



**London TDM**

# **Engineering and Technical Skills Training Courses**

**Course Venue:** United Kingdom - London

**Course Date:** From 11 January 2026 To 15 January 2026

**Course Place:** London Paddington

**Course Fees:** 7,500 USD

## Introduction

This professional course on "Engineering Materials and Failure Analysis" is designed to provide participants with comprehensive knowledge of material properties and the fundamentals of failure analysis. Participants will learn about material selection, mechanical properties, and common causes of failure, equipping them with the skills to identify and prevent future failures.

## Objectives

- Understand the fundamental properties of engineering materials.
- Identify various types of material failures and their causes.
- Analyze failure mechanisms through practical examples.
- Apply knowledge of material properties to real-world engineering problems.
- Develop skills in selecting appropriate materials for specific applications.

## Course Outlines

### Day 1: Introduction to Engineering Materials

- Overview of different types of materials: metals, ceramics, polymers, and composites.
- Atomic structure and bonding in materials.
- Properties of materials and their importance in engineering.
- Introduction to material selection processes.
- Case studies on material applications in industry.

### Day 2: Mechanical Properties of Materials

- Stress-strain relationships and their significance.
- Mechanical properties: toughness, hardness, ductility, and fatigue.
- Testing methods for evaluating mechanical properties.
- Understanding material behavior under different loading conditions.
- Practical session: Tensile testing and hardness testing demonstrations.

### Day 3: Introduction to Failure Analysis

- Common types of material failures: fatigue, creep, corrosion, and wear.
- The failure analysis process: steps and methodologies.
- Tools and techniques used in failure analysis.
- Introduction to fracture mechanics.
- Case studies of engineering failures and lessons learned.

### Day 4: Advanced Failure Analysis Techniques

- Non-destructive testing (NDT) methods in failure analysis.
- Microscopic examination and its role in identifying failure modes.
- Characterization techniques: SEM, EDS, and XRD.
- Predicting failures through simulations and modeling.
- Hands-on session: Analysis of failed components using NDT techniques.

## **Day 5: Material Selection and Design Considerations**

- Factors influencing material selection for engineering applications.
- Designing for reliability and prevention of material failure.
- Integration of material selection and failure analysis in design processes.
- Environmental and economic considerations in material choice.
- Capstone project: Application of course concepts to a real-world problem.