MAWA EVENTS

Address: No. 857, Block A2. Leisure Commerce Square - No 9., 46150 Petaling Jaya, Selangor, Malaysia

Phone: +601116373203 | **Email:** info@mawaevents.net

MATERIALS ENGINEERING FOR THE OIL & GAS INDUSTRY

"Master the science and strategy of materials selection to extend equipment life, improve safety, and minimize failure in upstream and downstream operations."

Schedule

Venue (InHouse)	Fees
At Your Organization Premises	Ask For The Quotation

► **Available delivery methods:** In-House Training

Introduction

Materials engineering is a critical discipline in the oil & gas industry where assets must withstand harsh conditions, including extreme pressure, temperature, corrosion, erosion, and sour service environments. This course delivers a solid foundation in material behavior, selection, degradation, and mitigation techniques tailored to pipelines, offshore platforms, refineries, and petrochemical plants. Participants will explore the relationship between materials, corrosion control, mechanical integrity, and operational safety.

Objectives

By the end of this course, participants will be able to:

- Identify key materials used in oil & gas production and processing
- Evaluate material performance under different operating environments
- Understand failure mechanisms such as corrosion, stress corrosion cracking, and fatigue
- Apply proper selection and testing standards (NACE, ASME, ASTM, API)
- Recommend mitigation strategies to enhance material durability and integrity

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Why Attend

Inappropriate material selection or failure to understand material degradation mechanisms can result in costly shutdowns, environmental damage, and safety risks. This course ensures that engineers and inspectors understand how to make informed material choices, reduce failures, and extend equipment life cycles, especially in corrosive and high-risk environments.

Target Audience

- Materials Engineers and Metallurgists
- Integrity & Inspection Engineers
- Mechanical, Pipeline, and Process Engineers
- Corrosion and Coating Specialists
- Asset Integrity Managers
- Operations & Maintenance Personnel
- QA/QC and HSE Officers

Individual Benefits

- Gain technical proficiency in selecting suitable materials for oil & gas equipment
- Identify signs of material degradation and potential failure risks
- Increase your effectiveness in inspection and failure analysis
- Apply industry standards in real-world design and selection challenges

Organizational Benefits

- Minimize costly failures and unplanned shutdowns
- Enhance compliance with industry codes and safety regulations
- Improve asset integrity and extend service life of infrastructure
- Reduce maintenance costs through smarter material choices and design

Instructional Methodology

- Expert-led classroom instruction
- Illustrated case studies and failure analysis reports
- Interactive group discussions and exercises
- Videos and photos of real-world materials performance
- Standards review (e.g., API 5L, ASTM G48, NACE MR0175)

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Course Outline

DETAILED 5-DAY COURSE OUTLINE (CUSTOMIZABLE)

Training Hours: 7:30 AM – 3:30 PM **Daily Format:** 3–4 Learning Modules | Coffee Breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 – 02:00

Day 1: Materials Engineering Fundamentals for Oil & Gas

- Module 1: Overview of Metallurgy and Materials Engineering (07:30 – 09:30)
- Module 2: Common Materials in the Oil & Gas Sector (Carbon Steel, SS, CRA, Inconel) (09:45 – 11:15)
- Module 3: Physical and Mechanical Properties – Ductility, Toughness, Yield, Creep (11:30 – 01:00)
- Module 4: Introduction to Degradation Mechanisms (Corrosion, Erosion, Fatigue) (02:00 – 03:30)

Day 2: Corrosion and Material Degradation

- Module 1: Corrosion Basics – Types, Rates, and Conditions (07:30 – 09:30)
- Module 2: Sour Service Corrosion & NACE Compliance (MR0175 / ISO 15156) (09:45 – 11:15)
- Module 3: High-Temperature Hydrogen Attack, Pitting, Galvanic Corrosion (11:30 – 01:00)
- Module 4: Case Studies: Corrosion Failures in Oil & Gas Facilities (02:00 – 03:30)

Day 3: Materials Selection and Coating Systems

- Module 1: Material Selection Process – Key Criteria and Compatibility (07:30 – 09:30)
- Module 2: Coating Systems, Linings, and Cathodic Protection (09:45 – 11:15)
- Module 3: Advanced Alloys for Offshore and HPHT Applications (11:30 – 01:00)
- Module 4: Workshop: Material Selection for Pipeline vs. Refinery (02:00 – 03:30)

Day 4: Testing, Standards & Failure Analysis

- Module 1: Mechanical Testing – Hardness, Impact, Tensile, Creep (07:30 – 09:30)
- Module 2: Non-Destructive Testing (NDT) and Quality Control (09:45 – 11:15)
- Module 3: API, ASTM, ASME, and ISO Materials Standards Overview (11:30 – 01:00)
- Module 4: Failure Analysis Techniques and Investigation Reports (02:00 – 03:30)

Day 5: Integrity Management and Lifecycle Considerations

- Module 1: Role of Materials Engineering in Integrity Programs (07:30 – 09:30)
- Module 2: Risk-Based Inspection and Fitness-for-Service (09:45 – 11:15)
- Module 3: Lifecycle Management – Aging Assets and Retrofits (11:30 – 01:00)
- Module 4: Final Group Activity: Material Strategy Plan for a Facility (02:00 – 03:30)

Certification

Participants will receive a Certificate of Completion: Materials Engineering for the Oil & Gas Industry, validating their competency in materials selection, degradation assessment, and performance optimization in oil & gas operations.

Why Choose MAWA Events

- **Global Expertise:** More than 17 years of experience in professional training and consulting.
- **Industry-Leading Faculty:** Courses delivered by seasoned professionals with hands-on experience.
- **Practical Insights:** Learn to turn theory into actionable strategies for real-world business impact.
- **Client-Focused Solutions:** Customized programs designed to achieve your organisation’s unique goals.

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In-House / Customized Training Interested in running this course for your team? Please contact us:	TEL: **+601116373203**	EMAIL: **info@mawaevents.net**