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MariEMS Learning Material

This is the 36th and last compilation by Professor Dr Reza Ziarati on the work of the EU funded Erasmus + MariEMS' partners and material extracted from the IMO TTT Course. The material is composed from Chapter 36 of the learning material. Readers are also advised to refer to the papers on IdeaPort and IdealShip projects led by C4FF and published by MariFuture.

36. ISO19030 and Application of SEEMP for EEOI Requirements

36.1 SEEMP main features

Shipping is a relatively efficient mode of transport compared to land and air when you consider the CO2 emissions produced per mile that each tonne of cargo is transported. However, shipping is also coming under increased scrutiny to lower its GHG by the international community and, under its remit, the IMO is looking at promoting measures to control these by improving ship efficiency through better management and implementation of best practice. The SEEMP provides a means to formally capture processes by which a ship owner can seek to improve the environmental efficiency aspects of their operations both onboard each of their ships as well as company-wide. The SEEMP is a 'live' document, containing energy improvement measures identified by the ship owner that will be kept onboard each ship. The document will be reviewed regularly to establish the relevance and impact of each measure on ship and fleet operations. Each SEEMP will be ship specific but should be linked to a broader corporate energy management policy of the ship owner. In some cases, the SEEMP may form part of the ship's Safety Management System (SMS) and many ship owners will already have an Environmental Management System (EMS) under ISO 14001 which contains relevant practices for environmental improvement that may augment the SEEMP. There are four key processes that the SEEMP must address and describe and together they form a continuous improvement process as shown in Figure 36.2.1. Each process, taken from the SEEMP Guidelines (MEPC.213 (63), has been summarised in the following sections.

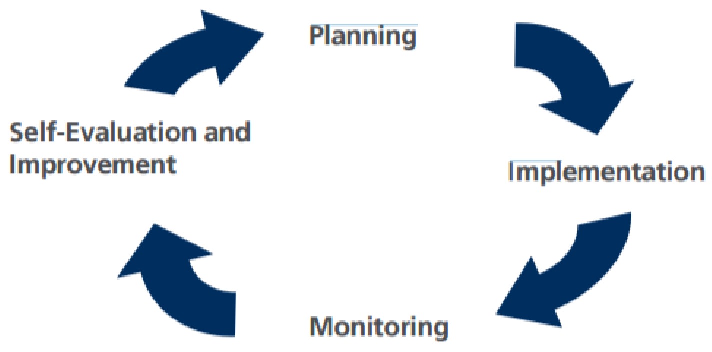

Figure 36.2.1: SEEMP processes

36.2 SEEMP and EEOI

The Ship Energy Efficiency Management Plan (SEEMP) is an operational measure that establishes a mechanism to improve the energy efficiency of a ship in a cost-effective manner. The SEEMP also provides an approach for shipping companies to manage ship and fleet efficiency performance over time using, for example, the Energy Efficiency Operational Indicator (EEOI) as a monitoring tool. 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 the EEOI for new and existing ships (MEPC.1/Circ.684). The EEOI enables 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. 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.

36.3 ISO 19030

The ISO 19030 was developed for hull and propeller performance assessment for ships in service. It outlines initial motivation, purpose and implementation of the standard. The standard is intended to serve the wider community as well as support shipping operators and suppliers in better business practice.

Today hull and propeller performance is a ship efficiency killer. According to the Clean Shipping Coalition in MEPC 63-4-8, poor hull and propeller performance accounts for around 1/10 of world fleet energy cost and GHG emissions. This points to a considerable improvement potential; 1/10 of world fleet energy costs and GHG emissions translates into billions of dollars in extra cost per year and around a 0.3% increase in man-made GHG emissions. The culprits are a combination biofouling and mechanical damages. Most vessels leave the new build yard or subsequent dry-docking with their hull and propeller in a fairly good condition. Then on account of a combination of biofouling and mechanical damage, hull and propeller performance begins to deteriorate.

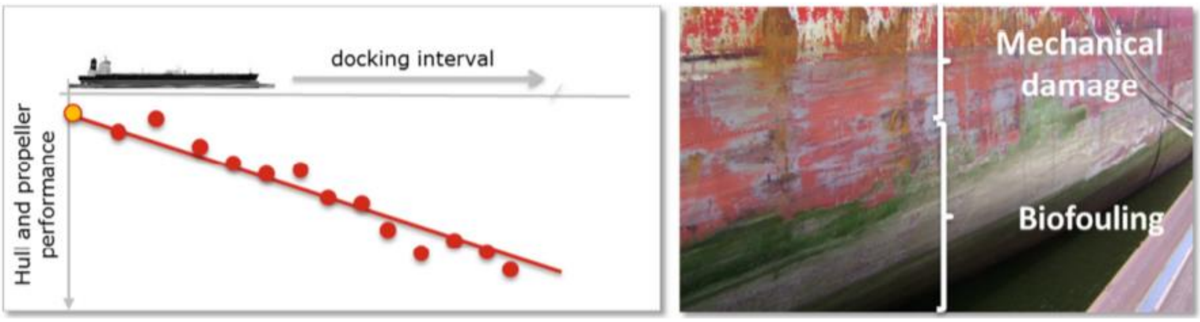

Figure 36.3.1: Hull and propeller performance

There are technologies and solutions on the market that can protect the hull and maintain good performance over the full duration of the docking interval - why then is hull and propeller performance still so poor?

In the past the problem has been a lack of measurability. If one cannot measure it, one cannot manage it. Now a multitude of measurement methods are being introduced in the market; some quite good, some really bad, most of them proprietary (black box) and many using their own yardsticks. It is becoming challenging, however, even for the most resourceful to determine which of these methods can be relied upon and which cannot. Moreover, the measurement methods have different and incompatible yard sticks resulting in the measurement output serving to confuse rather than inform.

This standard is intended for all stakeholders that are striving to apply a rigorous, yet practical way of measuring the changes in hull and propeller performance. It could be ship-owners and operators, companies offering performance monitoring, shipbuilders and companies offering hull and propeller maintenance and coatings. ISO 19030 will make it easier for decision makers to learn from the past and thereby make better informed decisions for tomorrow. It will also provide much needed transparency for buyers and sellers of technologies and services intended to improve hull and propeller performance. Finally, it will make it easier for the same buyers and sellers to enter into performance based-contracts and thereby better align incentives.

36.4 What ISO 19030 covers

ISO 19030 outlines general principles of, and defines both a default as well as alternative methods for, measurement of changes in hull and propeller performance. The standard defines sensor requirements, measurement procedures, including various filters and corrections, as well as how to calculate a set a set of four performance indicators for hull and propeller related maintenance, repair and retrofit activities.

One of the performance indicators is "In-service performance". In-service performance refers to the average change in hull and propeller performance over the dry-docking interval. Performance over the first year following the docking is compared with performance over whatever remains of the docking interval – typically two to four years.

This performance indicator (Fig 36.4 1) is useful for determining the effectiveness of the underwater hull and propeller solution – for example the hull coating system used.

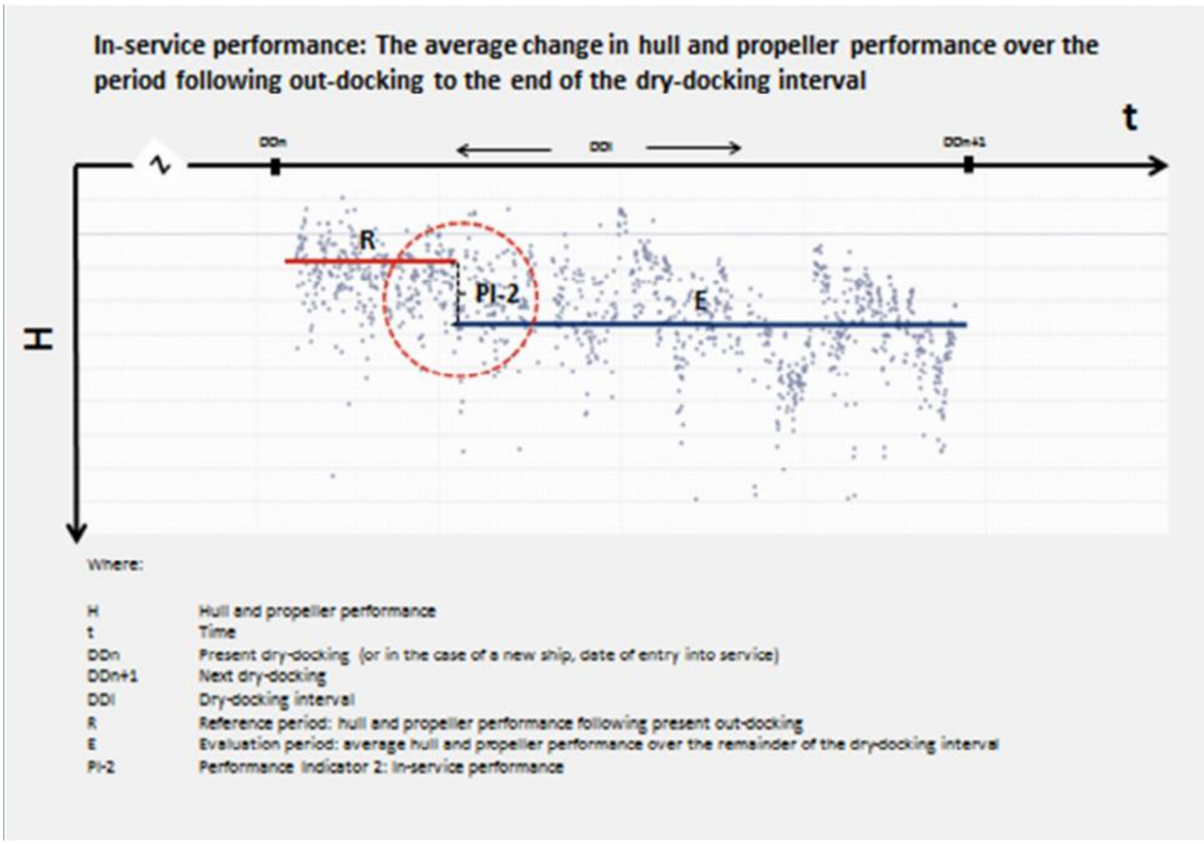

Fig. 36.4.1: Performance indicators in ISO 19030 – In-service performance

The three additional performance indicators are "Dry docking performance", "Maintenance trigger" and "Maintenance effect":

- Dry docking performance: Hull and propeller following the present out-docking is compared with the average performance from previous out dockings. This provides useful information on the effectiveness of the docking.

- Maintenance trigger: Hull and propeller performance at the start of the dry-docking interval is compared with a moving average at a point in time. Useful for determining when hull and propeller maintenance is needed – including propeller polishing or hull cleanings.

- Maintenance effect: Hull and propeller performance in the period preceding the maintenance event is compared with performance after. This provides useful information for determining the effectiveness of the event.

ISO 19030 is fairly all-encompassing. It covers what sensors are required, how these are to be maintained, step-by-step procedures for filtering and correcting the data, and finally how the individual performance calculators are to be calculated.

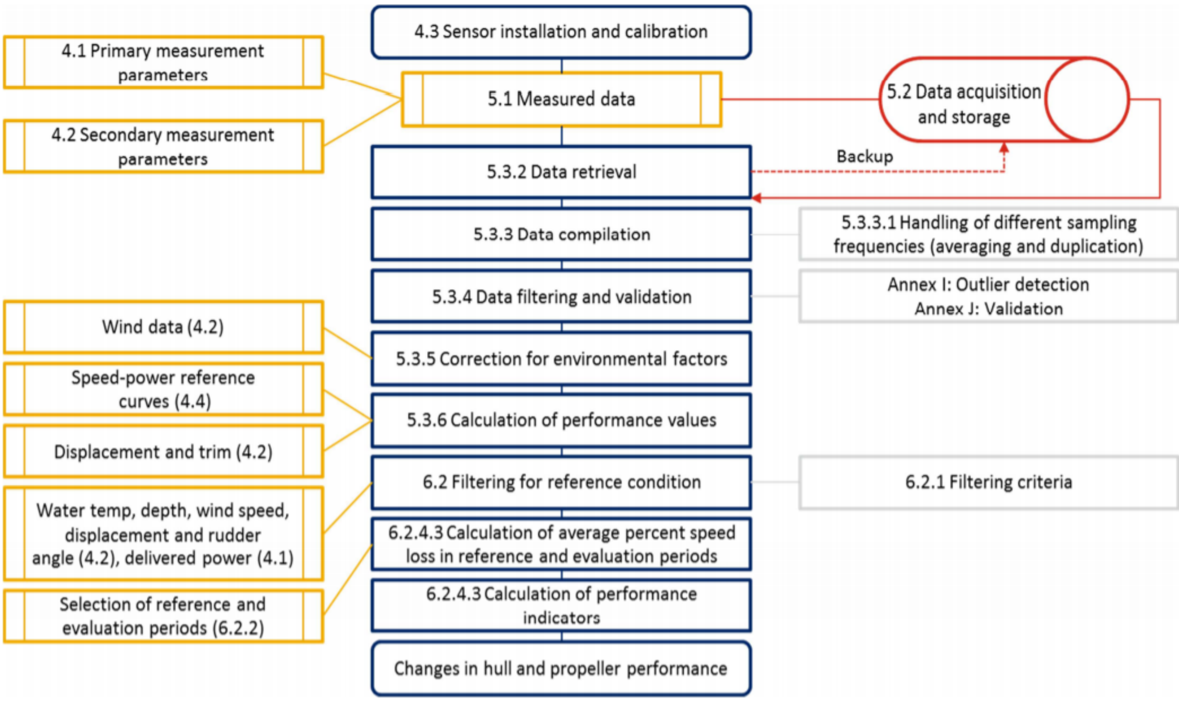

Fig. 36.4.2: ISO 19030 scope

The standard is organized into three parts:

- ISO 19030-1 outlines general principles for how to measure changes in hull and propeller performance and defines the 4 performance indicators for hull and propeller maintenance, repair and retrofit activities.

- ISO 19030-2 defines the default method for measuring changes in hull and propeller performance. It also provides guidance on the expected accuracy of each performance indicator.

- ISO 19030-3 outlines alternatives to the default method. Some will result in lower overall accuracy but increase applicability of the standard. Others may result in same or higher overall accuracy but include elements which are not fully validated in commercial shipping.

Descriptions and explanations are outlined in ISO 19030-1. Methodological alternatives that are state of-the-art and mature are addressed in ISO 19030-2. Alternatives that are state of the art but not fully mature have either been included in ISO 19030-3 or will be addressed in future revisions of the standard. Alternatives that give the same overall accuracy are included as options in ISO 19030-

2. Finally, alternatives that yield lower overall accuracy but increase applicability of the standard are covered in ISO 19030-3.

36.5 How ISO 19030 has been developed

The process towards developing the ISO19030 started when the Environmental NGO Bellona Foundation and Jotun A/S had informal discussions on how to improve energy efficiency within the maritime sector. Bellona Foundation looked for a robust and verifiable way to reduce CO_2 emissions, whereas Jotun A/S saw the need for a more transparent approach to verify a myriad of performance claims on hull and propeller maintenance.

A series of workshops held in accordance with Chatham House Rules involved a steadily increasing number of stakeholders and paved the way for a common understanding among performance monitoring companies, measurement manufacturers, ship maintenance system providers, classification societies, shipbuilders and ship-owners and their associations. Bellona Foundation and Jotun subsequently held a side-event at IMO-MEPC meetings and presented the embryo for a reliable and transparent hull and performance standard at several maritime conferences.

Work on the ISO-Standard was initiated in June 2013 when Working Group 7 under SC2 TC8 was formed. Svend Søyland from Nordic Energy Research serves as the Convener of the working group and Geir Axel Oftedahl from Jotun has the role as Project Manager. A series of Working Group meetings were held; Oslo (June 2013), Tokyo (November 2013), Hamburg (July 2014), Pusan (November 2014), San Ramon (February 2015) and Copenhagen (September 2015). More than 50 experts and observers, representing ship owners, shipping associations, new build yards, coatings manufacturers, performance monitoring companies, academic institutions, class societies and NGOS participated in the ISO working group that reached consensus on ISO 19030 standard.

Additional industry stakeholders have been consulted and involved as a part of this extensive process. World class experts shared their deep expertise in a truly collaborative effort and put aside their professional ties. A determination to find workable compromises was the hallmark of the drafting process. Representatives that in other contexts would be fierce competitors share expertise, policies and performance data etc. This was a larger than usual Working Group under the ISO-system and the by far largest with the Ship Technology section. The drafting process uncovered a need to address both the most rigorous methods available and the most commonly used approaches used. This led to the division into three parts.

A Committee Draft of part 1 and 2 was submitted in March 2015. A Ballot among P-members was concluded in May 2015 with sound support. The target date for submitting a Draft International Standard (DIS) of all three parts was December 2015. An ISO-Ballot was concluded in March 2016 and it is expected the Standard will achieve final approval and official publication by June 2016. The Working Group (WG7) will remain operational in order to prepare future revisions and refining the standard. The preparation for the Standard was followed with great interest for both trade journals and all relevant stakeholders. Many stakeholders are in the process of incorporating the standard in their daily operations and prepare contracts that use the ISO-standards as a point of departure.

Ship owner associations are drafting guiding documents and ISO 19030 may also become the bedrock for a carbon offset/crediting scheme incentivising greenhouse gas emission reductions.

36.6 References and further readings

1. http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Technical-and-Operational-Measures.aspx viewed Dec 2016.

2. http://www.nordicenergy.org/wp-content/uploads/2016/04/S%C3%B8yland-oftedal-paper_HullPIC2016.pdf viewed Dec 2016.

3. IMO (2014), Third IMO Greenhouse Gas Study 2014, IMO, London http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/GHGEmissions.aspx viewed Dec 2016.