

# MACHINERY AND SYSTEMS PERFORMANCE

As equipment and machinery systems onboard vessels become more complex, it is critical that shipowners and operators understand and evaluate the performance of those systems.

The ABS Machinery and Systems Performance analysis focuses on evaluating the performance of the machinery-related aspects of vessels. Through a set of Key Performance Indicators (KPIs) delivered from the assessment, a shipowner/operator will gain valuable insights into the state and performance of key equipment and machinery systems. Equipped with this information, shipowners/operators will be able to make more informed decisions on which systems to modify, retrofit or keep operating.

Benefits of a Machinery and Systems Performance analysis to operations and chartering:

- Greater transparency on machinery performance through easy understandable KPIs
- Improved machinery efficiency
- Predictable fuel consumption at various operating scenarios
- Identification of performance issues before they become problematic
- Benchmarking of machinery performance at a fleet level

## WHAT DOES THE SERVICE DELIVER?

Performance trend analysis covers:

- Main Engine with Associated Auxiliaries
- Generators
- Boilers and Steam Plant
- Electrical System



- Waste Heat Recovery
- Cargo Tank Heating (Tankers)
- Cargo Loading/Discharging (Tankers)
- Re-liquefaction Efficiency (LNG Carriers)

The ABS Machinery and Systems Performance analysis is based on data collected through manual or auto-logged approaches. Assessment results can be displayed on

dashboards with a comparison to OEM recommended parameters and best practices.

- The Main Engine Performance analysis addresses deviation of parameters, Engine Performance Index, Specific Fuel Oil Consumption, Specific Cylinder Oil Consumption with respect to recommended values, thermal efficiency and heat losses of the propulsion plant inclusive of associated auxiliaries.

The performance analysis at the plant level also addresses the electrical base load issues and overall energy utilization of the vessel.

- The Generator Performance analysis evaluates the electrical power generation efficiency by various equipment such as Diesel Generator, Turbo Generator and Shaft Generator.
- The Boiler and Steam Plant Performance analysis assesses thermal efficiency and heat losses of boilers and thermic fluid heaters, steam turbines efficiency and overall plant efficiency.
- The Electrical System Performance analysis addresses efficiency of large motors, system power factor losses and harmonic distortion.
- Waste Heat Recovery Analysis assesses what fraction of waste heat is recovered and at what recovery efficiency.
- Apart from propulsion, Cargo Handling Operations are also identified as energy intensive services offered by ships. These operations are assessed for energy intensity and efficiency at the plant level.

Heat Loss analysis identifies excess energy loss and determines the reason. From this analysis, opportunities for waste heat recovery can be targeted allowing for the identification of:

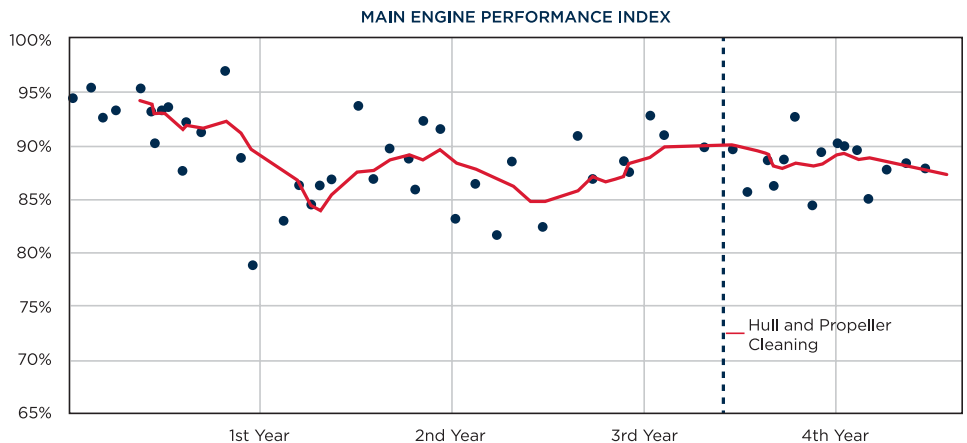
- Sources of recoverable waste energy that may be applied in future vessel design
- Plant modification and retrofit opportunities through techno-economic analysis
- Potential design improvements and new technologies for retrofitting or new buildings

The ABS Vessel Performance team consists of multi-disciplinary technical specialists covering hull structure, machinery systems and data analysis. This diverse team enables ABS to provide a robust and flexible system for performance analysis that uses physics-based techniques and statistical processes.

The team is experienced in hull and propeller performance

studies; propulsion and cargo-handling plants and associated engineering systems that are applied on a wide variety of vessel types.

As a trusted advisor, ABS stands ready to assist shipowners and operators in evaluating the performance of their vessels and finding new ways to enhance fleet efficiencies.



For additional information on the ABS Machinery and Systems Performance analysis, please contact us at [VesselPerformance@eagle.org](mailto:VesselPerformance@eagle.org)



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