

Condition Monitoring Award

WiDE Pilot Project: The pilot project is a collaboration involving WinGD and Energy Triumph, Enterprises Shipping & Trading, with the involvement of WinGD's development partners. WinGD's Integrated Digital Expert (WiDE) provides digital solutions that enhance the operational efficiency and crew decision making accuracy related to the engine and ship operations. WiDE is a comprehensive, integrated system for creating value from engine and ship data. Through the collection and intelligent analysis of engine and machinery data, real-time knowledge of the status of the engine is possible. Trouble-shooting, predictive maintenance, diagnostic advice and engine optimization are all outcomes of the intelligent data analysis. The ultimate benefit is that a new customer relationship between the engine designer and operator is established.

The WiDE pilot project on Energy Triumph began at the end of 2018. Energy Triumph is a crude oil tanker powered by a WinGD 6X72 engine, owned by Golden Energy Management. The pilot project is a collaboration involving WinGD and Energy Triumph, Enterprises Shipping & Trading, with the involvement of WinGD's development partners.

WiDE constantly monitors the engine status and its conditions allowing a closer connection to the customer to provide a quick support in case of engine malfunctions and to develop on-demand monitoring function.

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Only through proper collection and intelligent analysis of engine and ship data can clear value be delivered to the ship operator and owner.

Data must be collected in the right way to have the preconditions of a valuable analysis. WinGD, incorporates a data collection monitoring unit, specifically for collecting and visualizing engine and ship data.

Engine data are analysed through of three different analysis levels, namely: thermodynamic, know-how based and machine learning. The combination of such analyses gives the full engine diagnostic picture and valuable engine expertise to create real understanding of the engine condition.

The Thermodynamic analysis monitors the engine performances based on a detailed thermo-physical process model of the engine; a digital twin, custom-produced for each vessel engine. It then acts as the "reference" engine performance for any possible engine operation setting, the ambient conditions, and the type of fuel. The model is tuned separately for each individual engine, and calibrated using the recorded data from that engine's shop tests. It is further validated using the sea trials data. The model constantly calculates the ideal engine performance and defines a "reference optimal condition" which varies depending on the environmental and operational conditions measured in real-time on the ship.

The know-how based analysis is based on the WinGD engine design expertise and consists of specific machinery data correlated with rule sets and algorithms that are part of the engine expert implicit knowledge.

Advanced analytics performed on data collected through defined correlations between the signals predict engine component malfunctions, and generate actionable insights. The analytics used are based on expertise, statistical and predictive models, and machine learning algorithms.

A troubleshooting feature provides operators with instructions on how to solve engine problems in case of an alarm or if a failure occurs, often before the failure occurs. It reports the problem, the list of alarms, identifies the part involved and automatically provides drawings and documents of the components affected.

Engine data analytics enables predictive maintenance which can greatly reduce OPEX and increase TBO. The engine maintenance plan becomes dynamic, based on the actual condition and prediction rather than calendar-based scheduling.

Intelligent use of the collected data can quickly solve issues, optimise the engine, provide operational recommendations, and coordinate further technical support. A support centre provides regular reports on the health status of the machinery, including recommendations for optimal engine operations combining the best of digitalization and real person-to-person customer service.