PIPELINE INTEGRITY ASSESSMENTS – PRACTICAL ASPECTS

TRAINING METHODOLOGY

This interactive training workshop includes the following training methodologies as a percentage of total tuition hours:-

80% Lectures
20% Workshops, Group Work & Practical Exercises

TO REGISTER CALL NOW!
+61 8 9535 8176
VISIT:
www.worldwidetank.com.au
EMAIL:
admin@worldwidetank.com.au

WHO SHOULD ATTEND

The course is intended for engineers, maintenance technicians and inspectors responsible for the integrity, inspection, maintenance and repair of pipelines and piping systems. The fitness-for-service and integrity techniques are based on quantitative analysis, please bring a calculator.

PIPELINE INTEGRITY ASSESSMENTS – PRACTICAL ASPECTS

Course Description

A five-day in-depth course on the practical aspects of piping and pipeline integrity, maintenance and repair. Participants will be introduced to the technical basis of the ASME and API integrity rules, and their application to case studies and exercises.

The participants will be able to recognize causes of degradation in-service, whether mechanically induced (pressure, vibration, fatigue, pressure transients, external damage) or due to corrosion (wall thinning, pitting, cracking), and apply integrity analysis techniques to make run-or-repair decisions.

The participants will become knowledgeable in the technical basis and application of ASME B31.3, B31.4 and B31.8 piping codes, ASME B31G and API 579 Fitness-for-Service and Flaw Evaluation.

The participants will review inspection techniques, from the most common (PT, MT, UT, RT, MFL pigs) to most recent (AE, PED, UT pigs and multi pigs), and the use of hydrotesting for integrity assessment. and the implementation of integrity management programs, periodic inspections and evaluation of results.

The course will review the various repair techniques, their advantages and shortcomings, and the logic to be followed in making repair decisions and selecting the applicable repair.

PIPELINE INTEGRITY ASSESSMENTS – PRACTICAL ASPECTS

Course Objectives

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

- Have a very good background on the principles & concepts of pipeline and piping inspection, maintenance & integrity assessment
- Identify the material specifications of the pipeline and piping and know the metallurgy, heat treatment and API/ASTM material specifications
- Gain in-depth understanding on design pressure and failure margins of pipes and learn how to establish the system design pressure
- Understand risk-based inspection & integrity management and be able to carry-out practical approach to assessing damage mechanisms
- Learn corrosion and integrity specifically wall thinning & cracking and be able to know how to evaluate cracks in piping and pipelines
- Become familiar with third party damage including the analysis of dents & gouges in pipelines and the analysis of distortion & permanent deformation
- Review the fundamentals of flow in pipes & pipelines and be able to identify the classes of pressure transients including their features
- Discover how to classify the cause of vibration in-service and how to analyze vibration & decide if it is acceptable
- Recognize the temperature effects including the lay-out, expansion and contraction of pipes & pipelines as well as the analysis for flexibility and failure margins
- Employ pressure & leak testing and be able to improve examination & inspection methods in pipes & pipelines considering the selection & use of the various types of testing & inspection techniques
- Become familiar with the pigging technology and improve maintenance & inspection strategies by organizing a guide for pipe & vessel inspections and learning the application of inspection & analysis of results
- Carry-out repair & rehabilitation of pipes & pipelines and be able to identify the various repair techniques used such as grinding & welding, flush patch repair, weld overlay repair, etc

PIPELINE INTEGRITY ASSESSMENTS – PRACTICAL ASPECTS

DAY 1

0845 - 0900 Registration & Coffee
0900 - 0930 Welcome & Introduction
0930 - 1000 Introduction

History of Pipeline Technology

- Overview of Codes and Standards
- Difference between Design Codes and Integrity Codes
- ASME B31 Piping and Pipeline Codes
- ASME B&PV Pressure Vessel Codes
- API Tank Standards
- API Pipeline Inspection Standards
- ASME B16 Fitting Standards
- NACE, MSS-SP, PFI Standards
- Company Policies and Regulations

1000 – 1010 Break

1010 - 1150 Materials

- Overview of Ferrous Pipe and Pipeline Materials
- Carbon and Alloy Steels
- Chemistry and Positive Material Identification Introduction to Metallurgy of Base Metal and Welds
- Heat Treatment: When and Why
- Fabrication of Line Pipe and Forged Fittings
- Mechanical Properties: Strength and Toughness
- Ductile and Brittle Fracture
- API 5L and ASTM Material Specifications
- Marking Pipe and Fittings

DAY 1 continued

1150 - 1340 Lunch
1340 - 1520
Design Pressure And Failure Margins

- How to Establish the System Design Pressure Introduction to Pressure Relief Valves
- Pipe and Pipeline Sizing Formula with Applications
- Factors affecting flow and throughput
- Flange and Fitting Class: Origins and Application
- Branch Reinforcement, Stopple and Hot taps

1520 – 1530 Break

1530 – 1730
Design Pressure And Failure Margins(cont'd)

- How to Establish the System Design Pressure Introduction to Pressure Relief Valves
- Pipe and Pipeline Sizing Formula with Applications
- Factors affecting flow and throughput
- Flange and Fitting Class: Origins

1730 End of Day One

PIPELINE INTEGRITY ASSESSMENTS – PRACTICAL ASPECTS

DAY 2

0845 - 1000
Risk-Based Inspection, Integrity Management

- Failure Modes: Leak, Break and Fracture
- A Practical Approach to Assessing Damage Mechanisms
- Predicting Remaining Life of Piping and Pipelines
- Making Run-or-Repair Decisions
- Analysis of Inspection Results: Integrity Management
- Company Policies and Regulations

1000 - 1010 Break

1010 – 1150 Corrosion And Integrity: Wall Thinning

- How to Evaluate Wall Thinning
- Application of ASME B31G to Determine Remaining Life Application of API 579 to General and Local Corrosion Application of API 579 to Analyze Pitting

1150 - 1340 Lunch

1340 - 1520 Corrosion And Integrity: Cracking

- Environmental Effects
- Fatigue Cracking
- Hydrogen and H2S Effects
- Introduction to Fracture Mechanics
- How to Evaluate Cracks in Piping and Pipelines
- Prediction of Failure Mode: Leak, Break or Fracture

1520 - 1530 Break

1530 – 1730 Third Party Damage

- Analysis of Dents and Gouges in Pipelines; Analysis of Distortion and Permanent Deformation

1730 End of Day Two

DAY 3

0845 - 1000
Fundamentals Of Flow In Pipes And Pipelines
Basic Design and In-Service Modifications
Flow Rate and Throughput

1000 - 1010 Break

1010 - 1150 Pressure Transients

- The Four Classes of Pressure Transients Recognizing and Solving Liquid Hammer Pump Station Transients
- Study of Pipeline Failures Due to Transients Two-Phase Liquid-Vapor Transients
- Two-Phase Liquid-Gas Transients
- Gas Line Pulsing and Transients

1150 - 1340 Lunch

1340 – 1520 Vibration In Service

- How to Classify the Cause of Vibration In-Service
- Mechanical and Hydraulic Induced Vibration in Piping
- How to Measure Vibration
- How to Analyze Vibration and Decide if it is Acceptable
- Options for Resolving Vibration

1520 - 1530 Break

- 1530 - 1730 Temperature Effects Layout, Expansion and Contraction: Rules of Good Practice
- Analysis for Flexibility and Failure Margins
- Fatigue Evaluation and Remaining Life Prediction
- Local Thermal Shocks

1730 End of Day Three

PIPELINE INTEGRITY ASSESSMENTS – PRACTICAL ASPECTS

DAY 4

0845 - 1000
Pressure And Leak Testing

- The Difference Between Leak Testing and Pressure Testing
- Review of Different Testing Techniques
- The Purpose of Hydrotest
- How to Conduct a Hydrotest
- Pipeline and Piping Systems Testing
- Pneumatic Testing
- Sensitive Leak Testing Methods
- Pressure and Leak Testing of Repairs

1000 - 1010 Break

1010 - 1150
Examination And Inspection

- Inspection Techniques
- Liquid Penetrant Testing: Advantages and Limitations
- Magnetic Particle Testing: Advantages and Limitations
- Radiographic Testing: Advantages and Limitations
- Ultrasonic Testing: Advantages and Limi-tations Eddy Current, Acoustic Emission, Thermography
- Pulsed Eddy Current Inspections Through Insulation
- Digital Radiography Through Insulation

DAY 4 Continued

1150 - 1340 Lunch

1340 – 1520 Pigging Technology

- Overview of Utility Pigs
- Smart Pig Applications
- Overview of 49CFR Regulations for In-Line Inspections
- ASME B31.8S Integrity of Unpiggable Lines
- Surface Assessment Techniques

1520 - 1530 Break

1530 – 1730
Maintenance And Inspection Strategies

- Key Questions: What, Where and How to Inspect
- A Guide for Pipe and Vessel Inspections Workmanship Standards (ASME B31)
- Integrity Standards (B31G, API 1104, API 579)
- Application of Inspections and Analysis of Results
- Corrective and Predictive Maintenance
- Reliability Engineering: Maintenance Analysis and Trending

1730 End of Day Four

PIPELINE INTEGRITY ASSESSMENTS – PRACTICAL ASPECTS

DAY 5

0845 - 1000 Repair And Rehabilitation
- The New ASME Post-Construction Code: Repair Standards
- The Fundamentals of Repair Packages Welding on Line (In-Service)

1000 - 1010 Break

1010 – 1150 Repair Techniques
- Pipe and Component Replacement
- Grinding and Welding
- Welded Sleeve: Type A and Type B
- Flush Patch Repair
- Fillet Welded Patch

1150 - 1340 Lunch

1340 - 1520 Repair Techniques (cont'd)
- Weld Overlay Repair
- Mechanical Clamp with Sealant Injection
- Mechanical Clamp without Sealant Injection
- Insertion Liners
- Painted and Brushed Liners
- Pipe Coating Repairs

1520 - 1530 Break

1530 – 1700 Overall Review
- Summary
- Open Forum

Dress Code:
Smart casual wear is suggested along with a sweater or jacket in case the conference room is cool.

Payment Terms:
Payment must be made prior to the event or admittance will not be permitted. A tax invoice and confirmation letter will be emailed to the attendee upon completion of a valid registration. Payment may be made by EFT, cheque or credit card.