



PDHonline Course G280 (15 PDH)

**AutoCAD Inventor - Solid Modeling,
Stress and Dynamic Analysis**

Instructor: John R. Andrew, P.E.

2020

PDH Online | PDH Center

5272 Meadow Estates Drive
Fairfax, VA 22030-6658
Phone: 703-988-0088
www.PDHonline.com

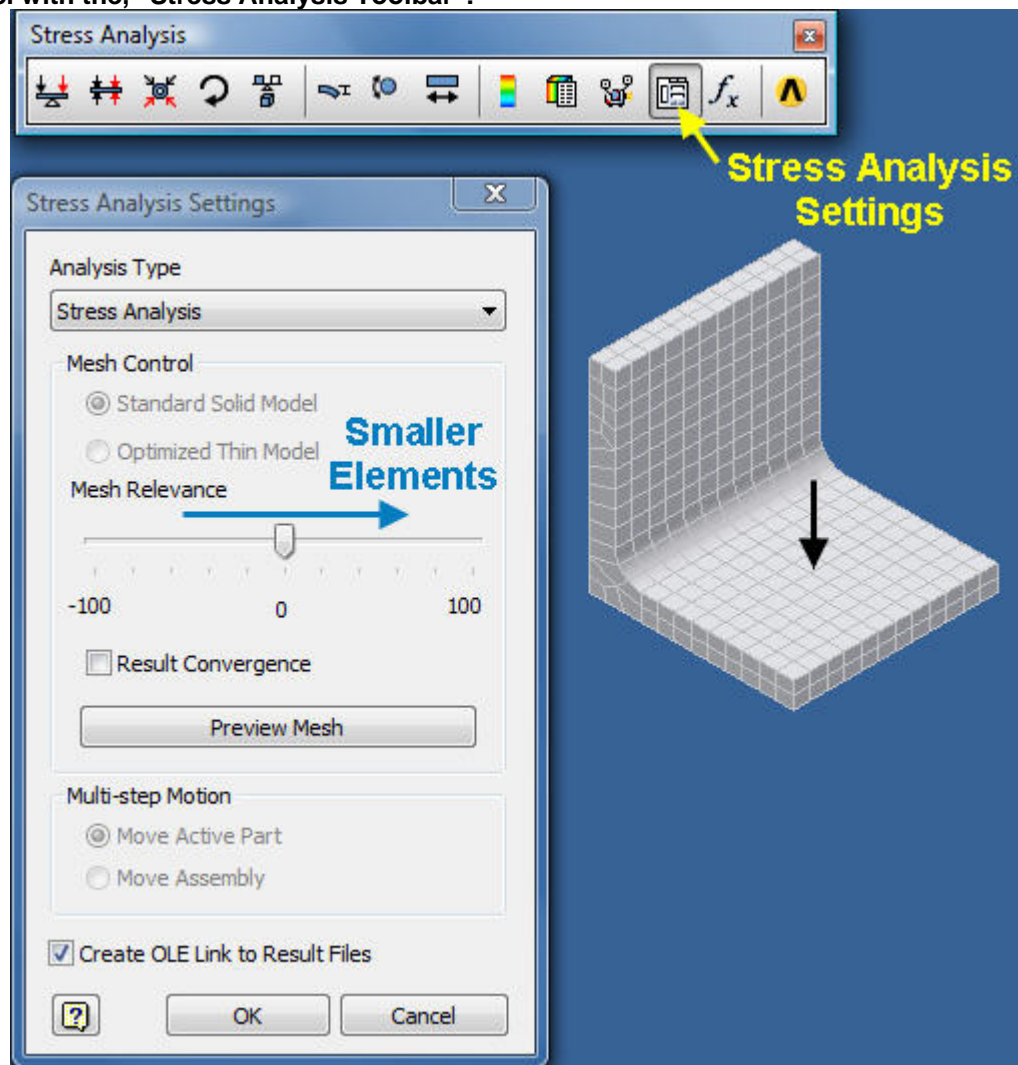
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AutoCAD Inventor - Solid Modeling, Stress and Dynamic Analysis

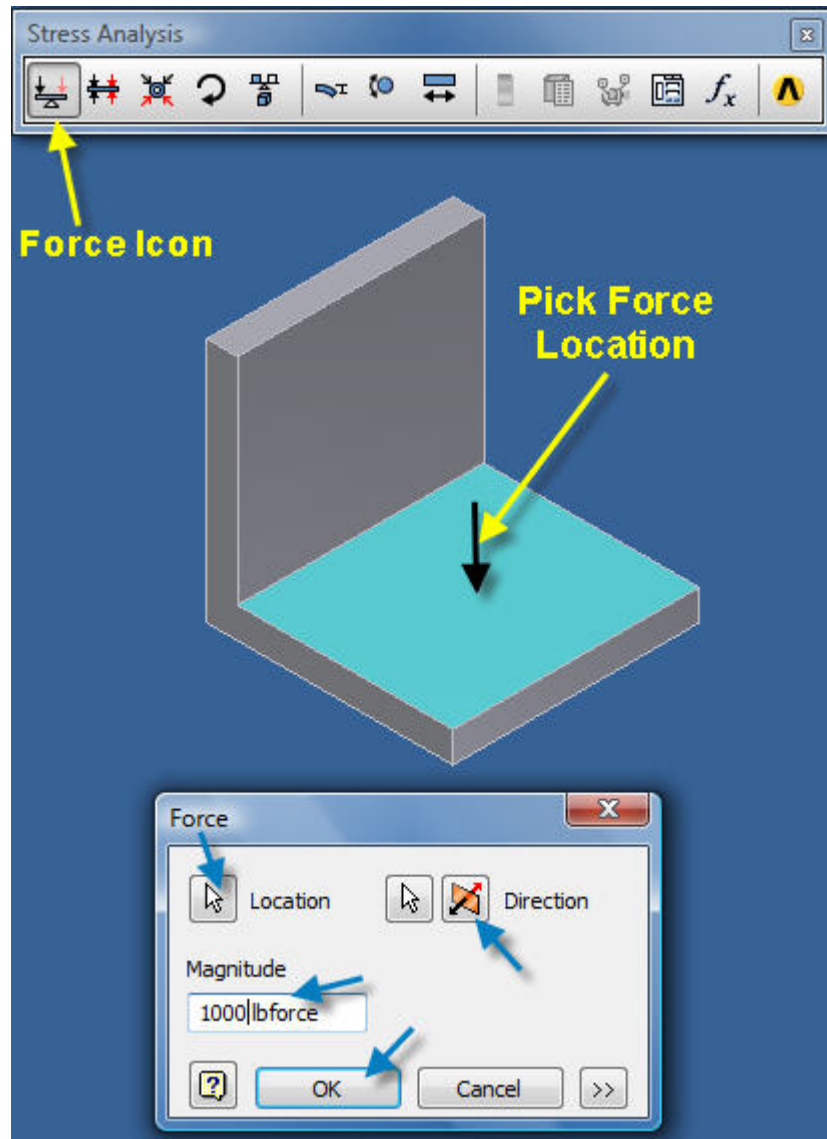
John Andrew, P.E.

Learning Objectives

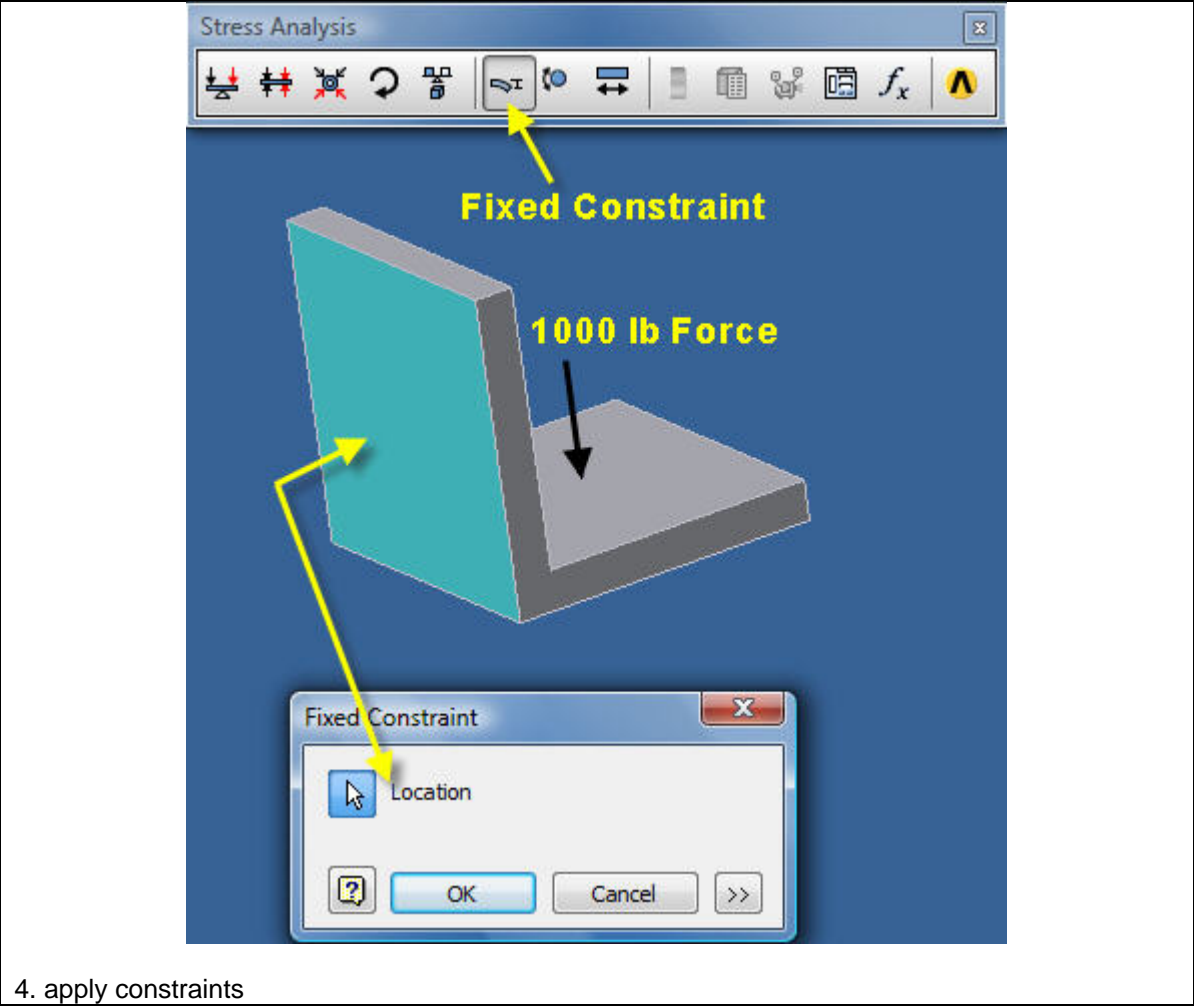
Calculate a finite element stress and deflection analysis automatically of any 3D solid model with the, "Stress Analysis Toolbar":

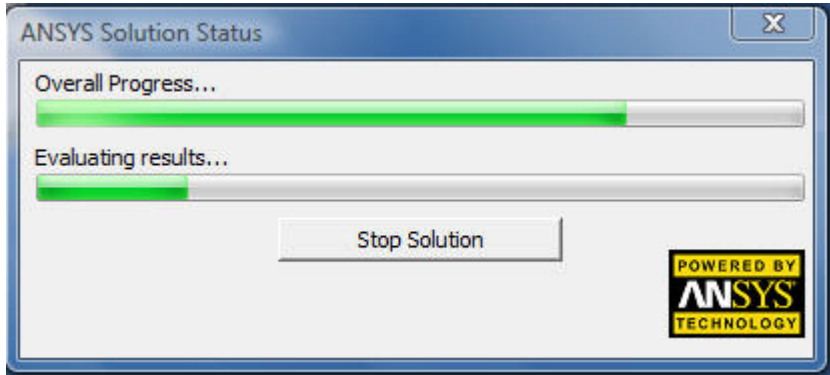
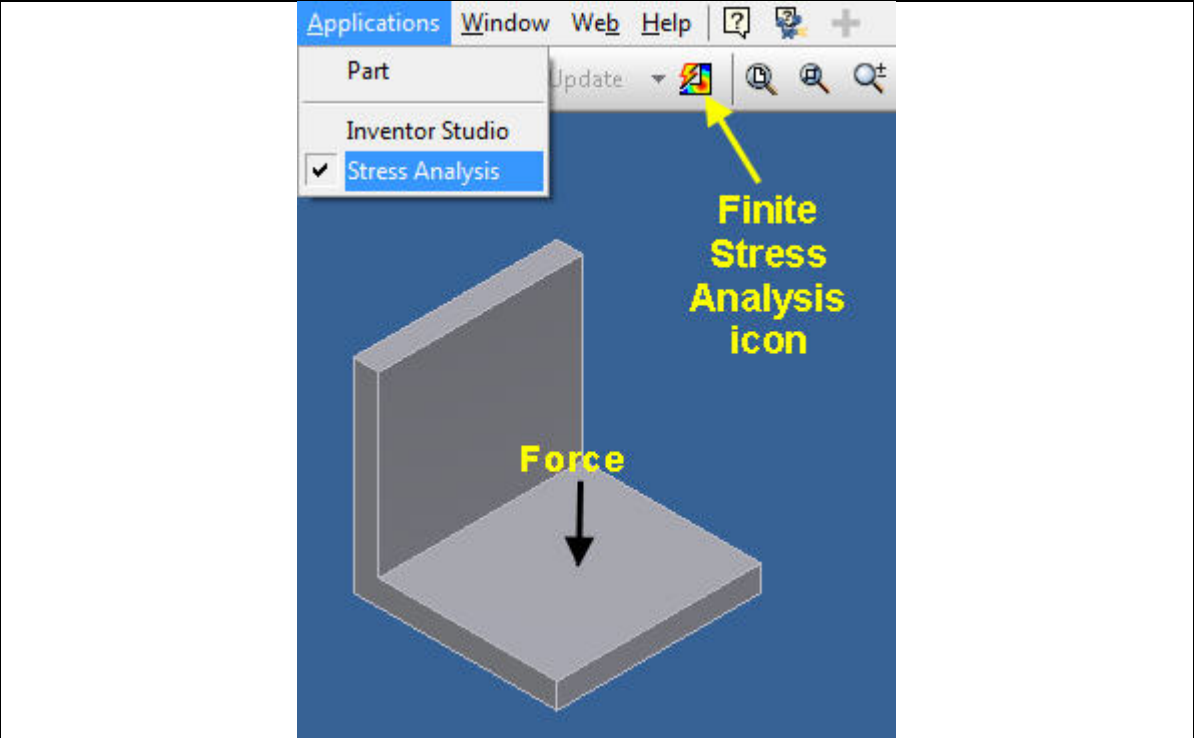


1. Create a grid with adjustable fineness on any 3D object

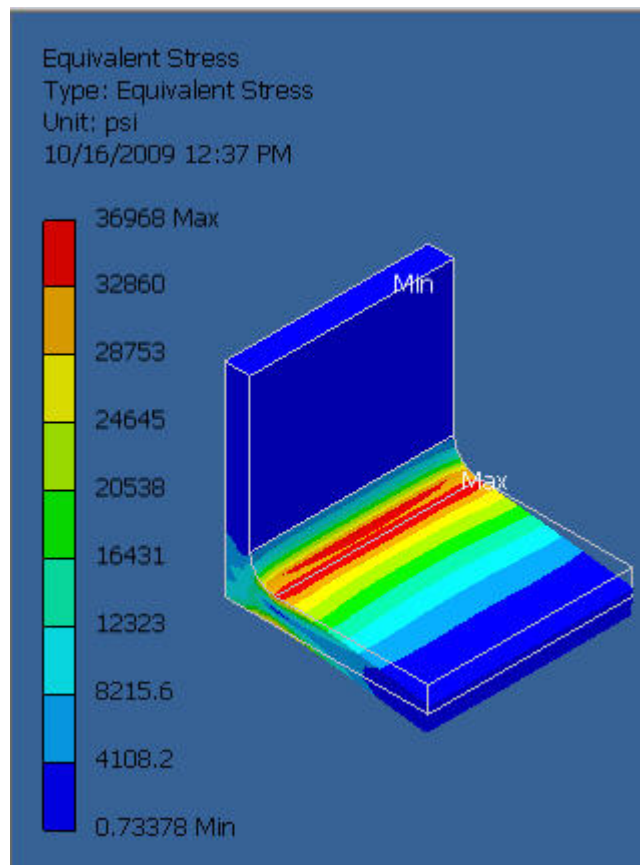
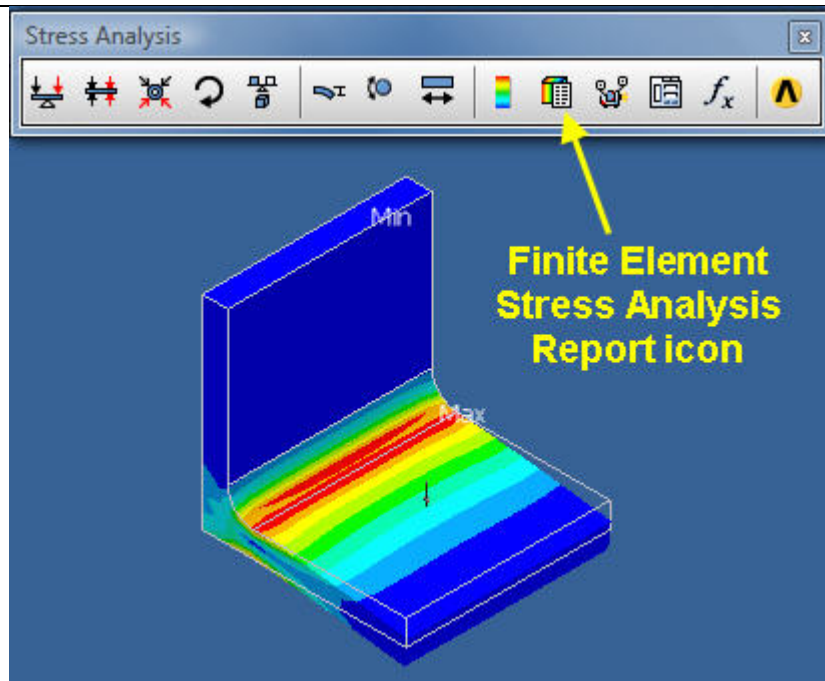


2. apply loads and pressures
3. apply moments





5. calculate a finite element stress and deflection analysis



6. adjust finite element size and re-calculate a stress and deflection analysis

**TABLE 2
Steel, Mild**

Young's Modulus	3.191e+007 psi
Poisson's Ratio	0.275
Mass Density	0.2842 lbm/in ³
Tensile Yield Strength	3.002e+004 psi
Tensile Ultimate Strength	5.004e+004 psi

**TABLE 2
Steel, Mild**

Name	Young's Modulus	3.191e+007 psi	num
Equivalen	Poisson's Ratio	0.275	e+004 psi
Maximur	Mass Density	0.2842 lbm/in ³	e+004 psi
Minimum	Tensile Yield Strength	3.002e+004 psi	psi
Deformati	Tensile Ultimate Strength	5.004e+004 psi	e-003 in
Safety Factor	0.8121	N/A	

Create: linkages that move, pistons that reciprocate, gears and cams that rotate with Inventor.

7. Create a spring and bracket assembly that extends and retracts in real time.

Click on the, "Beam, Plate, & Column Calculator" icon on the, "Design Accelerator Toolbar" and:

- 8. Select any AISC standard beam section properties
- 9. Calculate the stresses and deflections of any loaded beam automatically

Click on the, "Weld Calculator" icon on the, "Design Accelerator Toolbar" and:

- 10. Select any common type of weld
- 11. Calculate the stresses in any welded joint automatically

Click on the, "Tube & Pipe" icon on the "Part Features" toolbar to create any pipe or tubing run:

- 12. Populate a piping route by selecting: Browser > Edit > Select the nested route (Blue Lines) > Click the "Populate Route Tool" > The piping will be created automatically conforming to the current piping specification.

The student will see step-by-step illustrated examples of typical AutoCAD Inventor 2 and 3-dimensional objects to an accuracy of less than one ten thousandths of an inch:

13. parts

14. assemblies
15. dimensioned drawings
16. drawing lines, polygons, and any shape
17. apply: horizontal, vertical, parallel, perpendicular, and other constraints to lines automatically
18. draw lines at any angle.
19. draw lines of adjustable length
20. create circles of any desired diameter.
21. add dimensions to a drawing automatically.

Open and use the following Tool Bars:

22. 2D Sketch Panel
23. Part Features Toolbar
24. Design Accelerator Toolbar
25. Stress Analysis toolbar
26. Dynamic Simulation Panel
27. Assembly Panel
28. Drawing Views Panel

Create any two dimensional shape or pattern of shapes with the, “2D Sketch Panel” tools:

29. Draw
30. Copy
31. Mirror
32. Circular and rectangular Arrays
33. Move
34. Rotate
34. Scale
36. Chamfer any angle
37. Fillet any radius

Use the, “Part Features” tool bar tools to convert 2 dimensional sketches to 3 dimensional solid models with:

38. Extrude
39. Revolve
40. Loft
41. Sweep

Use the, “Part Features” tool bar tools to copy or modify 3 dimensional solid models with:

42. Copy
43. Mirror
44. Circular and rectangular Arrays
45. Move
46. Rotate
47. Scale
48. Chamfer any angle
49. Fillet any radius

Apply the toggle function keys:

50. f5 to view the 2D front view of sketches and solids
51. f6 to view the 2D front view of sketches and solids

Create 3D assemblies composed of any number of parts with the, "Assembly Panel" tools:

- 52. Place Component
- 53. Pattern Component
- 54. Mirror Component
- 55. Copy Component
- 56. Place Constraint
