

AMSB27 JOINING TECHNIQUES IN SHIP BUILDING TECHNOLOGY

UNIT-1 INTRODUCTION

- 1.1 Definition, Historical Background, Electric arc welding, Development in Welding, Science of Welding
- 1.2 Welding Metallurgy: Introduction, Structure of metals, Crystallisation of a pure metal, Equilibrium of constitutional dig.
- 1.3 Phase transformation in Iron- Carbon diagram, Weldability of steel, Presence of alloy elements, Effect of welding process & nature of base metal, Preheating, HAZ.

UNIT-2 GAS METAL ARC WELDING

- 2.1 Process, different metal transfers, power source, electrodes, shielding gas, uses of Gas in metal arc welding Mechanized system in shipbuilding
- 2.2 Introduction, philosophy of automation in welding, different welding systems in shipyards,
- 2.3 Welding in production shop- SAW, Gravity welding, Auto contact, CO 2 Welding

UNIT-3 PANEL LINE PRODUCTION

- 3.1 One-sided welding – SAW, MIG welding, welding of stiffeners Welding in building berth
- 3.2 External welding on the berth, Electro-slag welding, Electro-gas welding, One sided welding (Flux Asbestos backing, Ceramic backing etc);
- 3.3 Internal welding on the berth. Comparison of European, Japanese & Indian Welding Process

UNIT-4 WELDING PROBLEMS

- 4.1 Weld defects, Distortion, Accuracy control; Non-destructive tests. Welding quality control
- 4.2 Welding standards, Welding procedure qualification,
- 4.3 Effect of variables on qualification of tests, Performance qualification of Welders & operators,
- 4.4 Test reports, Acceptance standards, Quality assurance and audit,
- 4.5 Consumable classification & coding. Introduction to Robotic Welding.

UNIT-5 STRUCTURAL ADHESIVE BONDING AS A JOINING TECHNIQUE

- 5.1 Adhesives and adherands, bonding methods and joint design, analysis of joints for strength,
- 5.2 Surface preparation for steel, aluminium and other materials used for marine structures.

Reference Books:

1. Davies, A.C.; Welding, Cambridge University Press, Low Price Edition, 1996.
2. Richard, Little; Welding Technology, McGraw Hill Publications, New Delhi., 2001.
3. Joe Lawrence; Welding Principles for Engineers, Prentice-Hall Inc. Englewood Cliffs, N.J., 1951.
4. Welding Handbook – Vol.:1, 2,3; American Welding Society, 1991.
5. O.P. Khanna; A Textbook of Welding Technology, Dhanpat Rai & Sons., 2011.