

Saving fuel through cargo heating management

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Innovative software could provide the key to almost halving the amount of fuel used to maintain cargo at the optimum temperature, writes Bill Thomson.

Blue Water is involved in various aspects of ship and project management from its base in Dehradun in Northern India. Along with ship broking and maritime supplies, Blue Water considers itself a pioneer in developing customised IT solutions with a focus on efficiency and energy savings.

Operations manager Anurag Tiwari says: "Our [maritime energy efficiency] services are a milestone addition to the upcoming ways of saving fossil fuels and reducing environmental impact from emissions; primarily by innovating new methodologies to optimise the fuel consumption across diverse operations."

The company's IT services include simulation, voyage management, vessel information systems, planned maintenance, performance follow-up applications and centralised report tracking, all developed for the requirements of individual clients. One of the recent introductions is the ORB-IT software which assists with maintaining oil record books.

Tiwari says that as part of its role as a fully-fledged maritime service provider, Blue Water strongly believes in promoting a greener planet through its stated goal of keeping a pollution free marine environment. "We take it as our responsibility to ensure that all our endeavours constantly focus on contributing towards reducing harmful emissions, fossil fuel consumption and any other forms of marine pollution."

With these aims in mind, Blue Water has developed a novel system for cargo heating. This is intended to reduce fuel oil consumption for cargo heating operations by more than 30%, with a corresponding reduction in boiler emissions.

The system builds on the company's five-year experience in the tanker industry with its cargo heating management service, which, during times of severe recession, is said to have succeeded in saving costs for operators in a highly competitive market sector through advanced vessel/fuel optimisation techniques.

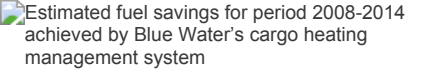
The cargo heating management service aims to optimise shipboard fuel oil consumption required for cargo heating, along with estimating the cargo temperature trend over a specified voyage. By analysing and digitising the performance characteristics of the boiler, the system is able to determine the optimum boiler load settings and the quantity of fuel to be burnt to raise or maintain the cargo temperature as required by the charter party.

Based on the initial report obtained from a particular ship, the system uses a software algorithm to devise a comprehensive voyage-specific cargo heating plan. The software takes into account the various factors affecting the efficiency of the cargo heating operation such as heat losses, expected drop in cargo temperature due to differing ambient temperatures and prevailing weather, climatic, regional and seasonal conditions, cargo and fuel characteristics, and vessel type and freeboard during the voyage. As well as avoiding wasted fuel, by tightly controlling the cargo temperature, the system is said to help prevent expensive cargo claims.

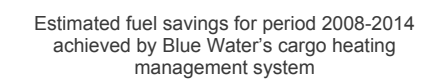
The cargo heating management service is based on a simulation tool, which encompasses thermodynamic calculations coupled with regression analysis of data sets built up through records obtained from over 1700 voyages. The tool, known as E-Therm, is claimed to be able to accurately project cargo temperature drop and corresponding fuel consumption for raising cargo temperature in any marine environment. The relationship between temperature drop and other factors which can have an influence on cargo temperature - including ambient temperatures, weather, quantity of cargo, cargo properties and stowage - is statistically validated and updated with the incoming data from the vessel. This allows voyage specific constants to be applied to thermodynamically generated empirical functions, enabling the cargo heating to be optimised for the duration of the voyage.

Blue Water has recently introduced a cargo heating performance indicator (CHPI) for post voyage analysis. According to the company this has enabled dynamic benchmarking of cargo heating performance of any voyage in any scenario. It uses normalisation techniques to express the CHPI of any voyage in terms of fuel consumption in MT/day at standard conditions. This allows vessel operators to compare the cargo heating performance of any voyage against best and average performers in the fleet, enabling performance comparisons at equal scale. In depth analysis of the cargo heating parameters of the voyage based on CHPI helps the operator or fleet manager to identify areas for improvement and implementation of corrective measures. In one particular case, on an Aframax tanker carrying 80,000 tonnes of crude oil cargo, Blue Water says it observed the CHPI dropping from a historical figure of 7.9MT/day to an average of 3.4 MT/day for maintaining the cargo temperature at 50°C in the sub-tropical trading area.

A recent success for the company's cargo heating management software was winning a Lloyd's List North America award for technical innovation. "Receiving this award is both an honour and a challenge which we take on with pride," said Blue Water founder and managing director Captain Kumaresh Gupta. "We indeed want to revolutionise the cargo heating management project and believe that thumb rule may not always



Estimated fuel savings for period 2008-2014 achieved by Blue Water's cargo heating management system



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apply for cargo heating management.”

According to Gupta, during the past year over 28,000 tonnes of fuel oil have been saved on 559 voyages managed by Blue Water in which cargo heating management was employed. This represents an average consumption of 3.5MT/day, with corresponding savings in carbon, SOx and NOx emissions. The system is now being used by chemical, vegetable oil and other product tankers as well as crude carriers.

Going forward, Blue Water aims at hosting its cargo heating management service as an online interactive application, synchronised with weather forecasting systems, to maximise the efficiency of the system.