

Ship Energy Performance Framework

Case Study: Guidance for Implementation of Hull and Propeller Performance Monitoring Standard ISO 19030

Tier 4: Improvement Evaluation



CASE

A major bulk carrier operator plans to establish a framework to create value from the sensor data it receives from its ships, having recently arranged an expansion of data acquisition from its vessels. The operator tasked ABS with reviewing the data made available through its monitoring system and providing a reasonable plan for creating internal tools to implement the International Organization for Standardization (ISO) 19030 hull and propeller performance monitoring standard.

METHODOLOGY

ABS received data related to vessel performance, such as descriptions of the measurements from onboard sensors and excerpts of data made available to its onshore premises. Applying in-house experience in vessel performance monitoring and analysis, ABS provided a detailed gap analysis focused on methods to align sensor data with the requirements of ISO 19030. The methodology to calculate meaningful vessel performance key performance indicators was systematically presented with strong emphasis on practical considerations in the context of a shipping company.

DELIVERABLES

Tailor-made reports with methodology to process data, calculate performance metrics and specific recommendations based on a gap analysis of the operator's current procedures. More specifically:

- Gap analysis
- Detailed methodology to calculate Vessel Performance Indicators (defined in ISO 19030)
- Functional requirements for an in-house company tool implementing ISO 19030



Figure 1: Example of measurements analysis: Speed Over Ground versus Speed Through Water. Significant deviations indicate data that should be filtered out from vessel performance analyses.

Extensive investigation of the sensor measurement data provided by the operator revealed important information about their accuracy and the complexities inherent in the application of a fleet-wide vessel performance monitoring system. The outcomes were documented in the provided reports through recommendations of best practices, definition of quantities useful for vessel performance analysis, as well as setting of distinct limits on the acceptability of measurement data.

ABS thoroughly presented methods for calculating composite quantities using available sensor measurements that bridge the gap between the reality of the operator's sensor data and the ISO 19030 standard's definitions.

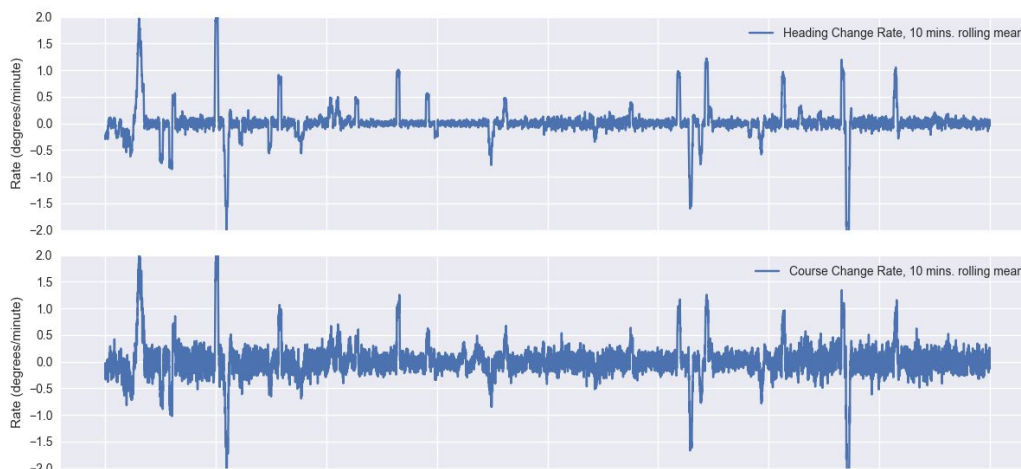


Figure 2: Heading and course change rate, calculated from high-frequency measurements. Significant values indicate vessel maneuvering.

Through close cooperation with the operator, analysis methods that go beyond the minimum requirements were introduced, such as including additional filtering criteria for sensor data.

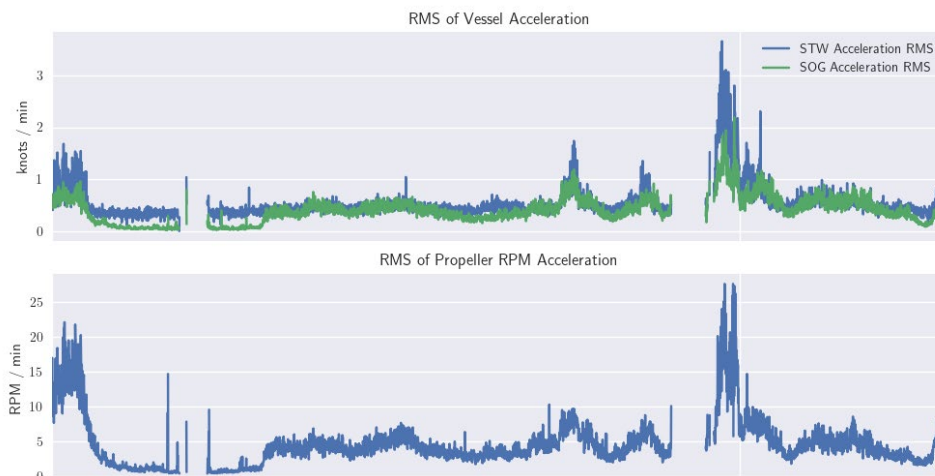


Figure 3: Vessel and propeller acceleration.

Vessel performance monitoring requires knowledge of baseline theoretical vessel performance models. ABS catalogued the data required to create such models and provided expert insight on how to treat typical complications.

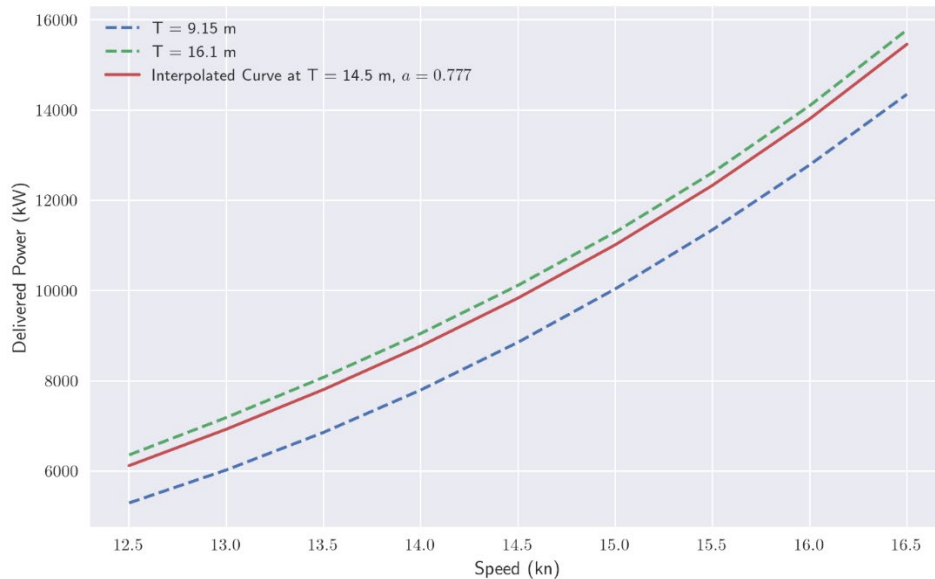


Figure 4: Vessel performance models used in ISO 19030 implementation.

Functional requirements of an in-house tool were defined, covering the calculation implementation details. Emphasis was placed on ensuring the establishment of proper conditions within the company for the successful application of vessel performance monitoring.

ABS, recognizing the need for fleet-wide application, presented concepts of how to establish uniform methods of storing data required for vessel performance calculations.

CONCLUSION AND RECOMMENDATIONS

- Successfully implementing vessel performance monitoring procedures is not trivial. While there is a widely recognized standard in the marine industry for this purpose (ISO 19030), its implementation is a delicate, case-specific matter.
- Proper internal training on such a tool's use is necessary, as is the definition of distinct roles within the company for its proper maintenance.
- Vessel performance monitoring is based on ship propulsion theory supplemented by empirical methods and heuristics. Navigating the intricacies of these matters requires extensive knowledge; therefore, it is recommended to collaborate with professional advisors at an early stage.
- In-house vessel performance monitoring and analysis procedures provide the capability for evaluating energy saving devices' impact. It is, however, important to ensure that the available data allows for meaningful evaluation.

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