ENGINEERING TRAINER

DYNAFLOW RESEARCH GROUP

Pipe Stress Analysis according to ASME B31.3 and EN 13480

Learn the pipe stress fundamentals behind ASME B31.3 and EN 13480, so you can understand calculations, review software output, and make better engineering decisions.

Buy This Course

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ONLINE	SELF-PACED	1-YEAR ACCESS
7 MODULES	21 PDH	21 HOURS

TRUSTED BY ENGINEERING TEAMS WORLDWIDE

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What you'll learn

Pipe stress analysis is not only a software task. Engineers need to understand the assumptions, load cases, allowable values, and failure mechanisms behind the results.

This course gives you a structured foundation in pipe stress analysis according to ASME B31.3 and EN 13480. It explains the basic physics and code logic behind pipe stress checks, then connects these principles to supports, load conditions, overstressed locations, nozzle loads, support loads, and displacements.

This is not a CAESAR II or pipe stress software tutorial. The focus is on understanding what the software is calculating, why certain checks are required, and how to judge whether the results make sense.

Skills you'll gain

- ✓ Understand the physics and equations behind pipe stress analysis
- ✓ Determine material allowable values according to relevant design codes
- ✓ Identify relevant load cases and failure mechanisms
- ✓ Understand how components, supports, and load conditions influence the analysis
- ✓ Perform a basic pipe stress analysis by hand using ASME B31.3 and EN 13480 principles
- ✓ Review pipe stress software output with stronger engineering judgement
- ✓ Identify practical solutions for excessive pipe stresses, nozzle loads, support loads, and displacements

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About the instructor

Dynaflow Research Group

Dynaflow Research Group is an engineering consultancy specializing in complex piping, mechanical, structural, vibration, and dynamic analysis. Their work focuses on technically demanding industrial problems where calculation quality, code understanding, physical insight, and engineering judgment are critical.

Their courses turn this specialist consulting experience into practical training, helping engineers understand the principles, assumptions, failure mechanisms, and design decisions behind real engineering systems.

Who this course is for

- ✓ Junior piping engineers who want to build a structured foundation in pipe stress analysis
- ✓ Pipe designers who want to increase their analysis capabilities
- ✓ Engineers using pipe stress software who want to understand the theory behind the output
- ✓ Engineers performing or reviewing analyses according to ASME B31.3 and EN 13480
- ✓ Experienced pipe stress engineers who want to refresh their knowledge
- ✓ Engineers who need to understand load cases, allowable values, failure mechanisms, and practical stress mitigation methods

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Course content

Module 1 - Basics of Pipe Stress

Build the technical foundation required to understand pipe stress calculations.

- Pipe geometry and typical pipe properties
- Forces, moments, external forces, and bending moments
- Stress directions: hoop, axial, radial, and shear stress
- Stress-strain theory
- Piping codes, material codes, code stress, and allowable values

Module 2 - Piping Components

Learn how common piping components affect pipe stress analysis.

- Straight pipe and wall thickness concepts
- Thin- and thick-walled pipe
- Bends, reducers, and tees
- Flanges, valves, and nozzles

Module 3 - Supporting & Load Conditions

Understand how supports and load conditions influence piping system behavior.

- Support types, stiffness, gaps, and friction
- Spring supports and steel structures
- Process conditions, imposed displacements, and occasional loads
- Supporting a simple piping system

Module 4 - Failure Modes & Allowable Values

Learn how piping systems are assessed against load types and failure mechanisms.

- Load types and failure mechanisms
- Sustained, occasional, and operating loads
- Expansion and fatigue
- Load case construction

Module 5 - Performing a Pipe Stress Analysis

Work through the main checks used in a pipe stress code conformance assessment.

- Flexibility analysis
- Stress Intensification Factors (SIFs)
- Code stress definitions and allowable values
- Nozzle, flange, support, and displacement checks
- Role of pipe stress software

Module 6 - Solving Overstressed Locations

Learn how to identify overstressed locations and evaluate practical design solutions.

- Solution process for overstressed piping systems
- Identification of overstressed locations
- Model detail and resolution
- Design improvements
- Expansion loops and bellows

Module 7 - Advanced Topics

Explore additional topics that often appear in pipe stress engineering work.

- Reporting a pipe stress analysis
- Fiberglass Reinforced Plastic (FRP) piping
- Buried piping systems
- Water hammer phenomena