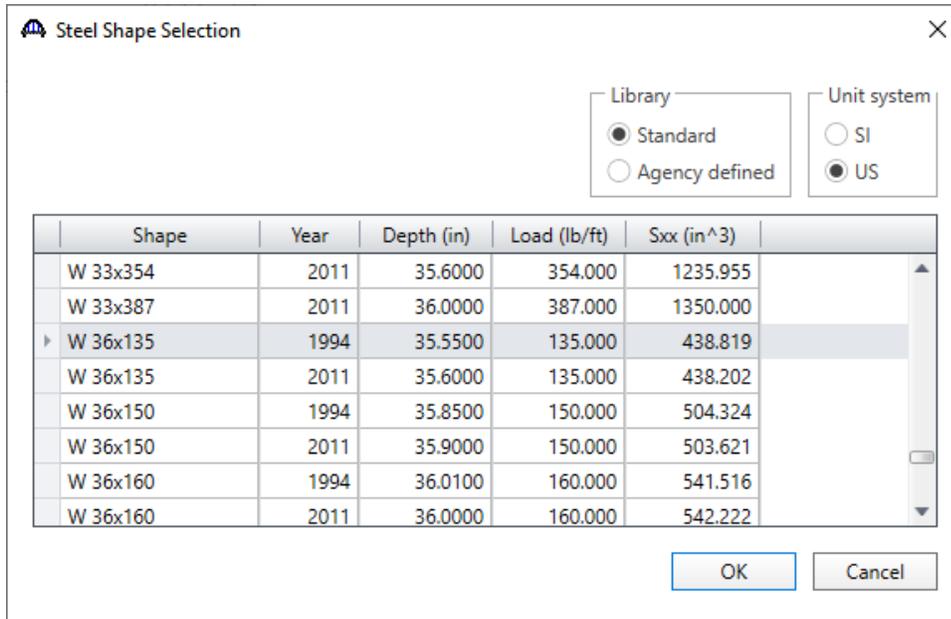
Beam Shapes

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.

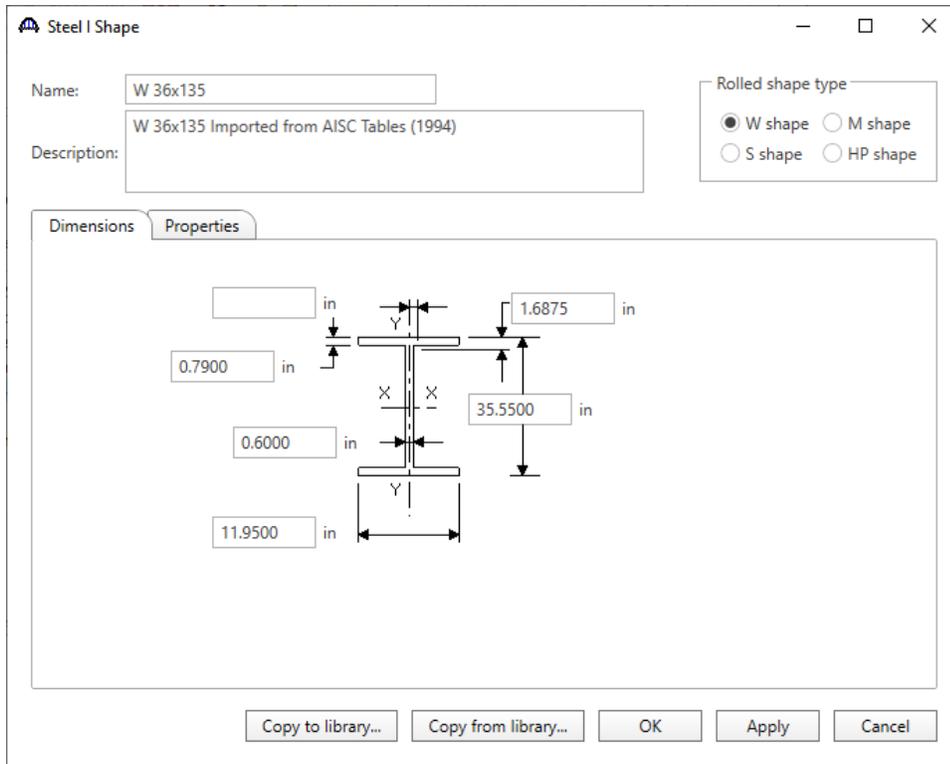


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Select the **Rolled shape type** as **W shape** and click the **Copy from library...** button. The **Steel Shape Selection** window will appear. This window displays all of the steel shapes available in the library. The list can be sorted by clicking on any of the column headers (e.g. **Shape**, **Year**, **Depth** etc.). Select **W36x135** and click **OK**.



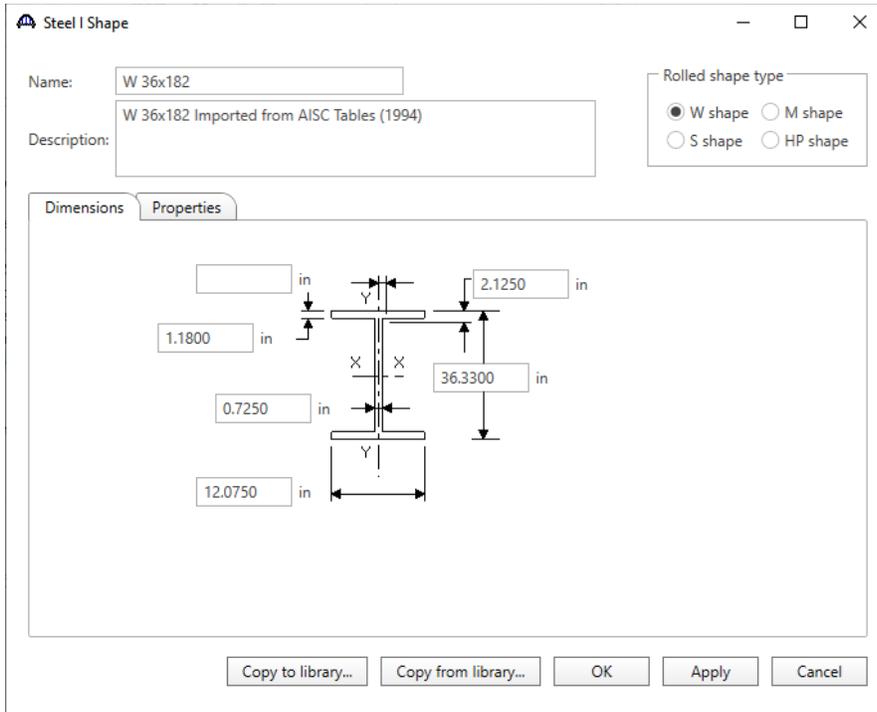
The beam properties are copied to the **Steel I Shape** window as shown below.



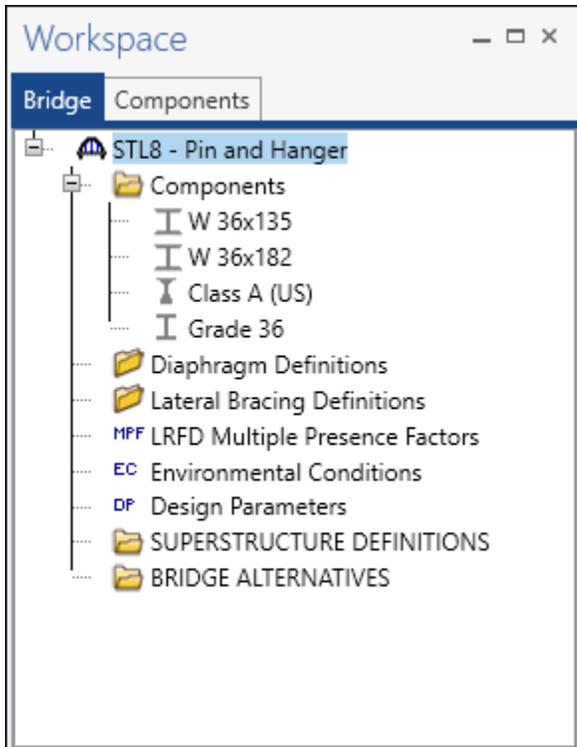
Click **OK** to apply the data and close the window.

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Follow the same procedure to copy a **W36x182** shape from the library.



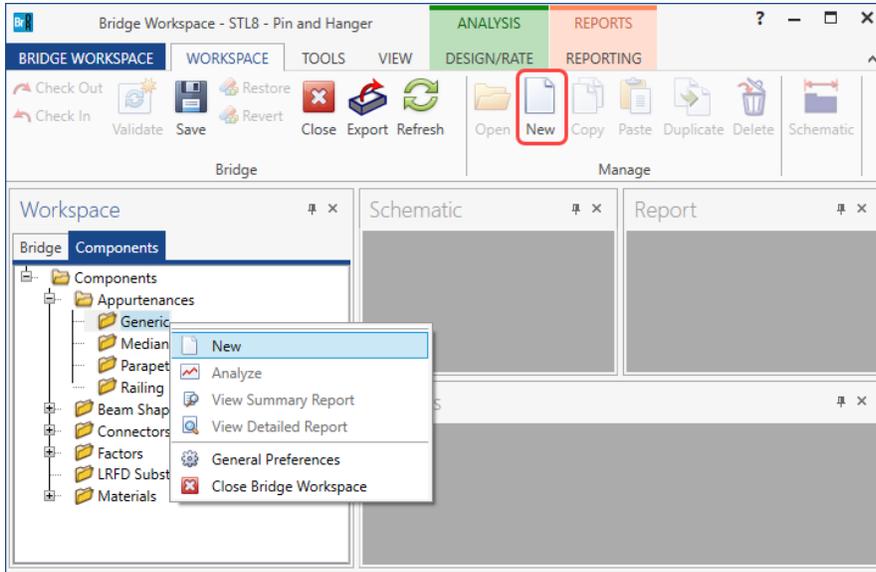
A partially expanded **Bridge Workspace** tree is shown below.



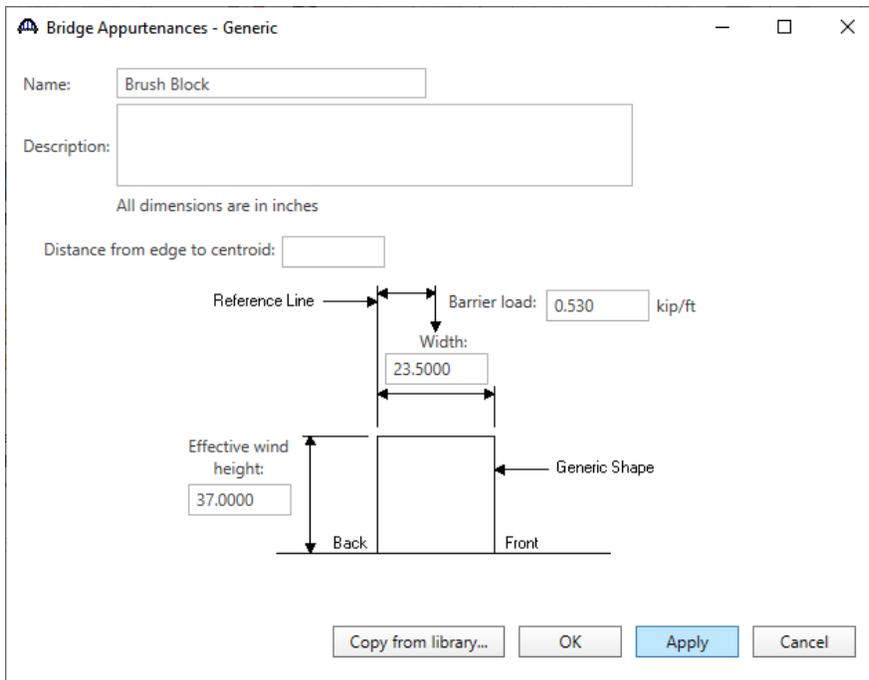
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Bridge Appurtenances

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



Enter the data as shown below.



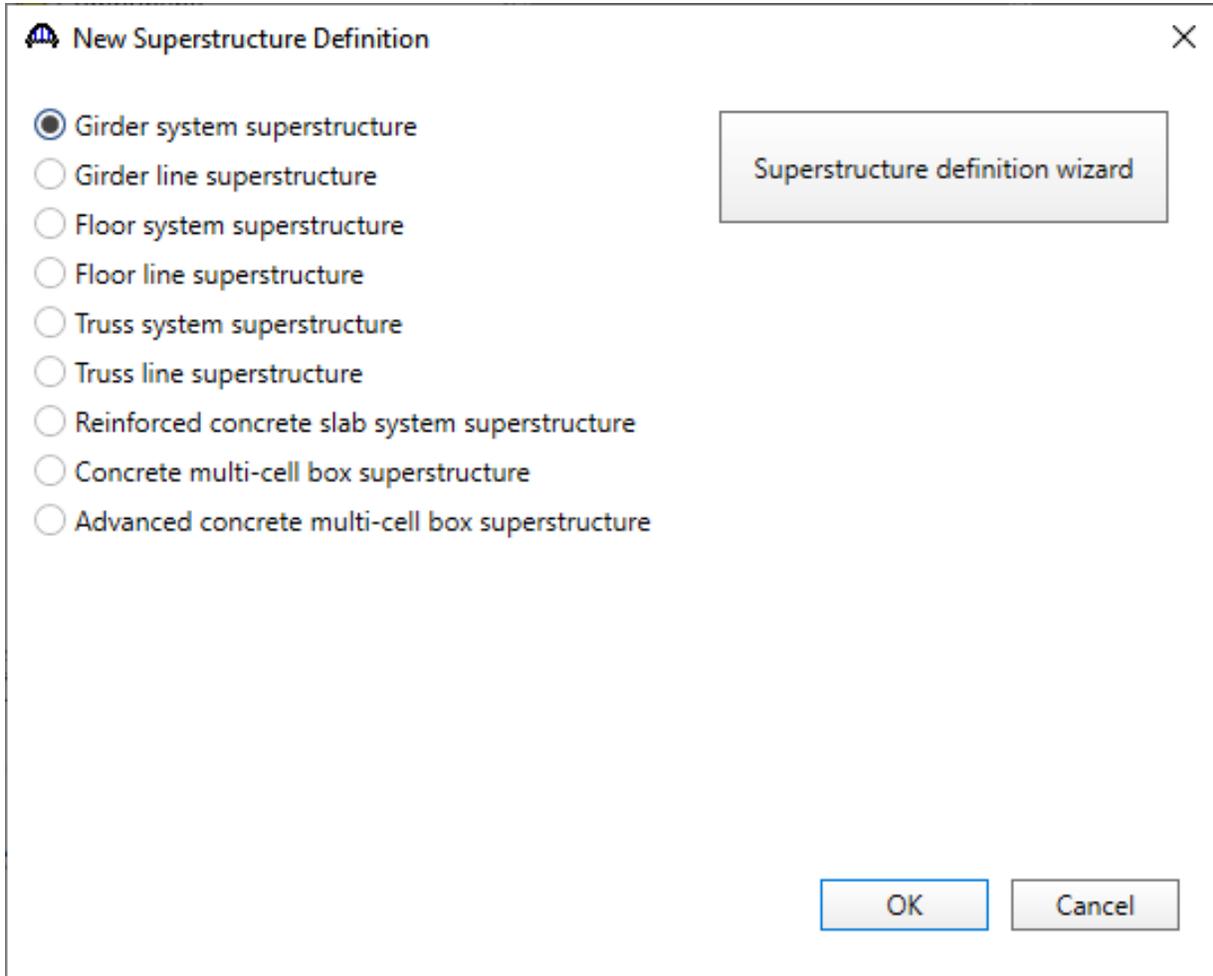
Click **OK** to apply the data and close the window.

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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: Girder System

Description:

Default units: US Customary

Number of spans: 3

Number of girders: 5

Enter span lengths along the reference line:

Span	Length (ft)
1	40.00
2	82.00
3	40.00

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

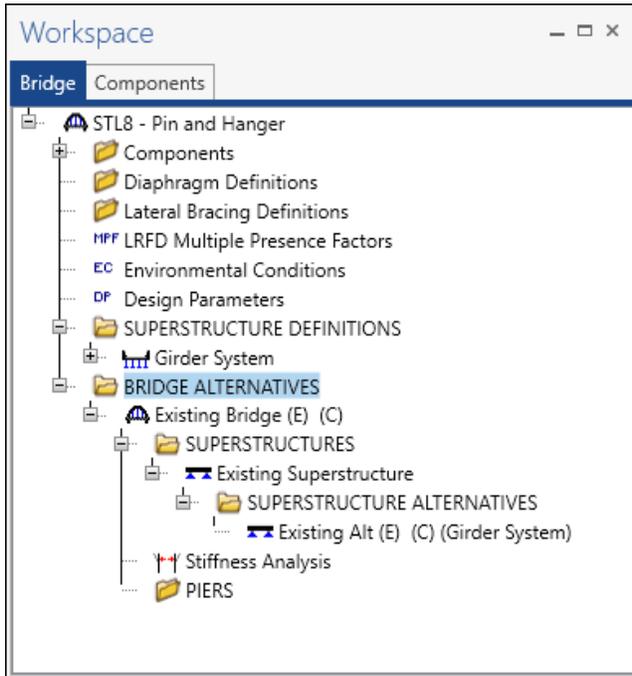
Click **OK** to apply the data and close the window.

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Bridge Alternative

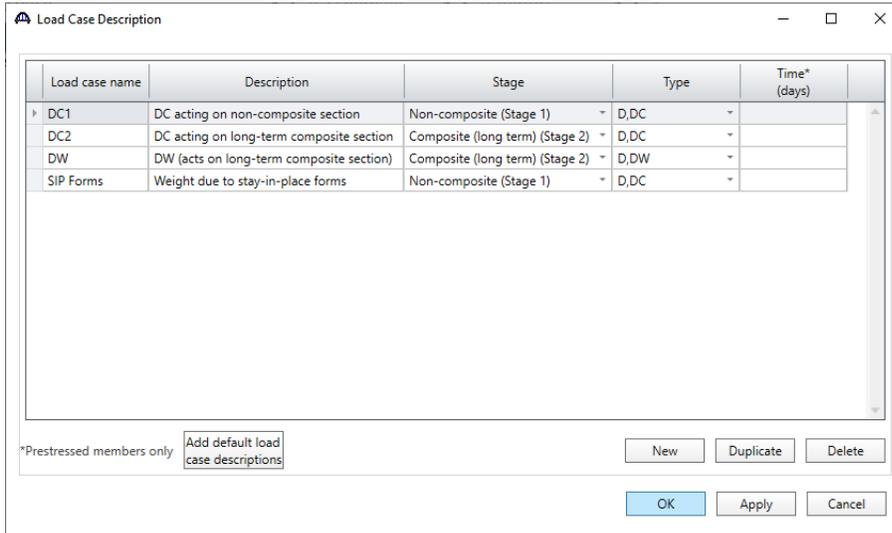
Navigate to the **Bridge Alternatives** node in the **Bridge Workspace** tree and create a new **Bridge Alternative**, a new **Structure**, and a new **Structure Alternative** as shown in **STL1 tutorial**.

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



Load Case Description

Double-click on the **Load Case Description** node in the **Bridge Workspace** tree to open the **Load Case Description window**. Click on the **Add default load case description** button to create the following load cases.



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

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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 and click the **Apply** button to apply this data.

Number of spans: 3 Number of girders: 5

Layout Diaphragms Lateral bracing ranges

Support	Skew (degrees)
1	0.000
2	0.000
3	0.000
4	0.000

Girder spacing orientation
 Perpendicular to girder
 Along support

Girder bay	Girder spacing (ft)	
	Start of girder	End of girder
1	8.75	8.75
2	8.75	8.75
3	8.75	8.75
4	8.75	8.75

OK Apply Cancel

Structure Framing Plan Detail – Diaphragms

Switch to the **Diaphragms** tab and enter diaphragm spacing for Girder Bay 1 as shown below.

Number of spans: 3 Number of girders: 5

Layout Diaphragms Lateral bracing ranges

Girder bay: 1 Copy bay to... Diaphragm wizard...

Support number	Start distance (ft)		Diaphragm spacing (ft)	Number of spaces	Length (ft)	End distance (ft)		Load (kip)	Diaphragm
	Left girder	Right girder				Left girder	Right girder		
> 1	0	0	0	1	0	0	0	0.325	--Not Assigned--
1	0	0	20	1	20	20	20	0.22	--Not Assigned--
1	20	20	20	1	20	40	40	0.325	--Not Assigned--
2	0	0	5.25	1	5.25	5.25	5.25	0.22	--Not Assigned--
2	5.25	5.25	2	1	2	7.25	7.25	0.22	--Not Assigned--
2	7.25	7.25	16.875	4	67.5	74.75	74.75	0.22	--Not Assigned--
2	74.75	74.75	2	1	2	76.75	76.75	0.22	--Not Assigned--
2	76.75	76.75	5.25	1	5.25	82	82	0.325	--Not Assigned--
3	0	0	20	1	20	20	20	0.22	--Not Assigned--
3	20	20	20	1	20	40	40	0.325	--Not Assigned--

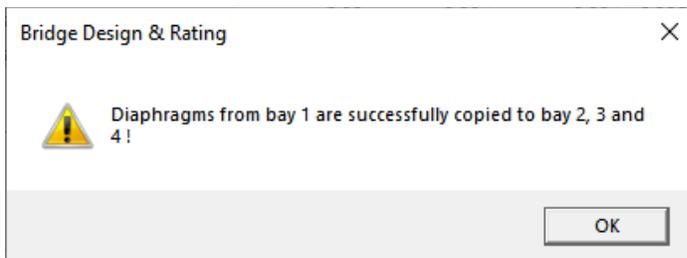
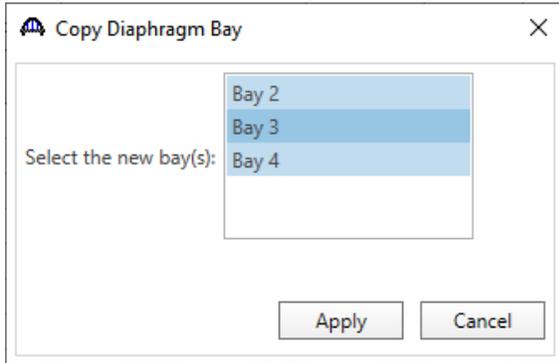
New Duplicate Delete

OK Apply Cancel

Click the **Apply** button to apply this data.

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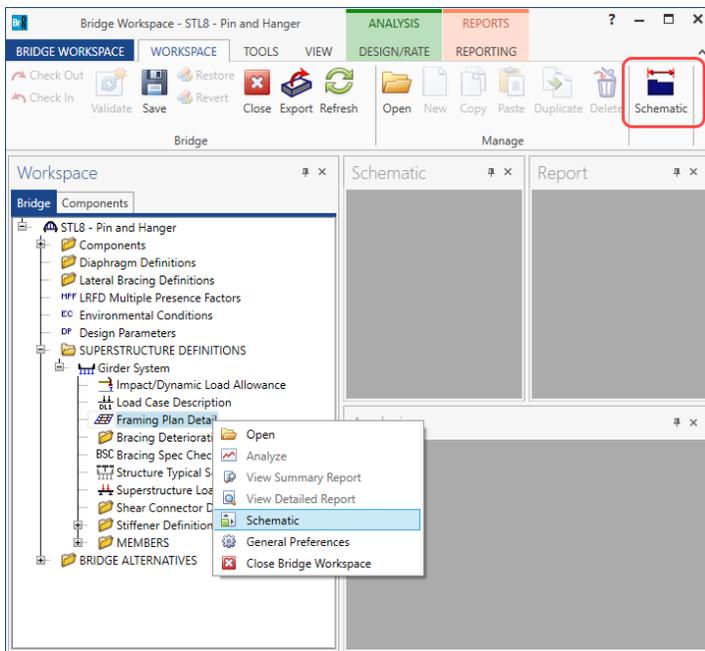
Click the **Copy bay to...** button, select **Bay 2**, **Bay 3** and **Bay 4** by holding the **Shift** key and click the **Apply** button to copy the **Bay 1** diaphragm spacing to all other bays.



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

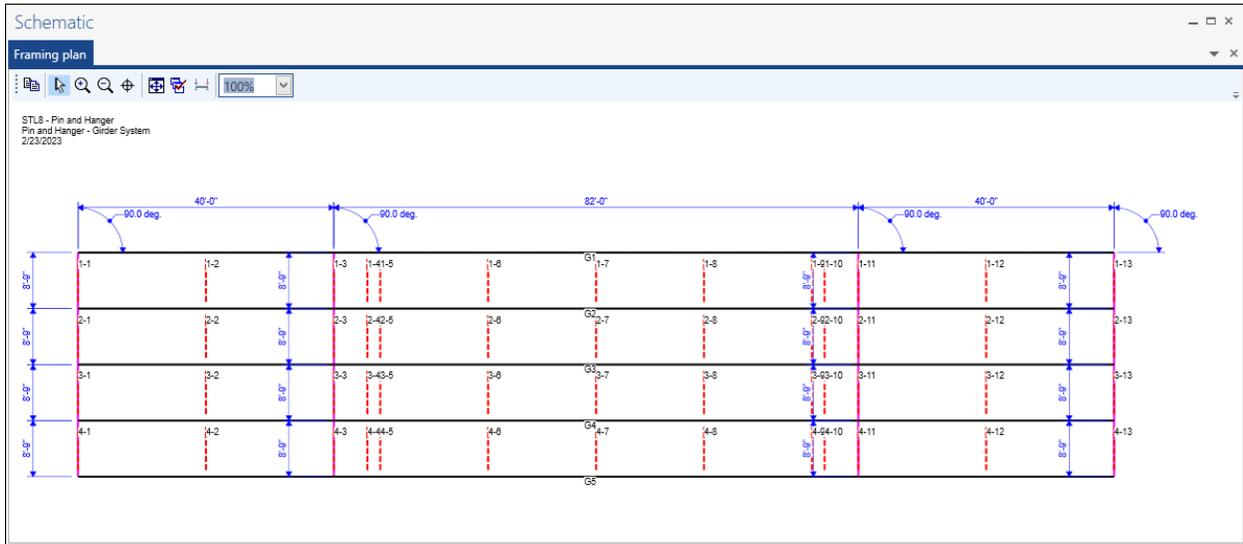
Schematic - Framing Plan Detail

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



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The following schematic is displayed.



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 'Structure Typical Section' dialog box contains the following configuration:

- Superstructure definition reference line is: the bridge deck.
- Distance from left edge of deck to superstructure definition reference line: ft
- Distance from right edge of deck to superstructure definition reference line: ft
- Left overhang: ft
- Computed right overhang: ft

Buttons at the bottom: OK, Apply, Cancel.

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Structure Typical Section – Deck (cont'd)

The **Deck (cont'd)** tab provides input options to enter information about 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.

Structure Typical Section

Distance from left edge of deck to superstructure definition ref. line | Distance from right edge of deck to superstructure definition ref. line

Deck thickness | Superstructure Definition Reference Line

Left overhang | Right overhang

Deck | Deck (cont'd) | Parapet | Median | Railing | Generic | Sidewalk | Lane position | Striped lanes | Wearing surface

Deck concrete: Class A (US)

Total deck thickness: 8.0000 in

Load case: Engine Assigned

Deck crack control parameter: 130.000 kip/in

Sustained modular ratio factor: 3.000

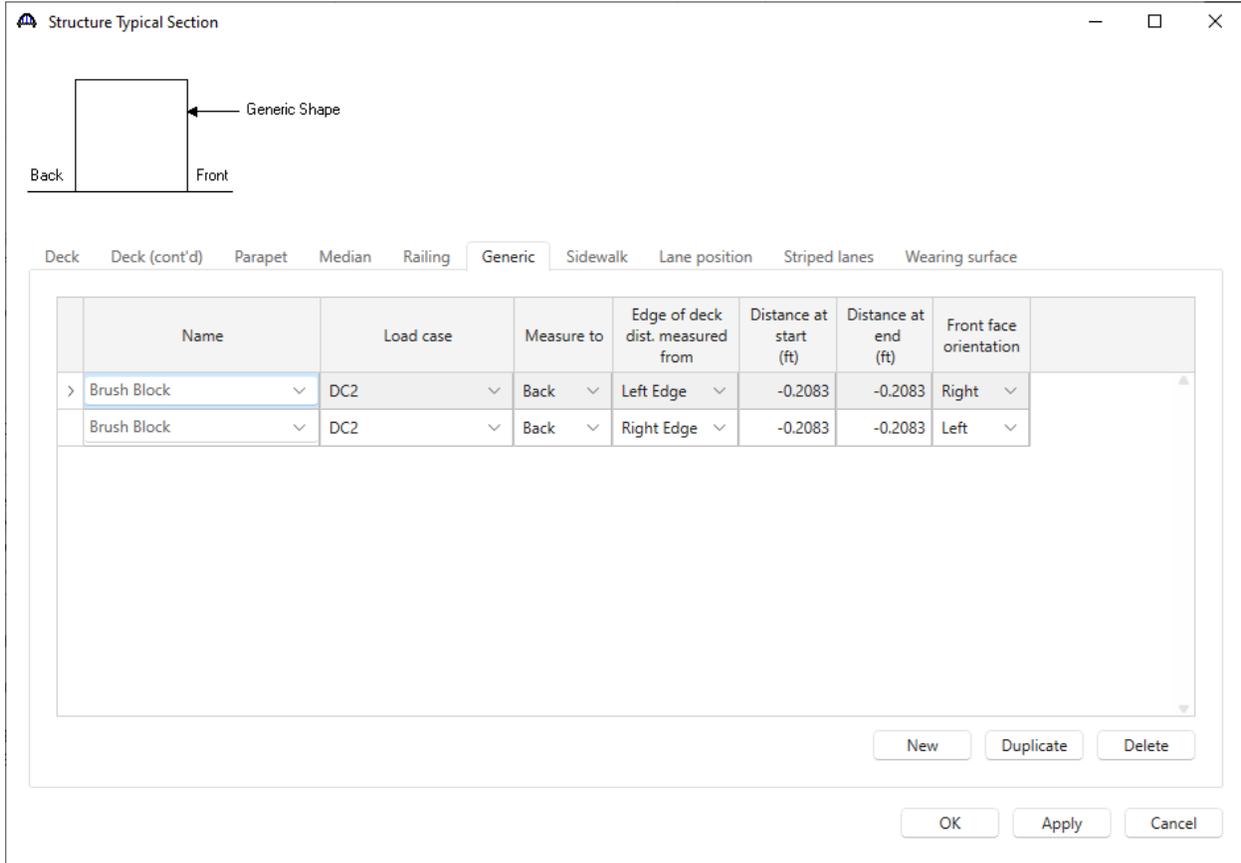
Deck exposure factor:

OK Apply Cancel

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Structure Typical Section – Generic

Click the **New** button to add a row to the table. The **Name** of the curb defaults to the only generic appurtenance described for the bridge. Change the **Load case** to **DC2** and select **Back** in the **Measure to** column (in this example, locate the curb on the deck by referencing the back of the curb to the left edge of the deck). Enter **-0.2083' (2.5")** 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.



The screenshot shows the 'Structure Typical Section' window with the 'Generic' tab selected. A diagram at the top left shows a rectangular shape with 'Back' on the left and 'Front' on the right, labeled 'Generic Shape'. Below the diagram is a table with the following data:

	Name	Load case	Measure to	Edge of deck dist. measured from	Distance at start (ft)	Distance at end (ft)	Front face orientation
>	Brush Block	DC2	Back	Left Edge	-0.2083	-0.2083	Right
	Brush Block	DC2	Back	Right Edge	-0.2083	-0.2083	Left

At the bottom of the window are buttons for 'New', 'Duplicate', 'Delete', 'OK', 'Apply', and 'Cancel'.

Note: When validating or saving this bridge, an error message will appear that the appurtenance is not located on the deck. This can be ignored.

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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.

Compute Lane Positions

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	-18.25	18.25	-18.25	18.25

Apply Cancel

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

Structure Typical Section

Deck Deck (cont'd) Parapet Median Railing Generic Sidewalk Lane position Striped lanes Wearing surface

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	-18.25	18.25	-18.25	18.25

LRFD fatigue
 Lanes available to trucks:
 Override Truck fraction:

Compute New Duplicate Delete

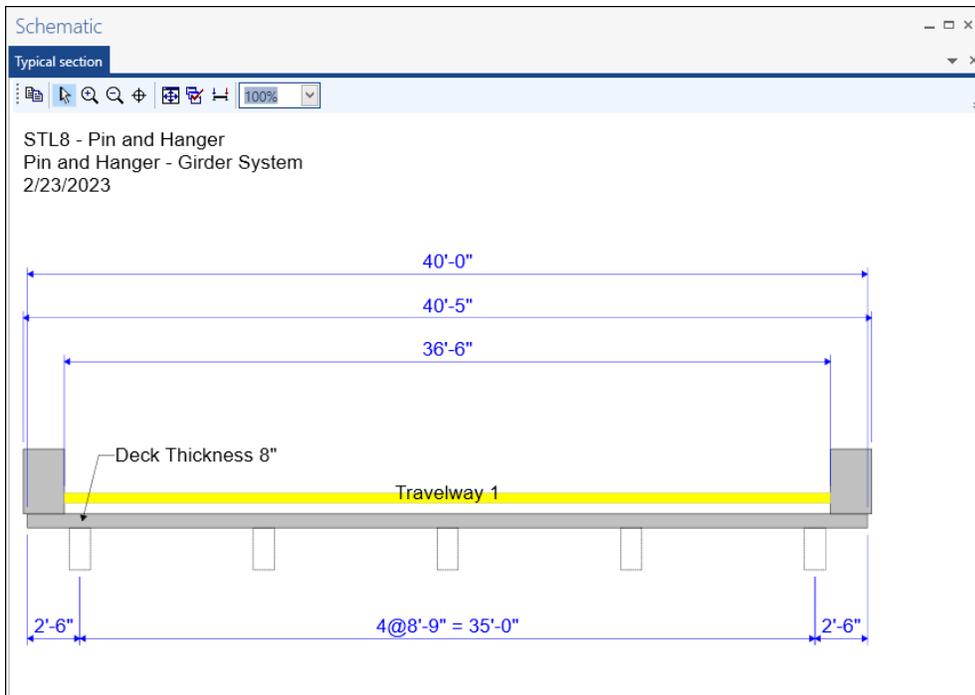
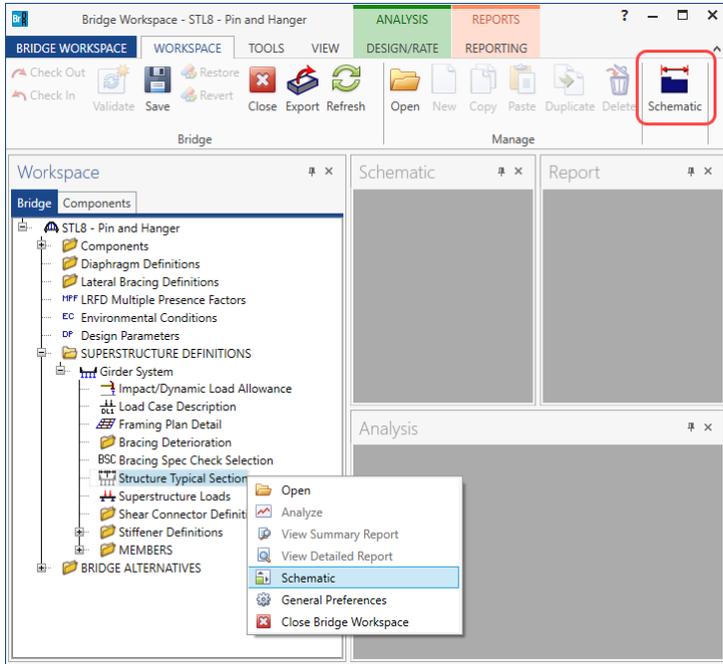
OK Apply Cancel

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

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Schematic – Structure Typical Section

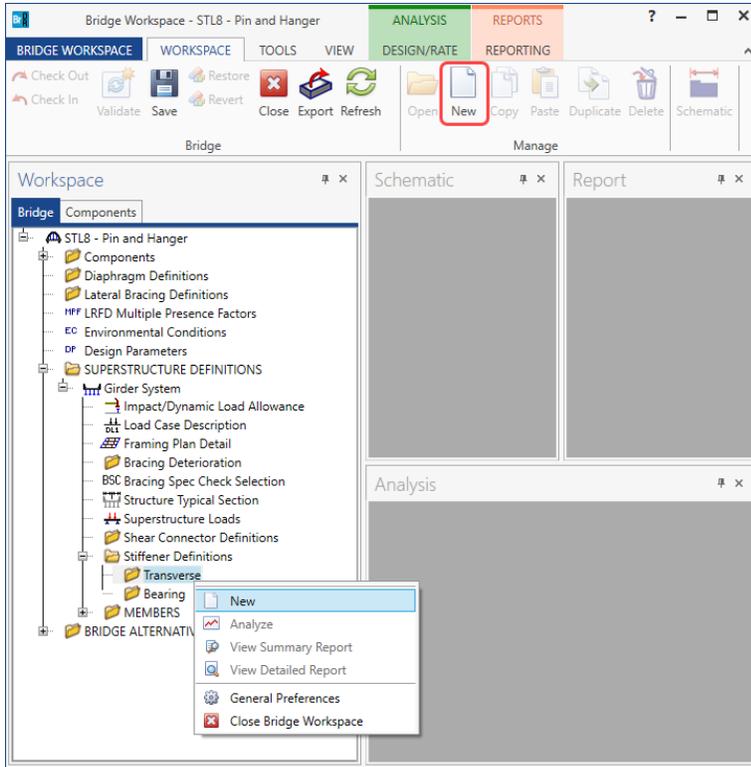
While the **Structure Typical Section** is selected in the **Bridge Workspace** tree, open the schematic for the structure typical section by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click on **Structure Typical Section** in the **Bridge Workspace** and select **Schematic**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



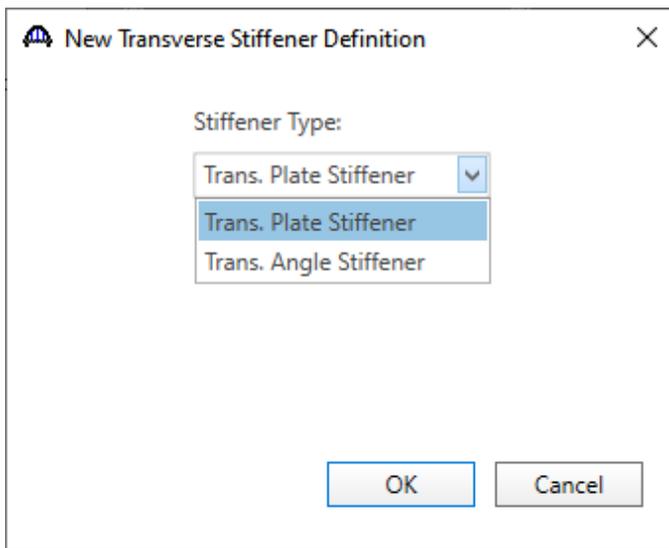
STL8 – Pin and hanger Rolled Beam Example

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.



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.



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Define the stiffener as shown below.

The screenshot shows the "Transverse Stiffener Definition" dialog box. The "Name" field is set to "Diaphragm Conn Plate". Under "Stiffener type", the "Pair" radio button is selected. The "Plate" section shows "Thickness" as 0.5000 in and "Material" as Grade 36. The "Welds" section has "Top", "Web", and "Bottom" all set to "-- None --". On the right, "Top gap" and "Bottom gap" are empty, and "Width" is 4.5000 in. A diagram of a stiffener is shown on the right. At the bottom are "OK", "Apply", and "Cancel" buttons.

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

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.

The screenshot shows the "New Bearing Stiffener Definition" dialog box. The "Stiffener Type" dropdown menu is open, showing "Plate Stiffener" selected. At the bottom are "OK" and "Cancel" buttons.

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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

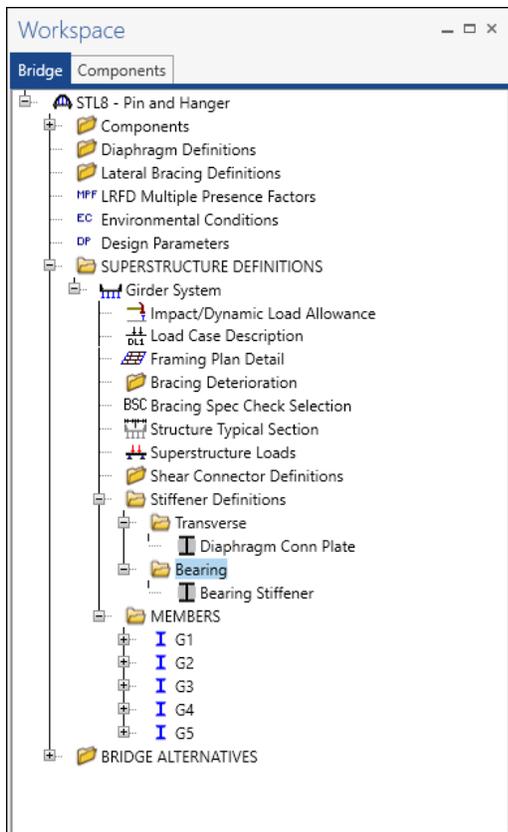
in

in

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

The **Member** window shows the data that was generated when the structure definition was created. Open the window for **Member G2** by double clicking on **G2** in the **Bridge Workspace** tree. 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.

Existing	Current	Member alternative name	Description
----------	---------	-------------------------	-------------

Number of spans: 3

Span no.	Span length (ft)
1	40.00
2	82.00
3	40.00

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**.

Material type:

- Post tensioned concrete
- Prestressed (pretensioned) concrete
- Reinforced concrete
- Steel**
- Timber

Girder type:

- Built-up
- Plate
- Rolled**

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

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Schedule based input

The **Member Alternative Description** window will open. Enter the data as shown below. Select the **Schedule-based** Girder property input method.

Member alternative:

Description | Specs | Factors | Engine | Import | Control options

Description:

Material type:

Girder type:

Modeling type:

Default units:

Girder property input method

Schedule based

Cross-section based

End bearing locations

Left: in

Right: in

Simple DL, continuous LL

Self load

Load case:

Additional self load: kip/ft

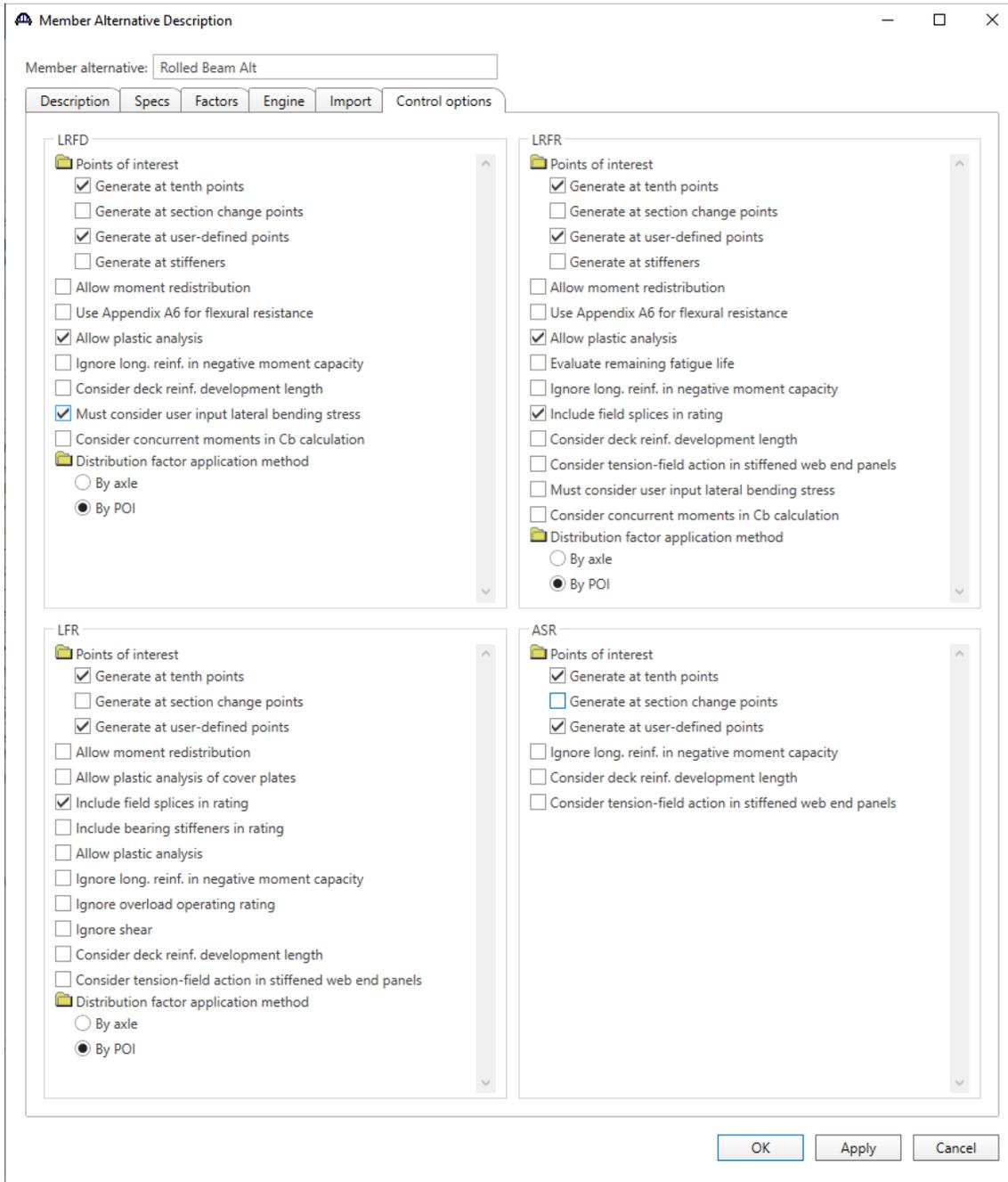
Additional self load: %

Default rating method:

OK Apply Cancel

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



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

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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	Support number	Start distance (ft)	Length (ft)	End distance (ft)	Material
W 36x135	1	0	46	46	Grade 36
W 36x182	2	6	70	76	Grade 36
W 36x135	2	76	46	122	Grade 36

Describe the bottom cover plate as shown below.

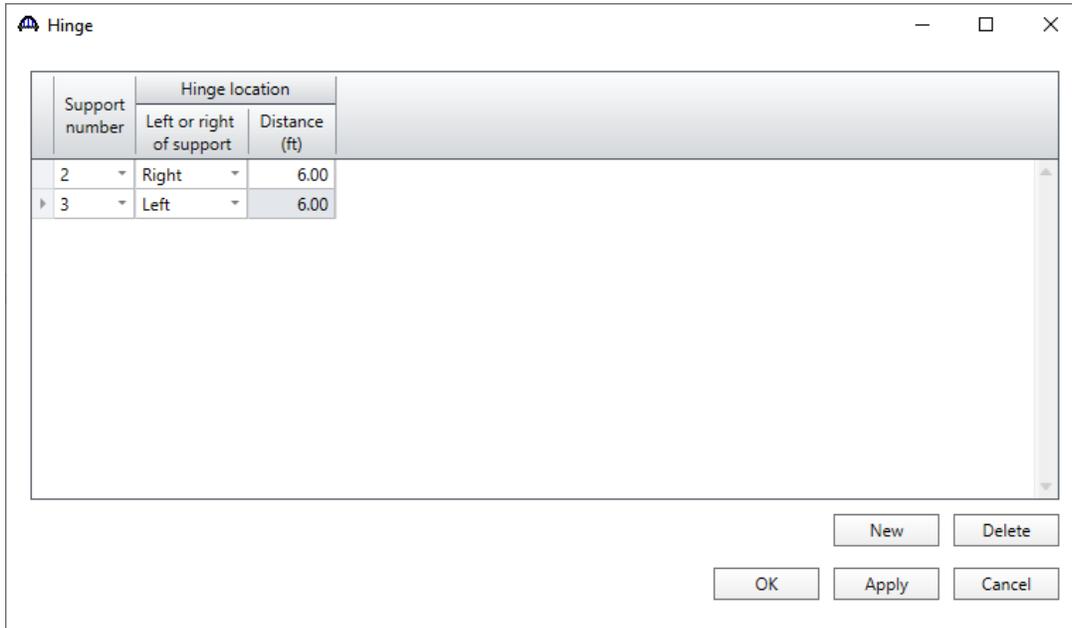
Relative position	Begin width (in)	End width (in)	Thickness (in)	Support number	Start distance (ft)	Length (ft)	End distance (ft)	Material	Side weld	End weld at right
1	10.5	10.5	1.5	2	6	70	76	Grade 36	-- None --	-- None --

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

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Hinge - Pin and hanger in center span

Next open the **Hinge Locations** window by double-clicking on the **Hinge** node in the **Bridge Workspace** tree and describe the pin locations as shown below.



The Hinge dialog box contains a table with the following data:

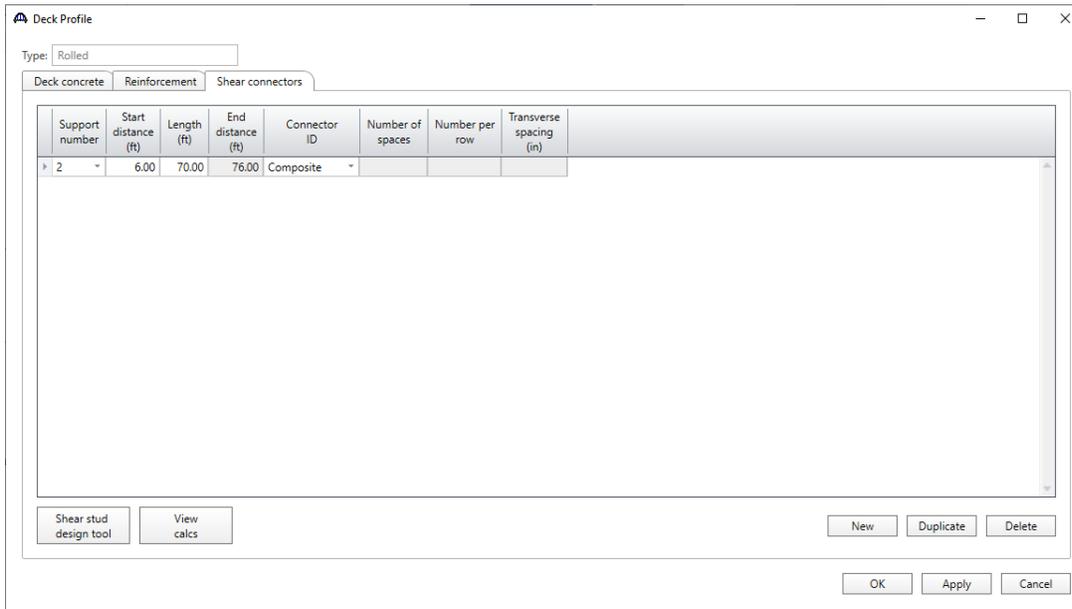
Support number	Hinge location	
	Left or right of support	Distance (ft)
2	Right	6.00
3	Left	6.00

Buttons: New, Delete, OK, Apply, Cancel

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

Deck Profile – Shear connectors

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



The Deck Profile dialog box shows the Shear connectors tab with the following data:

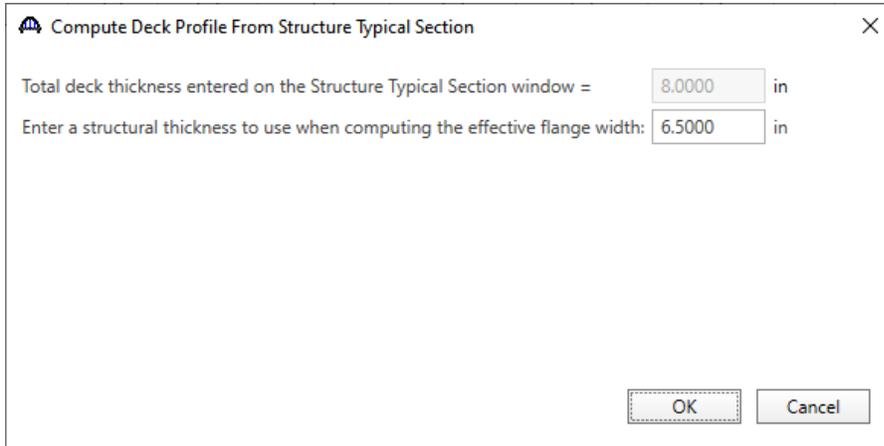
Support number	Start distance (ft)	Length (ft)	End distance (ft)	Connector ID	Number of spaces	Number per row	Transverse spacing (in)
2	6.00	70.00	76.00	Composite			

Buttons: Shear stud design tool, View calcs, New, Duplicate, Delete, OK, Apply, Cancel

STL8 – Pin and hanger Rolled Beam Example

Deck Profile – Deck concrete

Navigate to the **Deck concrete** tab. Click the **Compute from typical section...** button. Enter the following data. The points of contraflexure are required for the computation of the LRFD effective flange width. Enter the hinge locations as the points of contraflexure in span 2 as shown below and click **OK**.



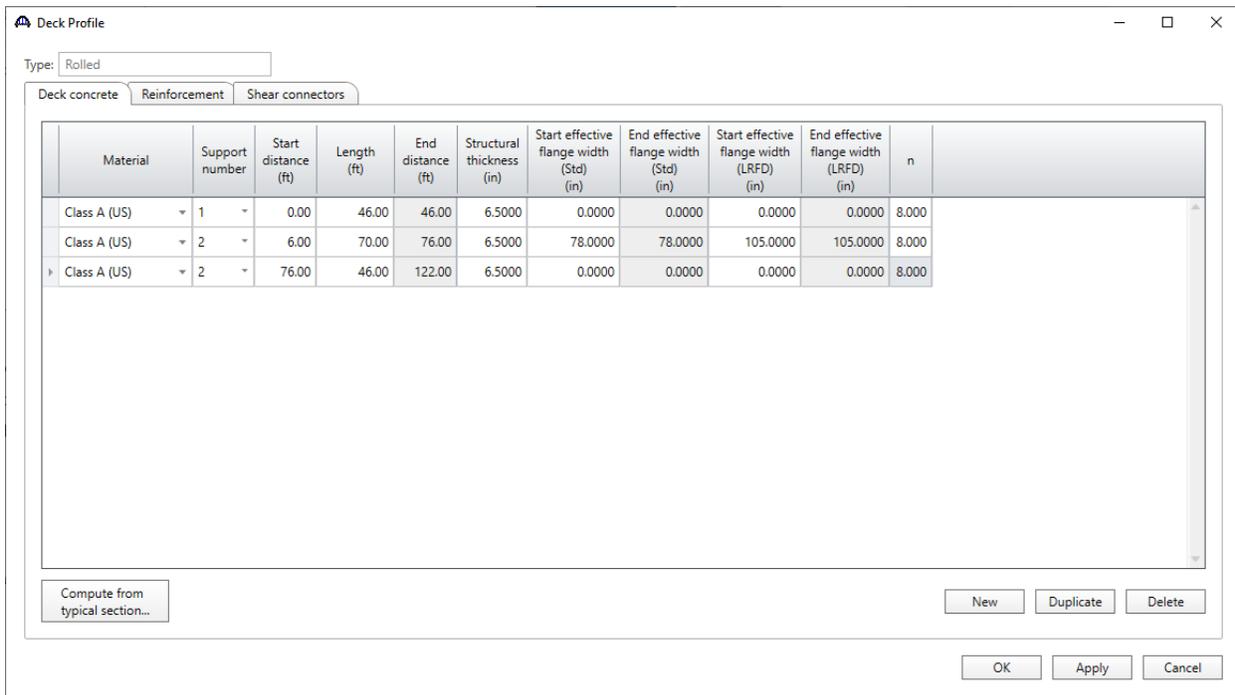
Compute Deck Profile From Structure Typical Section

Total deck thickness entered on the Structure Typical Section window = 8.0000 in

Enter a structural thickness to use when computing the effective flange width: 6.5000 in

OK Cancel

The completed **Deck concrete** tab of this window is shown below. Note that the distance to the top row of steel is measured from the top of the effective deck slab thickness. Enter a value for the modular ratio of the concrete. The **Compute from typical section...** button could not compute this since a reinforcing steel material is not defined.



Deck Profile

Type: Rolled

Deck concrete Reinforcement Shear connectors

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	46.00	46.00	6.5000	0.0000	0.0000	0.0000	0.0000	8.000
Class A (US)	2	6.00	70.00	76.00	6.5000	78.0000	78.0000	105.0000	105.0000	8.000
Class A (US)	2	76.00	46.00	122.00	6.5000	0.0000	0.0000	0.0000	0.0000	8.000

Compute from typical section... New Duplicate Delete

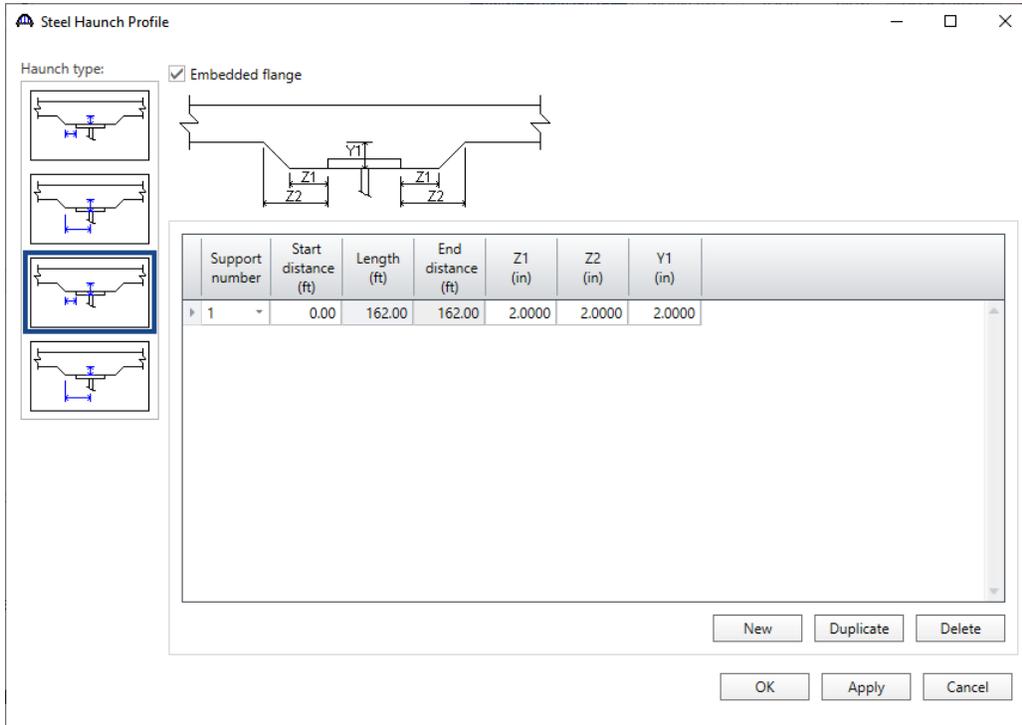
OK Apply Cancel

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

STL8 – Pin and hanger Rolled Beam Example

Haunch Profile

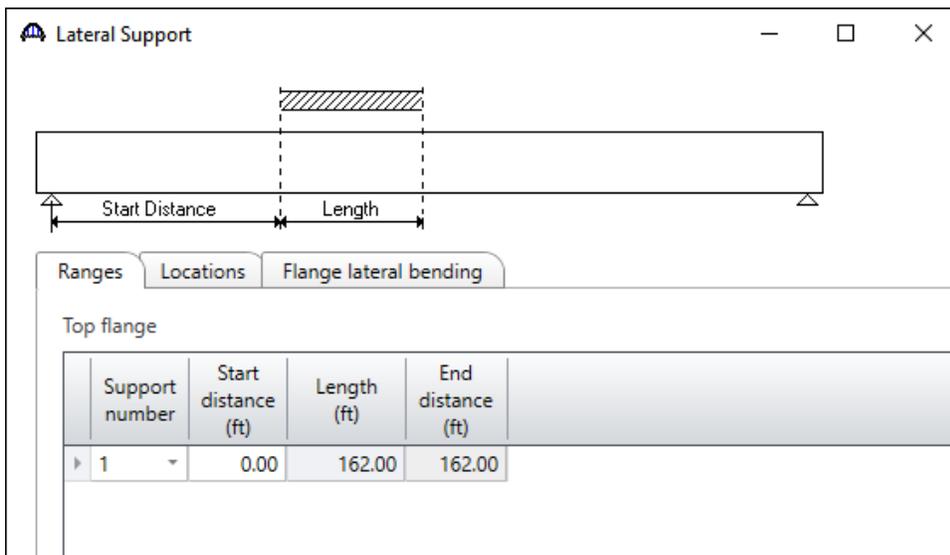
Define the haunch by double-clicking on the **Haunch Profile** node in the **Bridge Workspace** tree. Enter data as shown below.



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

Lateral Support

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



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

STL8 – Pin and hanger Rolled Beam Example

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.

The screenshot shows the "Diaphragm Connection Plates" dialog box. It has a title bar with a close button (X). The main text says "Apply the following stiffener definitions to the diaphragm locations:". There are two sections: "End diaphragms and diaphragms at piers" with a dropdown menu set to "Bearing Stiffener", and "Interior diaphragms" with a dropdown menu set to "Diaphragm Conn Plate". At the bottom, there are three buttons: "OK", "Cancel", and "Help".

The **Stiffener Ranges** window are updated as shown below.

The screenshot shows the "Stiffener Ranges" window. At the top, there is a diagram of a beam with vertical lines representing stiffeners. Below the diagram, there are labels for "Start Distance" and "Spacing". The main part of the window is a table with two tabs: "Transverse stiffener ranges" (selected) and "Longitudinal stiffener ranges". The table has the following columns: Name, Support number, Start distance (ft), Number of spaces, Spacing (in), Length (ft), and End distance (ft). The data in the table is as follows:

Name	Support number	Start distance (ft)	Number of spaces	Spacing (in)	Length (ft)	End distance (ft)
> Diaphragm Conn Plate	1	20	1	0	0	20
Diaphragm Conn Plate	2	5.25	1	0	0	5.25
Diaphragm Conn Plate	2	7.25	1	0	0	7.25
Diaphragm Conn Plate	2	7.25	4	202.5	67.5	74.75
Diaphragm Conn Plate	2	76.75	1	0	0	76.75
Diaphragm Conn Plate	3	20	1	0	0	20

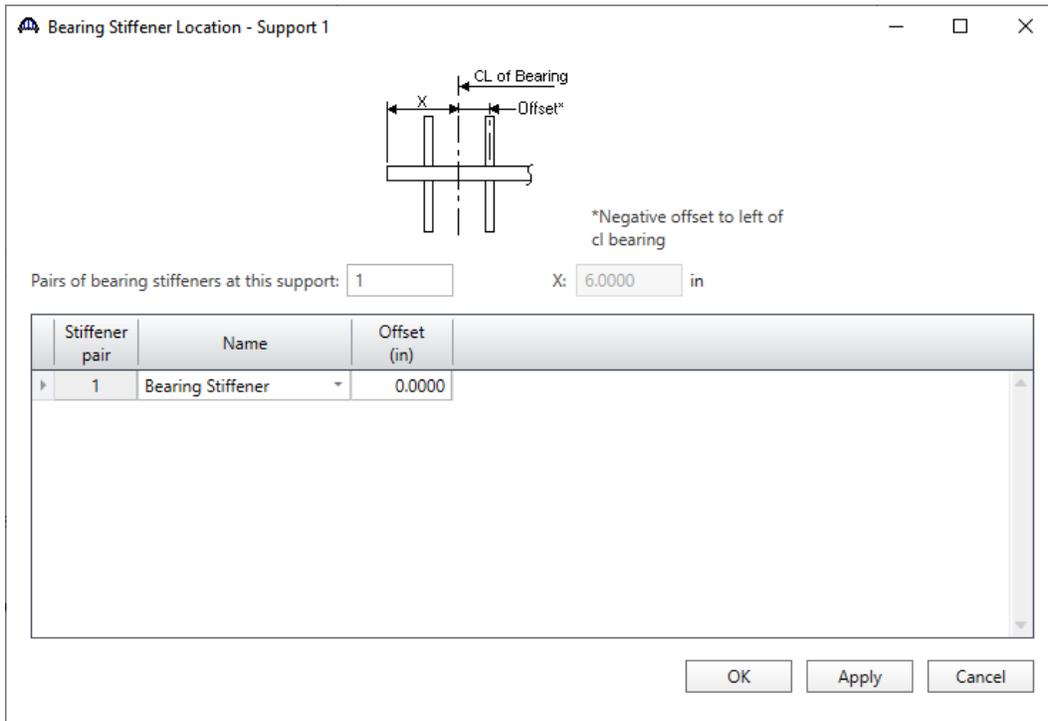
At the bottom of the window, there are buttons for "Apply at diaphragms...", "Stiffeners between diaphragms...", "New", "Duplicate", "Delete", "OK", "Apply", and "Cancel".

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

STL8 – Pin and hanger Rolled Beam Example

Bearing Stiffener Locations

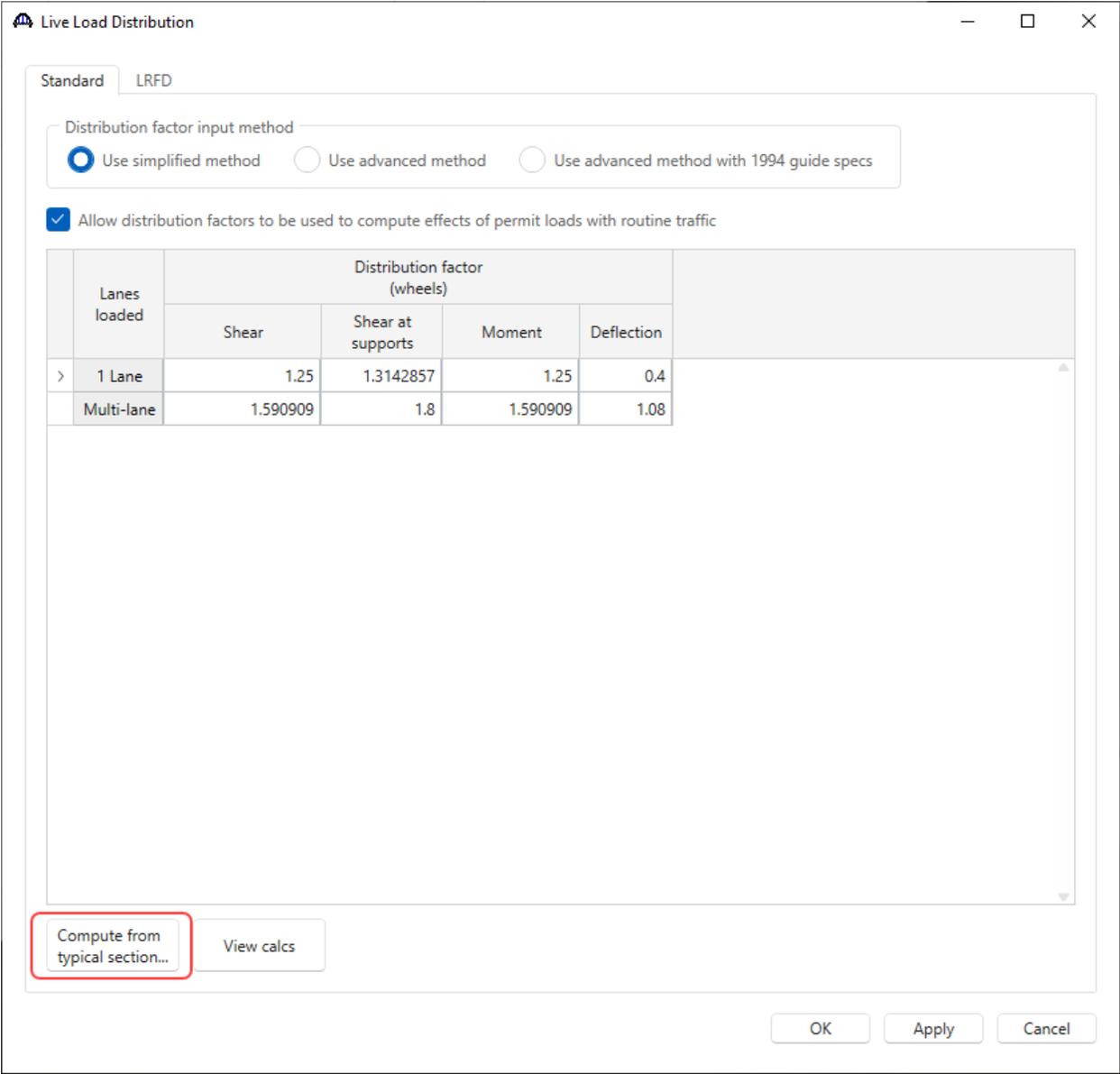
Bearing stiffener definitions were assigned to locations when the **Apply at diaphragms...** option was used on the **Stiffener Ranges** window. The **Bearing Stiffener Location – Support 1** window is opened by expanding the **Bearing Stiffener Locations** node in the **Bridge Workspace** tree and double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



STL8 – Pin and hanger 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 the **View Calcs** button.

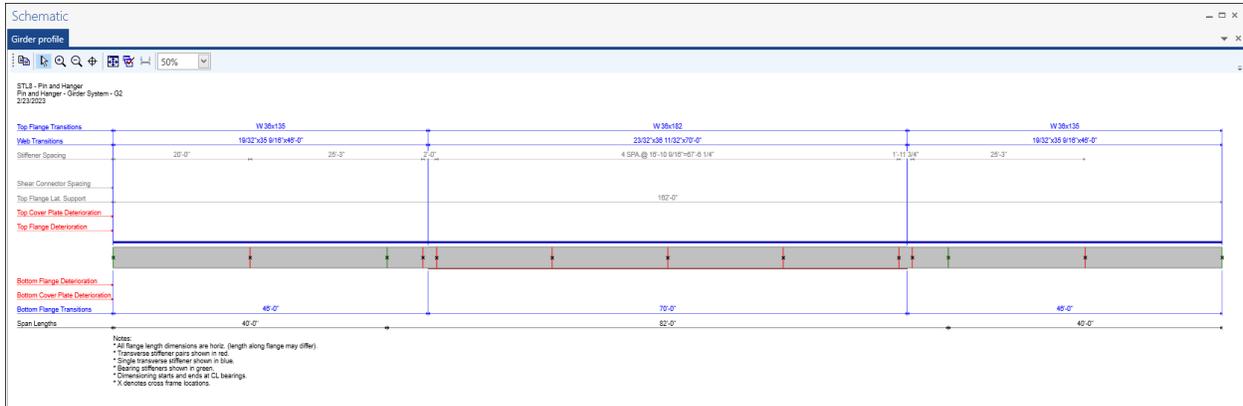
Click **OK** to apply the data and close the window.

The description of an interior beam for the structure definition is complete.

STL8 – Pin and hanger Rolled Beam Example

Schematic – Member alternative

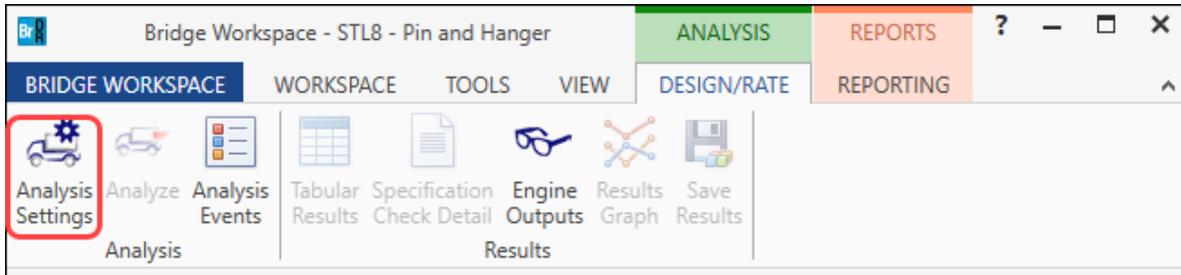
While the member alternative **Rolled Beam with Cover Plates** for member **G2** is selected in the **Bridge Workspace** tree, open the schematic for the girder profile by selecting the **Schematic** button on the **WORKSPACE** ribbon (or right click and select **Schematic** from the menu).



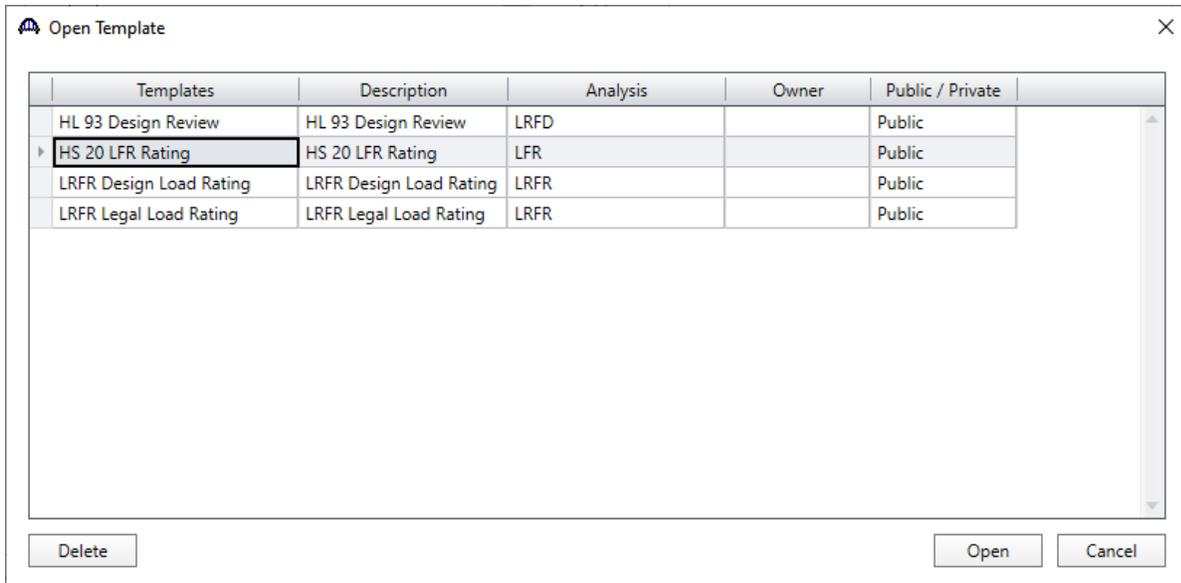
STL8 – Pin and hanger Rolled Beam Example

LFR Analysis

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

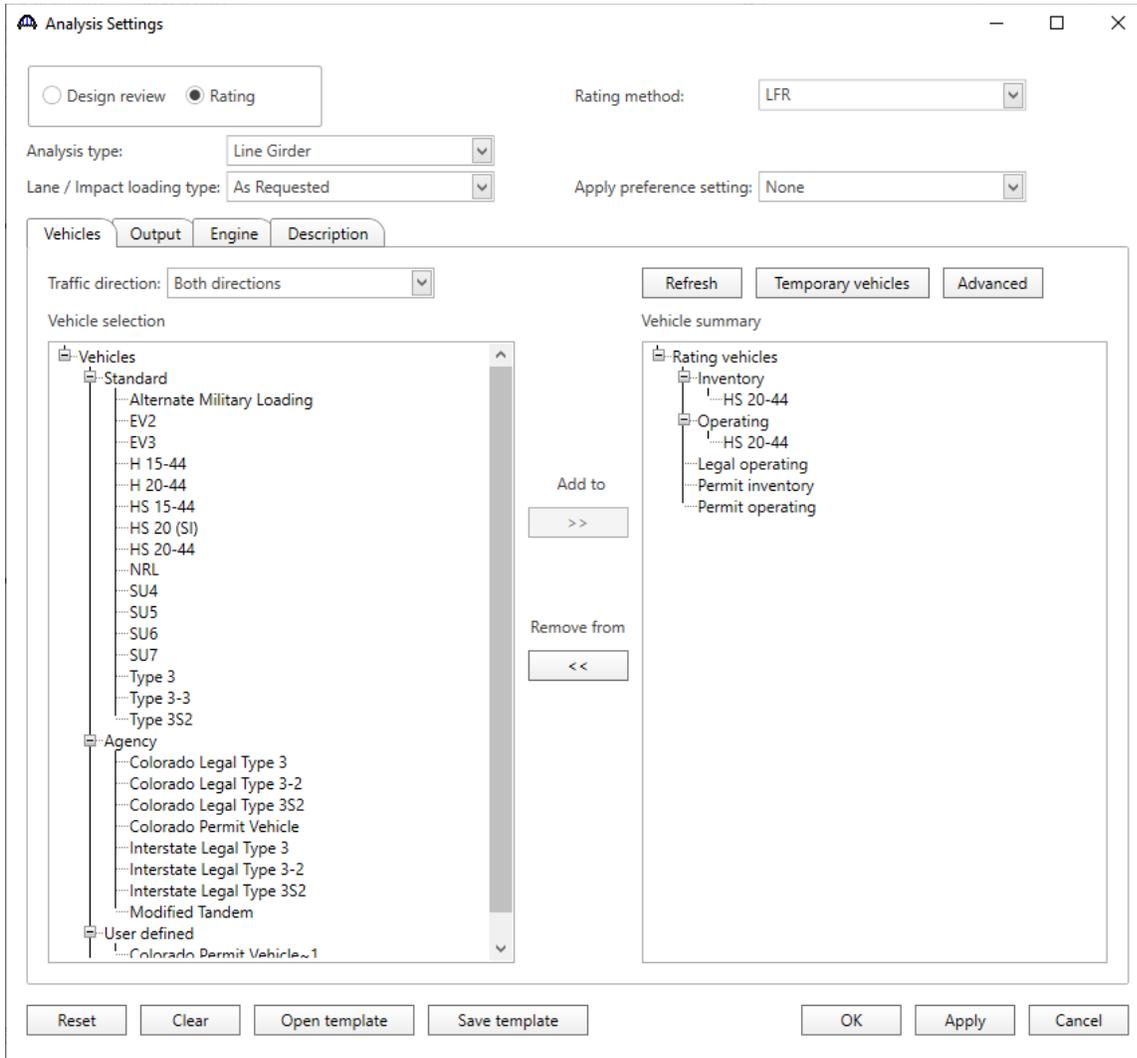


Click the **Open Template** button and select the **HS 20 LFR Rating** used in the rating and click **Open**.



STL8 – Pin and hanger Rolled Beam Example

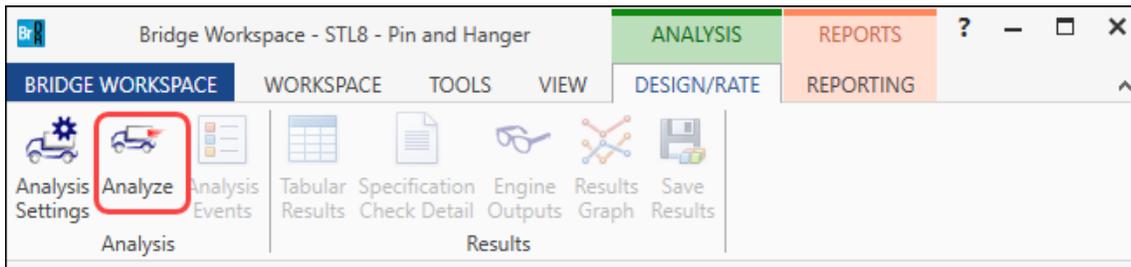
The **Analysis Settings** window are populated as shown below.



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

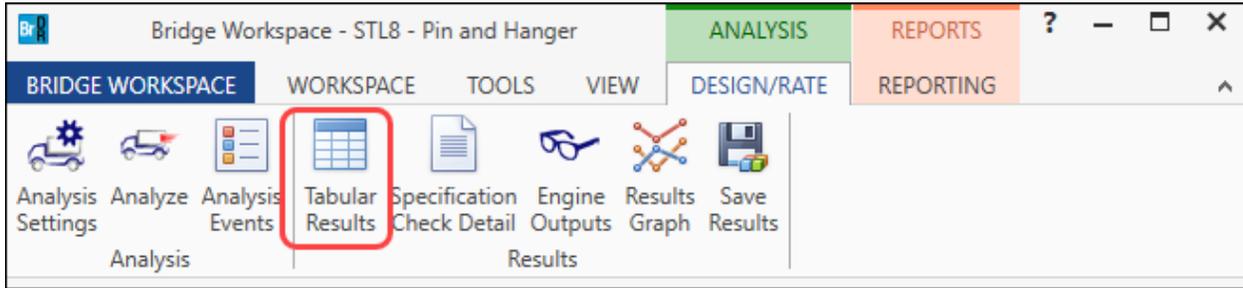
Tabular Results

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



STL8 – Pin and hanger Rolled Beam Example

When the rating is complete, 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 Alt' window. It features 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
HS 20-44	Axle Load	LFR	Inventory	40.13	1.115	122.00	2 - (100.0)	Design Flexure - Steel	As Requested	As Requested
HS 20-44	Axle Load	LFR	Operating	67.02	1.862	122.00	2 - (100.0)	Design Flexure - Steel	As Requested	As Requested
HS 20-44	Lane	LFR	Inventory	59.18	1.644	122.00	2 - (100.0)	Design Flexure - Steel	As Requested	As Requested
HS 20-44	Lane	LFR	Operating	98.82	2.745	122.00	2 - (100.0)	Design Flexure - Steel	As Requested	As Requested

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