ENGINEERING TRAINER

Introduction to Pipe Stress Engineering: Fundamentals 1

This pipe stress fundamentals course explains why an analysis is required, which loads matter and how piping, equipment and supports interact. It introduces mechanics, piping and equipment codes, criticality selection, analysis types and wall-thickness calculations under ASME B31.3 and ASME B31.8. This self-paced online course includes video lectures, knowledge-check quizzes and a completion certificate with PDH credits.

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

TRUSTED BY ENGINEERING TEAMS WORLDWIDE

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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 loads relevant to pipe stress engineering and how they are classified
- ✓ understand primary, secondary, occasional and dynamic loads
- ✓ explain the relationship between force, moment, material stress and piping-system behavior
- ✓ understand the differences between piping, pipeline, onshore and offshore stress analysis
- ✓ recognize the role of piping codes, equipment codes and international standards
- ✓ understand equipment interfaces and overloaded nozzles
- ✓ distinguish visual, manual, computational, static and dynamic analysis
- ✓ perform basic piping-stress criticality selection
- ✓ understand wall-thickness calculations under ASME B31.3 and ASME B31.8

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About the instructor

Stressman Engineering

Stressman Engineering specializes in stress analysis, from hand calculations to three-dimensional finite element analysis. Its pipe-stress courses explain piping loads, code checks, equipment interfaces, support choices and technical reporting through practical engineering examples.

Who this course is for

- ✓ Piping design engineers who need pipe-stress fundamentals for design decisions
- ✓ Piping design leads responsible for piping-system layout
- ✓ Junior pipe stress engineers with 0–3 years of experience
- ✓ Mechanical engineers who need a broader understanding of piping-system design
- ✓ Process engineers who need to understand piping loads and equipment interfaces
- ✓ Structural engineers who interface with pipe supports and piping loads
- ✓ Project engineers who discuss pipe stress requirements with clients or vendors

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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 is
- 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
- Summary and further discussion of piping load classification

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 & Standards

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

- Codes and standards for pipe stress
- ASME codes
- European codes
- International standards
- ASD versus LFRD
- Onshore and offshore piping codes
- Other international and local piping codes
- Recommended reference document

Module 5 - Equipment Codes & Standards

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

- Equipment codes in process piping systems
- Overloaded nozzles and further discussion
- Centrifugal pumps
- Positive displacement pumps
- Centrifugal compressors
- Reciprocating compressors
- Steam turbines
- Shell-and-tube heat exchangers
- Plate heat exchangers
- Air-cooled heat exchangers
- Remaining equipment types
- ASME vessels and columns
- PD5500 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 analysis depth is selected.

- Stress criticality selection
- Visual analysis
- Manual analysis
- Comparison of analysis types
- Computational analysis and FEA
- Static versus dynamic computational 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 per ASME B31.3
- Weld Joint Quality Factor, E
- Weld Joint Strength Reduction Factor, W
- Material Coefficient Factor, Y
- Corrosion allowance
- Wall thickness calculation per ASME B31.8
- ASME B31.3 Chapter II examples based on OD and ID
- ASME B31.3 Chapter IX high-pressure piping examples based on OD and ID
- ASME B31.8 Chapter VIII examples