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The GTT newsletter - October 2020 - n° 18

Message from Anouar Kiassi, Digital & Information VP, GTT

IMO regulations regarding Greenhouse Gas (GHG) reduction have resulted in the development of technical and operational measures for ships energy efficiency management.

Under our new mission statement (“raison d’être”), we are committed, more than ever, to contribute to the international effort to reduce the global emissions. Significant reduction of the fuel consumption is possible by operational performance management.

Environmentally friendly measures are effective and widely adopted when aligned with economic performance. In this issue, we will discuss how our practical Smart Shipping solutions help the maritime players achieve these two goals by getting the best performance out of their assets.

Anouar Kiassi

DIGITAL

Effective Ship Performance Management

Voyage Execution & Speed Optimisation

A vessel’s fuel consumption for propulsion is a result of energy required to push the vessel through the water at the given speed. This relationship, between fuel consumption and vessel speed, is typically an exponential one. **A vessel sailing with variable speed will usually, for the same distance and duration, consume more fuel compared to sailing with constant speed**. Improved planning, better use of vessel specific knowledge, weather forecasts and communication between charterer, port and vessel **can improve the speed** profile during a voyage and consequently **reduce the fuel consumption**.

An energy efficient voyage **can bring significant savings in fuel costs and also lower emissions.** Voyage Optimisation identifies and recommends speed profiles that minimise the voyage operational costs for given routes whilst respecting the given Estimate Time of Arrivals (ETAs).

Voyage Optimisation enables energy efficient voyage planning based on simulations, modelling and ocean forecasts that will **maximise energy efficiency during sea passages.** Fuel consumption and costs for the voyage are minimises, as are harmful emissions. The most efficient speed of the ship is continuously calculated during the sea passage.

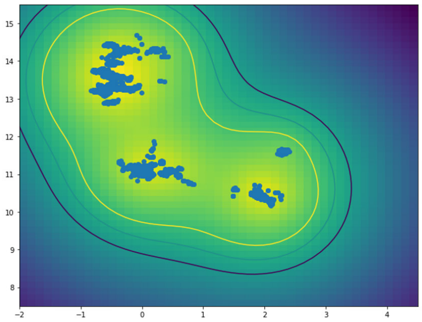
With real time data and the voyage execution module, operators on shore can in real time monitor if the crew complies to instructions and be alerted automatically if not.

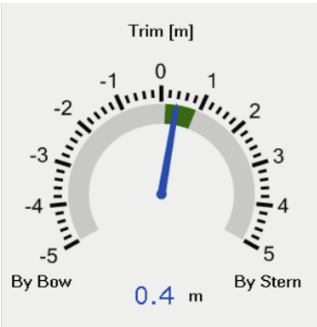
On a slow-steaming VLCC, **accelerating by 1kn costs an extra 10 to 15 MT of fuel per day**. On average bunker price of the past 3 years i**t costs between 3,000 and 5,000 USD per day**. Based on experience, the crew adheres to instructions in a different way when the operation is monitored by operators.

Trim Advisory

The trim and/or draft of the ship influences the hull resistance and therefore the fuel consumption. Better trim and draft will reduce the resistance and therefore less engine power is required which **leads to a lower fuel consumption**.

Trim Advisory helps the bridge team r**educe fuel consumption by providing recommendations** on the optimal trim that will lead to minimized hull resistance. This energy saving measure requires a good understanding of the relationship between trim, load and propulsion energy consumption by providing an overview of these important operational parameters and their effects on performance.





Optimal dynamic trim assists the bridge team in adjusting the ship's trim to the optimum setting, **thereby reducing hull resistance and saving fuel.**

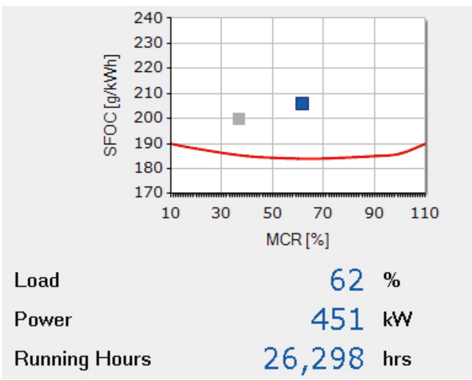
Trim optimization is applicable for all vessel types and vessel ages. However, some vessels have less flexibility regarding trim.

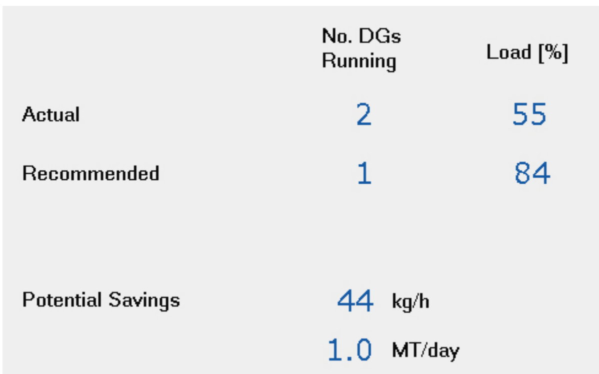
Machinery Efficiency

Most ship and engine types and ages have an improvement potential in the optimization of engine efficiency. In addition, both 2- and 4-stroke engines, mechanic and electric, are eligible for optimization, and the principles do not change much with use of different fuels either.

The concept of "machinery load" optimisation and "parallel operation" reductions **can be used for energy saving purposes**. The load profile for a multi-machinery setup provides valuable information on how-to optimise the load sharing strategy (e.g. reducing parallel run).

Monitoring tools allow the crew to see **how actual performance compares with baseline levels.**





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Technology for a Sustainable World

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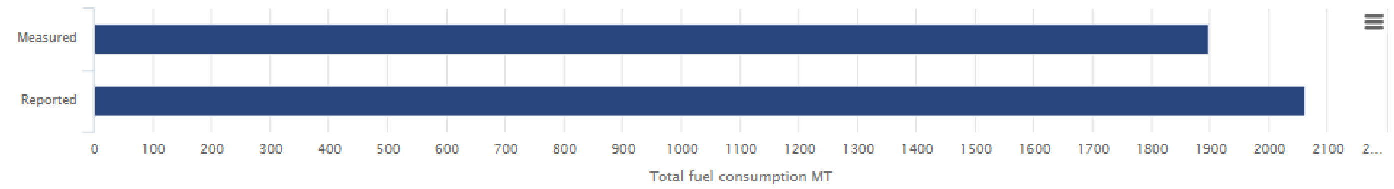
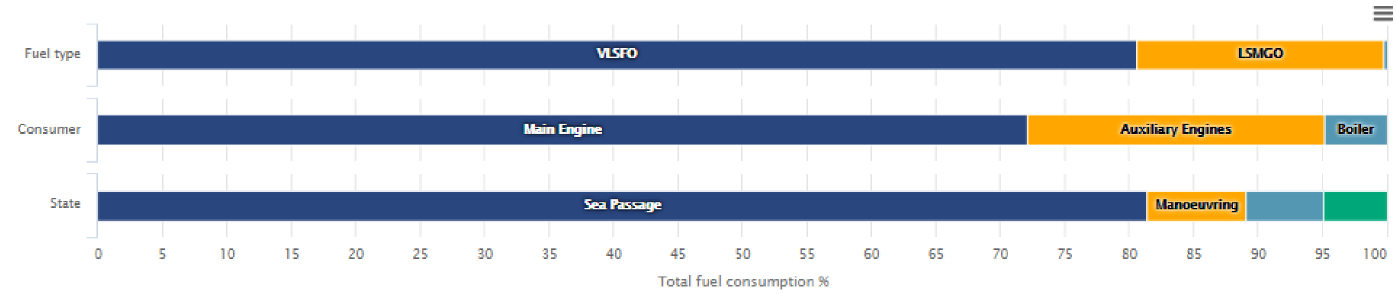
Fuel Management

Fuel Management provides the ship's management and crew with an up-to-date reading of their Remaining On Board (ROB) inventories along with details of fuel flow meters. It maintains **a consumption balance audit** record between fuel added and actual measured consumption, making sure that all fuel use is properly accounted for.

Measured vs. reported



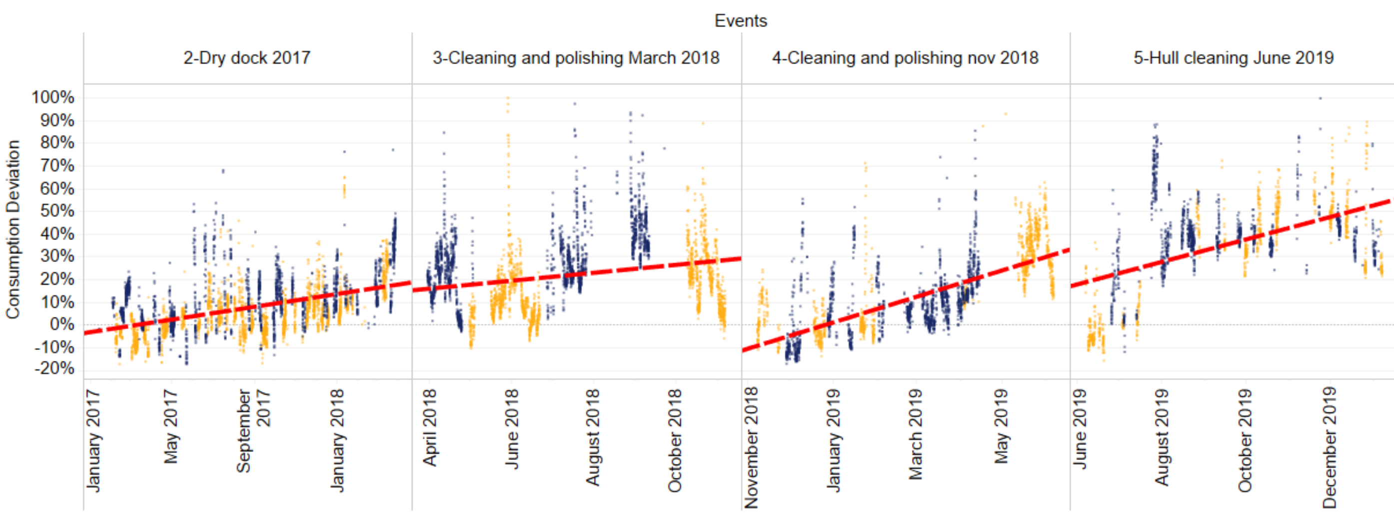
Consumption overview



Propulsion Performance

For most vessels trading internationally, hull resistance increases over time between dockings. The increase in resistance depends on many factors; environmental which cannot be controlled, but also on decisions made on maintenance, paint and operations of the vessel. Simple measures like moving vessels every 5 days when idle can in some cases prevent heavy fouling and well-timed hull cleaning can do so as well. In a single docking cycle, **it is common to see resistance increase towards end of year 5 by greater than 30% and cost of resistance in a docking cycle is up to 20% of the total cost.**

ME Consumption Deviation from baseline



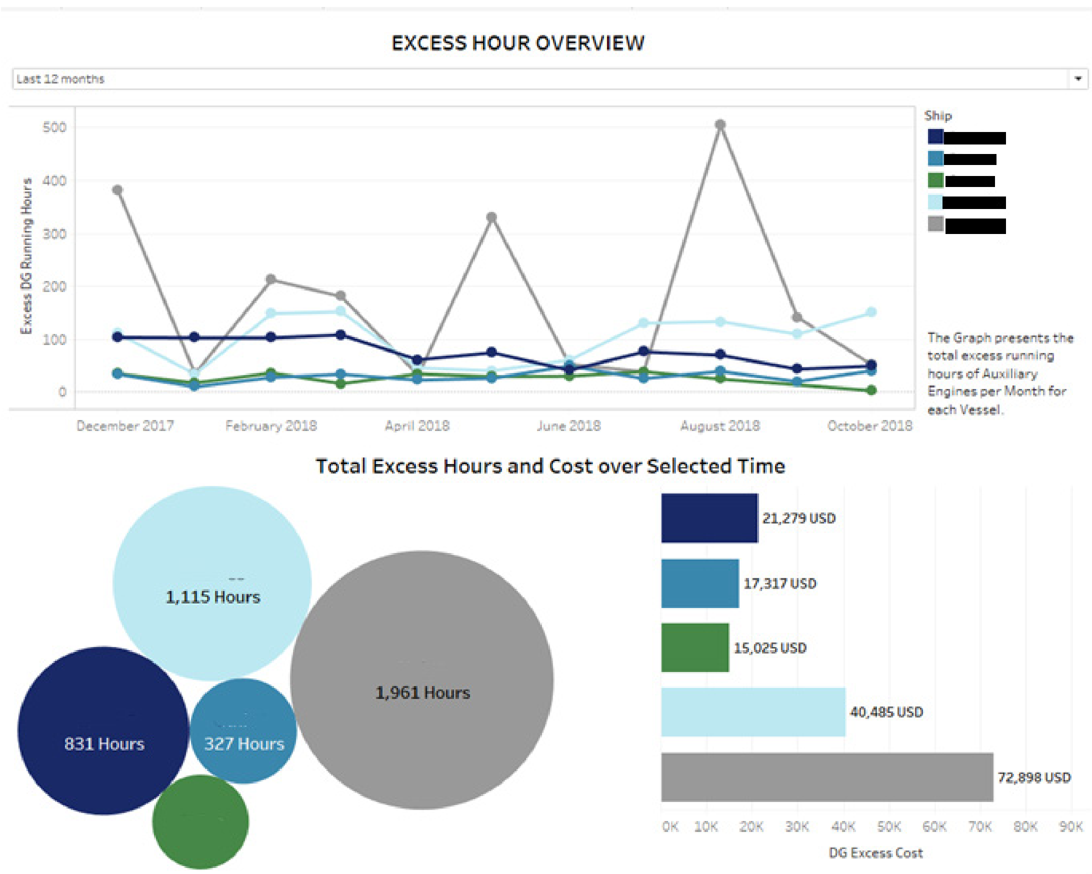
Data gathered from daily vessel operations are used to give advice on the propulsion performance. For instance: if the hull condition is monitored and managed, a VLCC which **consumes 60 MT/d at 13kn on a laden voyage with 200 sea passage-days consumes approximately 60.000 MT of fuel in one docking cycle**. An unmanaged sister vessel consuming same amounts per day out of dock which is impacted by ordinary fouling can consume over 70.000 MT in the docking cycle. At an average bunker price for the past 3 years, the difference in **fuel cost between those two vessels is 3 Million USD.**

The total hull resistance increases as speed increases. Ships are generally re-coated every fifth year. With high quality and high frequency data, and good analytics, the operators can intervene on time to **minimize this excess cost of ship operation.** In cases where high performance paint is applied with performance warranty, similar analyses are used to verify the claims of the paint performance supplier.

Optimising Auxiliary Engine Usage

There are many different engine configurations, with normally 2 or 3 auxiliary engines on a diesel-mechanical vessel, and 4 to 6 auxiliary engines on diesel-electric vessels. These engines, together with the generators, provide uninterrupted power supply to support ship systems such as the hotel load and pump operations. During specific operations, losing power production can be very critical, but during deep sea transit in calm weather it is typically not critical to experience a black-out.

Running redundant auxiliary engines excessively is a very common. This can be addressed by proper monitoring.



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Above is an overview of 5 sister vessels on similar trade delivered in 2017 and 2018, all with new engines that can take high load. The crew of 3 out of 5 vessels ensures minimum running hours of redundant engines while the crew of the other two sister vessels did not. **The most extreme excess cost in a single calendar year for the worst performer in this class is 72k USD** considering both operational expenses and fuel cost. By subscribing to automatic alerts, the redundant hours have been heavily reduced r**esulting in significant cost savings** compared to the baseline state.

About GTT Digital services

GTT Digital Services are comprised of the combination of the expertise of our digital entities delivered in one single comprehensive smart shipping platform.

With all the features described above and many more that can be offered, we help our customers **reduce fuel consumption, cut emissions, mitigate risks and increase transparency.**