

DAY 1

Materials Testing and Failure

- Course Objectives and Overview
- Materials Testing – *Tensile, Impact, Hardness*
- Types of Failures – *Ductile / Brittle Fracture, Temperature Effects*
- Analytical Tools – *Visual Examination of Fracture Surface, Fractography, Microscopy*
- Industrial Failures – *Examples of Failures and Causes*

DAY 2

Damage and Interpretation of Failure I

- Stress Concentrating
- Fracture Mechanics
- Fatigue Failure
- High Temperature Creep
- Thermal Expansion and Deflections
- Worked Examples

DAY 3

Damage and Interpretation of Failure II

- Wear, Galling and Fretting
- Principles and Types of Corrosion Damage and Mitigation
- Vibration of Equipment and Piping
- Vibration Condition Monitoring
- Technical Problem Solving and Decision-making Approaches

DAY 4

Examples of Equipment Failure

- Pressure Vessels and Life Extension
- Heat Exchangers
- Pumps and Compressors
- Mechanical Seals and “O” Ring Failures

- Bearing Failure
- Pipes and Repair Techniques

DAY 5

Inspection, Testing and Condition Assessment

- NDT Methods and Techniques
- Inspection of Process Equipment
- Examples of Remaining Life Calculations
- Relevant Inspection Codes, API 570, etc.
- Course Summary and Wrap-up