2011 IBUG North Conference

LEAP Bridge

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Lesson Name: Create a 3D Model of a Bridge

LESSON OBJECTIVE:

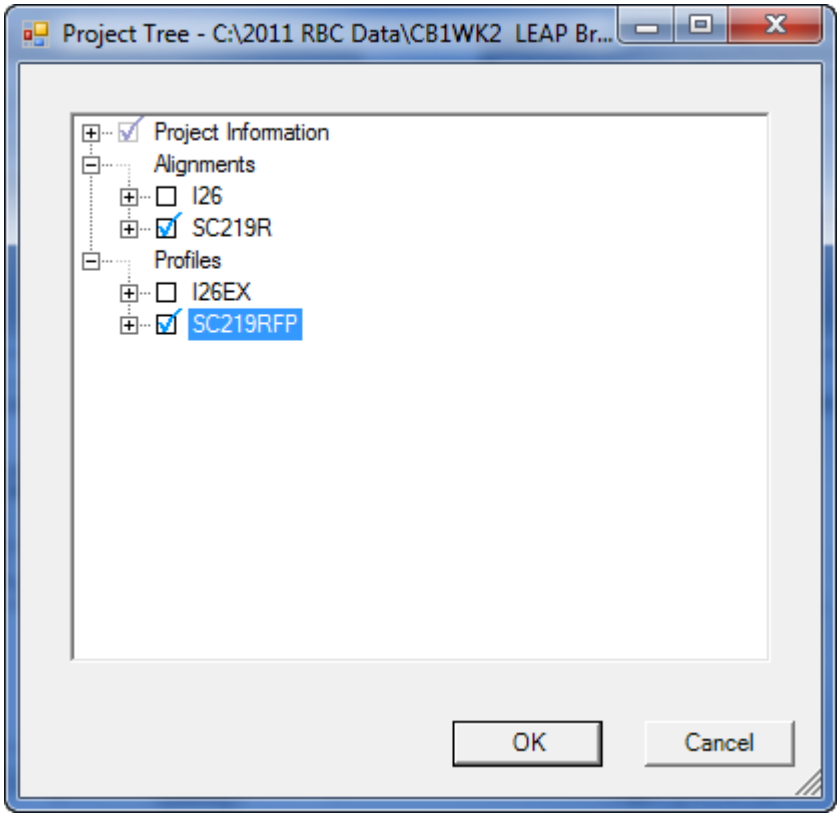
In this lesson the student will learn how to easily model a precast girder bridge in 3D.

EXERCISE: USE ABC WIZARD TO CREATE A 2 SPANSTRUCTURE

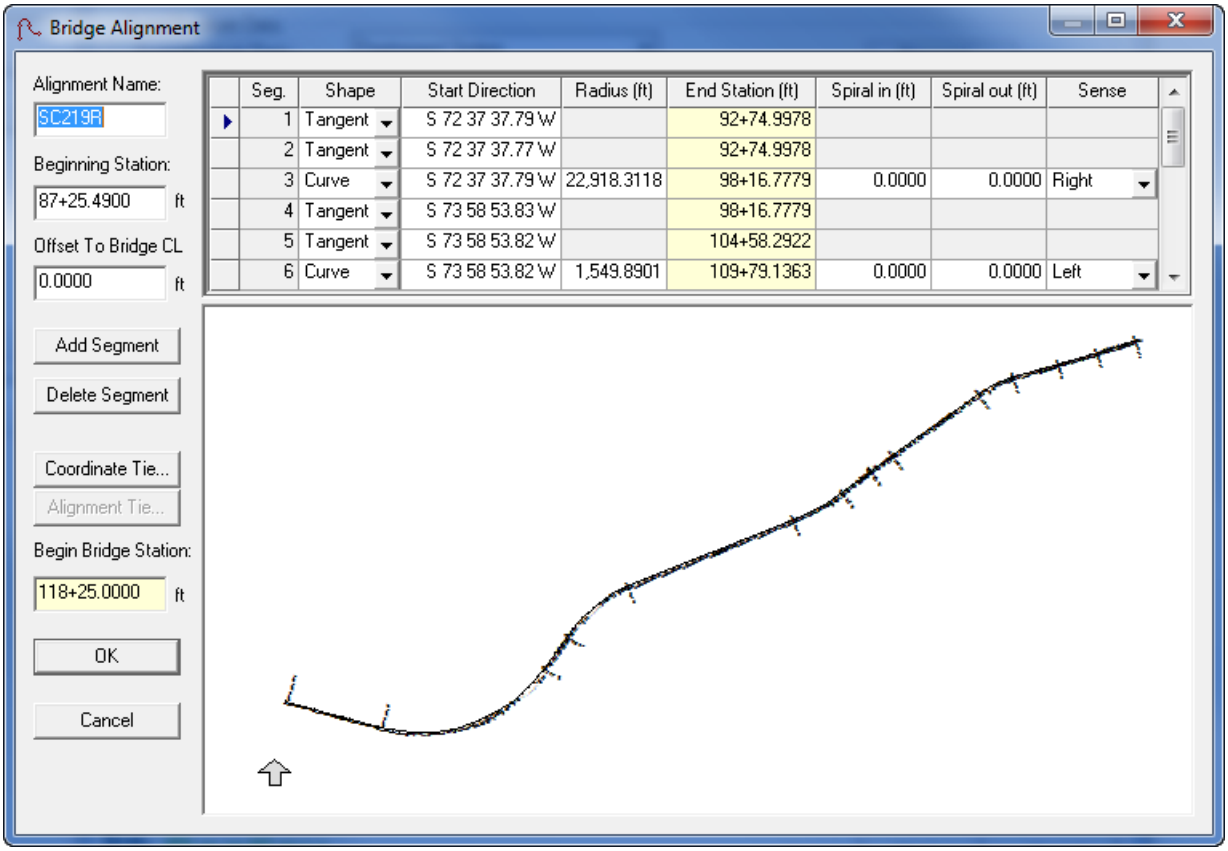
This exercise will guide you through the steps to get started

1. Start LEAP Bridge.
2. Start the **ABC Wizard**.

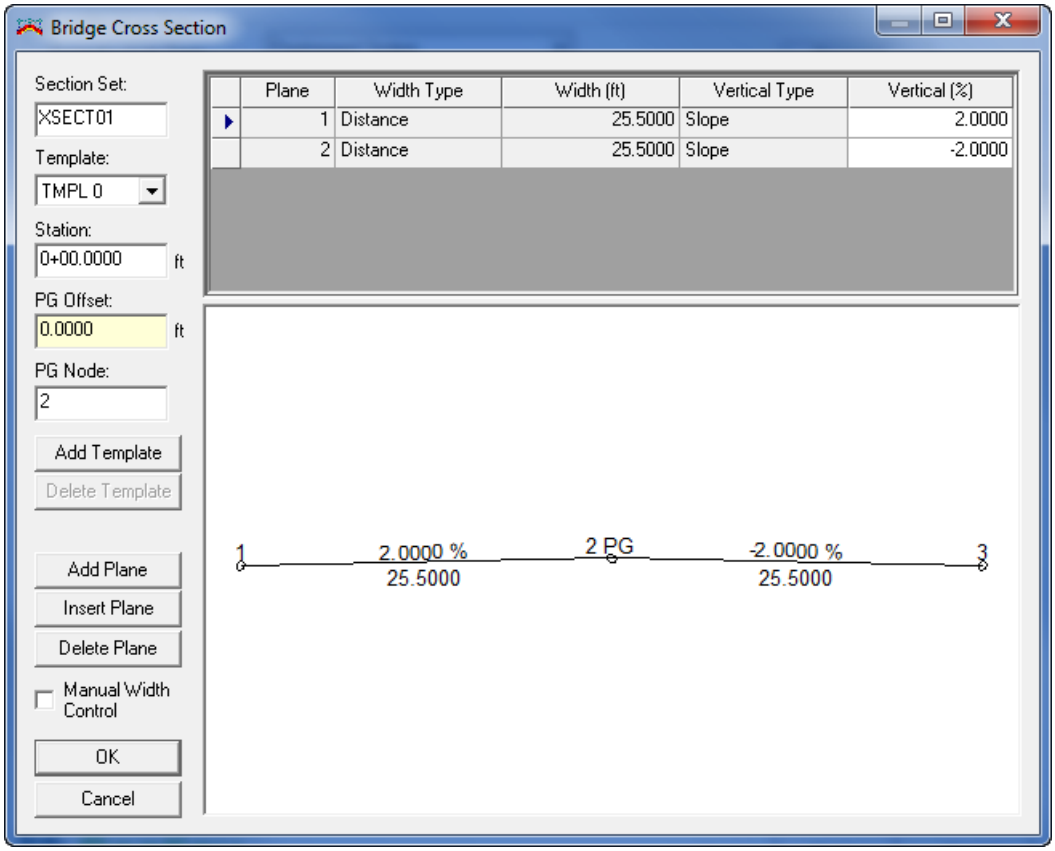
3. Select **LandXML**. Select *C:\Bentley Training\LEAP\SC219 and I26.xml* from the Browse button. Select **Connect**.
4. Expand the Alignments and Profiles toggles and toggle on the alignment and profile as shown below. Select **OK** to import the geometry. Select **OK** when prompted to acknowledge the information has been imported.



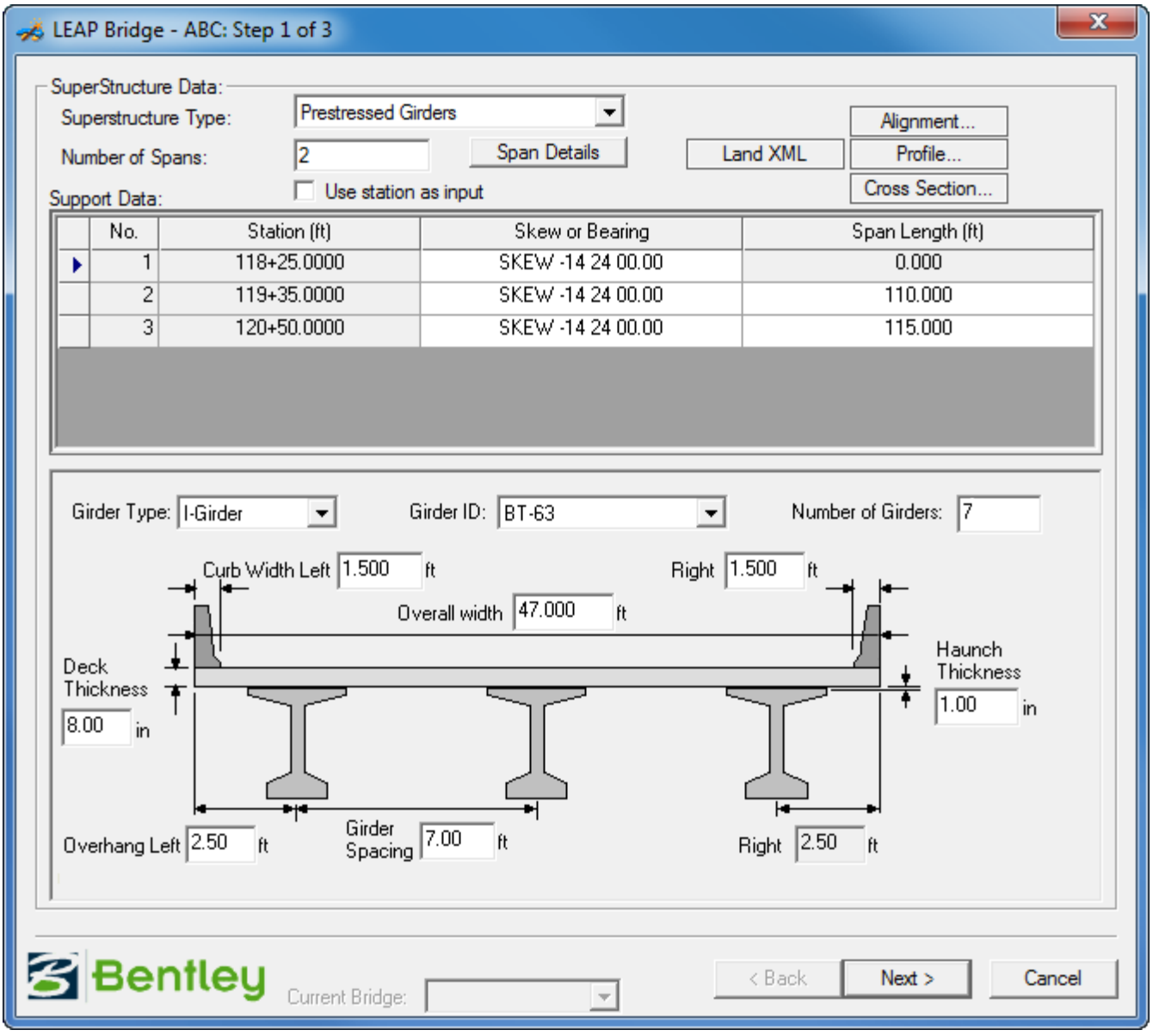
5. The bridge begins at station 118+25. Select **Alignment…** and set the **Begin Bridge Station** to *118+25*. Select **OK** to accept this value.



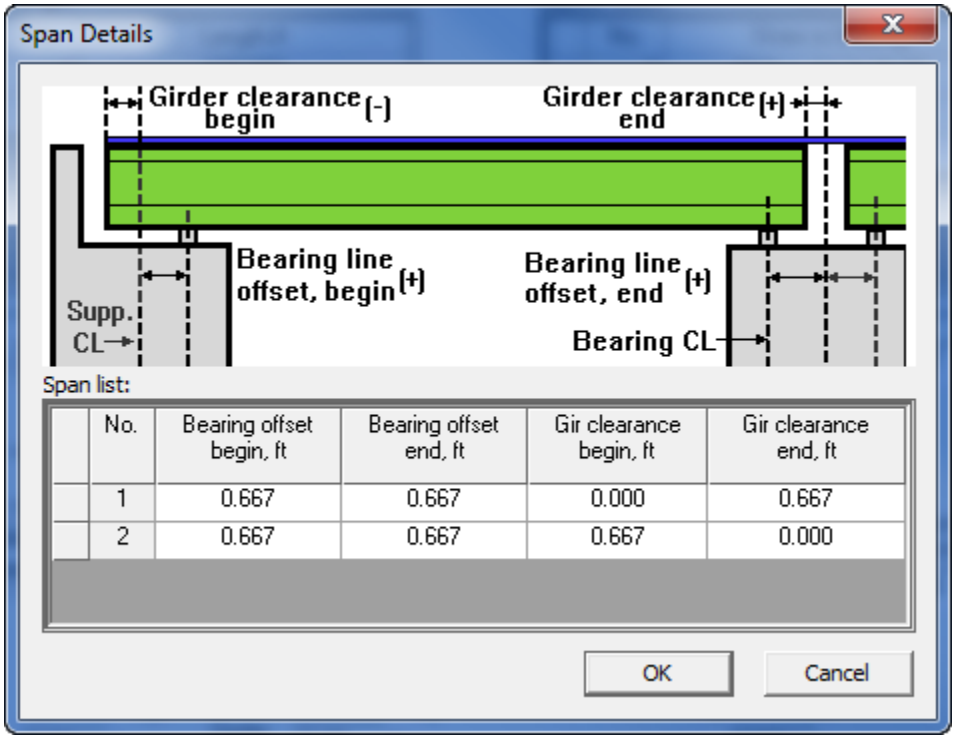
6. The Cross slope of the structure is normal crown of 2%. Select **Cross Section…** from the Step 1 of 3 dialog. Populate the Bridge Cross Section dialog as shown and select **OK** when completed.



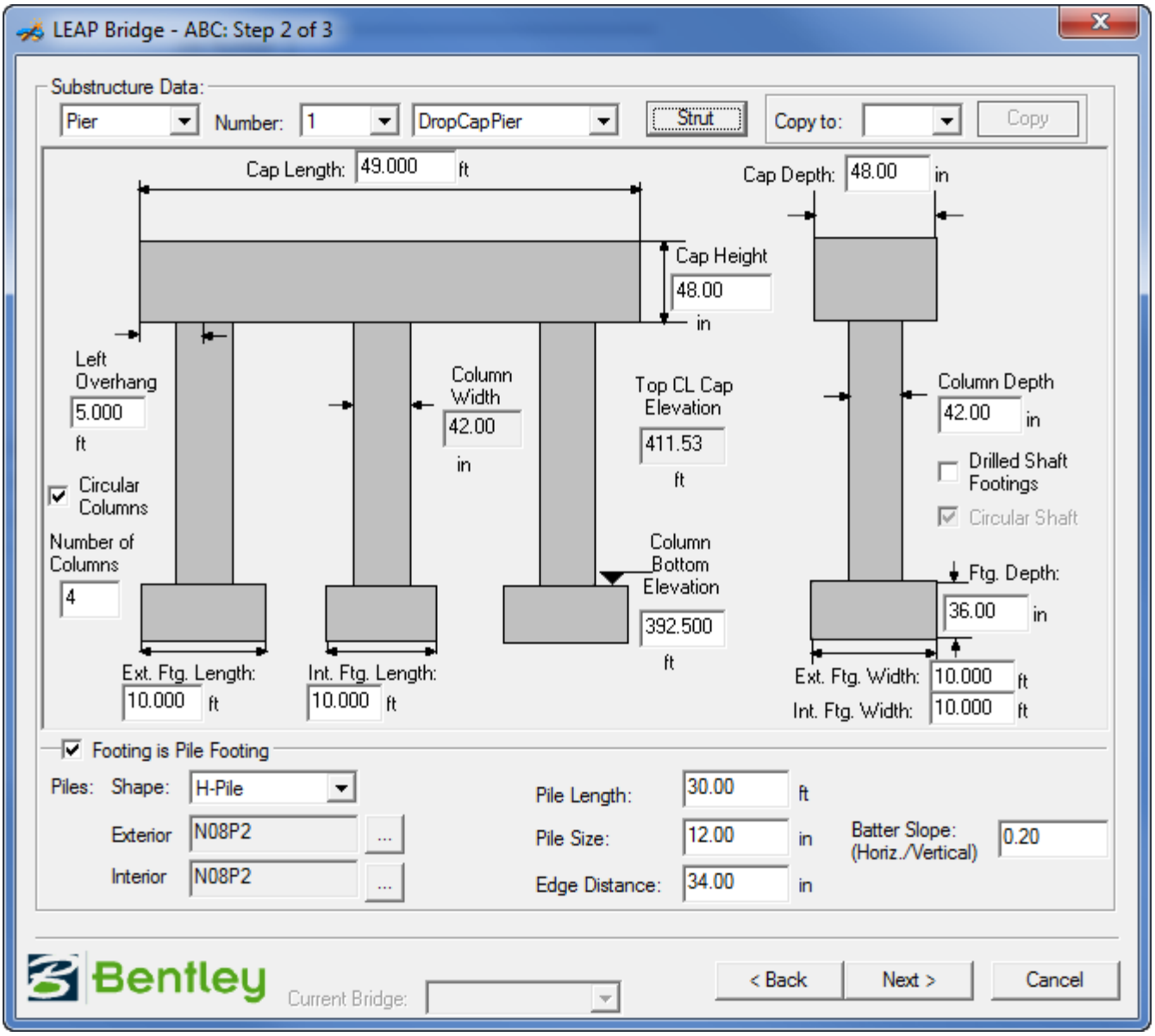
7. Populate the Step 1 of 3 dialog as shown below.



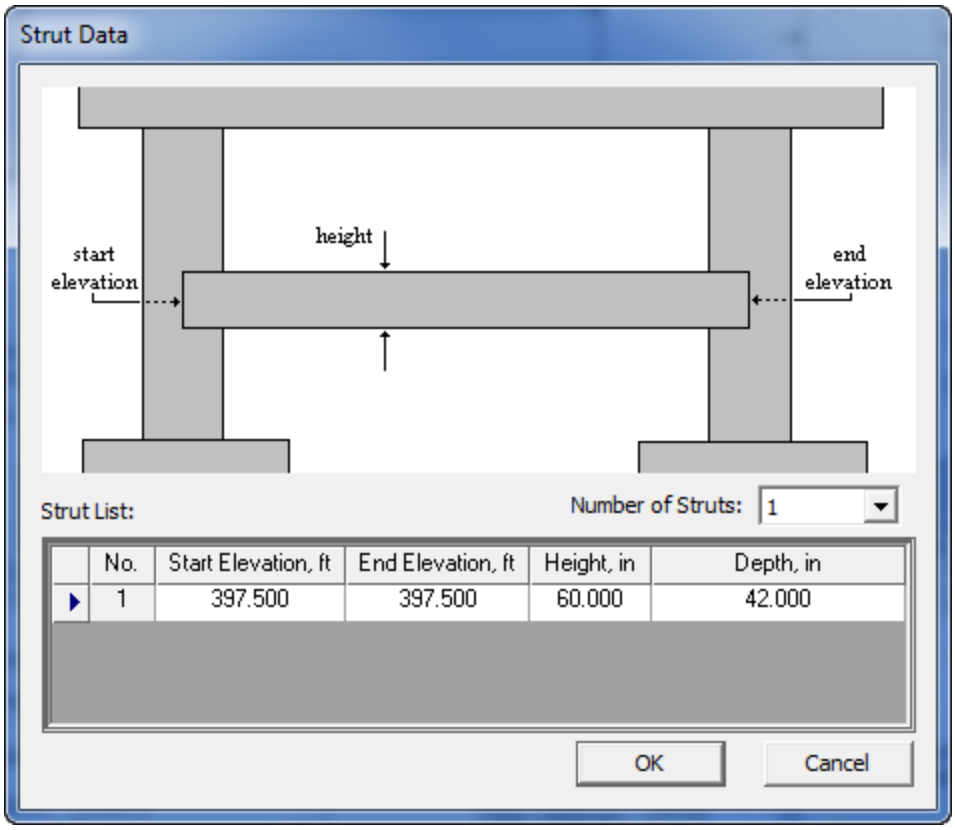
8. Select **Span Details**. Populate as shown below. Select **OK** to save the values.



9. Select **Next** to move on to Step 2 of 3.
10. For Pier 1, complete the dialog as shown.



11. Select **Strut** and populate as shown. Select **OK** to accept.



12. Select **Next**. Select **Finish** completing the wizard.
13. Select the **Geometry** tab to view a 3D model of structure.
14. Right click in the view and select **Export**. Set the **Save as Type** to *DGN Files*. Set the folder location to *C:\Bentley Training\LEAP and key-in a file name of sc219br.dgn*.
15. Open the drawing in MicroStation to review. Close MicroStation.
16. Select **File > Save As…** . Set the folder location to *C:\Bentley Training\LEAP and key-in a file name of sc219br.xml*.

Lesson Name: Use CONSPAN to Analyze and Design the Superstructure

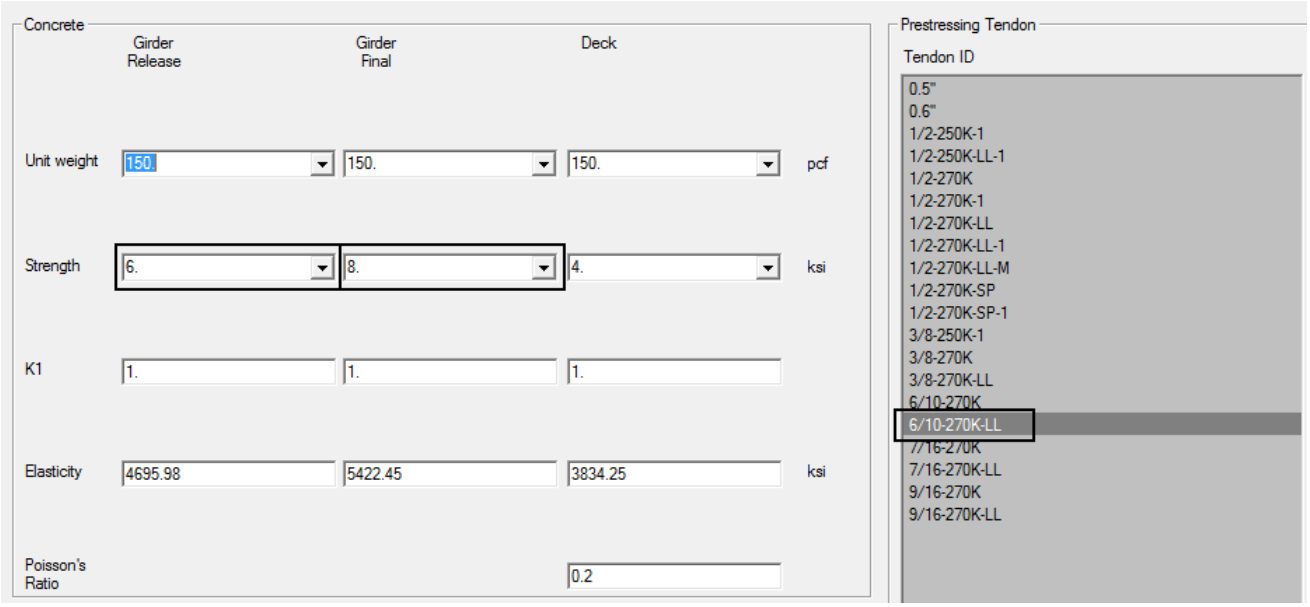
LESSON OBJECTIVE:

In this lesson the student will learn how to apply LRFD loads to a precast girder structure as well as analyze and design the beams.

EXERCISE: SUPERSTRUCTURE DESIGN

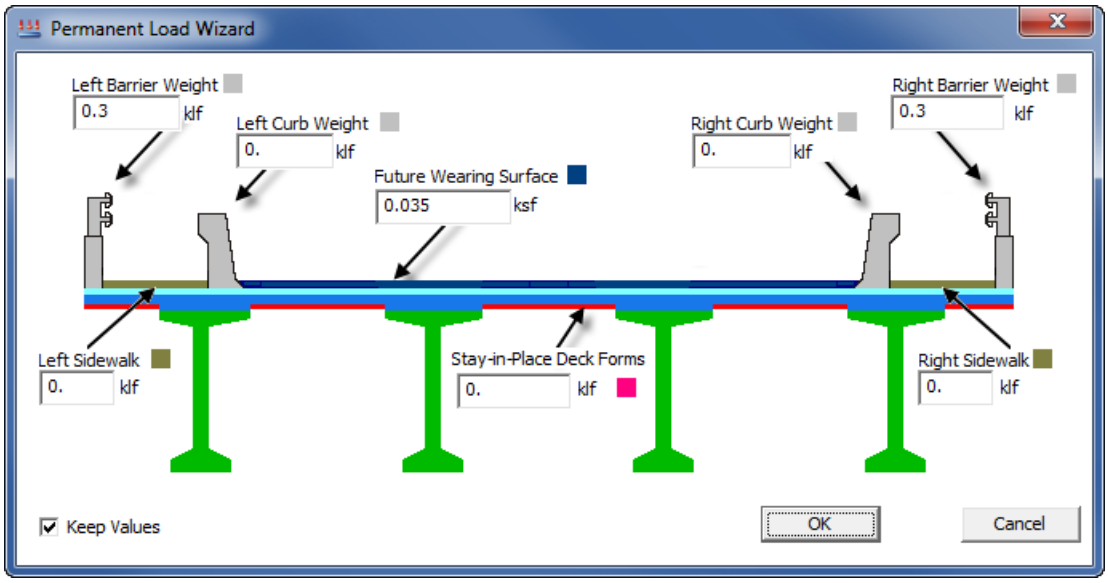
This exercise will guide you through the steps to get started

1. From the **SuperStructure** tab in LEAP Bridge, select **CONSPAN**.
2. Select the **Materials** tab. Change the values noted below.



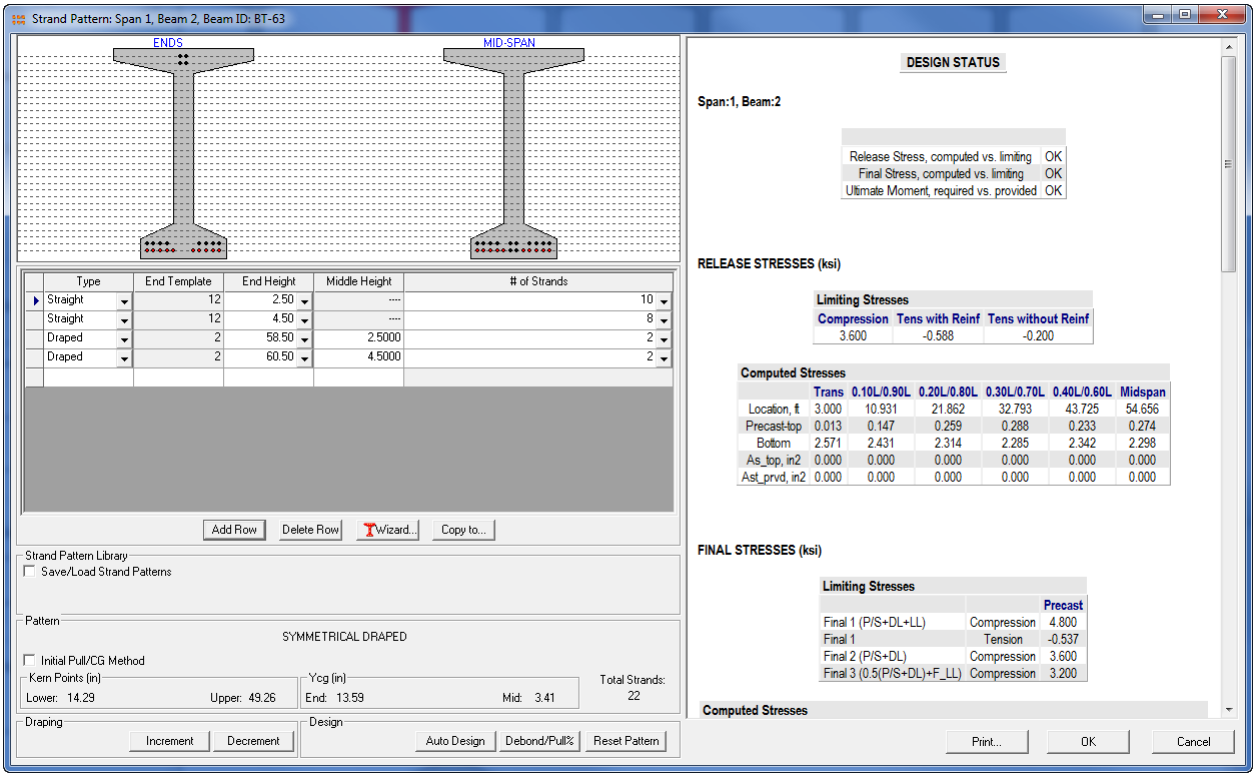
3. Select the **Loads** tab.
4. Select the **Wizard…** button at the upper right.
5. Fill out the Permanent Load Wizard using the following values. Enable the **Keep Values** toggle. Select **OK** when completed.

LOAD TYPE	MAGNITUDE
Left and Right Barrier	0.3 klf each
Future Wearing Surface	0.035 ksf

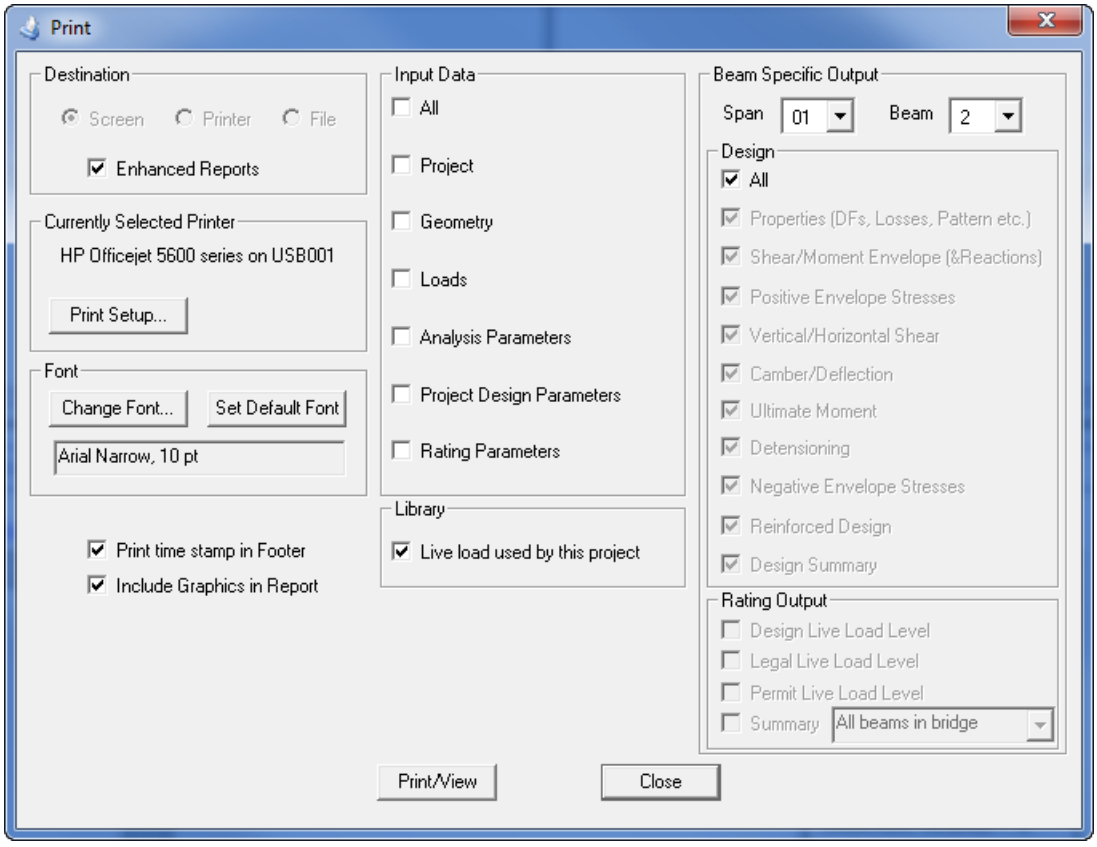


This will populate the **Permanent Loads** section of the dialog.

6. Enable the **Include LL Deflection** toggle.
7. Select the **Beam** tab.
8. Select Beam 2, Span 01.
9. Select **Strand Pattern…** .
10. Select **Auto Design** to design the strand pattern. Review the Design Status results. Use the **Wizard…** tool to modify the strand pattern to see the effect on the Design Status. **OK** the results when completed.



11. Select **File > Print…** from the Conspan menu. Enable the toggles as shown then select **Print/View**.



12. Close the report viewer window and the Print dialog.
13. Close Conspan. When Prompted update the LEAP Bridge model but do not generate any reports.
14. From the Geometry tab, enable transparent mode to review the strands in the beam.

Lesson Name: Use RC-PIER to Analyze and Design the Substructure

LESSON OBJECTIVE:

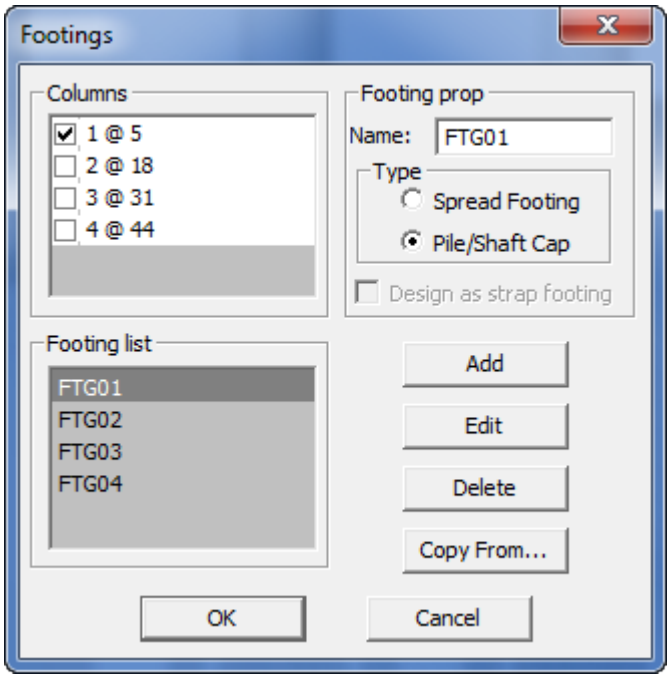
In this lesson the student will learn how to modify the footing geometry, apply LRFD loads to the pier, graphically review the loads and then analyze and design the cap, column and footing.

EXERCISE: SUBSTRUCTURE DESIGN

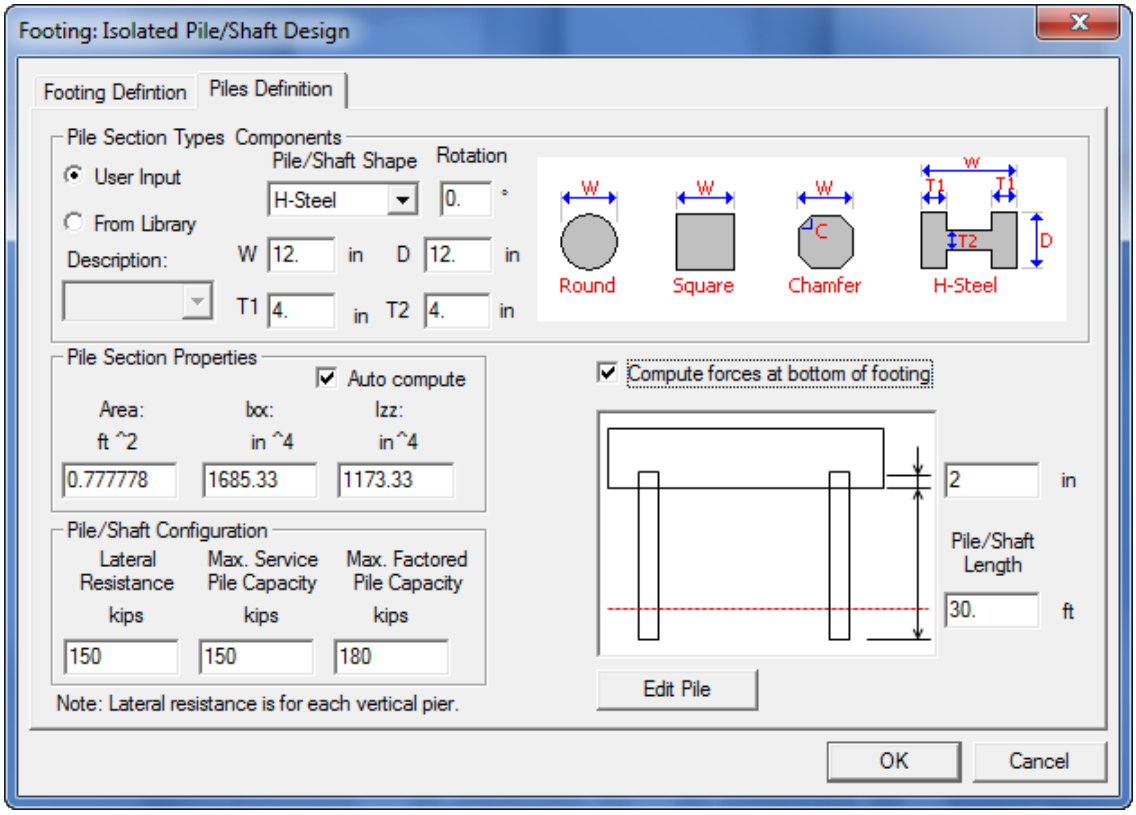
This exercise will guide you through the steps to get started

1. From the **SubStructure** tab in LEAP Bridge, select **RC-PIER**.

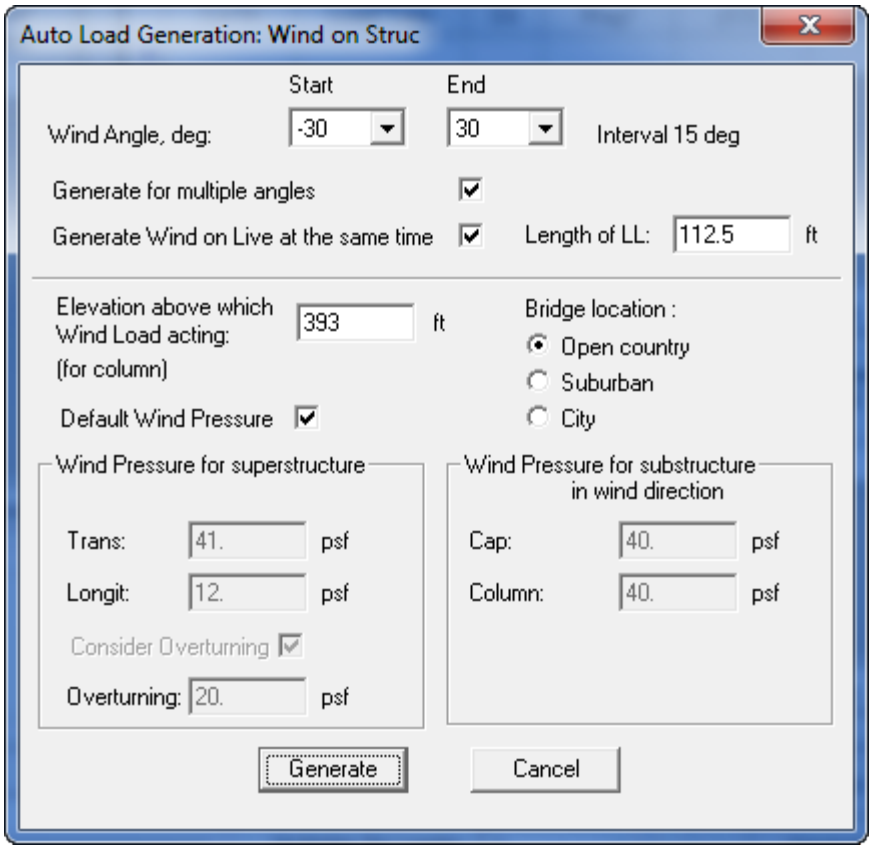
2. From the Geometry tab, select **Footing Pile** tool.
3. Select Column 1 and Footing FTG01. Select **Edit** to modify the pile definition.



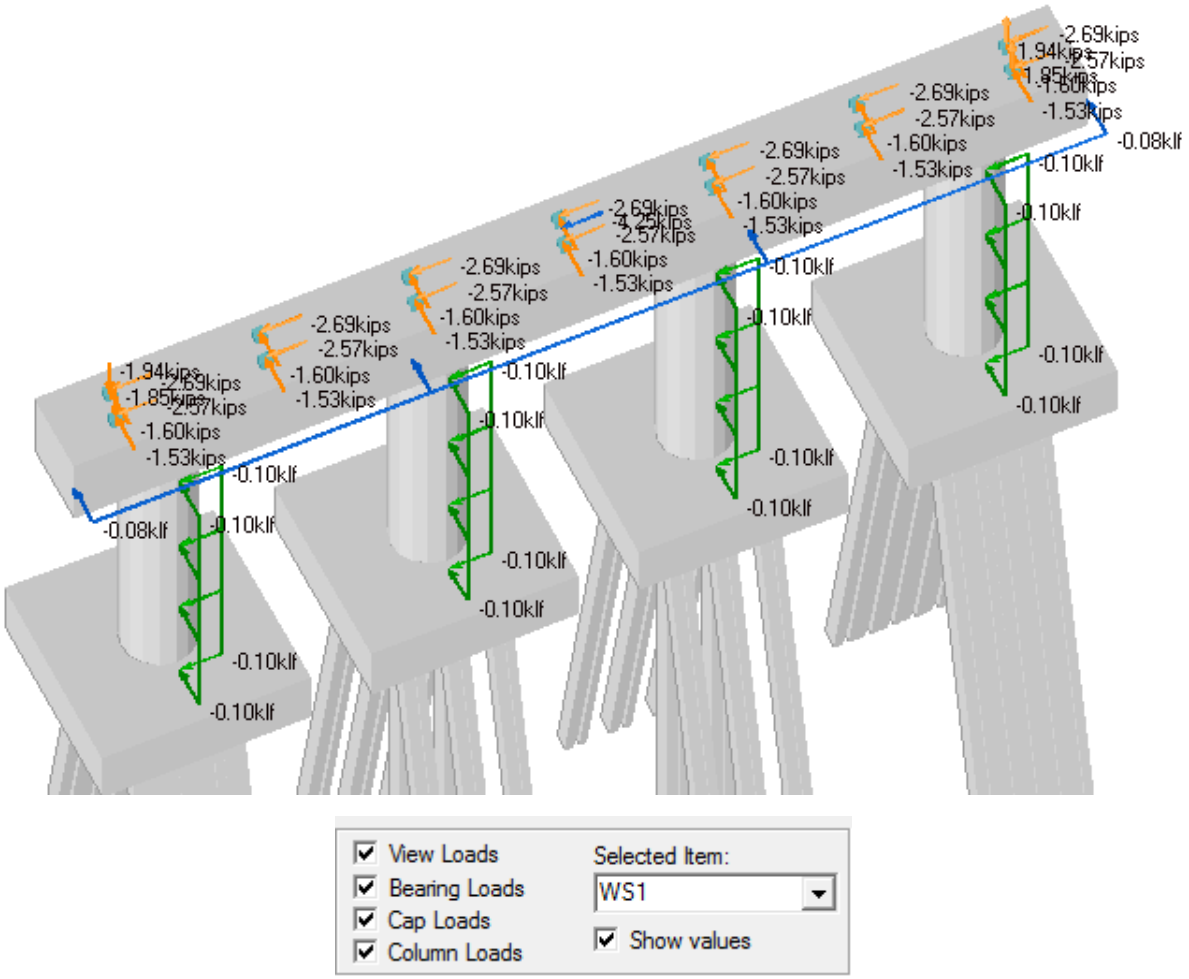
4. Populate the Pile Definitions tab as shown.



5. **OK** the new values. Make the same changes to the remaining pile definitions.
6. From the Loads tab, add the *DC, DW, LL and WS* loads to the right pane.
7. For the first 3 loads, auto-generate the loads from Conspan.
8. For the WS1 load, populate the Generate dialog as shown.



9. Add *Strength Group I, Service Group I and Service Group III* to the Selected Groups pane.
10. Select the Geometry tab and review the resulting loads graphically.



11. From the Analysis tab, run the analysis.
12. From the Cap tab, Auto Design the cap.
13. From the Column tab, Auto Design the columns.
14. From the Footing tab, select Auto Design for all footings.
15. Close RC-PIER to review the updated 3D model. When Prompted update the LEAP Bridge model but do not generate any reports.
16. From the Geometry tab, enable transparent mode to review the reinforcing in the cap, columns and footings.