# LAB-16: Designed Solids (Optional)

Objective

After completing this lab, you will be able to:

- Use Connect relationships to position Shapes, rotate Shapes with the Arrow keys on the keyboard. For this lab, we will create a hierarchy using Designed Equipment Components. Understand and apply relationship. Use Boolean operations (Add, Subtract and Suppress) effectively.

1. Open a session file.

2. Define your workspace to include the A2 → U05 and CS → U05 CS system.

3. Activate the PinPoint toolbar by selecting Tools -> PinPoint or by pressing [icon] in the ribbon bar and change the coordinate system from Global to U05 CS in the ribbon bar. If the U05 CS is not shown in the pull down list. Then go to More and select U05CS by expanding the CS. Select the reposition target and select the highlighted U05 CS. Your view should resemble the following graphic.
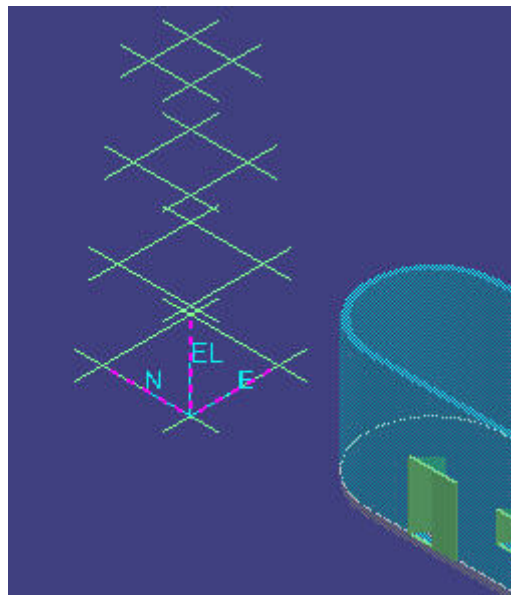
4. Expand the fly-out toolbar and press the [icon] icon on the vertical toolbar to start the Place Designed Equipment command. Expand *Equipment -> Civil* and select *Miscellaneous*. Press OK.

5. In the Design Equipment Properties dialog, choose *Solids* as the System and give a User Defined name of *Stack*. Press OK.

6. Place the Designed Equipment at E: -50 ft, N: -90 ft and EL: 0 ft.

7. Expand the Fly-out by holding down the [icon] icon on the vertical toolbar. Select the Place Designed Equipment Component [icon] icon.

8. Select *Stack* as the parent.

9. In the Select Equipment Component type dialog, choose any Equipment Component. The type of the Component does not matter. This dialog can be customized through the catalog to suit your needs. For example, expand \Equipment Components\Process Components\Attachments\Vessel Platform\Vessel Platform and press OK.

10. In the Designed Equipment Component Properties dialog, make sure the Equipment property is set to *Stack*. Name the Component *Stack Tower* and press OK. See image below.
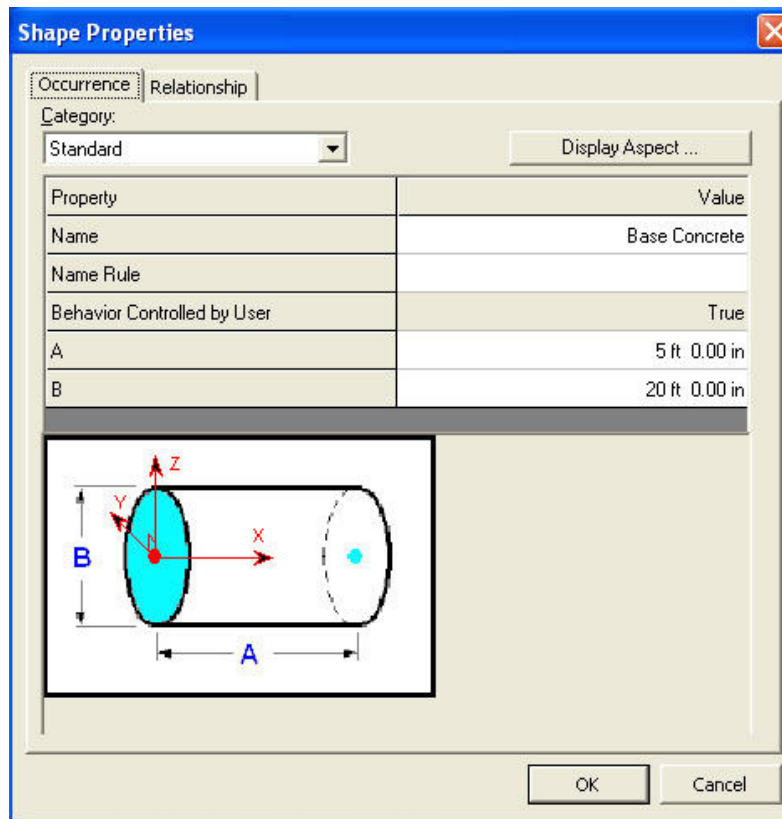

11. Place *Stack Tower* at E: -50 ft, N: -90 ft and EL: 0 ft.

12. Expand the Fly-out by holding down the [icon] icon on the vertical toolbar. Select the Place Designed Solid [icon] icon.

13. Choose *Stack Tower* as the parent. Rename the Solid to *Tower Objects*.

14. Go to Edit → Properties. Properties window will show up. Set the Material Type and Grade to Concrete and Fc 3000 for Solids, *Tower Objects*. Your workspace explorer should resemble the following graphic.


15. Hold down the Place Shape command in the vertical toolbar until the Place Shape dialog appears. Select *RtCircularCylinder 001* from the Shapes dialog. Choose *Tower Objects* as the parent of the Shape.
16. In the Shape Properties dialog, set A to 5 ft, B to 20 ft. Name the *RtCircularCylinder 001* as *Base Concrete*. Press OK.


17. Press Up arrow key once and then press left arrow key once. Your view should resemble the following graphic.
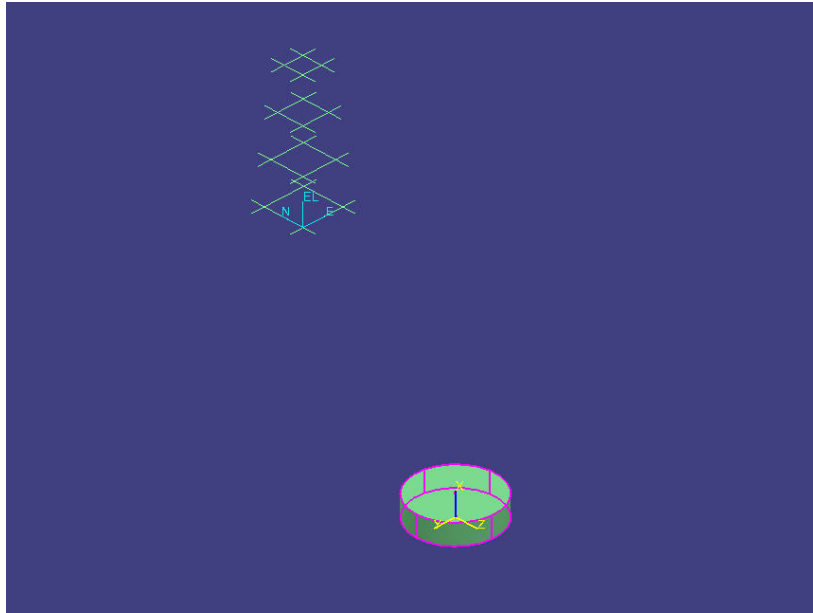
18. Place the Shape at E: -50 ft, N: -90 ft and EL: 0 ft.
19. Select *RtCircularCone001* from the Shapes dialog. Choose *Tower Objects* as the parent of the Shape.
20. In the Shape Properties dialog, set A to 150 ft, B to 14 ft and C to 4ft 5in. Name the *RtCircularCone001* as *Concrete Tower*. Press OK.
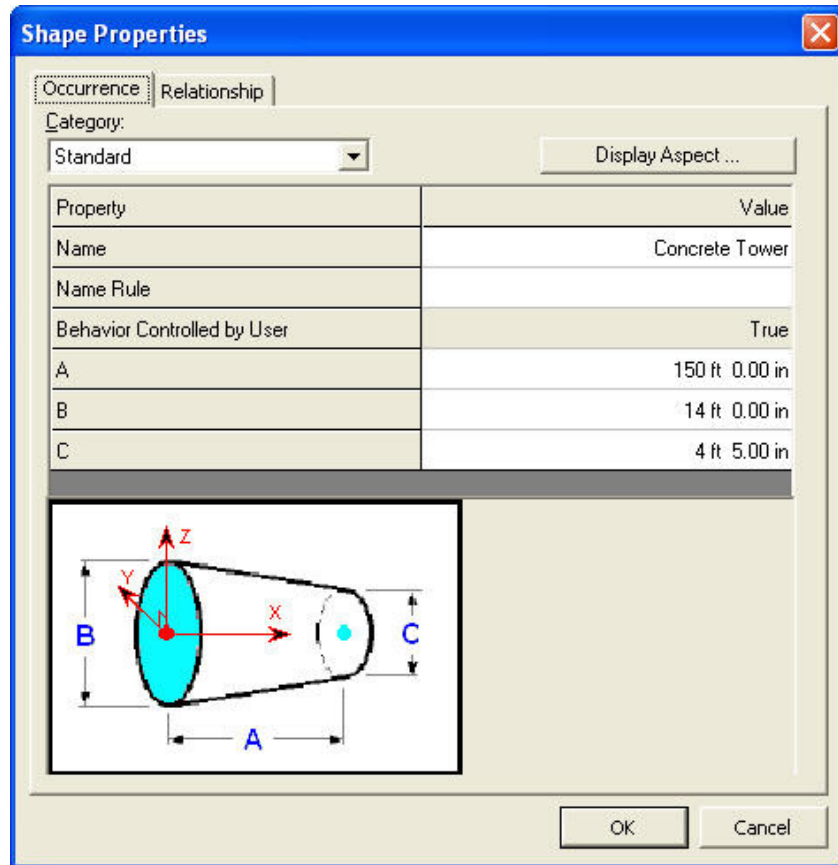
21. Press right arrow key once. Your view should resemble the following graphic.
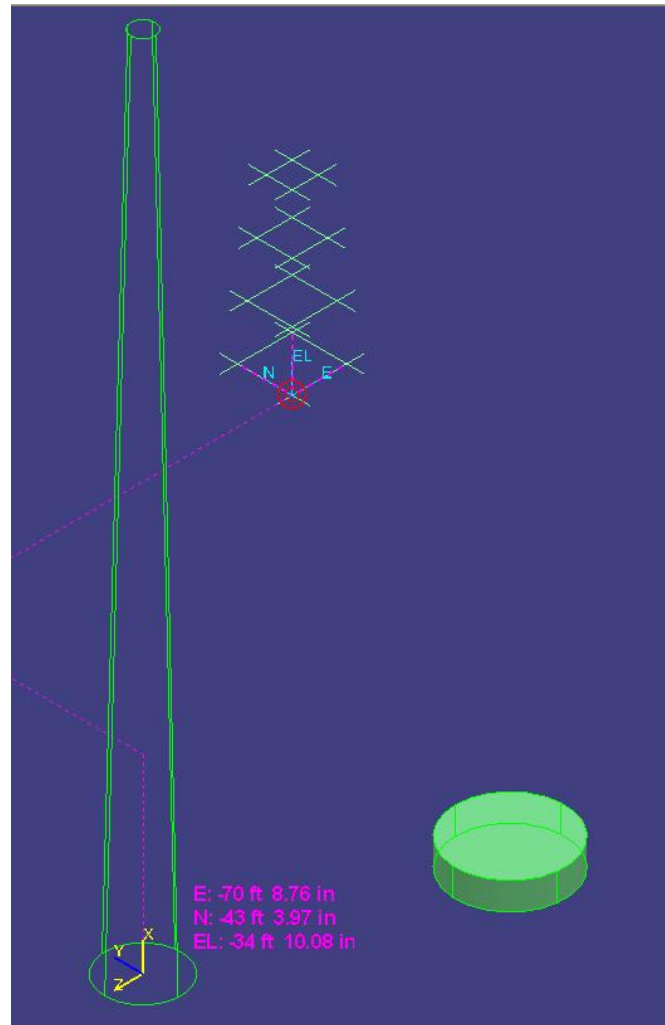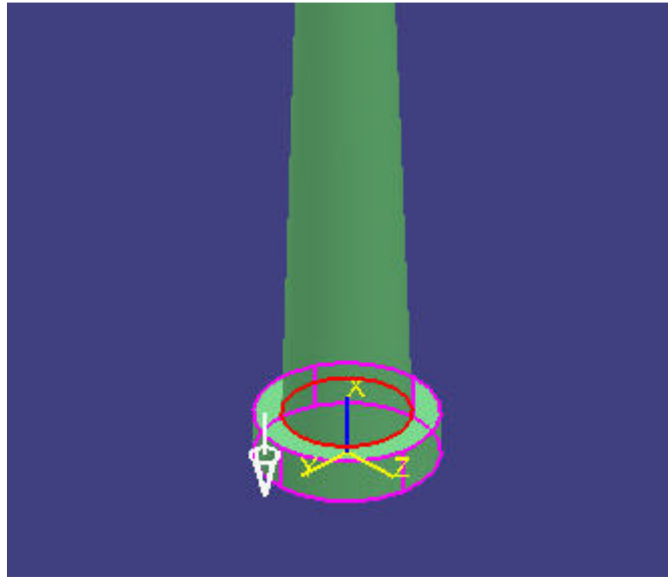
22. Place the Shape at E: -50 ft, N: -90 ft and EL: 5 ft.
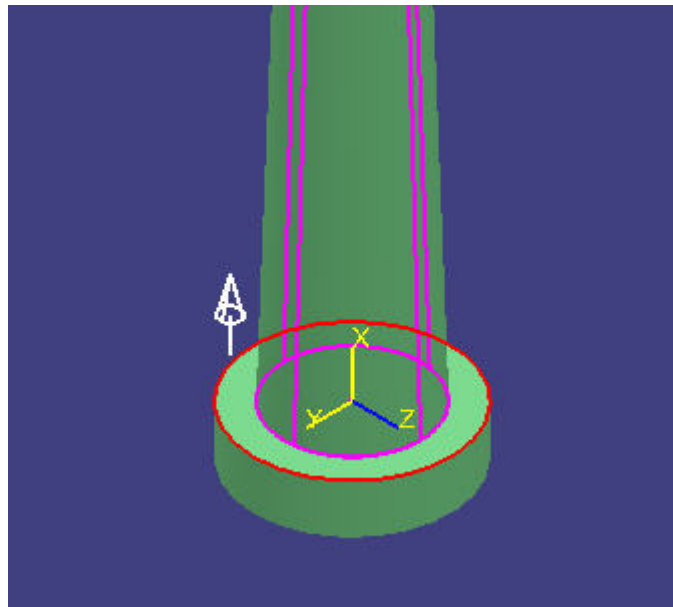23. Your view should resemble the following graphic.
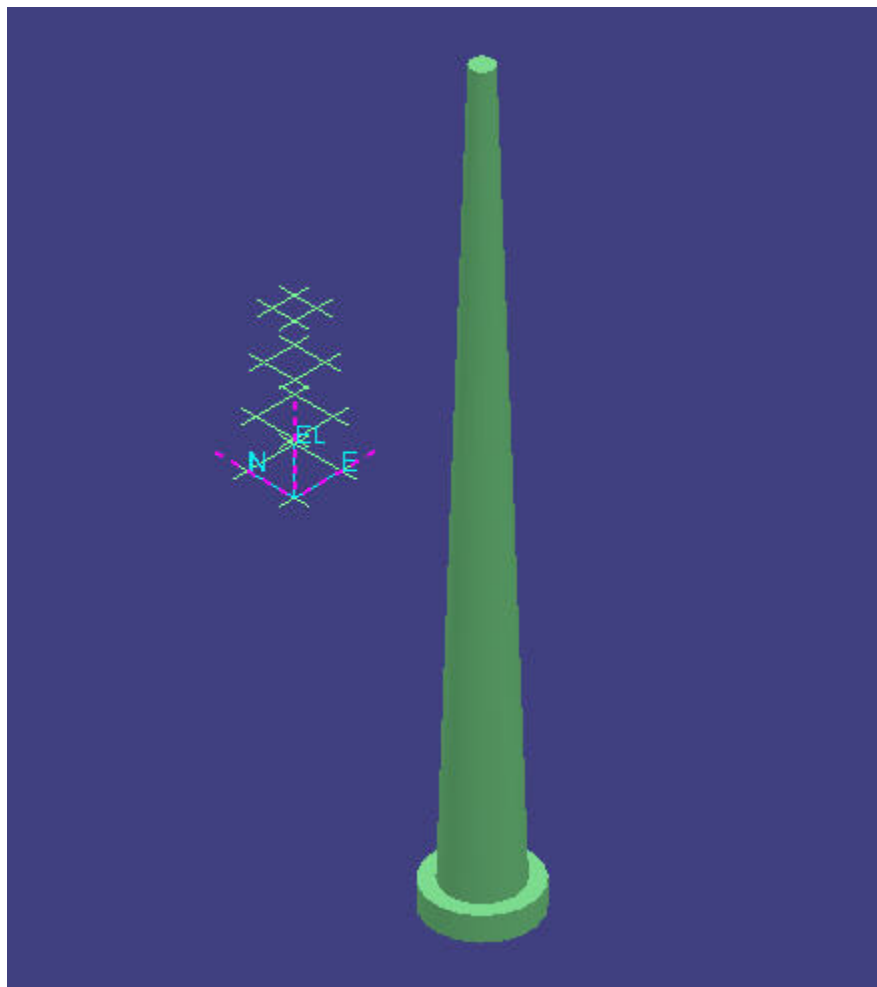
24. Select *Concrete Tower* from the workspace explorer. From the smart toolbar choose New Relationship. Choose "Mate" as the new relationship.


25. Move the mouse over the *Concrete Tower.* Your view should now resemble the following graphic.
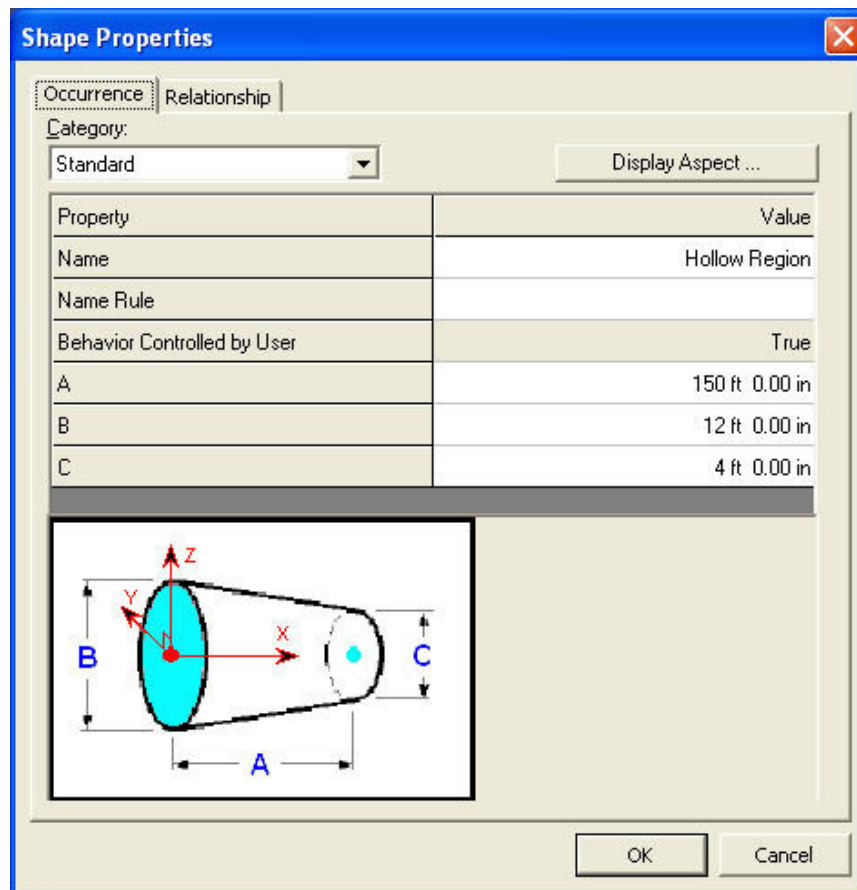
26. Move your mouse over the *Tower Objects* and it should highlight *Base Concrete* and click the left mouse button once at the location as shown in the figure. Your view should now resemble the following graphic.

27. After selecting the highlighted plane, Mate Relationship will apply to the *Base Concrete* and *Concrete Tower*. Your view should resemble the following graphic.
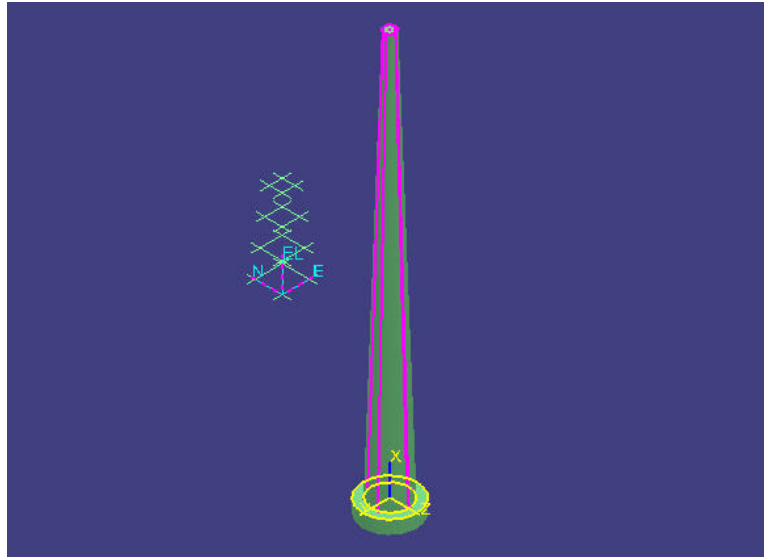
28. Select *RtCircularCone001* from the Shapes dialog. Choose *Tower Objects* as the parent of the Shape.
29. In the Shape Properties dialog, set A to 150 ft, B to 12 ft and C to 4ft. Name the *RtCircularCone001* as *Hollow Region*. Press OK.
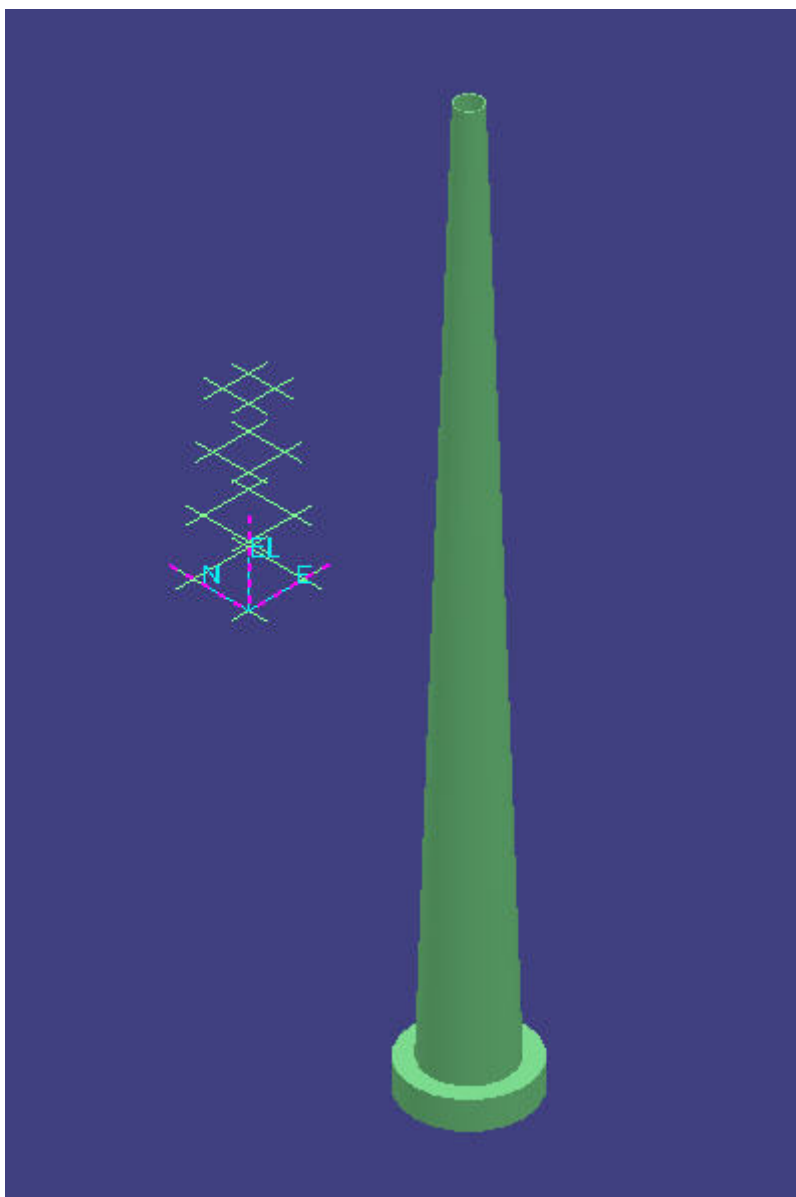
30. Press the right arrow key once.

31. Place the Shape at E: -50 ft, N: -90 ft and EL: 5ft.

32. In the ribbon bar, change the *Add Shape* operation to a *Subtract Shape* operation.
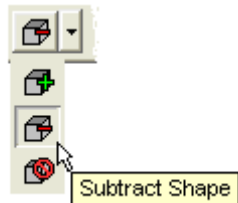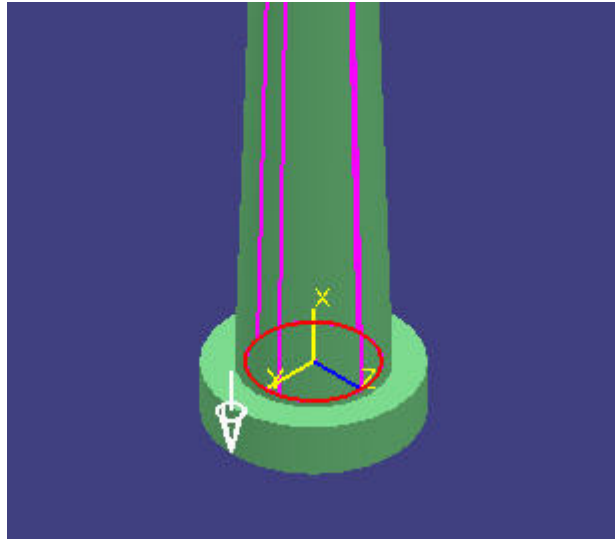

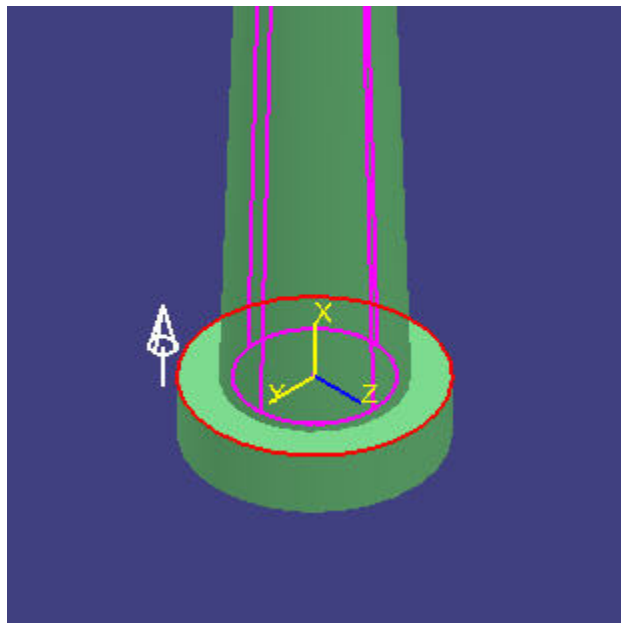33. Your view should resemble the following graphic.

34. Select *Hollow Region* from the workspace explorer. From the smart toolbar choose New Relationship. Choose "Mate" as the new relationship.


35. Move the mouse over the *Hollow Region.* Your view should now resemble the following graphic.

36. Move your mouse over the *Tower Objects* and it should highlight *Base Concrete* and click the left mouse button once at the location as shown in the figure. Your view should now resemble the following graphic.

37. After selecting the highlighted plane, Mate Relationship will apply to the *Base Concrete* and *Hollow Region*. Your view should resemble the following graphic.
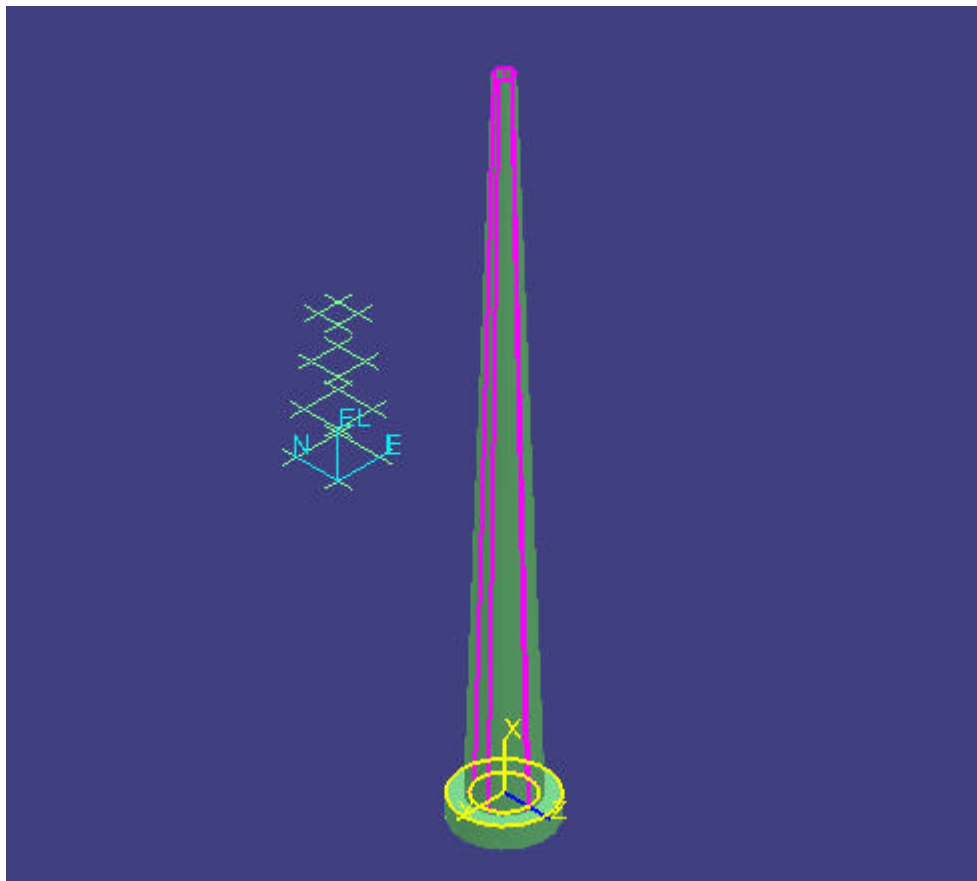
38. Your workspace hierarchy should resemble the following graphic.

39. File Save.