MERCURY

Process Equipment and Piping: Damage Mechanisms and RBI

8 – 12 August 2027
Online



Dubai - UAE: +971 4 450 5697
Istanbul - Türkiye: +90 539 599 1206
Amman - Jordan: +962 79 712 3347

MERCURY

Process Equipment and Piping: Damage Mechanisms and RBI

Ref: 6037_300760 **Date:** 8 – 12 August 2027 **Location:** Online **Fees:** 2900 Euro

Process equipment and piping damage mechanisms and RBI cover how vessels, lines and tanks deteriorate in service, how to rank them by risk and how to decide whether each one runs, gets repaired or is rerated. This 1-week course is for engineers and inspectors who look after assets already in service, and you leave with an Asset Integrity Risk Register. This RBI course is delivered by Mercury Training Center.

About This Course

No plant can inspect every vessel and line at the same interval, yet deterioration does not wait for the next shutdown. You should already work with inspection findings, corrosion data or asset records. You practice on damage cases, RBI ranking sheets and fitness-for-service checks, then apply them to a unit you know.

Who It Is For

- Inspection engineers who plan examinations of vessels, lines and tanks and interpret their findings.
- Integrity and corrosion engineers who track deterioration and set inspection intervals.
- Reliability and upkeep engineers who decide when a degraded asset is repaired, altered or rerated.
- Plant engineers and supervisors who answer for safe containment in their unit.
- Technical staff who carry out NDT and report wall thickness and crack indications.

This course is not for engineers who need to size and lay out new vessels and pipework, who will get more from a mechanical design course, nor for NDT technicians seeking hands-on qualification in one method, who suit a method-specific inspection course.

Competencies You Will Build

- Damage Mode Recognition: you name the likely deterioration for each service and say where to look for it.
- Material Suitability Judgement: you check whether an alloy, lining or cladding still fits its service.
- Risk-Based Inspection Planning: you rank assets by probability and consequence and set intervals to match.
- Inspection Technique Selection: you choose an NDT method with the right probability of detection.
- Fitness-for-Service Assessment: you judge whether a flawed or thinned component can keep running.
- Root Cause Investigation: you trace an incident to its cause and stop it happening again.

What You Will Be Able to Do

By the end of the course you will be able to:

Dubai - UAE: +971 4 450 5697
Istanbul - Türkiye: +90 539 599 1206
Amman - Jordan: +962 79 712 3347

- From a unit's service conditions, list the credible damage modes for each vessel and line.
- Given an inspection history, set an RBI ranking and next inspection date following API 580.
- Using thickness readings from a corroded shell, run a first-level fitness-for-service check and state the result.
- Given a vibration or surge complaint on a line, identify the source and the support or restraint change needed.
- From a cracked component report, carry out a root cause review and write corrective actions.
- Using an assessment result, choose between continued service, repair, alteration or rerating.

Course Content

Day 1: Damage Modes and Deterioration

- Wear, Fretting and Fatigue Damage in Rotating and Static Assets
- Corrosion and Stress Corrosion Cracking in Hydrocarbon and Water Service
- Creep and Thermal Fatigue in High-Temperature Service
- Imperfections, Defects and Metal Loss as Causes of Strength Reduction
- Damage Mode Screening Sheet for a Unit's Vessels and Lines

Day 2: Materials, Root Causes and Integrity Limits

- Carbon, Alloy, Nickel, Titanium, Aluminum and Copper Alloy Behavior in Service
- Plastic Lines, Linings and Cladding: Limits and Safeguards
- Material Selection Economics and Life Cycle Costing
- Root Causes From Engineering, Operating and Upkeep Decisions
- Physical Limits of Tubing, Fittings, Vessels and Storage Tanks

Day 3: In-Service Incident Cases

- Vessel, Boiler and Line Rupture Case Histories
- Vibration and Flow-Induced Resonance in Pipework
- Transient Hydraulic Pulsation and Surge Effects
- Supports, Restraints and Wind Loading on Above-Ground Lines
- Industry Practices for Avoiding Repeat Incidents

Day 4: Risk-Based Inspection and Fitness-for-Service

- API 580 Risk-Based Inspection Strategy and Criticality Ranking
- RBI Plan Built From Probability and Consequence of Loss of Containment
- NDT Techniques, Probability of Detection and Technique Selection
- Damage Characterization and API 579-1/ASME FFS-1 Assessment Levels
- Smart Pigging, Cleaning and Operating Procedures for Pipelines

Dubai - UAE: +971 4 450 5697
Istanbul - Türkiye: +90 539 599 1206
Amman - Jordan: +962 79 712 3347

Day 5: Run, Repair or Rerate Practice

- Exercise: Ranking a Unit's Assets by RBI Risk
- Exercise: Fitness-for-Service Check on a Thinned Vessel Shell
- Exercise: Root Cause Review of a Cracked Line
- Upkeep Plans, Alteration and Rerating Choices for Degraded Assets
- Completing the Asset Integrity Risk Register for Your Own Unit

Case Studies and Exercises

These are suggested activities.

- Case study: a refinery heat exchanger shell shows local thinning at the inlet; you decide whether it runs to the next turnaround.
- Case study: a power plant boiler tube fails by creep; you identify the cause and the inspection change that would have caught it.
- Exercise: a gas processing unit's small-bore connections crack from vibration; you propose support changes and a monitoring plan.
- Exercise: a chemical plant needs a new inspection plan; you rank its vessels and lines with an RBI sheet and set intervals.

What You Take Back

You return with the Asset Integrity Risk Register for a unit you know. In your first month back, use it to compare the current inspection intervals with the risk ranking, flag assets that need an earlier look and raise fitness-for-service checks on known thinning.

- Damage mode screening for each vessel, line and tank.
- RBI ranking with probability, consequence and next inspection date.
- Chosen NDT technique for each damage mode.
- Run, repair, alter or rerate decision log.

Quick Answers FAQ

What should I know before a damage mechanisms and RBI course?

You should already read inspection reports, thickness data or asset records for a plant. Basic knowledge of metals and corrosion helps.

How does a damage mechanisms and RBI course differ from a mechanical design course?

A design course sizes and lays out new vessels and pipework to code. An RBI course looks at assets already running: how they deteriorate, how to rank them by risk, how to inspect them and whether a flaw can stay in service.

Dubai - UAE: +971 4 450 5697
Istanbul - Türkiye: +90 539 599 1206
Amman - Jordan: +962 79 712 3347

Why use risk-based inspection instead of fixed inspection intervals?

Risk-based inspection puts effort where deterioration is likely and a leak would matter most. Low-risk items can wait longer, high-risk items get earlier and better-targeted inspection, so the same budget covers the real threats.

What do I take back from damage mechanisms and RBI training?

You take back the Asset Integrity Risk Register: damage mode screening, an RBI ranking with inspection dates, technique choices and a run, repair or rerate log, built for a unit you know.

For Your Manager

After the course, the engineer can identify credible damage modes, rank assets with risk-based inspection, select inspection techniques and judge whether a flawed component can stay in service. They return with an Asset Integrity Risk Register for a current unit, first used to review inspection intervals before the next turnaround.