

*AASHTOWare BrDR 7.5.0*

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*Floor System Tutorial*

*FS3 – Floorbeam Stringer Floor System Example*

# FS3 – Floorbeam Stringer Floor System Example

## BrDR Tutorial

### Topics Covered

- Superstructure composed of floorbeams and stringers.
- System superstructure definition
- Rolled beam stringers.
- Plate girder floorbeams, linearly varying web.
- Using wizards to create member alternatives for stringer and floorbeam members.

This example demonstrates entering a Floorbeam-Stringer superstructure in BrDR using the System superstructure definition approach.

Superstructure composed of girders, floorbeams and stringers.

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 details:

- Bridge ID: FS System
- NBI structure ID (8): FS System
- Template:
- Bridge completely defined:
- Bridge Workspace View:
  - Superstructures:
  - Culverts:
  - Substructures:
- Description tab selected.
- Name: Floorbeam Stringer System Example
- Year built: [empty]
- Description: [empty text area]
- Location: [empty]
- Length: [empty] ft
- Facility carried (7): [empty]
- Route number: -1
- Feat. intersected (6): [empty]
- Mi. post: [empty]
- Default units: US Customary
- Bridge association...:  BrR,  BrD,  BrM
- Buttons: OK, Apply, Cancel

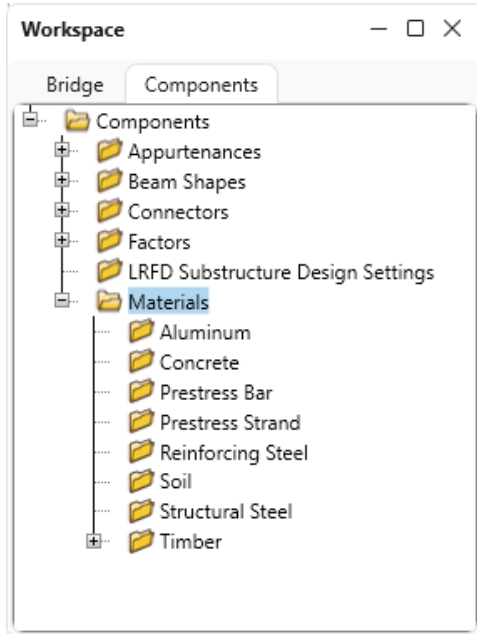
Click **OK** to apply the data and close the window.

## FS3 – Floorbeam Stringer Floor System Example

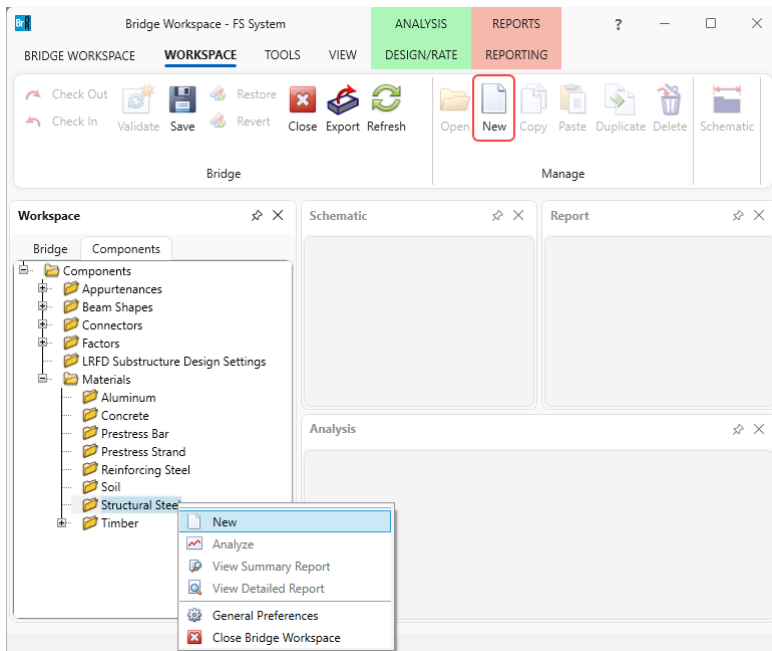
### Bridge Materials

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

The tree with the expanded **Materials** branch is shown below.

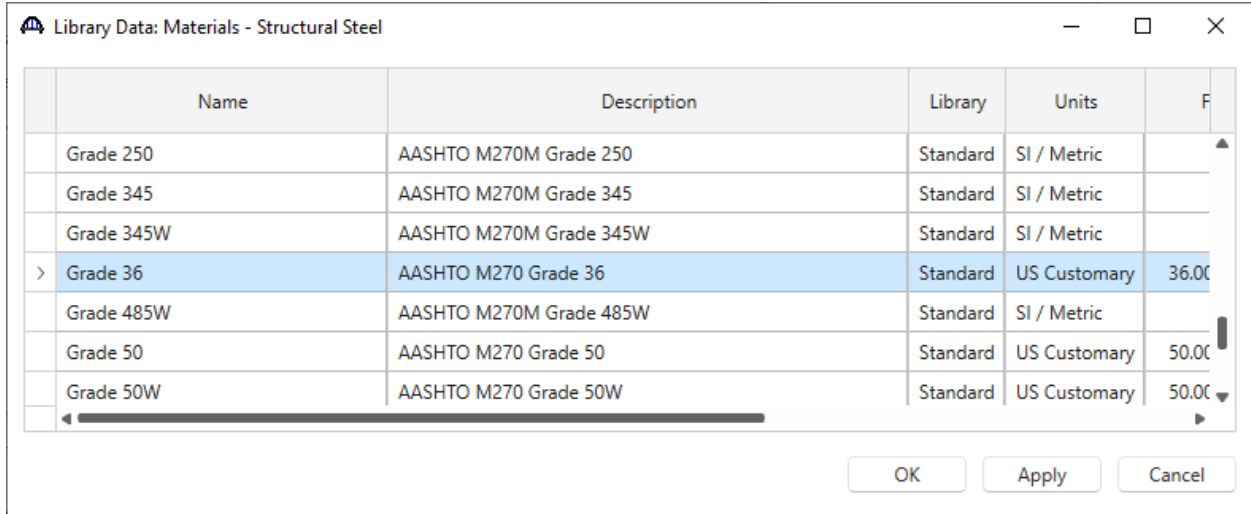


To add a new structural steel material, in the **Components** tab of the **Bridge Workspace**, click on **Materials**, **Structural Steel**, and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or right mouse click on **Structural Steel** and select **New**). The window shown below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

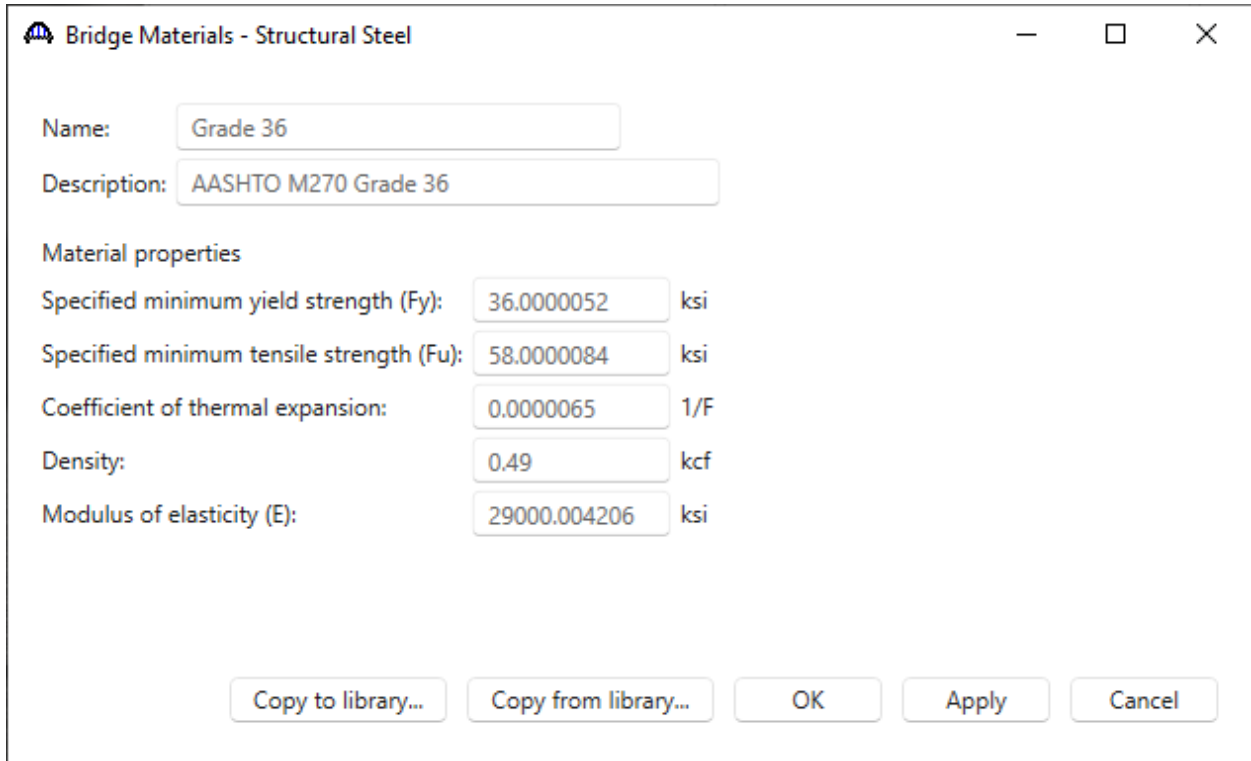


## FS3 – Floorbeam Stringer Floor System Example

Add the structural steel material by clicking the **Copy from library...** button. The following window opens. Select **Grade 36** and click **OK**.



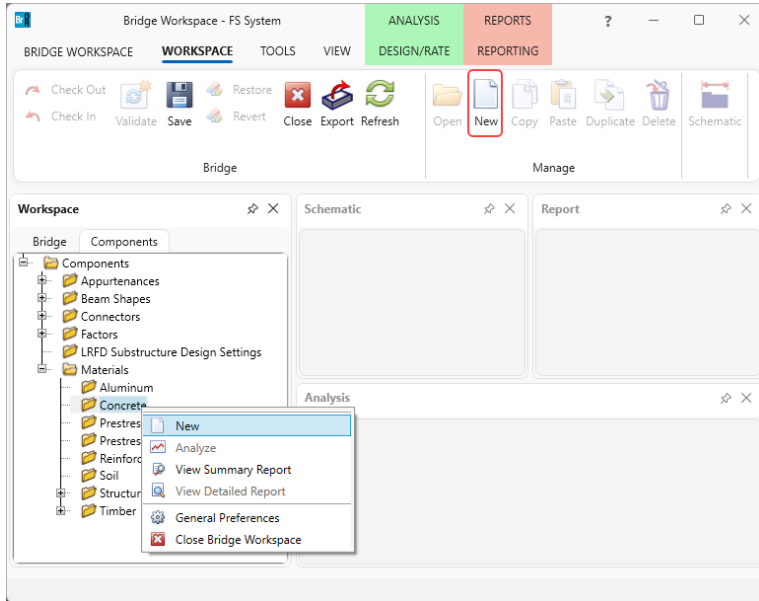
The selected material properties are copied to the **Bridge Materials – Structural Steel** window as shown below.



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

## FS3 – Floorbeam Stringer Floor System Example

Add a new concrete material, by clicking on **Materials, Concrete**, and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or right mouse click on **Concrete** and select **New**). The window shown below will open.



Enter the values shown above the **Compute** button and click the **Compute** button to compute the remaining values below them.

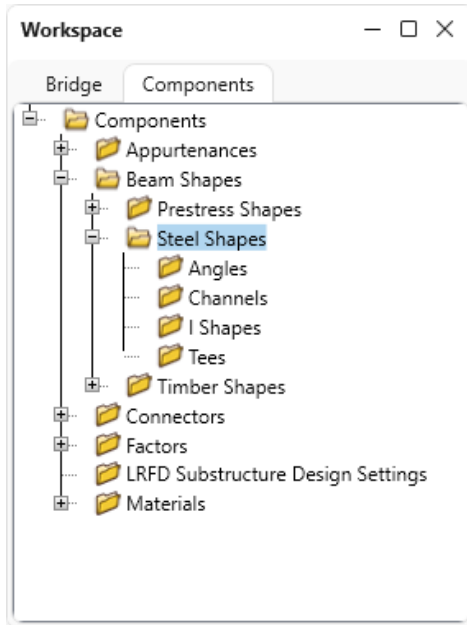
Name:	3.5 ksi concrete
Description:	
Compressive strength at 28 days (f'c):	3.5 ksi
Initial compressive strength (f'ci):	
Composition of concrete:	Normal
Density (for dead loads):	0.15 kcf
Density (for modulus of elasticity):	0.145 kcf
Poisson's ratio:	0.2
Coefficient of thermal expansion (α):	0.000006 1/F
Splitting tensile strength (fct):	
LRFD Maximum aggregate size:	
Std modulus of elasticity (Ec):	3408.787789 ksi
LRFD modulus of elasticity (Ec):	3814.69399 ksi
Std initial modulus of elasticity:	
LRFD initial modulus of elasticity:	
Std modulus of rupture:	0.443706 ksi
LRFD modulus of rupture:	0.448999 ksi
Shear factor:	1

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

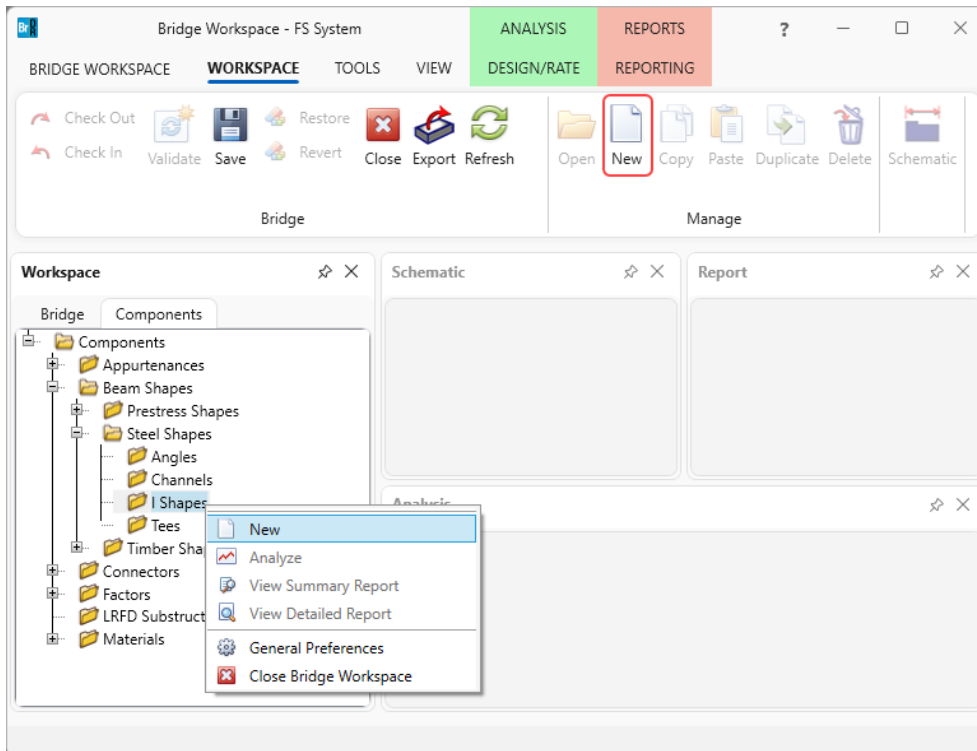
## FS3 – Floorbeam Stringer Floor System Example

### Beam Shapes

To enter a steel beam shape to be used in this bridge, expand the tree labeled **Beam Shapes** and **Steel Shapes** as shown below. The partially expanded **Components** tree with the **Steel Shapes** node expanded is shown below.

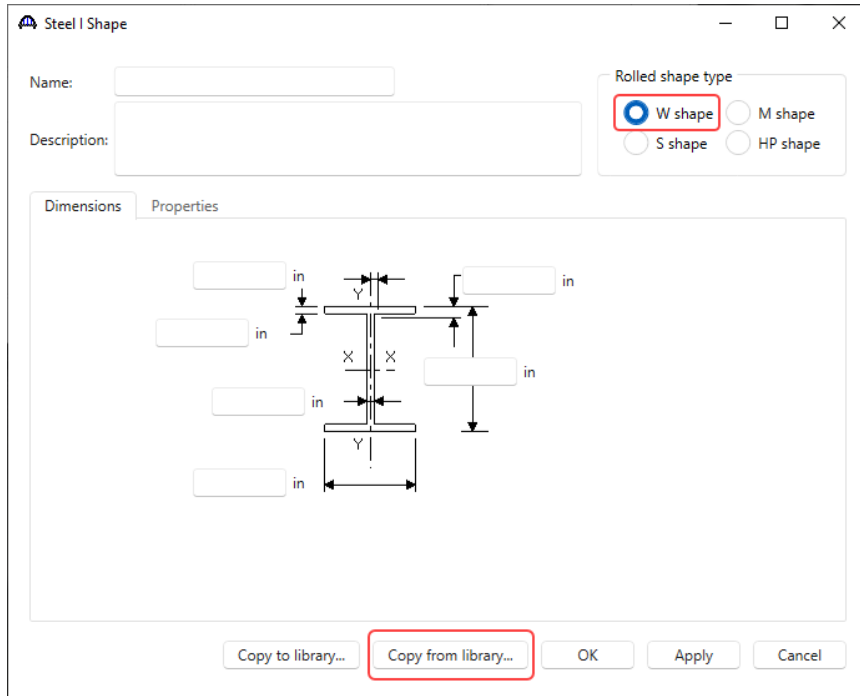


To add a new steel I shape, click on the **I Shapes** node in the **Components** tree and select **New** from the **Manage** group of the **WORKSPACE** ribbon (or right mouse click on **I Shapes** and select **New** or double click on **I Shapes** in the **Components** tree). The window shown below will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

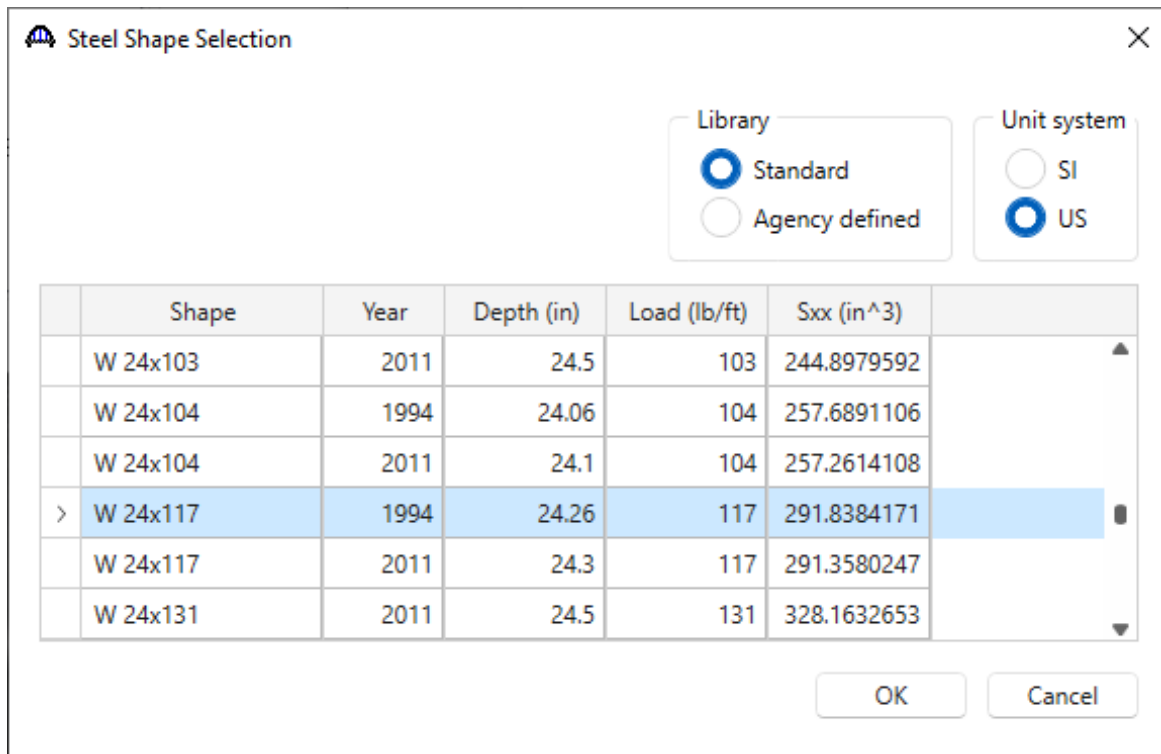


## FS3 – Floorbeam Stringer Floor System Example

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 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 **W24x117 (Year – 1994)** and click **OK**.



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

The screenshot shows the 'Steel I Shape' dialog box. The 'Name' field contains 'W 24x117' and the 'Description' field contains 'W 24x117 Imported from AISC Tables (1994)'. Under 'Rolled shape type', 'W shape' is selected. The 'Dimensions' tab is active, displaying a cross-section diagram of a wide-flange beam with the following dimensions: top flange thickness (0.85 in), flange width (12.8 in), web thickness (0.55 in), web height (24.26 in), and bottom flange thickness (1.625 in). The diagram also shows the X and Y axes. At the bottom, there are buttons for 'Copy to library...', 'Copy from library...', 'OK', 'Apply', and 'Cancel'.

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

Similarly add a **W16x67 (Year – 1994)** steel I shape. The **Steel I Shape** window will be updated as shown below.

The screenshot shows the 'Steel I Shape' dialog box updated for a 'W 16x67' beam. The 'Name' field contains 'W 16x67' and the 'Description' field contains 'W 16x67 Imported from AISC Tables (1994)'. Under 'Rolled shape type', 'W shape' is selected. The 'Dimensions' tab is active, displaying a cross-section diagram of a wide-flange beam with the following dimensions: top flange thickness (0.665 in), flange width (10.235 in), web thickness (0.395 in), web height (16.33 in), and bottom flange thickness (1.375 in). The diagram also shows the X and Y axes. At the bottom, there are buttons for 'Copy to library...', 'Copy from library...', 'OK', 'Apply', and 'Cancel'.

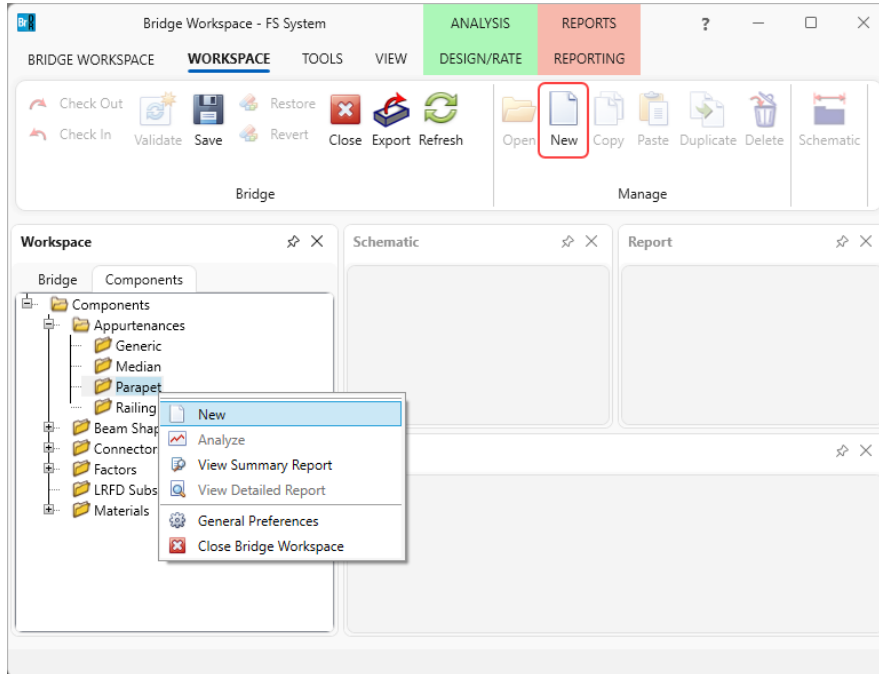
Click **OK** apply the data and close the window.



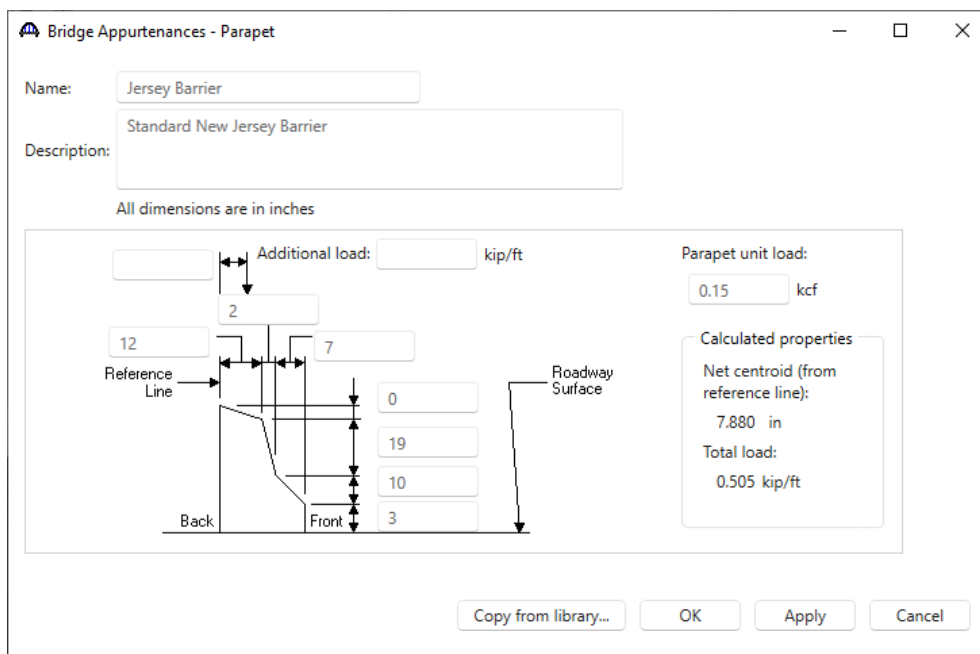
## FS3 – Floorbeam Stringer Floor System Example

### Bridge Appurtenances - Parapet

To enter the appurtenances to be 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. Select **Jersey Barrier** and click **OK**. The selected parapet is copied to the **Bridge Appurtenances – Parapet** window as shown below.

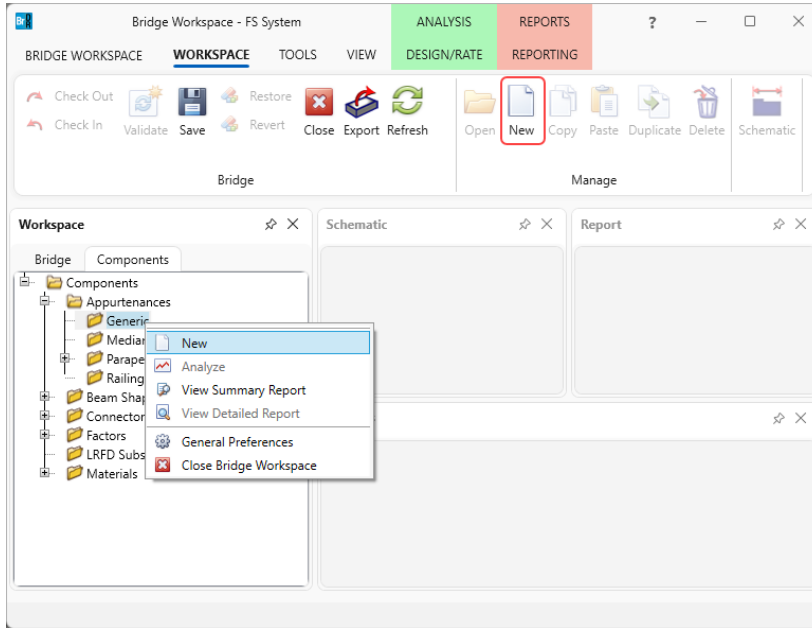


Click **OK** apply the data and close the window.

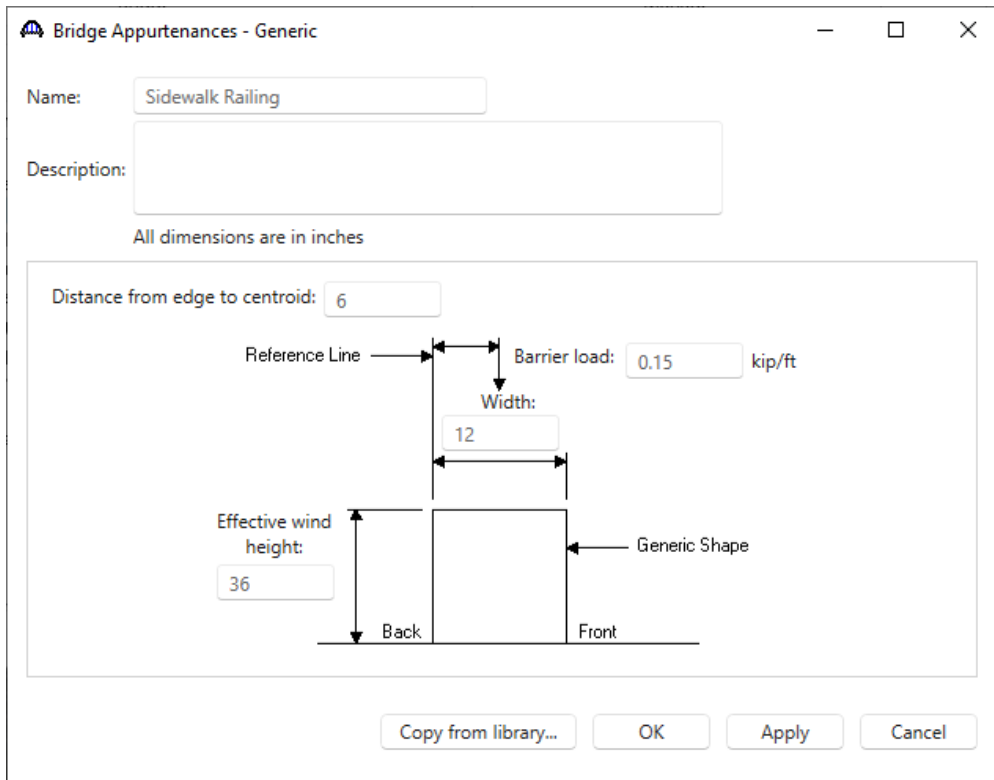
# FS3 – Floorbeam Stringer Floor System Example

## Bridge Appurtenances - Generic

To enter the appurtenances to be used within the bridge, expand the tree branch labeled **Appurtenances**. To define a generic barrier, 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.

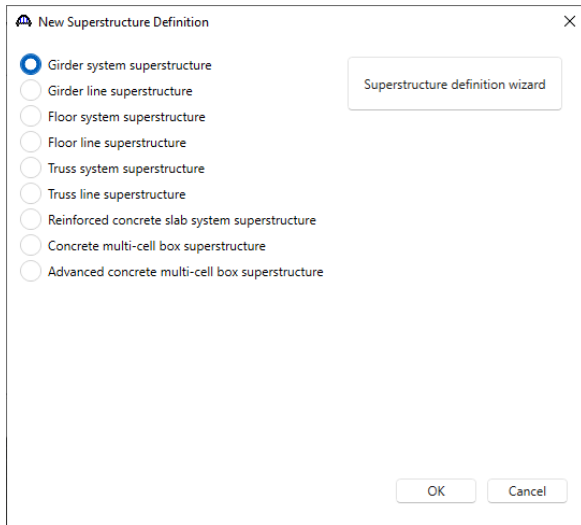


Click **OK** to apply the data and close the window.

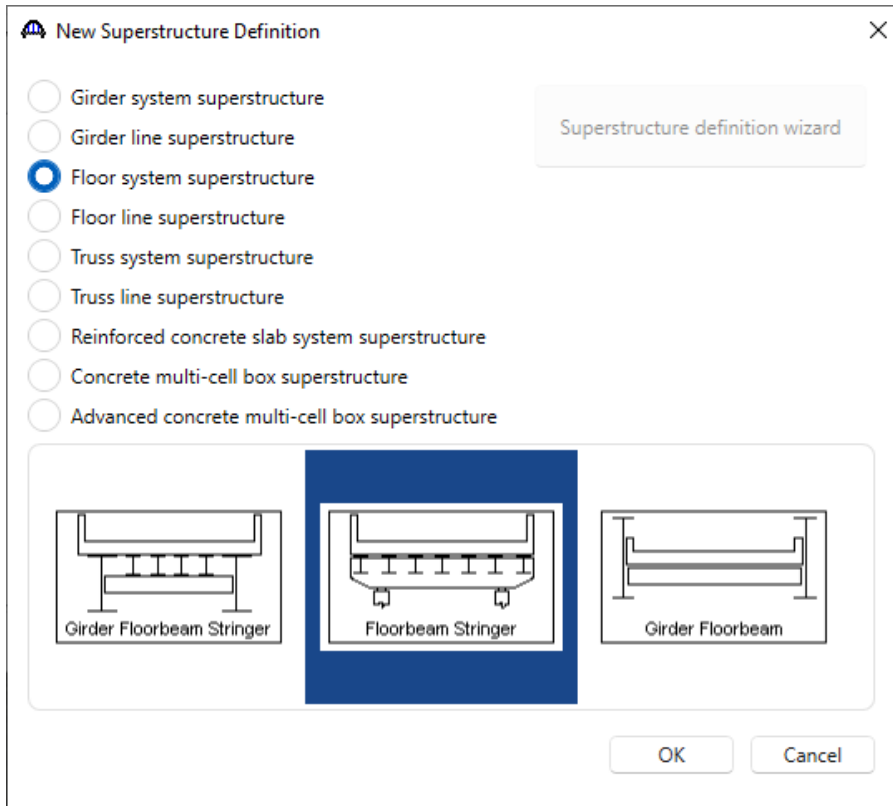
## FS3 – Floorbeam Stringer Floor System Example

### 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.



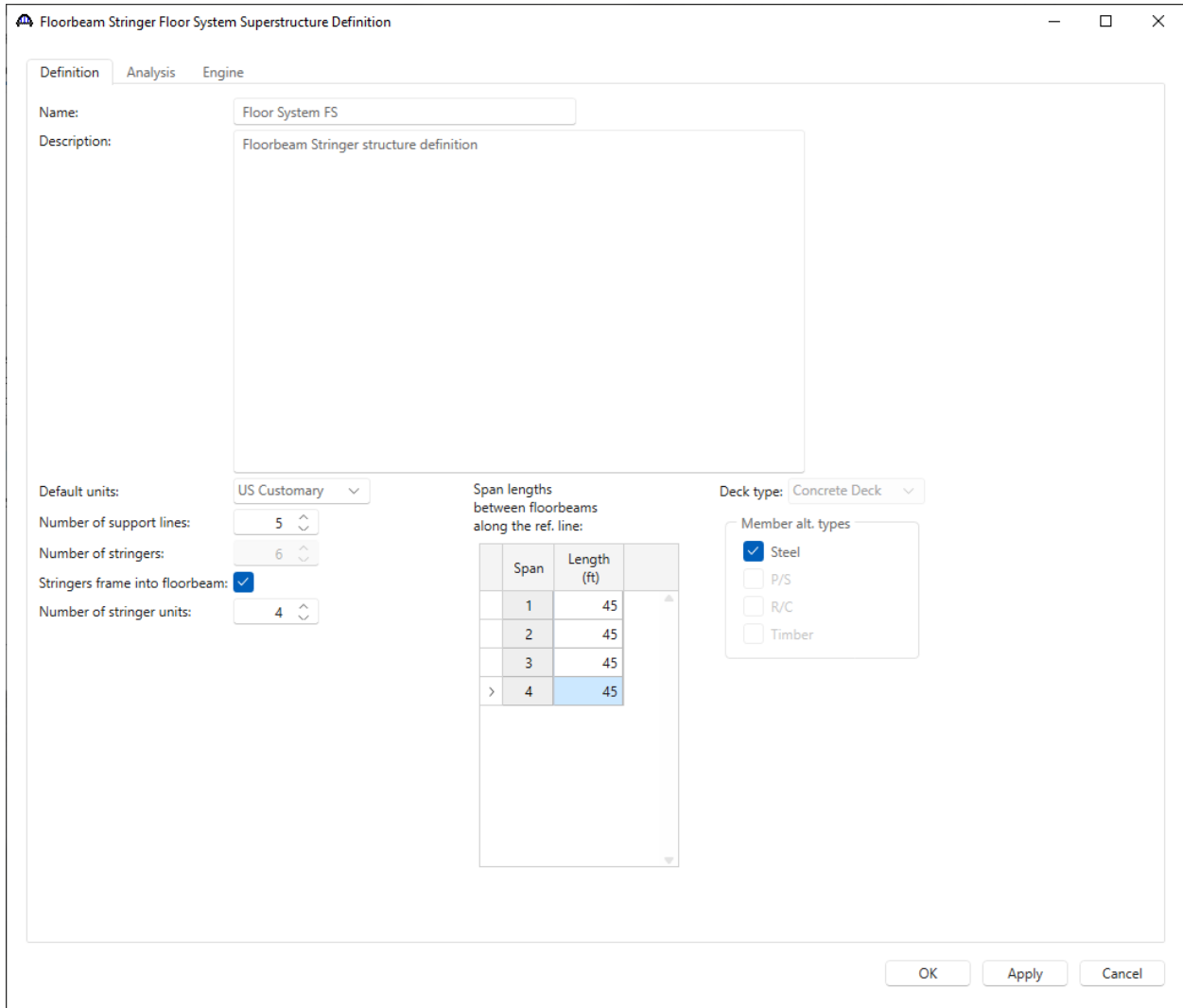
Selecting **Floor system superstructure** displays three types of floor system superstructure definitions. Select the Floorbeam Stringer and click **OK**.



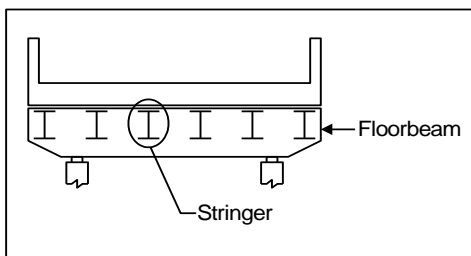
# FS3 – Floorbeam Stringer Floor System Example

## Floorbeam Stringer Floor System Superstructure Definition

The **Floorbeam Stringer Floor System Superstructure Definition** window will open. Enter the data as shown below.

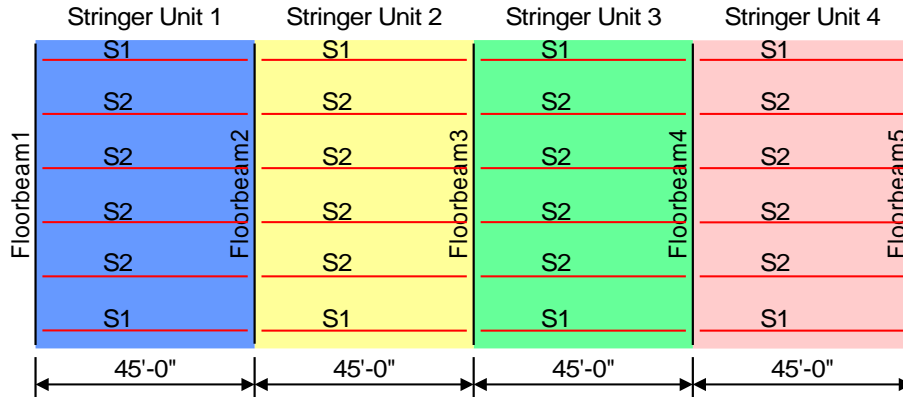


The following describes some of the terminology on this window. As shown in the sketch, this structure has 6 stringers. Each floorbeam in a Floorbeam-Stringer superstructure is a support line so this superstructure has 5 support lines since it has 5 floorbeams.



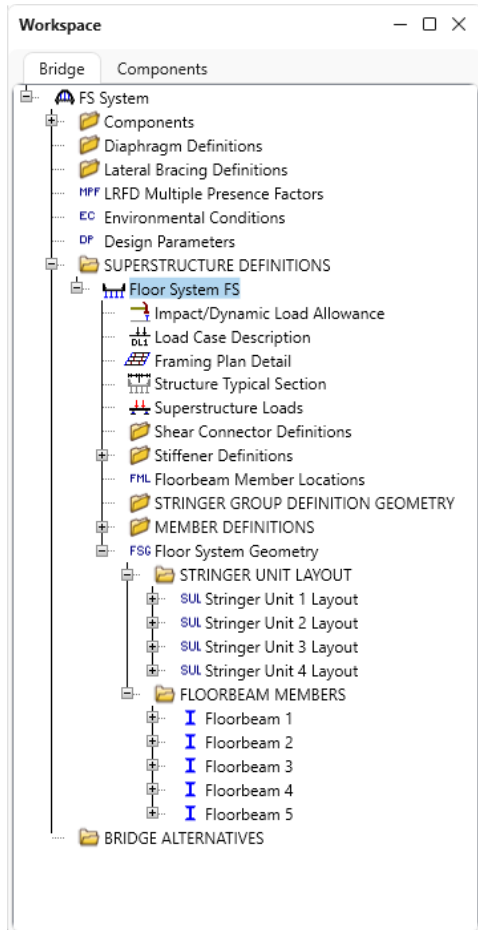
## FS3 – Floorbeam Stringer Floor System Example

Stringer Units are the portions of the structure where the stringers are to be analyzed as structurally continuous units. In this structure, the stringers are simple span between the floorbeams and there are 4 stringer units. Each stringer unit contains 6 stringer members.



Framing Plan  
(Stringers are shown in red, they are single span between floorbeams.)  
4 Stringer Units in this superstructure definition

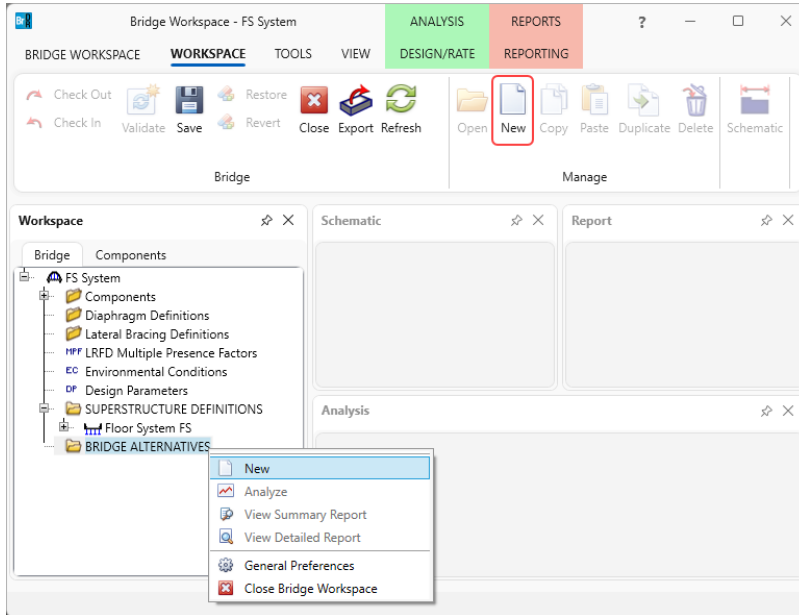
The partially expanded **Bridge Workspace** tree is shown below.



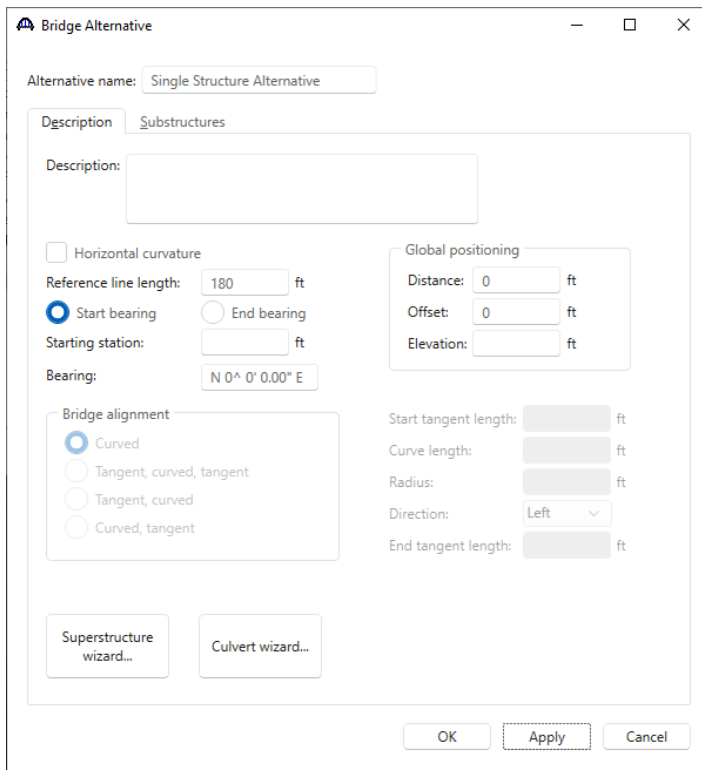
# FS3 – Floorbeam Stringer Floor System Example

## BRIDGE ALTERNATIVES

Navigate to the **BRIDGE ALTERNATIVES** node in the **Bridge Workspace** tree and create a new bridge alternative by double-clicking on **BRIDGE ALTERNATIVES** (or click on **BRIDGE ALTERNATIVES** and select **New** from the **Manage** group of the **WORKSPACE** ribbon).



Enter the following data.

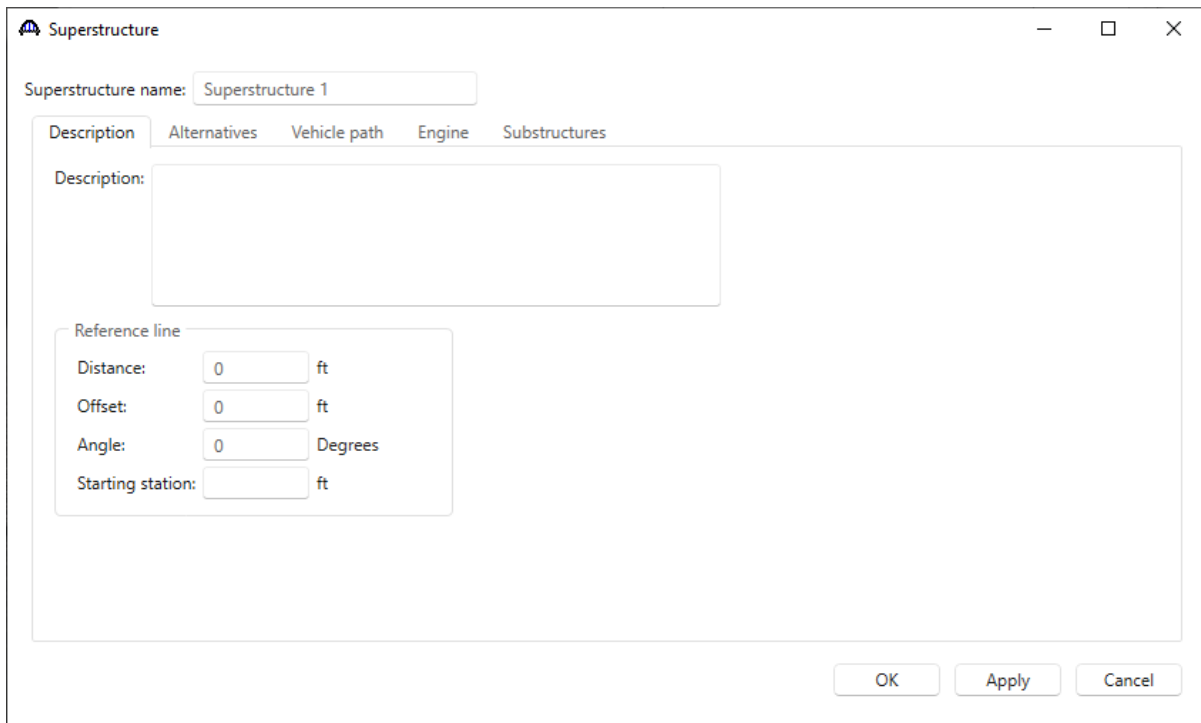
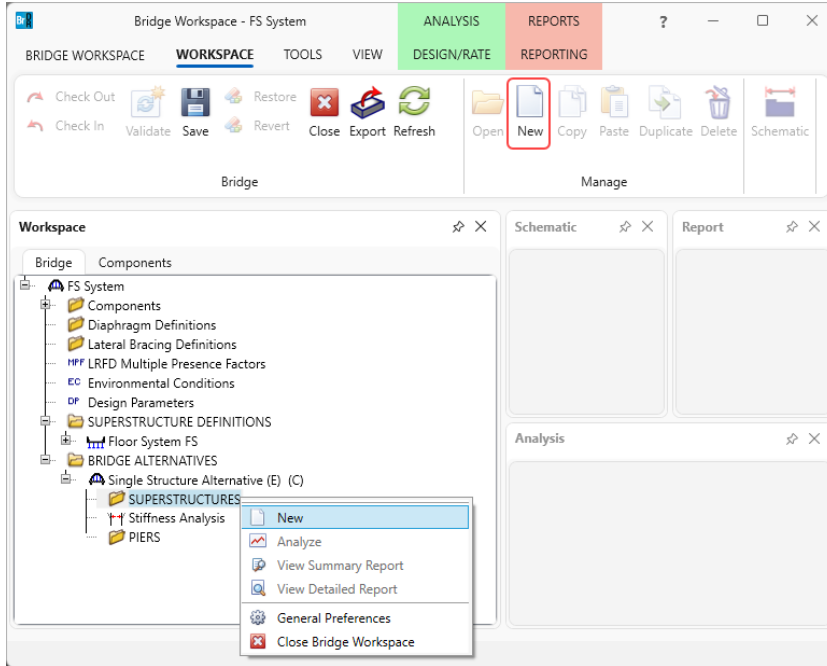


Click **OK** to apply the data and close the window.

# FS3 – Floorbeam Stringer Floor System Example

## SUPERSTRUCTURES

Expand the **Single Structure Alternative** node in the **Bridge Workspace** tree by clicking the **+** button. Double-click on the **SUPERSTRUCTURES** node (or select **SUPERSTRUCTURES** and click **New** from the **Manage** group of the **WORKSPACE** ribbon) and enter the following new superstructure.

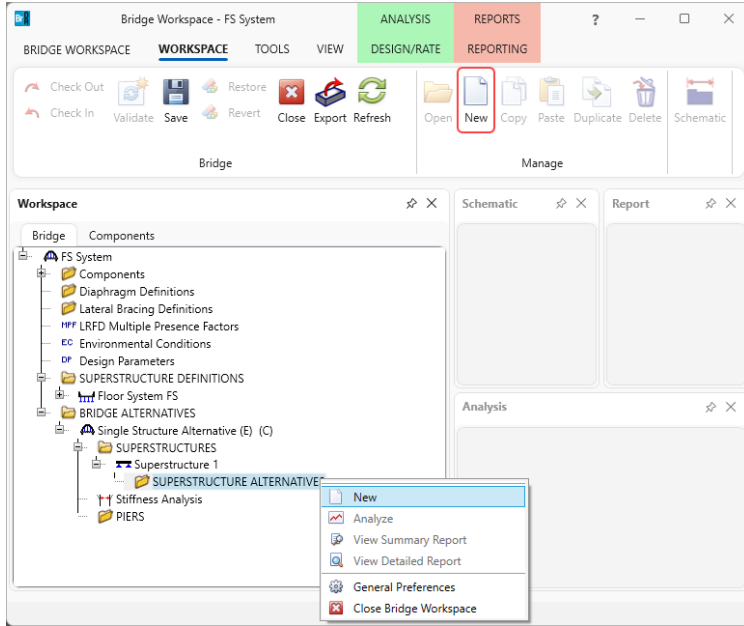


Click **OK** to apply the data and close the window.

## FS3 – Floorbeam Stringer Floor System Example

### Superstructure Alternative

Expand the **Superstructure 1** node in the **Bridge Workspace** tree by clicking the **+** button. Double-click on the **SUPERSTRUCTURE ALTERNATIVES** node (or select **SUPERSTRUCTURE ALTERNATIVES** and click **New** from the **Manage** group of the **WORKSPACE** ribbon) and enter the following new superstructure alternative.



Select the **Superstructure definition Floor System FS** as the current superstructure definition for this Superstructure Alternative.

The Superstructure Alternative dialog box is shown with the following configuration:

- Alternative name: Existing Alternative
- Description: (empty)
- Superstructure definition: Floor System FS
- Superstructure type: FloorBeam Stringer
- Number of main members: 0

Span	Length (ft)
1	45
2	45
3	45
4	45

Buttons: OK, Apply, Cancel

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



## FS3 – Floorbeam Stringer Floor System Example

### Load Case Description

Navigate to the **Floor System FS** superstructure definition and 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.

The screenshot shows the 'Load Case Description' window with a table of load cases. The table has columns for Load case name, Description, Stage, Type, and Time\* (days). Below the table are buttons for 'New', 'Duplicate', 'Delete', 'OK', 'Apply', and 'Cancel'. A note at the bottom left says '\*Prestressed members only'.

Load case name	Description	Stage	Type	Time* (days)
DC1	DC acting on non-composite section	Non-composite (Stage 1)	D,DC	
DC2	DC acting on long-term composite section	Composite (long term) (Stage 2)	D,DC	
DW	DW acting on long-term composite section	Composite (long term) (Stage 2)	D,DW	
> SIP Forms	Weight due to stay-in-place forms	Non-composite (Stage 1)	D,DC	

\*Prestressed members only    Add default load case descriptions    New    Duplicate    Delete    OK    Apply    Cancel

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.

The screenshot shows the 'Structure Framing Plan Details' window. It includes a 'Number of stringers' field set to 6, a 'Layout' tab, and three sections: 'Support skew', 'Member spacing orientation', and 'Stringer spacing'. The 'Support skew' table has columns for Support and Skew (degrees). The 'Member spacing orientation' section has radio buttons for 'Perpendicular to member' (selected) and 'Along support'. The 'Stringer spacing' table has columns for Stringer bay, Start of stringer, and End of stringer.

Number of stringers: 6

Layout

Support skew:

Support	Skew (degrees)
> 1	0
2	0
3	0
4	0
5	0

Member spacing orientation:

Perpendicular to member  
 Along support

Stringer spacing:

Stringer bay	Stringer spacing (ft)	
	Start of stringer	End of stringer
1	7	7
2	7	7
3	7	7
4	7	7
> 5	7	7

OK    Apply    Cancel

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

# FS3 – Floorbeam Stringer Floor System Example

## Structure Typical Section - Deck

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

Superstructure Definition Reference Line

Left edge of deck to first stringer

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

Superstructure definition reference line is within the bridge deck.

	Start	End
Distance from left edge of deck to superstructure definition reference line:	19.75 ft	19.75 ft
Distance from right edge of deck to superstructure definition reference line:	19.75 ft	19.75 ft
Left edge of deck to first stringer:	2.25 ft	2.25 ft

OK Apply Cancel

## FS3 – Floorbeam Stringer Floor System Example

### Structure Typical Section – Deck (cont'd)

The **Deck (cont'd)** tab is used to enter information about the **Deck concrete** and the **Total deck thickness**. The material to be 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' software window with the 'Deck (cont'd)' tab selected. At the top, a diagram illustrates the deck layout with labels: 'Distance from left edge of deck to superstructure definition ref. line', 'Distance from right edge of deck to superstructure definition ref. line', 'Superstructure Definition Reference Line', and 'Left edge of deck to first stringer'. Below the diagram is a tabbed menu with 'Deck (cont'd)' active, and other tabs include 'Deck', 'Parapet', 'Median', 'Railing', 'Generic', 'Sidewalk', 'Lane position', 'Striped lanes', and 'Wearing surface'. The main input area contains the following fields:

- Deck concrete: 3.5 ksi concrete (dropdown)
- Total deck thickness: 9 in (text input)
- Load case: Engine Assigned (dropdown)
- Deck crack control parameter: 130 kip/in (text input)
- Sustained modular ratio factor: (empty text input)

At the bottom right, there are three buttons: 'OK', 'Apply', and 'Cancel'.

# FS3 – Floorbeam Stringer Floor System Example

## Structure Typical Section – Parapet

Click the **New** button to add a row to the table. The **Name** of the parapet defaults to the only parapet described for the bridge. The completed tab is shown below.

The screenshot shows a software window titled "Structure Typical Section" with a standard Windows interface (minimize, maximize, close buttons). In the top left, there is a diagram of a parapet cross-section with "Back" and "Front" labels. Below the diagram are several tabs: "Deck", "Deck (cont'd)", "Parapet", "Median", "Railing", "Generic", "Sidewalk", "Lane position", "Striped lanes", and "Wearing surface". The "Parapet" tab is active, displaying 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
>	Jersey Barrier	DC2	Back	Left Edge	6	6	Right
	Jersey Barrier	DC2	Back	Right Edge	6	6	Left

Below the table are three buttons: "New", "Duplicate", and "Delete". At the bottom of the window are three buttons: "OK", "Apply", and "Cancel".

## FS3 – Floorbeam Stringer Floor System Example

### Structure Typical Section – Generic

Click the **New** button to add a row to the table. The **Name** of the generic barrier defaults to the only barrier described for the bridge. 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
Sidewalk Railing	DC2	Front	Left Edge	0	0	Left
Sidewalk Railing	DC2	Front	Right Edge	0	0	Right

### Structure Typical Section – Lane Positions

Select the **Lane position** tab. This tab defines the travelways where vehicles can move across the width of the bridge. 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	-12	12	-12	12

## FS3 – Floorbeam Stringer Floor System Example

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

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	-12	12	-12	12

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.

This superstructure does not contain any transverse or bearing stiffeners so stiffener definitions will not be created.


### Floorbeam Member Locations

Double click on the **Floorbeam Member Locations** node in the **Bridge Workspace** tree to open the **Floorbeam Member Locations** window and enter the data as shown below.

These floorbeam member locations were created when the superstructure definition was created based on the number of support lines and the span lengths between floorbeams entered on the **Superstructure Definition** window. The location of the floorbeam members on this window cannot be edited because their locations are set by the span lengths entered on the **Superstructure Definition** window.

Enter the distance from the left edge of the deck to the left edge of the floorbeam for each floorbeam. This data positions the floorbeam relative to the structure typical section and the lane positions.

## FS3 – Floorbeam Stringer Floor System Example

 Floorbeam Member Locations
— □ ×

	Floorbeam name	Reference distance (ft)	Offset (ft)	Location (ft)	Skew (degrees)	Perpendicular distance from left edge of deck to left edge of floorbeam (ft)
>	FloorbeamMbrLocation1	0	0	0	0	1.25
	FloorbeamMbrLocation2	45	0	45	0	1.25
	FloorbeamMbrLocation3	90	0	90	0	1.25
	FloorbeamMbrLocation4	135	0	135	0	1.25
	FloorbeamMbrLocation5	180	0	180	0	1.25

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

### Stringer Group Definition Geometry – Stringer span lengths

Double click on the **STRINGER GROUP DEFINITION GEOMETRY** in the **Bridge Workspace** tree to define the geometry for a stringer group definition. A stringer group definition contains data regarding a portion of the structure where the stringers are structurally continuous. The stringers in this structure all have the same span data. They are single span between 2 floorbeams. One stringer group definition can be created to contain this geometry data and then later apply this stringer group definition to all 4 stringer units in the structure.

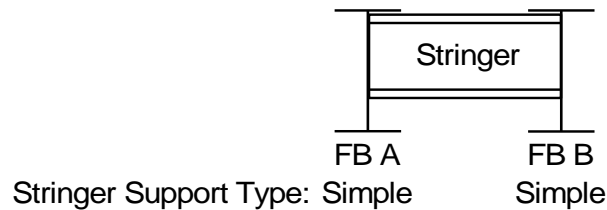
The default value for the **Number of floorbeams that support this stringer group definition** is **2**. The **Possible floorbeam spacing** list shows all the possible combinations of adjacent floorbeam spacings between 2 floorbeams.

## FS3 – Floorbeam Stringer Floor System Example

BrDR uses the information shown in the **Floorbeam Member Locations** window to produce this list. This structure has a constant floorbeam spacing of **45** feet, so this list only has one entry, **45.0000**.

Select **Yes** for the field **All floorbeams are perpendicular to the structure definition reference line**. The **Skew angle** column in the **Floorbeam spacings** grid will now be disabled. If some of the floorbeams in the superstructure definition were not perpendicular to the superstructure definition reference line, select **No** and then pick the appropriate skew angle in the **Floorbeam spacings** grid. It is necessary to know which floorbeams in the stringer group definition are skewed because skewed floorbeams will cause the stringer span lengths in the stringer group definition to vary.

The stringers in this stringer group definition have the following support types.



Enter data in the Floorbeam spacing grid to describe the span lengths of the stringer members that will be in the stringer units to which this stringer group definition is assigned in the **Floor System Geometry** window later. In this example, the default values in the grid are correct and no changes are required in the grid.

Enter the **Name** of the Stringer Group Definition as shown below.

**Stringer Group Definition Geometry**

Name: Stringer Group Def 1 Description:

Stringer span lengths | Diaphragms

Number of floorbeams that support this stringer group definition: 2

All floorbeams are perpendicular to the structure definition reference line:  Yes  No

**Floorbeam spacings**  
Select the floorbeam spacings which can be used to define the stringer span lengths in this stringer group definition:

Possible floorbeam spacing (ft): 45.0000

Floorbeam spacing (ft)	Skew angle (degrees)	Stringer support	Offset/cantilever length (ft)
> 0	0.000	Simple	0
45	0.000	Simple	0

**Computed resulting stringer span lengths**

Span	Length (ft)	Cantilever span
> 1	45	<input type="checkbox"/>

OK Apply Cancel

Click **Apply** to compute and apply the data before navigating to the **Diaphragms** tab.

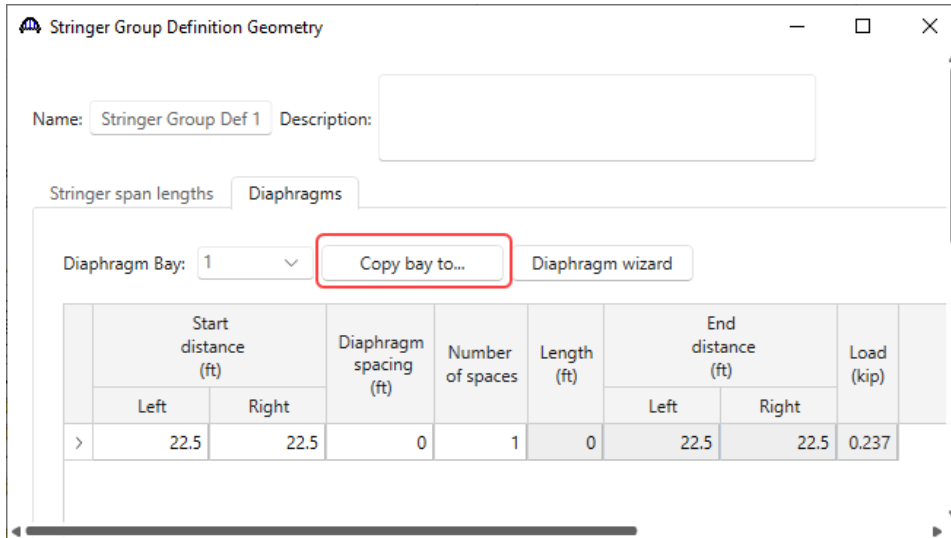


## FS3 – Floorbeam Stringer Floor System Example

Click **F1** on this window to open the **AASHTOWare BrDR Help** for this window to view some examples illustrating how to define stringer group definitions.

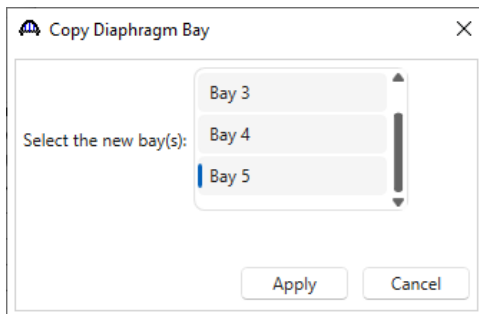
### Stringer Group Definition Geometry – Diaphragms

Navigate to the **Diaphragms** tab to enter the diaphragm spacing for the stringer group definition. Each diaphragm bay contains only 1 diaphragm along the length of the stringer group definition. Enter the following data for **Diaphragm Bay 1**.

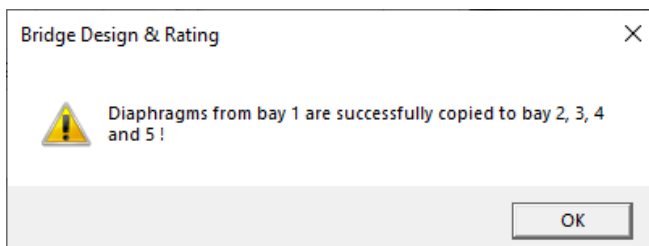


	Start distance (ft)		Diaphragm spacing (ft)	Number of spaces	Length (ft)	End distance (ft)		Load (kip)
	Left	Right				Left	Right	
>	22.5	22.5	0	1	0	22.5	22.5	0.237

Click the **Copy bay to...** button to copy the diaphragms entered for Bay 1 to the other bays. The following window appears. Select all the bays by holding the **Shift** key and Click **Apply** as shown below.



The following message appears indicating that the diaphragms have been copied. Click **OK** to close this window and update the diaphragms for each bay.



## FS3 – Floorbeam Stringer Floor System Example

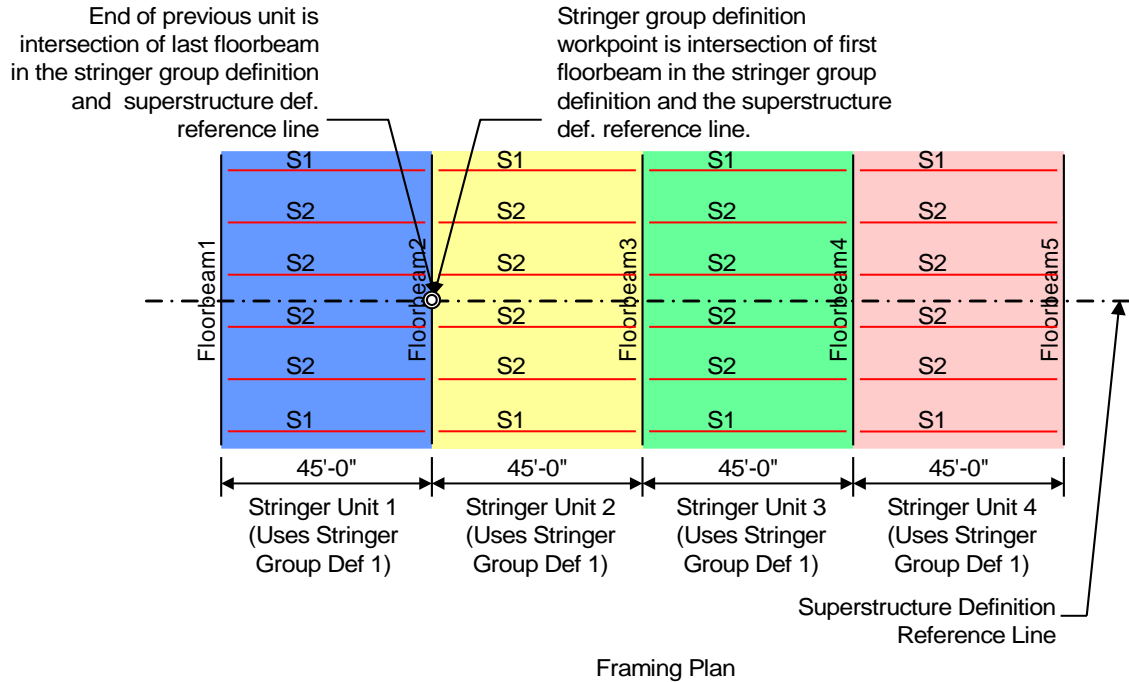
### Assigning Stringer Group Definitions to Stringer Units – Floorbeam System Geometry

Double click on the **Floor System Geometry** node in the **Bridge Workspace** tree to assign stringer group definitions to stringer units in the floor system superstructure definition. Enter the data as shown below.

Stringer unit number	Stringer group definition	Unit referenced from left end of superstructure or end of previous unit	Distance to stringer group definition workpoint (ft)	Mirror group definition	Include in analysis	
Unit 1	Stringer Group Def 1	Left end of structure	0	None	<input type="checkbox"/>	
Unit 2	Stringer Group Def 1	End of Previous Unit	0	None	<input checked="" type="checkbox"/>	
Unit 3	Stringer Group Def 1	End of Previous Unit	0	None	<input type="checkbox"/>	
> Unit 4	Stringer Group Def 1	End of Previous Unit	0	None	<input type="checkbox"/>	

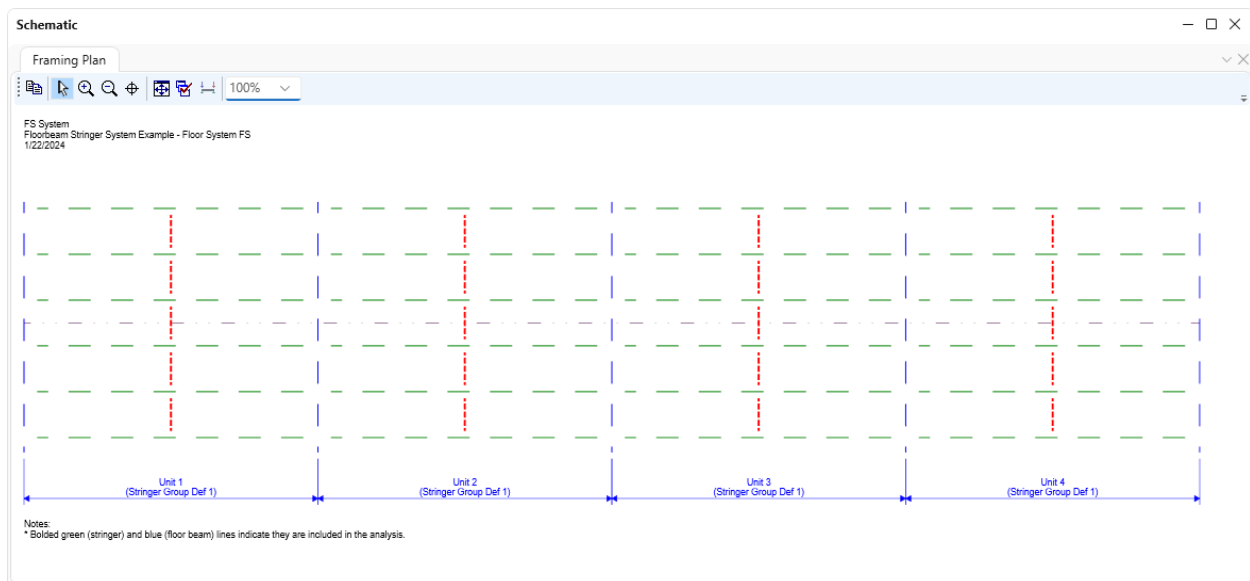
Before opening this window, the total number of stringers in this structure is known i.e., 24 since there are 4 stringer units and each unit contains 6 stringers. However, the location of these stringer members along the length of the structure and the length of the stringer is not known. The stringer members in the structure are all located at the beginning of the structure and do not have any length to them until a stringer group definition is assigned to the stringer units. The stringer group definition defines the stringer span lengths. Assigning stringer group definitions to the stringer units also locates the stringer members along the length of the structure. Click **F1** while this window is open to open the **AASHTOWare BrDR Help** to view examples illustrating how to assign stringer group definitions to stringer units.

## FS3 – Floorbeam Stringer Floor System Example



### 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 dashed lines represent the stringer member and floorbeam member locations. The members appear as dashed lines since member definitions are not assigned to them yet. The diaphragms entered in the Stringer group definitions are also displayed in this schematic.

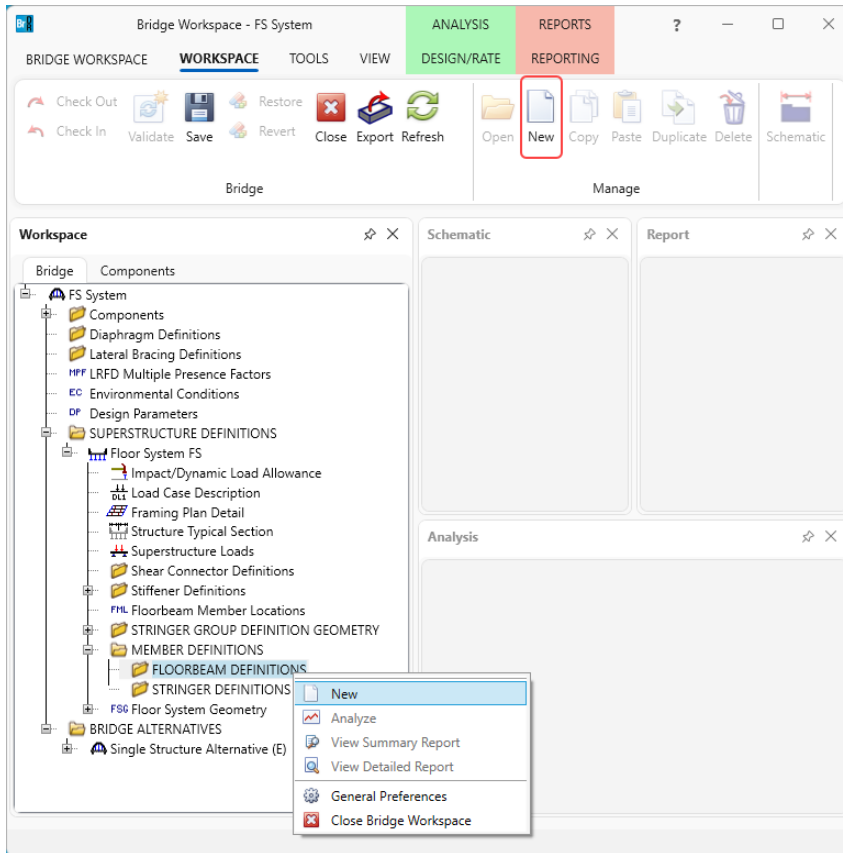


## FS3 – Floorbeam Stringer Floor System Example

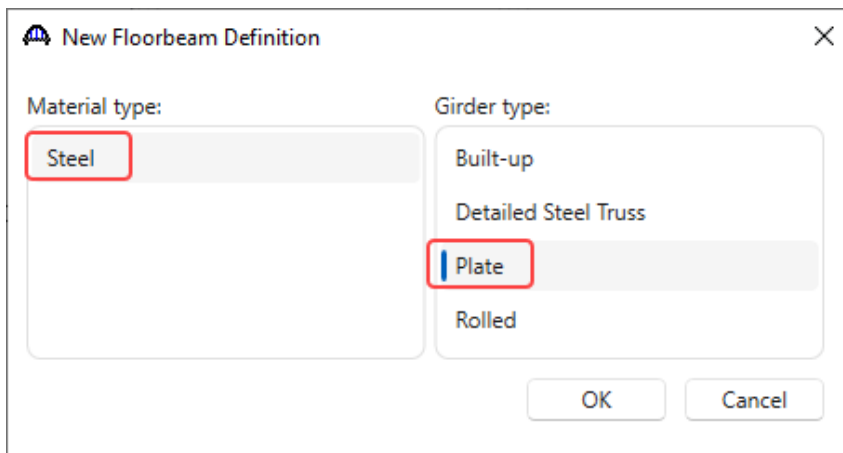
### Describing a floorbeam member

This superstructure contains 1 floorbeam definition that is applied to all floorbeam members.

Expand the **MEMBER DEFINITIONS** node in the **Bridge Workspace** tree and double click on the **FLOORBEAM DEFINITIONS** node (or select **FLOORBEAM DEFINITIONS** and click **New** from the **Manage** group of the **WORKSPACE** ribbon) to open the **New Floorbeam Definition** window as shown below.



Select **Steel** as the **Material type** and **Plate** for **Girder type** as shown below.



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

## FS3 – Floorbeam Stringer Floor System Example

The **Floorbeam Definition** window will open. Enter the data as shown below. Select **Schedule-based** as the **Floorbeam property input method**. This definition is used to describe **FB1** in the structure.

Floorbeam Definition
— □ ×

Name:

Description

Specs

Factors

Engine

Control options

Description:

Material type:

Floorbeam type:

Default units:

Floorbeam property input method

Schedule-based

Cross-section based

Self load

Load case:

Additional self load:  kip/ft

Additional self load:  %

Default rating method:

Number of Floorbeam supports:

Floorbeam length between supports

	Span	Length (ft)
>	1	21

Cantilever

Cantilever lengths

Left:  ft

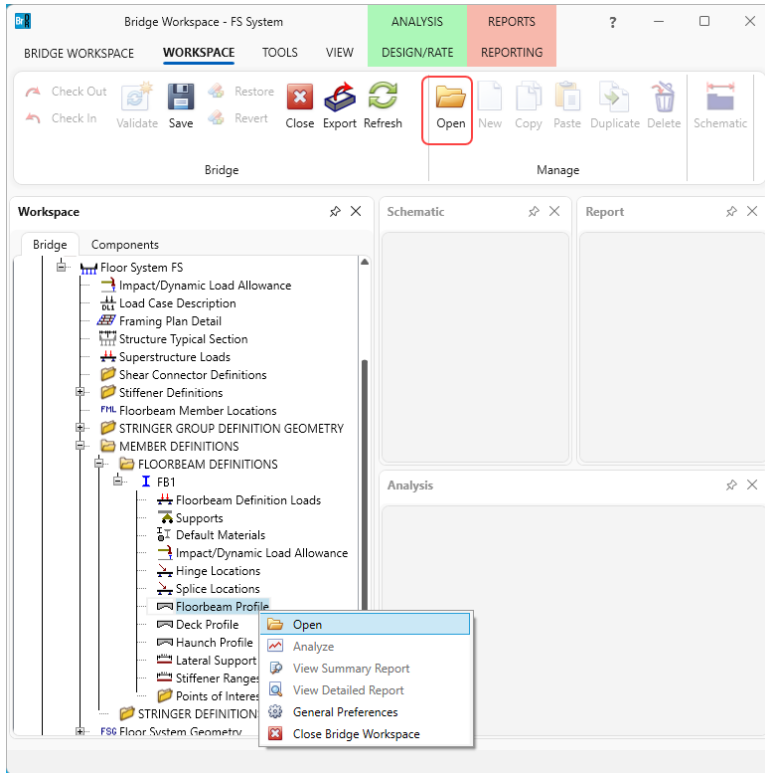
Right:  ft

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

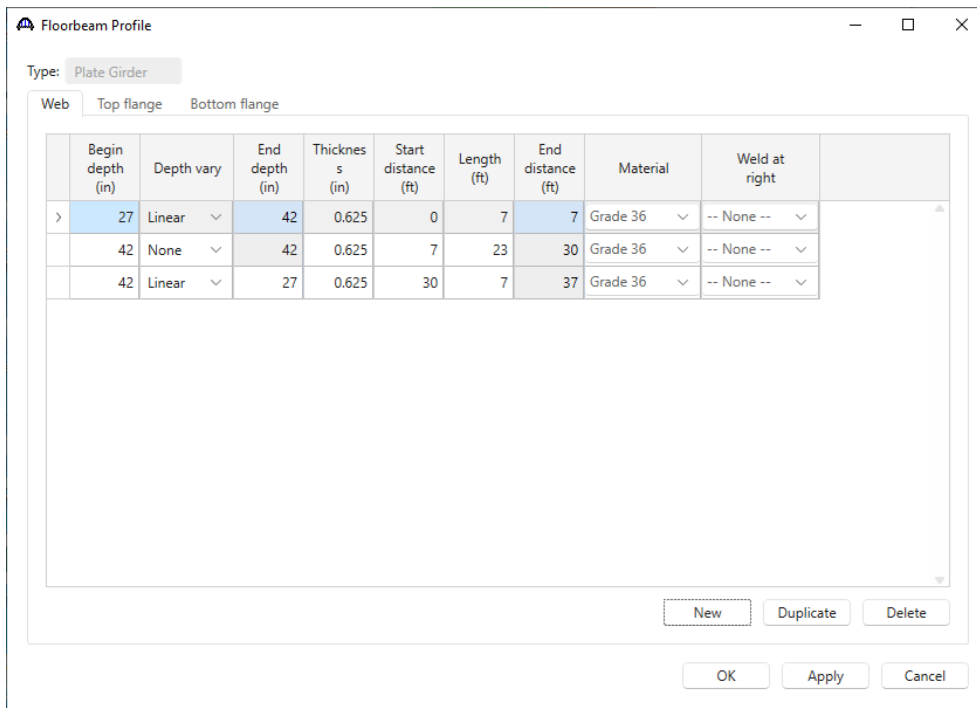
# FS3 – Floorbeam Stringer Floor System Example

## Floorbeam Profile

Expand the **FB1** node in the **Bridge Workspace** tree and double click on the **Floorbeam Profile** node in the **Bridge Workspace** tree to open the **Floorbeam Profile** window as shown below.



Describe the web as shown below.



# FS3 – Floorbeam Stringer Floor System Example

Describe the flanges as shown below.

Floorbeam Profile

Type: Plate Girder

Web Top flange Bottom flange

	Begin width (in)	End width (in)	Thickness (in)	Start distance (ft)	Length (ft)	End distance (ft)	Material	Weld	Weld at right
>	16	16	2	0	37	37	Grade 36	-- None --	-- None --

Copy to bottom flange

New Duplicate Delete

OK Apply Cancel

Floorbeam Profile

Type: Plate Girder

Web Top flange Bottom flange

	Begin width (in)	End width (in)	Thickness (in)	Start distance (ft)	Length (ft)	End distance (ft)	Material	Weld	Weld at right
>	16	16	2	0	37	37	Grade 36	-- None --	-- None --

Copy to top flange

New Duplicate Delete

OK Apply Cancel

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

## FS3 – Floorbeam Stringer Floor System Example

### Deck Profile

Next open the **Deck Profile** window by double clicking the **Deck Profile** node in the **Bridge Workspace** tree. Floorbeam deck effective flange width is calculated according to AASHTO Article 10.38.3. The effective flange width shall not exceed one-fourth of the span length of the floorbeam,  $35' / 4 = 105''$ , the distance center to center of floorbeams, 45', and twelve times the least thickness of the slab,  $12 \times 8.5'' = 102''$ . One-fourth of the span length of the floorbeam, 102'' controls.

Deck Profile window showing the Deck concrete tab. The table contains one row of data:

Material	Start distance (ft)	Length (ft)	End distance (ft)	Structural thickness (in)	Effective flange width (Std) (in)	Effective flange width (LRFD) (in)	n
> 3.5 ksi concrete	0	37	37	8.5	102	102	

Buttons: New, Duplicate, Delete, OK, Apply, Cancel

Navigate to the **Shear connectors** tab and enter the data as shown below.

Deck Profile window showing the Shear connectors tab. The table contains one row of data:

Start distance (ft)	Length (ft)	End distance (ft)	Connector ID	Number per row	Number of spaces	Transverse spacing (in)
> 0	37	37	Composite			

Buttons: New, Duplicate, Delete, OK, Apply, Cancel

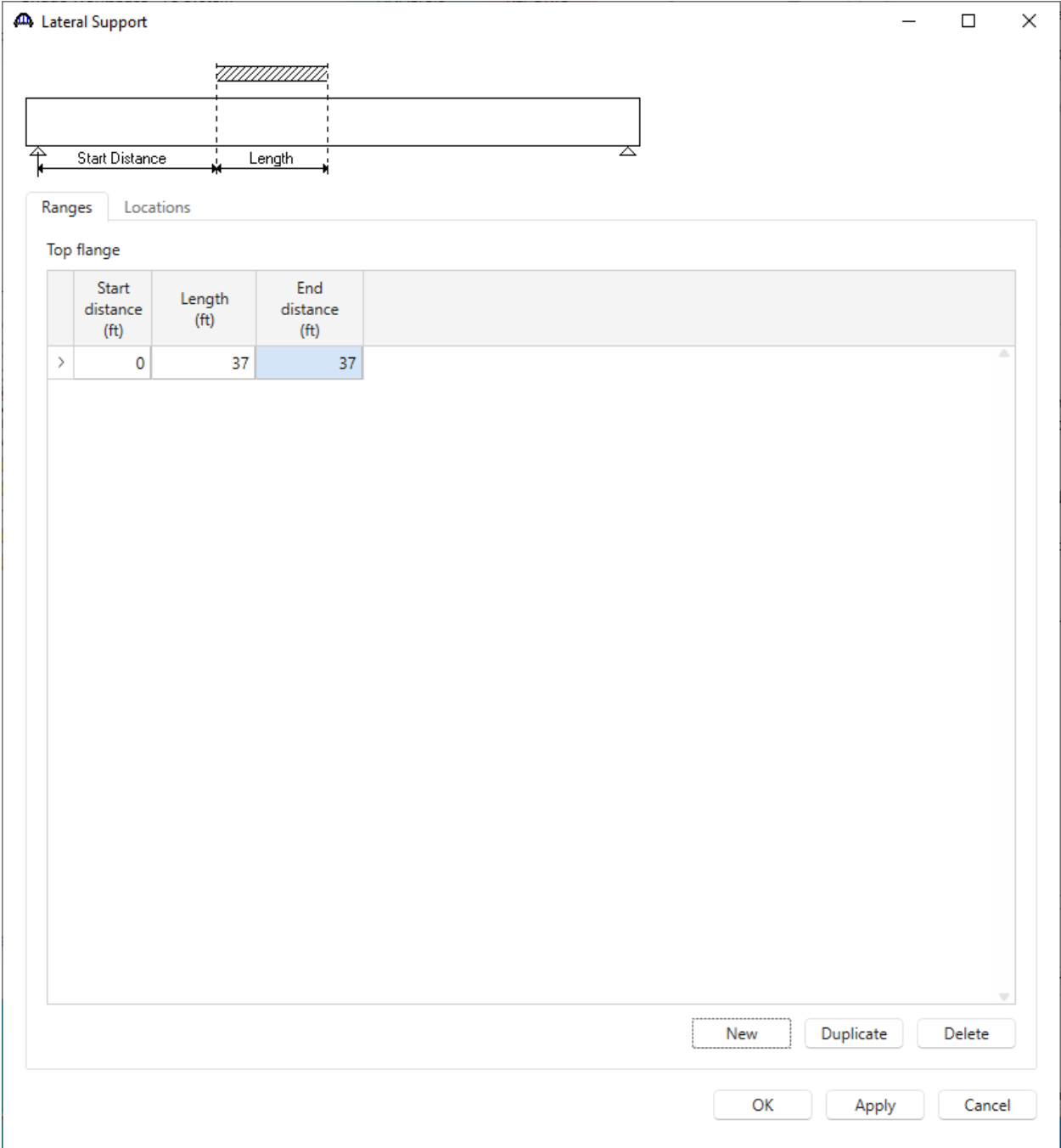
Click **OK** to apply the data and close the window.



# FS3 – Floorbeam Stringer Floor System Example

## Lateral Support

Double click on the **Lateral Support** node in the **Bridge Workspace** to open the **Lateral Support** window. Enter the top flange lateral support information as shown below.



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

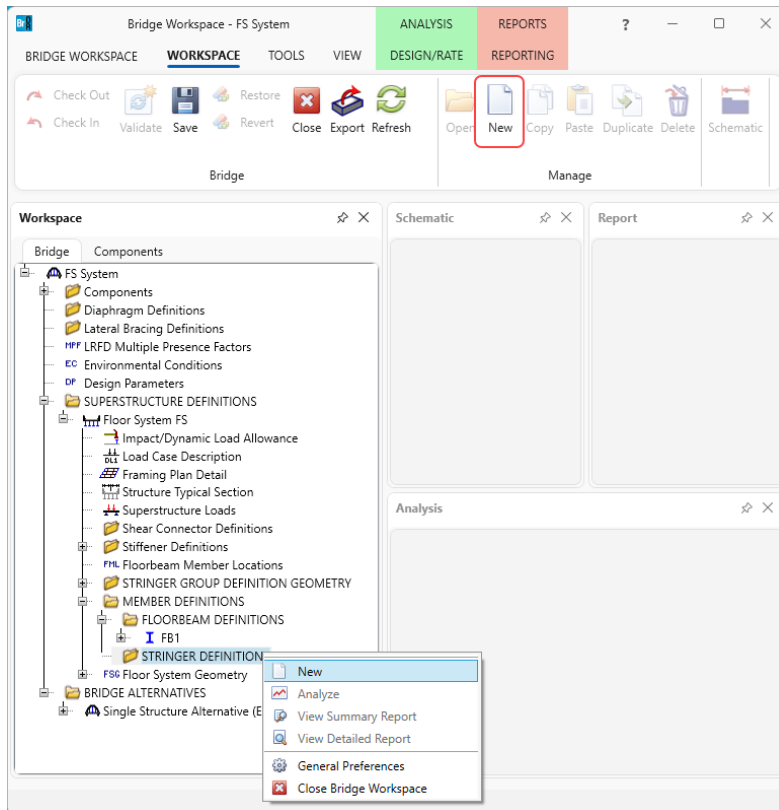
The description of the floorbeam definition is complete.

## FS3 – Floorbeam Stringer Floor System Example

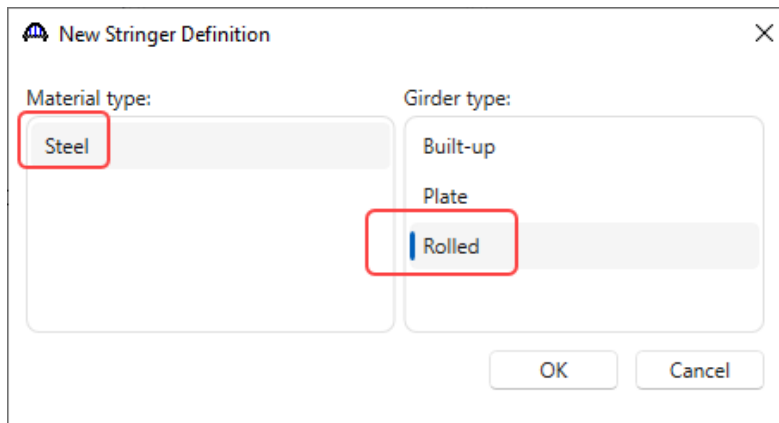
### Describing a Stringer Member Definition – Exterior Stringer Definition (Rolled beam stringers)

This superstructure contains 2 different stringer definitions that will be assigned to the interior and exterior stringer members in the superstructure definition.

To create the exterior stringer definition, expand the **MEMBER DEFINITION** node in the **Bridge Workspace** tree and double click on the **STRINGER DEFINITIONS** node (or select **STRINGER DEFINITIONS** and click **New** from the **Manage** group of the **WORKSPACE** ribbon). This opens the **New Stringer Definition** window as shown below.



Select **Steel** as the **Material type** and **Rolled** for **Girder type** as shown below.



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

## FS3 – Floorbeam Stringer Floor System Example

The **Stringer Definition** window will open. Enter the data as shown below. Select **Schedule-based** as the **Stringer property input method**. Select the **Associate with stringer group definition** button so that the stringer span lengths will be populated based on the stringers span lengths specified in the **Stringer Group Definition Geometry** window.

Name:

Description:

Material type:

Stringer type:

Default units:

Stringer property input method

Schedule-based

Cross-section based

Self load

Load case:

Additional self load:  kip/ft

Additional self load:  %

Stringer span lengths

Associate with stringer group definition:

Enter stringer span lengths

Number of spans:

Span	Length (ft)	Cantilever span
1	45	<input type="checkbox"/>

Default rating method:

End bearing locations

Left:  in

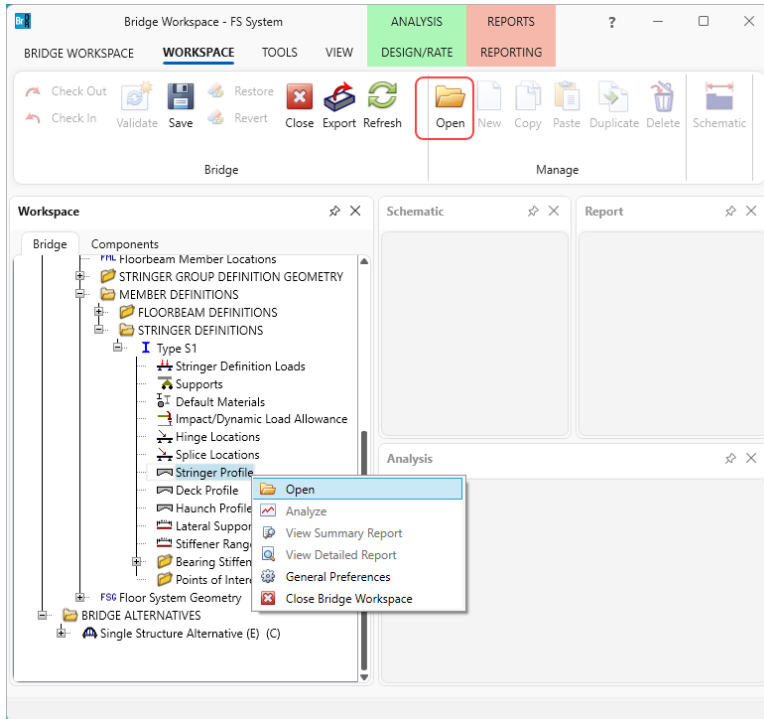
Right:  in

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

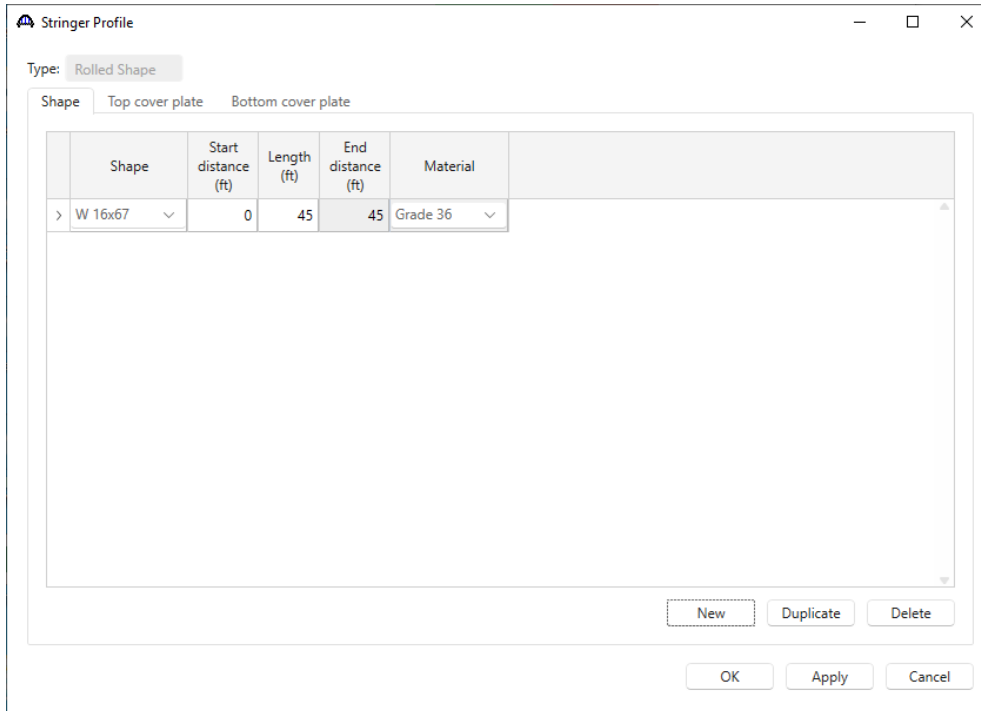
# FS3 – Floorbeam Stringer Floor System Example

## Stringer Profile

Expand the **Type S1** node in the **Bridge Workspace** tree and double click on the **Stringer Profile** node in the **Bridge Workspace** tree to open the **Stringer Profile** window as shown below.



Describe the shape as shown below.



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

## FS3 – Floorbeam Stringer Floor System Example

### Deck Profile

Next open the **Deck Profile** window by double clicking the **Deck Profile** node in the **Bridge Workspace** tree. Enter the data describing the structural properties of the deck. Stringer deck effective flange width is calculated according to AASHTO Article 10.38.3, the effective flange width shall not exceed one-fourth of the span length of the stringer,  $45' / 4 = 11.25' = 135''$ , the distance center to center of stringers,  $7' / 2 + 2.25' = 69''$ , and twelve times the least thickness of the slab,  $12 \times 8.5'' = 102''$ . The distance center to center of stringers,  $69''$  controls.

The screenshot shows the 'Deck Profile' window with the 'Deck concrete' tab selected. The 'Type' is set to 'Rolled'. Below the tabs, there is a table with the following data:

Material	Start distance (ft)	Length (ft)	End distance (ft)	Structural thickness (in)	Effective flange width (Std) (in)	Effective flange width (LRFD) (in)	n
> 3.5 ksi concrete	0	45	45	8.5	69	69	

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

No reinforcement is described. Composite regions are described using the **Shear Connectors** tab as shown below.

The screenshot shows the 'Deck Profile' window with the 'Shear connectors' tab selected. The 'Type' is still 'Rolled'. Below the tabs, there is a table with the following data:

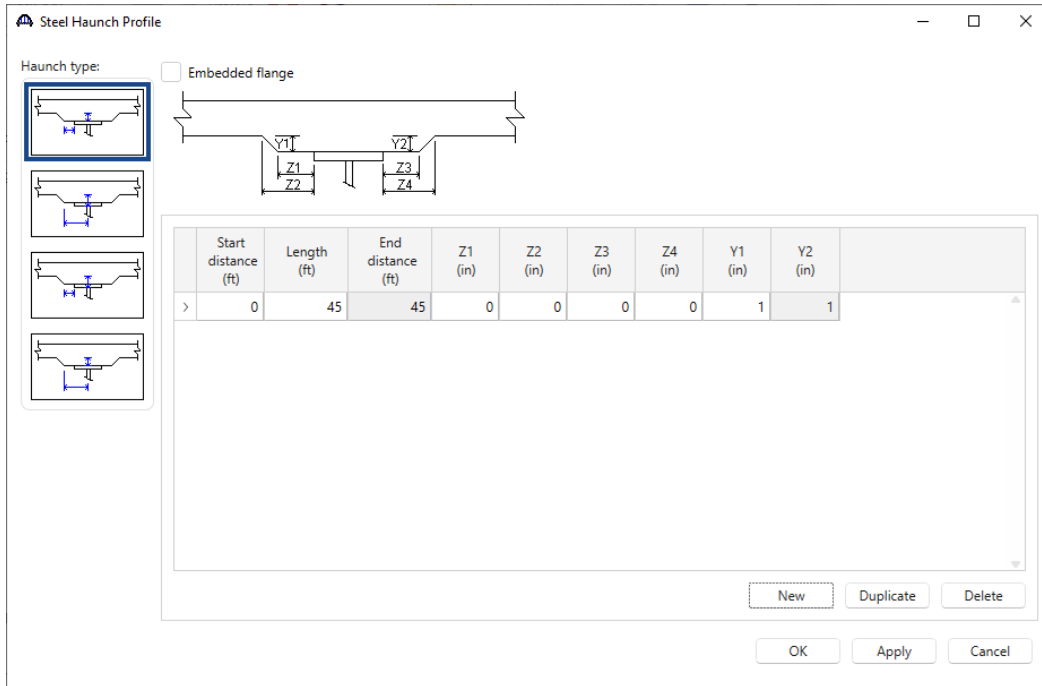
Start distance (ft)	Length (ft)	End distance (ft)	Connector ID	Number per row	Number of spaces	Transverse spacing (in)
> 0	45	45	Composite			

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

## FS3 – Floorbeam Stringer Floor System Example

### Haunch Profile

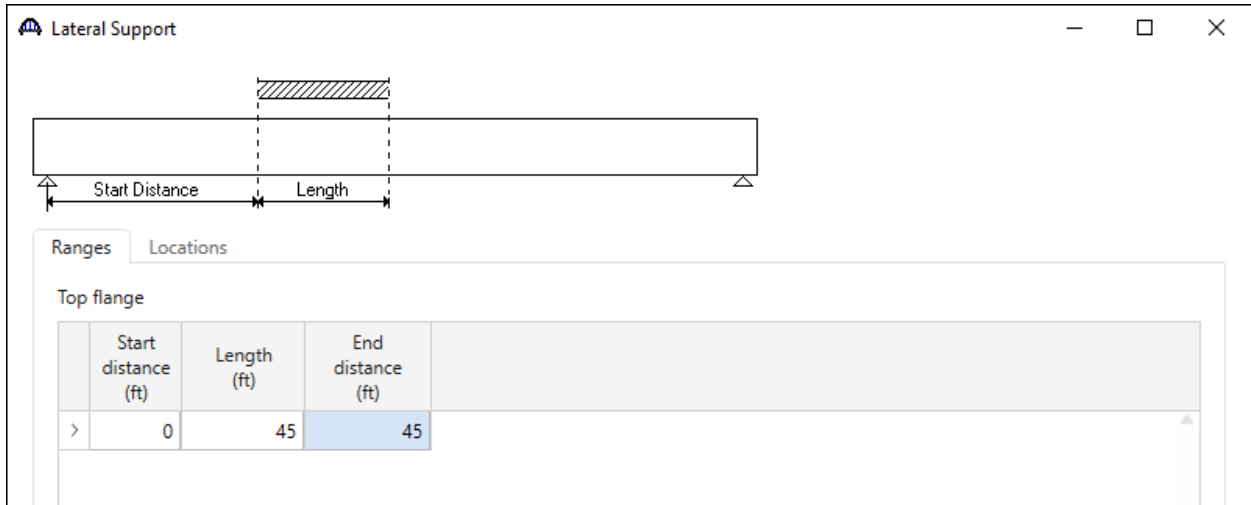
Double click on the **Haunch Profile** node in the **Bridge Workspace** tree and enter data in the **Haunch Profile** window as shown below.



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. Enter the following lateral support data for the top flange.



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

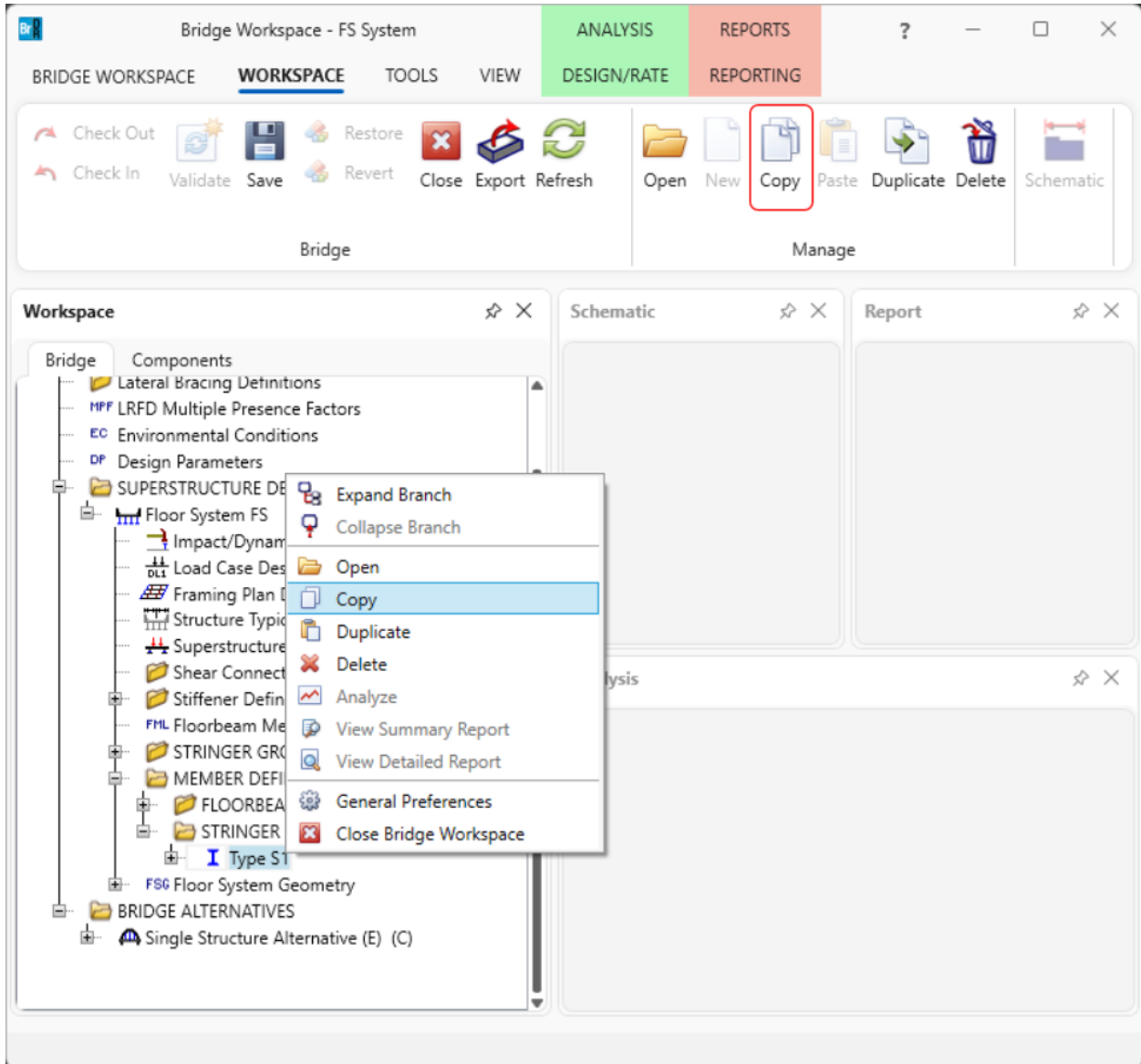
The description of the exterior stringer definition is complete.

## FS3 – Floorbeam Stringer Floor System Example

### Interior Stringer Definition (Copy/Paste)

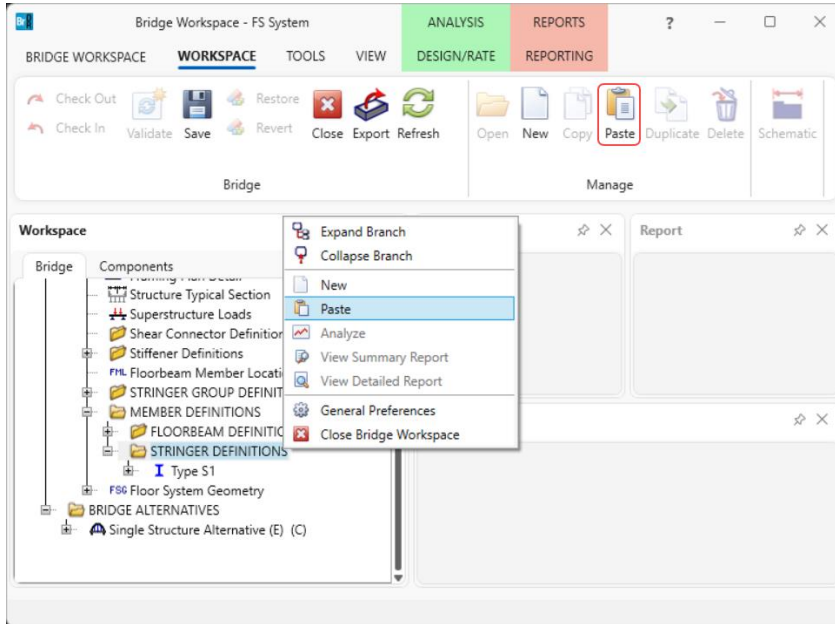
Define the interior stringer definition. The interior stringer definition is very similar to the exterior stringer definition created in the previous steps. Copy the exterior stringer definition as shown below.

Select the **Type S1** node in the **Bridge Workspace** tree and click the **Copy** button from the **Manage** group of the **WORKSPACE** ribbon (or right click and select **Copy**) as shown below.

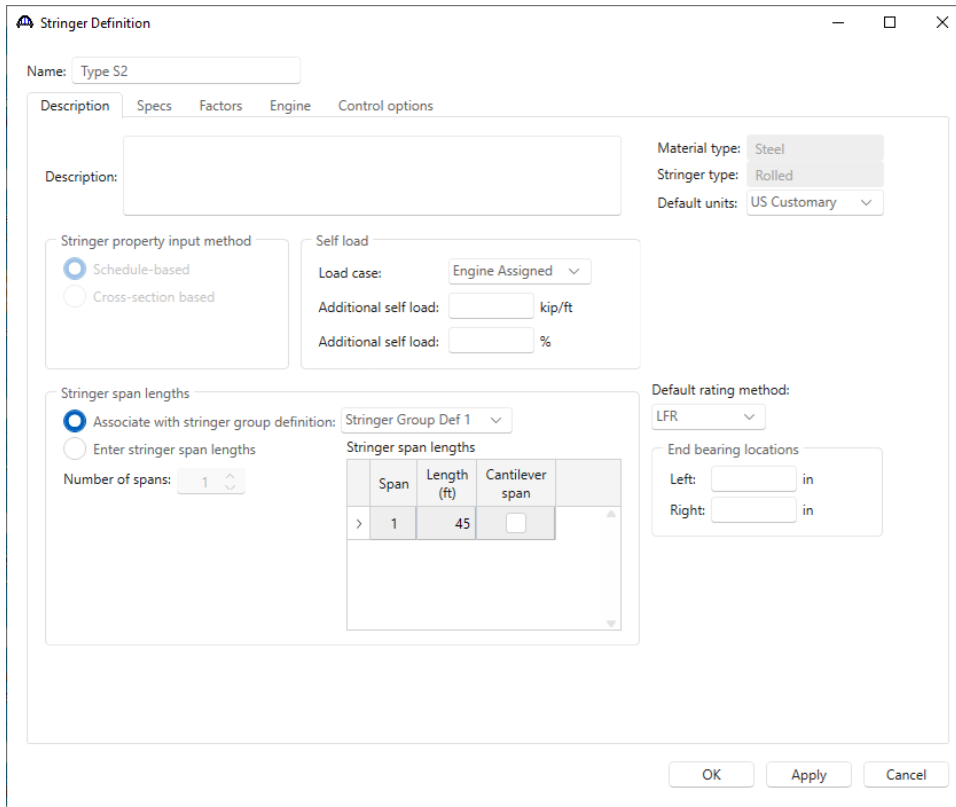


## FS3 – Floorbeam Stringer Floor System Example

Select the **STRINGER DEFINITIONS** node in the **Bridge Workspace** tree and click the **Paste** button from the **Manage** group of the **WORKSPACE** ribbon (or right click and select **Paste**) as shown below.



Double click on the newly created stringer definition (**Type S1 ~ 1**) to open the **Stringer Definition** window. Rename this to **Type S2** as shown below.



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



## FS3 – Floorbeam Stringer Floor System Example

### Stringer Profile

Expand the **Type S2** node in the **Bridge Workspace** tree and double click on the **Stringer Profile** node in the **Bridge Workspace** tree to open the **Stringer Profile** window. Change the rolled shape assigned to the stringer profile to the **W24x117** shape as shown below.

The screenshot shows the 'Stringer Profile' window with the following data in the table:

Shape	Start distance (ft)	Length (ft)	End distance (ft)	Material
W 24x117	0	45	45	Grade 36

The 'Shape' dropdown menu is open, showing the following options:

- W 16x67
- W 24x117 (highlighted with a red box)
- Create new shape --

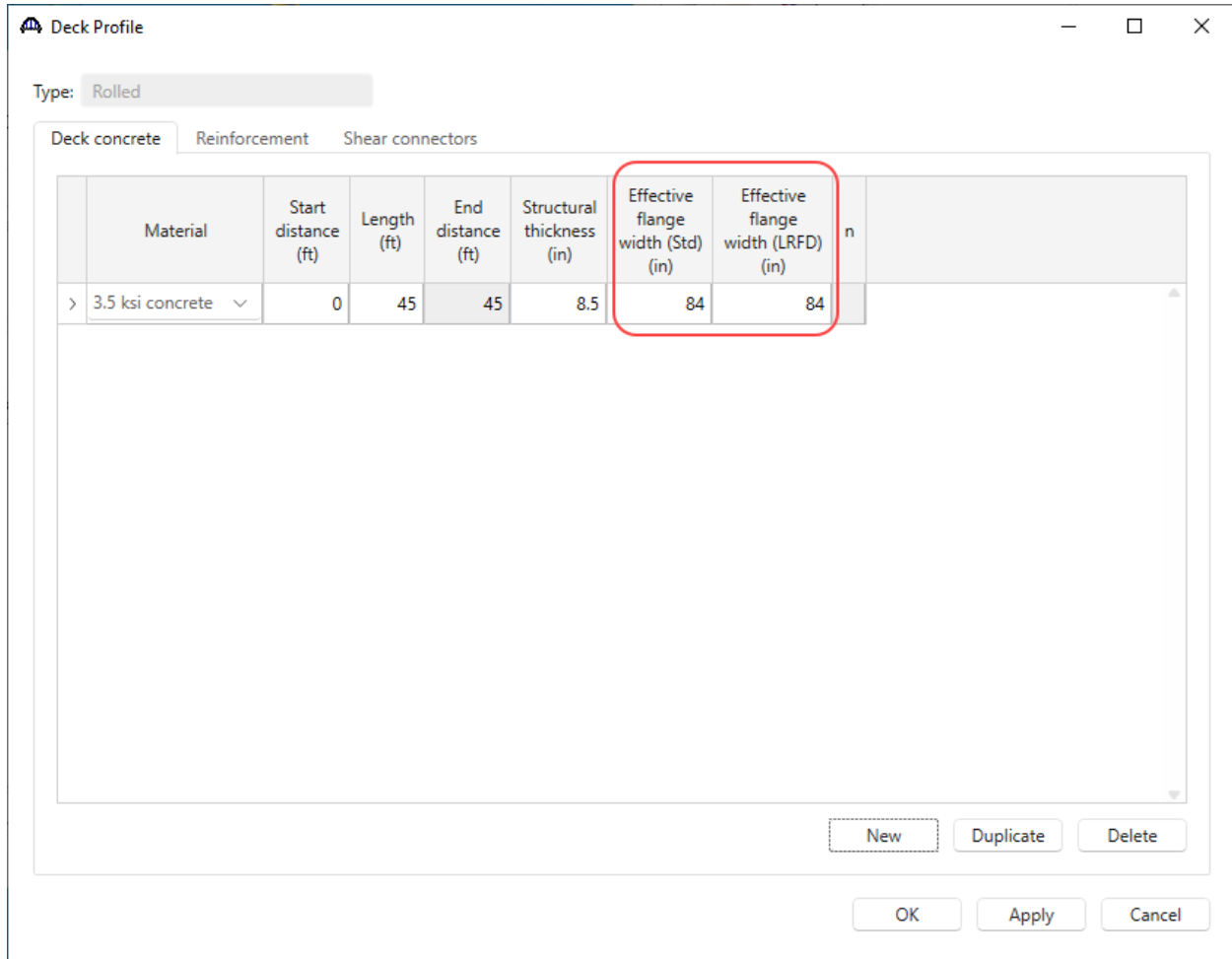
Buttons at the bottom of the window include: New, Duplicate, Delete, OK, Apply, and Cancel.

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

## FS3 – Floorbeam Stringer Floor System Example

### Deck Profile

Next open the **Deck Profile** window by double clicking the **Deck Profile** node in the **Bridge Workspace** tree. Change the **Effective flange width (Std. and LRFD)** to **84** inches as shown below.



The screenshot shows the 'Deck Profile' dialog box with the 'Deck concrete' tab selected. The 'Type' is set to 'Rolled'. A table lists the deck concrete properties. The 'Effective flange width (Std)' and 'Effective flange width (LRFD)' columns are highlighted with a red box, both showing a value of 84 inches.

	Material	Start distance (ft)	Length (ft)	End distance (ft)	Structural thickness (in)	Effective flange width (Std) (in)	Effective flange width (LRFD) (in)	n
>	3.5 ksi concrete	0	45	45	8.5	84	84	

Buttons at the bottom: New, Duplicate, Delete, OK, Apply, Cancel.

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

The description of the **Type S2** stringer definition is complete.

### Describing a Stringer Member alternative

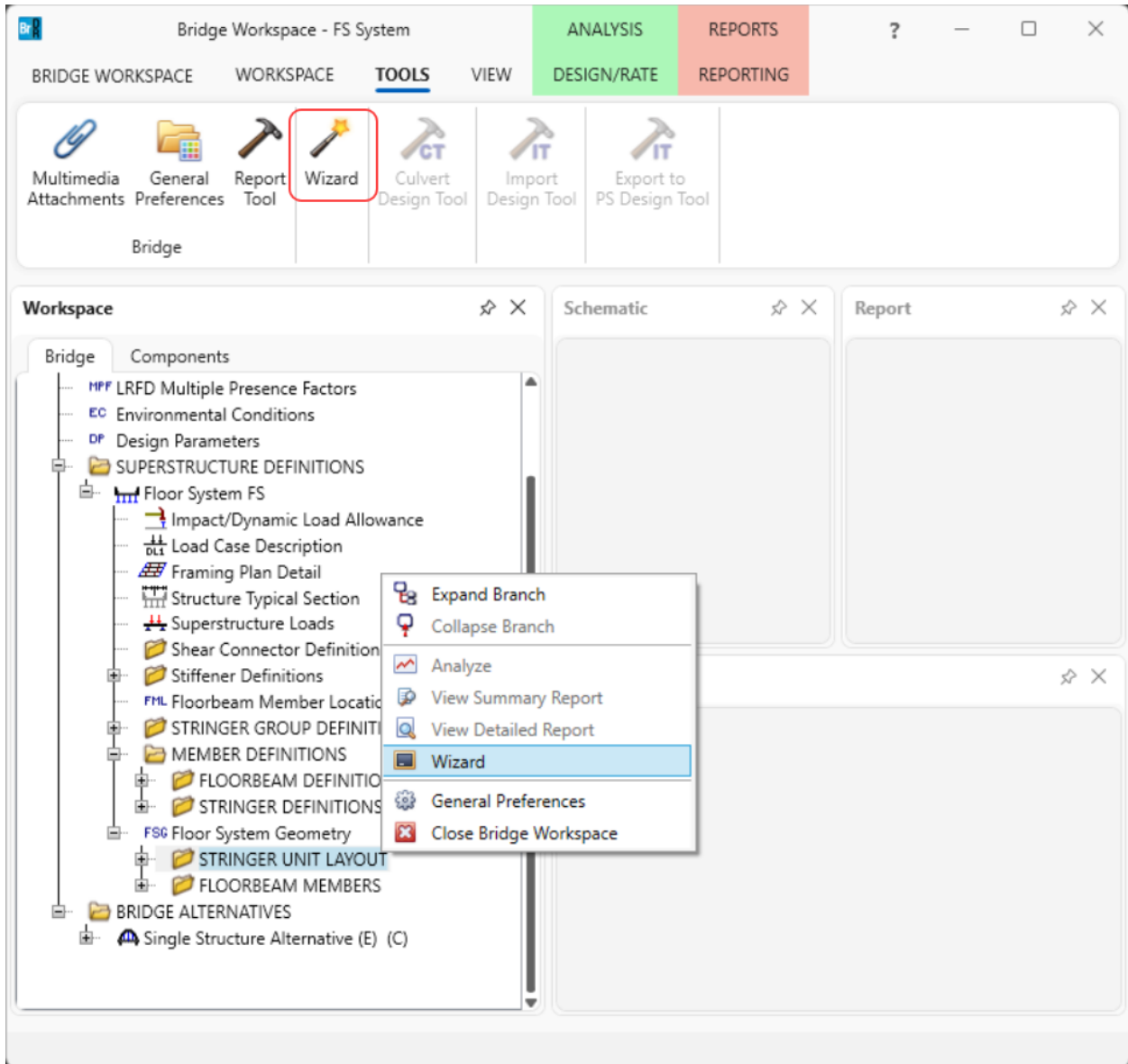
There are two methods to create stringer member alternatives for the stringer members in the structure:

1. Manually create a stringer member alternative in the **Bridge Workspace** tree and assign a stringer definition to this alternative.
2. Use the **Stringer Unit Layout Wizard** to quickly create stringer member alternatives for all the stringer members in the structure. This wizard can be accessed by selecting the **Wizard** button from the **TOOLS** ribbon while the **STRINGER UNIT LAYOUT** is selected in the **Bridge Workspace** tree.

## FS3 – Floorbeam Stringer Floor System Example

This example uses the **Stringer Unit Layout Wizard** in Option 2 to create stringer member alternatives for the stringer members in this structure.

Expand the **Floor System Geometry**, select **STRINGER UNIT LAYOUT** in the **Bridge Workspace** tree and click the **WIZARD** button from the **TOOLS** ribbon, or right click and select **WIZARD**) as shown below.



The **Stringer Unit Layout Wizard** uses templates to store the data entered in this wizard. Stringer group definition templates allows the user to assign stringer definitions and live load distribution factors to stringer members in all the stringer units to which a stringer group definition has been applied. This wizard contains a lot of data and templates so that the data can be saved to avoid losing data if interrupted while using the wizard. If for some reason BrDR is closed while entering the data, the template can be reopened to continue entering data.

## FS3 – Floorbeam Stringer Floor System Example

This example has only 1 stringer group definition and it has been assigned to all the stringer units in the **Floor System Geometry** window. The data entered in this will pertain to this stringer group definition and will thus create stringer member alternatives for all the stringer members in the superstructure definition.

The first screen of the wizard is shown below. **Enter a name for the new template** and click **Next**.

Stringer Unit Layout Wizard

### Welcome to the stringer unit layout wizard

This wizard helps you create stringer member alternatives quickly using stringer group definition templates.

Stringer group definition templates let you assign stringer definitions and stringer live load distribution factors to stringer members. These templates can be stored and re-used.

Select the stringer group definition to which this template applies: Stringer Group Def 1

Enter a name for the new template: Training Template

This stringer group definition has been applied to the following stringer unit locations in the floor system geometry window:

	Stringer unit	Stringer group definition	Mirrored status
>	Unit 1	Stringer Group Def 1	
	Unit 2	Stringer Group Def 1	
	Unit 3	Stringer Group Def 1	
	Unit 4	Stringer Group Def 1	

< Back   **Next >**   Cancel   Help

The second screen in the wizard allows the user to assign stringer definitions to and enter names for the stringer member alternatives that will be created by the wizard. Use the **Generate stringer member alternative names** button to have the wizard generate the names using the specified prefix. Since the same definition is assigned to both the

## FS3 – Floorbeam Stringer Floor System Example

existing and current alternative for each stringer member, the wizard will create only 1 alternative that is assigned as existing and current for each stringer member. Click on the **Generate stringer member alternative names** button to automatically generate names based on the prefix selected. Select existing and current stringer definitions for each stringer member as shown below and click **Next**.

**Stringer Unit Layout Wizard** ✕

**Stringer definitions**

This screen allows you to create Stringer Member Alternatives and assign Stringer Definitions to these alternatives for all Stringer Members using the Stringer Group Definition picked on Page 1. After the Stringer Member Alternatives are created at the end of this wizard, you can change the Stringer Definitions assigned to the Stringer Member Alternatives by visiting the individual Stringer Member Alternative windows. Changing stringer definitions in the stringer member alternative window will not make corresponding changes in this template.

This wizard will generate names for the Stringer Member Alternatives for you or you can enter them yourself in the table below.

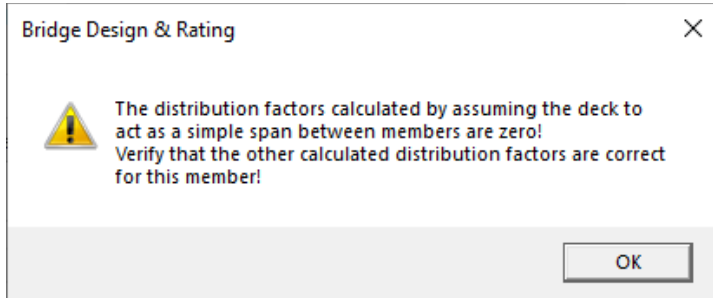
Prefix to use when generating Stringer Member Alternatives' names:  Generate stringer member alternative names

Stringer member*	Existing stringer member alternative name	Existing stringer definition	Current stringer member alternative name	Current stringer definition
Stringer 1	Stringer 1 Alt	Type S1	Stringer 1 Alt	Type S1
Stringer 2	Stringer 2 Alt	Type S2	Stringer 2 Alt	Type S2
Stringer 3	Stringer 3 Alt	Type S2	Stringer 3 Alt	Type S2
Stringer 4	Stringer 4 Alt	Type S2	Stringer 4 Alt	Type S2
> Stringer 5	Stringer 5 Alt	Type S2	Stringer 5 Alt	Type S2
Stringer 6	Stringer 6 Alt	Type S1	Stringer 6 Alt	Type S1

\*Stringer members in this table are listed from left to right in the structure typical section.

## FS3 – Floorbeam Stringer Floor System Example

The third screen of the wizard allows the user to assign live load distribution factors to stringer member alternatives. Use the **Compute from typical section** button to compute the **Standard live load distribution factors** for the alternatives that will be created for **Stringer 1**. A warning message will appear indicating that the distribution factors computed using simple beam distribution are zero for this member as shown below.



This is due to the fact that this exterior stringer is not located under a travelway since it is under the sidewalk. Change the **Shear at supports** value from 0.0 to **0.929** and click **Apply** to save these distribution factors. Select **Stringer 2** from the drop down menu of **Stringer** and repeat these actions to define the live load distribution factors. Repeat for the remaining stringer members and click **Next** to move onto the last screen of the wizard.

**Stringer Unit Layout Wizard**

Live load distribution factors  
This screen allows you to assign live load distribution factors to the Stringer Member Alternatives that will be generated by this wizard

Stringer: Stringer 1

Standard

Allow distribution factors to be used to compute effects of permit loads with routine traffic

Lanes loaded	Distribution factor (wheels)			
	Shear	Shear at supports	Moment	Deflection
> 1 Lane	1.2173913	0.929	1.2173913	0.3333333
Multi-lane	1.2173913	0.929	1.2173913	0.6666667

Lrfd

Allow distribution factors to be used to compute effects of permit loads with routine traffic

Action: Moment

Start distance (ft)	Length (ft)	End distance (ft)	Distribution factor (lanes)	
			1 lane	Multi-lane

< Back

## FS3 – Floorbeam Stringer Floor System Example

The live load distribution factors for each stringer is shown below.

**Stringer Unit Layout Wizard** ✕

Live load distribution factors  
This screen allows you to assign live load distribution factors to the Stringer Member Alternatives that will be generated by this wizard

Stringer: Stringer 2 Apply

Standard

Allow distribution factors to be used to compute effects of permit loads with routine traffic Compute from typical section

	Lanes loaded	Distribution factor (wheels)			
		Shear	Shear at supports	Moment	Deflection
>	1 Lane	1	1	1	0.3333333
	Multi-lane	1.2727273	1	1.2727273	0.6666667

**Stringer Unit Layout Wizard** ✕

Live load distribution factors  
This screen allows you to assign live load distribution factors to the Stringer Member Alternatives that will be generated by this wizard

Stringer: Stringer 3 Apply

Standard

Allow distribution factors to be used to compute effects of permit loads with routine traffic Compute from typical section

	Lanes loaded	Distribution factor (wheels)			
		Shear	Shear at supports	Moment	Deflection
>	1 Lane	1	1.1428571	1	0.3333333
	Multi-lane	1.2727273	1.3571429	1.2727273	0.6666667

# FS3 – Floorbeam Stringer Floor System Example

**Stringer Unit Layout Wizard**

Live load distribution factors  
 This screen allows you to assign live load distribution factors to the Stringer Member Alternatives that will be generated by this wizard

Stringer: Stringer 4 Apply

Standard

Allow distribution factors to be used to compute effects of permit loads with routine traffic Compute from typical section

Lanes loaded	Distribution factor (wheels)			
	Shear	Shear at supports	Moment	Deflection
> 1 Lane	1	1.1428571	1	0.3333333
Multi-lane	1.2727273	1.3571429	1.2727273	0.6666667

**Stringer Unit Layout Wizard**

Live load distribution factors  
 This screen allows you to assign live load distribution factors to the Stringer Member Alternatives that will be generated by this wizard

Stringer: Stringer 5 Apply

Standard

Allow distribution factors to be used to compute effects of permit loads with routine traffic Compute from typical section

Lanes loaded	Distribution factor (wheels)			
	Shear	Shear at supports	Moment	Deflection
> 1 Lane	1	1	1	0.3333333
Multi-lane	1.2727273	1	1.2727273	0.6666667



## FS3 – Floorbeam Stringer Floor System Example

**Stringer Unit Layout Wizard** [X]

Live load distribution factors  
This screen allows you to assign live load distribution factors to the Stringer Member Alternatives that will be generated by this wizard

Stringer: Stringer 6 [v] [Apply]

Standard

Allow distribution factors to be used to compute effects of permit loads with routine traffic [Compute from typical section]

Lanes loaded	Distribution factor (wheels)			
	Shear	Shear at supports	Moment	Deflection
1 Lane	1.2173913	0.929	1.2173913	0.3333333
> Multi-lane	1.2173913	0.929	1.2173913	0.6666667

The last screen of the wizard is shown below. Select **Finish** to close the wizard and create the stringer member alternatives.

**Stringer Unit Layout Wizard** [X]

### Completing the stringer unit layout wizard

You have successfully completed the stringer unit layout wizard.

You have created a stringer group definition template named: Training Template

This template will be applied to the stringer members in the stringer units:

Stringer unit	Stringer group definition	Mirrored status
> Unit 1	Stringer Group Def 1	[v]
Unit 2	Stringer Group Def 1	[v]
Unit 3	Stringer Group Def 1	[v]
Unit 4	Stringer Group Def 1	[v]

To close this wizard, save this template and create stringer member alternatives with these template properties, click finish.

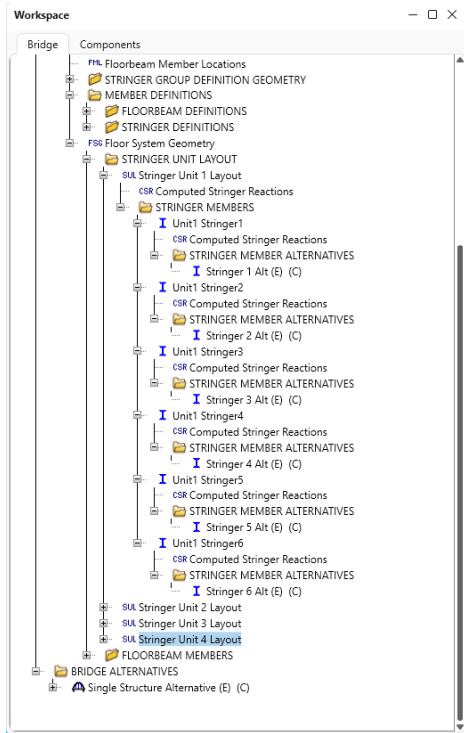
To close this wizard and save this template without creating stringer member alternatives with these template properties, click finish later.

To close this wizard without saving this template or creating stringer member alternatives, click cancel.

[< Back] [Finish later] [Finish] [Cancel] [Help]

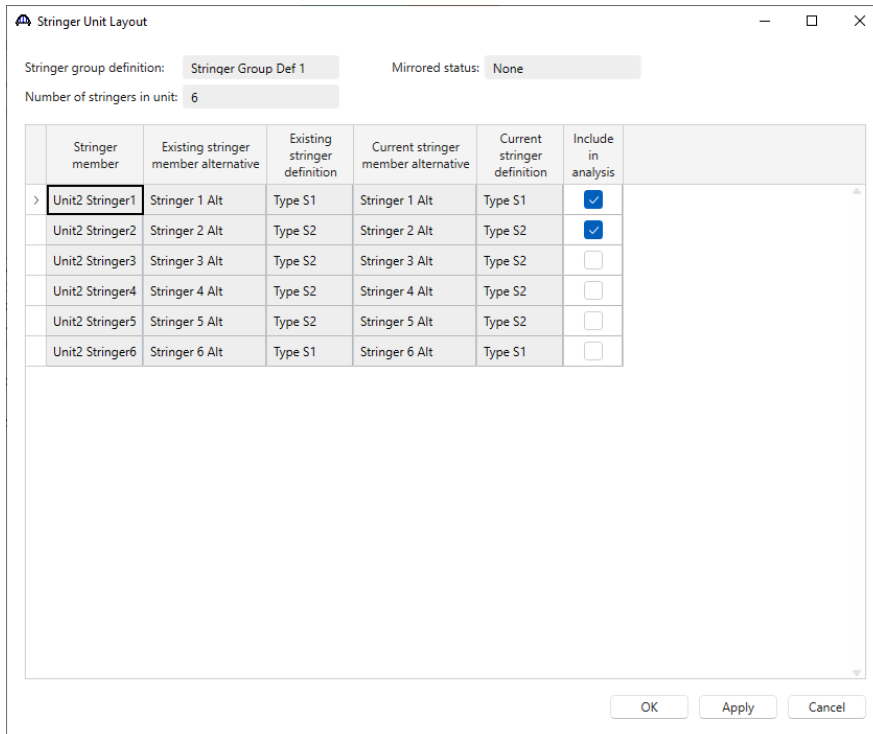
## FS3 – Floorbeam Stringer Floor System Example

The partially expanded **Bridge Workspace** tree for **Stringer Unit 1 Layout** is shown below.



### Stringer Unit 2 Layout

Double click on the **Stringer Unit 2 Layout** node in the **Bridge Workspace** tree and check the **Include in analysis** checkboxes for **Stringer 1** and **Stringer 2** as shown below.



## FS3 – Floorbeam Stringer Floor System Example

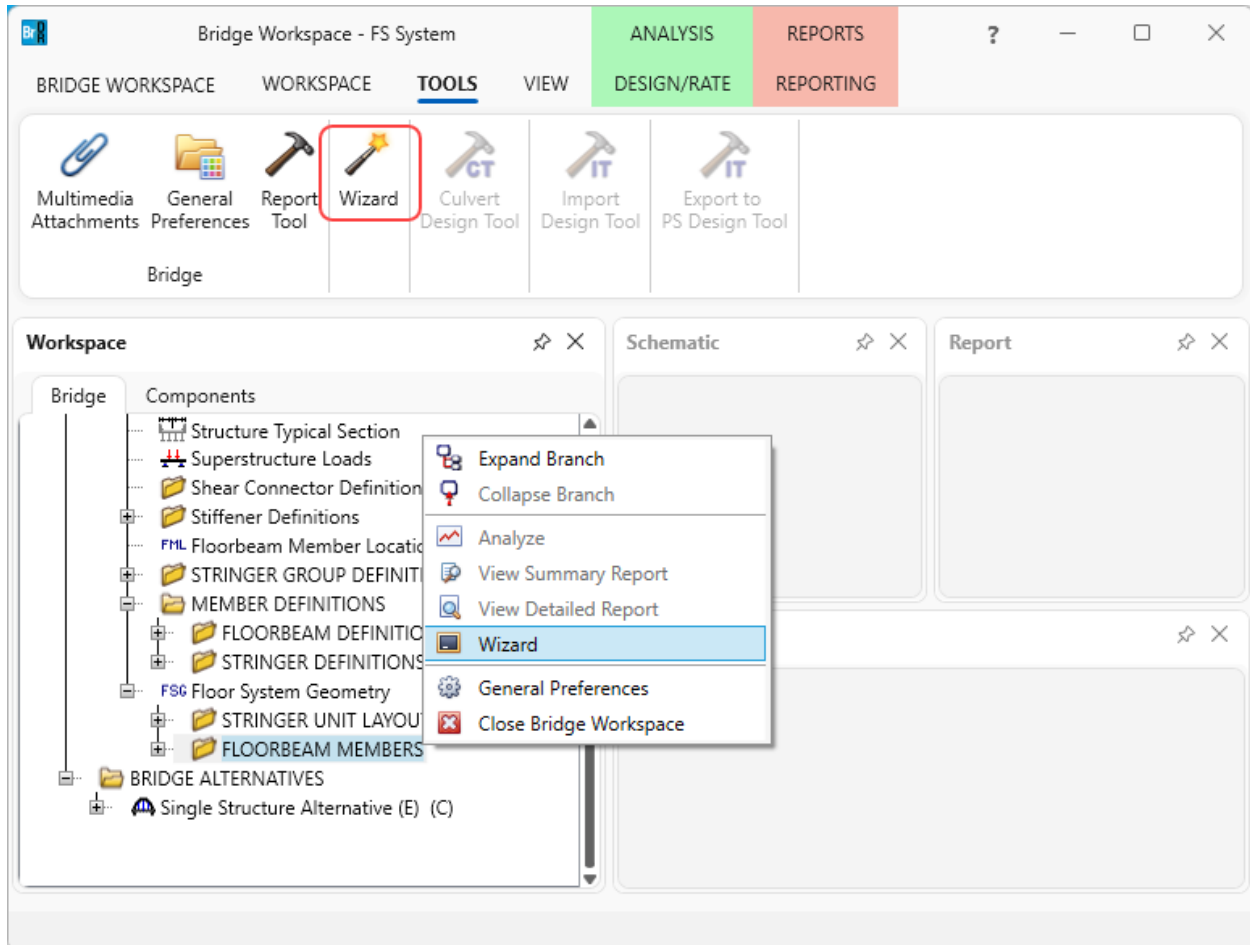
### Describing a Floorbeam Member – FLOORBEAM MEMBERS

There are two methods to create floorbeam member alternatives for the floorbeam members in the structure.

1. Manually create a floorbeam member alternative in the **Bridge Workspace** tree and assign a floorbeam definition to this alternative.
2. Use the **Floorbeam Member Alternative Wizard** to quickly create floorbeam member alternatives for all the floorbeam members in the structure. This wizard can be accessed by selecting the **Wizard** button from the **TOOLS** ribbon while the **FLOORBEAM MEMBERS** is selected in the **Bridge Workspace** tree.

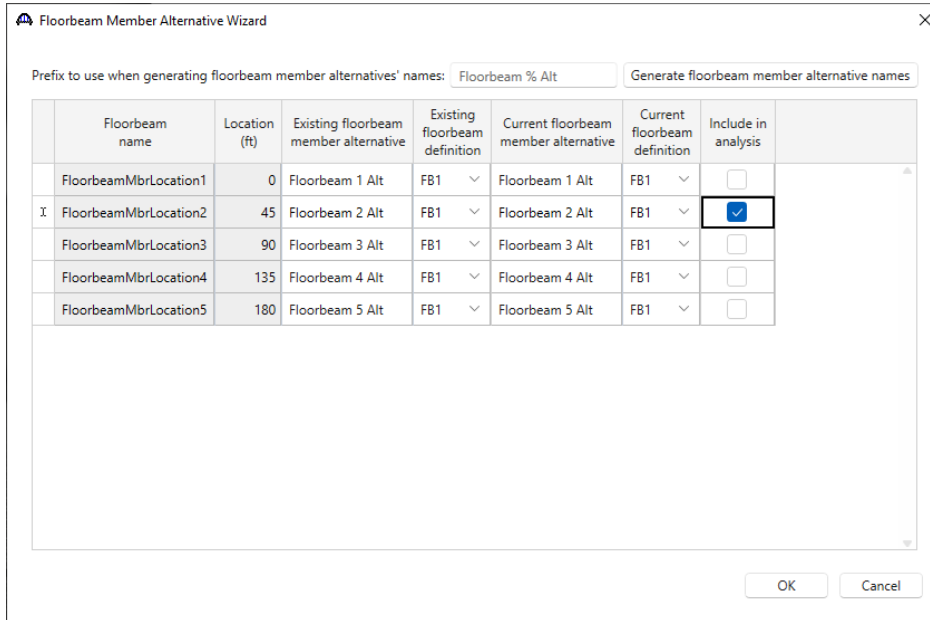
This example uses the **Floorbeam Unit Layout Wizard** in Option 2 to create floorbeam member alternatives for the floorbeam members in this structure.

Expand the **Floor System Geometry**, select **FLOORBEAM MEMBERS** in the **Bridge Workspace** tree and click the **WIZARD** button from the **TOOLS** ribbon, or right click and select **WIZARD**) as shown below.



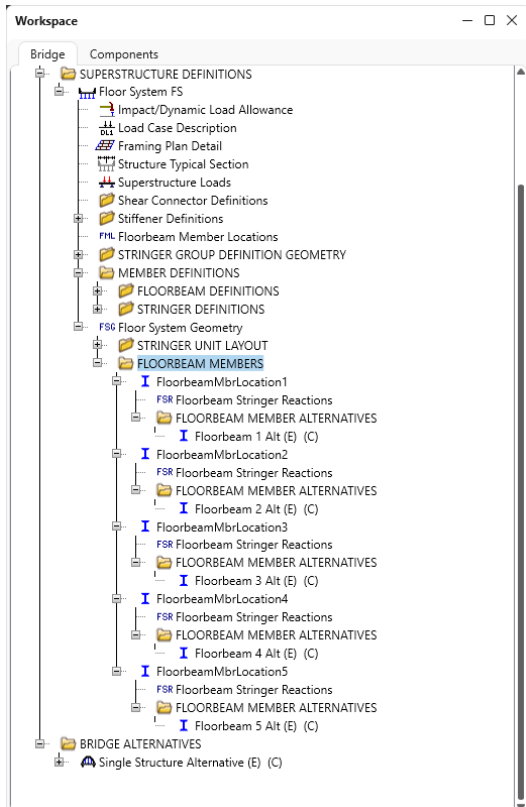
## FS3 – Floorbeam Stringer Floor System Example

The **Floorbeam Member Alternative Wizard** window opens as shown below. Use the **Generate floorbeam member alternative names** to create the member alternative names. Assign the **FB1** definition to all the member alternatives. Check the **Include in analysis** checkbox for **Floorbeam 2** as shown below.



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

The partially expanded **Bridge Workspace** tree for the **FLOORBEAM MEMBERS** is shown below.

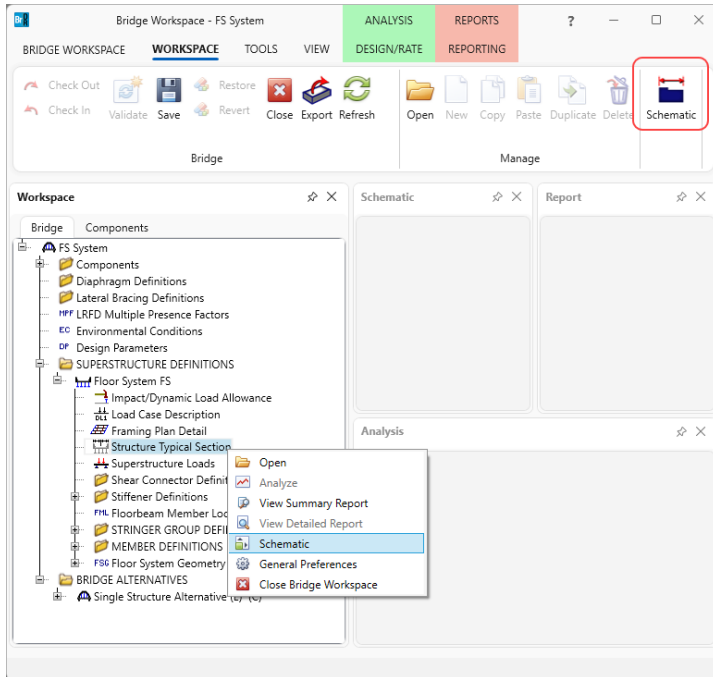


## FS3 – Floorbeam Stringer Floor System Example

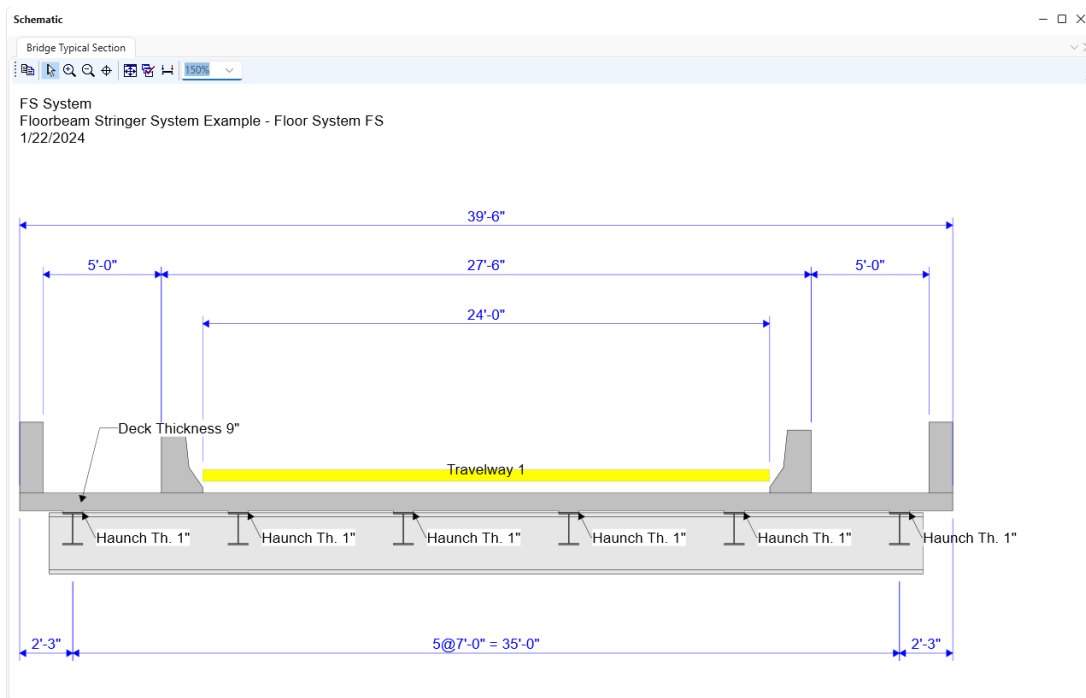
The description of the bridge is complete.

### 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).



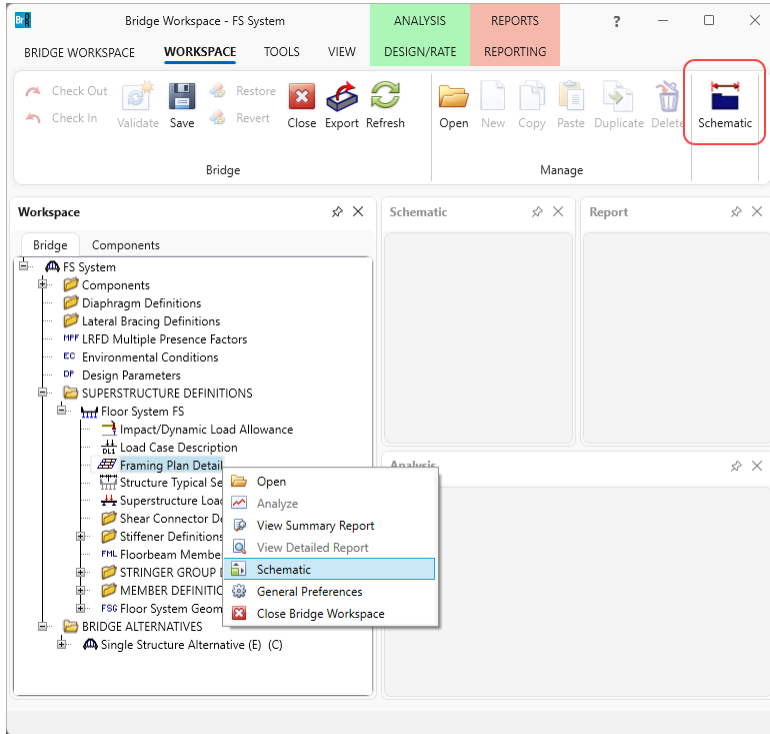
The following schematic will be displayed.



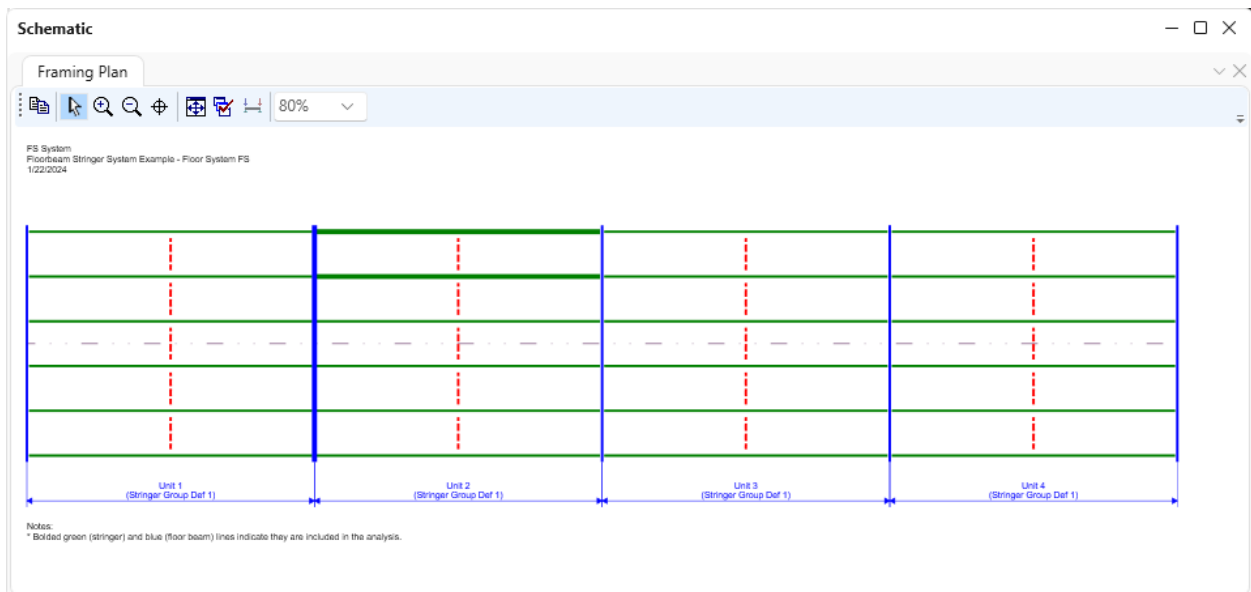
# FS3 – Floorbeam Stringer Floor System Example

## 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).



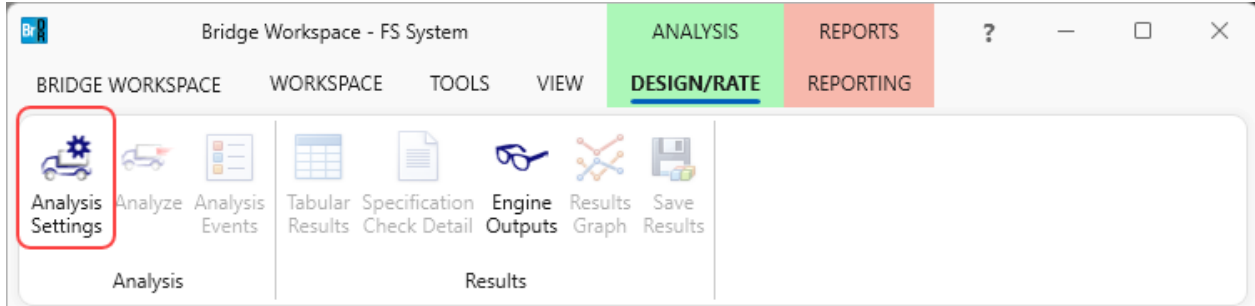
The following schematic will be displayed. All members are drawn as solid lines since the member definitions are assigned to all members. The members that were checked off to be included in a batch analysis are shown with bold lines.



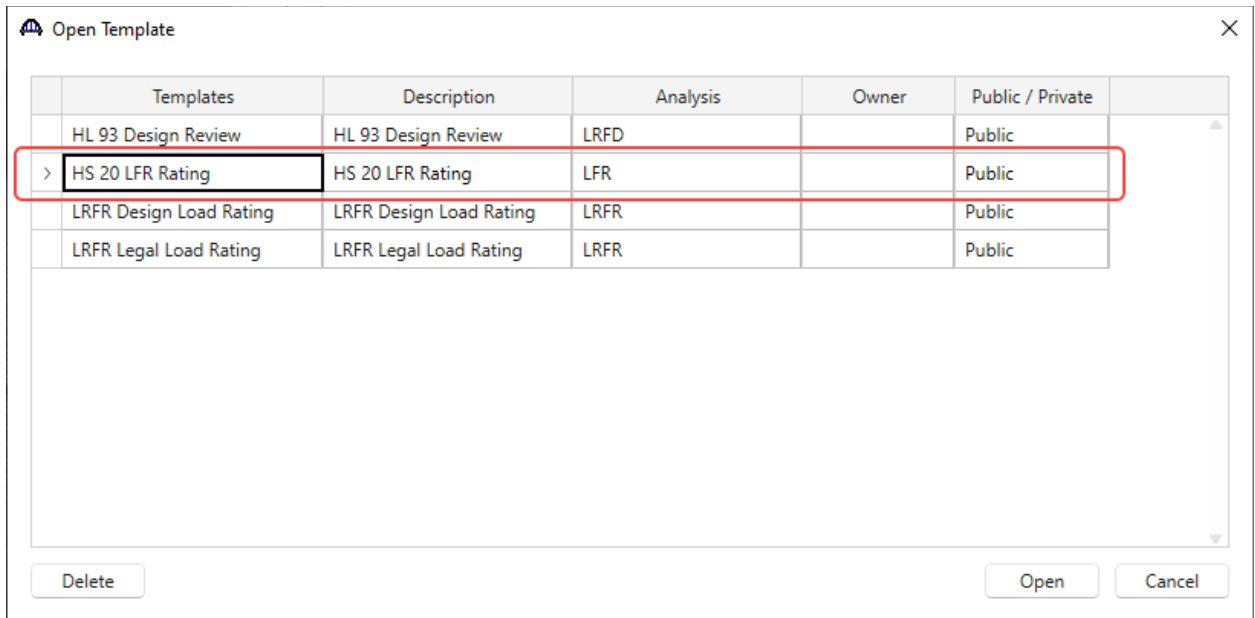
## FS3 – Floorbeam Stringer Floor System Example

### LFR Analysis

To perform an LFR rating, select the superstructure definition **Floor System FS** in the **Bridge Workspace** tree and click the **Analysis Settings** button on the **Analysis** group of the **DESIGN/RATE** ribbon. The window shown below opens.

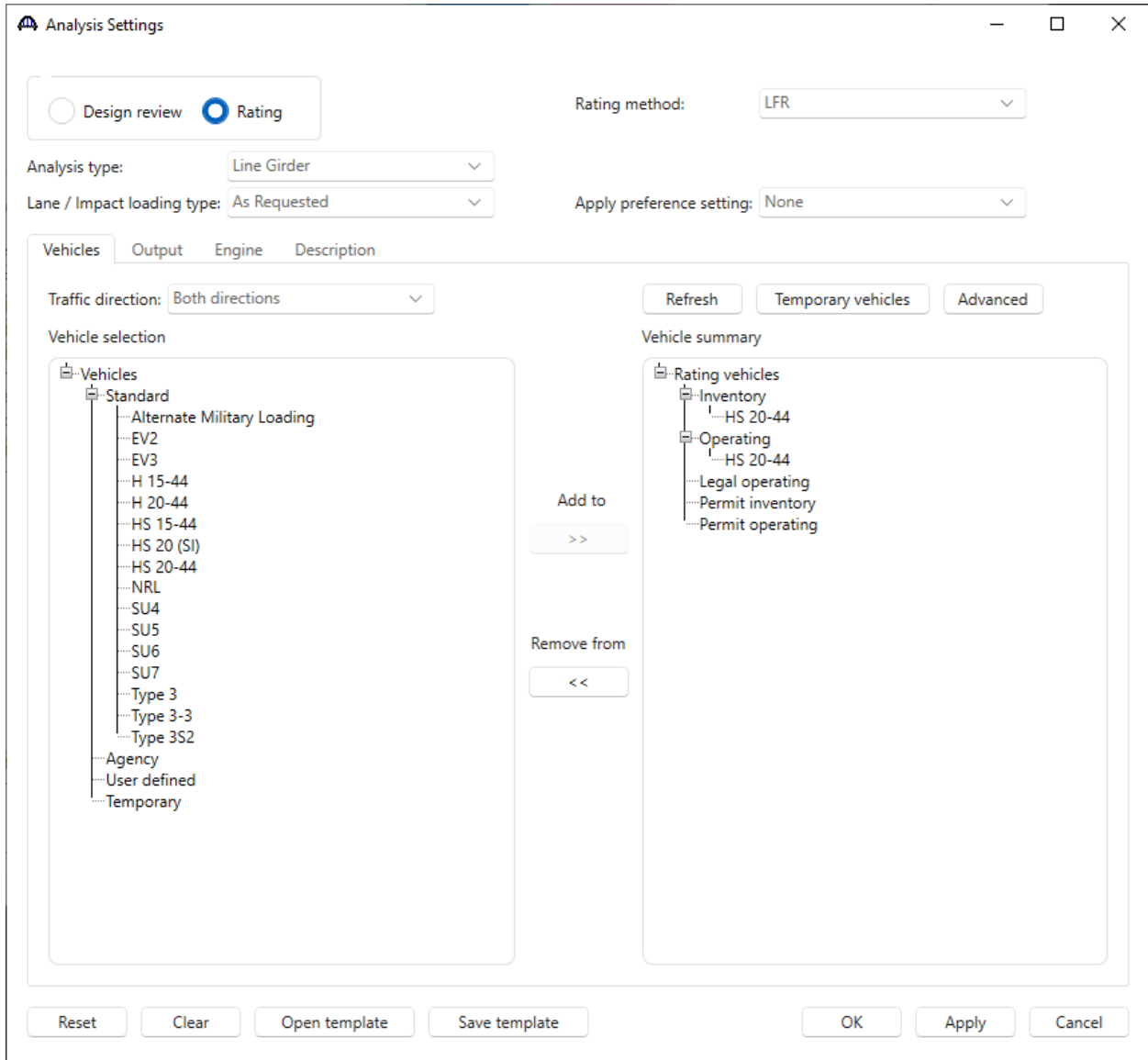


Click the **Open Template** button and select the **HS 20 LFR Rating** to be used in the rating and click **Open**.



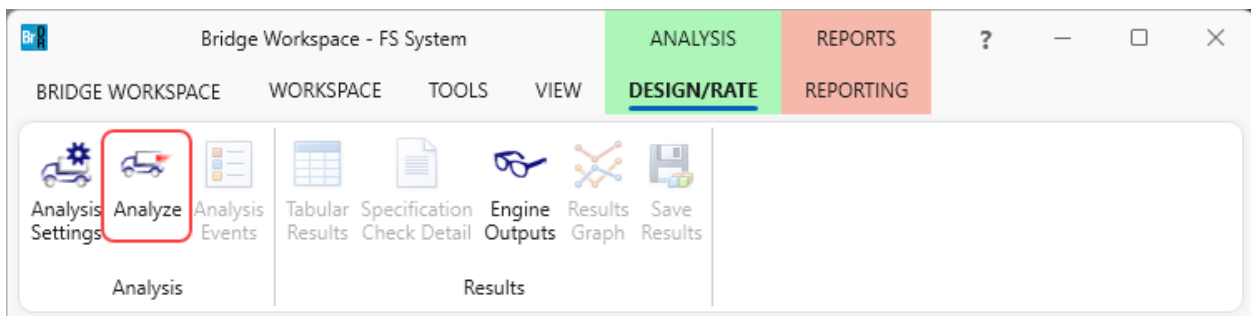
## FS3 – Floorbeam Stringer Floor System Example

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



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

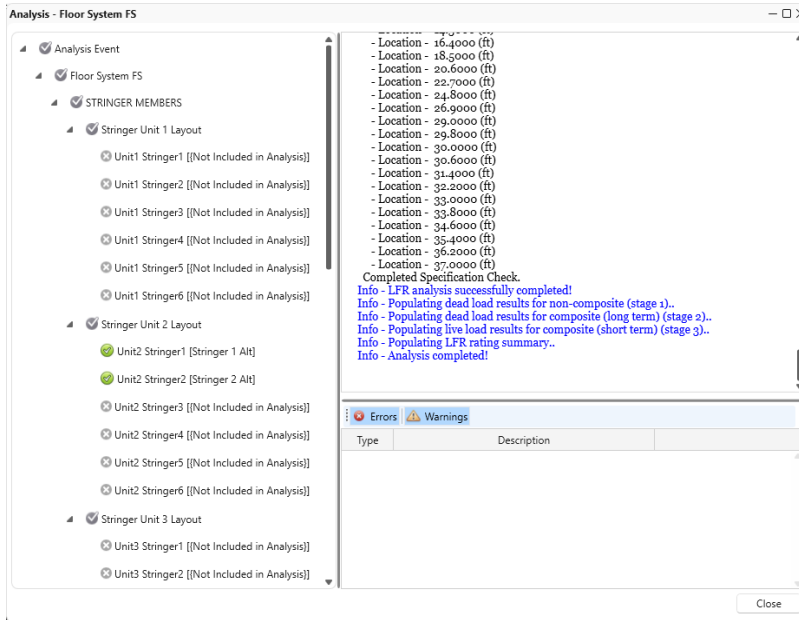
Next click the **Analyze** button on the **Analysis** group of the **DESIGN/RATE** ribbon to perform the rating.





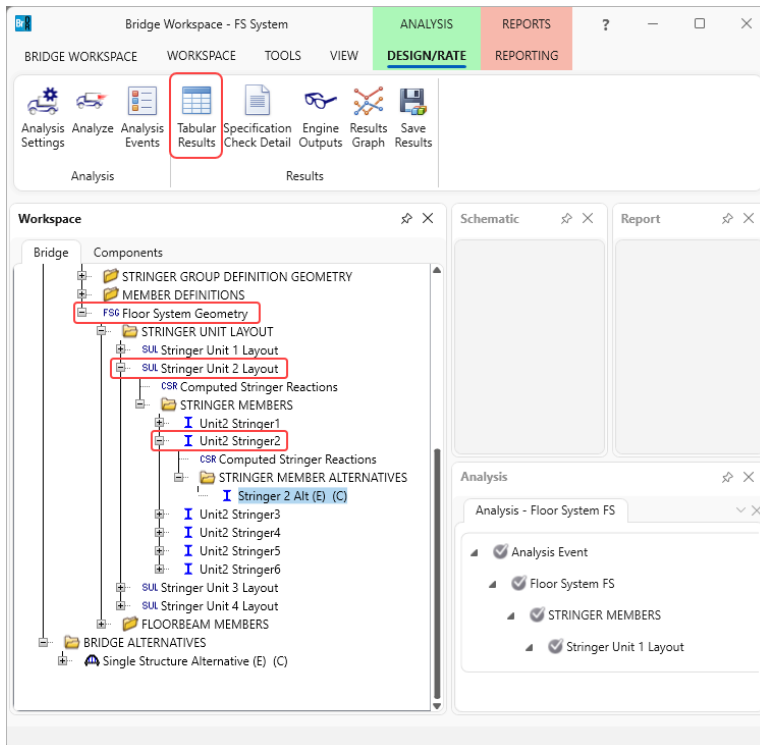
## FS3 – Floorbeam Stringer Floor System Example

The **Analysis** window for this analysis is shown below. The floorbeam and stringer member alternatives that were marked as **Include in analysis** will be rated as shown below.



### Tabular Results


When the rating is finished, view the results for the stringer alternative by selecting **Stringer 2 Alt** member alternative in the **Bridge Workspace** tree and clicking the **Tabular Results** button on the **Results** group of the ribbon.



# FS3 – Floorbeam Stringer Floor System Example

The window shown below will open.

Analysis Results - Stringer 2 Alt
— □ ×



Print

Report type: Rating Results Summary

Lane/Impact loading type:  As requested  Detailed

Display Format: Single rating level per row

	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	31.60	0.878	22.50	1 - (50.0)	Design Flexure - Steel	As Requested	As Requested	▲
	HS 20-44	Axle Load	LFR	Operating	52.77	1.466	22.50	1 - (50.0)	Design Flexure - Steel	As Requested	As Requested	
	HS 20-44	Lane	LFR	Inventory	45.95	1.276	22.50	1 - (50.0)	Design Flexure - Steel	As Requested	As Requested	
	HS 20-44	Lane	LFR	Operating	76.73	2.131	22.50	1 - (50.0)	Design Flexure - Steel	As Requested	As Requested	

AASHTO LFR Engine Version 7.5.0.3001

Analysis preference setting: None

Close