

Curriculum for Online 2-Session Training Programme on Welding Inspection Fundamentals

Session 1: Welding Processes and Joint Geometry (3 Hours)

Objective: Introduce participants to fundamental welding processes and joint geometries, essential for project management, decision-making, and ensuring weld quality.

Content Outline:

1. **Overview of Welding Processes:**
 - Introduction to industrial welding applications.
 - Importance of understanding different welding processes.
2. **Key Welding Processes:**
 - **Shielded Metal Arc Welding (SMAW):** Principles, applications, and limitations.
 - **Gas Metal Arc Welding (GMAW):** Process overview, key parameters, and material compatibility.
 - **Flux Cored Arc Welding (FCAW):** Differences from GMAW, typical uses in structural and heavy fabrication.
 - **Gas Tungsten Arc Welding (GTAW):** Detailed process, high-precision applications, and material suitability.
 - **Submerged Arc Welding (SAW):** Process characteristics, benefits, and common industries.
 - **Arc Stud Welding (SW):** Application in fastening and fabrication, process specifics.
3. **Welding Joint Geometry:**
 - Importance of joint design in welding.
 - Overview of single V, double V, and flare bevel joints.
 - Complete Joint Penetration (CJP) vs. Partial Joint Penetration (PJP).
 - Backing weld or groove face for weld integrity.
4. **Practical Examples and Case Studies:**
 - Real-world applications of welding processes and joint geometries.
 - Group discussion on process and joint selection based on scenarios.
5. **Q&A and Interactive Discussion:**
 - Clarification of concepts and discussion on process selection.

Session 2: Welding Symbols, Procedures, and Defects (3 Hours)

Objective: Equip participants with skills to read and create welding symbols, understand welding procedures, and identify and manage welding defects.

Content Outline:

1. **Welding Symbols Fundamentals:**
 - Introduction to AWS and ISO standards.
 - Basic elements and symbols for different joint types.
 - Creating welding symbols and comparison of AWS vs. ISO standards.
2. **Welding Procedures and Qualifications:**
 - Overview of pWPS, WPQR, and WPS.
 - Purpose and development of PQR.
 - Interpretation and application of WPS in the field.
 - Overview of welder qualifications and standards.
3. **Welding Defects and Discontinuities:**
 - Definition, classification, and impact of welding defects.
 - Common defects like excessive reinforcement, overlap, and undercut.
 - Critical discontinuities like incomplete fusion and hydrogen cracking.
 - Lamellar tearing causes and prevention techniques.
4. **Inspection and Evaluation Techniques:**
 - Visual inspection and Non-Destructive Testing (NDT) methods.
 - Criteria for determining weld acceptability.
5. **Practical Scenarios and Case Studies:**
 - Hands-on exercises in creating and interpreting welding symbols.
 - Real-world examples of welding defects and defect management.
6. **Q&A and Final Discussion:**
 - Clarification of symbol interpretation, procedure qualification, and defect management.
 - Discussion on the importance of accurate symbols and welding procedures in project outcomes.

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