

ELECTRICAL TRAINING FOR SHIPS' ENGINEER OFFICERS



TARGET GROUP

The course is intended for both Junior and Senior Engineer Officers to improve skills in safe operation, maintenance and faultfinding of electrical and electronic control systems.



OBJECTIVES OF THE COURSE

A trainee successfully completing the course will be able to:

- **Understand** the principles of electricity generation and distribution;
- **Understand** the principles and importance of correct synchronization of alternators and **Perform** load sharing (both active and reactive) between alternators worked in parallel;
- **Understand, evaluate, and troubleshoot** automatic systems which are responsible for load sharing;
- **Perform** safe operation electrical systems (e.g. alternators, motors, distribution boards);
- **Perform** necessary checks of electrical safety devices;
- **Read** electrical drawings;
- **Use** electrical measurement equipment;
- **Troubleshoot** electrical hard-wired and electronic systems.



COURSE CONTENTS

1. Electrical drives
 - a. Construction and Operation of Single- and Three-Phase AC Motors
 - b. Principles of Electromagnetic Induction
 - c. Operating and protective systems
2. Maintenance and Troubleshooting of motors and equipment
 - a. Electrical problem solving techniques
 - b. Practice
3. Alternators and distribution boards
 - a. Single- and Three-phase alternators
 - b. Brush- and brushless- alternators
 - c. Automatic Voltage Regulation
 - d. Distribution boards
 - e. Synchronization and Operation in Parallel
 - f. Active and Reactive Load Sharing
 - g. Maintenance
 - h. Voltage regulation
4. Electronic Circuits
 - a. Electronic Components. Principles of working, characteristics
 - b. Rectifiers
 - c. Analogue and Digital Electronic Systems
 - d. Automatic Control Systems
 - e. Inverters and AC motor drives
5. Digital Systems
 - a. Logic gates
 - b. Switches and electromechanical relays
 - c. Ladder logic
 - d. Digital automation systems
6. PID regulation
 - a. Proportional controlling principles
 - b. PI controlling principles
 - c. PD controlling principles
 - d. PID controlling principles
 - e. Electronic PID controllers: operation, adjustment

INCOME REQUIREMENTS

The course is open for Junior and Senior Engineer Officers.



TRAINING APPROACHES AND EQUIPMENT

During training course theoretical lessons are given using PowerPoint presentations, practical tasks are conducted on real electrical systems with electrical measurement instruments as well as on Electrical Power Plant of Engine Room Simulator.



COURSE LIMITATIONS

The training course has the following limitations:

- Minimum number of course participants – 4 persons
- Maximum number of course participants – 8 persons



DURATION OF THE TRAINING COURSE

The duration of the Electrical Training for Ship's Engineer Officers is 5 working days.

