

SOLIDWORKS Simulation Premium: Nonlinear Course Outline

 DURATION/TIME 2 Days 9:00 am - 5:00 pm	 METHODOLOGY Practical hands-on with using computers, lecturing, discussions and case studies.
 PREREQUISITES Experience with the Windows™ Operating System. Attended SOLIDWORKS Essentials and Simulation training. Basic knowledge of finite elements and mechanical principles.	 TARGET Application Engineer, R&D Engineer, Product Designer or Engineer, and Industrial Engineer

INTRODUCTION

This class will raise your SOLIDWORKS Simulation FEA skills to the next level! It offers hands-on experience on the use of SOLIDWORKS Simulation Premium nonlinear module. The 2-day course provides an overview on a wide range of nonlinear structural/mechanical analysis topics. You will learn how to deal with models that exhibit large displacements and/or yielding, discuss and practice the use of many material models available in SOLIDWORKS Simulation and, most importantly, how to drive a non-linear analysis to successful completion.

OBJECTIVE

At the end of this program participants are expected to:

- Understand the differences between linear and nonlinear studies.
- Perform nonlinear static study and buckling analysis on structures.
- Recognize the behavior of elastomers and perform analysis on materials like rubber.

CONTACT

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Certified ISO 9001:2015 QMS

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SOLIDWORKS Simulation Premium: Nonlinear

DAY 1

Course Outline:

Introduction

- Introduction to Nonlinear Structural Analysis
- Geometric Nonlinear Analysis
- Material Models and Constitutive Relations
- Interaction Analysis
- Numerical Procedures for Nonlinear FEA

Lesson 1: Large Displacement Analysis

- Objective
- Case Study: Hose Clamp
- Linear Static Analysis
- Nonlinear Static Study
- Linear Static Study (Large Displacement)

Lesson 2: Incremental Control Techniques

- Objective
- Incremental Control Techniques
- Case Study: Trampoline
- Project Description
- Linear Analysis
- Nonlinear Analysis- Force Control
- Nonlinear Analysis- Displacement Control

Lesson 3: Nonlinear Static Buckling Analysis

- Objective
- Case Study: Cylindrical Shell
- Problem Statement
- Linear Buckling
- Linear Static Study
- Nonlinear Symmetrical Buckling
- Nonlinear Asymmetrical Buckling

Lesson 4: Plastic Deformation

- Objective
- Plastic Deformation
- Case Study: Paper Clip
- Problem Statement
- Linear Elastic
- Nonlinear Study with Linear Material
- Nonlinear – von Mises
- Nonlinear – Tresca's
- Stress Accuracy
- Nonlinear Elastic Material

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DAY 2

Course Outline:

Lesson 5: Hardening Rules

- Objective
- Hardening Rules
- Case Study: Crank Arm
- Problem Statement
- Isotropic Hardening
- Kinematic Hardening

Lesson 6: Analysis of Elastomers

- Objective
- Case Study: Rubber Pipe
- Problem Statement
- Two Constant Mooney-Rivlin (1, 2 & 3 Material Curves)
- 2 Constant Mooney-Rivlin (2 Material Curves)
- 2 Constant Mooney Rivlin (3 Material Curves)
- 6 Constant Mooney-Rivlin (3 Material Curves)

Lesson 7: Nonlinear Interaction Analysis

- Objective
- Case Study: Rubber Tube
- Problem Statement
- Connections
- Dynamic Solution

Lesson 8: Metal Forming

- Objective
- Bending
- Case Study: Sheet Bending
- Problem Statement

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