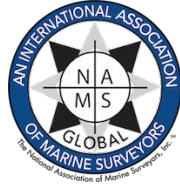


# NATIONAL ASSOCIATION OF MARINE SURVEYORS



## • *Yachts and Small Craft Apprentice Syllabus* •

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*The following syllabus has been developed for the apprentice surveyor and as guidance in developing a course of study for the profession of Marine Surveying.*

### **WOOD HULLS**

1. Construction Methods :
  - a. Carvel planked
  - b. Strip planked
  - c. Cold molded
  - d. Lapstrake
  - e. Edge glued
  - f. Batten seam
2. The Understanding of Lumber :
  - a. The characteristics of various species of ship lumber
  - b. The methods of sawing lumber and selection of
  - c. Rot resistance of various types of lumber
3. Advantages and Disadvantages of Types of Fastenings
4. Accepted Repair Practices :
  - a. Frame and butt block spacing
  - b. Sister frame application
  - c. Refastening
5. Maintenance and Care of Wood Vessels

### **METAL HULLS**

1. Welding practices
2. Construction methods
3. Material selection
4. Repair Methods
5. Protective coatings
6. Properties of metals
7. Corrosion

## **FIBERGLASS HULLS**

1. General Composites Knowledge :
  - a. Definition of composites
  - b. Advantages and disadvantages
2. Structural Concepts :
  - a. Single skin
  - b. Sandwich construction and theory of
3. Knowledge of Resins Types :
  - a. Polyester
  - b. Epoxy
  - c. Vinyl ester

## **FIBERGLASS HULLS CON'T.**

4. Repair Considerations :
  - a. Overlaps
  - b. Secondary bonds
  - c. Material selection
5. Fiber Materials, Characteristics :
  - a. E glass
  - b. S glass
  - c. Kevlar
  - d. Carbon
6. Core Materials, Characteristics and Uses :
  - a. Polyvinyl chloride (PVC), cross-linked and linear
  - b. Balsa
  - c. Polyurethane
7. Osmotic Blisters :
  - a. Causes/Prevention
8. Composites Manufacturing Processes :
  - a. Open molding processes
    1. Hand lay up
    2. Spray-up
    3. Filament winding
  - b. Closed molding process
    1. Resin transfer
    2. Vacuum infusion
    3. Prepreg processing

## **ELECTRICAL**

1. DC Systems, Basic Knowledge of :
  - a. ABYC, NFPA Standards
  - b. Bonding and Corrosion Control
  - c. Batteries, Type and Selection
  - d. Alternative Charging Systems

2. AC Systems, Basic Knowledge of :
  - a. ABYC, NFPA Standards
  - b. Grounding
  - c. Inverters
  - d. Corrosion Protection

## **MACHINERY**

1. The principals of operation of :
  - a. Diesel engines
  - b. Gasoline engines
2. Exhaust Systems
3. Tankage, Materials Selection, Plumbing

## **SAFETY AND REGULATIONS**

1. Demonstrate Knowledge of :
  - a. US Coast Guard Rules and Regulations for Recreational Vessels, CFR 33 & 46
  - b. American Boat and Yacht Council "Standards and Recommended Practices for Small Craft"
  - c. National Fire Protection Standard #302 "Pleasure and Commercial Motor Craft"
  - d. US Coast Guard 72 COLREGS, Navigation Rules, International & Inland
  - e. Offshore Racing Council "Safety Recommendations for Offshore Sailing"

## **SPARS AND RIGGING**

1. Standing Rigging Material and Fittings
2. Cabin Stepped vs. Keel Stepped Masts
3. Critical Inspection Issues for Fittings and Attachments
4. Spar Material Advantages and Disadvantages
  - a. Aluminum
  - b. Wood, solid or hollow box section
  - c. Carbon
  - d. Steel

## **STABILITY**

1. Demonstrate knowledge of the basics of stability :
  - a. Center of Gravity
  - b. Center of Buoyancy
  - c. Principals of Motion

## **GENERAL**

1. The Surveyor's Role :
  - a. Responsibility to Clients
  - b. Relationship to third parties

2. The Written Report :
  - a. Scope and Objectives
3. Appraisals :
  - a. Methodology
  - b. Limiting Conditions
  - c. Ethics
4. Insurance :
  - a. Surveyor's Responsibility
  - b. Salvage Contracts
  - c. Understanding of Insurance Policies