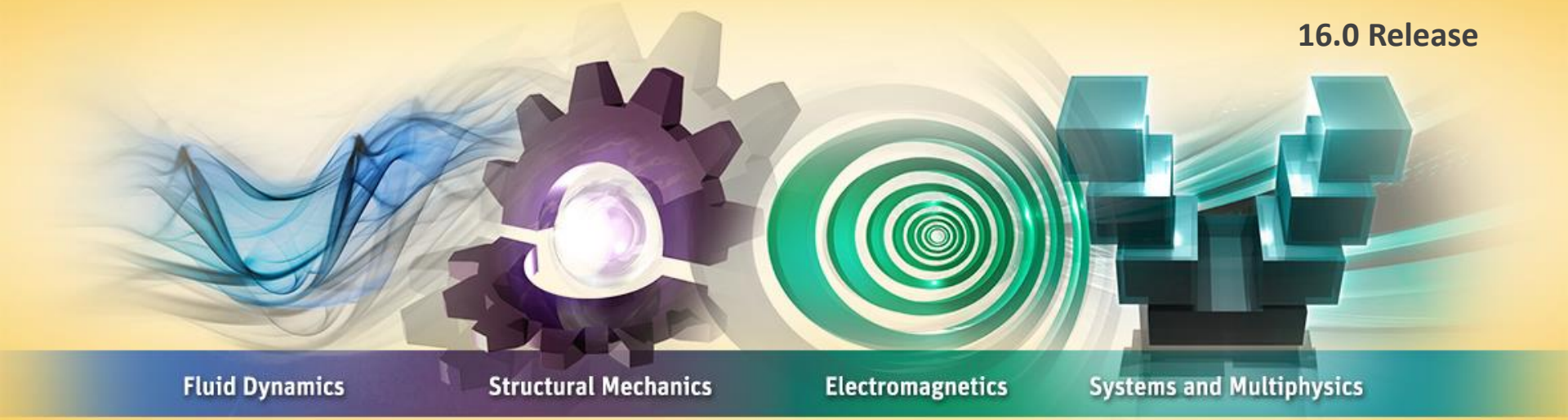
Workshop 3.4
Named Selections + Object generator

16.0 Release



Introduction to ANSYS Mechanical

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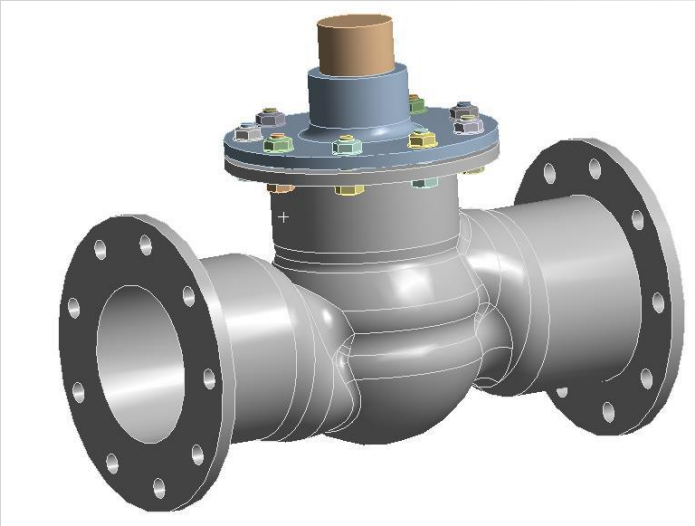
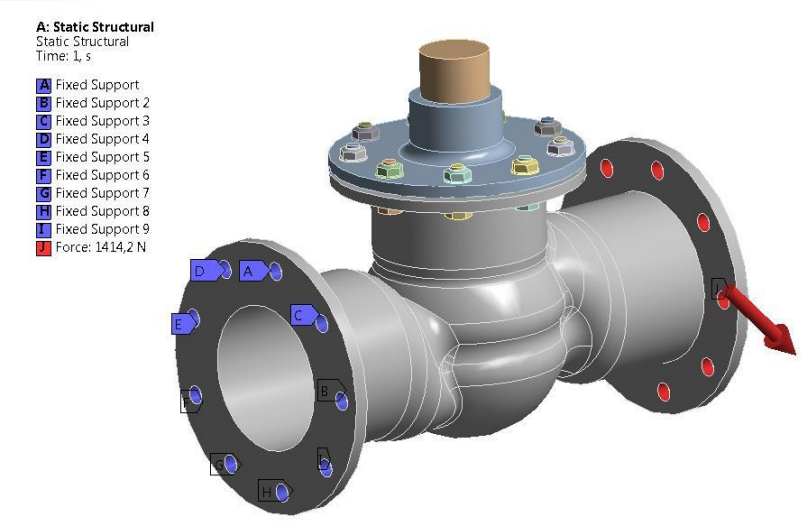
Goals

The goal of this workshop is to use several techniques to create named selections and use the object generator in order to minimize the time spent on preprocessing.



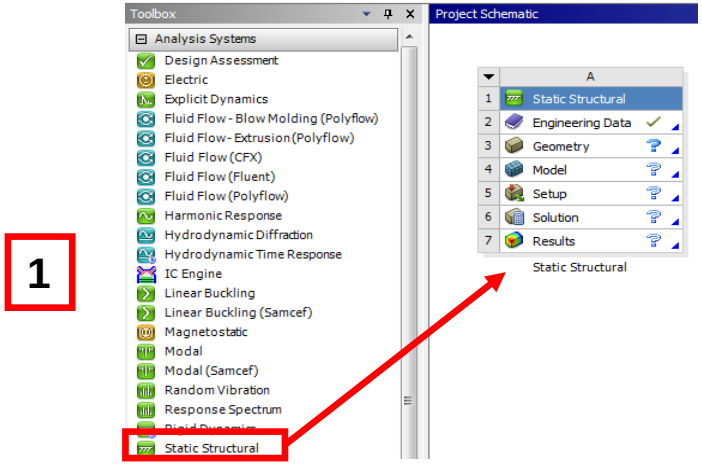


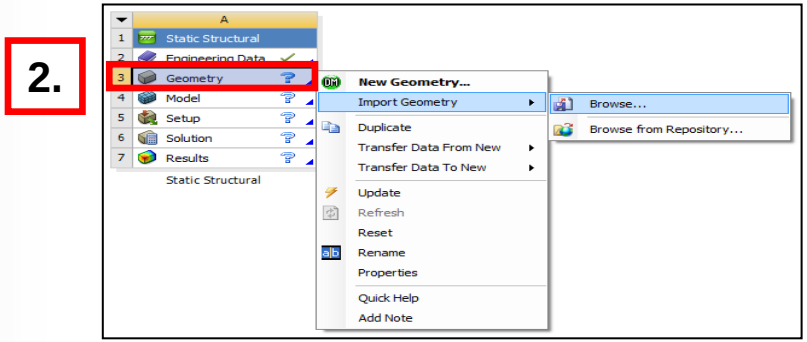
Project Schematic

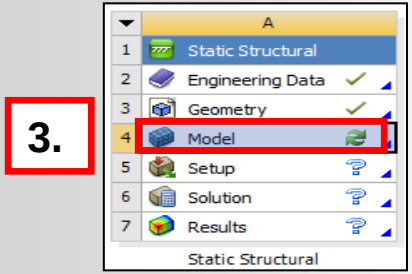
1. Double click “Static Structural” analysis type to add a new system.

2. From the “Geometry” cell, RMB > “Import Geometry” and browse to: “Valve_RM_20130113.stp”.

3. Double click the “Model” cell to start Mechanical.

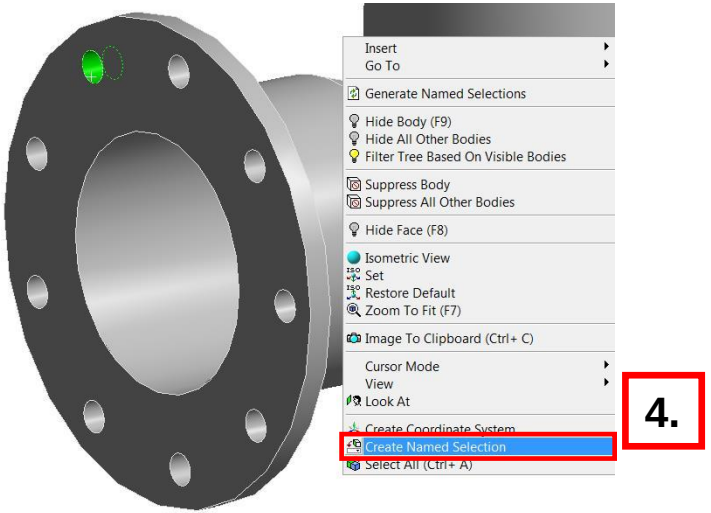


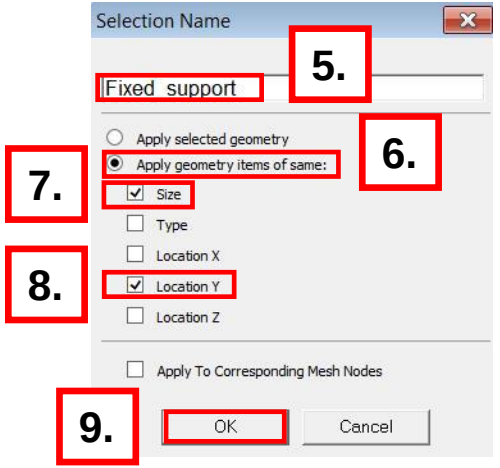


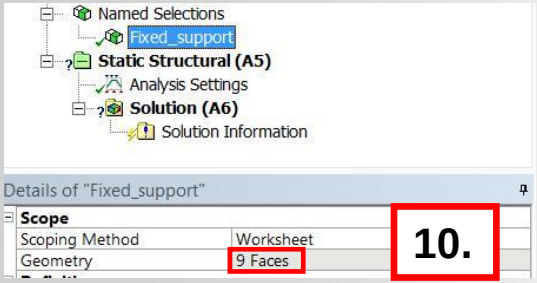


Preprocessing

4. Select one of the holes in the –Y direction RMB > Create Named Selection.
5. In the Selection dialog enter the name “Fixed_support”.
6. Choose “Apply geometry items of same:”.
7. Check the box “Size”.
8. Check the box “Location Y”.
9. Click the “Ok” button.
10. In the tree, highlight the new named selection “Fixed_support” and note the scope of the selection is 9 faces.



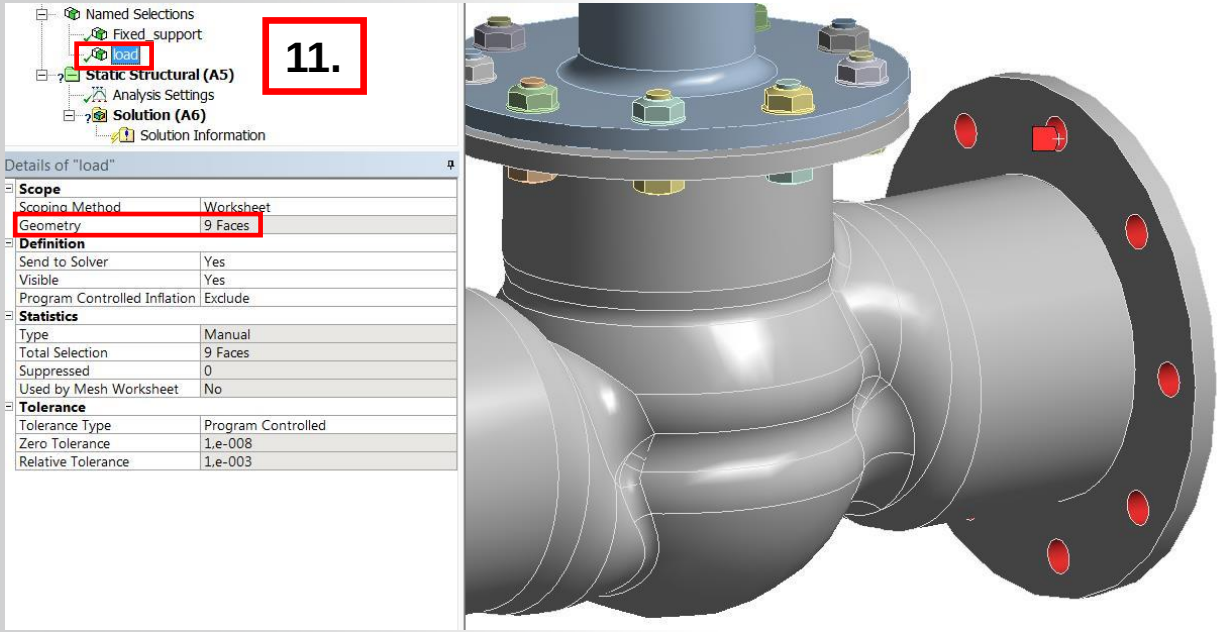




. . . Preprocessing

We will create the different named selections.

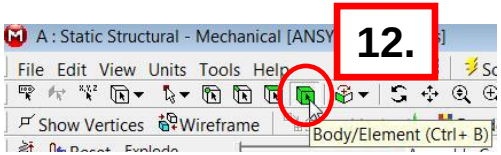
11. **Repeat the operations 4 -> 10 for the other side of the geometry and name the new named selection “load”**

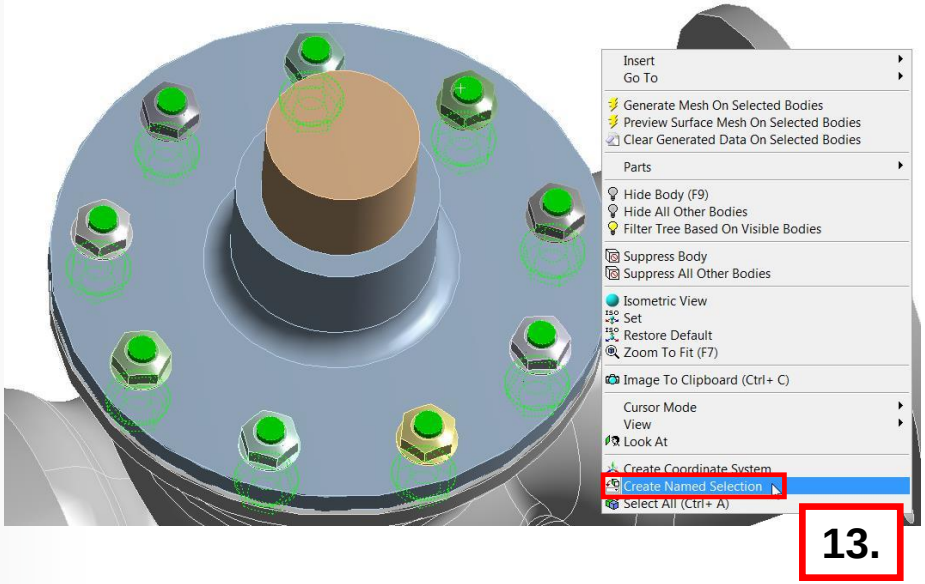


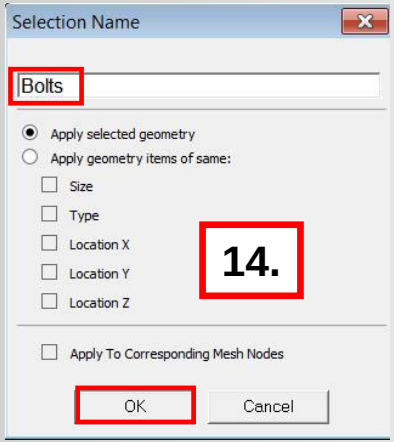
. . . Preprocessing

12. Choose the Body selection mode
13. Select all the bolts > RMB > Create Named Selection

14. In the Selection dialog enter the name “Bolts” and click “OK”

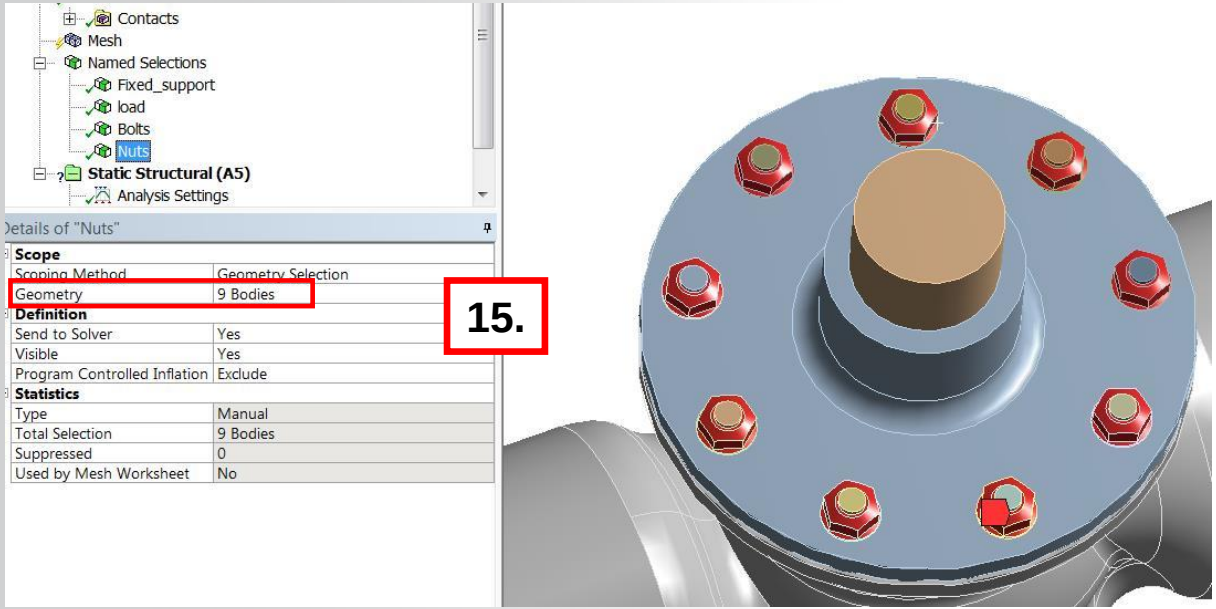






. . . Preprocessing

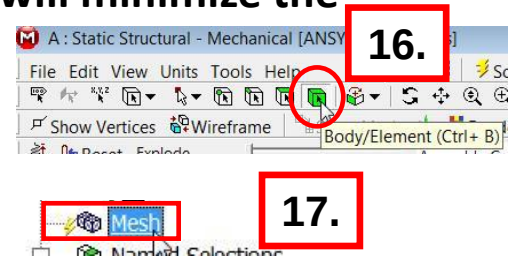
15. Repeat the operations 12, 13, 14 for the other nuts name the new named selection “Nuts”

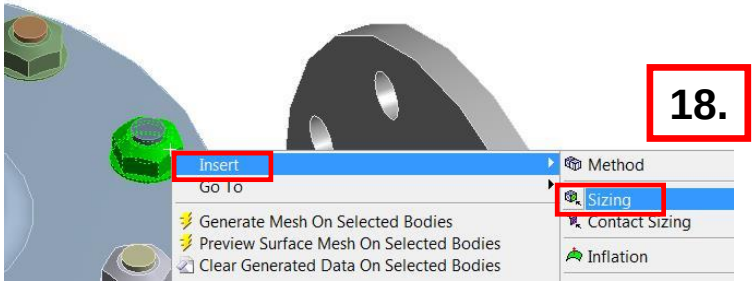


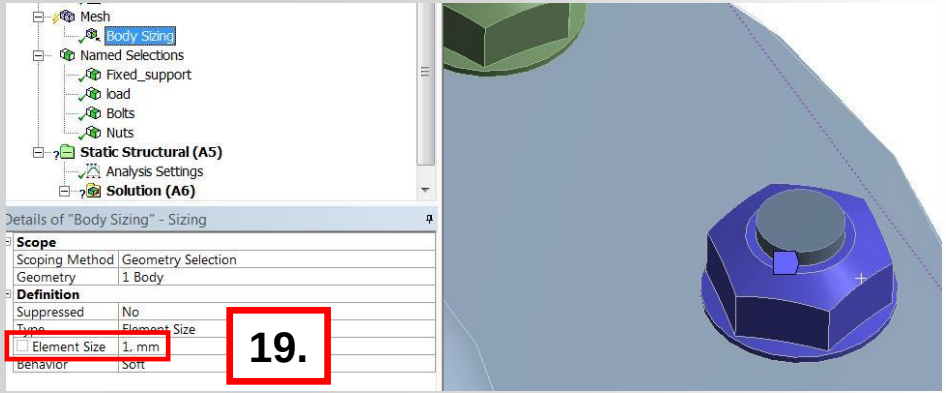
. . . Preprocessing

With the help of the named selection and the object generator we will minimize the time of the mesh setup.

16. **Choose the Body selection mode**
17. **Go on Mesh section by clicking on the mesh branch in the tree**
18. **Select one of the nuts > RMB > insert > Sizing**
19. **Choose 2 mm for the size of the element**



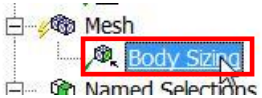




. . . Preprocessing

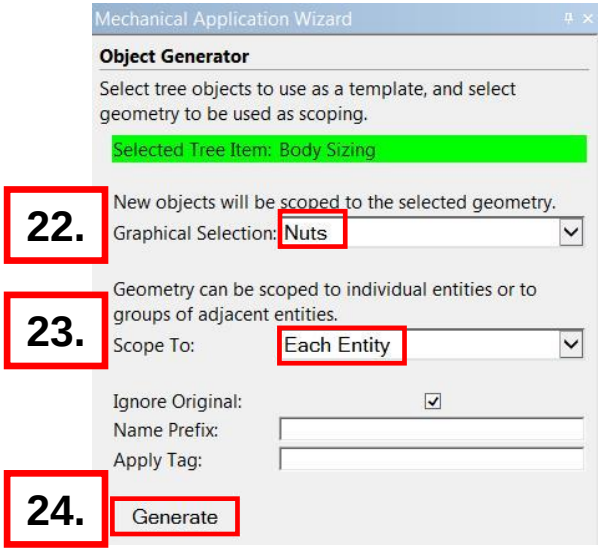
20. Select the Body sizing
21. Select the object generator tools

21.



20.

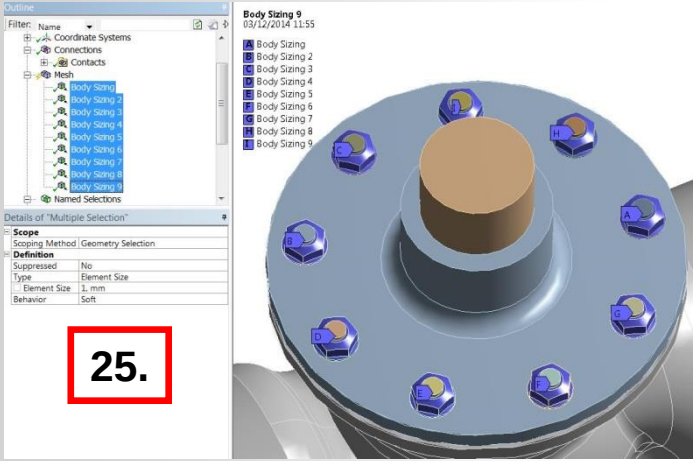
22. Change “Graphical Selection” to “Nuts”
23. Change “Scope to” to “Each Entity”
24. Click on Generate
25. The result is an automatic creation of a “Body sizing” for each nut



22.

23.

24.



25.

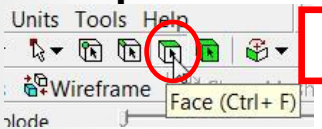
. . . Preprocessing

26. Repeat the operations 16 -> 25 for the mesh of the bolts

Environment

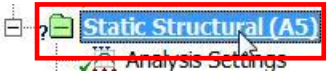
We will minimize the time of the boundaries setup with the help of the named selection and the object generator.

27. Choose the Face selection mode



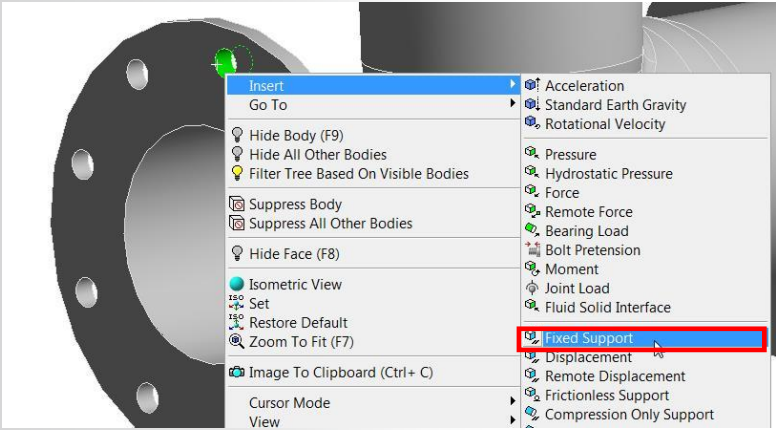
27.

28. Go on Loads section by clicking on the static structural branch in the tree



28.

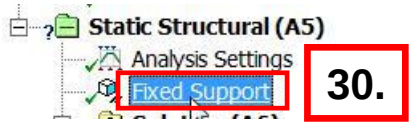
29. Select one hole on the –Y direction > RMB > insert > Fixed support

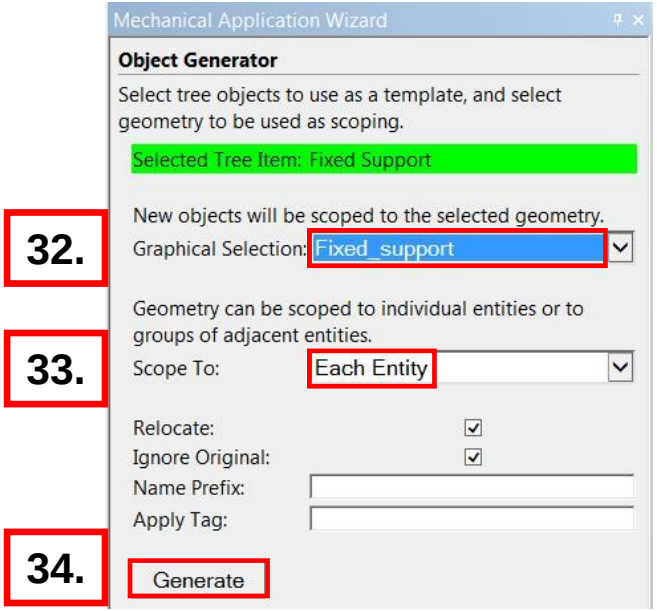


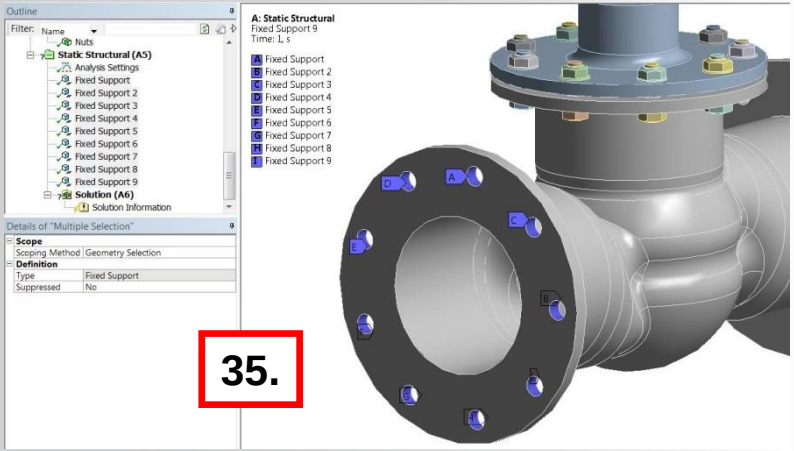
29.

. . . Environment

30. Select the fixed support
31. Select the object generator tools
32. Change “Graphical Selection” to “Fixed_support”
33. Change “Scope to” to “Each Entity”
34. Click on Generate
35. The result is an automatic creation of a “fixed support” for each holes, which can help on post processing for reaction forces

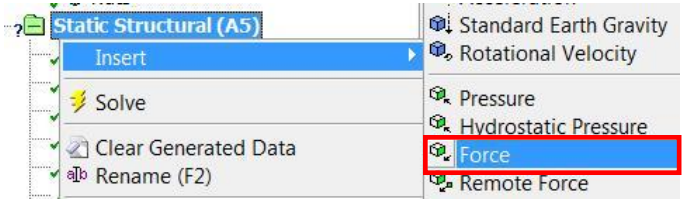




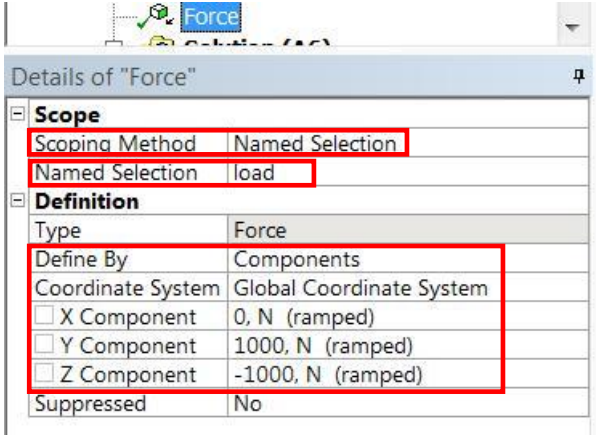


. . . Environment

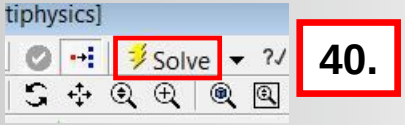
36. RMB on static structural > insert > Force



37. In the details view choose for “Scoping method”: “Named selection”
38. Choose for “Named selection”: “Load”
39. Change “Defined by” to “component” and put 1000 N for Y direction and -1000N for Z direction

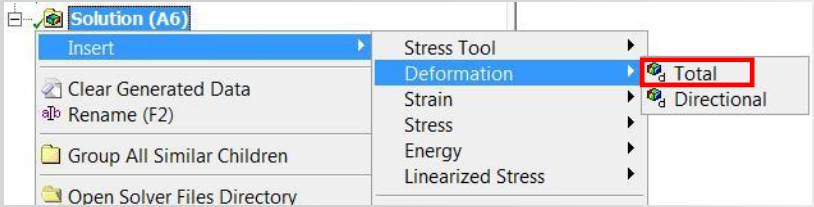


40. Launch the solution by clicking on solve



Results

41. Highlight the Solution branch, RMB > Insert > deformation > Total



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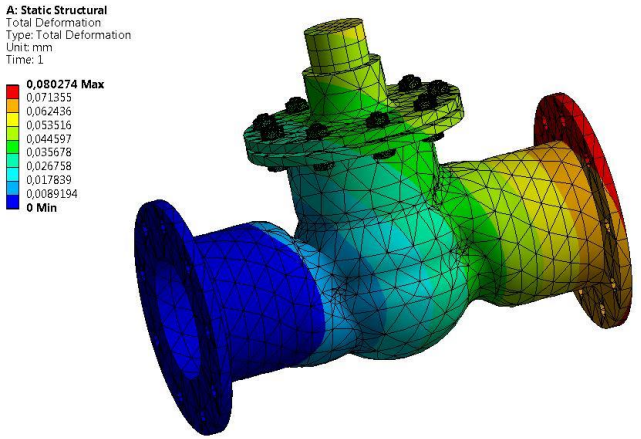
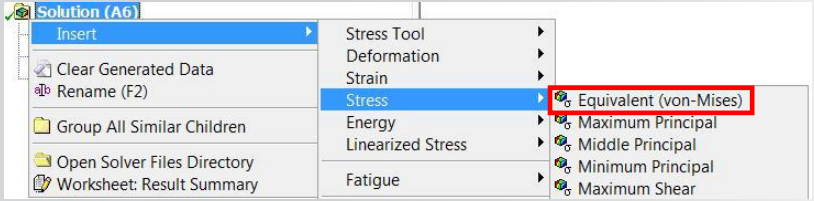


42. Highlight the Solution branch, RMB > Insert > stress > Equivalent



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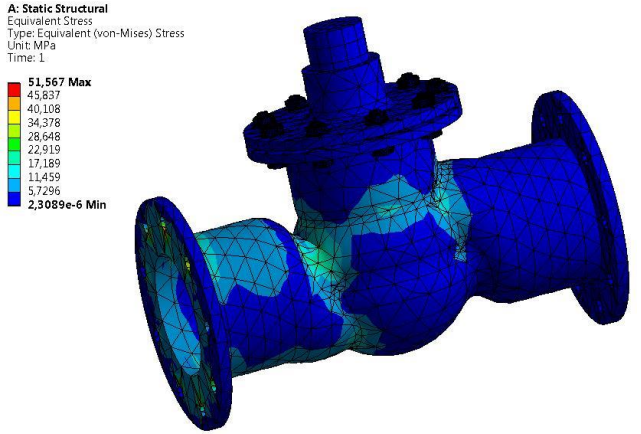

Go further!

If you finish this workshop and find yourself with extra time, you could try the following steps:

1. Try to use named selection and object generator on the post processing in order to be quicker on result demands.