API 570 PIPING INSPECTION CODE

TRAINIT ACADEMY

FMC104 Facility Integrity, Inspection, Metallurgy and Corrosion Engineering

COURSE TITLE

API 570 PIPING INSPECTION CODE

COURSE DATE/ VENUE

03rd – 07th Mar 25'

Dubai, UAE

COURSE REFERENCE

FMC104

COURSE DURATION

05 Days

DISCIPLINE

Facility Integrity, Inspection, Metallurgy and Corrosion Engineering

COURSE INTRODUCTION

Piping Systems are interconnected piping subject to the same set or sets of design conditions. Piping refers to assemblies of piping components used to convey fluids.

Pipeline Integrity Management is a hot bed of discussion these days. It is because many transmission pipelines are now over 20 years old and are in their "middle age". Even the best designed and maintained pipeline will become defective as it progresses through its design life. Therefore, operators need to be aware of the effect these defects will have on their pipeline, and — more importantly — be able to assess their significance in terms of the continuing integrity of the pipeline.

The increasing use of high-technology maintenance is helping pipeline owners to assess the condition of their lines, and if these modern maintenance methods are combined with modern defect-assessment methods, they can provide a very powerful, and cost-

effective, tool. This course will present the latest inspection, defect-assessment and maintenance methods to pipeline engineers and managers.

This course provides an opportunity to gain the knowledge and necessary skills as required to develop and manage a piping system inspection, integrity assessment and rehabilitation program.

Finally a brief introduction to Pipeline Integrity Management as a structured process by which operators can:
Determine the major threats and risks to the integrity of their system
Develop plans to address the identified threats
Conduct appropriate inspections to determine the condition of the system
Assess the results of the inspections
Control and Maintenance

This course will also provide the participants with an in-depth understanding of the most popular Codes and Standards used in piping and pipelines inspection, maintenance and integrity assessment, such as ASME B31 code rules and API standards.

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

The course covers all familiar inspection techniques, such as PT, MT, UT, RT and PA and indirect assessment (laboratory techniques) for maintenance programs by periodic inspections and evaluation of results.

The course 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.

COURSE OBJECTIVE

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

- ✓ Assess the significance of defects detected in all pipelines and connected equipment and auxiliaries
- ✓ Recognize simple analytical methods used to assess internal and external corrosion, dents and gouges, cracks (e.g. SCC), weld defects, and fatigue
- ✓ Discuss about defect assessment, and all aspects of the subject, including repair and risk management

COURSE AUDIENCE

This course is designed for Engineers with long field experience with the following disciplines: Pipeline Operations, Pipeline Inspection, Integrity Engineers.

The following personnel will also benefit from this course: Engineering Consultants, Maintenance Personnel, Inspectors, Inspection personnel, and Trainee Engineers.

COURSE CONTENT

DAY 1

Introduction to Basic Pipeline Engineering Principles

- Importance of pipeline
- Basic pipeline design principles
- Stresses in pipelines
- Routing of pipelines
- Basic pipeline operating parameters
- Operating & Design Pressure

Introduction to Pipeline Defects - Why Pipelines Fail

- How safe are pipelines?
- How often do they fail?
- What causes pipelines to fail?
- Pipeline risks

- History of pipeline defect assessment

Integrity for Sustained and Occasional loads

- Layout
- Support
- Temperature Effects
- Vibration Effects
- Pressure Effects

DAY 2

Codes and Standards

- ASME Codes and Standards
- API Standards
- Other standards: NACE, etc.

Pipeline / System Defect or Failure Relationships

- Why pipelines and systems fail? Material, manufacture, fabricational, operational, environmental factors
- Identifying cause assessing the damage/failure
- Fundamental failure relationships

Principles and Practice of Data Collection and Management

- Pipeline information database structures
- Manufacturing defects
- Construction defects
- Environmentally induced failures (SCC)
- Failure case studies analysis of causes of failures
- Failure modes and how pipelines fail (ductile/brittle fracture)
- Introduction to external and internal corrosion (including microbiological induced corrosion)
- Case studies of pump components, pipes, etc.

DAY 3

Piping system other auxiliaries and equipments and causes of failures

Importance of standards for old and new lines

- Inspection and testing practices – sec.5
- Selection of piping and fittings-flanges, elbows, joints
- Piping codes and standards – B 31
- Designing of piping system
- Material of construction – physical properties
- Pipe thickness calculations
- Engineering of piping – B 31.3
- Pressure drop
- Valves
- Pumps
- Compressors
- Heat exchangers
- heaters
- Expansion joints, orifice, strainers
- Pipe supports
- Routing: Above ground, below and in trenches
- Welding of CS and alloy steel
- Welding of austenite steels
- Conversion table
- Pressure testing
- Field velocities

Case studies and analysis of failures with photographs

- Repair, re-rate, alteration of in-service piping

DAY 4

Defect Assessment

This module will review the assessment methods which are applicable to pipelines and systems

- corrosion assessment methods (ASME B31.G)

- methods to assess manufacturing metal loss defects
- methods to assess dents
- methods to assess gouges and dent/gouge combinations
- methods to assess cracks (BS 7910, API 579, ln-sec)
- methods to assess laminations (API 579)
- using inspection data to carry out integrity assessments
- on line measurements-coupons

Repair and Remediation

The objective of this module is to describe the Preparation Procedures for Repairs and restoration. The applicability of each of the techniques for the repair of defects will be discussed. The following techniques will be include

- grind repairs
- local weld repairs
- sleeving, lining and cladding
- cold weld repair using epoxy products

Materials handled

Metallic

Non-metallic like concrete fiber glass rubber

Setting offshore Pipeline Intelligent Pig Inspection Levels

- Pigs - where they came from and what they can do.
- Basic theory
- Magnetic, ultrasonic pigs - their accuracy and limitations.
- What pigs can detect
- What operators want to detect
- Setting intelligent pig inspection levels

DAY 5

Risk and Integrity Management and Analysis

- What is risk and risk analysis?
- Risk Assessment & Risk Management

- Risk management methods - API and ASME
- Baseline and direct assessment - discussion item
- Integrity Management Programs
- Prioritization schemes

COURSE CERTIFICATE

TRAINIT ACADEMY will award an internationally recognized certificate(s) for each delegate on completion of training.

COURSE FEES

£4,500 per Delegate. This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

COURSE METHODOLOGY

The training course will be highly participatory and the course leader will present, guide and facilitate learning, using a range of methods including formal presentation, discussions, sector-specific case studies and exercises. Above all, the course leader will make extensive use of real-life case examples in which he has been personally involved. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Case studies & Practical Exercises
- 10% Role Play
- 10% Videos, Software or Simulators (as applicable) & General Discussions