

## Pipeline Operations & Maintenance

### Course general description:

Pipeline systems for oil and gas industry play important role in modern industrial operations. The purpose of this Pipeline Operations & Maintenance training course is to present basic characteristics of efficient operation of pipelines in various engineering applications. This Pipeline Operations & Maintenance training course will cover the interaction of pipelines with flow moving equipment, i.e. pumps and compressors and technical characteristics of operation of pump and compressor stations.

Through this Pipeline Operations & Maintenance training course, the delegates will be introduced to main points of inspection and testing according to relevant API standards. They will also develop familiarity with methods of cleaning and other maintenance activities, including necessary repairs as prevention of failures. This Pipeline Operations & Maintenance training course will include several workshops with real problems from industrial practice which will enable discussions and exchange of experiences.

### Audience:

This course is designed for:

1. Process, chemical and mechanical engineers working in petrochemical and process industry, including oil refineries and gas production companies where operation and maintenance of pipelines are high importance
2. Operation, technical service and maintenance professionals from various processing plants involved in everyday operation, control, inspection and maintenance of pipelines
3. Engineers and consultants dealing with planning of new production lines and retrofitting plants and introducing new technologies
4. Technical professionals responsible for maintenance and repair of equipment

### Course objectives:

The course objectives are:

1. To identify basic principles of safe operation & efficient maintenance of pipelines for various industrial applications
2. To develop deep understanding & familiarity with the practical aspects of operation and maintenance activities
3. To illustrate the concepts discussed and be provided with necessary experience in applying them
4. To use & follow the guidelines & best industrial practices related to operation, control, inspection & testing of pipelines

### Course duration:

5 days

### Course location:

Dubai

### Course contents:

#### **Day-1**

- Pretest

- Overview of Technical Characteristics of Pipelines
  - Overview of main elements of oil and gas pipeline systems
  - Selection & sizing of pipelines: flow rate, MAWP, pumping power: ASME B31.3
  - Selection of pipeline material and interaction with working fluid
  - Operation of pump and compressor stations
  - Pipeline flow control and measurements: custody transfer
  - Workshop: Examples and solutions

#### **Day-2**

- Operation & Material Degradation
  - Pipeline material ageing: erosion, corrosion & stress corrosion cracking
  - Corrosion Direct Assessment: External (ECDA) and internal (ICDA) Methods
  - Cathodic protection, coating and other technologies: outer & inner surface
  - Metal loss inline inspection (ILI) and smart pigging (NDT) monitoring
  - Pipeline fatigue, cracks, seam defects and ruptures
  - Workshop: Examples and solutions

#### **Day-3**

- Operation & Safety Management
  - Safety Instrumentation, Control Valves and Other Safety Accessories
  - Transient operation and effects and water hammer
  - Pipeline failure prevention & root cause analysis
  - Leak detection methods (LDAR) and patrolling & surveillance: SCADA
  - Inspection (RBI), Hydrostatic test methodology
  - Workshop: Examples and Solutions

#### **Day-4**

- Maintenance Technologies
  - Pipeline maintenance & cleaning technologies: pipeline reconditioning
  - Monitoring of pipeline vibrations and support integrity
  - Repair technologies: welding of composite sleeves and segment replacements
  - Maintenance of valves, fittings and accessories
  - Valve repair: hot tapping, temporary plugging (stopple)
  - Workshop: Examples and solutions

#### **Day-5**

- Testing & Monitoring in Operation
  - Hydrostatic testing: allowable operating pressure and hydrostatic test pressure
  - Reliability and availability of pipelines in operation
  - Risk based inspection (RBI)
  - Fitness for Service (FFS)
  - Estimate of remaining life of equipment
  - Course summary and review

- Posttest

**Methodology:**

- 50% lectures & concepts
- 10% Videos
- 10% Case studies
- 10% Exercises
- 10% Discussions
- 10% Software (if applicable or examples)

**Course code: (TEME038)**