Simplifying aspects of **SEEMP compliance** through the introduction of systematic fuel management

engine*i*®
fuel management

The value of fuel management in SEEMP compliance

90% of the world's international trade is travelling by sea, relatively speaking, an energy-efficient means of transporting assets and freight globally.

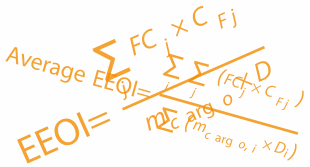
In shipping as in broader transport arenas, sustainability is increasingly becoming a practical agenda. Across this industry, operators are influenced by regulatory pressures for accountability and efficiency metrics. This is not surprising given shipping globally accounts for 3-4% of CO^2 emissions.

The IMO's work on measures to enhance ships' energy efficiency and thereby control and reduce their greenhouse gas emissions has three distinct 'building blocks', the Energy Efficiency Design Index (EEDI), Ship Energy Efficiency Management Plan (SEEMP) and Market Based Measures (MBM).

The international IMO agreement to adopt a package of technical measures to reduce shipping's CO^2 emissions, which by 2030 should reduce ships' emissions by 25-30%, contains binding and mandatory measures which will have substantial impact across the shipping industry.

Further, the Sustainable Shipping Initiative (SSI) continues to lay out a 'vision for 2040' for the industry. However short term, this vital work to some extent compounds challenges faced by the industry across all sectors as increasing fuel prices, erratic market trends and a turbulent global economy and political backdrop influence industry performance.

It is clear to many that while difficult, if changes do not occur, if naval designers, system engineers and operators do not take up the call to innovate in design and operational management; the industry will suffer. Cutting operational costs, is practically speaking as essential to survival as reducing environmental impacts. These two issues clearly go hand in hand.



'The demands on superintendents and onshore staff to deploy new metrics, and on crew to translate and rationalise new procedures into operational routines is of course not an insignificant burden. We need to streamline data collation requirements and automate analysis interpretation. I genuinely believe we can generate insight that will over time lead to ever increasing fuel efficiencies and reduce costs fleet wide.'

Lawrence Brown, Managing Director
enginei®

The practical demands of new regulations

While longer term plans for future sustainability are underway and of interest, as of January 2013 operational demands for monitoring and recording fuel efficiencies will already be in place (as a compliance obligation).

The Ship Energy Efficiency Management Plan (SEEMP) provides an approach for monitoring ship and fleet efficiency performance over time, and encourages the ship owner, at each stage of the plan, to consider new technologies and practices when seeking to optimise ship performance. SEEMP also applies to existing fleets, new and operational vessels over 400GT.

The guidance on the development of the SEEMP for new and existing ships incorporates best practices for fuel efficient ship operation, as well as guidelines for voluntary use of new indicators.

It is intended that shipping companies will manage ship and fleet efficiency performance over time using, for example, the Energy Efficiency Operational Indicator (EEOI) as a monitoring tool (MEPC.1/Circ.684).

The EEOI is an indicator designed to enable operators to measure the fuel efficiency of a ship in operation and to gauge the effect of any changes in operation, e.g. improved voyage planning or more frequent propeller cleaning, or introduction of technical measures such as waste heat recovery systems or a new propeller.

While all measures covered improve aggregate fuel efficiency; enhancement and performance measures of direct relevance to everyday fuel management include:

Fuel efficient operations

1. Improved voyage planning
2. Weather routing
3. Just-in-time
4. Speed optimisation
5. Optimised shaft power

Optimised ship handling

1. Optimum trim
2. Optimum ballast
3. Optimum propeller and propeller inflow considerations
4. Optimum use of rudder and autopilot

Machinery and equipment optimisation

1. Main and auxiliary engine optimisation
2. Equipment and systems

Extract from MEPC 62

'It is important that the source of figures established are properly recorded, on the basis which figures have been calculated and any decisions on difficult or grey areas of data. This will provide assistance on areas for improvement and be helpful for any later analysis.'

'It is recommended that monitoring of an EEOI should be carried out by shore staff, utilising data obtained from existing required records such as the official engineering log-books and oil record books, etc. The necessary data could be obtained during internal audits under the ISM Code and routine visits by superintendents.'

IMO guidelines for voluntary use of EEOI

Barriers to substantial operational impacts and change

A survey conducted by ship design software house NAPA Group into preparation levels for the upcoming SEEMP has revealed that a majority of respondents were unaware of the potential fuel savings the plan could trigger.

The survey completed by over 50 ship owners, operators and charterers, revealed that the industry is taking responsibility for SEEMP compliance seriously and is optimistic about its benefits. However, the focus for most respondents was to ensure compliance and maintaining a business-as-usual approach, rather than implementing a SEEMP with significant potential fuel savings.

79% of respondent organisations already have a system in place for SEEMP compliance, but what does that really mean? Research undertaken by Royston discovered many companies were utilising simple data collation and relying on shore staff to complete compliance documentation.

'The drive for fleet wide operational fuel efficiency should not be hampered by lack of practical tools. Our goal is to deliver operational insight that leads to tangible results. By its nature 'enginei' supports regulatory compliance and offers cost efficient time saving reporting.

Many systems are both overly complex and costly to implement, or too simple to deliver real intelligence that supports operational changes. enginei® is a balanced solution capable of generating a truly comprehensive range of real time data views and comparative reports at the office and on the bridge.'

Sarah Wade, Marketing Director
enginei®

A key challenge is that the marine sector represents many smaller as well as large well-resourced operators. The NAPA Group survey findings revealed a significant variation in awareness and preparedness for SEEMP between small and large companies and between Europe and Asia; with 95% of those responsible for 30+ vessels stating they were "prepared", compared to companies with 5 to 15 vessels who had the lowest preparation rate at only 43%.

Growing evidence suggests the potential cost of implementation is driving many to pay less attention to regulations as a positive driver for practical change and potentially as more of an additional burden.

The need for advanced yet cost efficient insight and operational intelligence

While it is good news to discover many organisations perceive themselves as ready for compliance, realistically, true insight, change in behaviour and performance is another benchmark.

In practical terms the purpose of the SEEMP plan is to establish direction and enable action.

On-going fleet, vessel operational management and technical systems will be required to deliver longer term monitoring and performance intelligence if significant enhancements and the dramatic efficiencies and changes as proposed in the IMO agreement are to be achieved. However, only 45% of operators participating in the NAPA group survey are intending to use electronic data collection methods. This is relatively low given the potential value of sophisticated data analytics to everyday management improvements.

Examples of beneficial practical information that could be gathered include:

- Operational behaviour and impacts on fuel performance
- Ready identification of costly manoeuvres or navigational behaviour
- Understanding comparative performance of vessels and fleet groups
- Comparative vessel to vessel data relating to different systems and associated performance
- Understanding impact of environmental factors on specific journey performance
- Insight into differences in navigational and operation approaches, and impact on fuel efficiency.

It comes as no surprise then that in real terms the SEEMP urges the ship owner and operator at each stage of the plan to consider new technologies and practices when seeking to optimise the performance of a ship. Further 70% of those without a plan in place for SEEMP believe electronic systems would be the best solution.

A fundamental question is of course, how can vessel operators gather such operational data and make effective decisions to support optimisation? Clearly a unified data standard as seen in other logistics industries would be of great value; however this is not presently available.

Establishing internal bespoke process provides potential for bespoke data cross tabulations and customised reporting, however it has many downfalls.

- Data incompatibility between vessels, fleet groups and vendors
- Less viable as a long term solution
- Less potential for ROCE, as VMS data systems evolve
- Less adaptability/higher costs as new regulations are established (varying reporting needs)
- Lack of 'True' operational value as cost benefits of developing complex data collation and interpretation systems outweigh practical benefits

'We wanted to create a solution that is accessible to smaller fleet owners and operators. We recognise times are lean and committing to new management systems is potentially onerous. enginei® is cost efficient to install and operate, and offers scalability and future proofing. We have designed the system to be compatible with other systems so you can access 'best in class' fuel management and integrate this with other vessel management systems.'

Damian McCann, Business Development Manager enginei®

About engine*i*®

We have worked hard to develop a unique system offering the best range of useful data and visualisations, while delivering value for money.

Helping compliance to new and existing regulations

Save fuel and reduce costs

- Advanced fleet comparison analytics allows a customisable assessment on your individual vessel or fleet. engine*i*® gives you the ability to compare past and real time data enabling you to present accurate reports on improved fuel savings.

Enhance insight into fleet operations

- Delivering reliable data to both the on-board and onshore team in an accessible format and offering a variety of metrics to help create the data you desire; engine*i*® works simultaneously with the data it collects to effectively translate the data into understandable analytics.

Minimal installation time and low cost installation

- Our advanced system can be used with existing flow meters, providing dramatically reduced installation costs when compared to other solutions..

Broader VMS system integration

- We have designed our system with compatibility to broader vessel management solutions in mind. Our data outputs comply with data compliance for marine application and we are happy to work in partnership with your preferred suppliers to provide integrated solutions.

THE BRIDGE

Fuel Optimisation Display

Detailed fuel consumption display showing consumption per mile, as well as cost per mile.

Key features:

- Fuel consumption in L/Hr/ Minute/Mile
- Speed over ground
- Fuel cost $/Mile
- Masters name
- Destination/Arrival port
- Departure/Arrival time
- Weather condition notes

THE ONSHORE OFFICE

Website

Detailed fuel consumption display showing consumption per mile, as well as cost per mile.

Key features:

- Fleet / vessel overview
- Fuel consumption
- Average fuel consumption
- Engine hours
- Voyage costs
- Captain to captain comparison
- Ship to ship comparison
- Google Earth tracking
- RPM
- Weather notes

THE BRIDGE

Data Transfer

All logged data is transmitted to the secure engine*i*® server on shore for storage and analysis via the engine*i*® web site. Data transmission is via the ship's existing communication network:

- Use existing comms platform (3G/ GPRS/Satellite)
- Alternatively, a dedicated platform can be provided
- Data logged every minute
- Up to 2 year archive
- Transfer every 15 minutes
- Data storage onboard 30 days

Notes

Read more:

enginei®: www.enginei.co.uk

Sustainable Shipping Initiative: www.forumforthefuture.org