SOLIDUNIVERSITY Training Curriculum

SOLIDWORKS SIMULATION

Pre-Requisites: Knowledge of SOLIDWORKS and basic mechanical engineering concepts is recommended.

Daily Schedule: 8:30 a.m. - 4:30 p.m.

Length: 3 Days

This course is designed to make SOLIDWORKS users productive more quickly with the SOLIDWORKS Simulation Bundle. It offers a comprehensive hands-on training on the applications of SOLIDWORKS Simulation. This course will provide an in-depth coverage on the basics of Finite Element Analysis, covering the entire analysis process from meshing to evaluation of results for parts and assemblies.

The class discusses linear stress analysis, gap/contact analysis, and best practices. All SOLIDWORKS Simulation users wishing to create better designs in SOLIDWORKS by performing analysis and evaluating the behavior of their parts and assemblies under actual service conditions will benefit from taking this class.

Introduction

- 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

Lesson 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

Lesson 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

Lesson 3: Assembly Analysis with Contacts

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

Lesson 4: Symmetrical and Free Self-Equilibrated Assemblies

- Objectives
- Shrink Fit Parts

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

Lesson 5: Assembly Analysis with Connectors

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

Lesson 6: Compatible/Incompatible Meshes

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

Lesson 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

Lesson 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

Lesson 9: Mixed Meshing Shells & Solids

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

Lesson 10: Mixed Meshing Solids, Beams and Shells

- Objectives
- Mixed Meshing
- Case Study: Particle Separator

Lesson 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

Lesson 13: Adaptive Meshing

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

These courses are taught from the official course curriculum from SOLIDWORKS Corporation, with additional information from Graphics Systems instructors.

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Lesson 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

Appendix A: Meshing, Solvers, and Tips & Tricks

- Meshing Strategies
- Geometry Preparation
- Mesh Quality
- Mesh Controls
- Meshing Stages
- Failure Diagnostics
- Tips for Using Shell Elements
- Hardware Considerations in Meshing
- Solvers in SOLIDWORKS Simulation
- Choosing a Solver

Appendix B: Customer Help and Assistance

- Customer Help and Assistance

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