Pier Modeling Example

Bridging Your Innovations to Realities

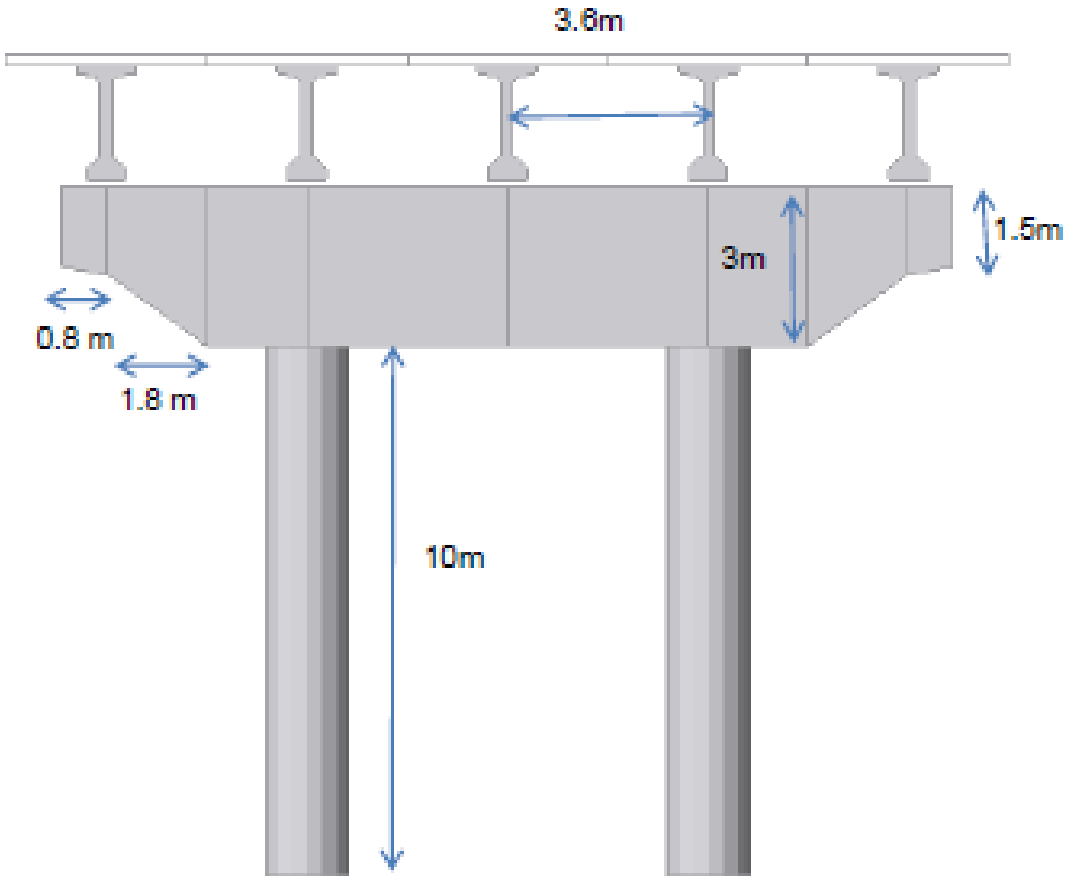
midas Civil

Training material

Overview: Pier Modeling

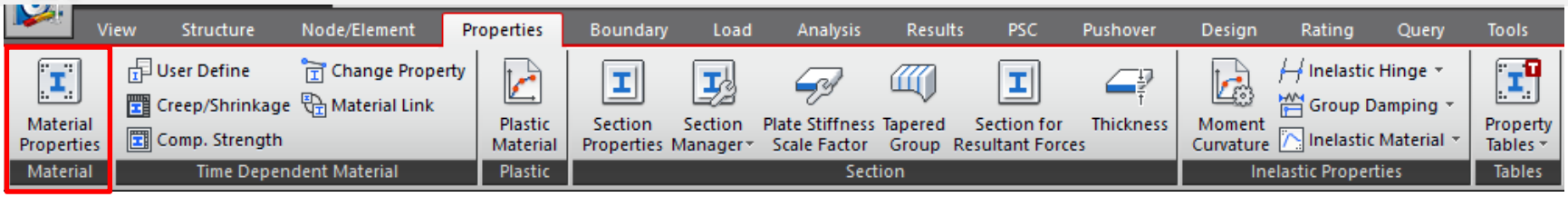
1. Response Spectrum Analysis
    1. Introduction
    2. Material
    3. Sections
    4. Modeling

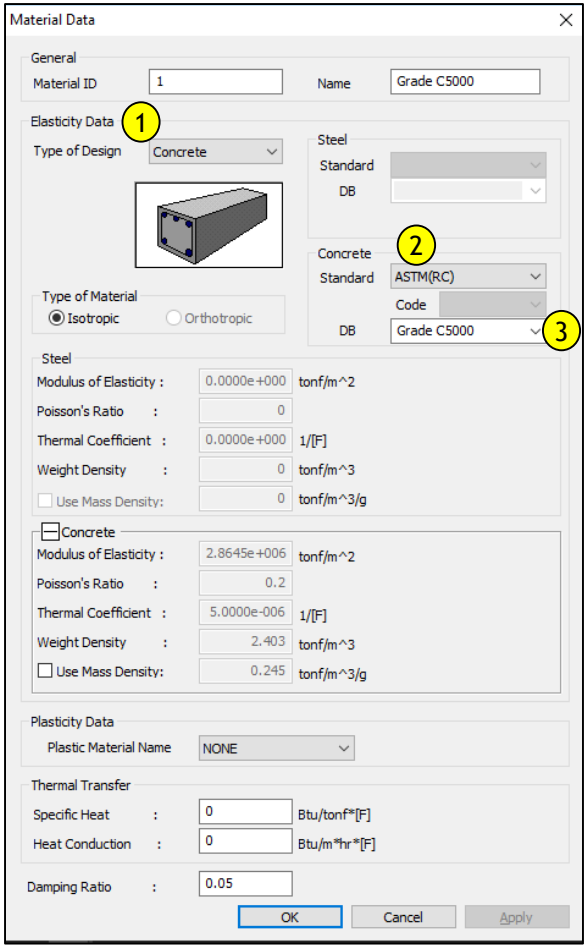
1. Introduction: Pier Modeling



Front View

2. Material



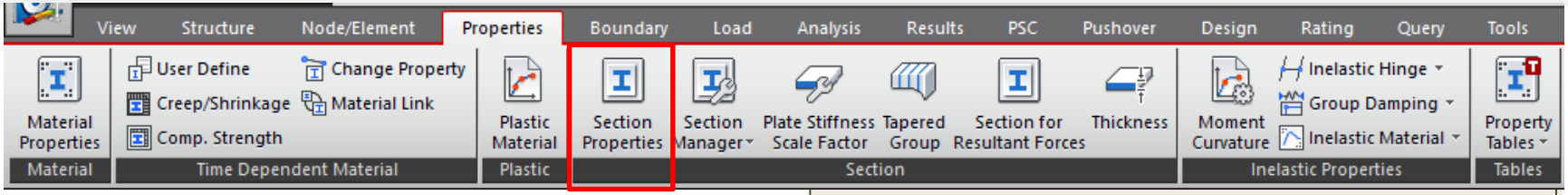


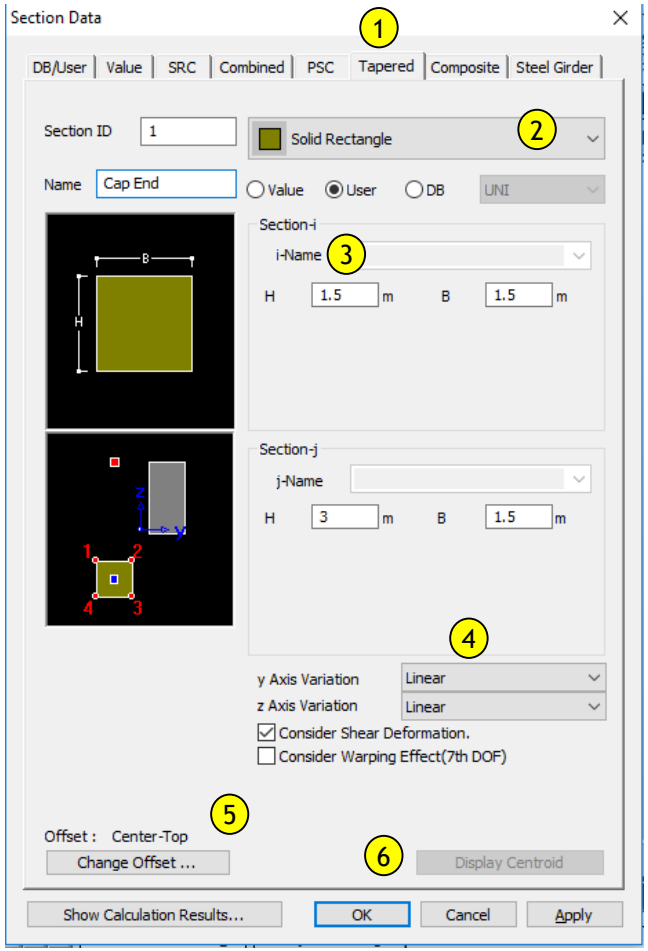
Properties > Material Properties

Concrete:

1. *Select Concrete under type of design.*
2. *Select ASTM(RC) under Concrete Standard.*
3. *Select C5000*

3. Sections





Properties > Section Properties

Add Section

Cap End:

1. Select Tapered Section Tab.

2. Select Solid Rectangle section for the ends of Pier Cap.

3. Enter values for i and j .

4. Apply y and z axis variation for linear.

5. Set Offset at Center Top

6. Click OK

Cap Mid:

1. Select DB/USER tab

2. Select Solid Rectangle

3. Enter 3 m X 1.5 m

4. Set Offset at Center Top

5. Click Apply

Pier:

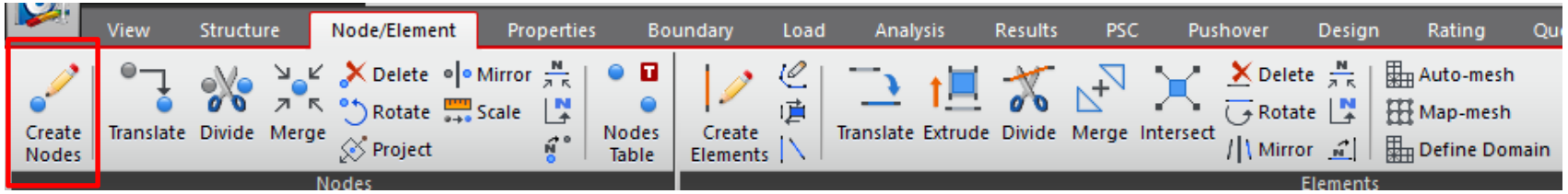
1. Select Solid Round

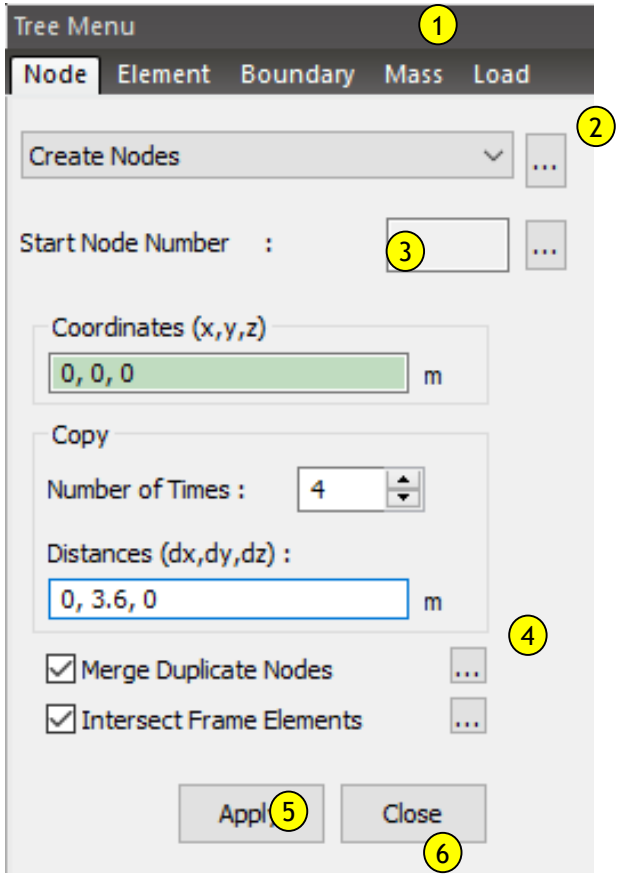
2. Enter diameter as 1.5 m

3. Set Offset at Center - Center

4. Click OK

4. Modeling



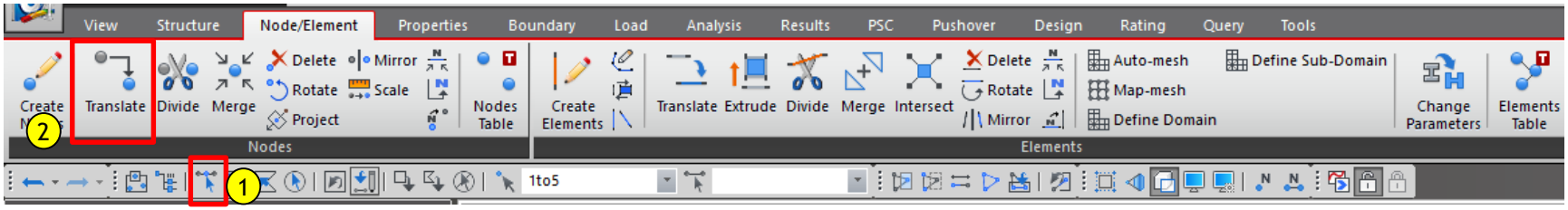


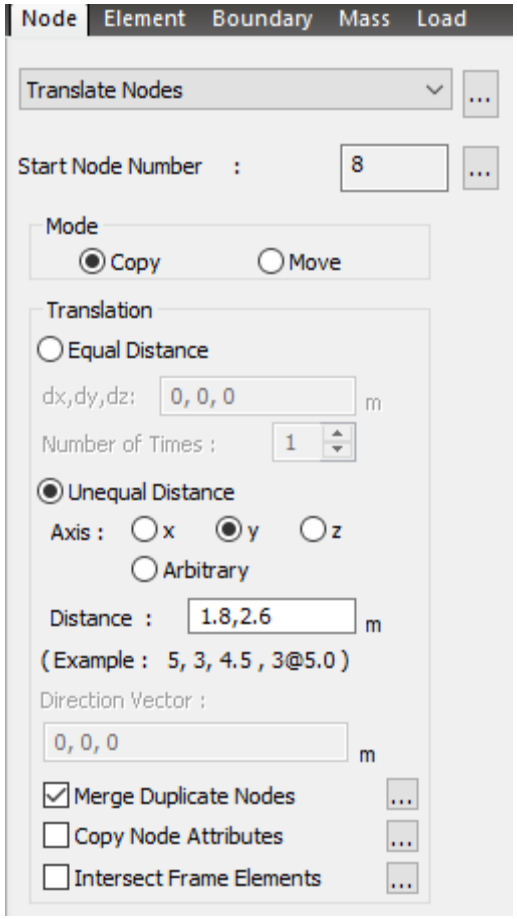
Node/Element > Create Nodes

Add Section

1. *Create Nodes and Copy node at origin 4 times by 0,3.6,0 (m)*
2. *[Zoom fit]*

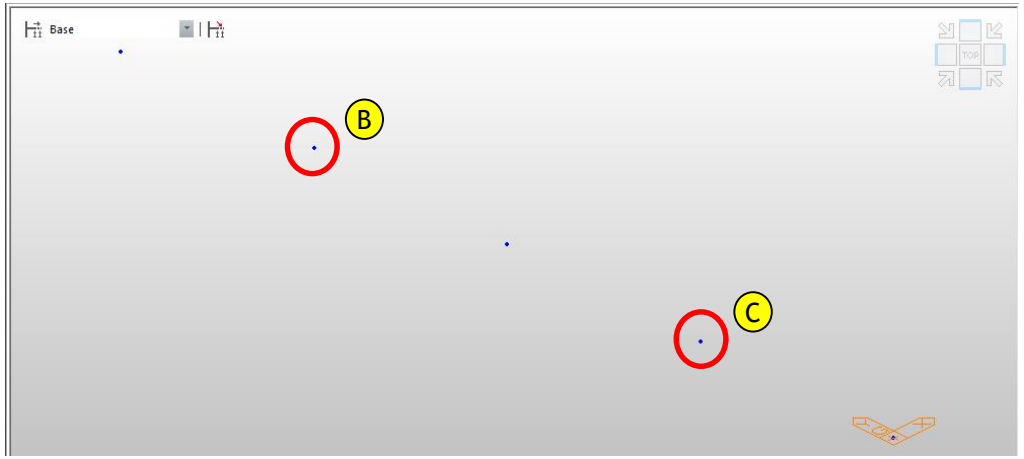
4. Modeling



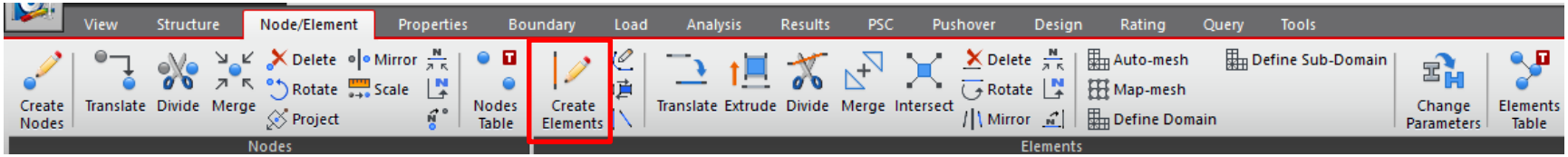


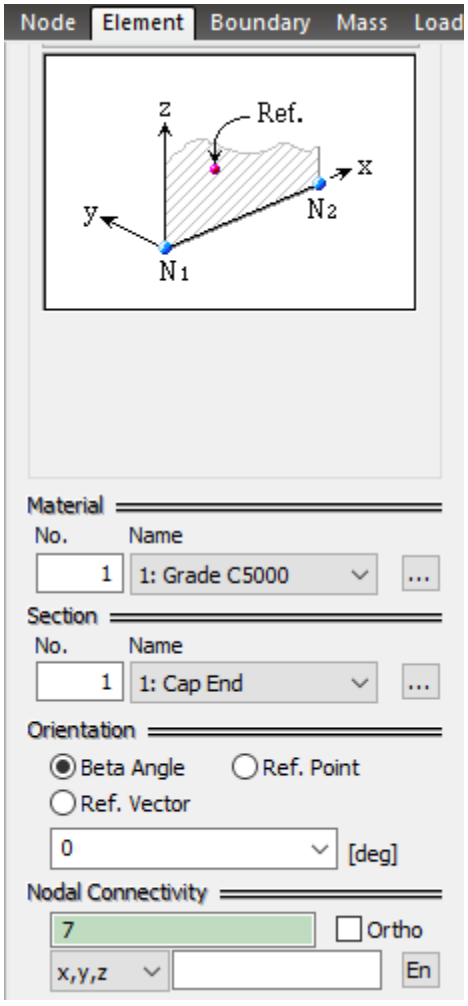
Node/Element > Translate Nodes

1. *Select Node B [using Select single]*
2. *Translate Node in circle B using the Copy function.*
3. *Repeat with Node C but distance as -1.8,-2.6 m*



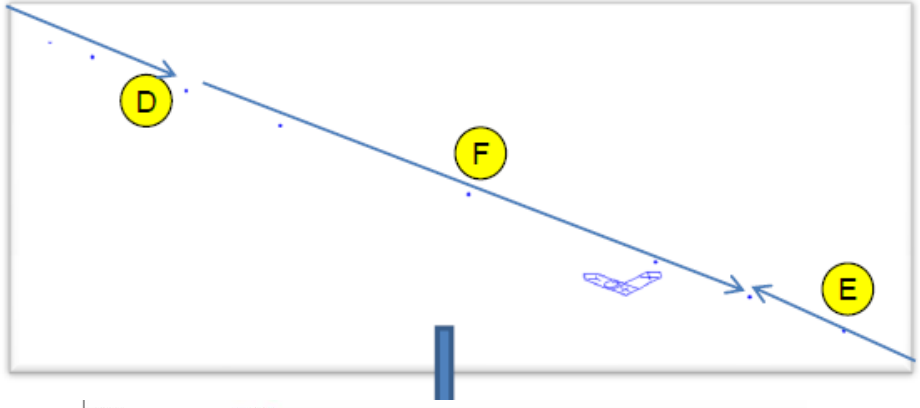
4. Modeling

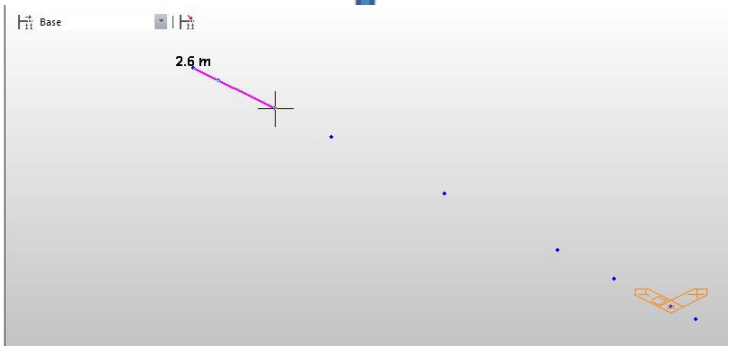




Node/Element > Create Elements

1. *Click in the nodal connectivity field to make it active and the click on the extreme nodes on either side in the direction of arrow. (to make pier cap ends) [First D then E]*
2. *Change section in 1 to Cap Mid and Click at the middle five nodes [F]*





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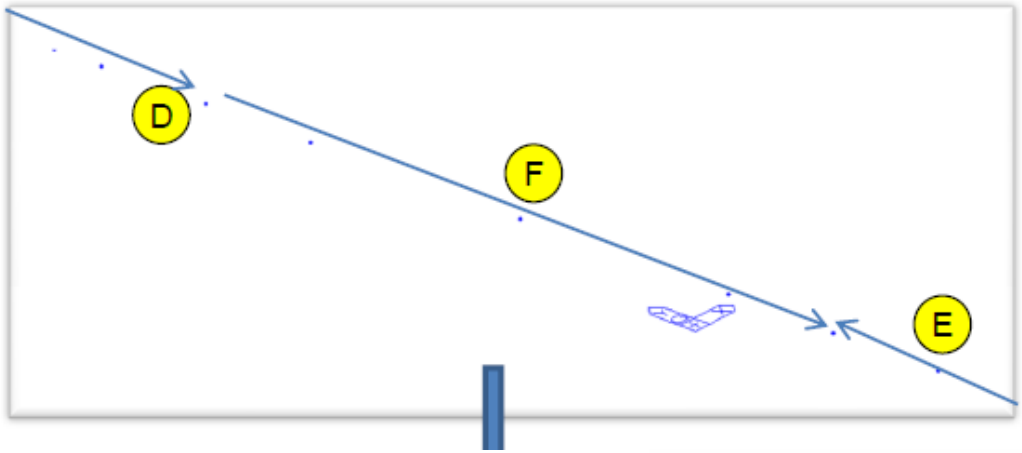

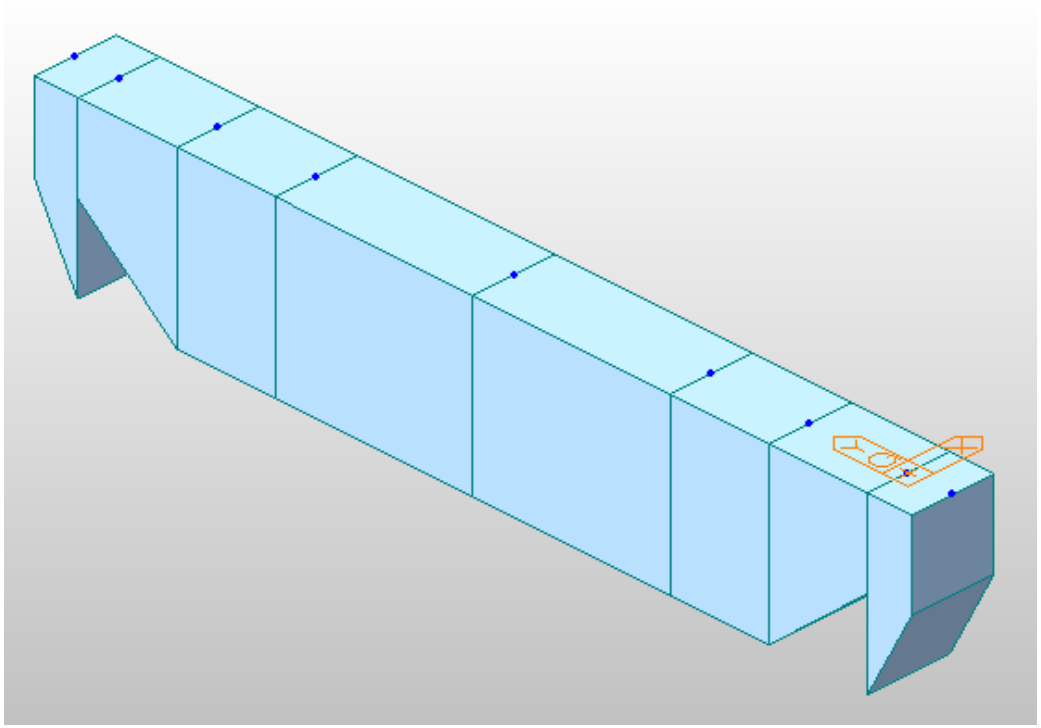

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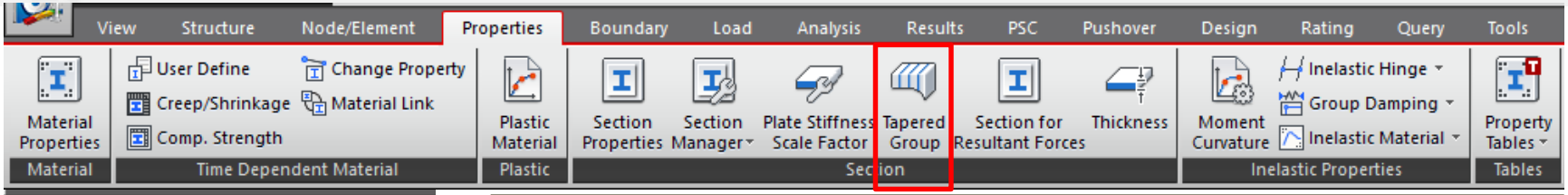
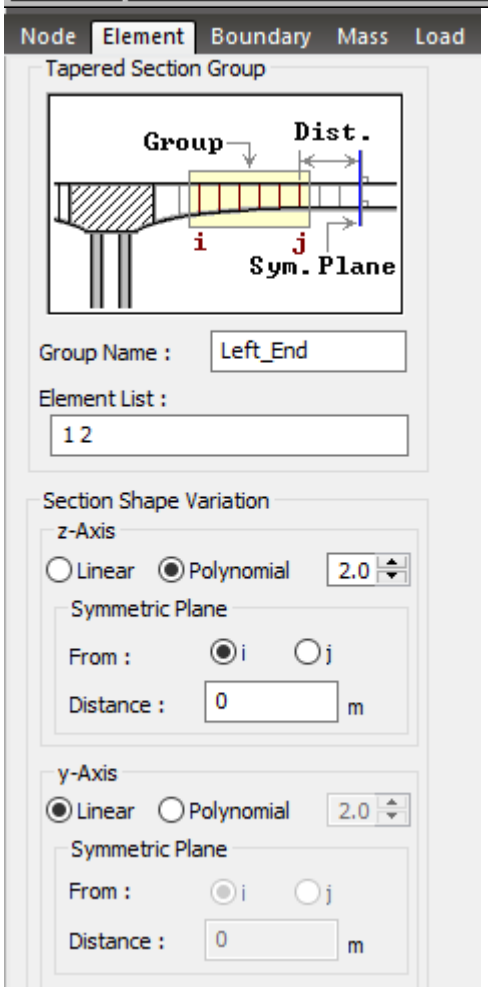
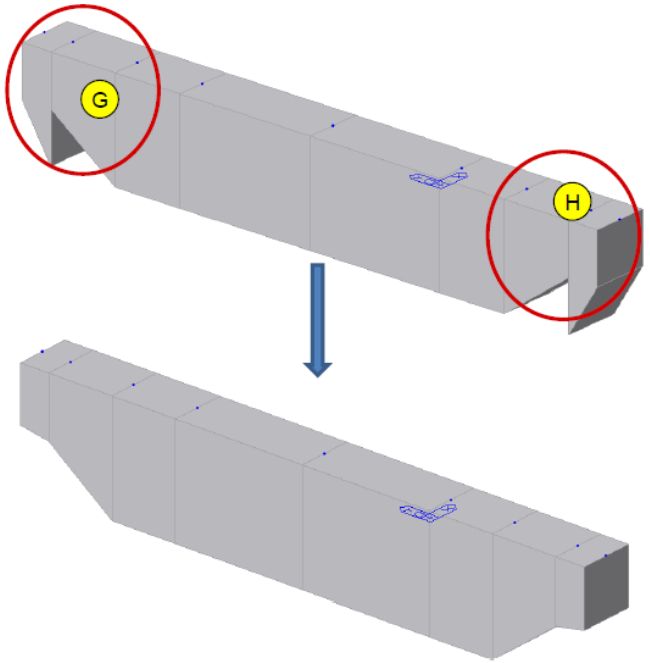




Properties > Tapered Group

1. *Select elements in group G [using single select] and enter values based on dialog box 1.*
2. *Repeat 2 with elements in group H and symmetric plane for Z axis from j (in dialog box 1)*



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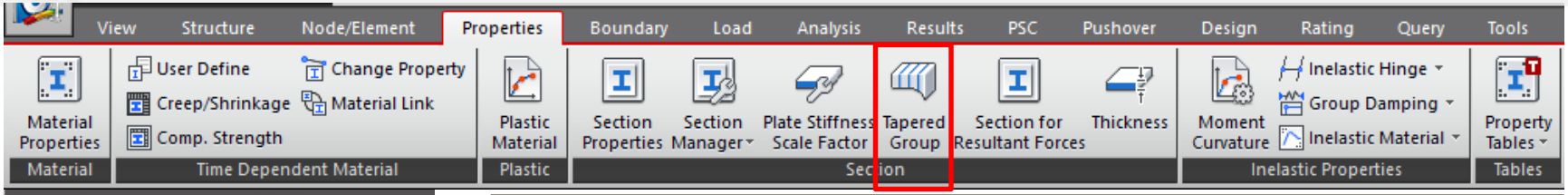

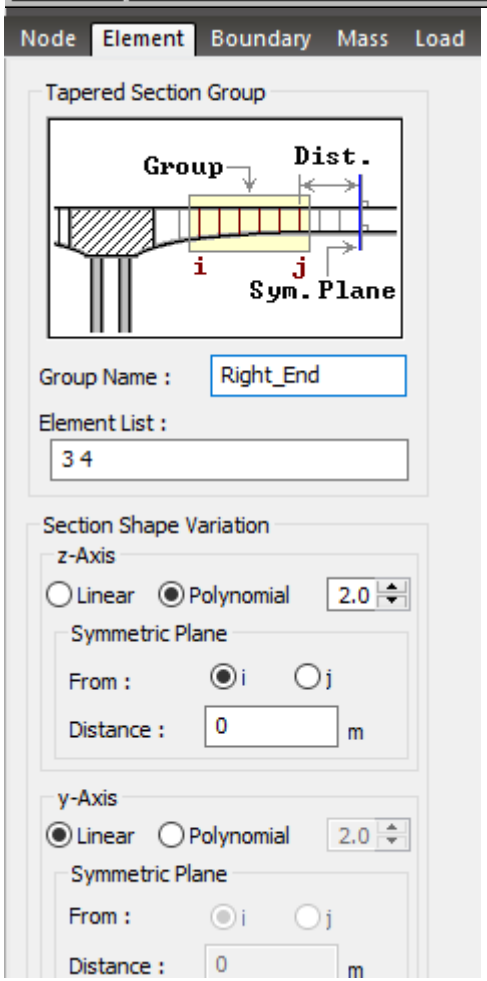

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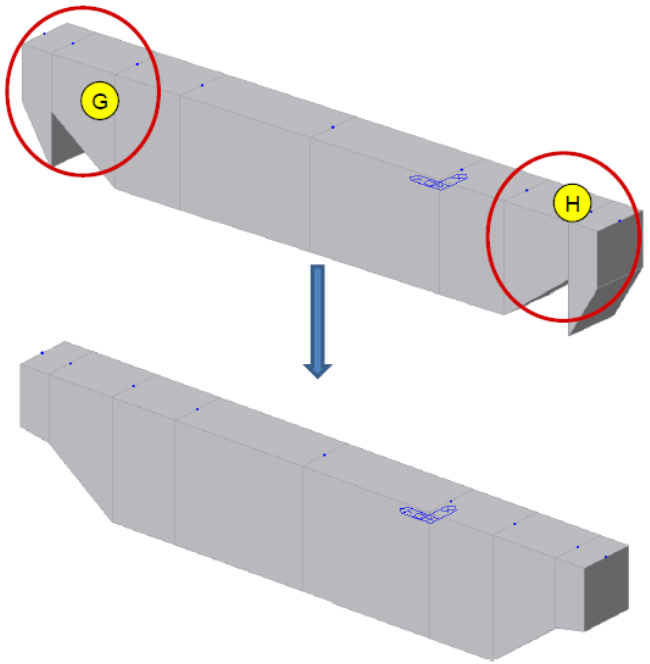
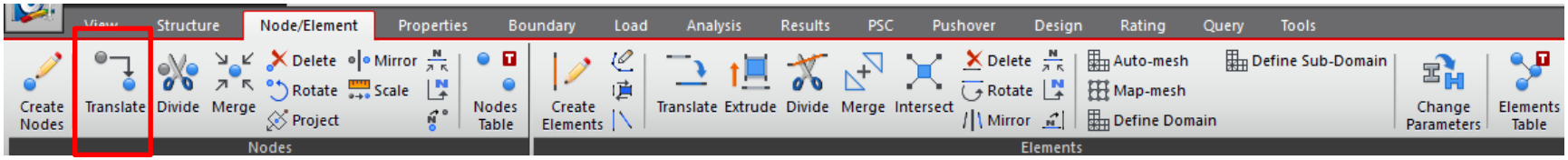
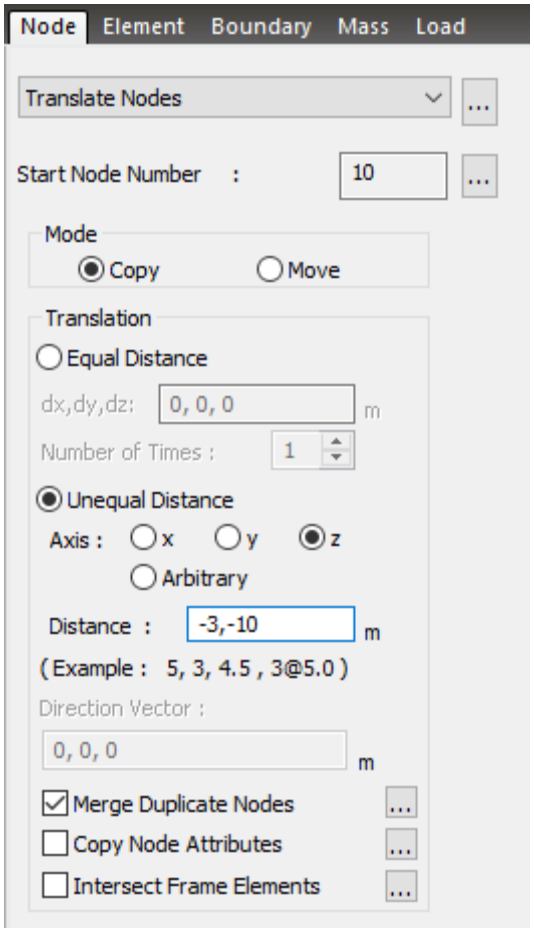


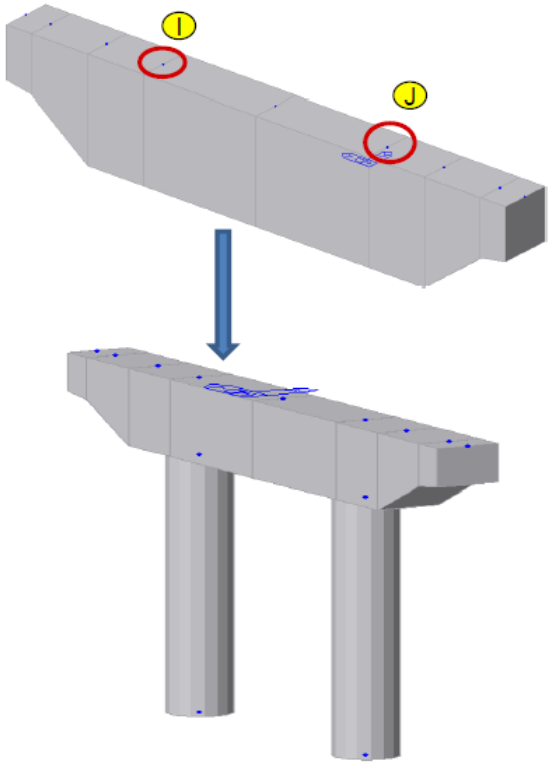
4. Modeling



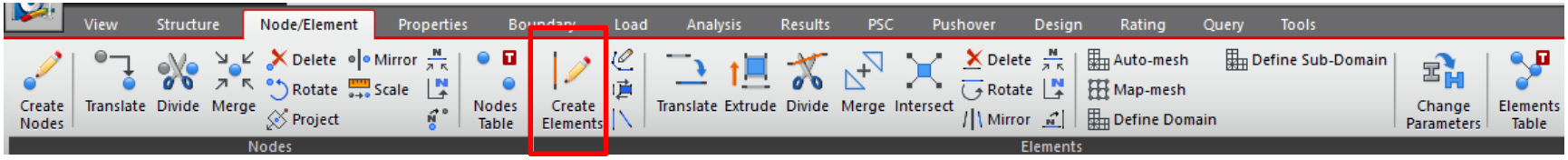


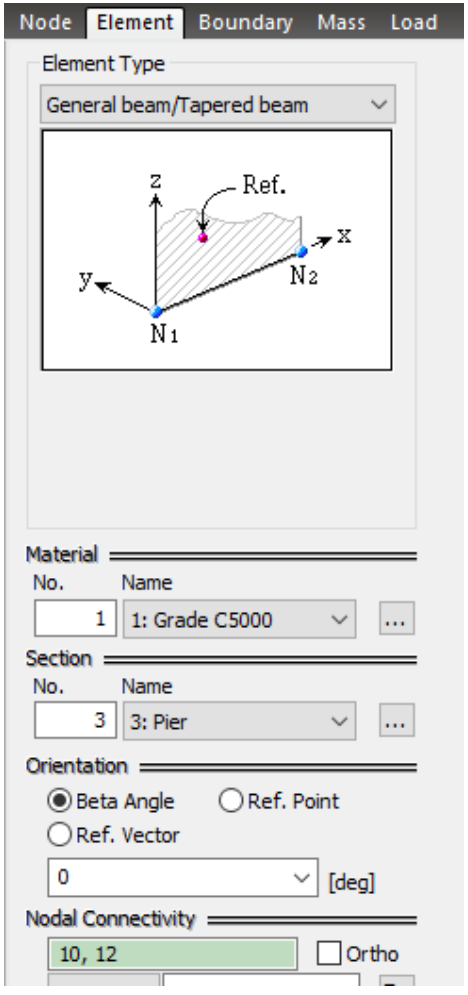
Node/Element>Translate

1. *Translate Nodes. Select Node I and J using .*
2. *2. Model>Elements> Create Elements. Create pier by clicking at the newly create nodes (after clicking in Nodal connectivity field)*



4. Modeling





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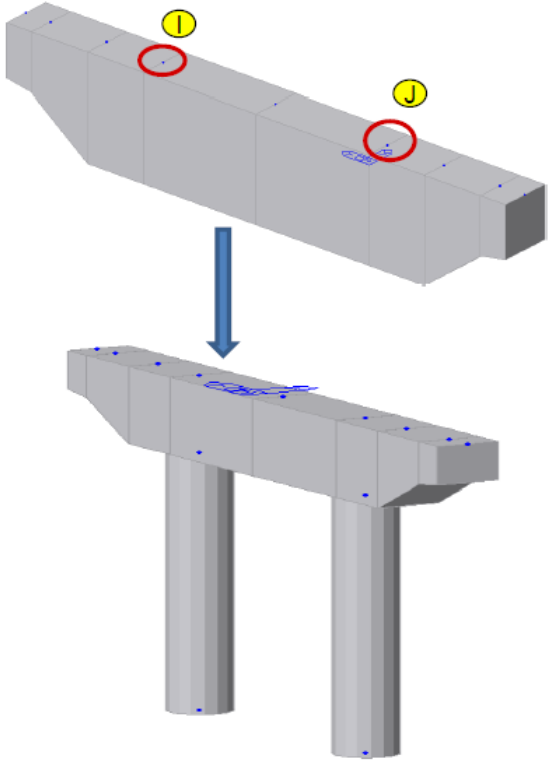
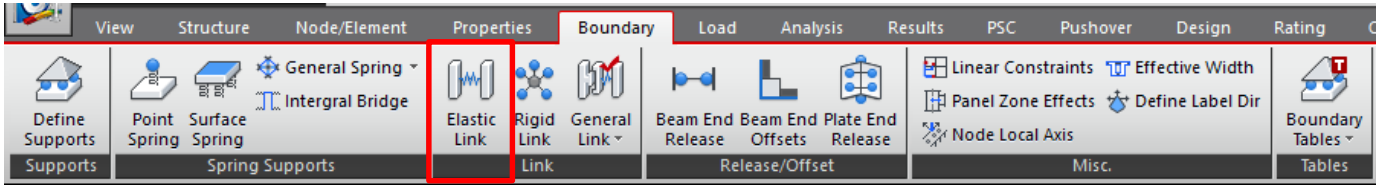
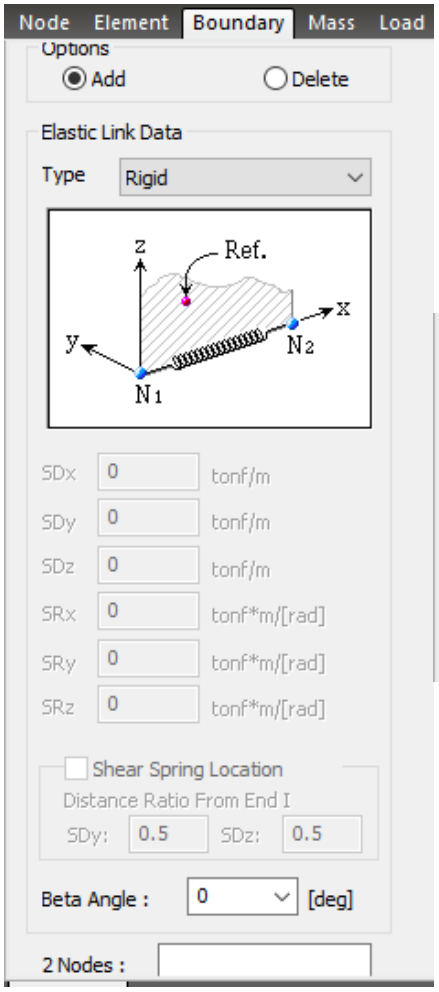


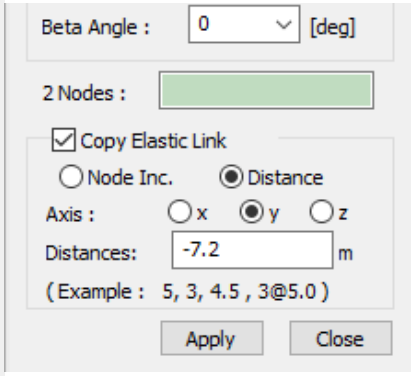
4. Modeling

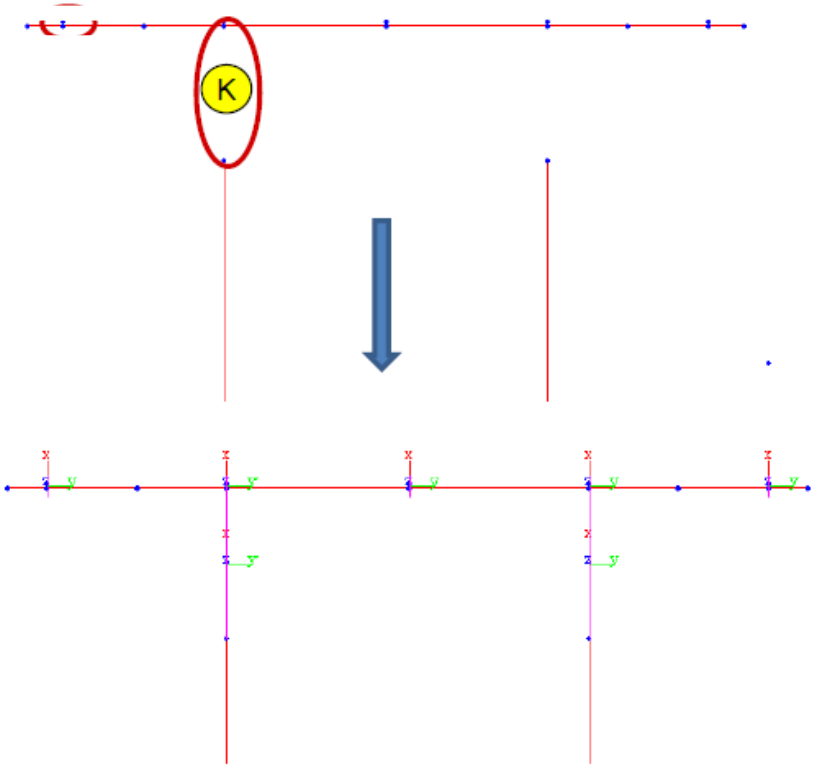




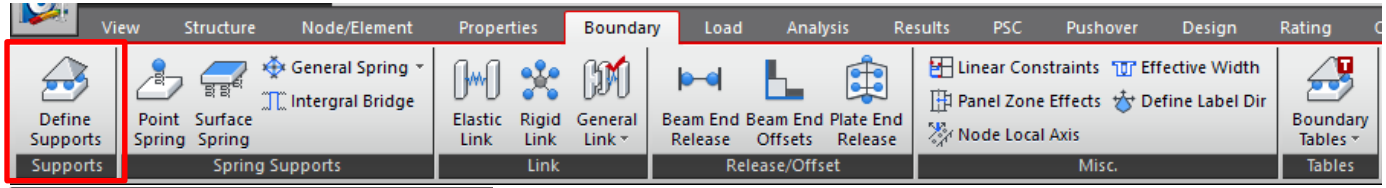
Boundary > Elastic Link

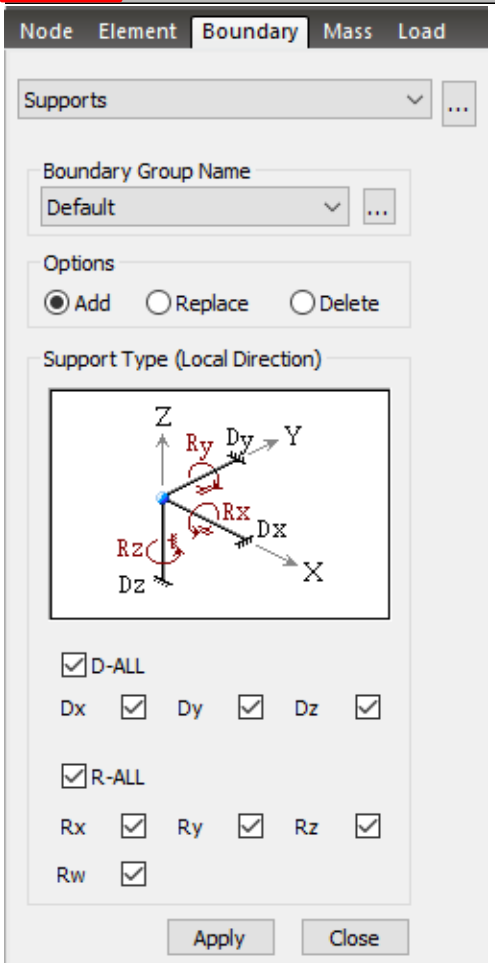
1. *Activate All , Hidden off (to see wire frame). Select Left View.*
2. *Pier cap connection: Check on Copy and enter the distance. Then click in the field against 2 Nodes and click on nodes in group K*





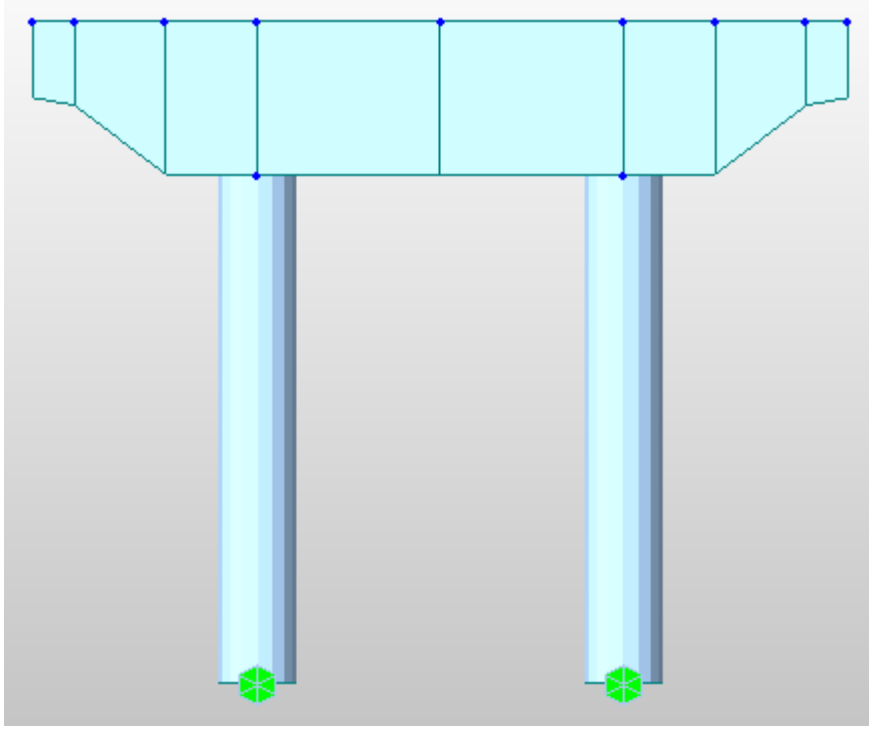
4. Modeling



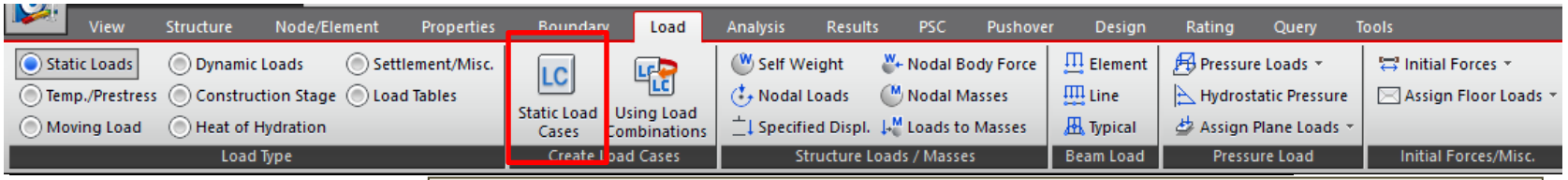


Boundary > Define Supports

1. *Select the nodes at the bottom of the piers to define the support conditions*
2. *D-All and R-All to restrain all the degrees of freedom and define a fixed condition.*

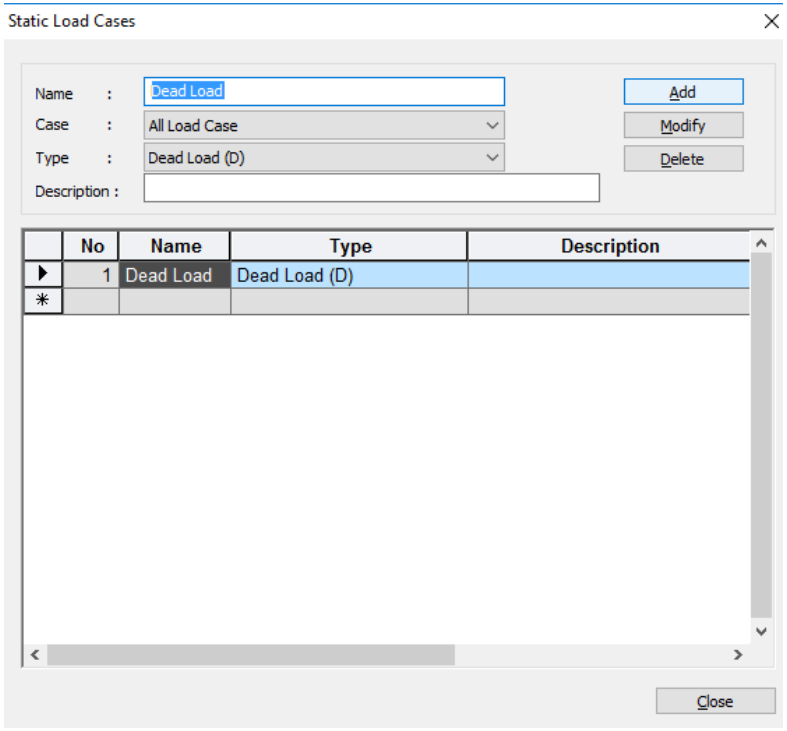


4. Modeling

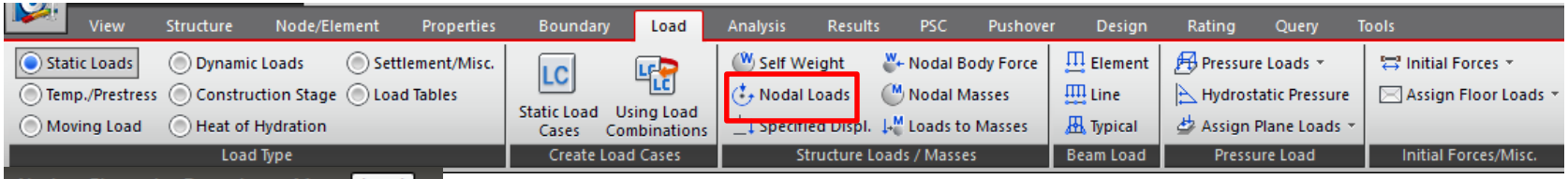


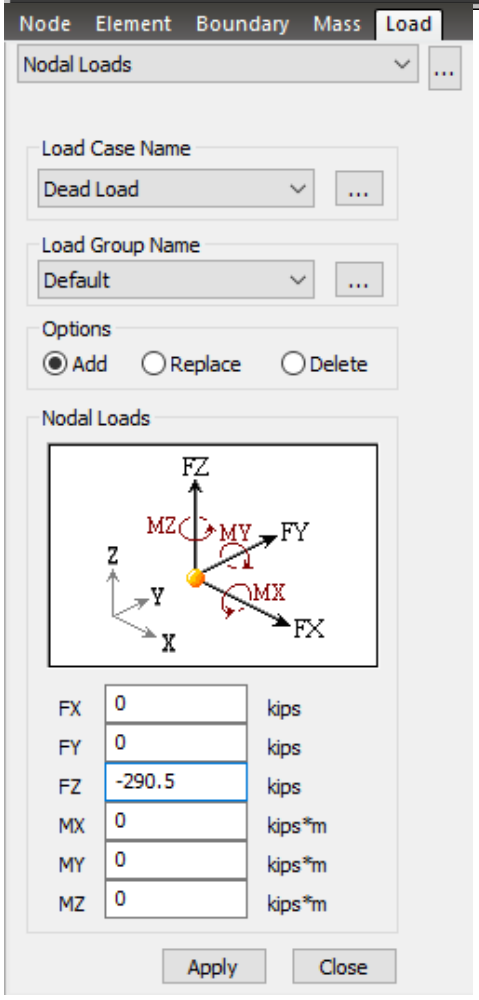
Load > Static Load > Static Load Cases

1. *Define the Dead Load case*
2. *Type Dead Load (D)*
3. *Click Add*



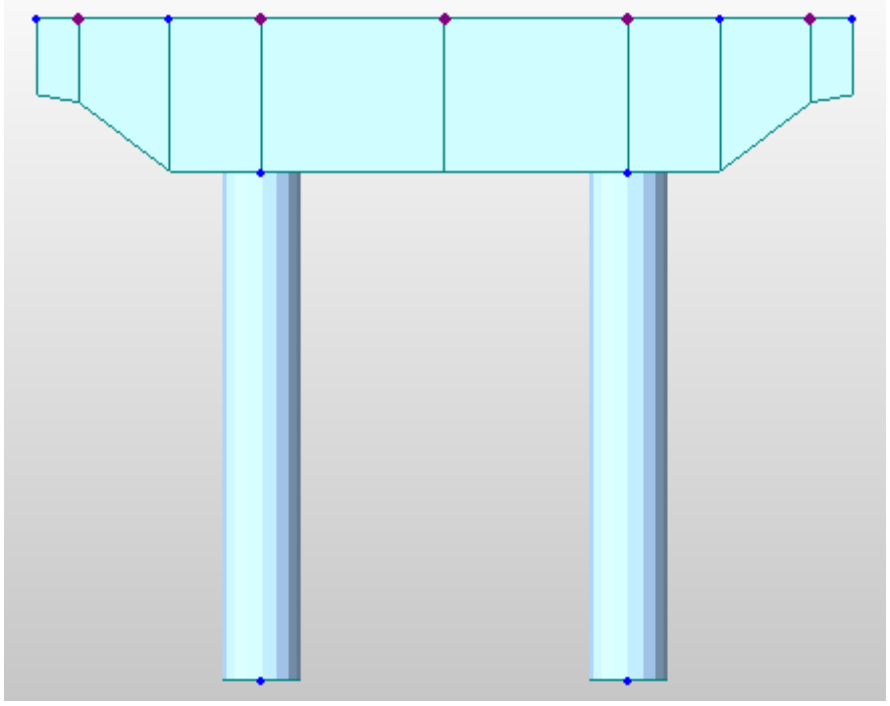
4. Modeling





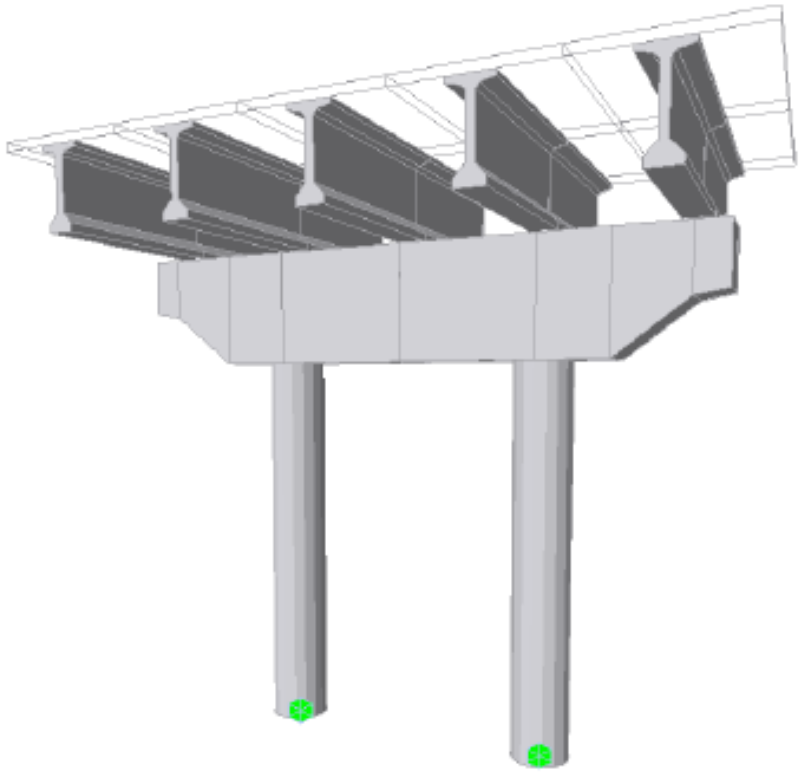
Load > Static Loads > Nodal Loads

1. *Select the nodes shown to apply the dead load as nodal loads*
2. *Apply -290.5 kips in the FZ (Vertical direction)*



4. Modeling

After pier modeling, support conditions based on requirements can be applied. In this example, a small section of the bridge was taken. The bridge span can be extended and other piers can be modeled based on the approach outlined in this tutorial.



Pier Modeling Example

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