

# Training: SOLIDWORKS Simulation Premium: Dynamics (2 days)

**Prerequisites:** Must have attended the basic SOLIDWORKS Simulation class or must have an experience with SOLIDWORKS + working basic knowledge of finite elements and of basic mechanical principles. The knowledge of basic principles in Vibrations is strongly recommended, but not required.

**Description:** This course is targeted for the users who would like to become productive in analyzing structures subjected to various types of dynamic loading. The material covered includes the time dependent analysis (force loads as well as motion shock loading examples), harmonic analysis and random vibration analysis (MILS-STD-810F example is included), response spectrum analysis, and introduction to nonlinear dynamics simulation.

## Introduction

- About This Course

## Lesson 1: Vibration of a Pipe

- Static Analysis
- Frequency Analysis
- Dynamic Analysis (Slow Force)
- Dynamic Analysis (Fast Force)

## Lesson 2: Transient Shock Analysis According to MILS-STD-810H

- Mass Participation Factor
- Cumulative Mass Participation Factor
- Damping
- Viscous Damping
- Time Step
- Model with Remote Mass
- Transient Analysis of Alternator Bracket

## Lesson 3: Harmonic Analysis of a Bracket

- Harmonic Analysis Basics
- Single DOF Oscillator
- Harmonic Study Properties

## Lesson 4: Response Spectrum Analysis

- Response Spectrum
- Response Spectrum Input
- Mode Combination Method 101

## Lesson 5: Random Vibration Analysis According to MIL-STD-810G

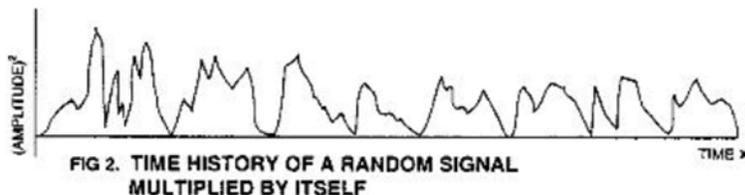
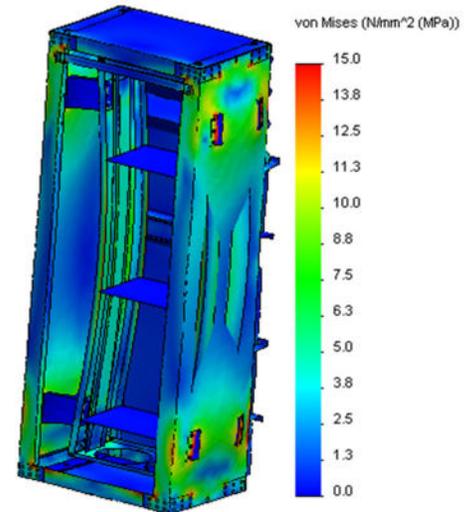
- Distributed Mass
- Random Vibration Analysis
- Power Spectral Density Function
- Overall Level of Acceleration PSD
- Decibels
- Random Study Properties
- RMS Results
- PSD Results
- Random Vibration Analysis of an Electronics Enclosure

## Lesson 6: Random Vibration Fatigue

- Random Vibration Fatigue
- Material Properties, S-N Curve
- Random Vibration Fatigue Options
- Random Vibration Fatigue of a Cantilever Beam

## Lesson 7: Nonlinear Dynamic Analysis of an Electronic Enclosure

- Linear Dynamic Analysis
- Nonlinear Dynamic Analysis
- Linear vs. Nonlinear Dynamic Analysis
- Rayleigh Damping
- Time Integration Methods
- Iterative Methods



Mass Participation (Normalized)			
Study name: SRS			
X direction	Y direction	Z direction	
0.014618	0.00012309	9.6184e-007	
1.9938e-007	0.00021283	0.00011699	
0.00070861	0.0039687	3.4257e-008	
0.00028024	2.837e-006	4.3074e-005	
0.0056454	0.00075101	7.7291e-005	
2.2845e-005	0.00012489	3.9079e-005	
Sum X = 0.70515	Sum Y = 0.80203	Sum Z = 0.78868	