



Piping Design & Stress Analysis Course



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Introduction:

This piping design and stress analysis course covers topics integral to piping design and stress analysis. Participants will learn piping design fundamentals, the factors that affect preliminary piping design, initial layout, overall system configuration, and essential principles of pipe stress analysis.

The curriculum also dives into the details of piping design and how it affects the selection and design of pipe supports and hangers. This piping design and stress analysis course provides specialized training for professionals looking to expand their piping design and stress analysis skills, particularly within the oil and gas sector.

Participants will receive both theoretical insights and practical tools crucial for accurate, code-compliant designs in a piping design program. Topics also include basics of piping design and specialized knowledge for individuals aiming to become proficient piping stress analysis engineers.

Target Groups:

- Process, Mechanical, and Chemical Engineers.
- Operation and Maintenance Engineers.
- Project Engineers.
- Supervisors and Managers.
- Technical Personnel are involved in inspection tasks.

Course Objectives:

After this piping design and stress analysis training course, participants will:

- Elevate their comprehension of piping systems' mechanical integrity and interdependence with proper design, operation, condition assessment, and maintenance.
- Acquire practical methods and tools for basic design calculations following industrial codes and best practices related to pressure equipment.
- Understand degradation mechanisms affecting process equipment, methods to identify and predict impact, and measures for prevention and control.

Targeted Competencies:

After this piping design and stress analysis training, participants' competencies will:

- Understand Pipe Stress Analysis.
- Deciding Stress Critical Lines and Preparing Critical Line List.
- Inputs for Piping Stress Analysis.
- Introduction to Pipe Supports
- Pipe Thickness Calculation
- What is Piping isometric drawing?
- Starting with Pump Piping Stress Analysis.
- Creating Load Cases for Pipe Stress Analysis.
- Modeling of Horizontal Vessels for Stress Analysis.
- Flange Leakage Analysis using Pressure Equivalent, NC, and ASME Sec VIII method
- PSV Piping Stress Analysis.
- What is a Piping Expansion Loop?
- Generating Stress Analysis Reports for Clients.
- Storage Tank Piping Stress Analysis.
- Know the Buried piping stress analysis steps.

Course Content:

Unit 1: Introduction - Overview of Piping:

- Influence of operating conditions on oil and gas piping design.
- Impact of internal and external forces on design integrity.
- The different modes of failure and the applicable codes affect the entire system.
- Overview of Piping layout, including general support classifications.

Unit 2: Basic Concepts of Stress Analysis - Flexibility Analysis:

- Historical perspective of how earlier analysis techniques were developed in the absence of today's computer technology
- Review how earlier techniques evolved, leading to today's finite element practices.
- We will cover the basic concepts of stress analysis, including failure theories, stress intensification factors, and the overall purpose of stress analysis.

Unit 3: Stress Analysis - Design Bases:

- Review of project evolution phases.
- Core analysis foundations: physical attributes, loads, and joint designs.
- Develop a rudimentary assembly of a stress model.
- How does vibration affect the piping system?

Unit 4: Influences on Pipe Support Design - Rigid Supports:

- Explore rigid pipe supports.
- Range of support elements, from catalog items to custom parts.
- Impact of the piping design on support design choices.
- How can adjustability be incorporated into the design to accommodate on-site discrepancies?

Unit 5: Influences on Pipe Support Design - Spring Supports:

- Explore types of resilient support elements: variable, constant, and big-ton springs.
- Determine ideal pipe support according to operating conditions.
- Utilize standard pipe support hardware and stock spring components.
- Customize spring elements for unique piping configurations.

Unit 6: Influences on Pipe Support Design - Restraints:

- Restraint devices for transient loads.
- Learn about component types and functions: hydraulic snubbers, mechanical snubbers, and sway struts.
- Design parameter considerations for restraint device selection.
- Focused guidelines on support standardization and versatility.