Tel No:+97126654546 | Fax No:+97126654182 | Email: training@cmc-me.com | www.cmc-me.com

FE140-4D:
Welding Technology Process, Procedures, Inspection & Safety

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Training Description:

Industrial Facility Visit: Course participants will be taken to an industrial facility where they will practice welding, fabrication and inspection. In case that this course is organized inside client premises (In-House), then client shall provide access to its welding and fabrication workshop for practical sessions.

Welding Simulator: Participants will use in the class the welding & fabrication software and AWS Tool Kit & Structural Weld Replica Kit to practice some of the skills learnt.

Welding Technology plays a major role in all maintenance and fabrication activities in the industry. Production equipment, a highly sophisticated welding technique and qualified personnel allow processing or production of steel products for different applications within short periods. This course provides a much needed source of authoritative information on the complex subject of welding. It provides a comprehensive run-down of the complex science of welding- processes, selection of power sources, weld metallurgy, weldability of metals, testing and inspection techniques.

The course will cover welding processes (GTAW, SMAW, MIG, FCAW, SAW, OAW), 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 and API.

Each session will be conducted in a lecture/discussion format and videos designed to provide intensive instruction and guidance. The director will be available following each day's session to provide participants with further opportunity for discussion and consideration of specific problems.

The course includes detailed discussions about welding of pipelines and related facilities in accordance with API 1104, AWS D1.1, ASME IX and API 577 codes and standards.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Apply and gain an in-depth knowledge on welding technology including welding, fabrication and inspection in accordance with AWS, ASME and API codes and standards
- ✓ Differentiate the various welding process such as SMAW, GTAW, GMAW, FCAW and OAW
- ✓ Identify the arc welding consumables including welding wires, coated electrodes, sub arc wires and fluxes, neutral and active fluxes and shielding gases
- ✓ Describe the properties and strength of materials and carryout destructive testing
- ✓ Analyze the fatigue of welded structures, joint design as well as dissimilar welds and weld overlays
- ✓ Characterize the metallurgical properties of steel and heat treatment and implement welding quality control
- ✓ Practice the latest standards and procedure for welding pipeline and employ related facilities
- ✓ Discuss the history and structure of API 1104, AWS D1.1 and ASME code
- ✓ Explain the standards and specification of ASME Sec IX and practice the correct welding procedures as well as supplemental variables and special consideration for notch toughness
- ✓ Implement welding safety with proper procedure and specification
- ✓ Inspect welding in accordance with API 577 standard

Training Designed for:

This course is intended for welding engineers, inspection engineers, facility integrity engineers, fabrication engineers, mechanical engineers, NDT personnel, quality assurance personnel, testing laboratory personnel, and maintenance personnel. Further, this course is a must for anyone involved in inspection of welding construction, qualifying welders, brazers and operators; or 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 in compliance of ASME code.

Training Requirement:

"Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request."

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

FOUR DAYS:

- Welding Processes
  - Fundamentals, SMAW (Shielded Metal Arc), GTAW (Gas Tungsten Arc), GMAW (or MIG) (Gas Metal Arc), FCAW (Flux Cored Arc), SAW (Submerged Arc), Stud Welding, OAW (Oxy Acetylene), High Energy, Special & Hybrid Welding Processes, Power Sources for Arc Welding, Brazing & Cutting Processes
- Classification of Arc Welding Consumables
  - Coated Electrodes, GMAW & GTAW Wires, FCAW Wires, Sub Arc Wires & Fluxes, Neutral & Active Fluxes, Shielding Gases
- Properties & Strength of Materials
  - Material Properties, Destructive Testing
- Fatigue of Welded Structures
  - Fatigue Mechanisms, Weld Finish Classifications
- Joint Designs
  - Joints, Symbols, Preparation, Design for Productivity
- Dissimilar Welds & Weld Overlays
  - Metallurgical Properties of Steel & Heat Treatment
  - Metallurgical Properties of Steel, Preheating, Post Weld Heat Treatment (PWHT), Field Heat Treating Equipment, Plans for PWHT
- Welding Quality Control
  - Planning for QC, Welding Problems & Defects, Visual Inspection, Employment of NDT, Welder Training & Qualification, CSWIP vs. ASNT Qualification
- Welding of Pipelines & Related Facilities (API 1104)
  - General, Referenced Publications, Definition of Terms, Specifications, Qualification of Welding Procedures for Welds Containing Filler-Metal Additives, Qualification of Welders,
  -

Design & Preparation of a Joint for Production Welding, Inspection & Testing of Production Welds
- Acceptance Standards for Nondestructive Testing, Repair & Removal of Defects, Alternative Acceptance Standards for Girth Welds, In-Service Welding, Procedures for Nondestructive Testing, Automatic Welding, Automatic Welding without Filler-Metal Additions

❖ API 1104 & AWS D1.1: History & Structure
- Historical Development of AWS D1.1 & API 1104, Pre-Qualification & Qualification of Welding Procedures, The Use of Pre-qualified Procedures, Base Metal Classifications to AWS & API

❖ ASME Code, History & Structure
- Historical Development of Section IX, Relationship of Section IX to Other Codes (ASME V111 & B31.3), Organization, Structure & Mechanics of Using Section IX–Essential, Non-Essential & Supplemental Essential Variables

❖ ASME Section IX: Base & Filler Metal Specifications
- P numbers & Base Metal Classifications, F-numbers, A-Numbers, SFA & Non-SFA Filler Metal Specifications, The Use of Standard Welding Procedures

❖ Recap

❖ Practical Session/Industrial Facility Visit

❖ Simulator (Hands-on Practical Sessions)

❖ ASME Section IX: Selecting & Preparing the Test Coupon for Both Procedure & Welder Qualifications
- Obtaining Maximum Cost-Effectiveness from Test Coupons, Preparation & Welding of the Test Coupon, Recording Both Necessary & Worthwhile Data, Demonstrating Code Compliance

❖ ASME Section IX: Writing Welding Procedure Specification
- Meeting Code Requirements, Addressing Customer Requirements, Providing Direction to the Welder, Sources of Information for Preparing Intelligent & Meaningful Welding Procedure Specifications

❖ ASME Supplemental Variables – Special Consideration for Notch Toughness
- How Welding Influences Toughness, Toughness Requirements of Construction Codes, Measuring & Recording Heat Input Data, Translating Heat Input Data into Useful Directions for a Welder, Typical Construction Code Requirements

❖ Welding Safety
- Electric Shock, Radiation, Fire & Explosions, Eye Injuries, Fume, Hearing Impairment

❖ Procedure Specification
- Use of Section IX Form, Other Formats, Procedure Qualification Record Forms, Revisions to Records & Procedures, Take-Home Test

❖ API 577 Welding Inspection
- Welding Inspection Procedure, NDT, Metallurgy, Refinery & Petrochemical Plant Welding Issues

❖ Course Conclusion

❖ POST-ASSESSMENT and EVALUATION

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:

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