

*AASHTOWare BrDR 7.5.0*

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*Feature Tutorial*  
*TMP1 – Use of Templates*

## TMP11 – Use of Templates

This example describes using BrDR to create a template for prestress bridges for a fictitious agency.

### Topics Covered

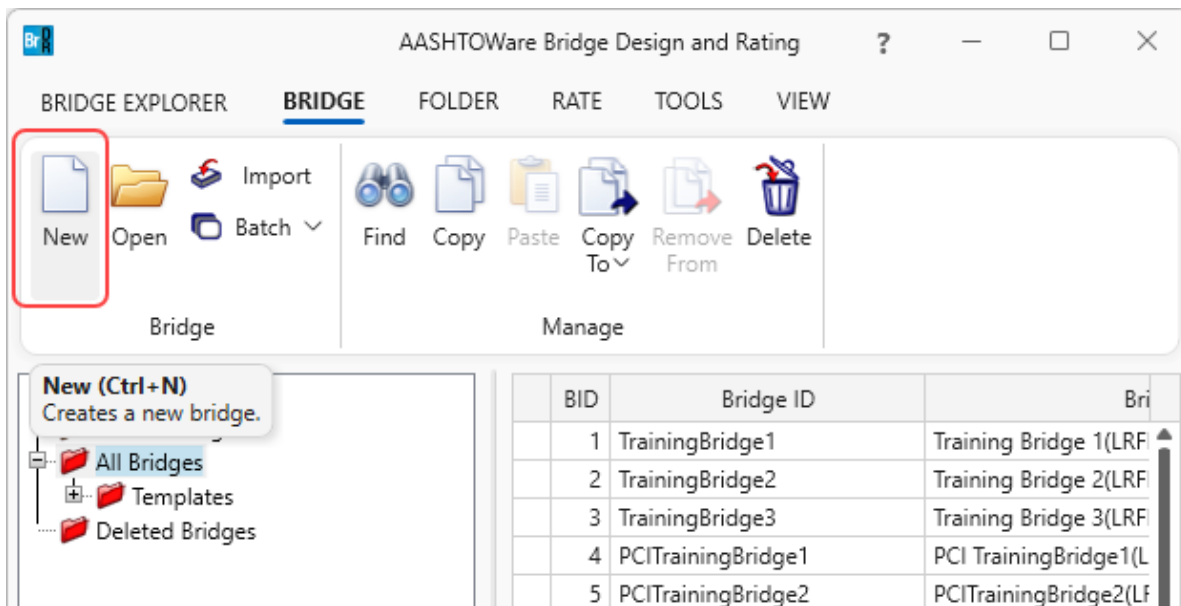
- What are templates?
- Creating a template prestress bridge
- Creating a folder to organize templates
- Using a template to create a new bridge

### What are templates?

Templates are bridges that are used as starting points for developing new bridges. Template bridges contain a basic framework for a specific type of bridge. The basic framework can consist of items such as standard materials, beam shapes and appurtenances that are used frequently on bridges for a given state. Use a template bridge to jump-start the data entry of a bridge or bridges.

### Creating a template prestress bridge

From the Bridge Explorer create a new bridge by clicking on the **New** button in the **BRIDGE** group of the **BRIDGE** ribbon as shown below.



## TMP11 – Use of Templates

Then enter the following data in the **New Bridge** window. Be sure to check the **Template** box to indicate this is a template bridge. Checking this box ensures that this bridge will not be rated when a batch rating is initiated from the Bridge Explorer. Click **OK** to continue.

**New Bridge**

Bridge ID:  NBI structure ID (8):   **Template**  Bridge completely defined

Bridge Workspace View

- Superstructures
- Culverts
- Substructures

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

Name:  Year built:

Description:

Location:  Length:  ft

Facility carried (7):  Route number:

Feat. intersected (6):  Mi. post:

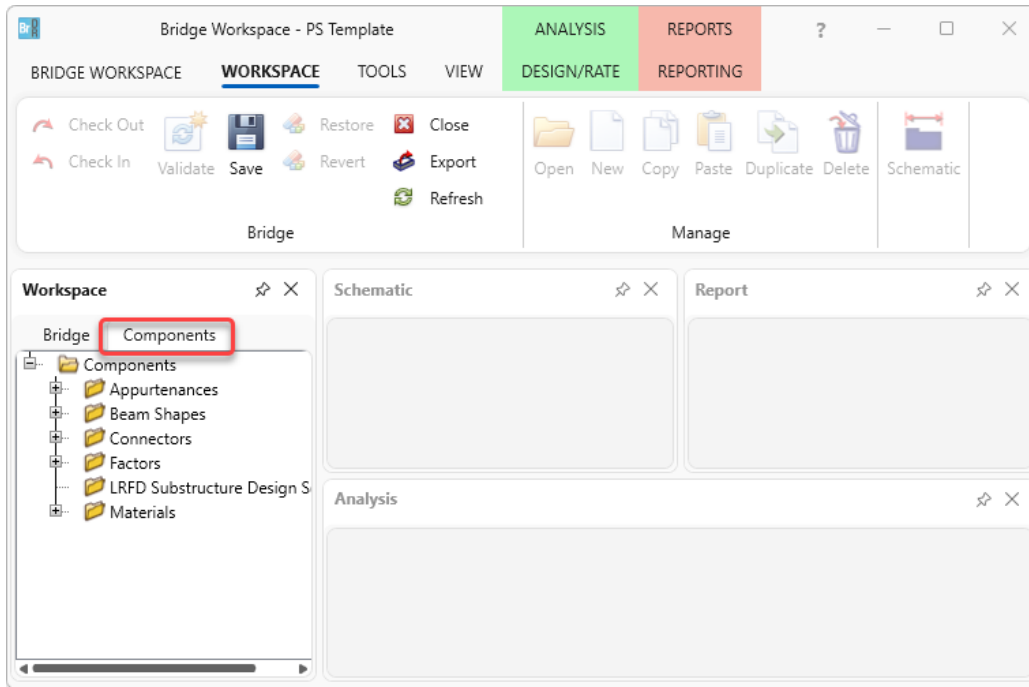
Default units:

Bridge association...  BrR  BrD  BrM

OK Apply Cancel

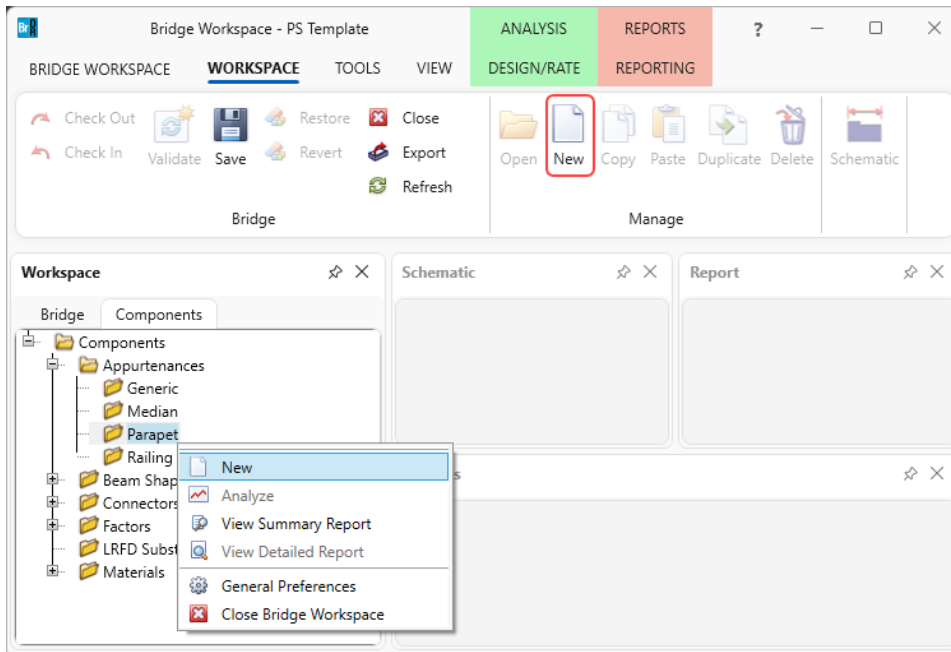
## TMP11 – Use of Templates

The **Components** tab of the **Bridge Workspace** opens the gateway to entering items to be used in the template bridge.



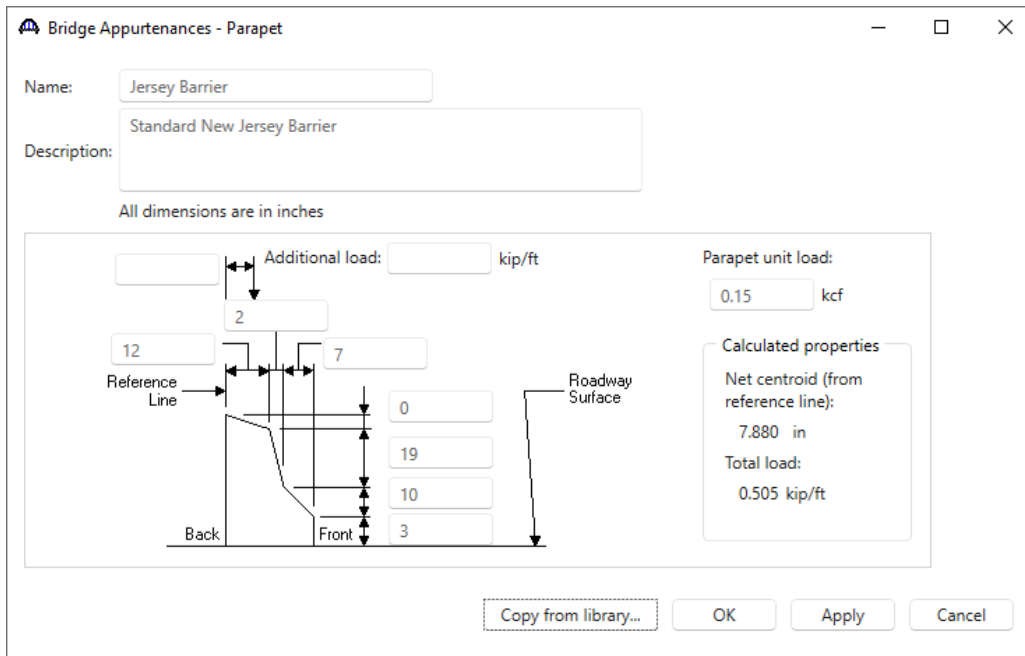
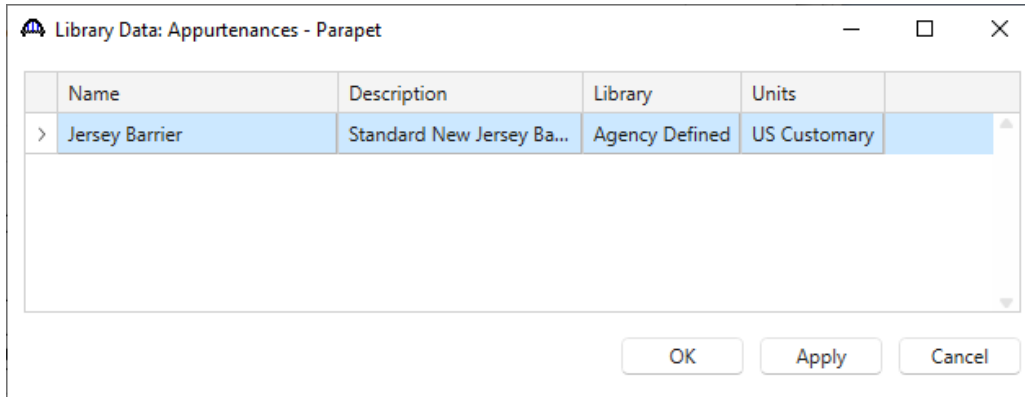
### Bridge Appurtenances – Parapet

Expand the **Appurtenances** folder and double click on **Parapet** (or select **Parapet** and click **New** from the **Manage** group of the **WORKSPACE** ribbon, or right click and select **New**) to add a new parapet.



## TMP11 – Use of Templates

Click on the **Copy from library...** button and select the **Jersey Barrier** Parapet from the library to the bridge.

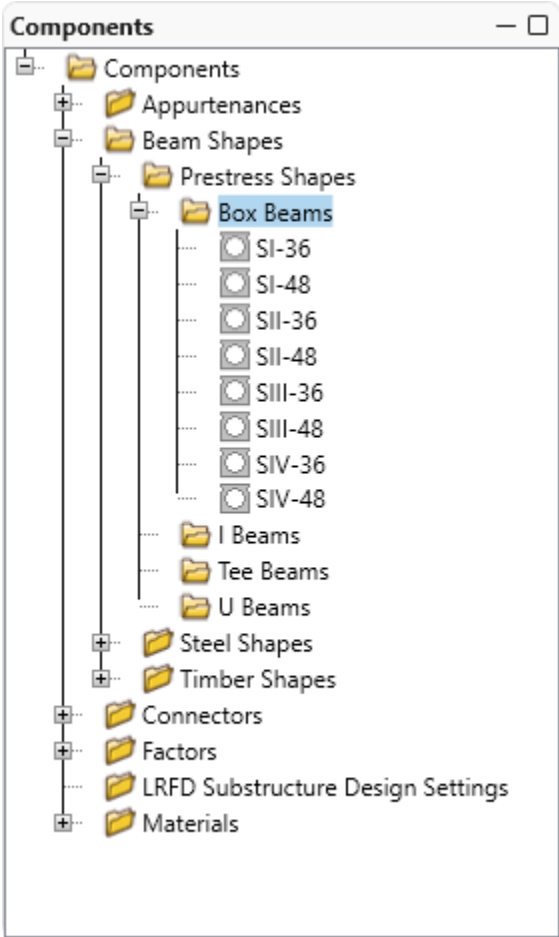


Click **OK** to add this parapet and close the window.

TMP11 – Use of Templates

Beam Shapes – Prestress Box Beams

Similarly, add the following **Prestress Beam Shapes** to this template bridge by copying the beam shapes from the library. The following shows the **Components** tab after all the prestress box beams with rectangular voids have been copied from the library.



## TMP11 – Use of Templates

### Bridge Materials - Concrete

Similarly, copy the **Class A (US)** concrete material from the **library** to the bridge. Also create a **5 ksi concrete** since it is often used for prestress beams.

The screenshot shows a software dialog box titled "Bridge Materials - Concrete". It contains various input fields for defining concrete material properties. The "Name" field is set to "Class A (US)" and the "Description" field is "Class A cement concrete". The "Compressive strength at 28 days (f'c)" is 4.0000006 ksi. Other fields include "Initial compressive strength (f'ci)", "Composition of concrete" (set to "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)" (3644.149254 ksi), "LRFD modulus of elasticity (Ec)" (3986.548657 ksi), "Std initial modulus of elasticity", "LRFD initial modulus of elasticity", "Std modulus of rupture", "LRFD modulus of rupture" (0.479857 ksi), and "Shear factor" (1). A "Compute" button is located below the aggregate size field. At the bottom, there are buttons for "Copy to library...", "Copy from library...", "OK", "Apply", and "Cancel".

Property	Value	Unit
Name	Class A (US)	
Description	Class A cement concrete	
Compressive strength at 28 days (f'c)	4.0000006	ksi
Initial compressive strength (f'ci)		ksi
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)		ksi
LRFD Maximum aggregate size		in
Std modulus of elasticity (Ec)	3644.149254	ksi
LRFD modulus of elasticity (Ec)	3986.548657	ksi
Std initial modulus of elasticity		ksi
LRFD initial modulus of elasticity		ksi
Std modulus of rupture		ksi
LRFD modulus of rupture	0.479857	ksi
Shear factor	1	

# TMP11 – Use of Templates

Bridge Materials - Concrete

Name:

Description:

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

Initial compressive strength (f'ci):  ksi

Composition of concrete:  ▾

Density (for dead loads):  kcf

Density (for modulus of elasticity):  kcf

Poisson's ratio:

Coefficient of thermal expansion ( $\alpha$ ):  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:  ksi

LRFD initial modulus of elasticity:  ksi

Std modulus of rupture:  ksi

LRFD modulus of rupture:  ksi

Shear factor:



## TMP11 – Use of Templates

### Bridge Materials – Prestress Strand

Using the **Copy from library...** option, copy the following **prestress strand** from the **library** to the bridge.

**Bridge Materials - PS Strand**

Name:

Description:

Strand diameter:  in

Strand area:  in<sup>2</sup>

Strand type:  ▾

Ultimate tensile strength (Fu):  ksi

Yield strength (fy):  ksi

Modulus of elasticity (E):  ksi

Transfer length (Std):  in

Transfer length (LRFD):  in

Unit load per length:  lb/ft

Epoxy coated

## TMP11 – Use of Templates

### Bridge Materials – Reinforcing Steel

Using the **Copy from library...** option, copy the **Grade 60** reinforcing steel. Now add **Epoxy** to the **name** and change its **Type** to **Epoxy**.

Bridge Materials - Reinforcing Steel

Name: Epoxy Grade 60

Description: 60 ksi reinforcing steel

Material properties

Specified yield strength (fy): 60.0000087 ksi

Modulus of elasticity (Es): 29000.004206 ksi

Ultimate strength (Fu): 90.0000131 ksi

Type

Plain

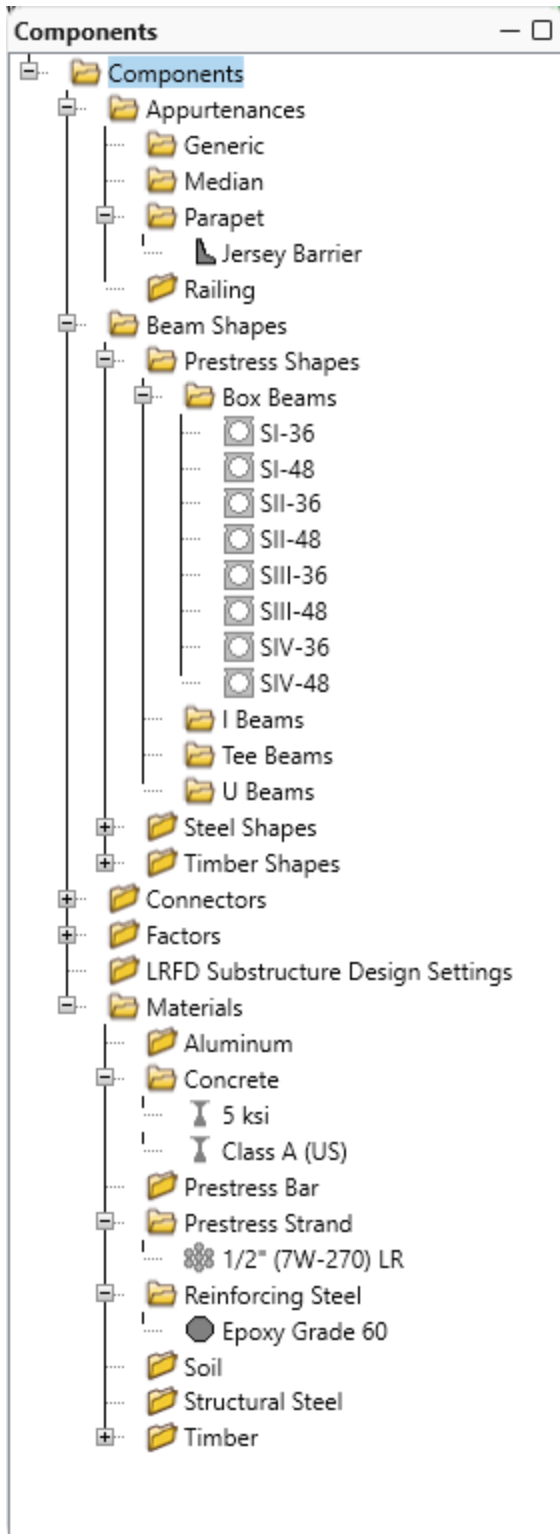
Epoxy

Galvanized

Copy to library... Copy from library... OK Apply Cancel

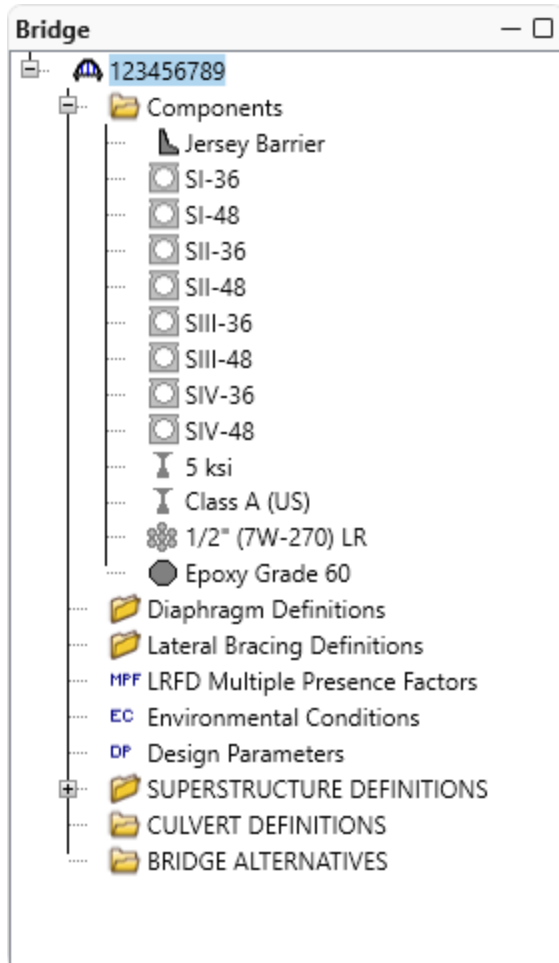
## TMP11 – Use of Templates

The **Components** tab now appears as follows:



## TMP11 – Use of Templates

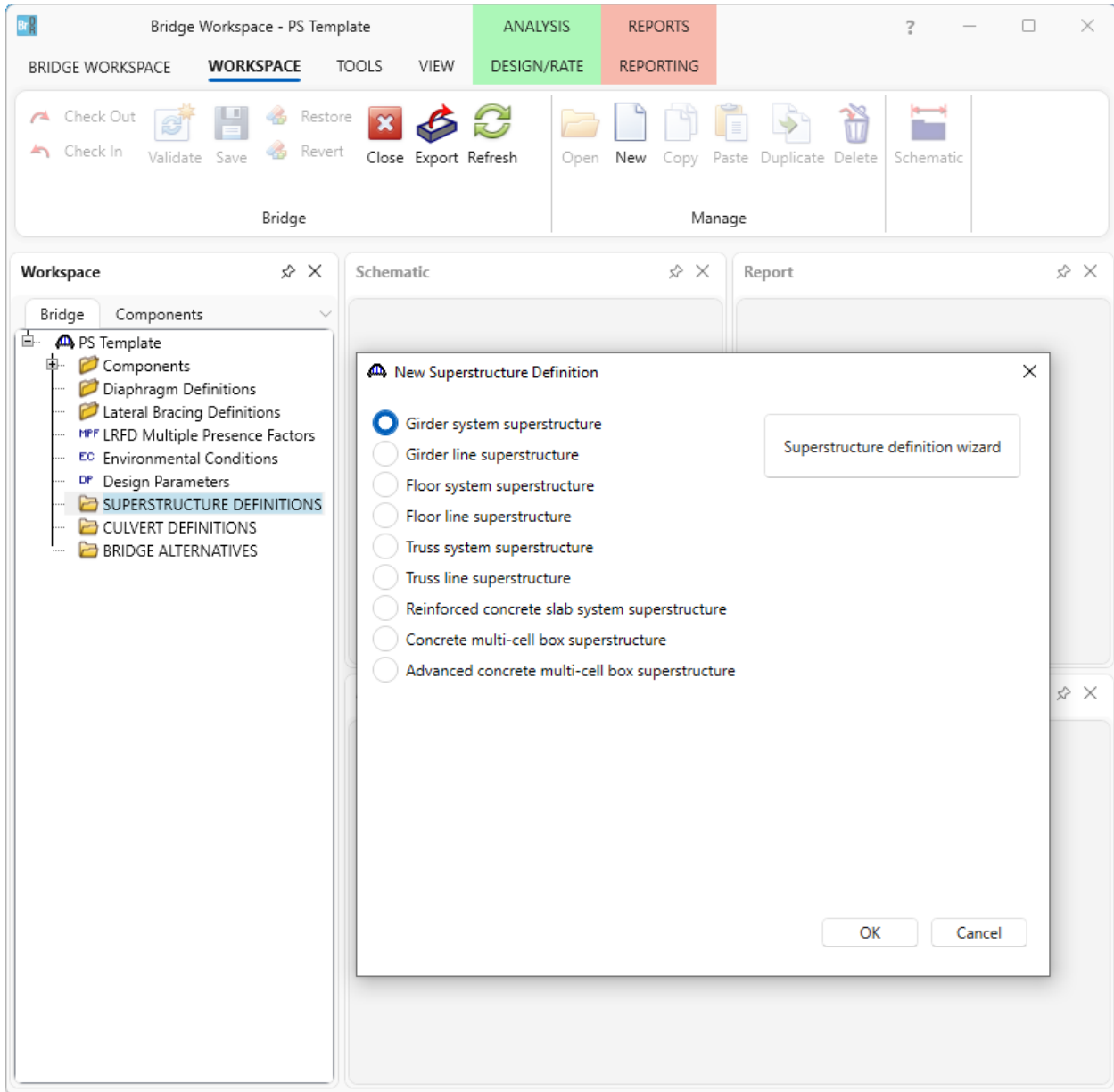
The partially expanded **Bridge** tab is shown below.



## TMP11 – Use of Templates

### Superstructure Definition

Create a **Girder System Superstructure Definition** with 1 span and 2 members. The span length can be any value but use 100' here. This template can be used to create a real bridge, by simply changing the number of spans, members and entering the correct span lengths in the real bridge. Double click on the **SUPERSTRUCTURE DEFINITIONS** node in the **Bridge Workspace (BWS)** tree. Select **Girder system superstructure** and click on the **OK** button to create a new girder system superstructure definition as shown below.



# TMP11 – Use of Templates

Enter details as shown below.

**Girder System Superstructure Definition**

Definition Analysis Specs Engine

Name:

Description:

Default units:

Number of spans:

Number of girders:

Enter span lengths along the reference line:

Span	Length (ft)
> 1	100

Modeling

Multi-girder system  MCB

With frame structure simplified definition

Deck type:

For PS/PT only

Average humidity:  %

Member alt. types

Steel

P/S

R/C

Timber

P/T

Horizontal curvature along reference line

Horizontal curvature

Superstructure alignment

Curved

Tangent, curved, tangent

Tangent, curved

Curved, tangent

Distance from PC to first support line:  ft

Start tangent length:  ft

Radius:  ft

Direction:

End tangent length:  ft

Distance from last support line to PT:  ft

Design speed:  mph

Superelevation:  %

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

## TMP11 – Use of Templates

### Load Case Description

Double click on the **Load Case Description** node under the newly created superstructure definition. Create default load cases using the **Add default load case descriptions** button.

Load case name	Description	Stage	Type	Time* (days)
DC1	DC acting on...	Non-composite (Stage 1)	D,DC	
DC2	DC acting on...	Composite (long term) (Stage 2)	D,DC	
DW	DW acting o...	Composite (long term) (Stage 2)	D,DW	
> SIP Forms	Weight due t...	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 Typical Section

Double click on the **Structure Typical Section** window and select the **deck concrete material** on the **Deck (cont'd)** tab as shown below.

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: in

Load case: Engine Assigned

Deck crack control parameter: kip/in

Sustained modular ratio factor: 3

Deck exposure factor:

OK Apply Cancel

## TMP11 – Use of Templates

Navigate to the **Parapet** tab of this window and locate the **Jersey Barrier** as shown below.

Name	Load case	Measure to	Edge of deck dist. measured from	Distance at start (ft)	Distance at end (ft)	Front face orientation
Jersey Barrier	DC1	Back	Left Edge	0	0	Right
Jersey Barrier	DC1	Back	Right Ed...	0	0	Left

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

### Concrete Stress Limits - Stress Limit Sets - Concrete

Double click on the **Concrete Stress Limits** node in the **BWS** tree. After selecting the concrete material press the **Compute** button.

	LFD	LRFD
Initial allowable compression:	2.4 ksi	2.6 ksi
Initial allowable tension:	0.1897367 ksi	0.1896 ksi
Final allowable compression:	3 ksi	3 ksi
Final allowable tension:	0.4248529 ksi	0.4248529 ksi
Final allowable DL compression:	2 ksi	2.25 ksi
Final allowable slab compression:		
Final allowable compression: (LL+1/2(Pe+DL))	2 ksi	2 ksi

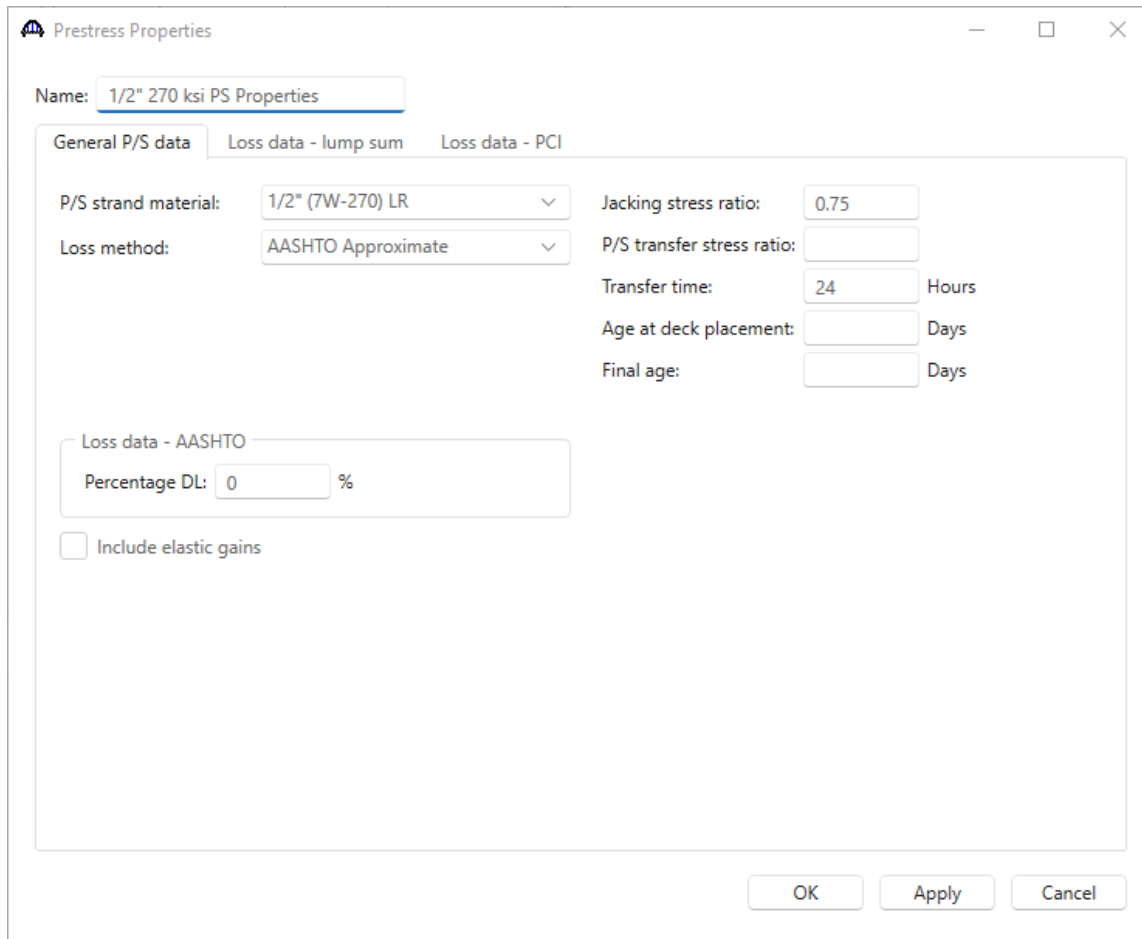
Click **OK** to apply the data and close the window.



## TMP11 – Use of Templates

### Prestress Properties

Double click on the **Prestress Properties** node in the **BWS** tree to create the following prestress properties. The only additional input needed here is the **Name**.



The screenshot shows a dialog box titled "Prestress Properties" with a standard Windows window control bar (minimize, maximize, close). The "Name" field at the top contains the text "1/2\" 270 ksi PS Properties". Below this, there are three tabs: "General P/S data" (which is selected), "Loss data - lump sum", and "Loss data - PCI".

Under the "General P/S data" tab, the following fields are visible:

- P/S strand material:** A dropdown menu showing "1/2\" (7W-270) LR".
- Loss method:** A dropdown menu showing "AASHTO Approximate".
- Jacking stress ratio:** A text input field containing "0.75".
- P/S transfer stress ratio:** An empty text input field.
- Transfer time:** A text input field containing "24" followed by a "Hours" label.
- Age at deck placement:** An empty text input field followed by a "Days" label.
- Final age:** An empty text input field followed by a "Days" label.

Below these fields, there is a section for "Loss data - AASHTO" with a text input field for "Percentage DL:" containing the value "0" and a "%" symbol. At the bottom of this section is a checkbox labeled "Include elastic gains" which is currently unchecked.

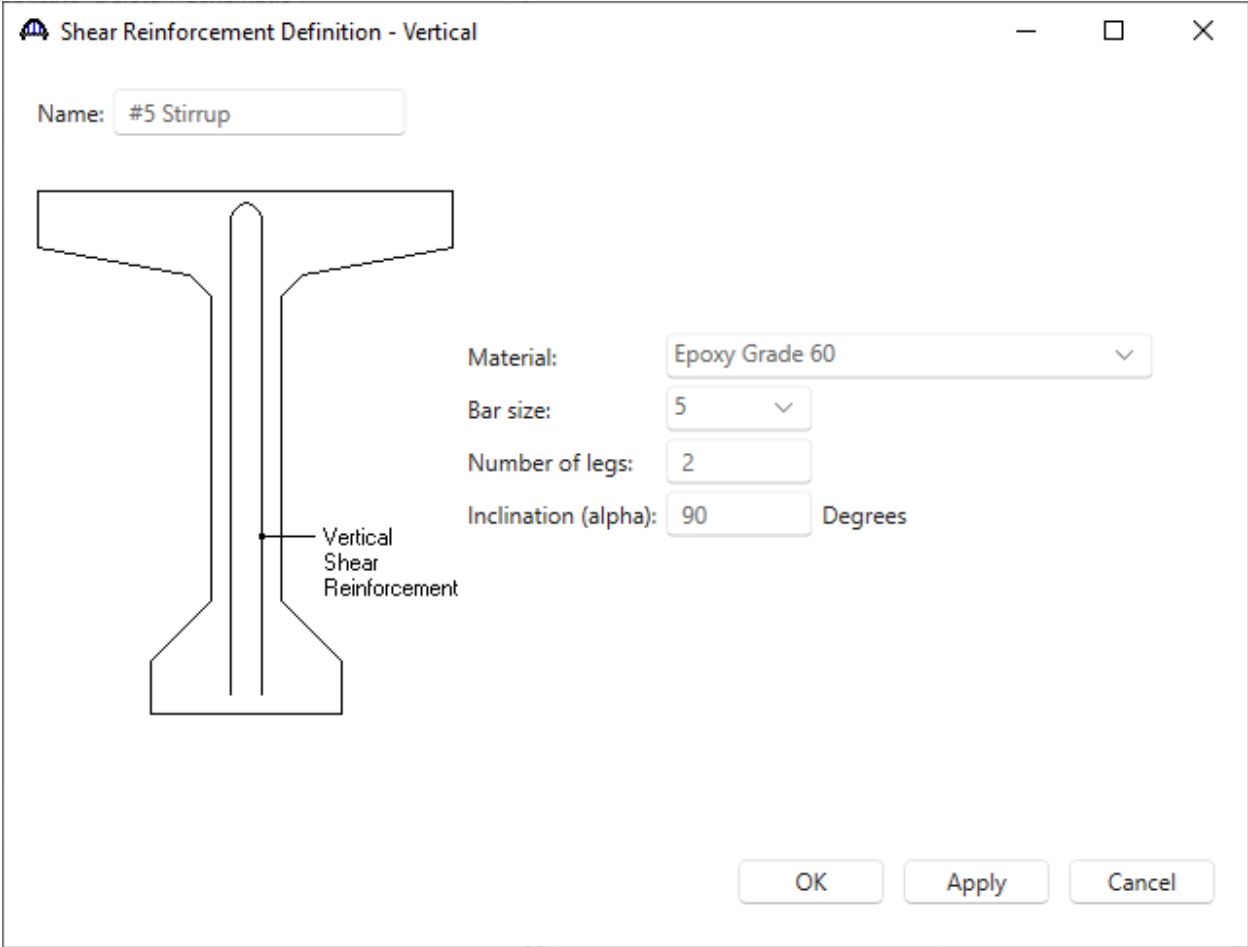
At the bottom right of the dialog box, there are three buttons: "OK", "Apply", and "Cancel".

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

TMP11 – Use of Templates

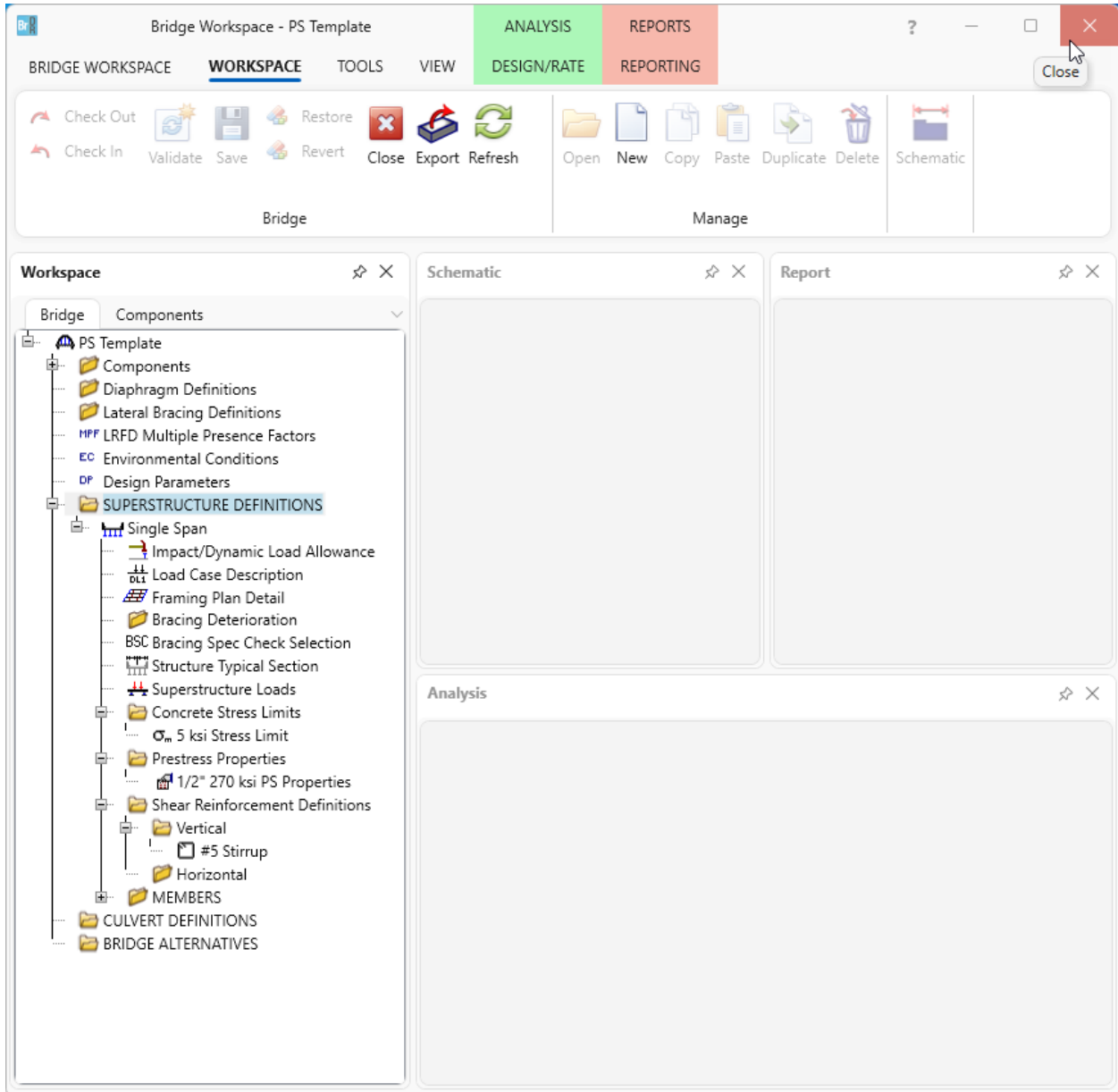
Shear Reinforcement Definitions - Vertical

Double click on the **Vertical** node under **Shear Reinforcement Definitions** folder in the **BWS** and create the following **Vertical Shear Reinforcement** Definition.



## TMP11 – Use of Templates

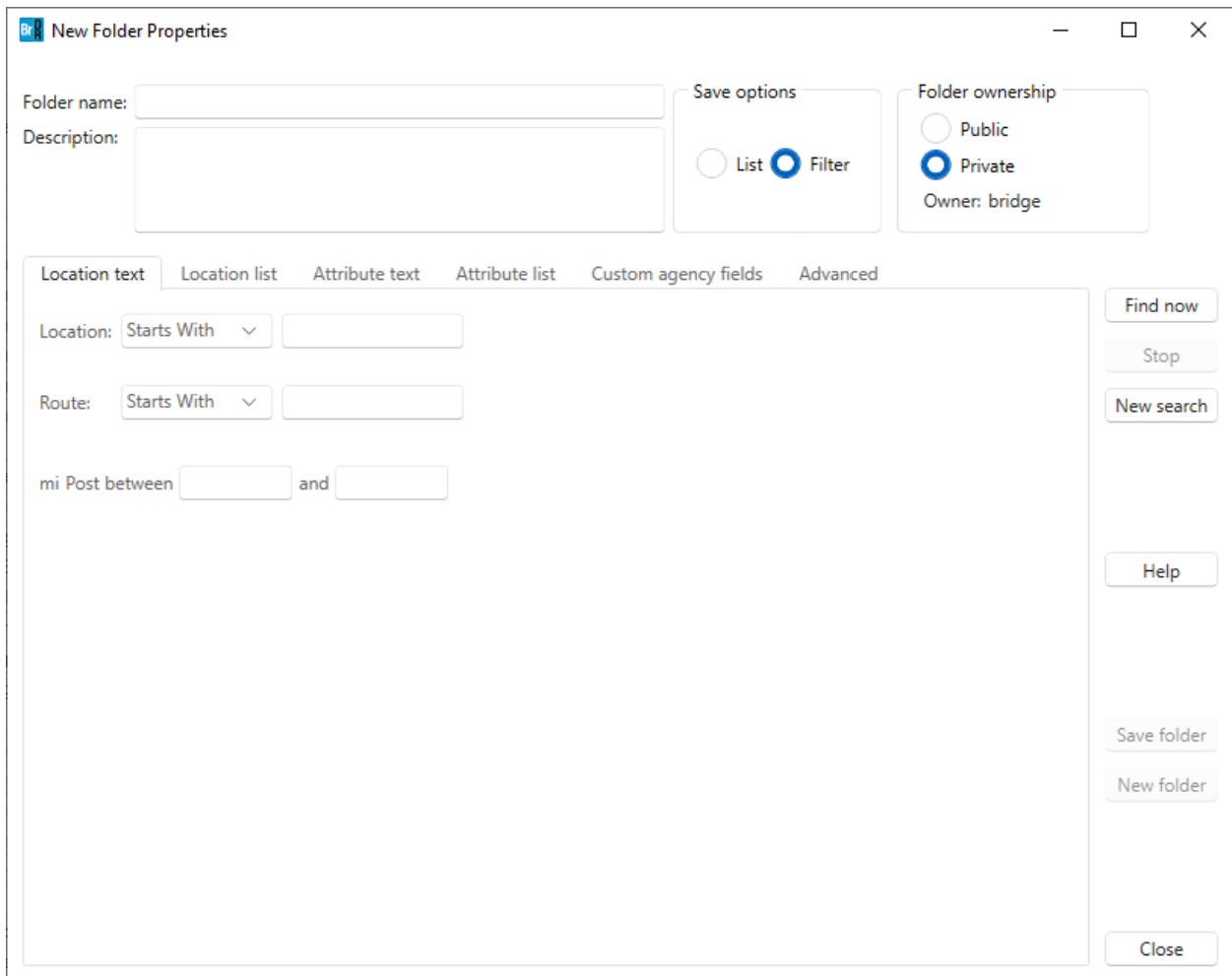
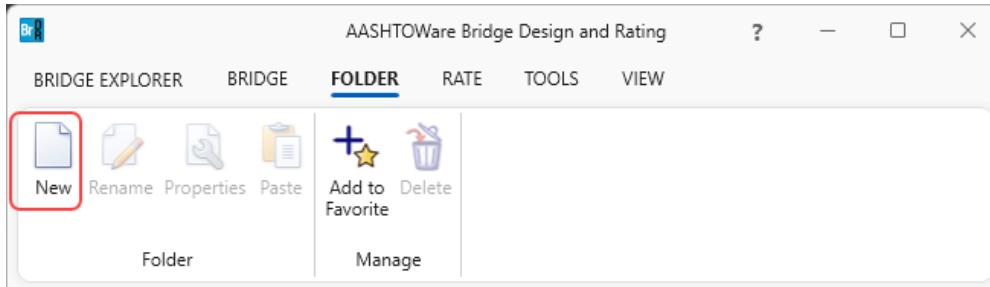
The template prestress bridge is now ready. The **Bridge** tab of the **Bridge Workspace** is shown below. Press the **Save** button from the **Bridge** group of the **WORKSPACE** ribbon and **Close** the window.



# TMP11 – Use of Templates

## Creating a Folder to Organize Templates

From **Bridge Explorer**, select **New** from the **Folder** group on the **FOLDER** ribbon to open the following window.



## TMP11 – Use of Templates

Enter a folder name and select **Template Bridges** as shown on the **Attribute Text** tab.

The screenshot shows the 'New Folder Properties' dialog box. At the top, the 'Folder name' is 'Template Bridge' and the 'Description' field is empty. The 'Save options' section has 'Filter' selected. The 'Folder ownership' section has 'Private' selected and the 'Owner' is 'bridge'. Below these are tabs for 'Location text', 'Location list', 'Attribute text' (highlighted with a red box), 'Attribute list', 'Custom agency fields', and 'Advanced'. The 'Attribute text' tab contains several sections: 'Identity' with 'Bridge ID', 'Bridge name', and 'NBI Structure ID' fields; 'Measurement' with 'Length (ft)' field; 'Status' with 'Year built' field; 'Other Attributes' with 'Facility' and 'Feature' fields; and 'Template', 'Design', and 'Definition' dropdown menus. The 'Template' dropdown is highlighted with a red box and shows 'Template Bridges' selected. On the right side, there are buttons for 'Find now', 'Stop', 'New search', 'Help', 'Save folder', 'New folder', and 'Close'.

## TMP11 – Use of Templates

Select **Find Now** and the template bridge just created will be listed. Select **Save Folder**.

Folder name:

Description:

Save options:  List  Filter

Folder ownership:  Public  Private  
Owner: bridge

Location text | Location list | **Attribute text** | Attribute list | Custom agency fields | Advanced

Identity: Bridge ID: Starts With [ ]  
Bridge name: Starts With [ ]  
NBI Structure ID: Starts With [ ]

Measurement: Length (ft): Greater Than [ ]

Status: Year built: After [ ]  
Template: Template Bridges [ ]  
Design: Both [ ]  
Definition: Both [ ]

Other Attributes: Facility: Starts With [ ]  
Feature: Starts With [ ]

**Find now** (highlighted)

Stop  
New search  
Help  
Save folder  
New folder  
Close

BID	Bridge Id	Bridge name	District	County	Facility
> 36	PS Template	PS Template			

Select **Save Folder** button above and the following folder is created in the **Bridge Explorer**.

AASHTOWare Bridge Design and Rating

BRIDGE EXPLORER | BRIDGE | **FOLDER** | RATE | TOOLS | VIEW

New | Rename | Properties | Paste | Add to Favorite | Delete Favorite

Folder | Manage

Favorites Folder  
Recent Bridges  
All Bridges  
Sample Bridges  
Template Bridge  
Deleted Bridges

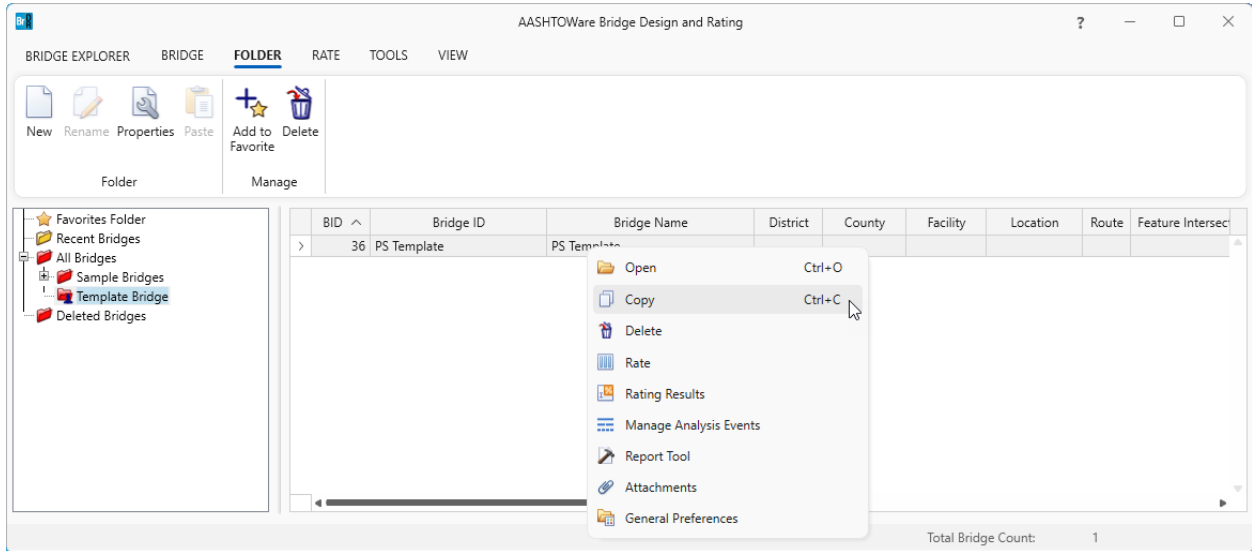
BID	Bridge ID	Bridge Name	District	County	Facility	Location	Route	Feature Intersec
36	PS Template	PS Template						

Total Bridge Count: 1

## TMP11 – Use of Templates

### Using a Template to Create a New Bridge

The created template will be used to create a new 2 span prestress box beam bridge. Right-click on the **PS Template** bridge in the Bridge Explorer and select **Copy** from the menu.



Right-click on the **PS Template** bridge again and select **Paste**. The following window appears. Revise the data to reflect the actual bridge being created using this template and click **OK**. This creates the new bridge and is added to the Bridge Explorer.

The 'Copy Bridge' dialog box contains the following fields and options:

- Bridge ID: 123456789  Add to current folder
- NBI Structure ID (8): 0123456789
- Name: I-15 Overpass
- Description: 2 Span PS Box Beam Overpass over I-15

Buttons: OK, Cancel, Help

## TMP11 – Use of Templates

Open the **Bridge** window for this new bridge just created. Uncheck the **Template** box and enter data to reflect this bridge.

The screenshot shows a software window titled "123456789" with a standard Windows-style title bar. The window contains several input fields and checkboxes. At the top right, there is a "Bridge Workspace View" panel with three checked options: "Superstructures", "Culverts", and "Substructures". Below this, there are two checkboxes: "Template" (unchecked) and "Bridge completely defined" (unchecked). The main area contains two text boxes for "Bridge ID: 123456789" and "NBI structure ID (8): 0123456789". Below these is a tabbed interface with tabs for "Description", "Description (cont'd)", "Alternatives", "Global reference point", "Traffic", and "Custom agency fields". The "Description" tab is active, showing fields for "Name: I-15 Overpass", "Year built:", "Description: 2 Span PS Box Beam Overpass over I-15", "Location: River City", "Length: 200 ft", "Facility carried (7): SR234", "Route number: 234", "Feat. intersected (6): I-15", "Mi. post: 12.5", and "Default units: US Customary". At the bottom left, there is a "Bridge association..." button and three checkboxes: "BrR" (checked), "BrD" (checked), and "BrM" (unchecked). At the bottom right, there are three buttons: "OK", "Apply", and "Cancel".

Now adjust the data in this new bridge to reflect the actual bridge. Items that must be adjusted include:

- Superstructure Definition – number of spans, number of girders, span lengths
- Framing Plan Details – girder spacing, support skews, diaphragms
- Structure Typical Section – deck width, lane positions
- Member Alternatives - must be created