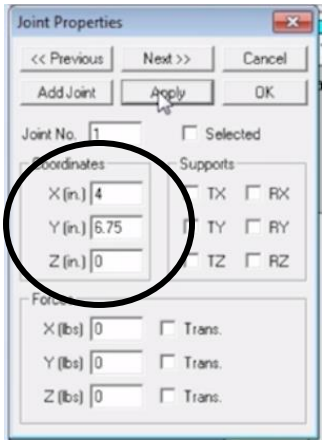
ModelSmart 3D

The Setup:

- Make sure your work space is bigger than your bridge
  - Edit
  - Preferences
  - Set your x, y, and z axis to be bigger than your model by 1” on each side
- Views
  - Up and down arrow keys = Zoom in and out
  - Left and right arrow keys = Rotate screen
  - + and – on the number pad = Tilt screen
  - To shift your screen, 2-down, 4-left, 8-up, 6-right
- Have a paper copy of your model for reference
  - With the paper copy, make a graph stating the points of each joint of the bridge and add 1 to every “y axis” point

The Bridge:

- Add a joint
  - Place anywhere within the rulers
- Joints
  - CHANGE THE ORIGINAL JOINT COORDIANTES: Joint ⟹ Properties ⟹ Select the joint ⟹ put in the correct coordinates ⟹ Apply
  - Then add another joint and put in the coordinate s for that point, etc.
  - DO NOT have 2 joints at the same coordinates, it will mess up your entire model, if the next 4 steps do not work, check for duplicate joints

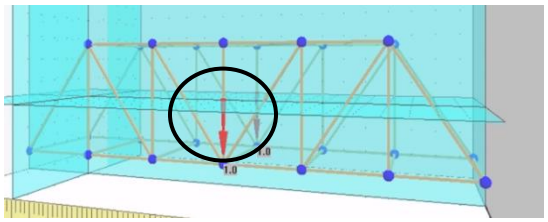


- The other side
  - Create another joint for the other side of the bridge (, add to the z plane)
- x/y plane
  - Guides ⟹ XY Guide plane ⟹ Move plane to joint ⟹ Left click on only one of the joints

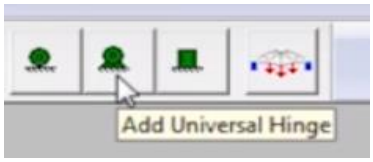
- Reflect the Points
  - Guides ⟹ XY Guide plane ⟹ Replicate joint(s) and move plane to joint ⟹ left click the lonely joint
- Members/ Connectors
  - Members ⟹ Add ⟹ Left click on a joint and hold as you move to another joint, release when your cursor is on the next joint

Testing and analysis:

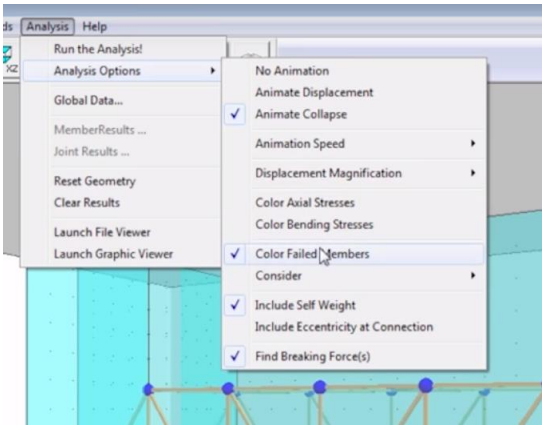
- Adding Load
  - Loads ⟹ Set default forces ⟹ Set the values to, X value = 0, Y value = -1, Z value = 0
  - Loads ⟹ Add/Change force Y ⟹ Left click the bottom middle joints, make sure the arrows are pointing down



- Abutments
  - Add universal hinge and put it on 2 end joints on one side of the bridge
  - Add a XZ roller on the other side of the bridge



- Analysis
  - Make sure all of the following are selected
  - Analysis ⟹ analysis options ⟹ color failed members
  - Analysis ⟹ analysis options ⟹ Consider ⟹ only have axial stresses selected
  - Include self-weight
  - Find breaking force
- Test
  - Analysis ⟹ Run the analysis



Results:

- Analysis ⟹ Global data
  - This shows you your model weight, and how much load it held
  - The number of joints, and members
  - Which members of the bridge failed first