ENGINEERING TRAINER

Introduction to Pipe Stress Engineering: Fundamentals 1

Build a structured foundation in pipe stress engineering, so you can understand piping loads, codes, equipment interfaces, stress criticality selection, and wall thickness calculations with stronger engineering judgement.

Buy This Course

Request a Quote or Invoice

ONLINE	SELF-PACED	1-YEAR ACCESS
7 MODULES	7.5 PDH	7.5 HOURS

TRUSTED BY ENGINEERING TEAMS WORLDWIDE

ENGINEERING TRAINER

Introduction to Pipe Stress Engineering: Fundamentals 1

What you'll learn

Pipe stress engineering is not only about running calculations. Engineers need to understand why a pipe stress analysis is required, which loads matter, how piping systems behave, and how codes, standards, equipment limits, and wall thickness requirements influence design decisions.

This course gives you a structured introduction to pipe stress engineering. It explains the design philosophy behind pipe stress analysis, the basic mechanics of forces, moments, and material stress, and the differences between piping, pipelines, onshore systems, offshore systems, static analysis, and dynamic analysis.

The course also introduces the codes and standards that affect pipe stress work, including ASME, European, international, local, onshore, and offshore piping codes. It connects these requirements to equipment codes, nozzle loading, equipment interfaces, piping stress criticality selection, and wall thickness calculations according to ASME B31.3 and ASME B31.8.

Skills you'll gain

- ✓ Understand why pipe stress analysis is performed and where it fits in piping system design
- ✓ Recognize the different loads relevant for pipe stress engineering and how they are classified
- ✓ Understand primary, secondary, occasional, and dynamic loads
- ✓ Explain the basic relationship between force, moment, material stress, and piping system behavior
- ✓ Understand the differences between stress analysis for piping, pipelines, onshore systems, and offshore systems
- ✓ Recognize the role of piping codes, equipment codes, and international standards in pipe stress work
- ✓ Understand equipment interfaces, overloaded nozzles, and the relevance of pumps, compressors, turbines, heat exchangers, vessels, columns, and other equipment
- ✓ Understand the main types of stress analysis, including visual, manual, computational, static, and dynamic analysis
- ✓ Perform piping stress criticality selection at a basic level
- ✓ Understand pipe wall thickness calculations according to ASME B31.3 and ASME B31.8

ENGINEERING TRAINER

Introduction to Pipe Stress Engineering: Fundamentals 1

About the Instructor

Stressman Engineering

Stressman Engineering is the course partner for this training, whose expertise listed in pipe stress, piping design, FEA, and Ansys. Their courses focus on practical pipe stress engineering topics that help engineers understand piping loads, design philosophy, code context, analysis methods, equipment interfaces, and calculation decisions used in real piping system work.

Who this course is for

- ✓ Piping design engineers and piping design leads who need to understand the basics of pipe stress engineering to make better design decisions
- ✓ Junior pipe stress engineers with 0–3 years of experience who want a structured introduction to the discipline
- ✓ Mechanical engineers who need a broader understanding of piping system design and pipe stress requirements
- ✓ Process engineers who work with piping systems and need to understand how loads, equipment interfaces, and codes affect design decisions
- ✓ Structural engineers who interface with pipe supports, loads, equipment, and piping stress requirements
- ✓ Engineers who want to improve technical discussions with colleagues, vendors, and clients on pipe stress topics

ENGINEERING TRAINER

Introduction to Pipe Stress Engineering: Fundamentals 1

Course content

Module 1 – Why Do a Pipe Stress Analysis?

Understand the purpose of pipe stress analysis and why it matters in piping system design.

- Definition of pipe stress analysis
- What a piping stress analysis involves
- Why engineers perform stress analysis

Module 2 – Back to Basics

Build the mechanical foundation required to understand pipe stress behaviour.

- Forces and moments
- Material stress
- Common types of stress
- Primary loads
- Secondary and occasional loads
- Primary versus secondary load classification
- Dynamic loads
- Piping load classification summary and further discussion

Module 3 – Stress Analysis on Various Systems

Learn how pipe stress analysis differs across system types and project contexts.

- Types of loads
- Piping versus pipelines
- Onshore versus offshore systems
- Piping stress analysis scenarios
- Pipeline stress analysis scenarios
- Static versus dynamic stress analysis

Module 4 – Piping Codes and Standards

Understand the codes and standards that provide the technical basis for pipe stress analysis.

- Codes and standards for pipe stress
- ASME codes
- European codes
- International standards
- Allowable Stress Design versus Load and Resistance Factor Design
- Onshore and offshore piping codes
- Other international and local piping codes
- Recommended reference documents

Module 5 – Equipment Codes and Standards

Understand how equipment codes and equipment interfaces affect piping stress decisions.

- Equipment codes in process piping systems
- Overloaded nozzles
- Centrifugal pumps
- Positive displacement pumps
- Centrifugal compressors
- Reciprocating compressors
- Steam turbines
- Shell-and-tube heat exchangers
- Plate heat exchangers
- Air-cooled heat exchangers
- Other equipment types
- ASME vessels and columns
- PD 5500 vessels and columns
- Onshore pipeline equipment and components
- Offshore equipment codes
- Plastic piping codes

Module 6 – Types of Stress Analysis

Learn the main types of pipe stress analysis and how the required level of analysis is selected.

- Stress criticality selection
- Visual analysis
- Manual analysis
- Comparison of analysis types
- Computational analysis and finite element analysis
- Static versus dynamic computational analysis
- Analysis selection methods
- Stress criticality selection examples

Module 7 – Wall Thickness Calculation

Work through pipe wall thickness calculation concepts according to ASME B31.3 and ASME B31.8.

- Wall thickness calculation according to ASME B31.3
- Weld Joint Quality Factor, E
- Weld Joint Strength Reduction Factor, W
- Material Coefficient Factor, Y
- Corrosion allowance
- Wall thickness calculation according to ASME B31.8
- ASME B31.3 Chapter II examples based on outside and inside diameter
- ASME B31.3 Chapter IX high-pressure piping examples based on outside and inside diameter
- ASME B31.8 Chapter VIII examples