



Marine Engineering Course: Ship Machinery, Diesel Engines and Engine Room Troubleshooting



Marine Engineering Course: Ship Machinery, Diesel Engines and Engine Room Troubleshooting

Introduction:

The marine engineering course on ship machinery, diesel engines and engine room troubleshooting is a 5-day course for marine engineers, technical superintendents and machinery performance staff that ends with a Machinery Performance Review and Troubleshooting Report for a case vessel. Fleets lose hire days when off-spec bunkers reach the engine, purifiers run out of adjustment and alarm patterns are read too late. Nominees already stand engine room watches or oversee vessel machinery and work through case studies on engine logs, indicator data and oil analysis reports. CoreConcept Training Center delivers this marine engineering course.

Course Objectives:

- Explain direct-drive two-stroke and geared four-stroke propulsion arrangements, shafting, steering gear and pumping systems on a case vessel
- Interpret main and auxiliary diesel engine parameters, indicator diagrams and turbocharger readings to judge combustion and cylinder load balance
- Operate fuel oil, bunker treatment, purifier and lube oil systems so that fuel and lubricant reach the engine within specification
- Control cooling water, auxiliary boiler, freshwater generator and compressed air systems within their normal operating ranges
- Diagnose machinery faults from alarm patterns, trend data and oil analysis using structured root cause methods
- Produce a Machinery Performance Review and Troubleshooting Report with prioritised corrective actions for a case vessel

Target Audience:

- Marine engineers responsible for running main and auxiliary machinery during watches at sea and in port
 - Engine room officers accountable for fuel, lube oil and purifier operation and for engine log records
 - Technical superintendence staff who review machinery reports, defect lists and performance data for managed vessels
 - Machinery performance and fleet technical support staff who analyse engine, fuel and oil test results
 - Offshore support vessel and harbour craft engineering staff who operate propulsion and auxiliary plant
-

Course Outline:

Day 1: Ship Propulsion Arrangements, Shafting and Engine Room Systems

- Direct-Drive Two-Stroke Versus Geared Four-Stroke Propulsion Layouts
- Diesel-Electric and Controllable-Pitch Propeller Plant Configurations
- Thrust Block, Intermediate Shafting and Stern Tube Bearings
- Electro-Hydraulic Steering Gear Rams, Pumps and Changeover Tests
- Centrifugal and Positive Displacement Pump Curves on Piping Diagrams

Day 2: Marine Diesel Engines, Turbocharging and Combustion Monitoring

- Uniflow Two-Stroke Crosshead and Four-Stroke Trunk Engine Principles
- Fuel Injection Pump, Injector and Common Rail Systems
- Turbocharger Air Path, Scavenge Air Cooler and Surging
- Indicator Diagram and Peak Pressure Reading for Cylinder Balance
- Crankcase Oil Mist Detection and Scavenge Fire Prevention

Day 3: Fuel Oil, Bunker Treatment, Lubrication and Cooling Water

- Marine Fuel Specification Parameters for Viscosity, Density and Cat Fines
- Bunker Settling, Service Tank Heating and Viscosity Control Routine
- Centrifugal Purifier Gravity Disc Selection and Clarifier Operation
- Lube Oil Analysis for Water, Base Number and Wear Metals
- Central Cooling and Jacket Water Treatment Limits Monitoring

Day 4: Auxiliary Plant, Watchkeeping Alarms and Machinery Fault Diagnosis

- Auxiliary Boiler and Exhaust Gas Economiser Water Chemistry Control
- Freshwater Generator Vacuum, Salinity and Output Troubleshooting
- Starting Air Compressor, Receiver and Control Air Dryer Checks
- Unattended Machinery Space Alarm Response and Watch Handover Records
- Fault Tree and Five Whys Analysis of Engine Room Failures

Day 5: Case Study on Machinery Performance Review and Troubleshooting

- Case Vessel Data Pack of Engine Logs and Oil Reports
 - Engine Performance Trend Analysis Against Shop Test Curves
 - Fuel and Lube Oil Treatment Gap Review for Case Vessel
 - Alarm History Fault Diagnosis and Corrective Action Ranking
 - Machinery Performance Review and Troubleshooting Report Completion
-

Skills You Will Gain:

- Marine Diesel Engine Operation
- Indicator Diagram Interpretation
- Fuel Oil Treatment Control
- Purifier Adjustment
- Lube Oil Condition Assessment
- Auxiliary Plant Operation
- Engine Room Alarm Response
- Machinery Fault Diagnosis

Why Attend This Course:

- Deliver a Machinery Performance Review and Troubleshooting Report for a case vessel to the chief engineer and the technical superintendent
- Decide when a cylinder unit, purifier or cooling circuit needs adjustment, isolation or a request for shore support
- Avoid off-hire, engine damage and blackout caused by contaminated fuel, overheated bearings and missed alarm patterns
- Pass on log review sheets, purifier setting guides and fault tree templates to engine room colleagues

Conclusion:

Back on board or in the technical office, the participant presents the Machinery Performance Review and Troubleshooting Report to the chief engineer, the technical superintendent and the fleet technical manager. They use it to agree which machinery defects need immediate correction, which fuel heating, purifier and cooling water settings should change, and which faults require shore support or spare parts. After the first voyage under the revised settings, the team should compare engine parameters, oil analysis results and alarm frequency against the report baseline and update the corrective action list.

Frequently Asked Questions FAQ:

What should participants know before the marine engineering course on ship machinery, diesel engines and engine room troubleshooting?

Participants should already hold or support engine room duties and be able to read machinery logs. Bringing anonymised engine logs, oil analysis reports or alarm histories from their own vessels helps them apply the case work on the final day.

How does the marine engineering course on ship machinery differ from a naval architecture course for non-specialists?

It concentrates on running and diagnosing machinery: diesel engines, fuel and lube oil treatment, cooling, auxiliary plant and alarms. A naval architecture course for non-specialists covers hull form, structure and stability, and treats machinery as one part of the vessel.

Why does marine engineering practice treat fuel in ship machinery before it reaches diesel engines?

Residual fuels are viscous and carry water, sludge and catalytic fines. Settling, heating and centrifugal purification bring the fuel to injection viscosity and remove contaminants that would otherwise wear injection pumps, cylinder liners and piston rings.

What do participants take back from the marine engineering course on ship machinery, diesel engines and engine room troubleshooting?

Participants take back a Machinery Performance Review and Troubleshooting Report with a trend analysis sheet, fuel and lube oil treatment checks, an alarm history review, a fault tree template and a ranked corrective action list.
