Continuous improvement

by Jonas Persson, *Sales Director, Lean Marine*

Lowering greenhouse gas emissions from the global shipping fleet in line with the strict targets set by the International Maritime Organization (IMO) remains a high priority for ship operators. Some of the major players, including container lines Maersk and CMA CGM, are even striving to achieve more ambitious, self-imposed decarbonization goals. Maximizing ship efficiency, with resulting fuel consumption reductions, will play a key role as the dominant, sure-fire strategy for short-term emission reductions that also boosts the bottom line for ship operators working in a highly competitive industry.

To achieve maximum efficiency enhancements to meet decarbonization requirements, ship owners will continue to develop and test disruptive solutions centred around vessel propulsion, including, among other things, alternative fuels, wind-assistance technologies, hybrid capabilities, Artificial Intelligence (AI)-powered systems for voyage optimization, and/or performance management.

Coming from Sweden's west coast, our company, specializing in ship propulsion optimization, has taken the decarbonization challenge very seriously. In 2013, Lean Marine introduced the propulsion automation system FuelOpt™, a system which transformed vessel propulsion control by enabling direct fuel savings via automated and optimized control of vessel speed and fuel consumption. Today, this technology supports over 190 vessels in achieving optimized propulsion with reduced fuel consumption and emissions output, representing more than 50 different ship owners worldwide. The use of FuelOpt™ on-board these vessels makes it possible to avoid emitting about 178m kg of CO_2 per year.

Dynamic tuning

The FuelOpt™ system was developed by a group of Swedish marine experts with vast experience in propulsion control systems, marine engineering, and hydrodynamics – and a passion for continuous improvement. Noticing the demand for fuel efficiency solutions, this expert team focused on integrating measures into the system that could unlock immediate and significant fuel savings and emission reductions: propulsion and speed optimization, and consumption management. The result was an automated solution for maximizing propulsion efficiency.

FuelOpt™ provides a direct interface between the machinery and vessel bridge crew for controlling the parameters that matter most for ship operational efficiency: speed, fuel consumption, engine power, or a combination of these. Notably, fuel usage setpoints empower them to avoid overconsumption in harsh weather conditions (high swells and strong wind).

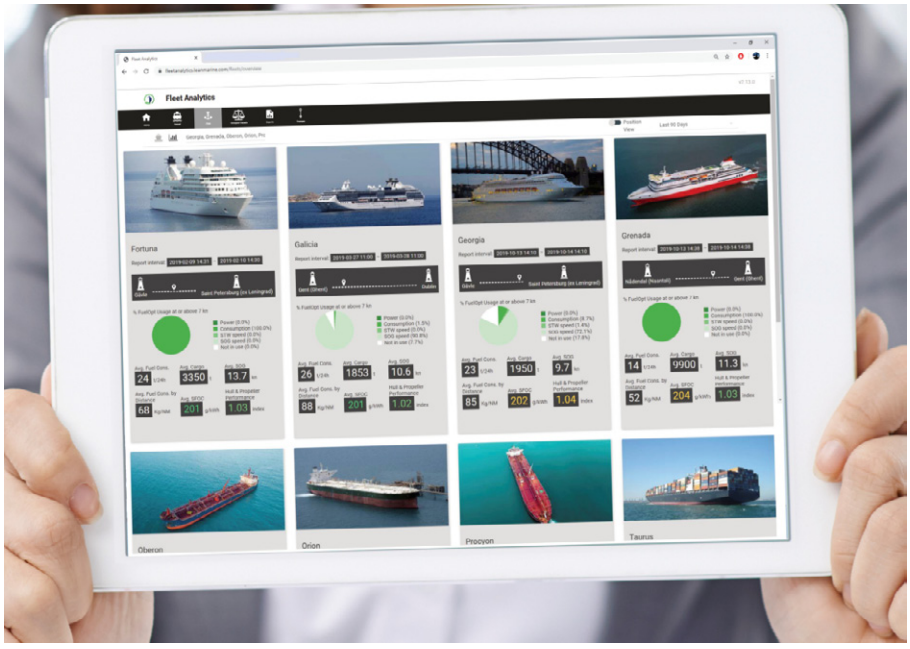
Once activated, with the push of a button, FuelOpt™ achieves real-time fuel savings and emission reductions. The system dynamically controls vessel propulsion based on the input commands, adapting the propulsive power to the changing environmental conditions. In this way, steady and predictable shaft power can be achieved, removing costly variations in speed and power caused by human operational factors.

On vessels with a controllable pitch propeller, the solution acts as a dynamic tuning system for the propulsion machinery. The system regulates the propeller's pitch and revolutions-per-minute separately to operate the engine and propeller at optimal conditions. As such, the system ensures that a maximum amount of propeller thrust is produced with a minimum amount of power, hence wasting significantly less energy. In addition, automatically and continuously following the signals from the engine and propulsion line enables

FuelOpt™ to avoid the risk of overload on the systems; consequently, the solution adds an extra layer of operational safety.

"As clean-tech innovators, it is our responsibility to support ship owners and operators with cost-efficient solutions compatible with all vessels in their fleet, both retrofit or newbuilding. With our FuelOpt™ system, we are aiming to have a quick return on investment for our clients, ideally less than one year. For the bigger vessel, the payback time is usually shorter," Mikael Laurin, CEO, Lean Marine, rounds up the benefits.

Moreover, to complete the continuous improvement cycle for operational efficiency improvement, FuelOpt™ can be coupled with the performance management and reporting software Fleet Analytics™ which provides aggregated fleet views and status insights for on- and offshore personnel. In doing so, ship owners and operators can learn from their past voyages and better the next ones, improving operational efficiency and reducing operating costs and emissions – in real-time and for the long haul.





Photos: Lean Marine

Via K-AI-zen

Rapid digitalization that has been taking place across the shipping industry for the past decade is enabling knowledge-driven transformation and decarbonization at a scale never seen before. The availability of big data at both vessel and fleet-level facilitates the development of a deeper understanding of ship operations while making the exploitation of AI-powered technology developments possible.

Lean Marine recently announced their leading role in a pioneering research & development project called Via Kaizen to explore AI-powered, semi-autonomous system for planning and executing more energy-efficient sea voyages. The project commenced in August 2020 and got its name from the Japanese word "kaizen" (かいぜん) which is used in situations striving for continuous improvement. To that end, our company is collaborating with the AI-application developers from Molflow, Swedish academics, as well as shipping lines, including the chemical/product tanker owner and operator Rederiet Stenersen and the pure car and truck carrier UECC.

Data will be collected via FuelOpt™ and processed by a deep learning-based vessel modelling system for presenting in Fleet Analytics™. After training it on the ship's operational data and describing the vessel's performance in varying conditions, the system will be able to determine the most energy-efficient voyage for a defined route, along with calculating the commands that should be applied for reaching the destination with the minimum amount of fuel. These commands form a route profile for the propulsion system which can be imported into FuelOpt™ or set manually by the bridge crew. This way, FuelOpt™ will assure that the vessel automatically sets the optimal propulsion parameters (such as engine output, speed, and propeller pitch) for each part of the voyage. We wholeheartedly believe this is the future of propulsion optimization – and it's here now. ■

LEAN MARINE

A vessel with the propulsion automation system FuelOpt™ onboard always runs with optimized fuel economy. Less fuel is used and less emissions are produced, which supports the operators decarbonizing efforts. Lean Marine offers innovative solutions for fuel saving and enhanced operational efficiency for the marine industry. Their goal is to reduce the environmental impact of operating a vessel while improving the bottom line of the customers. Visit **www.leanmarine.com** for further information.