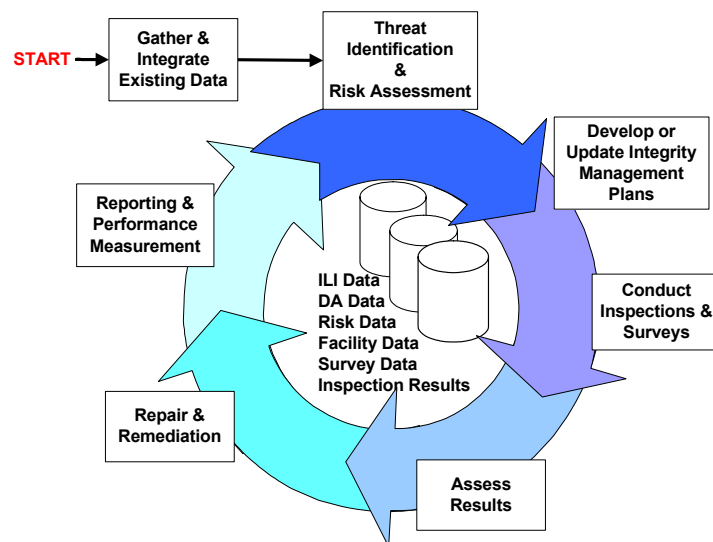


Pipeline Integrity Management Training

Course Overview

Being able to manage the integrity of a pipeline system is the primary goal of a pipeline system operator as this enables safe and reliable product delivery. Pipeline Integrity Management is a structured process by which pipeline operators can:

- Determine the major threats and risks to the integrity of their pipelines
- Develop plans to address the identified threats
- Conduct appropriate inspections to determine the condition of the pipeline
- Assess the results of the inspections
- Update the risk assessments and management plans



Pipeline Integrity Management is a continuous improvement process, as demonstrated by the above 'Integrity Management Circle', and the management plans are updated on the basis of the acquired data and information. This training course will guide attendees through the 'Integrity Management Circle', detailing the theory and practice of cost effective pipeline integrity management.



The course will be a mix of lectures (illustrated with examples), individual exercises, group case studies and software demonstrations.

Total time: 3 days

Who should attend?

The Pipeline Integrity Management Course is intended for anyone involved in the integrity, inspection or maintenance of oil and gas pipelines or anyone interested in obtaining a general knowledge of pipeline integrity management principles.

Aim:

The aim of the course is to provide attendees with a common awareness of Pipeline Integrity Management and also the tools and techniques for producing integrity management plans. At the end of the course trainees should be able to:

- Understand how pipeline data is integrated and gathered in database structures
- Identify the key pipeline degradation mechanisms and threats to pipeline integrity
- Understand the principles of risk assessment and be able to conduct a simple risk assessment
- Develop simple Pipeline Integrity Management plans
- Select and apply appropriate inspection and assessment criteria for pipeline defects
- Recommend appropriate Non Destructive Testing and repair methods for pipeline defects
- Appreciate the industry software available for the management of pipeline integrity

Handouts:

Each course participant will receive a CD containing the course lecture notes, presentation material and relevant reference material.

Course structure

I. Introduction to Pipeline Integrity Management

This introductory module is intended to provide the basics of pipeline integrity management and to introduce the concept of the integrity management circle.

II. Principles and Practice of Data Collection and Management

As one of the foundations of developing an effective integrity management plan is the collection, integration and management of data, therefore this model will address:

- graphical information systems (GIS)
- pipeline information database structures



- pipeline data Integration techniques
- principles of pipeline segmentation and centerline models

III. Causes of Pipeline Failure

This module aims to provide a description of defects in pipelines, including pipe manufacturing defects and in-service defects, and to describe examples of their effect on pipeline integrity. The following subjects will be included:

- failure statistics and the relative causes of pipeline failures
- manufacturing defects
- construction defects
- failure modes and how pipelines fail (ductile/brittle fracture)
- crack propagation
- introduction to external and internal corrosion (including microbiological induced corrosion)
- environmentally induced cracking (SCC)

IV. Introduction to Risk Assessment & Development of Management Plans

The purpose of this module is to explain the basic principles and foundation of risk assessments. The module will include:

- qualitative risk assessment approaches
- risk based inspection approaches (semi-quantative approaches)
- quantitative risk assessment approaches
- risk software tools
- statistical analysis of ILI data
- development of integrity management plans

V. Pipeline In-Line Inspection

The in-line pipeline inspection technologies that are available to detect the defects found in pipelines will be reviewed in this module. These technologies will include:

- Magnetic Flux Leakage tools (including MagneScan, TranScan and Elastic Wave)
- Ultrasonic tools (including UltraScan WM, UltraScan CD, EMAT)
- Caliper vehicles (including CalScan)
- Pipeline location vehicles (including ScoutScan)

VI. Uninspectable Pipelines and Direct Assessment

This module will explore the integrity management options for operators who cannot conduct internal inspections and will cover:

- Options for making pipelines inspectable
- Direct assessment procedures and methodologies for external corrosion, internal corrosion and stress corrosion cracking
- Above ground survey techniques (CIPS, DCVG etc.)



VII. Defect Assessment

This module will review, and illustrate with practical worked examples, the assessment methods which are applicable each of the different pipeline defects and will include:

- corrosion assessment methods (ASME B31.G, simplified and detailed RStreng, NG18, DNV, PCORRC)
- 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, In-sec)
- methods to assess laminations (API 579)
- using inspection data to carry out integrity assessments

VIII. Repair and Remediation

The objective of this module is to describe the main pipeline repair techniques. The applicability of each of the techniques for the repair of defects will be discussed. The following techniques will be included:

- grind repairs
- local weld repairs
- Clockspring and WrapMaster
- welded sleeves
- epoxy sleeves
- Petrosleeve
- Stopple and bypass

IX. Reporting and Performance Measurement

This module draws the course together and will provide information on how data collected during the process is integrated back into the management system.

