Welding and Metallurgy for Industry Professionals

Potential PDH: 24

Description:

The **Welding and Metallurgy for Industry Professionals** course covers welding processes, metallurgy fundamentals, defect prevention, and inspection techniques. Topics include welding metallurgy, heat-affected zones, defects, inspection methods, and specialized applications like strip lining and in-service welding. Case studies, industry codes, and welding procedure reviews connect theory to practice.

Outline:

Day 1:

- **Importance of joining process in the industry**
- **Differences between techniques (welding, brazing, soldering, adhesives)**
- **History of fusion welding**
- **Metallurgy Introductions**
  - o Carbon Steel and low alloys
  - o Stainless Steels (austenitic, ferritic, martensitic)
  - o Duplexes
  - o Nickel Alloys
  - o Titanium, Aluminum, Specialty Alloys
- **Welding Processes**
  - o Major processes (SMAW, SAW, GMAW, GTAW, FCAW)
  - o Basic welding consumables (rods, wires, fluxes, gases)

Day 2:

- **Metallurgy and Welding**
  - o What type metallurgical issues can arise with welding?
  - o HAZ concerns
  - o Heat Treatments
  - o Thermal Cycling
- **Welding Defects**
  - o Hot Cracking
  - o Cold Cracking
  - o Effects of hydrogen
  - o Environment and welder performance
- **Welding Inspection**
  - o Visual

- o Ultrasonic Testing
- o Radiography
- o Ferrite Testing
- o PMI
- o Advanced Techniques

Day 3:

- **Special Topics**
  - o Strip Lining
  - o Weld Overlay
  - o Roll and Explosion Bond
  - o Welding Repairs
  - o Hydrogen Bakeout
  - o Preheat/PWHT
  - o Temper Bead
  - o In-Service Welding
- **Case History**
  - o The good, bad, and ugly
- **Code Application**
  - o What codes govern welding in industry?
  - o API, ASME, AWS, etc.
  - o Practical WPS/PQR Review
- **Wrap-up**

Who Should Attend:

This course is for professionals in welding, fabrication, inspection, and metallurgy, including welding engineers, QA/QC inspectors, reliability engineers, fabrication supervisors, metallurgists, and project managers in industries like oil & gas, petrochemicals, power, and manufacturing.

Subject Matter Expert (SME):

Andrew G. Thigpen is a materials and integrity engineer specializing in welding, metallurgy, and asset integrity. He has led inspection, corrosion control, and risk-based integrity programs at Vertex Mobile Site and Shell Mobile Refinery, contributing to renewable diesel conversion and welding program development. An API RP 582 Subcommittee member, he holds a B.S. in Mechanical Engineering from Auburn, an M.S. in Welding Engineering from Ohio State, and multiple API certifications, including CWI.

John P. Richert, a refining metallurgy and corrosion expert, has 40 years of experience in damage mechanisms, mechanical integrity, and corrosion control. He has led corrosion studies, failure

investigations, and RBI at Unocal, Saudi Aramco-Mobil, and ExxonMobil, where he also drove global mechanical integrity initiatives. An active AMPP (NACE) member, he contributes to technical committees, publications, and conferences. He holds a B.S. in Metallurgical Engineering from Cal Poly, San Luis Obispo.

Terry McLane brings vast experience in inspection and mechanical integrity, holding numerous certifications such as API-510 and AWS-CWI. His background includes roles as Chief Inspector and Inspection Superintendent, where he oversaw safety protocols and major projects. Actively engaged with API committees, he contributes to industry standards and teaches on welding metallurgy and safety, equipping students with the technical and safety knowledge needed in the field.