

Ansys Mechanical Beyond the Basics

Module 01 Student Reference Guide: Improved Modeling Approach

Release 2021 R2

/ Module 01: Summary of Our Approach So Far

- Complete three-dimensional solid geometry of the assembly is included. Can we reduce the model size and, in doing so, gain better fidelity at the same time?
- Bonded contact everywhere. Can we achieve higher fidelity by including some nonlinear contact?
- Solid body representation of bolts and nuts. Can we increase solution efficiency by replacing them with simplified beam representations?
- All parts are meshed independently. Can/should we eliminate contact regions by connecting the mesh between certain parts of the assembly?

/ Module 01: Points to Consider

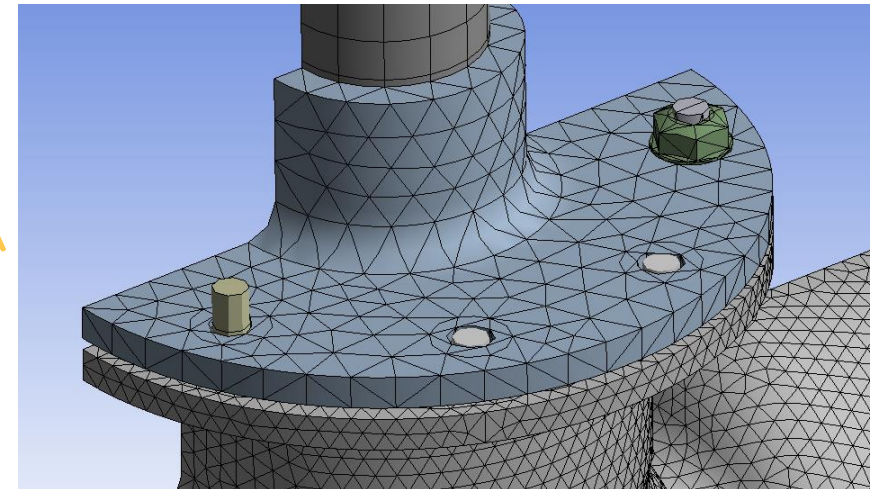
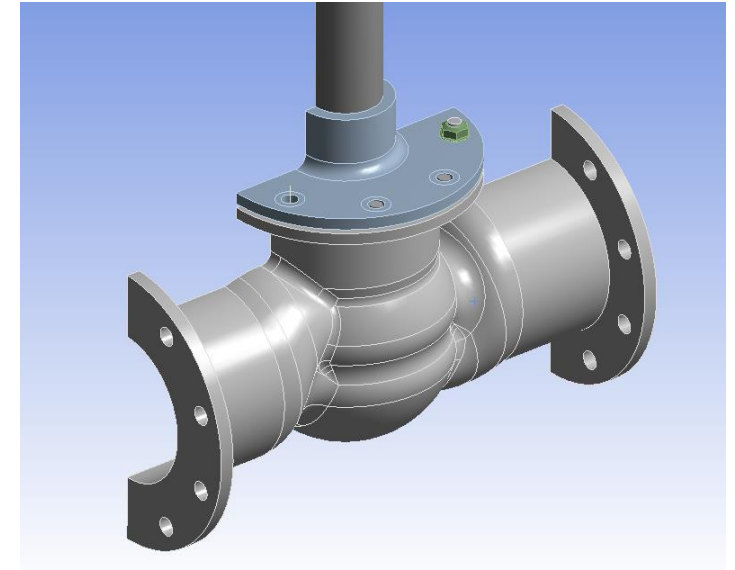
- What components should I model and why?
 - Reflective symmetry
 - Simplified bolt bodies / beams for bolts
 - Shared topology
- How do I treat the interfaces among the components?
 - No-separation and/or frictional contact
 - Body-body beams
- Can I make more realistic modeling assumptions?
 - Boundary conditions
 - Symmetry
 - Bolt preload
- How will I validate the model and the design?
 - Contact results
 - Beam / bolt results
 - Averaged / unaveraged stresses
 - Path and surface plots

Leads into M10: Further
Geometry Considerations
and M12: Enhanced Mesh
Techniques

Leads into M11: More
Realistic Connections

Leads into M13:
Additional Analysis
Settings, Loads, and
Supports

Leads into M14:
Expanded Results and
Validation



/ Module 01: Reference Material

For reflective symmetry, each of the following must exhibit symmetry about the mirror plane:

- *Geometry*
- *Material Properties*
- *Loads*
- *Supports*

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