

Internationell svetskonstruktör, IWSD - Kursprogram

Module 7: FABRICATION, COSTS, QUALITY AND INSPECTION

Modul 7: Tillverkning, kostnader, kvalitet och inspektion

7.1 Fabrication costs and cost reduction, 8 tim

Objective:

The students will understand the average cost levels of various fabrication processes and how they affect the total cost of a product

Scope:

Joint preparation costs
Filler material cost
Welding speed and machine costs
Fixed and marginal costs
Semi finished components

Expected result at comprehensive and standard levels:

Compute example on the influence of weld throat thickness on weld cost.
Illustrate typical division of welding costs for different types of welding operations.
Review typical production process and their relationship between cost and productivity.
Comparison of costs levels for manual welding, mechanized welding and robot welding.
Review of case studies in fabrication cost reduction.

7.2 Fabrication friendly design, 10 tim

Objective:

The students will have be acquainted with the costs of common fabrication processes of a welded structure and how these costs can be minimized during the design process. The student should know how to communicate these "fabrication friendly" concepts in a design drawing.

Scope:

Production costs
Manufacture friendly design
Automated and robotized production
LCC
Production measures

Expected result at comprehensive and standard levels:

Explain the influence of design in the total cost of a finished product.
Explain the principals of life cycle costs.
Review industrial case studies on product cost reduction.
Present limitations and advantages of various automated and robotized processes and how these influence design.
Explain general steps to reduce the overall costs of a structure.
Review different and often conflicting measures of fabrication productivity.
Illustrate good and bad examples of design drawings for efficient fabrication costs.

7.3 Quality assurance in welding fabrication, 4 tim

Objective:

The students will be acquainted with the role, methods and requirements for quality assurance in welding fabrication

Scope:

Quality standards involved
Weld imperfections
Acceptance of imperfections
Quality systems for production

Expected result at comprehensive and standard levels:

Review fundamental aspects of a quality system for fabricated structures.
Explain and identify typical defect types in welded joints.
Review typical corrective actions for reducing weld flaws.
Review of relevant standards for quality control, e.g., ISO 9001 "Quality management systems", EN 3834-series "Quality requirements for welding technology", ISO 6520-1:1998 "Welding and allied processes. Classification of geometrical imperfections in metallic materials- Part 1 fusion welding", ISO 5817:2003 (EN 5817) "Welding - Fusion welded joints in steel, nickel titanium and their alloys - Quality level for imperfections" and ISO 10042:2006 "Arc Welding Joints in Aluminium and its Weldable Alloys - Guidance on Quality Levels for Imperfections".

7.4 Inspection methods and criteria, 3 tim

Objective:

The students will have be acquaint with the common inspection methods of welded structures and their applicability

Scope:

Inspection methods

Destructive testing:

- Charpy;
- Tensile;
- Bending;
- Etc.

Non-destructive testing:

- Magnetic particle;
- Ultrasonic;
- Etc.

Expected result at comprehensive and standard levels:

Explain the technical limitations of common non-destructive inspection methods.

Explain the function of common destructive test procedure.

Introduce documentation relevant to the inspection of welded joints.

Review of relevant standards for quality control, e.g., (ISO 5817:2003) "Arc-welded joints in steel – Guidance on quality levels for imperfections", ISO 15614-1 "Welding Procedure Tests For The Arc Welding Of Steel", EN 571-1 "Non destructive testing. Penetrant testing. Part 1: General principles", EN 583-1 "Non-destructive testing. Ultrasonic examination. Part 1: General principles", etc.