An Applied Approach to Designing Pressurized Industrial Piping Systems According to ASME B31.3

Training Duration: 14 hours total (2 days x 7 hours)
(Certificate of Attendance will be provided)

DESCRIPTION

Pressurized industrial piping systems are used in several industries (refineries, terminals, pulp and paper, etc.) and are subject to laws and regulations. Due to their often dangerous nature, it is important to be able to design them properly.

This course covers the general design requirements according to ASME B31.3 required by Canadian code CSA B51. Design requirements are presented along with a case study and practical examples.

Although independent, this course is an ideal complement to the course entitled "ASME B31.1 and ASME B31.3 General Requirements Overview".

OBJECTIVES

This course is an introduction to designing pressurized industrial piping systems according to the ASME B31.3 Code design requirements.

Using practical examples, this course provides an opportunity to understand all the code design requirements of ASME B31.3.

Upon completion of this course, the participants will be able to:

- Understand all the design requirements of the ASME B31.3 Code
- Determine the design parameters
- Use simple theories to determine the stresses on the components of a piping system
- Perform all the calculations (thickness, flexibility, hydrostatic test) to demonstrate compliance with the requirements of the Code

TARGET ATTENDEES

- Engineers
- Inspectors
- Technicians
- Designers
- Contractors
- Other professionals working in the field of industrial pressurized piping

PROGRAM (2 days)

NOTE: The training is based primarily on Chapter II of ASME B31.3 - 2014.

Day 1

1. Definition of a pressurized piping system
2. External constraints to consider when designing a piping system
3. Description of piping system design for case study
4. Determine the design conditions for the case study :
   - Definition of design pressure and design temperature
   - How to determine design pressures and temperatures based on operations data and example calculations
   - How to determine the allowance to use
5. How to determine the required thickness for piping:
   - Formula for pipes with internal pressure
   - Example of calculation applied to case study
   - Select which type of pipe to use
   - Thick-walled pipe – sample calculation
6. Beam theory applied to piping
7. Designing according to primary stresses (due to sustained loads):
   - Definition of primary stresses
   - Adequately support pipework
   - Estimate loads to supports and equipment
   - Calculations applied to case study
   - Examples of special situations
8. List of types of pipework requiring flexibility analysis or formal stress analysis

Day 2

1. Designing according to secondary stresses (displacement load stress):
   - Definition of secondary stresses
   - Guide the pipework adequately
   - Simplified methods to check flexibility
   - Estimate loads to supports and equipment
   - Calculations applied to case study and other examples of applications
2. Understanding the difference between primary and secondary loads

3. Designing according to occasional stresses:
    - Definition of occasional loads
    - Ensure that piping is sufficiently supported and guided for occasional loads
    - Calculations applied to case study and others
4. Setting the pressure equivalent on a standard flange and examples of applications
5. Formula for piping bends
6. Calculations for openings (branches) on the main pipe and examples of calculations