TRAINING: SOLIDWORKS Simulation Professional (1 Day)

Prerequisites: SOLIDWORKS Simulation Essentials

Description: Topics covered in this course are: heat transfer analysis, steady state and transient; frequency analysis; effect of in-plane loading on thin-walled structures; structural failure under compressive loads; buckling of elastic structures; meshing options; drop testing; fatigue; optimization.

Introduction
- About This Course
- User Interface Appearance
- What is SOLIDWORKS Simulation?
- Limitations of SOLIDWORKS Simulation Professional

Lesson 1: Frequency Analysis of Parts
- Modal Analysis Basics
- Required Material Properties
- Frequencies and Mode Shapes
- Fundamental Frequency
- Frequency Analysis With Supports
- Postprocessing Frequency Results
- Frequency Analysis Without Supports
- Rigid Body Modes
- Fundamental Frequency
- Effect of Restraints
- Frequency Analysis with Load
- Effects of Prestress
- Analysis Without Load
- Analysis With Load

Lesson 2: Frequency Analysis of Assemblies
- All Bonded Contact Conditions
- Remote Mass
- Mass Properties
- Connecting the Assembly Parts
- Bonded and Allow Penetration Contacts

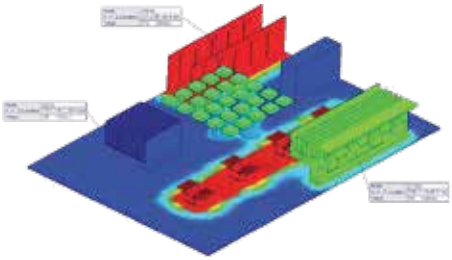
Lesson 3: Buckling Analysis
- Buckling Analysis 48
- Linear vs. Nonlinear Buckling Analysis
- Buckling Factor of Safety (BFS)
- Buckling Analysis Considerations
- Calculating Buckling Loads
- Will the structure Buckle or Yield First?

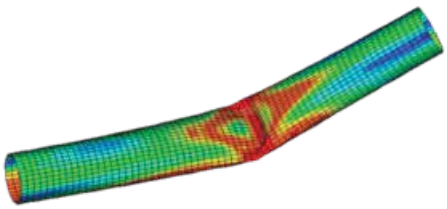
Lesson 4: Load Cases
- Load Cases
- Scaffolding
- Initial Load Case

Lesson 5: Submodeling
- Submodeling
- Parent Study
- Parent Load Cases in Submodeling Study
- Child Study
- Selecting Components for Submodeling
- Submodel Fixtures

Lesson 6: Topology Analysis
- Topology Analysis
- Goals and Constraints
- Best Stiffness to Weight ratio
- Minimize Maximum Displacement
- Manufacturing Controls
- Add Preserved Region
- Specified Thickness Control
- Specify De-mold Direction
- Specify Symmetry Planes
- Mesh Effects
- Load Cases in Topology Studies
- Export Smoothed Mesh

Lesson 7: Thermal Analysis
- Thermal Analysis Basics
- Mechanisms of Heat Transfer
- Conduction
- Convection
- Radiation
- Material Properties for Thermal Analysis
- Project Description
- Steady-State Thermal Analysis
- Interfacial Conductance
- Insulation
- Initial Temperature
- Thermal Results
- Heat Flux
- Heat Flux Results
- Heat Power
- Transient Thermal Analysis
- Importing Convective Effect from SOLIDWORKS Flow Simulation
- Transient Data Sensors
- Results Comparison
- Transient Analysis with Time Varying Load
- Time Curves
- Temperature Curves
- Transient Thermal Analysis using a Thermostat
- Symmetry Boundary Condition in Thermal Analysis





Lesson 8: Thermal Analysis with Radiation
- Steady State Analysis
- Review of Analysis Parameters
- Heat Flux Singularities

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Lesson 9: Advanced Thermal Stress2D Simplification

- Thermal Stress Analysis
- Metal Expansion Joint
- Thermal Analysis
- 2D Simplification
- Prescribed Temperature Condition
- Meshing Considerations in Thermal Analysis
- Thermal Stress Analysis
- Importing Temperatures and Pressures from SOLIDWORKS Flow Simulation
- Reference Temperature at Zero Strains
- 3D Model

Lesson 10: Fatigue Analysis

- Fatigue
- Stages of Failure due to Fatigue
- High vs. Low Cycle Fatigue
- Stress-life (S-N) Based Fatigue
- Fatigue Loading
- Thermal Study
- Thermal Stress Study
- Static Pressure Study
- Fatigue Terminology
- S-N Curve
- Derive from Material Elastic Modulus
- Constant Amplitude Events Interaction
- Alternating Stress Computation
- Mean Stress Correction
- Fatigue Strength Reduction Factor
- Damage Factor Plot
- Damage Result Discussion
- Fatigue Study with Dead Load
- Dead Loads in Fatigue Analysis
- Bolts in Fatigue Analysis
- Find Cycle Peaks

Lesson 11: Variable Amplitude Fatigue

- Suspension
- Variable Amplitude Fatigue Event
- Rain flow Cycle Counting Method
- Variable Loading Curve
- Bins for Rain flow Counting
- Noise in Random Loading History
- Fatigue Strength Reduction Factor
- Rain flow Matrix Chart

Lesson 12: Drop Test Analysis

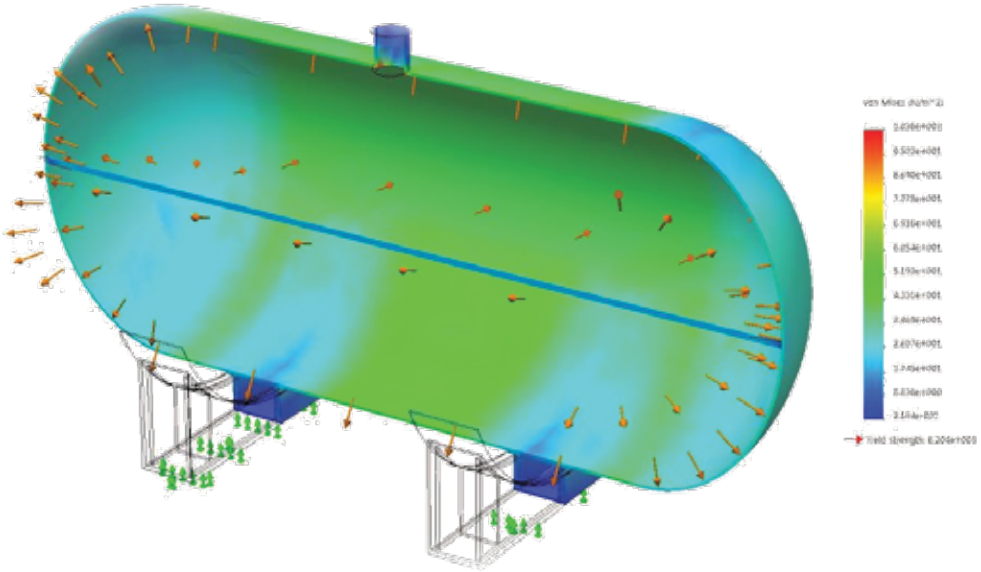
- Drop Test Analysis
- Rigid Floor Drop Test
- Drop Test Parameters
- Dynamic Analysis
- Damping
- Solution Time
- Graphing Results
- Linear vs. Nonlinear Solution
- Elastic Floor, Elasto-Plastic Material
- Elasto-Plastic Material Model
- Elasto-Plastic Model Parameters
- Processing Elasto-Plastic Results

Lesson 13: Optimization Analysis

- Optimization Analysis
- Static and Frequency Analyses
- Optimization Analysis
- Design Study
- Optimization Goal
- Design Variable Summary
- Define Constraints
- Constraint Tolerance
- Constraint Definition Procedure
- Postprocessing Optimization Results
- Local Trend Graphs

Lesson 14: Pressure Vessel Analysis

- Pressure Vessel
- Stress Intensity
- Membrane and Bending Stresses (stress linearization)
- Basic Stress Intensity Limits
- Pressure Vessel Analysis
- Load Case Combinations
- General Primary Membrane Stress Intensity
- Manhole Nozzle Flange and Cover
- Stress Linearization



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