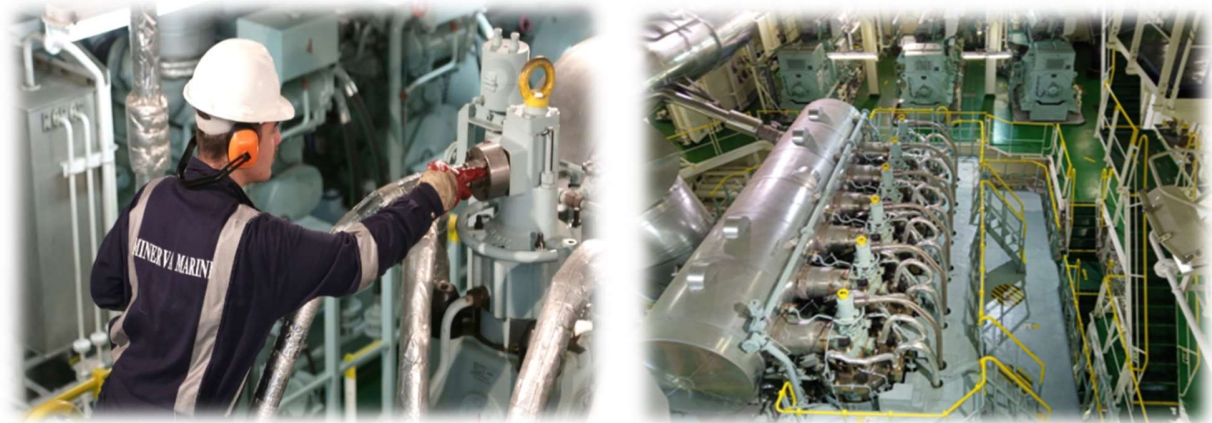


INTRODUCTION TO THE MAN B&W ME-C DIESEL ENGINE OPERATION

3-DAY TRAINING COURSE

A. OVERALL AIM

The seminar is aimed for Engineer Officers who will be employed on vessels with a MAN B&W ME-C, 2-stroke, slow speed, diesel engine. The overall aim is to increase their awareness on the concept, key components, operation and maintenance of this type of electronically controlled engine.



▪ LEARNING OBJECTIVES

The participants, on completing the course, will be able to fully understand:

- the camshaft less concept of the MAN B&W ME-C (and partially of ME-B) type of engine that is based on a mechanical-hydraulic system for the actuation of fuel injection pumps and exhaust gas valves, electronically controlled by a computer control system.
- the HPS system for delivering the necessary high-pressure hydraulic oil flow for the operation of the engine-driven piston pumps.
- the function of the HCU cylinder unit, the FIVA valve, the distribution block, the accumulator, the cylinder lubricator, the exhaust gas actuator and the fuel oil pressure booster.

- the engine control and adjustment system including the Multipurpose Controller, the Main and Local Operating Panel, the Pneumatic and Tacho System, and
- the HMI interface of the Main Operating Panel, its function, alarms, indications, process information and maintenance tasks.

B. TRAINING FACILITIES

B.1 K-SIM Engine Simulator

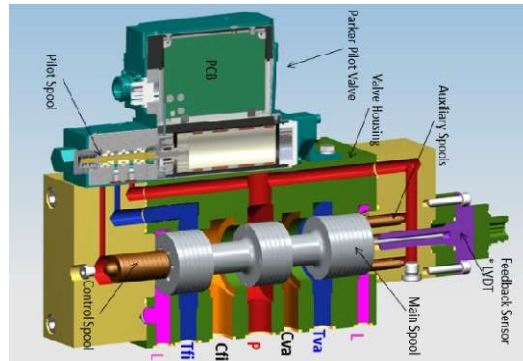
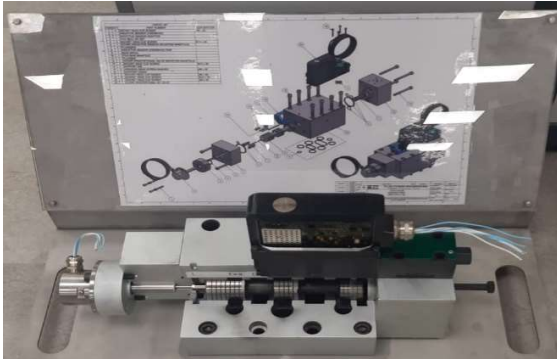
The last day of the seminar will take place in a Full-Mission K-Sim Engine Simulator simulating a L11 MAN 6S70ME Crude Oil Tanker, which is a 152.000 dwt tanker propelled by an electronically controlled MAN low speed engine with a nominal output of 18660 kW at 91 RPM. The model is based on real engine data which makes the dynamic behavior of the simulator close to the operation and response of a real engine interfaced to a K-Sim bridge simulator. There is a Big View simulation model (the simulated machinery spaces) displayed as full schematics (4 x 65" touch monitors).

- 6S70 ME-C, NCR 18660 kW/91 RPM
- ECS-ECU/EICU/CCU, Engine Safety System, MOP
- (3) X DGs (1125 KVA/1800 RPM/440 V)
- ME Open Loop EGCS
- ME Fuel Injection & Exhaust Valve Control System
- IAS inc. power management, auxiliary machinery control, vessel performance, AMS.



B.2 Lab – FIVA


FIVA demonstration, function of the main and the control spools, the work of the oil supply gates and of feedback sensor during the course.



C. DAILY SCHEDULE

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| DAY 1 | 09:15 – 11:00 | Introduction to MAN B&W ME–C Engine <i>ME Engines Designation</i> <i>An Overview of ME-C Design</i> <i>Differences between the MC and ME engines</i> <i>Tier II/Tier III & Exhaust Gas After Treatment Options</i> |
| | 11:00 – 11:15 | Coffee Break |
| | 11:15 – 13:00 | ME-C Components - The Hydraulic System <i>Electrically driven pumps, engine driven pumps, automatic filter unit, hydraulic loop supply to HCUs</i> |
| | 13:00 – 13:45 | Lunch Break |
| | 13:45 – 15:00 | ME-C Components - The Fuel System – Exhaust Gas Valve & Alpha Lubricator – FIVA function <i>Fuel Pressure Booster Unit, Exhaust Gas Valve Unit & Timing Adjustments, the FIVA & ELFI valves</i> |
| | 15:00 – 15.15 | Coffee Break |
| | 15:15 – 16:15 | ME-C Components - The Tacho System <i>Angle encoders, Tacho system amplifier, checks and troubleshooting</i> |

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| DAY 2 | 09:15 – 11:00 | The Engine Control System <i>Controllers and data acquisition units Engine Interface Control Unit, Cylinder Control Unit, Scavenge Air Control Unit, Auxiliary Control Unit, Engine Control Unit</i> |
| | 11:00 – 11:15 | Coffee Break |
| | 11:15 – 13:00 | The Engine Control System (continued) <i>Controllers and data acquisition units Engine Interface Control Unit, Cylinder Control Unit, Scavenge Air Multipurpose controllers-Checks in the MOP</i> |
| | 13:00 – 13:45 | Lunch Break |
| | 13:45 – 15:00 | Operating the Engine - MOP Explanation <i>Alarms, Engine, Operation, Process Adjustment, PMI, Autotuning</i> |
| | 15:00 – 15:15 | Coffee Break |
| | 15:15 – 16:15 | Operating the Engine (continued) <i>Running Modes, Selected Service Letters, Case Studies</i> |

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| DAY 3 | 09:15 – 11:00 | Familiarization with the ME-C Engine Simulator <i>Process Mimics, Monitoring of ME & DGs, Vessel Performance Diagram, Auxiliary Systems and Various Panels ECR and Local Stand Control</i> |
| | 11:00 – 11:15 | Coffee Break |
| | 11:15 – 13:00 | ERS Simulation Exercises <i>MOP Operation ECR/Bridge/Local Control Transfers, Main Engine Ready to Start with Malfunctions</i>  |
| | 13:00 – 13:45 | Lunch Break |
| | 13:45 – 15:00 | Debriefing – Assessment |