



# SolidWorks Simulation

## Introduction to FEA

- About This Course
- What is SolidWorks Simulation?
- What Is Finite Element Analysis
- Build Mathematical Mode
- Build Finite Element Mode
- Solve Finite Element Mode
- Analyze Result
- Errors in FEA
- Finite Elements
- Degrees of Freedom
- Calculations in FEA
- Interpretation of FEA Results
- Units of Measurement
- Limitations of SolidWorks Simulation

## 1: The Analysis Process

- Objectives
- The Analysis Process
- Case Study: Stress in a Plate
- Project Description
- SolidWorks Simulation Options
- Preprocessing
- Meshing
- Postprocessing
- Multiple Studies
- Reports

## 2: Mesh Controls, Stress Concentrations and Boundary Conditions

- Objectives
- Mesh Control
- Case Study: The L Bracket
- Project Description
- Case Study: Analysis of Bracket with a Fillet
- Case Study: Analysis of a Welded Bracket
- Understanding the Effect of Boundary Conditions

## 3: Assembly Analysis with Contacts

- Objectives
- Contact Analysis
- Case Study: Pliers with Global Contact
- Pliers with Local Contact

## 4: Symmetrical and Free Self-Equilibrating Assemblies

- Objectives
- Shrink Fit Parts
- Case Study: Shrink Fit
- Project Description
- Analysis with Soft Springs

## 5: Assembly Analysis with Connectors

- Objectives
- Connecting Components
- Connectors
- Case Study: Vise Grip Pliers

## 6: Compatible/Incompatible Meshes

- Objectives
- Compatible / Incompatible Meshing
- Case Study: Rotor

## 7: Assembly Analysis Mesh Refinement

- Objectives
- Mesh Control in an Assembly
- Case Study: Cardan Joint
- Problem Statement
- Part 1: Draft Quality Coarse Mesh Analysis
- Part 2: High Quality Mesh Analysis

## 8: Analysis of Thin Components

- Objectives
- Thin Components
- Case Study: Pulley
- Part 1: Mesh with Solid Elements
- Part 2: Refined Solid Mesh
- Solid vs. Shell
- Creating Shell Elements
- Part 3: Shell Elements - Mid-plane Surface
- Results Comparison
- Case Study: Joist Hanger

## 9: Mixed Meshing Shells & Solids

- Objectives
- Mixed Meshing Solids and Shells
- Case Study: Pressure Vessel

## 10: Mixed Meshing Solids, Beams & Shells

- Objectives
- Mixed Meshing
- Case Study: Particle Separator

## 11: Design Scenarios

- Objectives
- Design Study
- Case Study: Suspension Design
- Part 1: Multiple Load Cases
- Part 2: Geometry Modification

## Lesson 12: Thermal Stress Analysis

- Objectives
- Thermal Stress Analysis
- Case Study: Bimetallic Strip
- Examining Results in Local Coordinate Systems
- Saving Model in its Deformed Shape

## 13: Adaptive Meshing

- Objectives
- Adaptive Meshing
- Case Study: Support Bracket
- h-Adaptivity Study
- p-Adaptivity Study
- h vs. p Elements - Summary

## 14: Large Displacement Analysis

- Objectives
- Small vs. Large Displacement Analysis
- Case Study: Clamp
- Part 1: Small Displacement Linear Analysis
- Part 2: Large Displacement Nonlinear Analysis