

Course Title: Pipeline Defect Assessment

Duration: 3 Days

Course Description:

This course will provide in-depth knowledge on the defect assessment techniques available in the oil and gas industry based on the damage mechanisms typical for the onshore and offshore pipelines.

The attendees will receive a certificate from Z-Subsea by completion of the training course.

This training course helps to gain understanding on:

1. History of Pipeline Defect Assessment codes/standards
2. Overview of pipelines failure mechanisms
3. Pipelines inspection techniques (Conventional, advanced)
4. Risk-based inspection of pipelines
5. Assessment of pipelines anomalies such as:
 - Assessment of metal loss/corrosion
 - Assessment of dents and gauges
 - Assessment of girth welds crack-like defects (ECA)
 - Assessment of VIV, Fatigue of pipelines
 - Assessment of Brittle/Ductile Fracture
6. Repair and rehabilitation procedures
7. Worked examples

Who should attend?

Integrity engineers
Safety engineers
Material Corrosion engineers
Pipeline engineers;
Subsea and offshore engineers;
Project engineers and managers;
Engineers from other sectors of the Oil and Gas industry who wish to gain understanding of defect assessment methods.

Course Contents:

1. Historical development of Pipeline Defect Assessment codes/standards

- BS7910
- DNV RP-F101
- API579-1/ASME FFS-1

2. Pipelines Threat/Anomaly identification

- Manufacturing related anomalies
 - Lamination
 - Lamellar tearing
 - Cracking
 - Geometrical anomalies
 - Fabrication related anomalies
 - Cracking
 - Misalignment
 - Welding related defects
- In-service (operation) related anomalies:
 - Corrosion (internal, external)
 - Corrosion of welds
 - Third party damages
 - Cracking
 - High temperature damage

3. Pipeline statistics, facts and figures

- Pipeline incidents in the North Sea and Gulf of Mexico (GOM)
- Summary of the failure modes

4. Risk-based inspection of pipelines

- What is Risk Assessment?
 - Benefits of Risk assessment
 - Risk-based inspection (RBI)
 - Determination of inspection interval using RBI.

5. Assessment of pipelines anomalies such as:

- Assessment of metal loss/corrosion
 - Typical assessment procedures for assessment of corrosion
 - Simple profile defect assessment procedure to DNV RP F101 (Part A and B), ASME B31G, RSTRENG and API579-1/ASME FFS-1
 - Complex-shape defect assessment procedure to DNV RP F101 (Part A and B), ASME B31G, RSTRENG and API579-1/ASME FFS-1
- Calculation of safe operating pressure of a corroded pipeline
- Calculation of pipeline remaining life

- Assessment of dents and gauges
 - Geometrical characteristic of gouges and dents
 - Dents assessment procedures/acceptance criteria
 - Gouges assessment procedures/acceptance criteria
- Assessment of girth welds crack-like defects (ECA)
 - Type of crack-like weld defects
 - ECA Assessment levels
 - ECA outputs (acceptable flaw sizes) procedures/acceptance criteria
- Assessment of pipeline fatigue
 - Pipeline fatigue scenarios
 - Fatigue assessment approaches, S-N curve and fatigue crack growth
 - Fatigue of pipelines in sour service
 - Fatigue assessment outputs
- Assessment of Brittle/Ductile Fracture
 - What is a brittle or ductile fracture?
 - Assessment approaches for the assessment of brittle fracture
 - Assessment approaches for the assessment of ductile fracture

6. Pipeline Mitigation, Intervention and Repair

- Mitigation planning
 - Key drivers
 - Selection of the technique
 - Mitigation methods
- Intervention planning
 - Key drivers
 - Selection of the technique
 - Intervention techniques
- Repair and rehabilitation
 - Key drivers
 - Selection of the technique
 - Repair techniques
 - Weld metal deposition
 - Welded sleeves
 - Mechanical clamping
 - Coating repair
 - Pipe section replacement

7. Case studies/Worked examples

About the course Instructor



Dr Afshin Motarjemi has a PhD in Fracture and Fatigue of welded joints and over 15 years experience in oil and gas industry both in technical and managerial roles specialising in risk-based integrity management/assessment of subsea systems, pipelines, risers, topside and onshore facilities; life extension/remaining life assessment/calculation of in-service offshore/onshore assets; Engineering Criticality Assessment (ECA), and fatigue assessment of subsea assets. Afshin has also expertise in Materials selection, Welding, corrosion and CP studies.