

Bridging the technical divide

Two extremes remain a reality on the bridge: traditional versus fully integrated, says Anders Bergh, technical sales manager at Lean Marine

The shipping industry is very traditional, and some would even say that as an industry, compared to some other transportation sectors, it is often a late adopter of new technologies. This is true for the industry's approach to digitalisation and integrated bridge systems. Even though it took a long time to start to emerge, during last decade shipping has taken big steps forward towards data-driven digital transformation.

Shipowners and operators are now comprehending the value of gaining a deeper understanding of their ship operations through big data and interest in developments of AI-powered technologies that enable more energy efficient voyage planning and execution is therefore increasing.

However, when looking at the setup of the bridge on ships a split between the old traditional era and new digital era remains. In today's bridge systems, we see two extremes: traditional bridges with minimum tools versus fully integrated bridge systems. Moving from one extreme to the other may not be possible for every vessel, but a decent level of digitalisation is possible for all, and further improvements can be made over time.

If you are wondering where to start your vessel's digital transformation as a shipowner or operator, you should consider how far you would like to go on a short and long-term basis, then choose technology that would be able to follow your expectations in time.

Understanding vessel performance

The first step is to build up knowledge on a vessel's performance. In this way, you can start to improve the ship's operational efficiency, which will result in saving fuel, reducing emissions, and lowering operational costs. To do this, having a good level of data on weather, voyage, navigation, and your vessel's operational performance is essential. This prerequisite is the key to enabling performance monitoring,



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analysis, creating best practices, and then, improving vessel/fleet performance.

A ship operator might require an automated data collection system to facilitate data gathering which obtains more reliable data and consolidates it as big data in one central platform. Even though it may not be possible to connect all vessel data available within the confines of the system from the beginning, starting from the vital data sources and completing the rest over time is possible.

However, without performance management software in place, a ship operator would be just looking at hectic big data, which would require a great deal of analysis by the fleet performance team to determine the outcomes. This would be quite complicated and very time consuming.

With a performance management solution in place, a fleet performance team can easily turn complex volumes of big data into meaningful information. They can also visualise data as easy-to-understand graphs/indicators and transform data into useful reports. Therefore, this allows the fleet manager to quickly find out how the vessel is doing, where there are performance improvement opportunities, how the crew can adapt the best practices, and so on. In this way, ship operators can easily take fact-based decisions for improving a vessel's operational efficiency

and hence, lower the operational cost.

Additionally, having a central data platform that collects, transforms, and communicates the data with other systems means that workload onboard and onshore is greatly reduced.

Once the vessel performance improvement opportunities are defined, it is time to take action to make the required efficiency a reality. But this is much more complicated than it sounds, especially when it comes to fuel efficiency. Let us go back to the bridge of the ship and see how the systems there can help acting on the gained knowledge.

Although advanced tools can help reduce time spent on monitoring vessel performance and changing conditions, or setting speed and tracking fuel consumption, depending on the experience of the crew and individual judgements, intended improvements may differ. Also, manual speed and/or power setpoints adjustment frequency can remain relatively low because of bridge team high workloads. It is not uncommon for lever adjustments to be several hours apart, sometimes by even more than one day. Adjustment frequency and human factors can cause costly variations in speed and power, notably during fast changing weather or sea conditions.

To support the work of the crew and ensure optimal fuel efficiency, automation could be the answer for significantly decreasing human intervention and avoiding any unwelcome surprises.

At Lean Marine, we provide two solutions that enable automation and digitalisation: an 'on top' propulsion automation system – FuelOpt – and a smart performance management and reporting software – Fleet Analytics. We are confident our solutions offer operational efficiency benefits as soon as installation is complete.

Automated and direct fuel savings from the bridge

FuelOpt provides a direct interface between the machinery and vessel crew on the bridge that controls the parameters

which matter most on operational efficiency: speed, fuel consumption, engine power or a combination of these. Notably, the consumption setpoints empowers them on avoiding overconsumption of fuel in harsh conditions, such as high swells and winds.

Once it is activated with the push of a button from its intuitive panel on bridge, FuelOpt achieves real-time fuel savings and emissions reductions. The system dynamically controls vessel propulsion based on the commands set, 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.

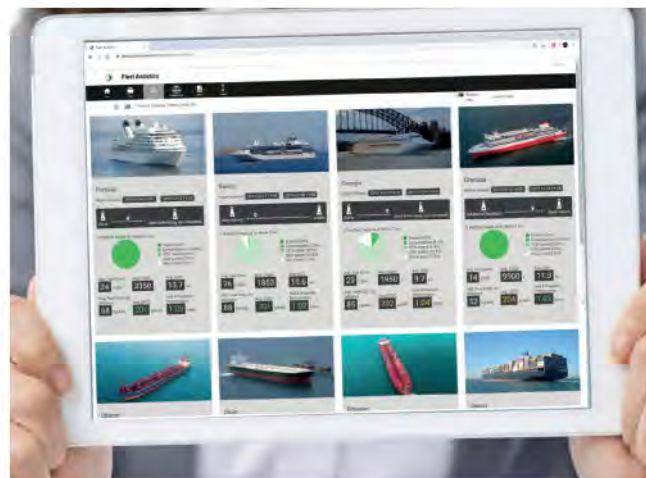
On vessels with a controllable pitch propeller, FuelOpt acts as a dynamic tuning system for the propulsion machinery. The system regulates the propeller's pitch and RPM separately to operate the engine and propeller at optimal conditions. In this way, the system ensures to produce maximum amount of propeller thrust with 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 risk of overload on the systems, adding an extra layer of operational safety.

To operate as a propulsion control system, FuelOpt gathers vast volumes of vessel data in real-time from sensors onboard (e.g. fuel flow meters, alarm systems, GPS, speed-log, etc.), particularly from the propulsion line and engine. Consequently, FuelOpt leverages the power of digitalisation for fleet performance management without any additional cost to the shipowners.

Turning data into knowledge

The cloud-based performance management and reporting software Fleet Analytics sits as the centrepiece for data collection and transmission. FuelOpt-generated data and data gathered from multiple sources, including satellite, wind, and logbooks are integrated into Fleet Analytics. The system turns this big data into knowledge presented in an easy-to-understand way and feeds data not

Fleet Analytics is a performance management and reporting tool



only to its own features, but also into existing business intelligence solutions. As a data platform that communicates with other systems, Fleet Analytics removes the need for multi-data entry by allowing the use of data gathered/received from different systems.

Fleet Analytics can be used for both daily vessel follow-ups and for analysing long-term performance. It provides aggregated fleet views and status insights for onboard and ashore personnel. In this way the shipowner and operator can learn from their past voyages and improve the next ones, improving operational efficiency and reducing operating costs and emissions.

Additionally, through the automatic generation of environmental and voyage reports, Fleet Analytics helps to reduce reporting workload onboard and ashore.

When these technologies are used together, ship operators can easily exploit the

win-win scenario of gaining a unique combination of data analysis over time and direct fuel optimisation in real-time for greatest achievable ship optimisation. The use of tools such as these will help the industry to bridge the gap between traditional and fully integrated bridge systems. [NA](#)

About Lean Marine Sweden AB

Lean Marine offers innovative solutions for fuel saving and increased operational efficiency for the marine industry, with the aim of reducing the environmental impact of operating a vessel.

Headquartered in Gothenburg, Sweden, the company's vision is to become a globally recognised player synonymous with direct and effective solutions.

Lean Marine's automated and direct fuel-saving system FuelOpt and smart performance management and reporting tools Fleet Analytics have been contracted to over 50 different shipowners.

FuelOpt draws together onboard sensor data to automate fuel consumption

