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ARCHITECTS, ENGINEERS AND QUANTITY SURVEYORS REGISTRATION BOARD

PRACTICAL TRAINING GUIDELINES FOR MARINE ENGINEERS AT SEA

A: INTRODUCTION

- (a) Subject to the contents of these practical training guidelines, every trainee in the Marine engineering discipline shall complete training in the types of works specified for a minimum period of three years or as specified in the Architects, Engineers and Quantity Surveyors Registration Regulations 2014.
- (b) In the case of research workers and other specialists, where the nature of work renders it impracticable to adhere to the requirements set out in the contents of these practical guidelines, the Board shall evaluate each individual's case separately having due regard to the practical training approved for the time being by the Board.
- (c) The main thrust for professional and technician engineers trainees is as follows:-

(i) Professional engineers:-

The main thrust is on knowledge, understanding subject matters, analysis and methods. Professional engineers must have analytical capabilities, adaptability to varying situations, ability to identify, rectify and design solutions, management capabilities, power and communication skills, adherence to the professional ethics and conduct as specified in the Architects, Engineers and Quantity Surveyors Registration Regulations 2014 and as amended from time to time.

(ii) Technician engineers:-

The main thrust is on know-how of subject matters. Technician engineers must have independent judgement within the field, top class engineering applications, development of cost effective systems and safe procedures, applications of appropriate mathematics, science and related subjects, team and resource management.

B: CONTENTS OF PRACTICAL TRAINING

(I) *Cadet Engineer*

The following contents will have the information of verification of cadets sea training under a registered senior watch keeping engineer/chief engineer, at least for one and a half years:

(a) Workshop Training (Pre-sea training)

Every trainee shall work under the supervision of a registered professional Marine engineer for a minimum period of 6 months or as determined by the Board in accordance with the Engineers Registration Regulations during which time knowledge and experience should be acquired in most of the following areas:

- Workshop safety
- Benchwork including punching, scraping, filing, gauging, etc
- Machine shop practice, including drilling, shaping, milling, threading, etc
- Welding including gas halogen etc
- Electrical and Electronics appliances practice including control circuits DC and AC machinery
- Pipe work and pipe fitting
- Sheet metal work

The following contents will have the information of verification of cadets sea training under a registered senior watch keeping engineer/chief engineer onboard ship at least for one year:

(b) Ships support systems

- Have knowledge of understanding and locating ships system including bilge main, ballast system, fuel transfer system, fire mains, etc.
- Locate tankers, observing all precautions and requirements relating to anti pollution.
- Prepare steering gear for sea passage and make routine checks and tests during a voyage

(c) Diesel main propulsion machinery

- Establish and understand main engine components including air starting system, fuel system, lubricating system, cooling, air supply, etc
- Establish and understand the pressure and temperature through the system for normal running conditions
- Establish and understand the main engine control system and operate the controls thoroughly

(d) Steam main propulsion

- Establish and understand the boilers system including condenser operation, boilers fuel combustion burner, water gauge pressure control valves, etc.
- Establish the temperature and pressure throughout the system

(e) Others

- Understanding the knowledge of watch keeping principles procedures for protection of the environment.
- Be able to carry out demand or manufacturing of ship auxiliary machinery, main generators, paralleling procedure, etc.
- Be able to carry out demand scheduling and maintenance programs

(II) Class 3 engineer

Every trainee shall work under the supervision of a registered professional Marine engineer for a minimum period of one year or as determined by the Board in accordance with the Architects, Engineers and Quantity Surveyors Registration Regulations during which time knowledge and experience should be acquired in most of the following areas:

(a) Main propulsion machinery and systems

- Graphical expressions and transmissions of information related to ships machinery
- Manufacturing methods for various machinery components and physical property of the material commonly used
- Working principles and constructional details of marine diesel engines, gears, clutches and auxiliary equipment
- Procedure for treatment and condition of heavy fuel oil, lubricating oil and cooling water.
- Principal operations, faults rectification of basic automatic control systems

(b) Management and maintenance

- Care management, repair and maintenance of ships machinery
- Assessment and calculations of power propulsion
- Knowledge of maritime legislation and safety working practices
- Communication skills
- Report writing on docking procedure and survey of ships

(III) Class 2 engineer

Every trainee shall work under the supervision of a registered professional Marine engineer for a minimum period of one year or as determined by the Board in accordance with the Architects, Engineers and Quantity Surveyors Registration Regulations during which time knowledge and experience should be acquired in most of the following areas:

(a) Main machinery propulsion transmission and ships support system

- Main diesel engines generating system and main components of truck and cross-head engines.
- Knowledge of operational repair maintenance of ships main and auxiliary machinery
- Knowledge of the ships bilge, ballast, fire main pumps and piping system, including pollution prevention equipment and system
- Full control of propulsion transmission system, including thrust and shaft bearing, stern tubes and propellers
- Steam boiler mountings, feed water system and boiler testing conditions.
- Constructional details of alternators, motors, switch gears and electrical distribution systems of DC and AC motors

(b) Dry docking and hull inspection

- Steering and stability systems
- Refrigeration machinery and air conditioning systems
- Fresh water production and conditioning
- Deck machinery and cargo handling system
- Marine diesel engines gearing and clutches
- Knowledge of safe working principles as published and amended.

(c) Management and legislation

- Precautions against fire or explosions, explosive mixtures, source of ignition
- Knowledge of codes of safe working practices associated with carriage of dangerous cargo
- Knowledge of shipboard administration, management and control of spares
- Knowledge of legislation Merchant shipping act and international convention
- Report writing on dry docking procedures and hull surveys.