

Shawn Catlin

Mallett Technology, Inc

ANSYS WORKBENCH 11.0

TIPS AND TRICKS

Engineering Data Library

- ◆ Creating the XML Material Data File
 - ◆ Select the engineering data icon
 - ◆ Enter data for first material
 - ◆ Export data to the XML

The image displays three screenshots from the ANSYS Workbench [ANSYS Multiphysics] interface, illustrating the process of creating an XML material data file. Red arrows and numbers (1, 2, 3) indicate the sequence of steps.

Step 1: The top screenshot shows the main interface with the 'Engineering Data' icon highlighted in the toolbar. A red arrow points to this icon, labeled with a large red '1'.

Step 2: The middle screenshot shows the 'Export' menu open, with the option 'Export Engineering Data to a Library ...' selected. A red arrow points to this option, labeled with a large red '2'.

Step 3: The bottom screenshot shows the 'Export Engineering Data to a Library' dialog box. The 'Save in' field is set to 'Materials', and the 'File name' is 'Workbench_Samples.xml'. A red arrow points to the 'Save' button, labeled with a large red '3'.

The bottom screenshot also shows the 'Engineering Data Project' tree on the left, with 'Materials (1)' expanded, showing 'Structural Steel' and 'Convections (1)'. The 'Properties' panel on the right shows material properties for 'Structural Steel'.

| Property | Value |
|-------------------------------|-----------------------------|
| Young's Modulus | 2.9008e+007 |
| Poisson's Ratio | 0.3 |
| Density | 0.28383 lbm/in ³ |
| Thermal Expansion | 6.6667e-006 |
| Alternating Stress | |
| Strain-Life Parameters | |
| Tensile Yield Strength | 36259 psi |
| Compressive Yield Strength | 36259 psi |
| Tensile Ultimate Strength | 66717 psi |
| Compressive Ultimate Strength | 0 psi |

Thermal Properties:

| Property | Value |
|----------------------|------------------------|
| Thermal Conductivity | 8.0917e-004 BTU/s-in-F |
| Specific Heat | 0.10358 BTU/lbm-F |

Electromagnetics Properties:

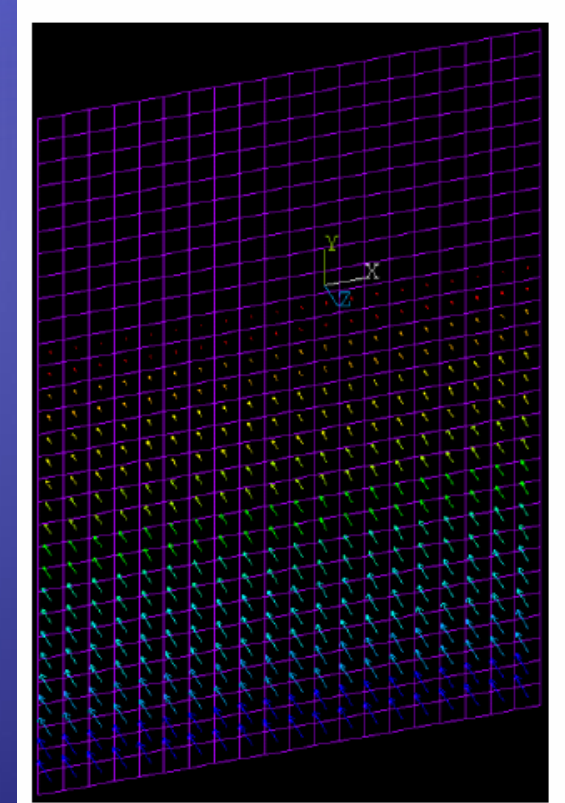
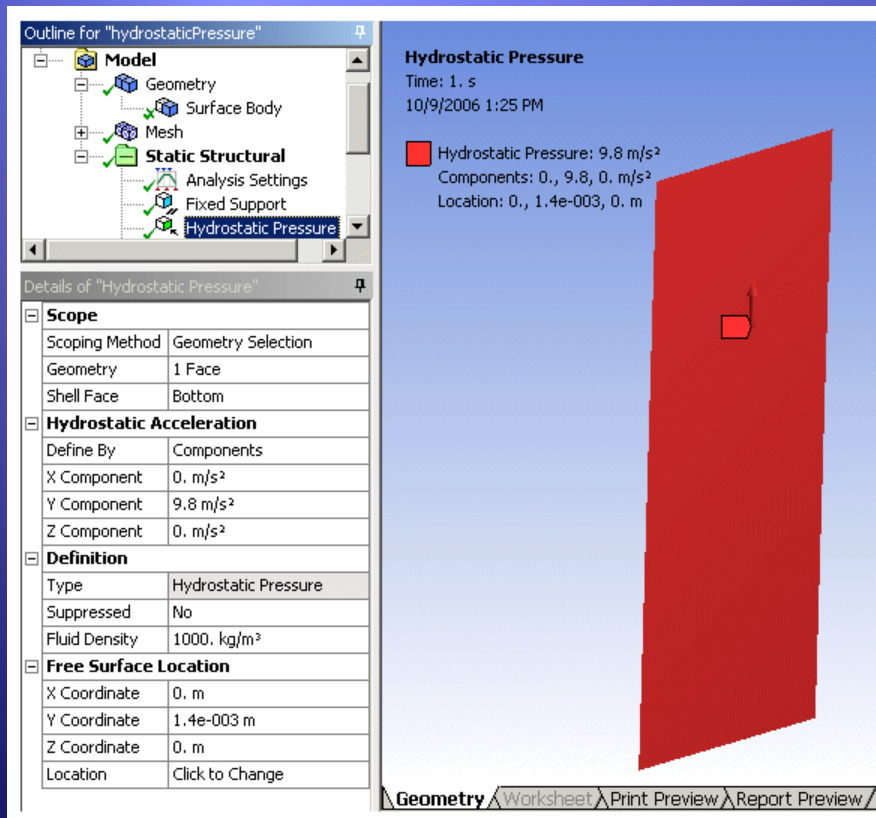
| Property | Value |
|-----------------------|-----------------------|
| Relative Permeability | 10000 |
| Resistivity | 8.5256 Ohm-Cir-mil/in |

Common Workbench Files

- ◆ Workbench project database file = .wbdb
- ◆ DesignModeler database file = .agdb
- ◆ CFX-Mesh database file = .cmdb
- ◆ Simulation database file = .dsdb
- ◆ Meshing database file = .cmdb
- ◆ Engineering Data database file = .eddb
- ◆ FE Modeler database file = .fedb
- ◆ ANSYS AUTODYN database file = .ad
- ◆ DesignXplorer database file = .dxdb
- ◆ BladeGen database file = .bgd
- ◆ Advanced Meshing database file = .prj

Hydrostatic Pressure

- ◆ A hydrostatic pressure load simulates pressure that occurs due to fluid weight.



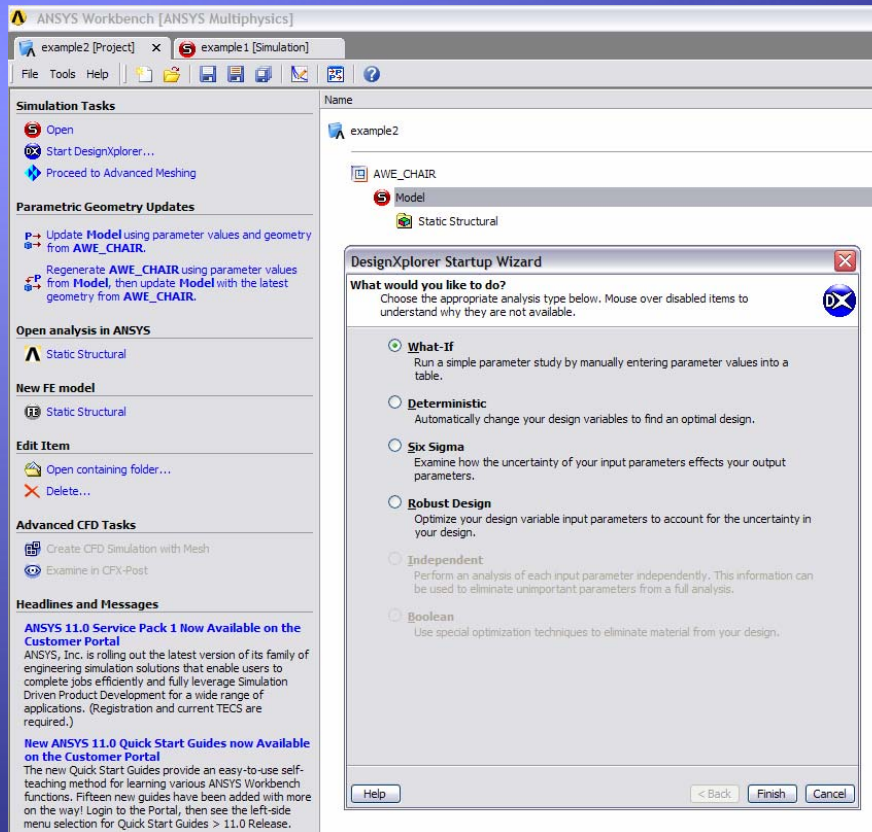
Elastic Support

- ◆ Allows one or more faces or edges to move or deform according to a spring behavior.

| Details of "Elastic Support" | |
|------------------------------|------------------------|
| [-] Scope | |
| Scoping Method | Geometry Selection |
| Geometry | 1 Face |
| [-] Definition | |
| Type | Elastic Support |
| Suppressed | No |
| Foundation Stiffness | 0. lbf/in ³ |

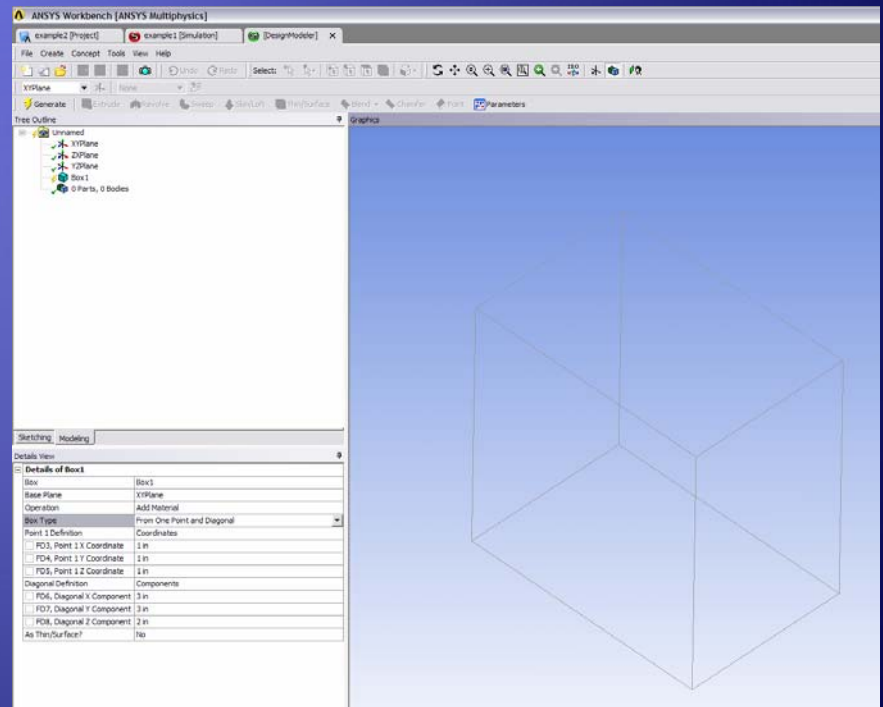
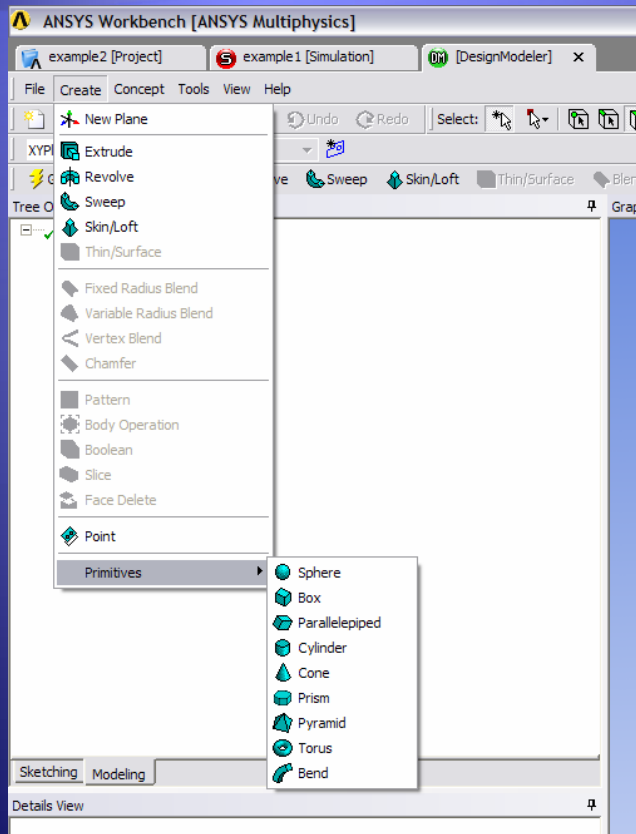
DesignXplorer – What-If

- ◆ Run a simple parameter study.



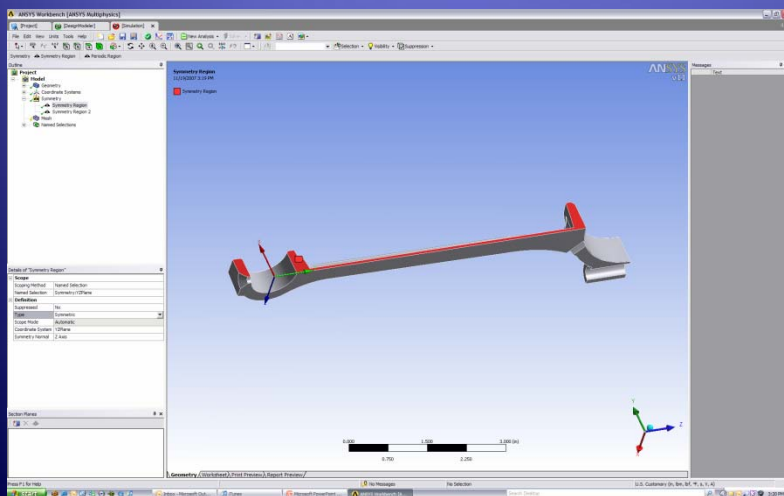
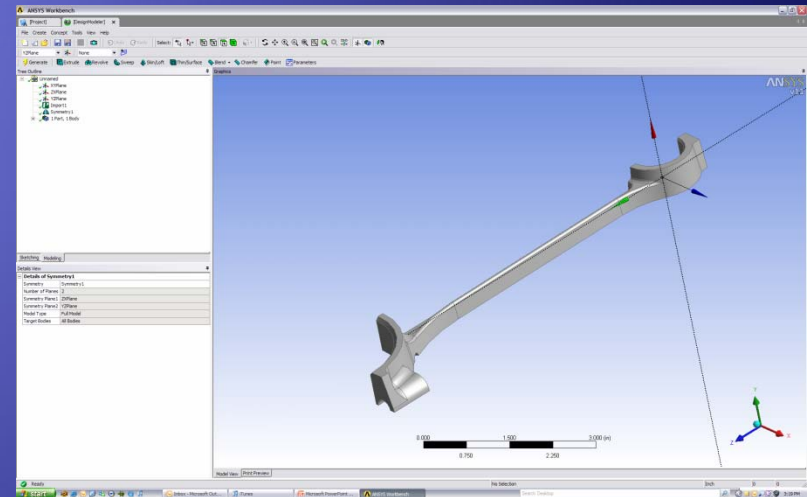
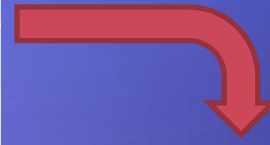
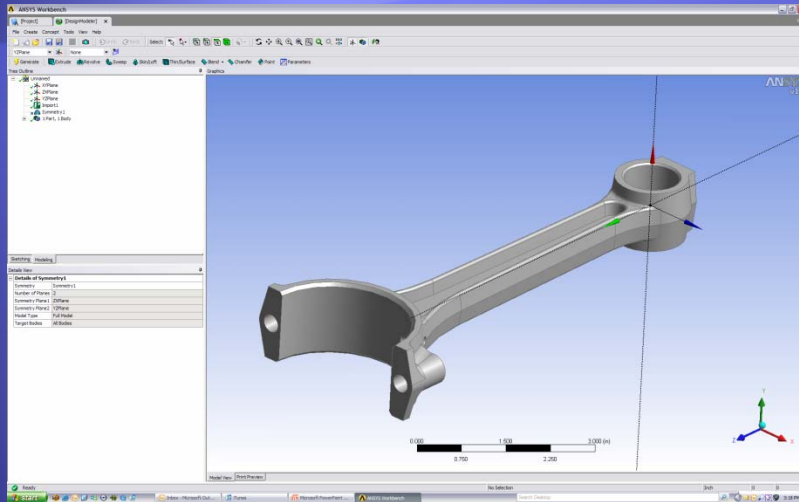
DesignModeler Primitives

- ◆ I can't get enough of those PREP7 primitives!

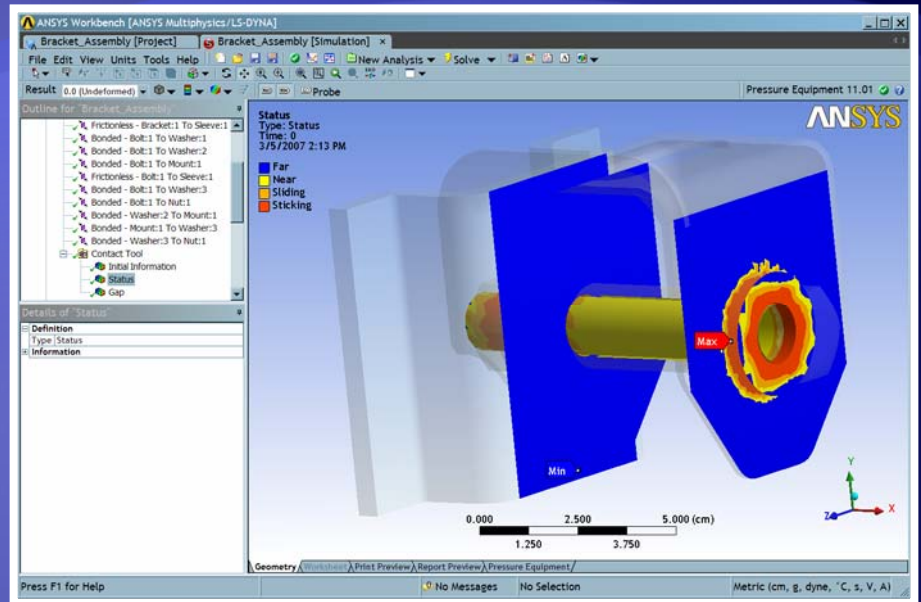
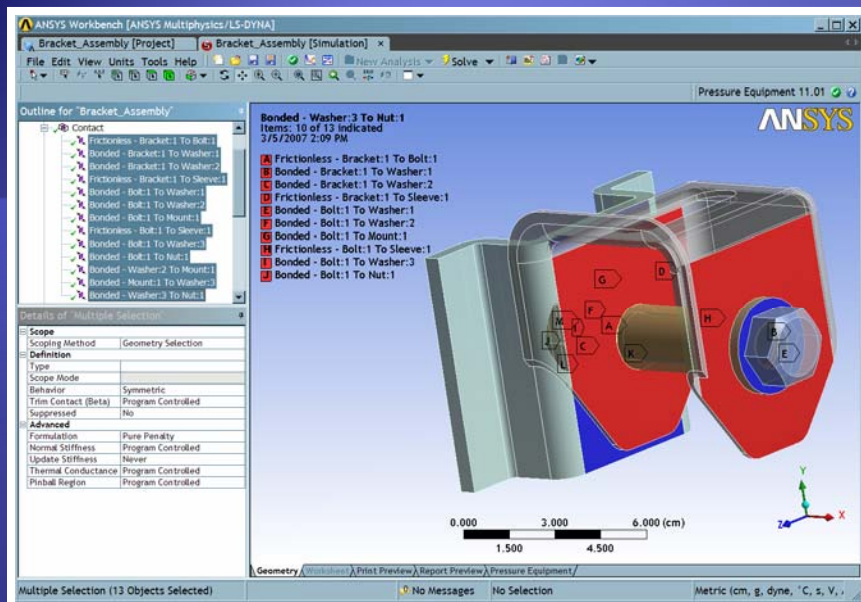


Symmetry Feature

◆ Automated Symmetry Creation and Management



Contact Detection / Management



ANSYS Workbench [ANSYS Multiphysics/LS-DYNA]

Bracket_Assembly [Project] | Bracket_Assembly [Simulation]

File Edit View Units Tools Help | New Analysis | Solve

Pressure Equipment 11.01

Contact Tool: Contact

Outline for 'Bracket_Assembly'

- Frictionless - Bracket:1 To Sleeve:1
- Bonded - Bolt:1 To Washer:1
- Bonded - Bolt:1 To Washer:2
- Bonded - Bolt:1 To Mount:1
- Frictionless - Bolt:1 To Sleeve:1
- Bonded - Bolt:1 To Washer:3
- Bonded - Washer:2 To Mount:1
- Bonded - Mount:1 To Washer:3
- Bonded - Washer:3 To Nut:1

Details of 'Initial Information'

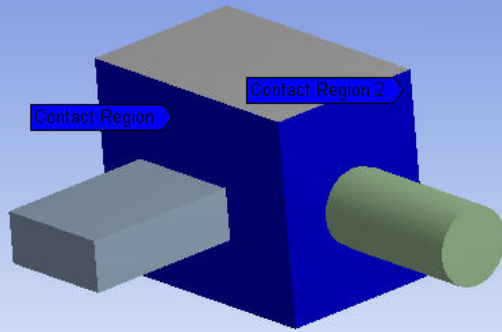
| Name | Contact Side | Type | Status | Penetration (cm) | Gap (cm) | Geometric Penetration (cm) | Geometric Gap (cm) |
|--------------------------------------|--------------|--------------|-----------|------------------|-------------|----------------------------|--------------------|
| Frictionless - Bracket:1 To Bolt:1 | Contact | Frictionless | Near Open | 0. | 4.9979e-002 | 0. | N/A |
| Frictionless - Bracket:1 To Bolt:1 | Target | Frictionless | Near Open | 0. | 5.0341e-002 | 0. | N/A |
| Bonded - Bracket:1 To Washer:1 | Contact | Bonded | Closed | 0. | 0. | 1.7764e-015 | 8.8818e-016 |
| Bonded - Bracket:1 To Washer:1 | Target | Bonded | Closed | 0. | 0. | 8.8818e-016 | 4.4409e-016 |
| Bonded - Bracket:1 To Washer:2 | Contact | Bonded | Closed | 0. | 0. | 1.7764e-015 | 8.8818e-016 |
| Bonded - Bracket:1 To Washer:2 | Target | Bonded | Closed | 0. | 0. | 8.8818e-016 | 8.8818e-016 |
| Frictionless - Bracket:1 To Sleeve:1 | Contact | Frictionless | Closed | 8.8818e-016 | 0. | 8.8818e-016 | N/A |
| Frictionless - Bracket:1 To Sleeve:1 | Target | Frictionless | Closed | 4.4409e-016 | 0. | 4.4409e-016 | N/A |
| Bonded - Bolt:1 To Washer:1 | Contact | Bonded | Closed | 2.321e-016 | 0. | 4.4409e-016 | 5.0956e-002 |
| Bonded - Bolt:1 To Washer:1 | Target | Bonded | Closed | 2.4252e-016 | 0. | 4.4409e-016 | 5.0939e-002 |
| Bonded - Bolt:1 To Washer:2 | Contact | Bonded | Closed | 1.5092e-016 | 0. | 0. | 5.0962e-002 |
| Bonded - Bolt:1 To Washer:2 | Target | Bonded | Closed | 2.7547e-016 | 0. | 0. | 5.0933e-002 |
| Bonded - Bolt:1 To Mount:1 | Contact | Bonded | Closed | 6.396e-017 | 0. | 0. | 4.9975e-002 |
| Bonded - Bolt:1 To Mount:1 | Target | Bonded | Closed | 1.3472e-016 | 0. | 0. | 4.9975e-002 |
| Frictionless - Bolt:1 To Sleeve:1 | Contact | Frictionless | Near Open | 0. | 5.0345e-002 | 0. | N/A |
| Frictionless - Bolt:1 To Sleeve:1 | Target | Frictionless | Near Open | 0. | 4.9978e-002 | 0. | N/A |
| Bonded - Bolt:1 To Washer:3 | Contact | Bonded | Closed | 2.3889e-016 | 0. | 0. | 5.0991e-002 |
| Bonded - Bolt:1 To Washer:3 | Target | Bonded | Closed | 2.4227e-016 | 0. | 0. | 5.0933e-002 |
| Bonded - Bolt:1 To Nut:1 | Contact | Bonded | Closed | 2.3867e-016 | 0. | 0. | 9.0802e-004 |
| Bonded - Bolt:1 To Nut:1 | Target | Bonded | Closed | 1.1771e-014 | 0. | 1.8822e-004 | 8.753e-004 |
| Bonded - Washer:2 To Mount:1 | Contact | Bonded | Closed | 0. | 0. | 4.4409e-016 | 8.8818e-016 |
| Bonded - Washer:2 To Mount:1 | Target | Bonded | Closed | 0. | 0. | 4.4409e-016 | 1.3323e-015 |
| Bonded - Mount:1 To Washer:3 | Contact | Bonded | Closed | 0. | 0. | 1.3323e-015 | 0. |
| Bonded - Mount:1 To Washer:3 | Target | Bonded | Closed | 0. | 0. | 8.8818e-016 | 8.8818e-016 |
| Bonded - Washer:3 To Nut:1 | Contact | Bonded | Closed | 0. | 0. | 8.8818e-016 | 8.8818e-016 |
| Bonded - Washer:3 To Nut:1 | Target | Bonded | Closed | 0. | 0. | 8.8818e-016 | 1.7764e-015 |

Geometry | Worksheet | Print Preview | Report Preview | Pressure Equipment |

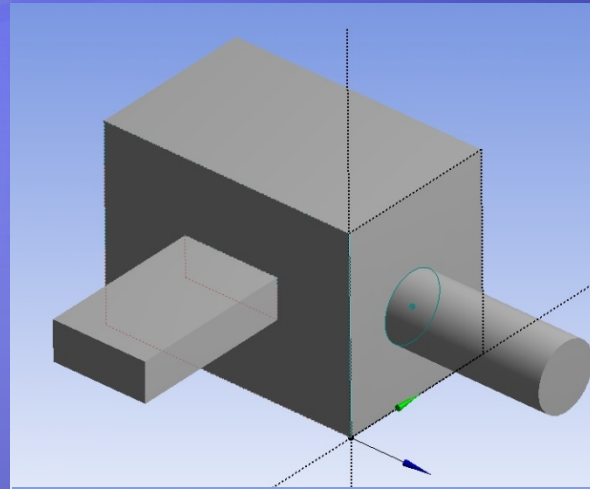
No Messages | No Selection | Metric (cm, g, dyne, °C, s, V, A)

Multi-Body Parts (glue)

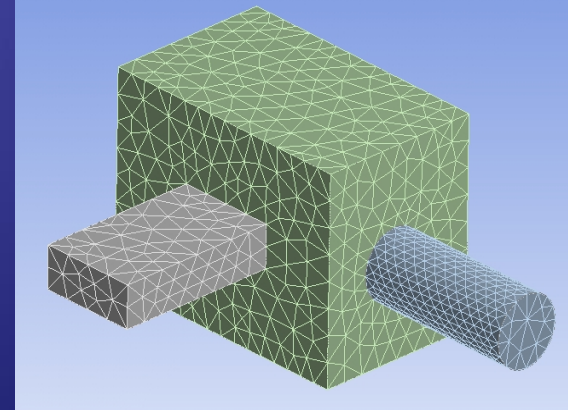
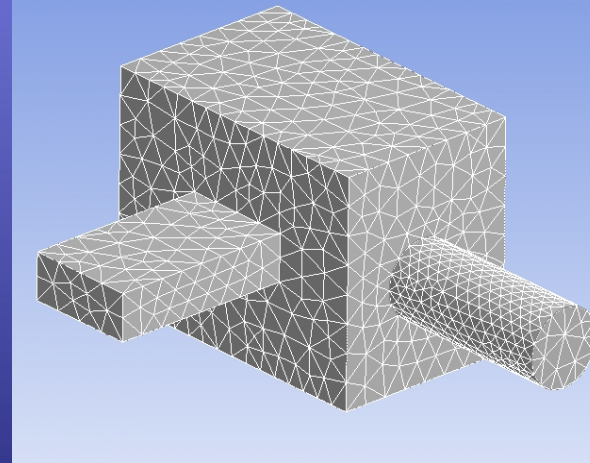
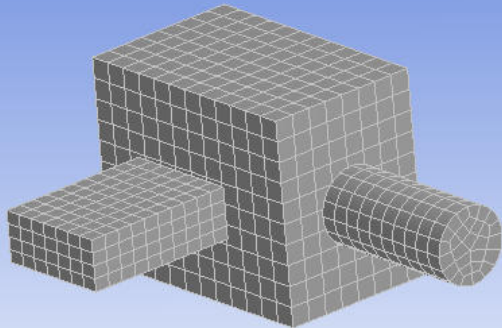
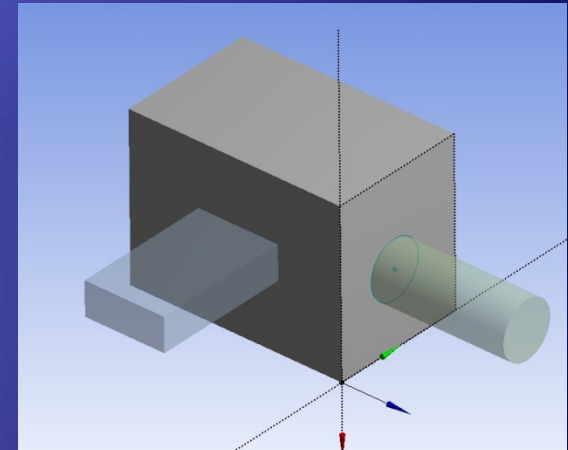
Three Bodies



One Body



Multi-Body



Multi-Body Part and Brick Elements

Demo

