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Erasmus+ Project:
South Mediterranean Welding Centre for
Education, Training and Quality Control, SM
Weld
Project Number:
561786-EPP-1-2015-1-SE-EPPKA2-CBHE-JP



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Training Course: Economics of Welding *with Certification*

In the framework of the Erasmus+ Project: South Mediterranean Welding Centre for Education, Training and Quality Control, SM Weld; **Project Number:** 561786-EPP-1-2015-1-SE-EPPKA2-CBHE-JP

in collaboration with the University of Science and Technology Houari Boumediène-USTHB and the Centre Métal-Construction-CTMC, sis Béni-Amrane-Boumerdes (

Training provided from March 14th to March 26th, 2019 by:

Professor Nicolescu CORNEL-MIHAI

Royal Institute of Technology-KTH (www.kth.se)

School of Engineering & Management

Certified for Economics of welding program

From

the American Welding Society-AWS

Objective of the course

How to identify and measure the cost of production so you can reduce the costs without sacrifice quality

Course description

- ❖ In order to hold down costs, you have to be familiar with all of the materials and processes that go into making your product.
- ❖ That is the only way that you will be able to realistically estimate how much it costs to make your product and set prices accordingly.
There are a number of factors that affect the cost of a finished welded piece.
- ❖ An understanding of all process variables and an accurate means of calculating the costs will allow to manipulate those variables in order to maximize efficiency without sacrificing quality

Course length:40 hr

Part 1: Process Variables – 8hr

Each variable can affect a weld's overall size and shape, and can cause problems that will distort the weldment if handled improperly

Objective

- ❖ Identify process variables
- ❖ How process variables affect the weld outcome

Course Content

Seminar 1.1 – Process Variables: Current, Amperage, Voltage

Seminar 1.2 – Process Variables: Polarity, Inductance, Arc Length, CTTWD, Shielding Gas

Seminar 1.3 – Process Variables: Travel Angle, Transverse Angle, Travel Speed, Electrode Position, Wire Feed Speed

Seminar 1.4 – Arc Welding Process Variables: SMAW, GTAW, GMAW, FCAW, SAW

Part 2: Process Selection – 8hr

We will focus on the unique properties that lend each process their relative advantages and limitations.

Understanding the unique qualities of these processes is the key to making smart, cost-effective decisions about the welding method we choose to apply.

Process selection depends on several factors including cost, weld quality, efficiency and flexibility.

Objective

- ❖ Understand the unique characteristics of five welding processes
- ❖ Understand how the welding processes vary from each other
- ❖ Analyze a potential application and select a welding process that best suits project needs and resources

Seminar 2.1 – Weld Process Comparison: Advantages and Disadvantages I

Seminar 2.2 – Weld Process Comparison: Advantages and Disadvantages II

Seminar 2.3 – Manufacturing Costs: Materials, Labour, Equipment, Overhead

Special theme: Welding Procedure Specification – 2hr

The welding procedure specification (WPS) provides important data needed to calculate the cost of the weld. Thus, the welding procedure specification can serve as the starting point for a cost estimate for welding, as it defines the welding variables to be used in the manufacturing process and provides a basis for repeatability and consistency in production.

Part 3: Cost – 12hr

Manufacturing costs are the expenses incurred as a result of producing a product.

For example, the manufacturing costs incurred when building a birdhouse include the price of such items as the wood, nails, glue and a hammer.

Cost is likely to come to mind when asked to think economically.

After all, we must consider what we will have to pay in order to perform a weld process, and cost can take many forms in welding. For example, we must consider the initial cost of purchasing or renting equipment.

We must also consider the cost of consumable materials, such as electrode wire or flux, the cost of transporting equipment or setting up a permanent facility with automated equipment and the cost of labour. These are just some of the factors that should be considered before choosing a process.

After all, if a process is too expensive, then no matter what other benefits the process has, another choice must be made. Alternatively, just because a process has a high initial price tag - perhaps due to expensive equipment or consumables - doesn't mean that the process won't ultimately prove more valuable in the long run because of high production rates.

Objective

In this module, you will be able to: define the fundamental concepts and variables that affect labor welding costs and define and calculate deposition rate.

Seminar 3.1 – Determining the Cost of Weld: Calculating Area

Seminar 3.2 – Determining the Cost of Weld: Calculating Volume

Seminar 3.3 – Determining the Cost of Weld: Calculating Deposited Weight

Seminar 3.4 – Determining the Cost of Weld: Calculating Deposition Efficiency

Seminar 3.5 – Determining the Cost of Weld: Calculating Deposition Rate

Seminar 3.6 – Calculating Labour Costs: Arc Time, Non-Arc Time, Total Labor Time

Seminar 3.7 – Calculating Labour Costs: Operator Factor

Seminar 3.8 – Calculating Labour Costs: Problem Solving

Seminar 3.9 – Calculating Filler Metal and Labour Costs: Problem Solving

Seminar 3.10 – Calculating Weld Job Costs: Problem Solving

Seminar 3.11 – Managing Costs: Joint Design, Weld Design, WPS, Mistake Proofing, Production Planning

Seminar 3.12 – Managing Costs: Eliminating Operations, Supporting Activities, Field Welding, process Selection

Seminar 3.13 – Managing Costs: Unforeseen Costs, Quality Issues, Overwelding

Part 4: Problems – 6hr

Seminar4.1 – Practice Problems: 15 Problems

Seminar4.2 – Practice Quiz 1: 5 Problems

Seminar4.3 – Practice Quiz 2: 5 Problems

Seminar4.4– Practice Quiz 3: 5 Problems

Seminar4.5 – Practice Quiz 4: 5 Problems

Part 5: Welding Laboratory/Demonstration – 4hr

BIBLIOGRAPHY

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