Thermal Stresses in a Bar - Geometry

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Geometry

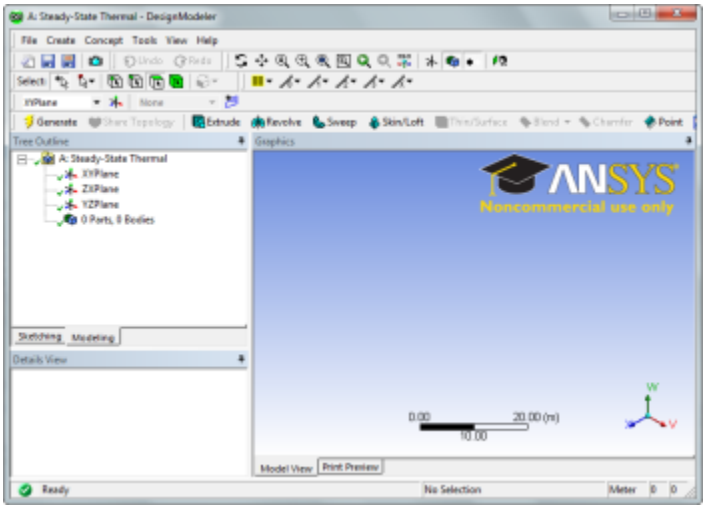
For users of ANSYS 15.0, please check this link for procedures for turning on the Auto Constraint feature before creating sketches in DesignModeler.

Change the Geometry Properties

In the ***Steady-State Thermal*** box, right click ***Geometry*** and select ***Properties*** . We need to allow ANSYS to recognize line bodies as valid geometries. We accomplish this by checking the box marked ***Line Bodies*** .

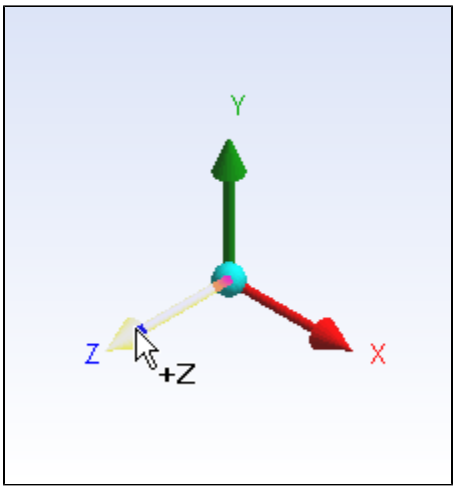
Open the Design Modeler

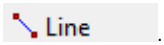
We are now ready to create the geometry in ANSYS. We will be creating a one dimensional line body to represent the steel bar. To open the design modeler, double click ***Geometry*** . After the design modeler is launched, you will be prompted on the default units. Select ***Meters*** and press ***OK*** .



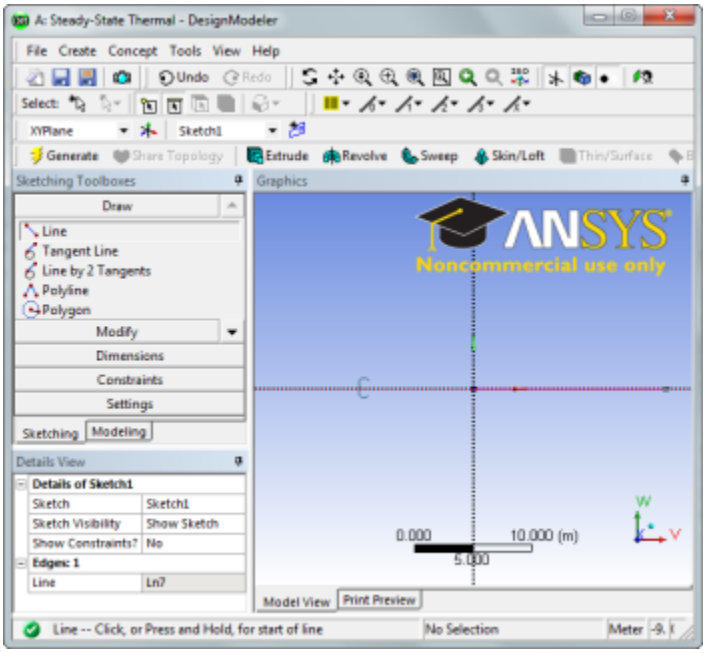
Draw a Line

Next, we need to draw a line to represent the length of the bar. To begin sketching, we need to look at a plane to sketch on. Click on the Z-axis of the compass in the bottom right hand corner of the screen to look at the x-y plane.

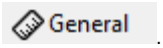


Next, click the ***Sketching*** tab in the *Outline* window to bring up the sketching menu. Next, select 

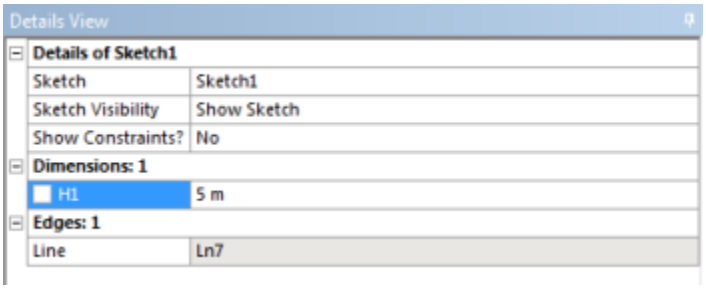
. To draw a line, first click the origin, followed by a point on the x-axis.



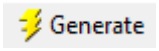
Dimension the line

Next, we need to assign the length to the line. In the ***Sketching Toolbox*** click the ***Dimensions*** tab, and select 

. Click on the line to create a dimension. In the *Details* window, change ***H1*** to 5 meters.



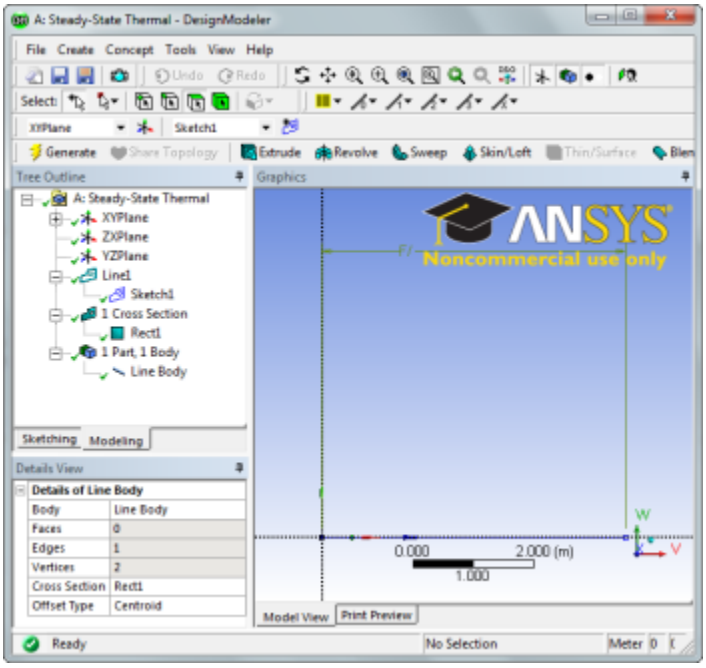
Concept - Line from Sketches

Next, we need to create the line body from the sketch. In the menu bar, click **Concept > Lines from Sketches**. Next, select the line we drew in the *Graphics* window, and in the *Details* window select ***Apply*** . Finally, press 

to create the line body.

Specify Cross Section

In the menu bar, go to **Concept > Cross Section > Rectangular** to create a cross section. In the *Details* menu, specify both ***B*** and ***H*** to `0.1`. After the cross section dimensions are specified, we need to set the cross section to the line body. Expand the ***1 Part, 1 Body*** and select the ***Line Body*** . In the *Details* window, change the ***Cross Section*** to ***Rect1*** .



You may now close the design modeler.

Go to Step 3: Mesh

Go to all ANSYS Learning Modules