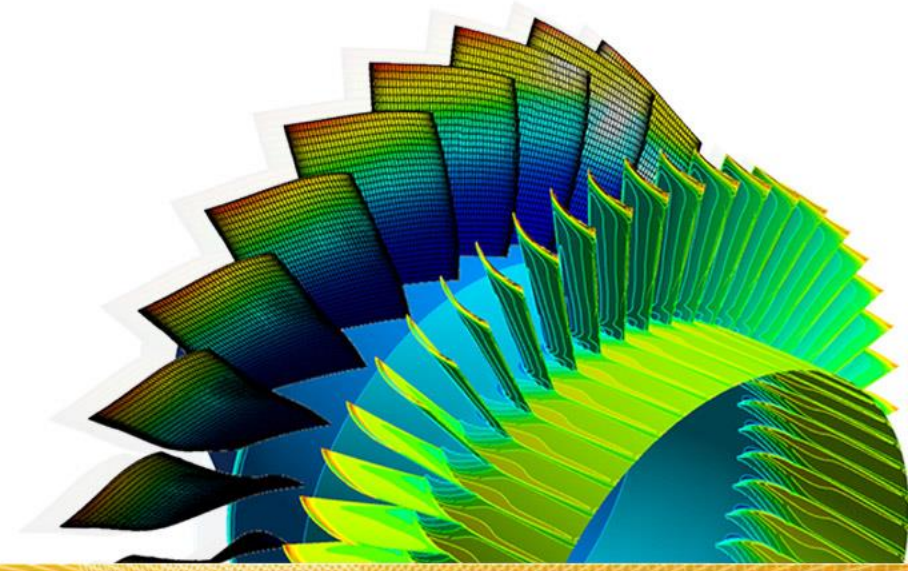
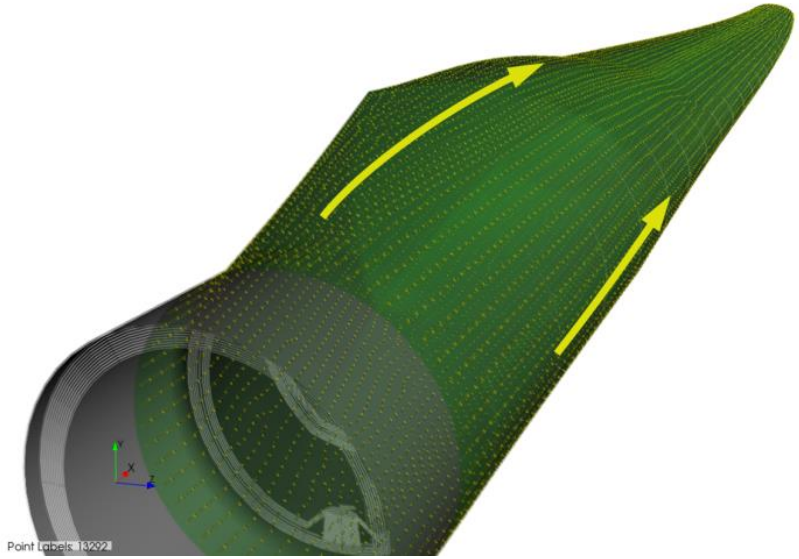
ANSYS Composite PrepPost 19.0

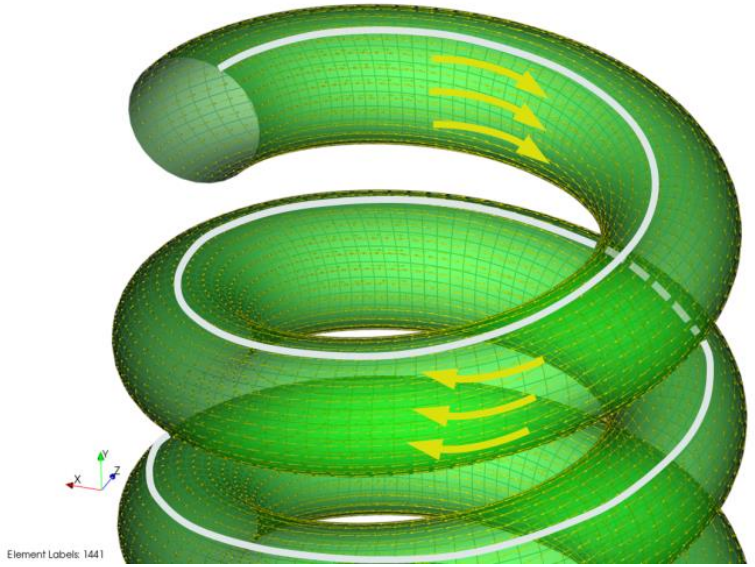
Workshop 04.1 – Helix



3. Workshop Helix

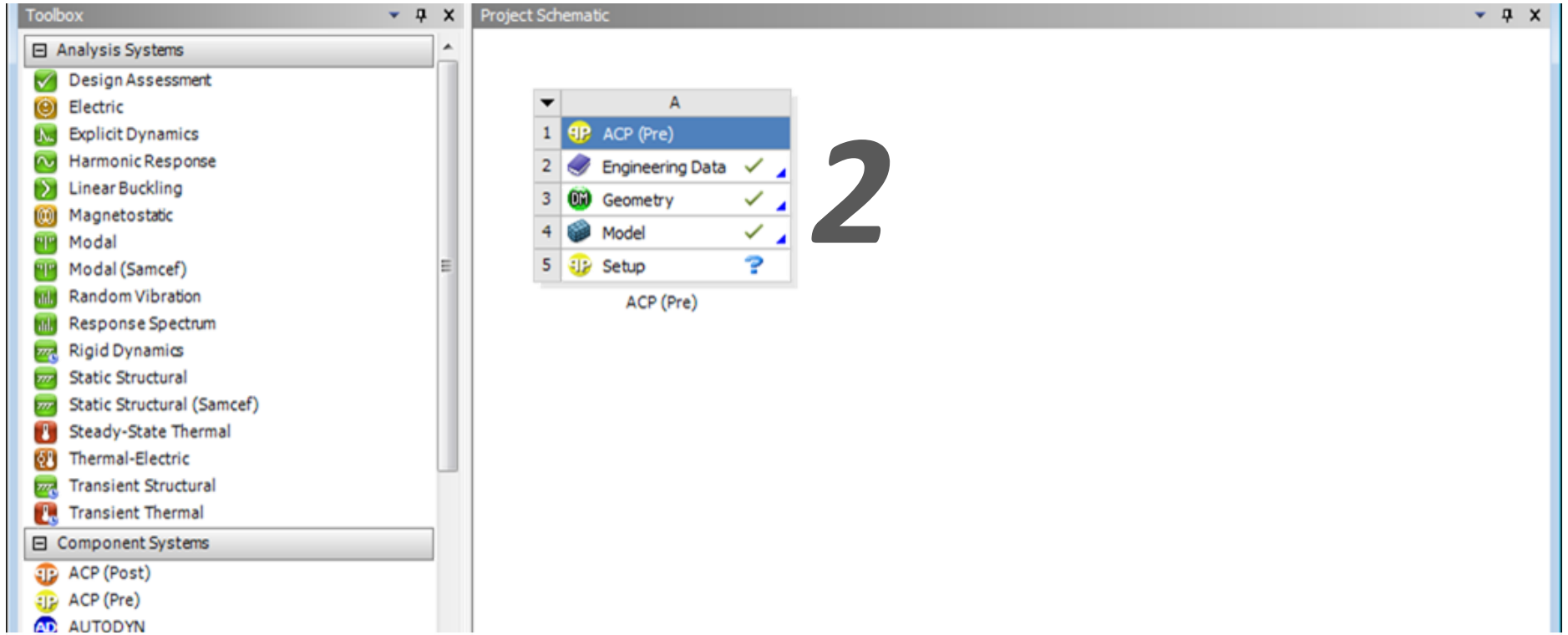
- This workshop will help using edges to orient fiber directions.
- Very often fiber directions follow the outer structure of a design. To use this when defining fiber directions ANSYS Composite PrepPost can define the directions based on edges in the model.





3. Workshop Helix

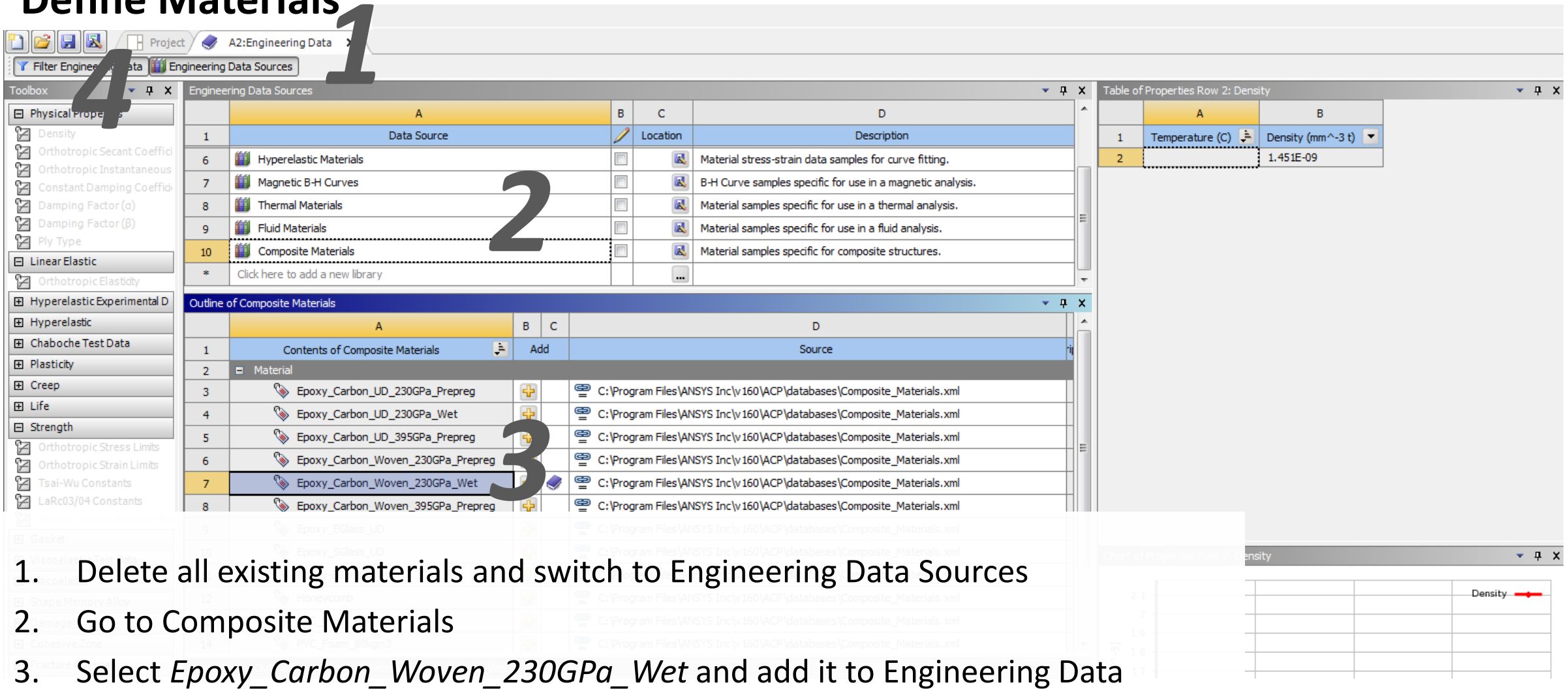
Start ANSYS Workbench and Restore Archive



1. Start ANSYS Workbench and restore Archive *Helix_START_19.0.wbpz*
2. Edit Engineering Data

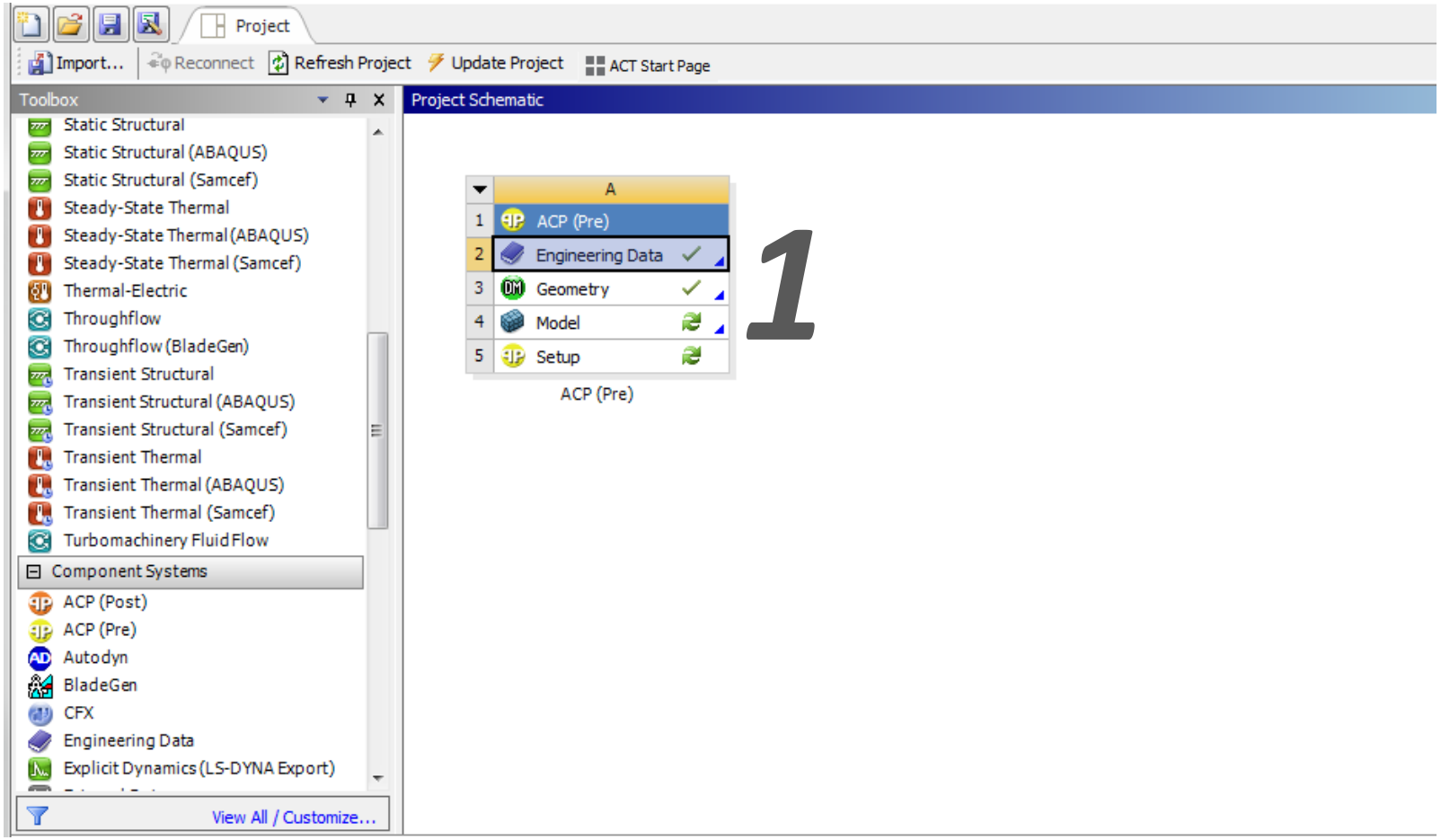
3. Workshop Helix

Define Materials



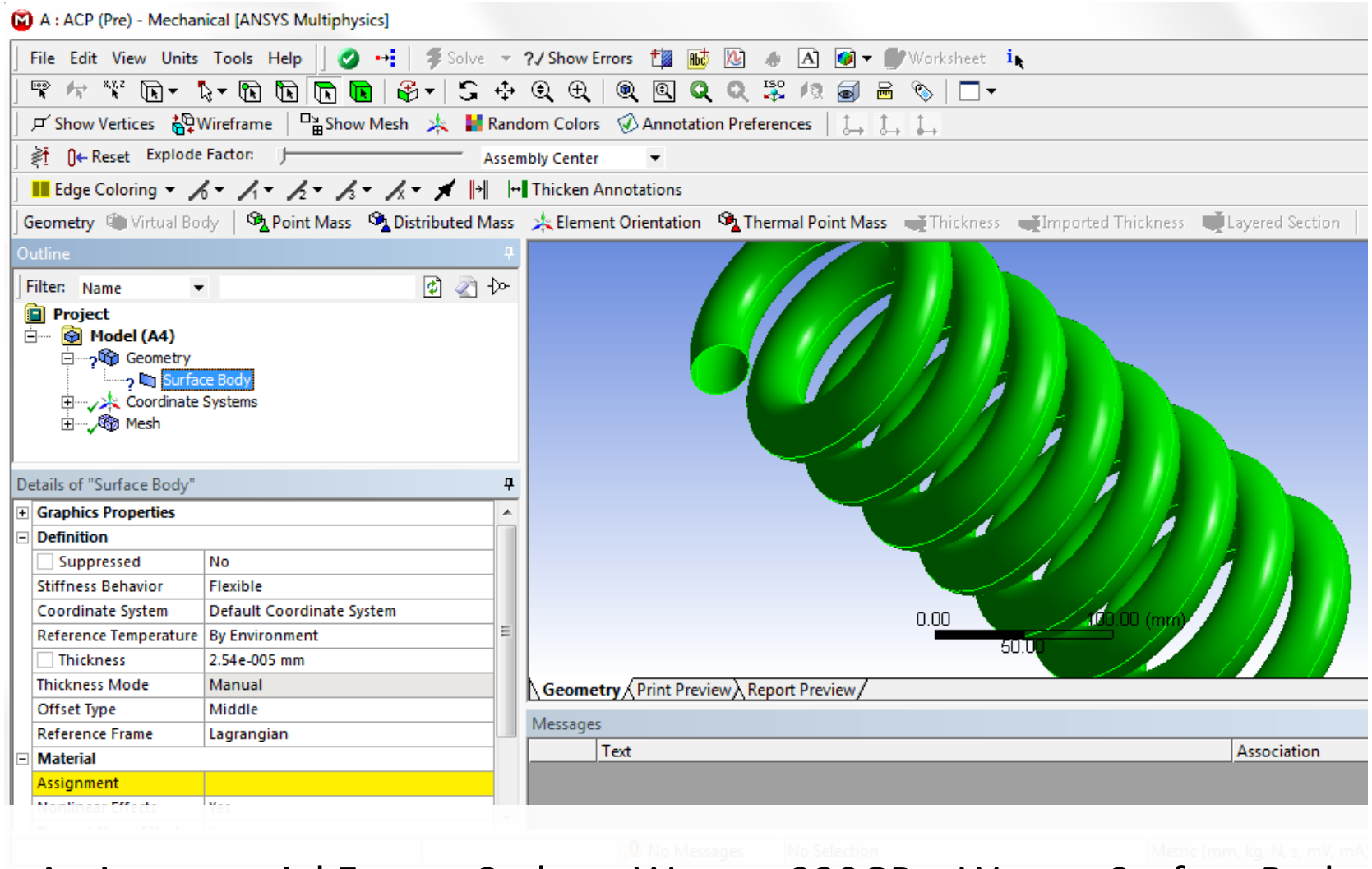
1. Delete all existing materials and switch to Engineering Data Sources
2. Go to Composite Materials
3. Select *Epoxy_Carbon_Woven_230GPa_Wet* and add it to Engineering Data
4. Return to Project

3. Workshop Helix



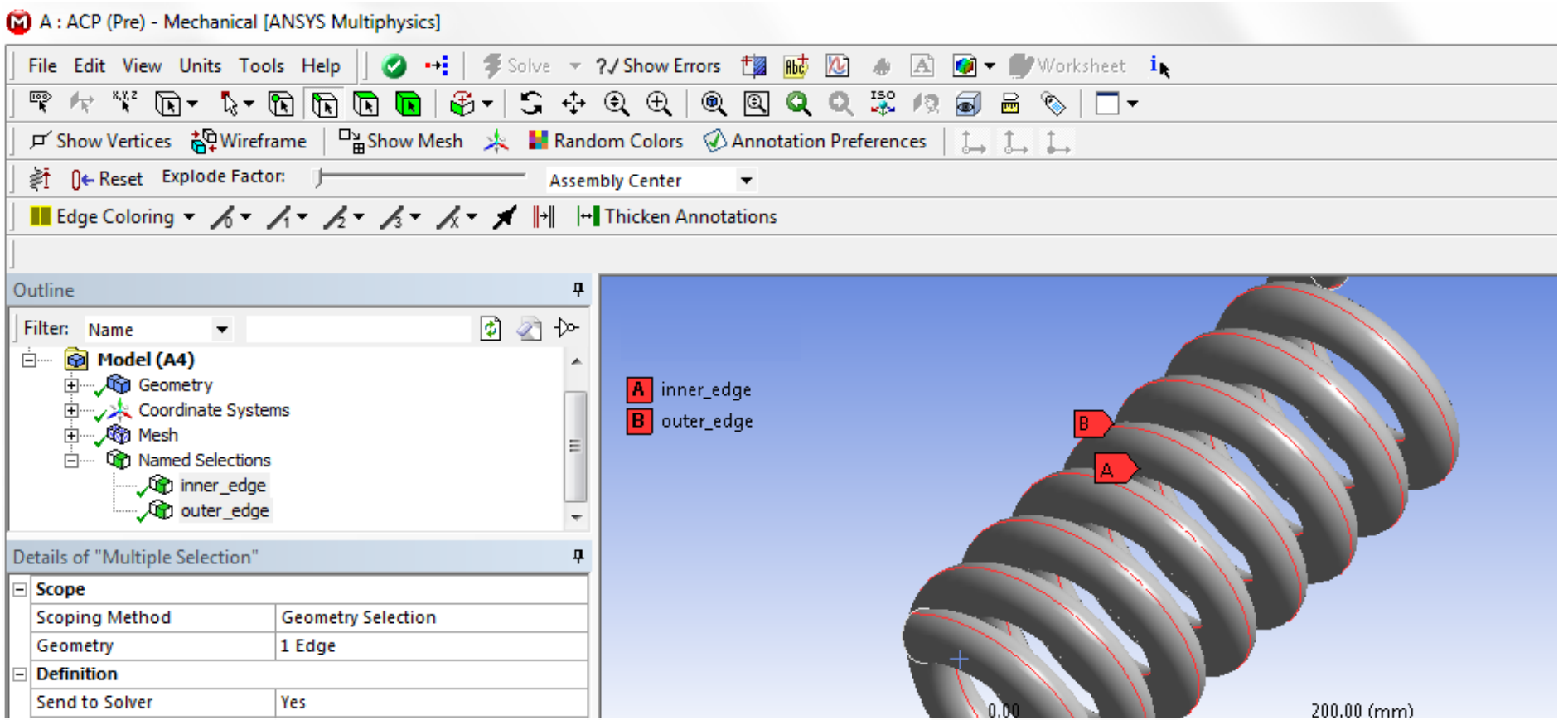
1. Read upstream data and edit Model in ANSYS Mechanical

3. Workshop Helix



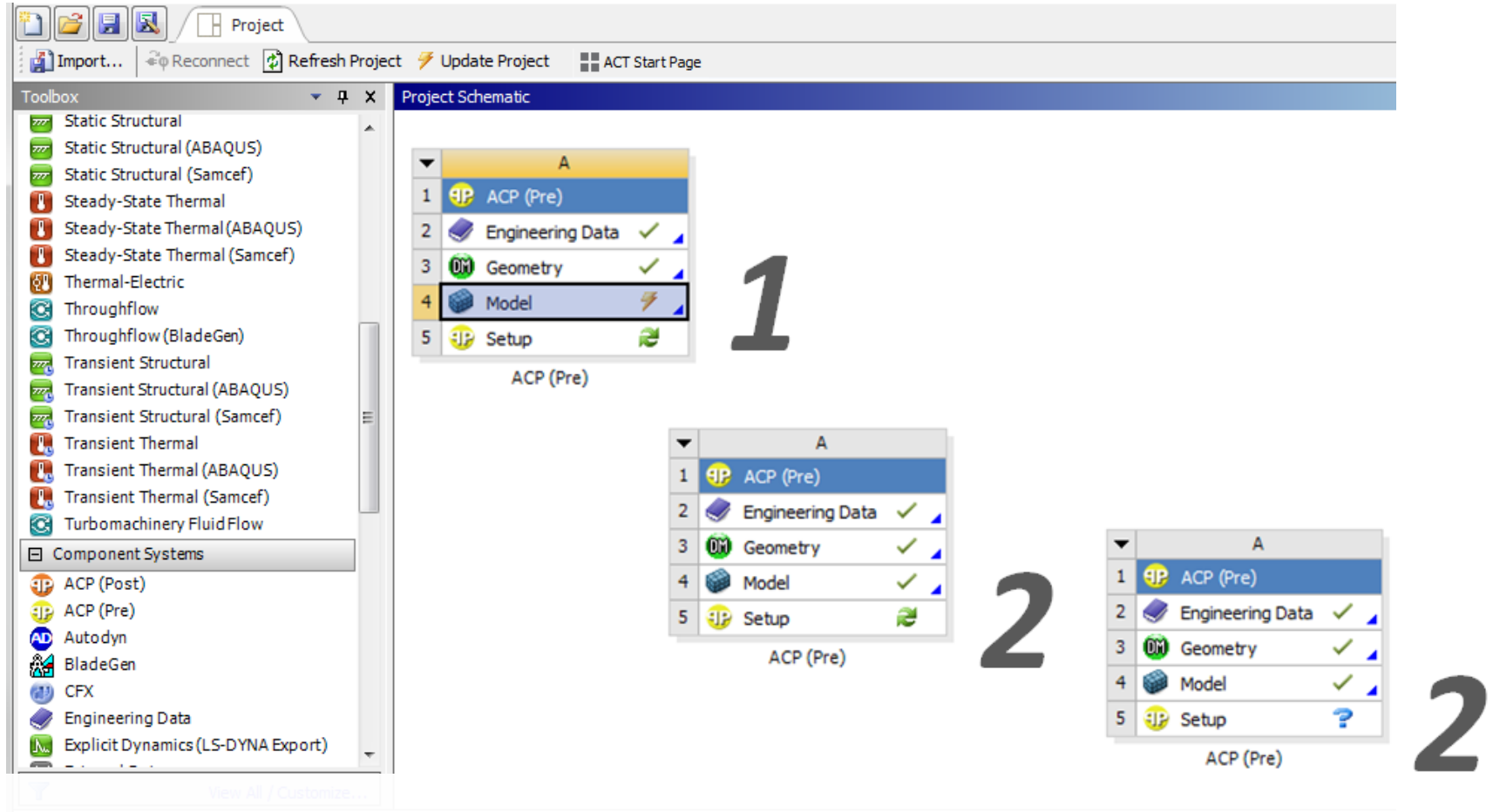
1. Assign material Epoxy_Carbon_Woven_230GPa_Wet to Surface Body

3. Workshop Helix



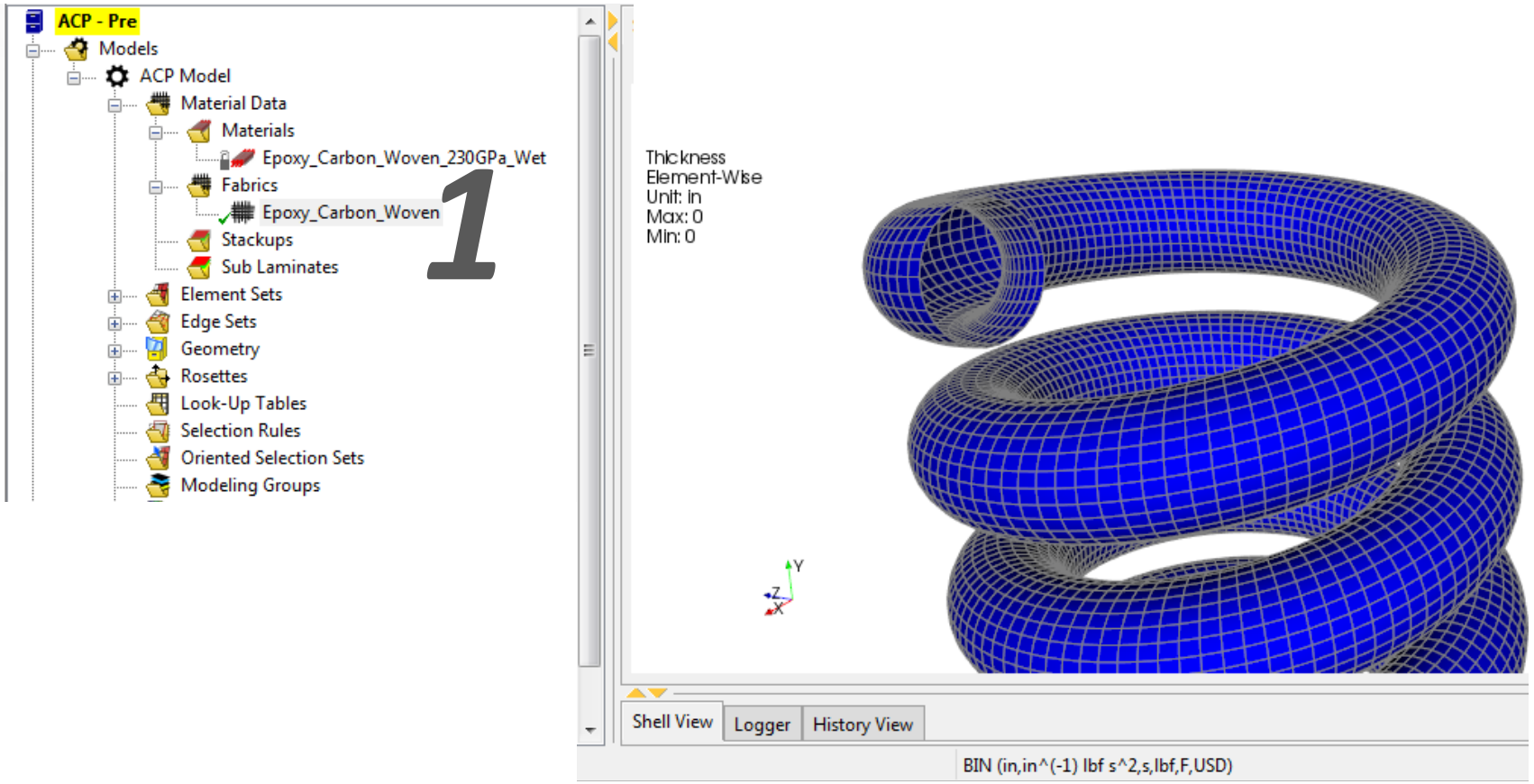
1. Create named selections for inner and outer edge of the helix (Create named selections by selecting one edge and then Right mouse button → Insert , Named Selection)
2. Close ANSYS Mechanical

3. Workshop Helix



1. Update Model
2. Refresh Setup in ACP (Pre) and start
   ANSYS Composite Prep Post (Right mouse button on Setup → Edit)

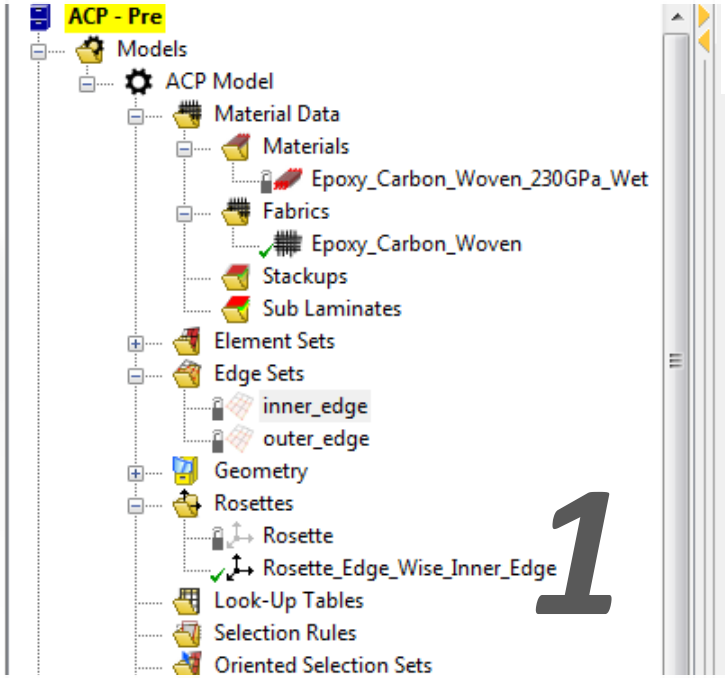
3. Workshop Helix

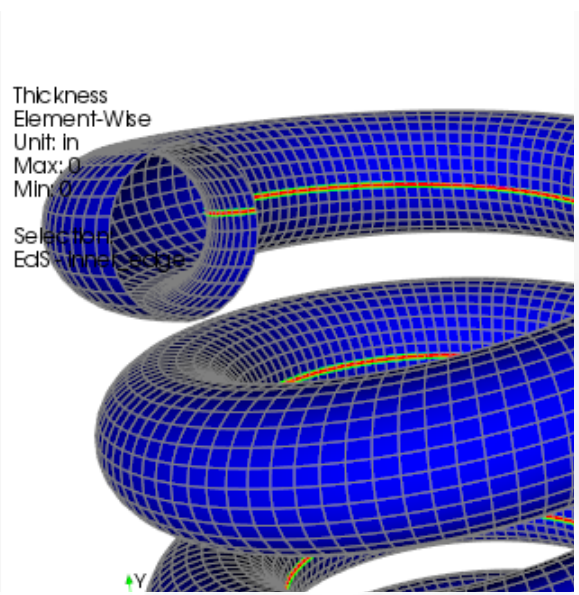


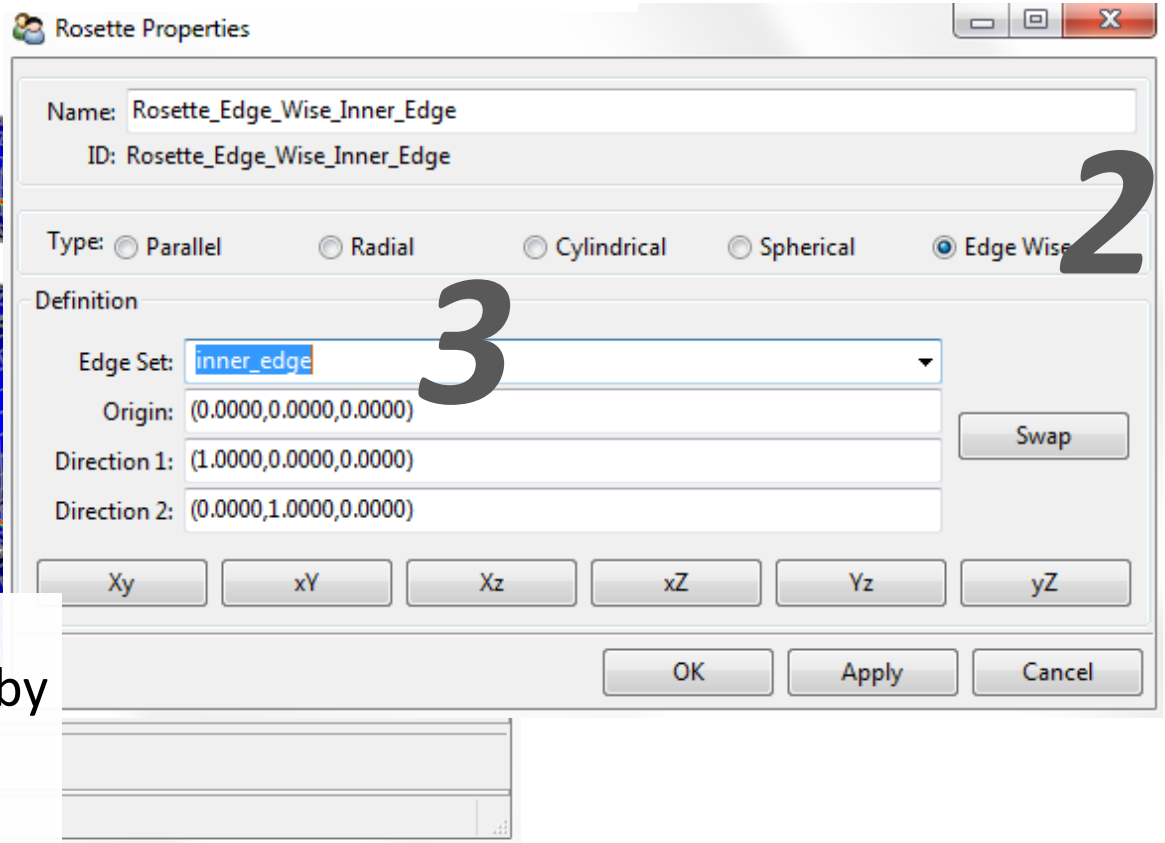
1. Create a Fabric Epoxy Carbon Woven using the material Epoxy_Carbon_Woven_230GPa_Wet and a thickness of 0.005 in

3. Workshop Helix

Create Edge Wise Rosettes

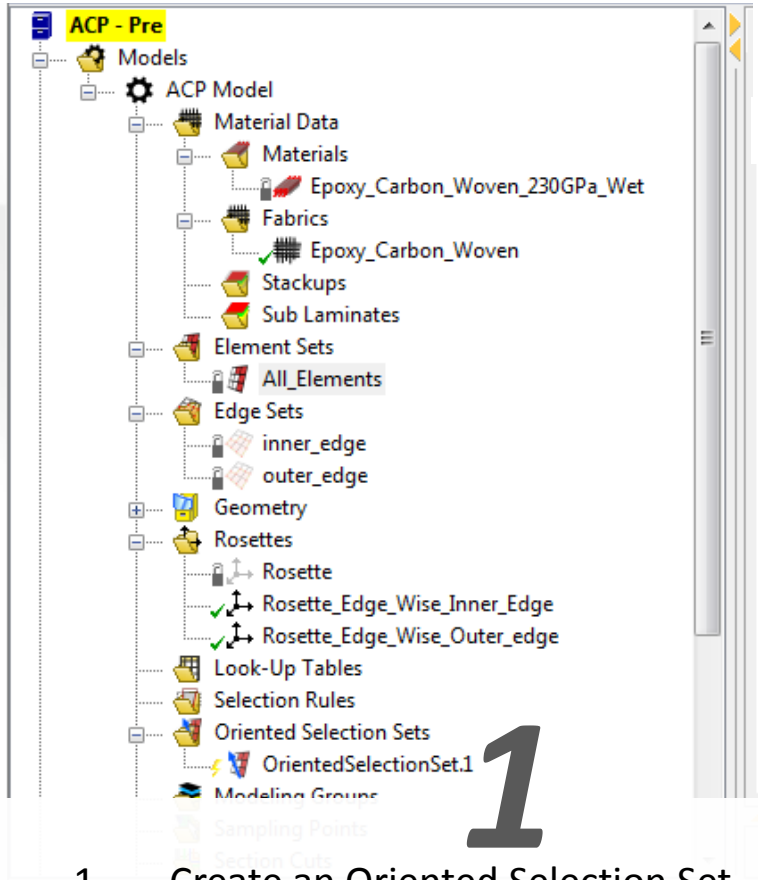


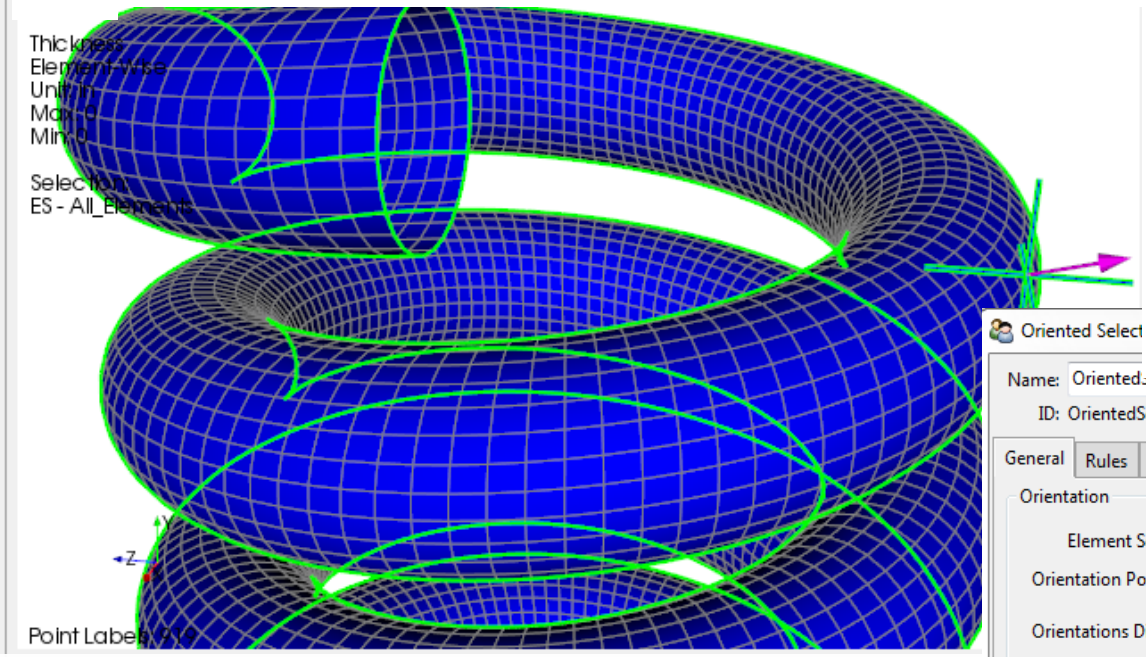


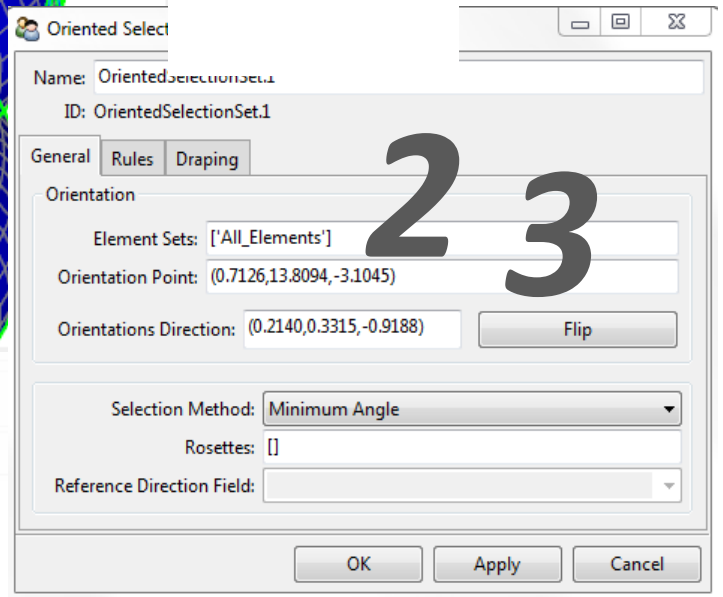


1. Create a rosette (Rosette_Edge_Wise_Inner_Edge) by Right mouse button on Rosettes → Create Rosette
2. Select Edge Wise Rosette
3. Select *inner_edge* as Edge Set

3. Workshop Helix

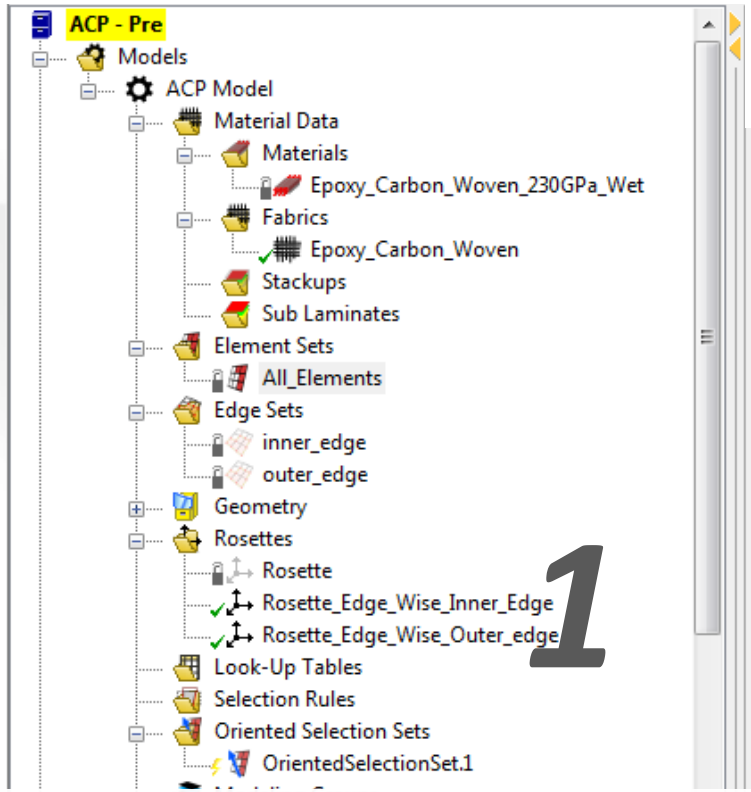


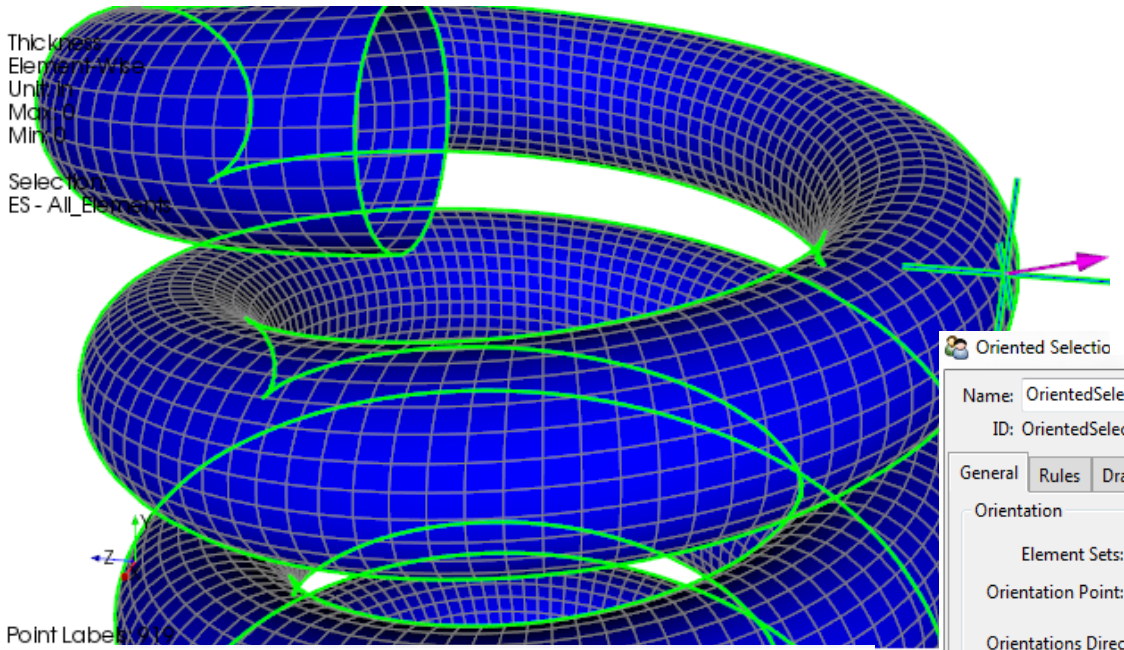


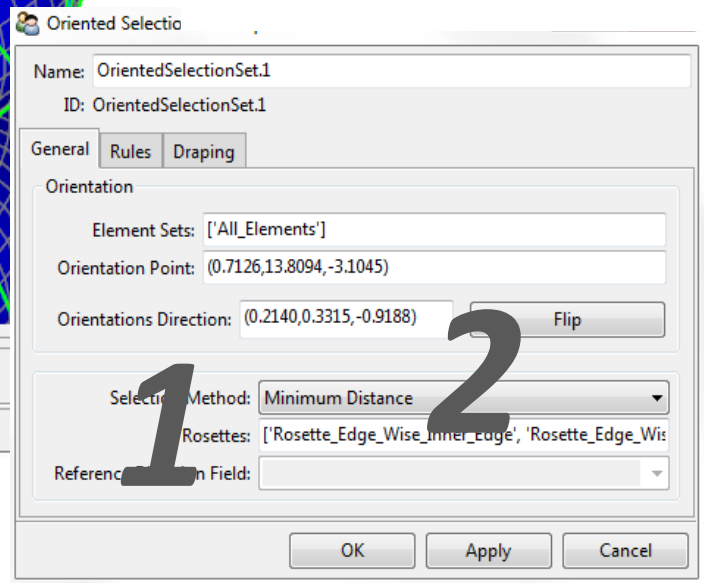


1. Create an Oriented Selection Set
2. Select All Elements as Selection Set
3. Define Orientation Point. Click into orientation point selection area and select an element. This will define Orientation Point and Orientations Direction (Layup Direction). Choose Layup direction outwards.

3. Workshop Helix

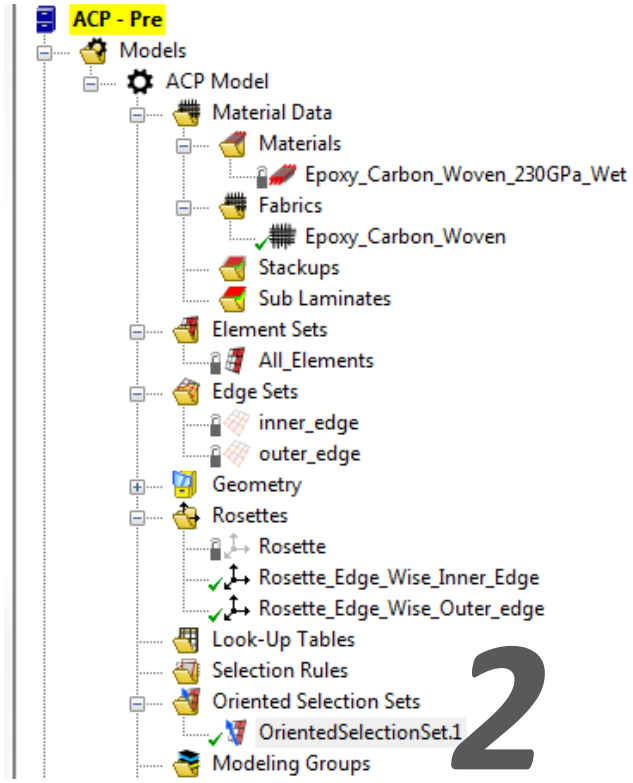


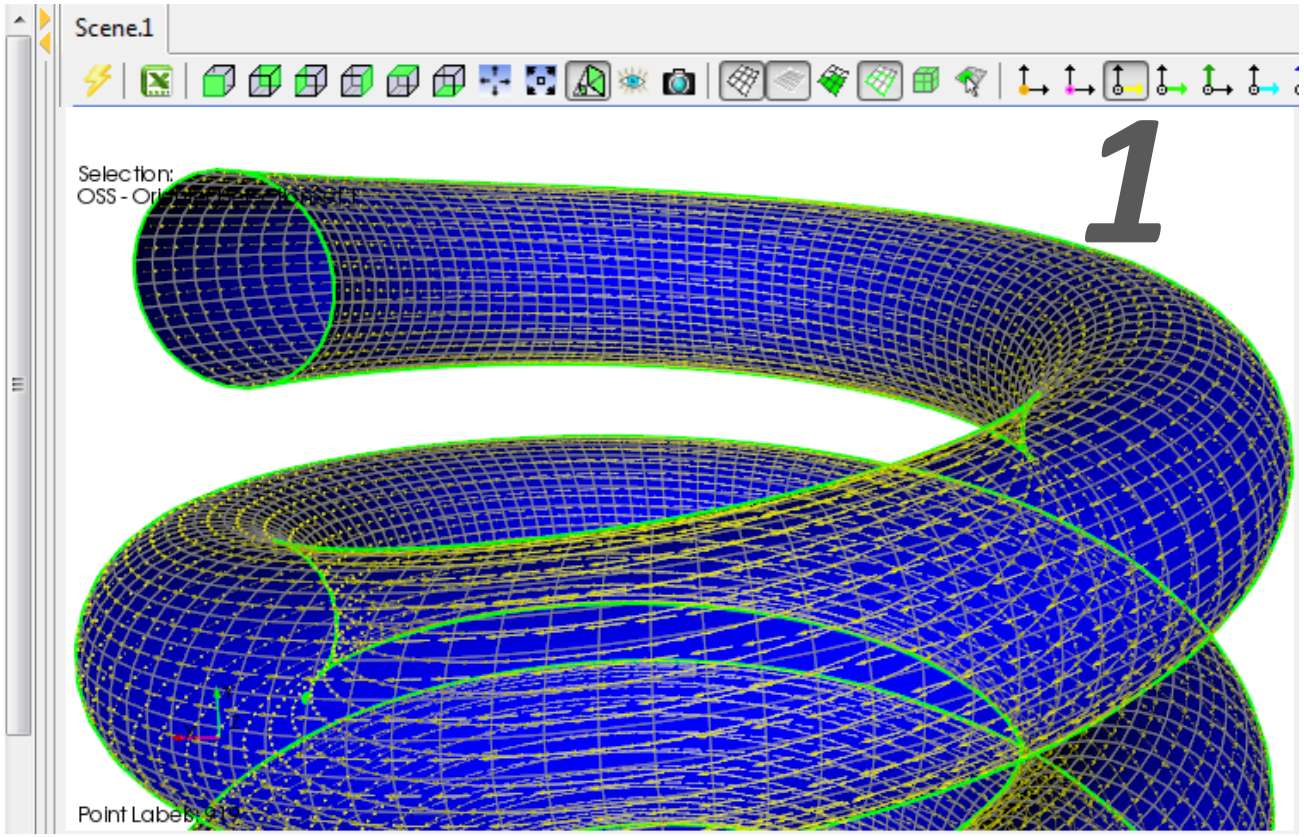




1. Select Rosettes *Rosette_Edge_Wise_Inner_Edge* and *Rosette_Edge_Wise_Outer_Edge* as Rosettes (Multiple Selections are possible pressing CTRL while selecting)
2. Select Selection Method Minimum Distance (The Selection Method specifies the rosette each element uses to define its reference direction when multiple rosettes are selected. We will pick this up at a later point)

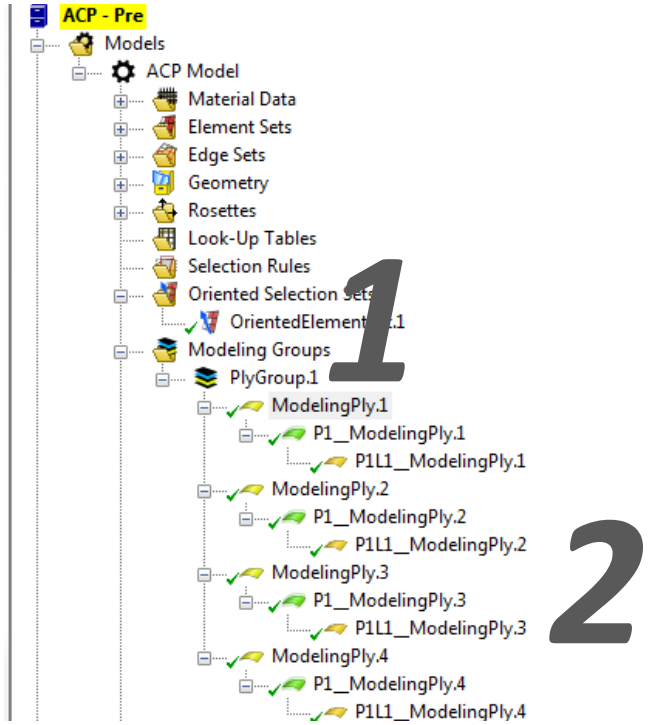
3. Workshop Helix

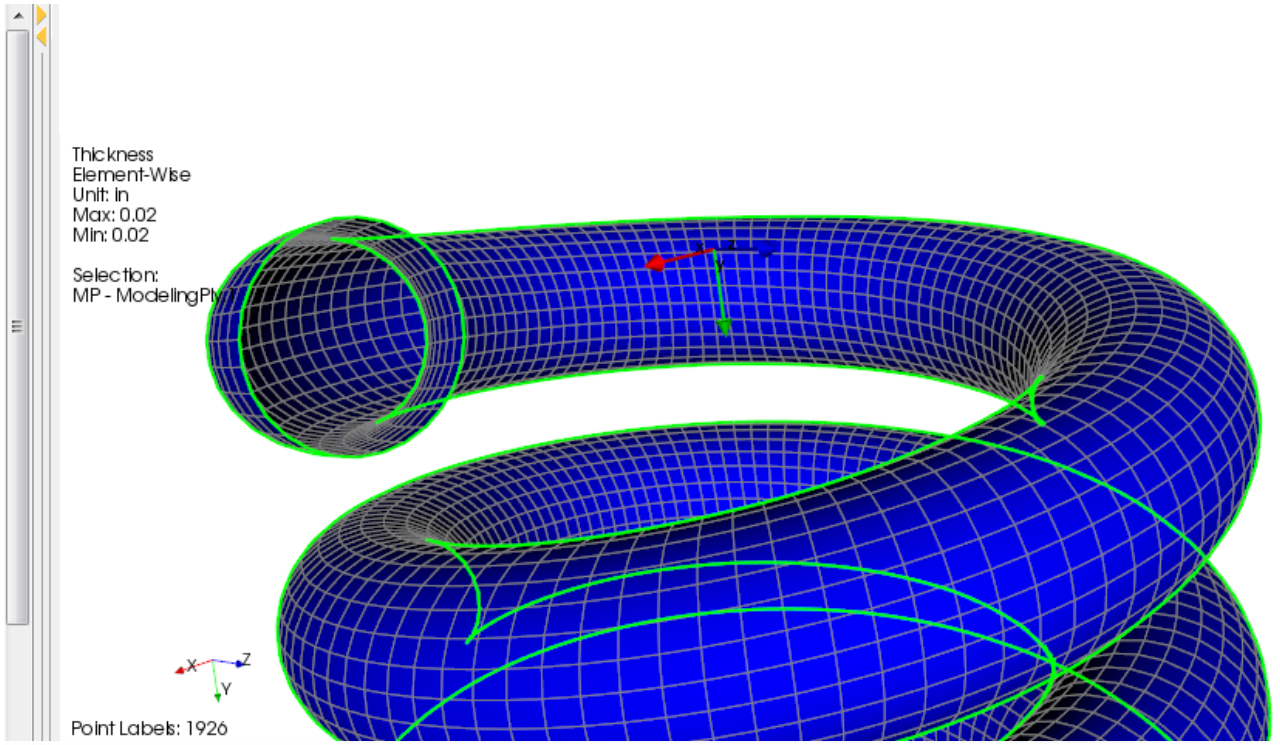




1. Select *Show Reference Direction*
2. If you don't see the reference direction for the oriented selection set, you may have to reselect the oriented selection set in the tree. Also check if the model is updated.

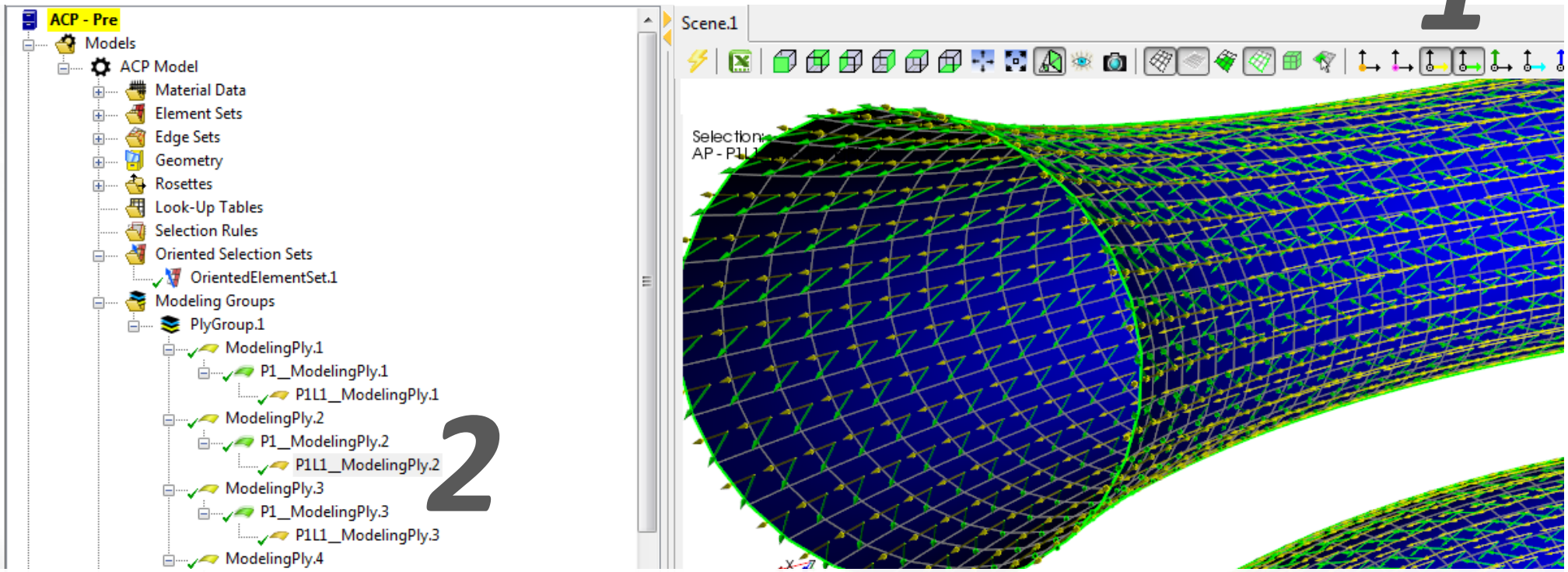
3. Workshop Helix





1. Create a new Ply Group
2. *Create the composite layup using four layer (0°, -30°, 30°, 0°)*

3. Workshop Helix



1. Check the fiber direction of the single layers

   Select *Show Reference Direction*

   Select Show Fiber Direction

2. Select analysis plies in the tree to see reference and fiber directions