

# AMSB21 STRUCTURAL DESIGN OF SHIPS

## UNIT-1 INTRODUCTION SHIPBUILDING MATERIALS

- 1.1 Transition from wood to steel (historical review), shipbuilding quality steels (properties, steel grades);
- 1.2 Joining techniques – riveting, welding (butt joints, fillet joints, lap joints, welding symbols, weld strength);
- 1.3 Ship structural design concepts – specialisation of the structure, general considerations in structural design, external loads (review),
- 1.4 Structural analysis models, design criteria, steps in structural design procedure, design from first principles, design according to classification rules.

## UNIT-2 SHIP STRUCTURAL SYSTEMS SHIP AS STIFFENED PLATE STRUCTURE

- 2.1 Framing systems, common stiffener sections, corrugated construction, design of strakes (butts, seams), welding sequences, shell expansion;
- 2.2 Structural subsystems – break up into bottom structure, side structure, deck structure, bulkhead structure, end structure, superstructure etc.,
- 2.3 General structural arrangements of different types of ships (historical review); subassembly, stiffened panels and volume sections.

## UNIT-3 BOTTOM STRUCTURE AND SIDE STRUCTURE BOTTOM STRUCTURE

- 3.1 Framing system, functions, single bottom and double bottom construction,
- 3.2 Structural components and scantlings, openings, cut outs, connection details, bilge keel;
- 3.3 Side structure – framing system, functions, structural components and scantlings.

## UNIT-4 DECKS AND BULKHEADS DECK STRUCTURE

- 4.1 Functions, framing system, structural components and scantlings, hatch ways, pillars, bulwarks, guard rails, fenders;
- 4.2 Bulkhead structure – type of bulkheads, functions, framing system, structural components and scantlings.

## UNIT-5 END STRUCTURES FORE END STRUCTURE

- 5.1 Functions, structural arrangements (panting), structural components & scantlings; Aft end structure – functions, structural arrangements, structural components & scantlings;
- 5.2 Structural connections- compatibility, bottom & side, side & deck, bulkhead with deck, side & bottom.

Practicals- Design of Bulk head, Midship section, Shell expansion

### Reference Books:

1. Taggart; Ship Design and Construction, SNAME, 1980.
2. D'Arcangelo; Ship Design and Construction, SNAME, 1969.
3. Yong Bai , Marine Structural Design, Elsevier Science, 2003.
4. Eyres D.J.; Ship Construction , William Heinemann Ltd, London, 2011.