

ISO 19345-2:2019 (E)

Petroleum and natural gas industry — Pipeline transportation systems — Pipeline integrity management specification — Part 2: Full-life cycle integrity management for offshore pipeline

Contents

| | |
|---------|--|
| | Foreword |
| | Introduction |
| 1 | Scope |
| 2 | Normative references |
| 3 | Terms, definitions and abbreviated terms |
| 3.1 | Terms and definitions |
| 3.2 | Abbreviated terms |
| 4 | General |
| 4.1 | Key principles |
| 4.2 | Integrity management program |
| 4.2.1 | General |
| 4.2.2 | Introduction to IMP elements |
| 4.3 | Integrity management process elements |
| 4.3.1 | Data acquisition, review and integration |
| 4.3.2 | Risk assessment |
| 4.3.3 | Inspection and monitoring |
| 4.3.4 | Integrity assessment |
| 4.3.5 | Mitigation activity |
| 4.3.6 | Performance measurement and improvement |
| 4.3.7 | Emergency response plan |
| 4.3.8 | Failure management plan |
| 4.3.9 | Remaining life assessment |
| 4.4 | Management elements |
| 4.4.1 | Policy and commitment |
| 4.4.2 | Scope of integrity management program |
| 4.4.3 | Organization structure, roles and responsibilities |
| 4.4.4 | Records and document control plan |
| 4.4.5 | Communication plan |
| 4.4.6 | Management of change plan |
| 4.4.7 | Management review and audit plan |
| 4.4.8 | Training and skill plan |
| 5 | Integrity management for the pipeline lifecycle phases |
| 5.1 | General |
| 5.1.1 | Objectives |
| 5.1.2 | Principles |
| 5.2 | Key lifecycle integrity processes |
| 5.3 | Lifecycle phases for integrity management |
| 5.3.1 | General |
| 5.3.2 | Feasibility |
| 5.3.2.1 | Objectives |
| 5.3.2.2 | Principles |
| 5.3.3 | Design |
| 5.3.3.1 | Objectives |
| 5.3.3.2 | Principles |
| 5.3.4 | Procurement |
| 5.3.4.1 | Objectives |

- 5.3.4.2 Principles
 - 5.3.5 Fabrication
 - 5.3.5.1 Objectives
 - 5.3.5.2 Principles
 - 5.3.6 Transportation and storage
 - 5.3.6.1 Objectives
 - 5.3.6.2 Principles
 - 5.3.7 Integrity during installation
 - 5.3.7.1 Objectives
 - 5.3.7.2 Principles
 - 5.3.8 Pre-commissioning and commissioning
 - 5.3.8.1 Objectives
 - 5.3.8.2 Principles
 - 5.3.9 Handover — Preparation for operation
 - 5.3.9.1 Objectives
 - 5.3.9.2 Principles
 - 5.3.10 Operation and maintenance
 - 5.3.10.1 Objectives
 - 5.3.10.2 Principles
 - 5.3.11 Modifications during operations
 - 5.3.11.1 Objectives
 - 5.3.11.2 Principles
 - 5.3.12 Abandonment
 - 5.3.12.1 Objectives
 - 5.3.12.2 Principles
- 6 Risk assessment**
- 6.1 Definition of objectives and requirements
 - 6.1.1 General
 - 6.1.2 Objectives
 - 6.1.3 Requirements
 - 6.2 Team definition
 - 6.3 Segmentation
 - 6.4 Threat identification
 - 6.5 Probability of failure assessment
 - 6.6 Consequence of failure assessment
 - 6.6.1 Consequence assessment
 - 6.6.2 Critical consequence areas analysis
 - 6.7 Risk determination
 - 6.8 Reporting
 - 6.9 Reassessment
- 7 Inspection and monitoring**
- 7.1 Inspection
 - 7.1.1 General
 - 7.1.2 Preparation for inspection
 - 7.1.3 Requirements of equipment
 - 7.1.4 Reporting requirements
 - 7.1.4.1 General
 - 7.1.4.2 Delivery requirements
 - 7.1.4.2.1 Field report
 - 7.1.4.2.2 Preliminary report
 - 7.1.4.2.3 Final report
 - 7.1.4.2.4 Supplement report for other type of anomalies
 - 7.1.4.2.5 Software
 - 7.1.5 Review of inspection results
 - 7.2 Monitoring
 - 7.2.1 Main monitoring activities
 - 7.2.2 Identification and follow-up of available technology
 - 7.2.3 Current and vibration monitoring
 - 7.2.4 Monitoring of ship traffic and fishing activities
 - 7.2.5 Leak detection
 - 7.2.6 Review of monitoring data

- 8 Integrity assessment
 - 8.1 General
 - 8.2 Fitness for purpose
 - 8.2.1 Assessment data collection
 - 8.2.2 Defect data statistics and causation analysis
 - 8.2.3 Assessment method selection
 - 8.2.4 Residual strength and remaining life assessment
 - 8.2.4.1 General
 - 8.2.4.2 Acceptance criteria
 - 8.2.4.3 Acceptability criterion for corrosion
 - 8.2.4.4 Acceptability criterion for manufacturing defects
 - 8.2.4.5 Acceptability criterion for cracks
 - 8.2.4.6 Acceptability criterion for dents
 - 8.2.4.7 Acceptability criteria for weld defects
 - 8.2.4.8 Reporting requirements
 - 8.3 Pressure test
 - 8.3.1 General
 - 8.3.2 Preconditions for use of pressure-testing on an in-service pipeline
 - 8.3.3 Features to be considered for pressure test
 - 8.3.4 Pressure test risks
 - 8.3.5 Management measures
 - 8.3.6 Monitoring of pressure test procedures
 - 8.3.7 Review of pressure test results
 - 8.3.8 Pressure test report
 - 8.4 Direct assessment
 - 8.4.1 General
 - 8.4.2 Direct assessment process
 - 8.4.3 Direct assessment methods
 - 8.4.4 Limitations of direct assessment
 - 8.5 Other assessment
- 9 Mitigation
 - 9.1 General
 - 9.2 Internal mitigation methods
 - 9.3 External mitigation methods
 - 9.4 Corrosion control systems
 - 9.4.1 External corrosion
 - 9.4.2 Internal corrosion and erosion
 - 9.5 Management of unintended releases
 - 9.6 MAOP reduction
 - 9.7 Emergency response
 - 9.8 Repair methods
 - 9.8.1 Repair methods selection
 - 9.8.2 Detailed procedures
- 10 Performance measurement and improvement
 - 10.1 General
 - 10.2 Performance measurement
 - 10.3 Management review
 - 10.4 System audit
- 11 Data management
 - 11.1 Data acquisition
 - 11.1.1 Data acquisition content
 - 11.1.2 Data acquisition method
 - 11.1.2.1 Routing survey
 - 11.1.2.2 Data acquisition for pipeline facilities
 - 11.1.3 Data alignment
 - 11.2 Data transfer
 - 11.3 Data integration
 - 11.3.1 General
 - 11.3.2 Data integration requirements

- 12 Pipeline integrity management within emergency response planning and failure management
 - 12.1 Emergency response planning
 - 12.1.1 General
 - 12.1.2 Emergency plan preparation
 - 12.1.3 Preparation for emergency data
 - 12.1.4 Emergency response
 - 12.2 Failure management
 - 12.2.1 General
 - 12.2.2 Failure analysis
 - 12.2.3 Incident investigation report
 - 12.2.4 Remedial and preventative measures
 - 12.2.5 Failure recovery prior to restart
 - 12.2.6 Trend analysis of pipeline incidents and causes
- 13 Pipeline remaining life assessment and abandonment processes
 - 13.1 General
 - 13.2 Pipeline remaining life assessment process
 - 13.2.1 General
 - 13.2.2 Data collection
 - 13.2.3 Pipeline segmentation
 - 13.2.4 Integrity assessment
 - 13.2.5 Physical life determination
 - 13.2.6 Economic viability assessment
 - 13.2.6.1 Economic comparison
 - 13.2.6.2 Minimum annual average cost method
 - 13.2.6.3 Cost-benefit method
 - 13.2.7 Risk assessment
 - 13.2.8 Remaining life assessment
 - 13.3 Deactivation and abandonment process
 - 13.3.1 Guideline for the abandonment of a transportation pipeline
 - 13.3.2 Preparation before pipeline abandonment
 - 13.3.3 Pipeline cleaning
 - 13.3.4 Deactivation of pipeline
 - 13.3.5 Records
 - 13.4 Life extension and recycle of pipeline
 - 13.4.1 Life extension
 - 13.4.2 Reactivation of pipeline
 - 13.5 Up-rating
 - 13.5.1 General requirements
 - 13.5.2 Limitation on increase in maximum allowable operating pressure
 - 13.5.3 Up-rating method
 - 13.6 Reporting
- 14 Records and documents management
- 15 Communication
 - 15.1 General
 - 15.2 Communications
- 16 Management of change
- 17 Training and skills
 - 17.1 General
 - 17.2 Levels of skill
- Annex A (informative) Example approach of semi-quantitative risk assessment
- Annex B (informative) Risk matrix
- Annex C (informative) Example of the threat identification in lifecycle phases
- Annex D (informative) Establishing performance measures
 - D.1 Example of classification of performance measures

- D.2 Example of performance measures by integrity assessment process steps
- D.3 Inspection audit form

Annex E (informative) Integrity data acquisition list

Annex F (informative) Structure of pipeline data tables

Annex G (informative) Outline requirements for pipeline management training and skills

- G.1 Training program
- G.2 Training objectives
 - G.2.1 Training objectives of Level 1 management skills
 - G.2.2 Training objectives of Level 2 management skills
 - G.2.3 Training course outline for Level 3 management skills
 - G.2.3.1 General
 - G.2.3.2 Comprehensive integrity management and system management
 - G.2.3.3 Data management
 - G.2.3.4 Risk assessment
 - G.2.3.5 Pipeline inspection and assessment management
 - G.2.3.6 Management of pipeline defect repair
 - G.2.3.7 Pipeline maintenance
 - G.2.4 Requirements for skills

Page count: 91