

---

*AASHTOWare BrD/BrR 6.8*

*Feature Tutorial*

*TMP1 – Use of Templates*

## TMP1 - Use of Templates

This example describes the use of templates in BrR/BrD. We are going to create a template for prestress bridges for a fictitious agency.

### Topics

- 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 in your state. You can use a template bridge to “jump-start” the data entry of your bridges.

## Creating a Template Prestress Bridge

From the Bridge Explorer create a new bridge and enter the following data. 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.

The screenshot shows a software dialog box for creating a new bridge. At the top, there are two text input fields: "Bridge ID:" and "NBI Structure ID (8):", both containing the text "PS Template". To the right of these fields is a checked checkbox labeled "Template", which is highlighted with a red rectangular box. Further right are two more checked checkboxes: "Superstructures" and "Culverts". Below these is an unchecked checkbox labeled "Bridge Completely Defined". A tabbed interface is visible, with the "Description" tab selected. The main area contains several input fields: "Name:" with the value "Prestress Template", "Year Built:" (empty), "Description:" with the text "Template for creating new bridges with prestress beams", "Location:" (empty), "Length:" (empty) followed by "ft", "Facility Carried (7):" (empty), "Route Number:" (empty), "Feat. Intersected (6):" (empty), "Mi. Post:" (empty), and "Default Units:" with a dropdown menu set to "US Customary". At the bottom left is a button labeled "AASHTO Ware Association...". At the bottom right are three buttons: "OK", "Apply", and "Cancel". At the very bottom, there are three checkboxes: "BrR" (checked), "BrD" (checked), and "BrM" (unchecked).

## TMP1 - Use of Templates

We are going to create the materials we typically use in prestress bridges.

Copy the “Class A” concrete material from the library to the bridge since our agency typically uses this concrete in our decks. Also enter the “5 ksi” concrete since we typically use that for our prestress beams.

Bridge Materials - Concrete

Name:  Description:

Compressive strength at 28 days (f'c) =  ksi  
Initial compressive strength (f'ci) =  ksi  
Coefficient of thermal expansion =  1/F  
Density (for dead loads) =  kcf  
Density (for modulus of elasticity) =  kcf  
Std Modulus of elasticity (Ec) =  ksi  
LRFD Modulus of elasticity (Ec) =  ksi  
Std Initial modulus of elasticity =  ksi  
LRFD Initial modulus of elasticity =  ksi  
Poisson's ratio =   
Composition of concrete =   
Modulus of rupture =  ksi  
Shear factor =   
Splitting tensile strength (fct) =  ksi

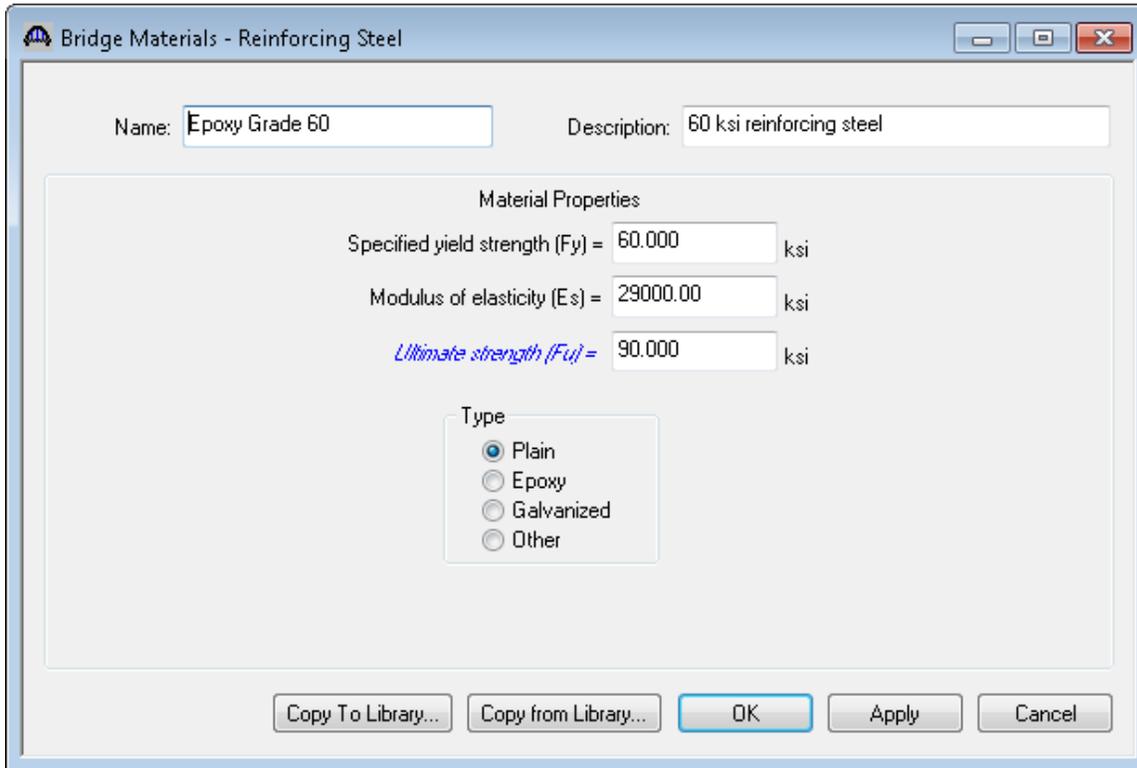
Bridge Materials - Concrete

Name:  Description:

Compressive strength at 28 days (f'c) =  ksi  
Initial compressive strength (f'ci) =  ksi  
Coefficient of thermal expansion =  1/F  
Density (for dead loads) =  kcf  
Density (for modulus of elasticity) =  kcf  
Std Modulus of elasticity (Ec) =  ksi  
LRFD Modulus of elasticity (Ec) =  ksi  
Std Initial modulus of elasticity =  ksi  
LRFD Initial modulus of elasticity =  ksi  
Poisson's ratio =   
Composition of concrete =   
Modulus of rupture =  ksi  
Shear factor =   
Splitting tensile strength (fct) =  ksi

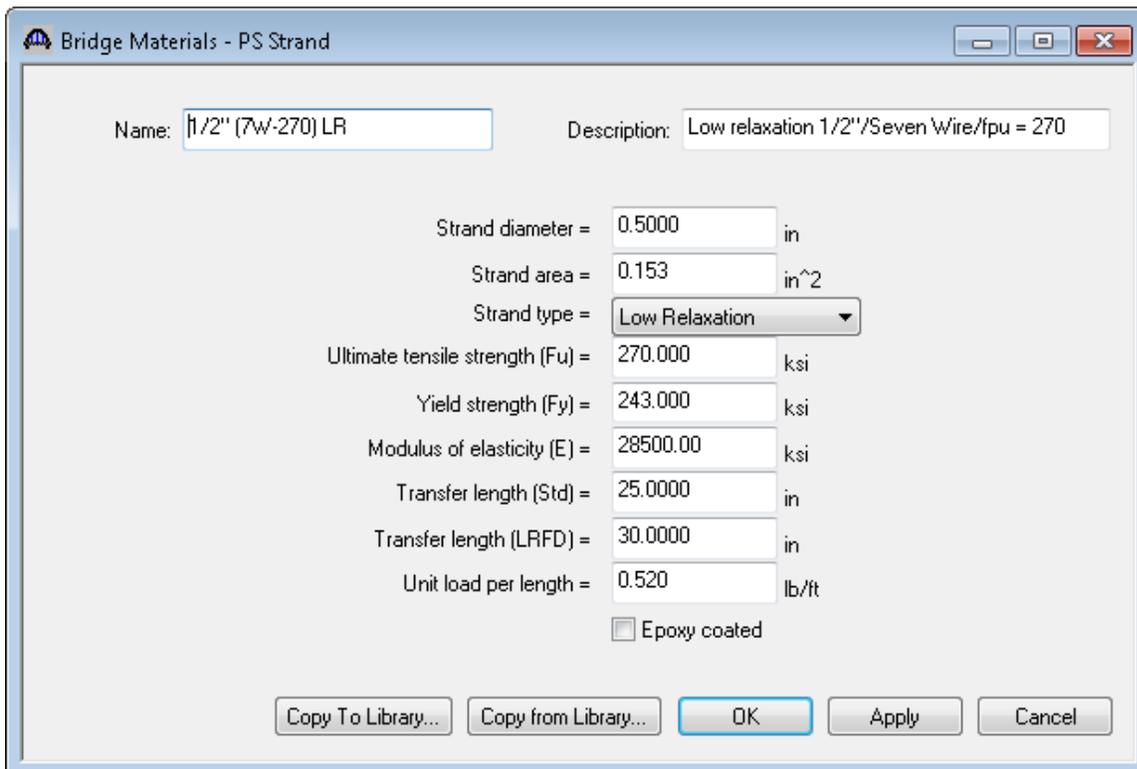
## TMP1 - Use of Templates

Copy the following reinforcing steel from the library and change its type to “Epoxy”.



The screenshot shows the "Bridge Materials - Reinforcing Steel" dialog box. The "Name" field is set to "Epoxy Grade 60" and the "Description" field is "60 ksi reinforcing steel". Under "Material Properties", the "Specified yield strength (Fy)" is 60.000 ksi, "Modulus of elasticity (Es)" is 29000.00 ksi, and "Ultimate strength (Fu)" is 90.000 ksi. The "Type" section has radio buttons for "Plain", "Epoxy", "Galvanized", and "Other", with "Epoxy" selected. At the bottom are buttons for "Copy To Library...", "Copy from Library...", "OK", "Apply", and "Cancel".

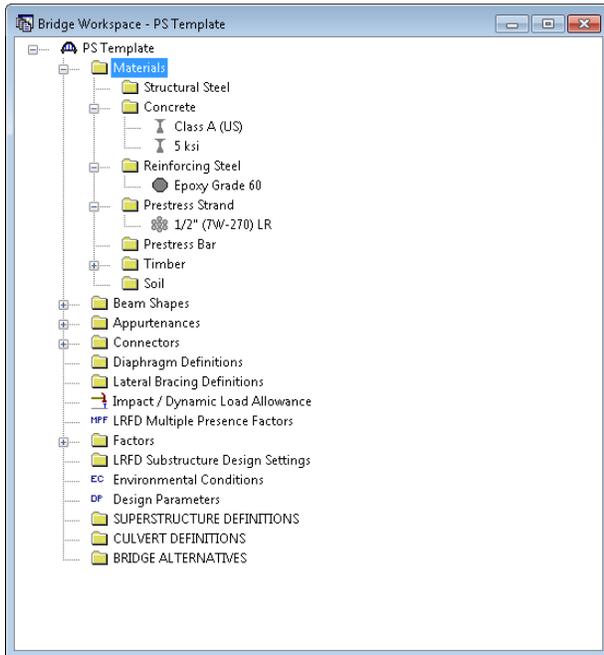
Copy the following prestress strand from the library to the bridge.



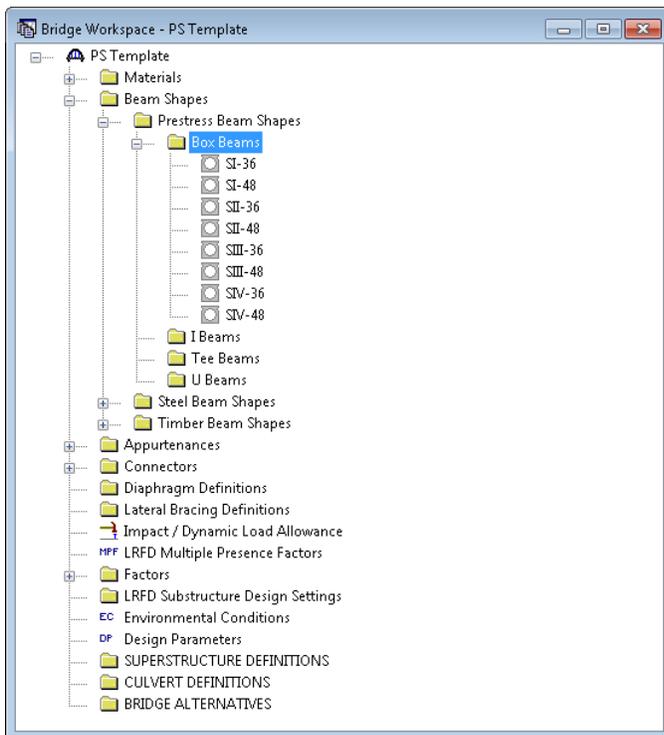
The screenshot shows the "Bridge Materials - PS Strand" dialog box. The "Name" field is "1/2" (7W-270) LR" and the "Description" is "Low relaxation 1/2"/Seven Wire/fpu = 270". Properties include: "Strand diameter" = 0.5000 in, "Strand area" = 0.153 in<sup>2</sup>, "Strand type" = Low Relaxation (dropdown), "Ultimate tensile strength (Fu)" = 270.000 ksi, "Yield strength (Fy)" = 243.000 ksi, "Modulus of elasticity (E)" = 28500.00 ksi, "Transfer length (Std)" = 25.0000 in, "Transfer length (LRFD)" = 30.0000 in, and "Unit load per length" = 0.520 lb/ft. There is an unchecked checkbox for "Epoxy coated". At the bottom are buttons for "Copy To Library...", "Copy from Library...", "OK", "Apply", and "Cancel".

## TMP1 - Use of Templates

The Bridge Workspace tree now appears as follows:

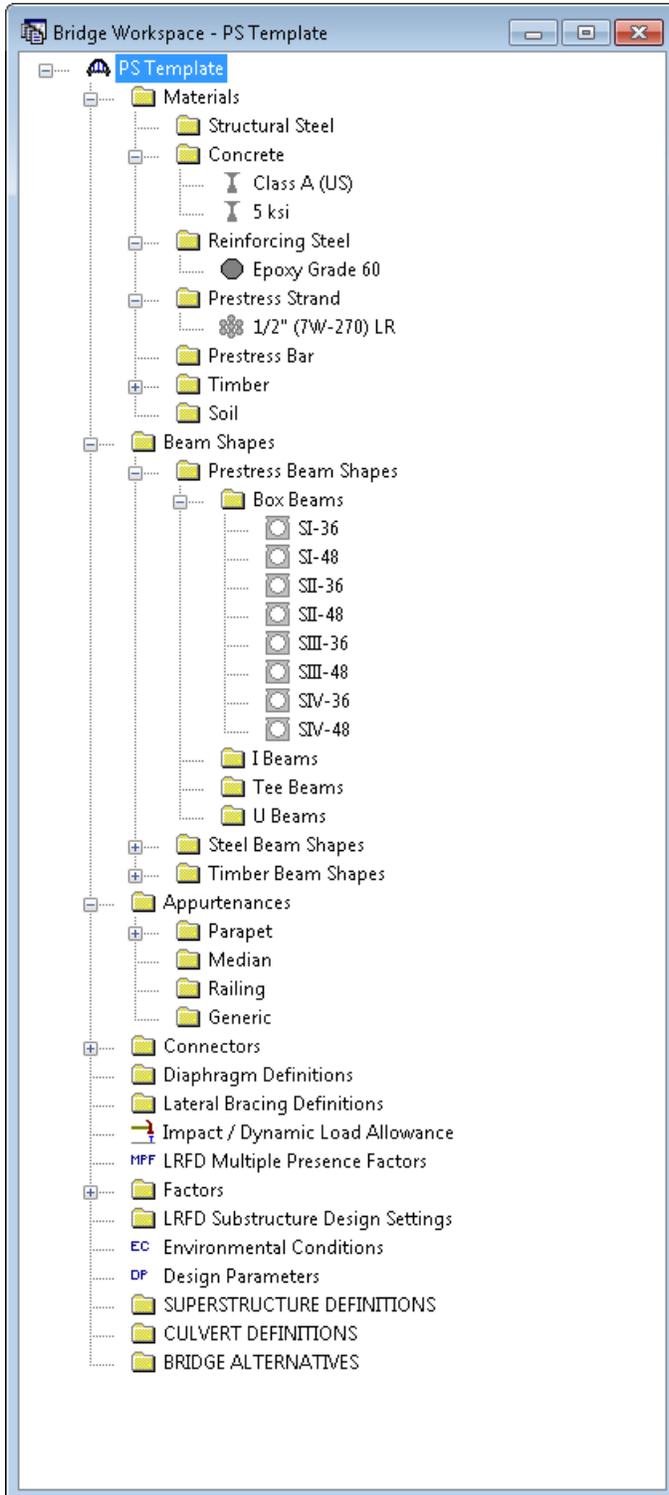


We can now add Prestress Beam Shapes to our template bridge by copying the beam shapes from the library. The following shows the Bridge Workspace tree after all of the prestress box beams with rectangular voids have been copied from the library to our template bridge.



## TMP1 - Use of Templates

Appurtenances can also be added to our template bridge. Copy the “Jersey Barrier” parapet from the library to the bridge. The expanded Bridge Workspace tree is shown below.



## TMP1 - Use of Templates

You could stop your template at this point but we will further advance this template by creating a superstructure definition. Create a girder system superstructure definition with 1 span and 2 members. The span length can be any value. When we use this template to create a real bridge, we can simply change the number of spans, members and enter the correct span lengths in the real bridge. Create a new girder system superstructure definition under **SUPERSTRUCTURE DEFINITIONS** and enter the following.

**Girder System Superstructure Definition**

Definition | Analysis | Specs | Engine

Name: Single Span

Description:

Default Units: US Customary

Number of spans: 1

Number of girders: 2

Enter Span Lengths Along the Reference Line:

Span	Length (ft)
1	100.00

Frame Structure Simplified Definition:

Deck type: Concrete

For PS only  
Average humidity: 70.000 %

Member Alt. Types:  
 Steel  
 P/S  
 R/C  
 Timber

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: Left

End tangent length: \_\_\_\_\_ ft

Distance from last support line to PT: \_\_\_\_\_ ft

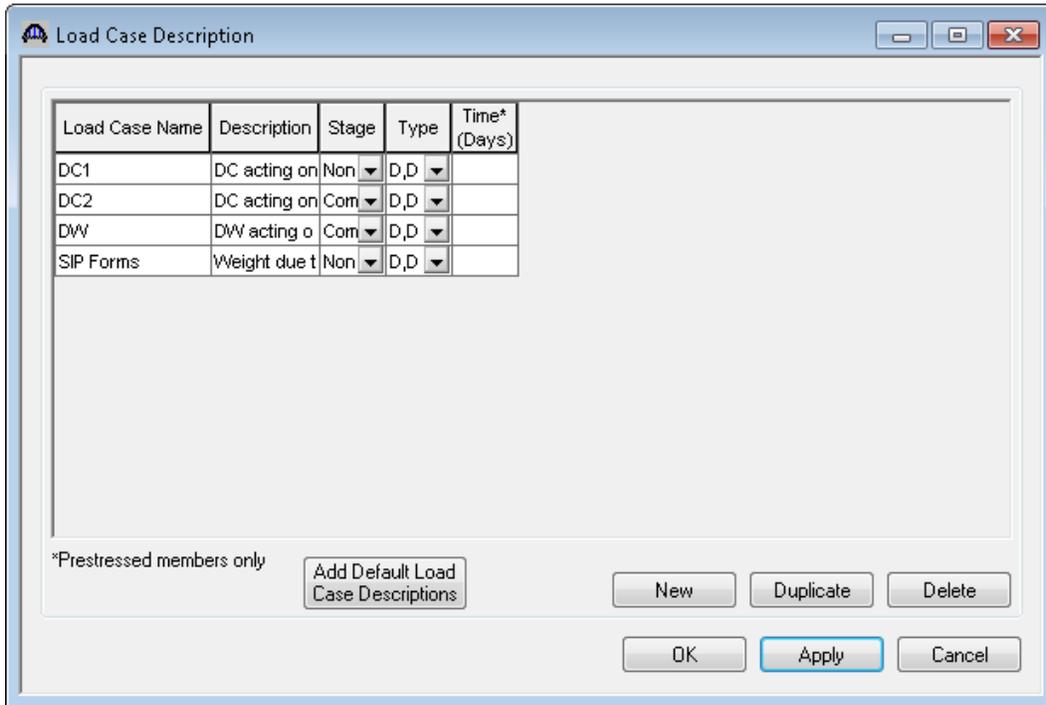
Design speed: \_\_\_\_\_ mph

Superelevation: \_\_\_\_\_ %

OK Apply Cancel

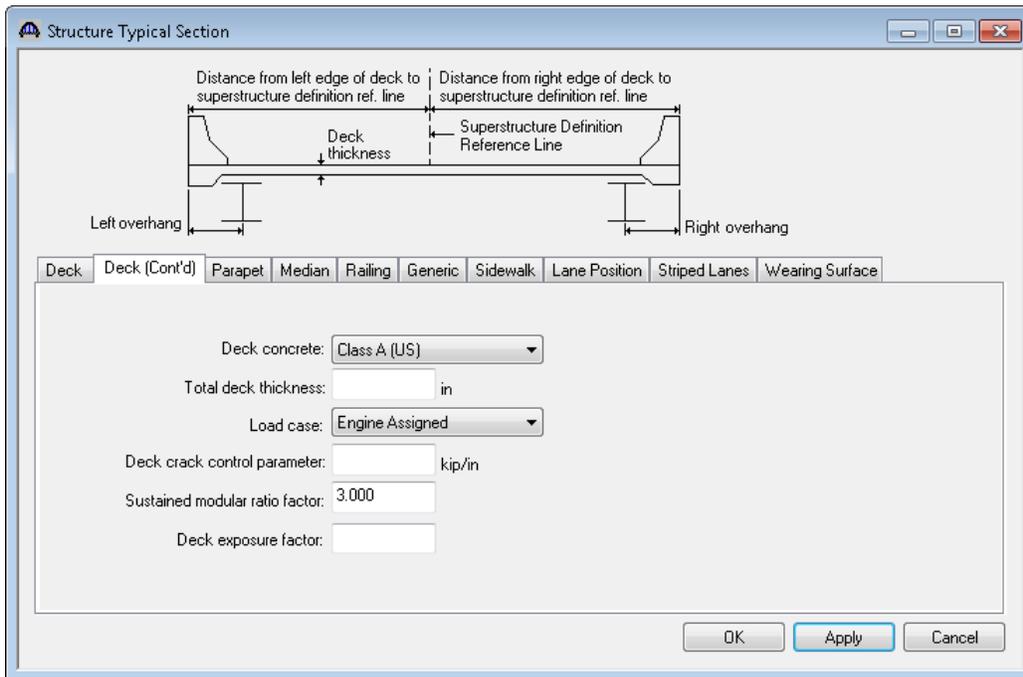
## TMP1 - Use of Templates

Create default load cases.



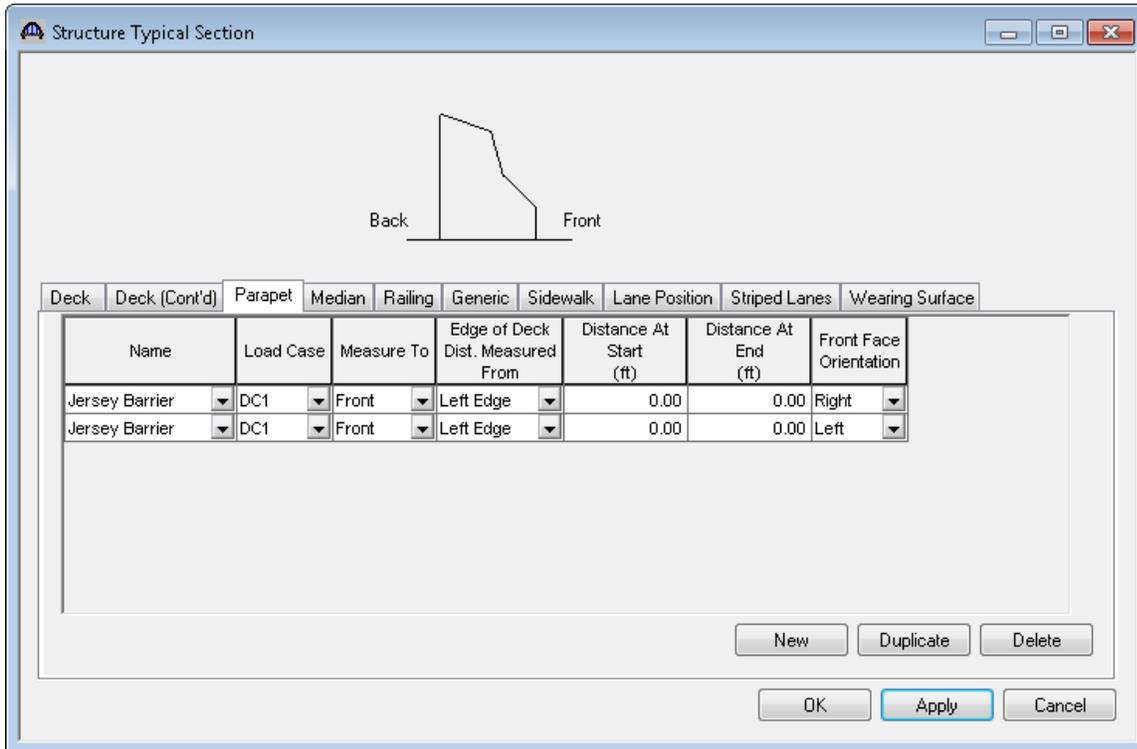
We are not going to enter any data for the girder spacing or deck width since it is better to leave this data blank rather than forget that it needs to be changed once we create a real bridge from the template.

Open the Structure Typical Section window and select the deck concrete material on the Deck (Cont'd) tab.

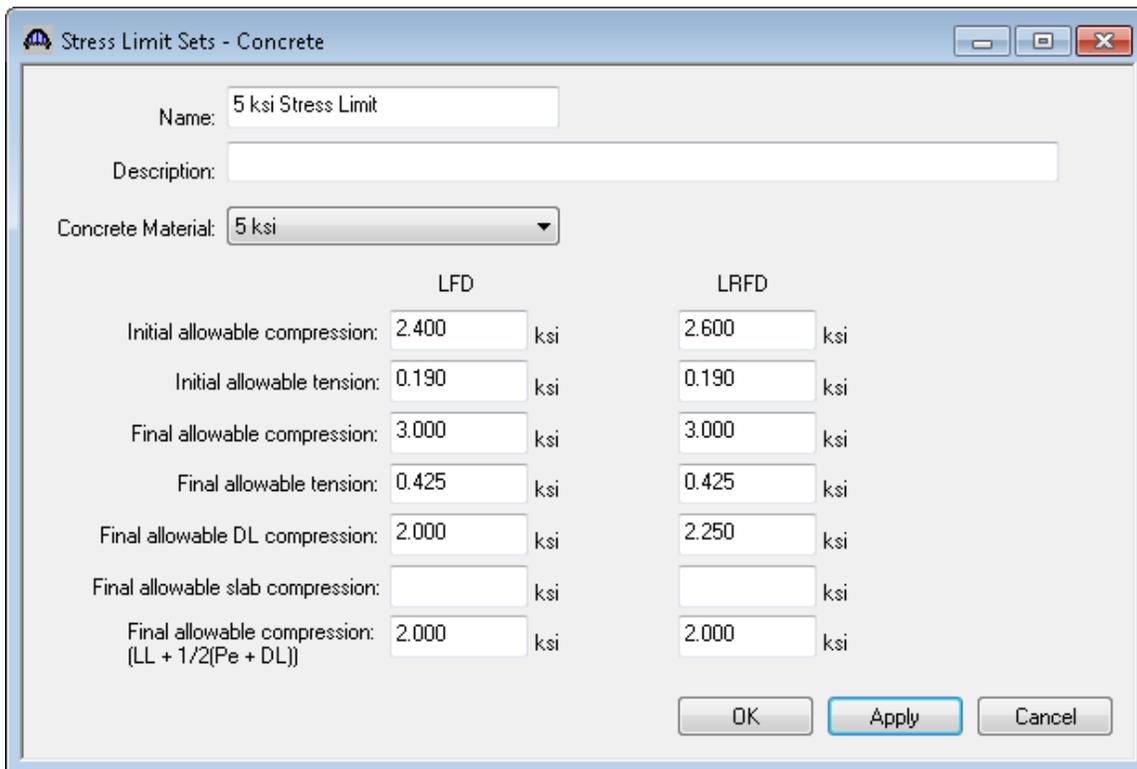


## TMP1 - Use of Templates

Locate the Jersey Barrier parapets on the Parapet tab.

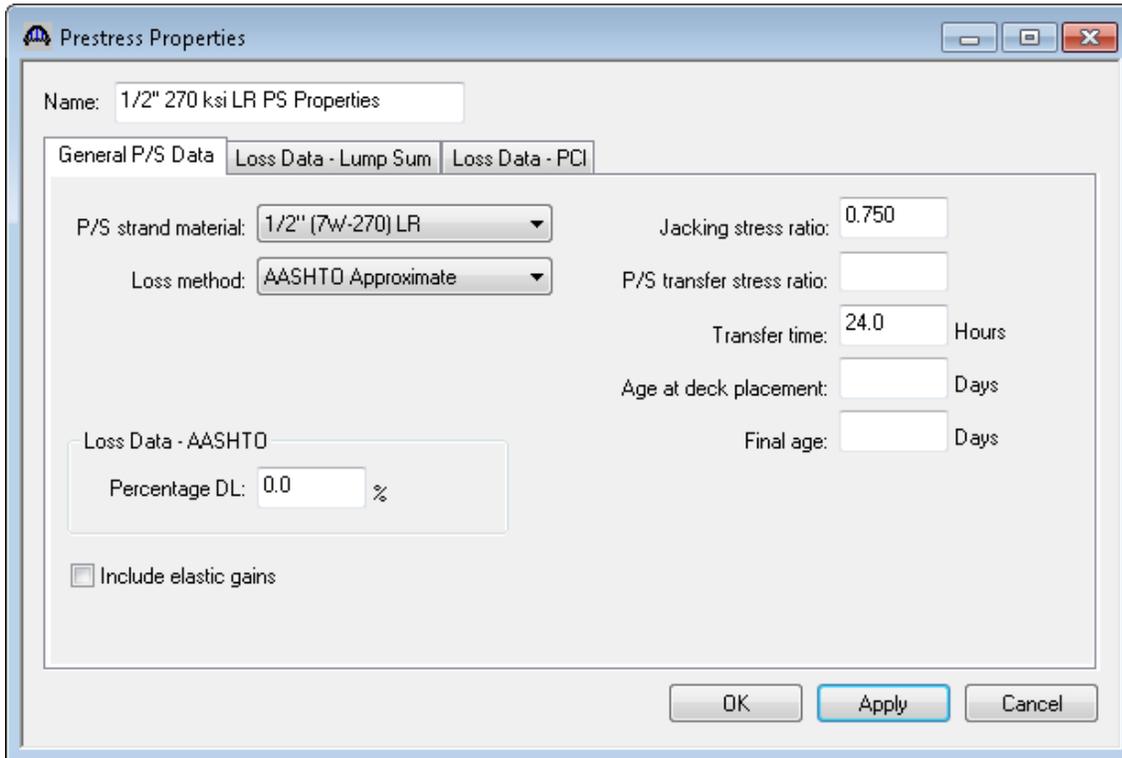


Create the following Stress Limit.



## TMP1 - Use of Templates

Create the following Prestress Properties.

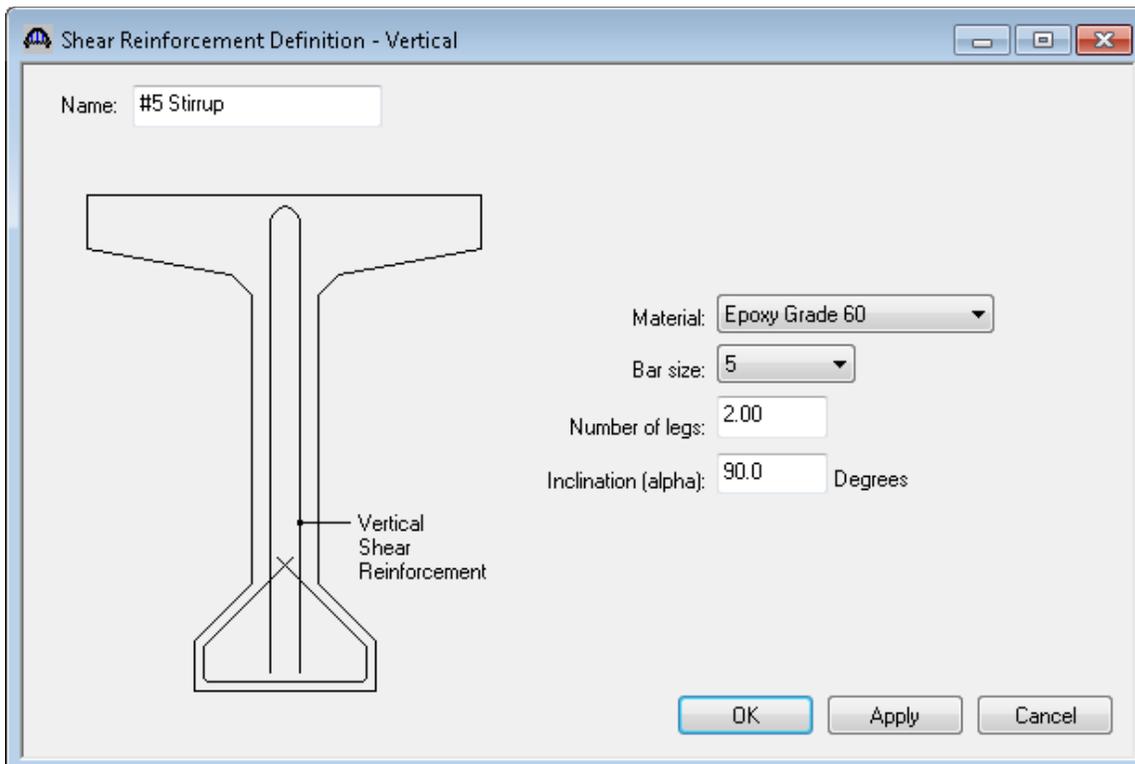


The screenshot shows the "Prestress Properties" dialog box with the following settings:

- Name: 1/2" 270 ksi LR PS Properties
- General P/S Data tab selected.
- P/S strand material: 1/2" (7W-270) LR
- Loss method: AASHTO Approximate
- Jacking stress ratio: 0.750
- P/S transfer stress ratio: (empty)
- Transfer time: 24.0 Hours
- Age at deck placement: (empty) Days
- Final age: (empty) Days
- Loss Data - AASHTO section: Percentage DL: 0.0 %
- Include elastic gains

Buttons: OK, Apply, Cancel

Create the following Vertical Shear Reinforcement Definition.



The screenshot shows the "Shear Reinforcement Definition - Vertical" dialog box with the following settings:

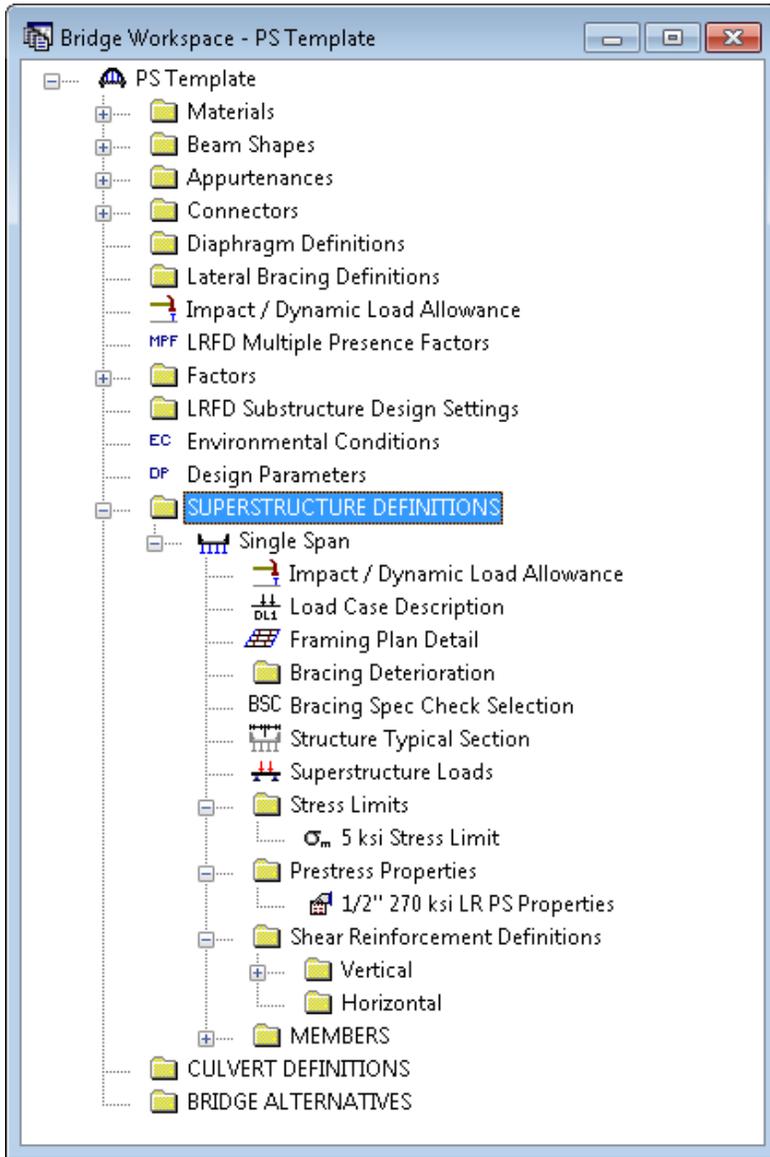
- Name: #5 Stirrup
- Material: Epoxy Grade 60
- Bar size: 5
- Number of legs: 2.00
- Inclination (alpha): 90.0 Degrees

A diagram of a T-beam cross-section is shown on the left, with a vertical stirrup reinforcement bar highlighted and labeled "Vertical Shear Reinforcement".

Buttons: OK, Apply, Cancel

## TMP1 - Use of Templates

We are now done creating our template prestress bridge. The Bridge Workspace tree is shown below.



## Creating a Folder to Organize Templates

Select “New Folder” from File/Menu to open the following window.

The screenshot shows the 'New Folder Properties' dialog box. At the top, there is a 'Folder Name' text box, a 'Description' text box, and a 'Save Option' section with radio buttons for 'List' and 'Filter' (selected). To the right is a 'Folder Ownership' section with radio buttons for 'Public' and 'Private' (selected), and a label 'Owner: bridge'. Below these are several tabs: 'Location Text', 'Location List', 'Attribute Text', 'Attribute List', 'Custom Agency Fields', and 'Advanced'. The 'Location Text' tab is active, showing search criteria for 'Location' and 'Route', both set to 'Starts With'. There are also fields for 'mi Post between' and 'and'. On the right side of the dialog, there are several buttons: 'Find Now', 'Stop', 'New Search', 'Help', 'Save Folder', 'New Folder', and 'Close'.

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

The screenshot shows the 'New Folder Properties' dialog box with the 'Folder Name' field containing 'Template Bridge'. The 'Save Option' is still 'Filter'. The 'Attribute Text' tab is now selected, showing search criteria for 'Identity', 'Measurement', and 'Status'. The 'Identity' section includes 'Bridge ID', 'Bridge name', and 'NBI Structure ID', all set to 'Starts With'. The 'Measurement' section includes 'Length (ft)' set to 'Greater Than'. The 'Status' section includes 'Year Built' set to 'After' and 'Template' set to 'Template Bridges' (highlighted with a red box). The 'Other Attributes' section includes 'Facility' and 'Feature', both set to 'Starts With'. The 'Design' and 'Definition' dropdowns are set to 'Both'. The buttons on the right are the same as in the previous screenshot.

## TMP1 - Use of Templates

Select “Find Now” and the template bridge we just created will be listed. Select “Save Folder”.

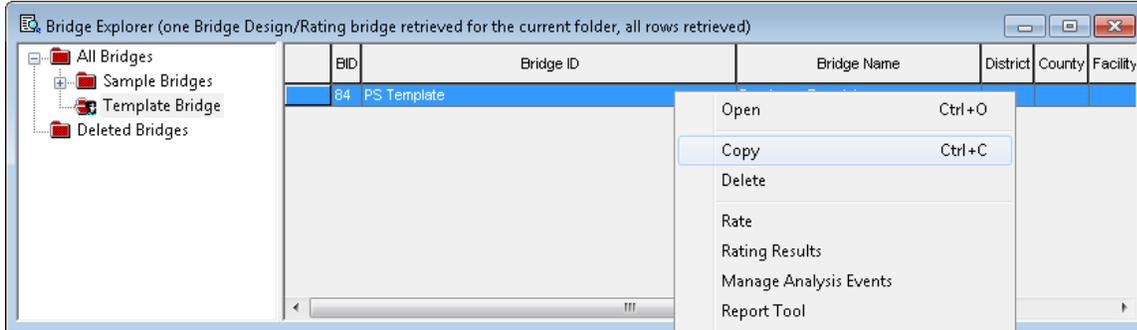
BID	Bridge Id	Bridge Name	District	County	Facility	Location	Route	Feature
84	PS Template	Prestress Template						

The following folder is created in the Bridge Explorer.

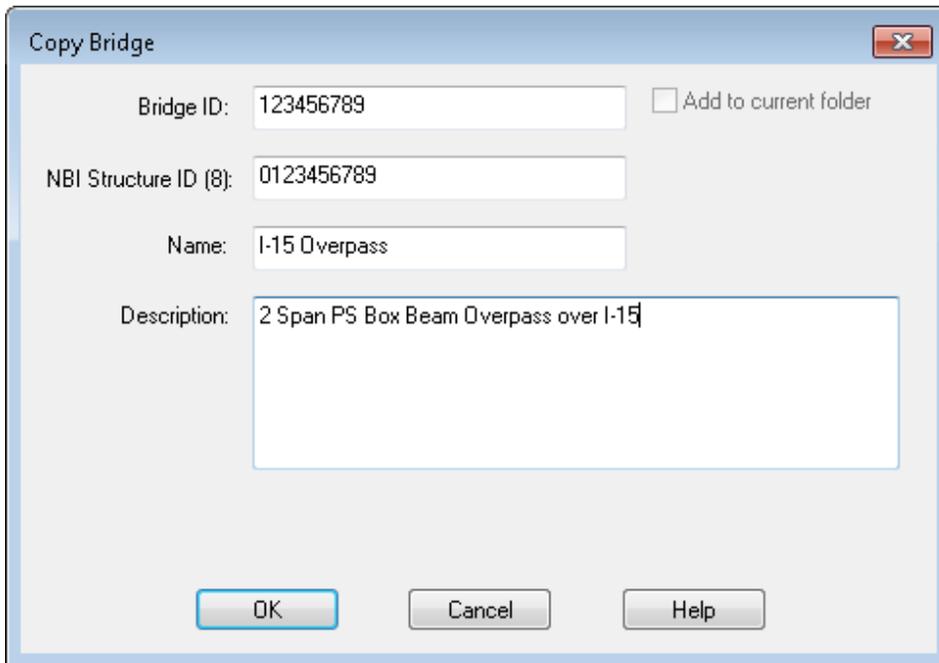
BID	Bridge ID	Bridge Name	District	County	Facility
84	PS Template	Prestress Template			

## Using a Template to Create a New Bridge

We will now use our template bridge to create a new 2 span prestress box beam bridge. Right-click on the template bridge in the Bridge Explorer and select “Copy” from the menu.



Right-click on the template bridge again and select “Paste”. The following dialog appears. Revise the data to reflect the actual bridge we are creating.



## TMP1 - Use of Templates

Then open the Bridge window for this new bridge we have just created. Uncheck the “Template” box and enter data to reflect our bridge.

Bridge ID: 123456789      NBI Structure ID (8): 0123456789       Template       Superstructures  
 Bridge Completely Defined       Culverts

Description      Description (cont'd)      Alternatives      Global Reference Point      Traffic      Custom Agency Fields

Name: I-15 Overpass      Year Built:

Description: 2 Span PS Box Beam Overpass over I-15

Location: River City      Length: 200.00 ft

Facility Carried (7): SR234      Route Number: 234

Feat. Intersected (6): I-15      Mi. Post: 12.5

Default Units: US Customary

AASHTOWare Association...       BrR       BrD       BrM      OK      Apply      Cancel

We can now adjust the data in this new bridge to reflect our 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