

Course Outline

SOLIDWORKS Simulation Premium Non-Linear Training	
Description	This 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.
Prerequisites	SOLIDWORKS Simulation or experience with SOLIDWORKS + working basic knowledge of finite elements and of basic mechanical principles.
Duration	2 days
Delivery Mode	Face to Face OR Online

<p>Introduction What is SOLIDWORKS Simulation</p> <p>Introduction to Nonlinear Structural Analysis Introduction Types of Nonlinearities Solving Nonlinear Problems</p> <p>Geometric nonlinear Analysis Introduction Small Displacement Analysis Large Displacement Analysis Finite Strain Analysis Large deflection Analysis References</p> <p>Material Models and Constitutive Relations Introduction Elastic Models Elasto-Plastic Models Super Elastic Nitinol Model Linear Visco-Elastic Model Creep Model References</p> <p>Numerical Procedures for Nonlinear FEA Overview Incremental Control Techniques Iterative Methods Termination Criteria</p>	<p>Lesson 1: Large Displacement Analysis Case Study: Hose Clamp Problem Statement Linear Static Analysis Nonlinear Static Study Linear Static study (Large Displacement) Summary Questions</p> <p>Lesson 2: Incremental Control Techniques Incremental Control Techniques Case Study: Trampoline Project Description Linear Analysis Nonlinear Analysis – Force Control Nonlinear Analysis – Displacement Control Summary Questions</p> <p>Lesson 3: Nonlinear Static Buckling Analysis Case Study: Cylindrical Shell Problem Statement Linear Buckling Linear Static Study Nonlinear Symmetrical Buckling Nonlinear Asymmetrical Buckling</p>	<p>Lesson 5: Hardening Rules Hardening Rules Case Study: Crank Arm Problem Statement Isotropic Hardening Kinematic Hardening Summary Questions</p> <p>Lesson 6: Analysis of Elastomers Case Study: Rubber Pipe Problem Statement Two Constant Mooney-Rivlin (1 Material Curve) 2 Constant Mooney-Rivlin (2 Material Curves) 2 Constant Mooney-Rivlin (3 Material Curves) 6 Constant Mooney-Rivlin (3 Material Curves) Summary Questions</p> <p>Lesson 7: Nonlinear Contact Analysis Case Study: Rubber Tube Problem Statement Summary Questions</p> <p>Lesson 8: Metal Forming Bending Case Study: Sheet Bending Problem Statement</p>
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<p>References</p> <p>Contact Analysis Introduction Global Contact/Gap Conditions Local Contact/Gap Conditions Troubleshooting for Gap/Contact Problems References</p>	<p>Summary Questions</p> <p>Lesson 4: Plastic Deformation Plastic Deformation Case Study: Paper Clip Problem Statement Linear Elastic Nonlinear – von Mises Nonlinear – Tresca’s Summary Questions</p>	<p>Summary Questions</p> <p>Appendix A: True and Engineering Stress and Strain Engineering Stress and Strain True Stress and Strain References</p>
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