

**MODERN WELDING  
TECHNOLOGY: WELDING,  
FABRICATION &  
INSPECTION (AWS,  
ASME & API codes)**



**WMC1080  
WELDING  
ENGINEERING**

## **COURSE TITLE**

**MODERN WELDING TECHNOLOGY: WELDING, FABRICATION & INSPECTION (AWS, ASME & API codes)**

## **COURSE DATE/ VENUE**

1<sup>st</sup> -05<sup>th</sup> July 24'

London, UK

## **COURSE REFERENCE**

WMCI080

## **COURSE DURATION**

05 Days

## **DISCIPLINE**

WELDING ENGINEERING

## **COURSE INTRODUCTION**

The American Welding Society (AWS), American Society of Mechanical Engineers (ASME), and American Petroleum Institute (API) are prominent organizations that establish standards and codes governing welding, fabrication, and inspection practices. These codes ensure safety, quality, and performance in welded structures and components.

Introduction to AWS, ASME, and API Codes:

### **American Welding Society (AWS):**

- AWS is a non-profit organization dedicated to advancing the science, technology, and application of welding and allied joining processes.
- AWS publishes various codes and standards covering welding procedures, qualifications, inspection, and safety.
- Some notable AWS codes include AWS D1.1 for structural welding, AWS D1.6 for stainless steel welding, and AWS D1.2 for aluminum welding.

### **American Society of Mechanical Engineers (ASME):**

- ASME is a professional association focusing on the development and advancement of mechanical engineering.
- ASME Boiler and Pressure Vessel Code (BPVC) sets standards for the design, fabrication, and inspection of boilers, pressure vessels, and nuclear power plant components.
- Other ASME standards related to welding include ASME B31.1 for power piping and ASME B31.3 for process piping.

### **American Petroleum Institute (API):**

- API is a trade association representing the oil and natural gas industry.
- API publishes standards related to welding, fabrication, and inspection of equipment and structures used in the petroleum industry.
- API standards cover a wide range of topics, including welding procedures for pipelines, storage tanks, and offshore structures.

### **COURSE OBJECTIVE**

#### **Upon successful completion of this course, the delegates will be able to:**

This training course provides the complex science of welding- processes, selection of power sources, weld metallurgy, weld ability of metals, testing and inspection techniques. Also covers welding processes, welding consumables, design of welded joints, applied welding metallurgy and heat treating, welding quality control, non-destructive testing and major International Welding Codes and Standards such as AWS, API & ASME.

Appreciation of Weld Design, Development, Planning, Production

Understanding the key welding concepts to design and produce quality welds, reliably and economically.

## **COURSE AUDIENCE**

Inspection engineers, Mechanical Engineers, Electrical Engineers, NDT personnel, quality assurance personnel, auditors, testing laboratory personnel, and maintenance personnel. Further, this course is a must for anyone involved in the inspection of welding construction, qualifying welders, and operators; or other involved in writing and qualifying welding and brazing procedure specifications; those responsible for reviewing supplier procedures, auditing or reviewing in-house procedures and qualifications; and those who estimate jobs where compliance of ASME code.

## **Course Outcome**

- **Introduction to welding**
- **Overview of codes of construction**
- **Materials of construction**
- **Overview of fusion welding process**
- **Basic welding Metallurgy.**
- **Welding Consumables, usage testing**
- **Welding of plain carbon steels**
- **Welding of low alloy steels**
- **Welding of Stainless steels**
- **Welding of dissimilar materials**
- **Welding of Procedure Qualifications**
- **Welding of Performance Qualifications**
- **Welding defects, process & detection**
- **Welding processes**
- **Concepts of SMAW, GTAW, GMAW, FCAW, SAW, RSW etc.,**
- **Safety precautions in welding**
- **Economics of welding**
- **Welding consumables**
- **Weld joint design and basic symbols, Metal Joining and Cutting Process**

- Weld faults- causes and remedies
- Destructive and Non-destructive testing
- Welding qualification WPS, PQR, WPQ.
- QA systems for coded fabrication, typical QA plan

## **COURSE CONTENT**

- Introduction to welding
- Terminology
- Terms & Definitions
- Welding Safety
- Introduction to welding codes and standard (ASME IX, API 1104 and AWS D1.1)
- The main duties of the welding inspector
- Introduction to Welding Processes
  - SMAW
  - GMAW
- Introduction to Welding Processes (cont.)
  - FCAW
  - GTAW
  - PAW
  - SAW
- Welding Consumable types according to (AWS & ASME II PART C)
- Material of construction types, properties, and weldability
  - Ferrous materials
    - Carbon steel
    - Low alloy steel
    - Alloy steel (stainless steel)
    - Nonferrous materials
    - Nickel base alloy (Monel & Inconel)
- Mechanical Testing

- Tensile test
- Hardness test
- Impact test
- Heat treatment and weldability of steel
  - Annealing
  - Normalizing
  - Quenching
  - PWHT
- Welding Symbols on Drawings
- Welding Imperfection types
  - Cracks
  - Porosity
  - Lack of penetration and fusion
  - Slag inclusion
  - Under cut
  - residual stress & distortion
- Documents cover welding qualifications as per ASME IX.
  - Welding Procedures specification (WPS)
  - Procedure qualification records (PQR)
  - Welder performance qualifications (WPQ)
- Introduction to Non-Destructive testing (NDT)
  - Visual Inspection Section
  - PT
  - MT
  - UT
  - RT
- Repair by welding according to ASME PCC-2

**COURSE CERTIFICATE**

**TRAINIT ACADEMY** will award an internationally recognized certificate(s) for each delegate on completion of training.

### **COURSE FEES**

£5,500 per Delegate. This rate includes participant's manual, Hand-Outs, lunch, coffee/tea on arrival, morning & afternoon of each day.

### **COURSE METHODOLOGY**

The training course will be highly participatory and the course leader will present, guide and facilitate learning, using a range of methods including formal presentation, discussions, sector-specific case studies and exercises. Above all, the course leader will make extensive use of real-life case examples in which he has been personally involved. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Case studies & Practical Exercises
- 10% Role Play
- 10% Videos, Software or Simulators (as applicable) & General Discussions