

€ TRAINING

Piping Mastery Using ASME B31 Standards





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Introduction:

This training program will involve the practical aspects of Pipeline Design and Piping Inspection, Maintenance, Repair, Management and Integrity. The participants will obtain an in-depth understanding of the ASME B31 code rules and API standards, their technical basis, and practical application to field conditions. It will review the various repair techniques, their advantages and shortcomings, and the step-by-step logic to be followed in making repair decisions and selecting the applicable repair.

Program Objectives:

At the end of this course, the participants will be able to:

- Explain the many prevention and detection practices to ensure pipeline safety.
- Describe how the use of certain prevention and detection practices from the ASME B31.8S Standard, as well as 49CFR192 regulations, interact for improved performance and ensure maximum safety.
- Specify prevention and repair solutions for each threat and improve the IMP performance for gas pipelines.
- Explain the reasons why one prevention and repair solution may be better than another; or why both together can be even more effective.

Targeted Audience:

- Engineers.
- Maintenance technicians and repair of pipelines and piping systems.
- Inspectors responsible for the design.
- Integrity.

Program Outlines:

Unit 1:

Materials and Sizing:

- Overview of pipeline technology history and evolution.
- Understanding ASME, API, NACE, MSS-SP, and PFI standards.
- Familiarization with API 5L and ASTM specifications for materials.

- Practical aspects of metallurgical properties and chemistry.
- Establishing system design pressure and introduction to pressure relief valves.
- Pipe and pipeline sizing formulas with practical applications.

Unit 2:

Layout, Support, and Design:

- Proper methods for supporting piping systems.
- Factors influencing pipeline design, including material selection, environmental considerations, and operational requirements.
- Review of support types and their applications.
- Flexibility layout analysis and handling temperature effects.
- Implementation of corrosion control measures and cathodic protection systems.
- Hydraulic analysis and calculations for determining pipeline capacity and flow rates.

Unit 3:

Integrity for Sustained and Occasional Loads:

- Recognizing and solving pressure transients, including liquid hammer and pump station transients.
- Study of pipeline failures due to pressure transients, two-phase transients, and gas discharge transients.
- Understanding buried pipe behavior under soil and surface loads, including expansion and settlement.
- In-depth analysis of pipeline failures through case histories, focusing on root causes and preventive measures.

Unit 4:

Material Flaws, Inspections, and Testing:

- Overview of pipe and pipeline welding practices, including API 1104 and ASME IX requirements.
- Techniques for weld inspection and overview of pigging technology.
- Understanding regulations for in-line inspections and flange and mechanical joint integrity.
- Review of pressure and leak testing techniques, including hydrostatic and pneumatic testing.
- Assembly of flange joints and leak tightness considerations.

Unit 5:

Corrosion Assessment and Repairs:

- Introduction to practical corrosion mechanisms and classification.
- Understanding mechanical damage to pipelines, including dents, gouges, ripples, and buckles.
- Overview of fitness-for-service assessments and application of ASME B31G and API 579 standards.
- Techniques for evaluating cracks in piping systems and pipelines.
- Overview of repair techniques according to ASME standards, including welding, sleeve repair, and mechanical clamping.