


A VISION FOR EUROPEAN MARITIME RDI 2030

ECMAR Position Paper - Appendices

Safer, Smarter, and Greener for a Sustainable European Maritime Sector

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A Vision for European Maritime Research, Development and Innovation for 2030

ECMAR Position Paper - Appendices

The Appendices in this document provide additional information on the topics explored in the ECMAR Position Paper: *A Vision for European Maritime Research, Development and Innovation for 2030*. The appendices, which include details of legislation related to the topic areas, information on fuel cells for maritime applications, and human factors, are as listed below:

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ANNEX 1: Climate Change and Emissions Policies

Paris Agreement on Climate Change

The Paris Agreement on Climate Change[1] is a new legally binding framework for an internationally coordinated effort to tackle climate change, but it does not bind international shipping and aviation. The Agreement aims to hold global temperatures well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C. This goes beyond what had been agreed in Copenhagen and confirmed in Cancún, namely to recognize the scientific view that the increase in global temperature should be below 2 degrees Celsius.

The Paris Agreement puts emphasis on processes rather than on defined mitigation goals. One of the aims of the Paris Agreement is for greenhouse gas emissions to peak as soon as possible, and to achieve net-zero emissions in the second half of this century.

IMO's Progress on reducing greenhouse gas emissions

There is no current agreement by IMO on capping carbon dioxide emissions. Although shipping is a fast-growing source of greenhouse gases, projected to account for 17% of global emissions by 2050. IMO members have agreed to further monitoring of greenhouse gas emissions data from international shipping, with a view to drawing up an action plan to reduce them and to implement them after 2023.

The IMO has therefore made limited progress to address greenhouse gas emissions on the maritime sector. It has agreed to cap the sulphur content of marine fuels at 0.5% by 2020. It has also adopted a global and mandatory system to collect fuel consumption data from ships and established NOx Emission Control Areas (NECAs).

IMO have recently established the next two NOx Emission Control Areas (NECAs) in the Baltic Sea and the North Sea for 2021. Ships with keels laid down after that date will be required to meet dramatically reduced NOx emission limits; this will require either exhaust gas after treatment (selective catalytic reduction or exhaust gas recirculation) or use of LNG.

IMO is now focusing on a more gradual approach, with monitoring, reporting and verification of emissions (MRV) as a first step, further efficiency measures for existing ships, and market-based measures in the mid-to-long term. A roadmap (2017 through to 2023) for developing a "Comprehensive IMO strategy on reduction of greenhouse gas (GHG) emissions from ships", foresees the adoption of an initial GHG strategy in 2018.

EU Policy on reducing greenhouse gas emissions

In line with on-going IMO discussions, the European Commission has introduced EU-wide monitoring, reporting and verification of emissions (MRV) rules bringing emissions from shipping into its 2009 climate and energy package. The EU Regulation (EU) 2015/757 on monitoring, reporting and verification of carbon dioxide emissions from maritime (MRV Regulation), will become fully effective on 1 January 2018; this regulation will lead to a further emissions reduction of up to 2% compared to a business-as-usual scenario.

[1] Paris Agreement on Climate Change: https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf

EU Emissions Trading System (ETS)

In 2016, the Environment Committee (ENVI) of the European Parliament adopted its report on the revised EU Emissions Trading System (ETS) in which a compromise text for shipping was agreed. This will put pressure on IMO to have a system comparable to ETS operating for global shipping from 2021. If this compromise is not acceptable, then shipping will be included in the European ETS as from 2023.

EC Study on GHG emissions reductions for maritime transport

According to an EC study on the "Analysis of market barriers to cost effective GHG emission reductions in the maritime transport sector, 2012"[2] a number of impacts are expected by increasing a vessel's efficiency. The direct economic impact of the reduced fuel consumption with lower fuel costs, leads to a more competitive industry with lower transport costs; this in turn reduces the cost of imported goods for the consumer.

	2007		2020		2030	
	Likely	High	Likely	High	Likely	High
Speed Reduction	96.8	173.9	225.6	440.0	383.7	752.1
Weather Routing	7.9	31.7	12.0	47.9	18.3	73.1
Autopilot Upgrade / Adjustment	8.1	12.6	12.7	19.2	20.3	30.1
Optimisation of Trim & Ballast	8.9	28.8	13.1	44.6	19.7	70.8
Propeller Polishing	8.9	26.7	13.1	39.3	19.7	59.0
Hull Cleaning	8.9	44.5	13.1	65.5	19.7	98.4
Hull Coating	17.8	44.5	26.2	65.5	39.4	98.4
Propeller / Rudder Upgrade	26.5	34.4	40.9	52.9	63.9	82.2
Main Engine Tuning & Common Rail	8.9	26.7	13.1	39.3	19.7	59.0
Waste Heat Recovery	12.9	42.9	22.5	74.8	36.4	121.5
Speed Control of Pumps and Fans	1.8	8.9	2.6	13.1	3.9	19.7
Energy Saving Utilities (e.g. Lighting)	0.1	0.3	0.1	0.3	0.1	0.4

Summary of global CO_2 abatement potential for the twelve solutions (Mt).[2]

[2] Analysis of market barriers to cost effective GHG emission reductions in the maritime transport sector, Reference: CLIMA.B.3/SER/2011/0014: https://ec.europa.eu/clima/sites/clima/files/transport/shipping/docs/market_barriers_2012_en.pdf

ANNEX 2: Arctic Policy and the Polar Code

EU's Policy for the Arctic

The European Union's new integrated EU policy for the Arctic[3] aims to develop a more coherent framework for EU action and funding programmes in the Arctic. The Arctic ice is melting because of climate change, which is creating a longer shipping season and has already resulted in vessel traffic increases of 166 percent through the Canadian Northwest Passage since 2004.

The climate of the Arctic region also makes it an ideal innovation site for cold climate technologies and services. Harsh climatic conditions and the fragile environment require specialised technology and expertise to meet high environmental standards. Opportunities in the 'Green Economy', such as sustainable multi-source energy systems, eco-tourism and low emission food production, could be developed further.

The European Commission will help to monitor potential opportunities for sustainable economic activities, including in 'Blue Economy' sectors such as aquaculture, fisheries, offshore renewable energy, maritime tourism and marine biotechnology. With wide variations across this vast region, energy will be a growth sector, and may include on- and off-shore wind power, ocean energy, geothermal energy and hydropower.

IMO's Polar Code

IMO has adopted the International Code for Ships Operating in Polar Waters (Polar Code)[4] and related amendments to make it mandatory under both SOLAS and MARPOL. The Polar Code covers the full range of design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in the inhospitable waters surrounding the two poles. A new MARPOL regulation protects the Antarctic from pollution by heavy grade oils, but it does not apply to Arctic ship operations.

Ships operating in Polar Regions face a number of unique risks. Poor weather conditions and the relative lack of good charts, communication systems and other navigational aids pose challenges for mariners. Furthermore, if accidents do occur, the remoteness of the areas makes rescue or clean-up operations difficult and costly.

Extreme cold may reduce the effectiveness of numerous components of the ship, including deck machinery and emergency equipment. Furthermore, when ice is present, it can impose additional loads on the hull and propulsion system. To address all these issues, the Polar Code sets out mandatory standards that cover the full range of design, construction, equipment, operational, training and environmental protection matters that apply to ships operating in the inhospitable waters surrounding the two poles.

[3] A new integrated EU policy for the Arctic adopted. http://europa.eu/rapid/press-release_IP-16-1539_en.htm

[4] IMO International Code for Ships Operating in Polar Waters (Polar Code), MEPC 68/21/Add.1 Annex 10: www.imo.org/en/MediaCentre/HotTopics/polar/Documents/POLAR%20CODE%20TEXT%20AS%20ADOPTED.pdf

ANNEX 3: Fuel Cells for Maritime Applications

Introduction

One of the strategic goals and recommendations for the EU's maritime transport policy until 2018[5] was for measures to work towards the long-term objective of 'zero-waste, zero-emission' maritime transport. The EU policy is aimed at reducing greenhouse gas emissions from shipping, improving the environmental quality of its marine waters, managing ship-generated waste and ship dismantling, reducing sulphur oxides and nitrogen oxides emissions from ships, and promoting more ecological shipping. The European Commission also recommended promoting innovation and technological Research and Development in order to improve the energy efficiency of ships, reduce their environmental impact and provide better quality of life at sea.

There are already many ways to reduce CO_2 emissions with existing and future technologies. These include improved energy efficiency, the use of renewable energy and alternative fuels. The LeanShips[6] project aims to demonstrate the effectiveness and reliability of energy saving and emission reduction technologies at full scale. However, fuel cells and the use of hydrogen as an energy carrier is the most promising contender to develop a 100% pollution-free energy-chain.

Applying fuel cell technology by converting energy from hydrogen is undoubtedly an essential requirement for future sustainable transportation, as this would effectively eliminate greenhouse gas in the marine environment. The use of hydrogen has political support in the form of an EU commitment to invest in a new fuel cell system for marine purposes. This is part of the Fuel Cells and Hydrogen 2 Joint Undertaking[7], represented by the European Commission, Hydrogen Europe, and research groups.

Although there have been numerous research projects on fuel cells using alternative fuels, such as Methanol, there has been limited activity to demonstrate the feasibility of fuel cell technology for maritime applications. However, there is growing interest in eco-friendly power generation with fuel cells, particularly for cruise ships (e.g. e4ship and Royal Caribbean Icon class cruise ships), and for a hydrogen-powered ferry (HYBRIDShips).

IMO's Carriage of Cargoes and Containers Sub-Committee are currently considering fuel cells with a view to including safety provisions in the International Code of Safety for Ships using Gases or other Low- flashpoint Fuels, the (IGF) code.

Fuel Cells

Fuel cells produce electricity through the reaction of a fuel with oxygen. Fuel cells convert electrochemical energy directly by transforming the chemical energy in the fuel directly, with low to zero emissions. There are many types of fuel cells, but they all consist of an anode, a cathode, and an electrolyte. This allows for an ion charge carrier, e.g. a hydrogen ion or oxygen ion, to move between the two sides of the fuel cell, thus producing electric current for utilization in an external circuit. The primary fuels used in fuel cells include hydrogen, LNG, methanol, and methane, etc.

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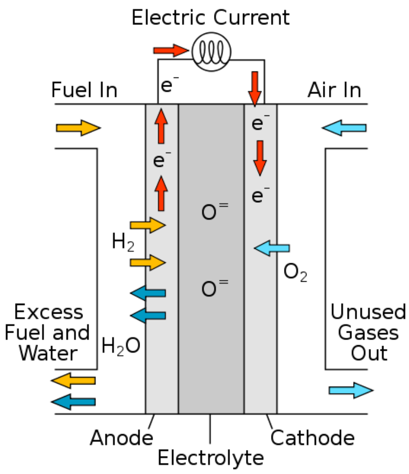
[5] Strategic goals and recommendations for the EU's maritime transport policy until 2018, COM(2009)08, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0008:FIN:EN:pdf
[6] LeanShip project, http://www.leanships-project.eu/home/
[7] Fuel Cells and Hydrogen 2, Joint Undertaking: http://www.fch.europa.eu/



Scheme of a Fuel Cell (credit to D. Rajasekhar et al.[8])

Hydrogen-oxygen fuels cells use hydrogen as their fuel, and water is the only waste product. The main safety aspects relate to the use and storage of hydrogen. Hydrogen however is a versatile energy carrier with favourable characteristics and it does not release any CO_2. It can therefore play an important role in the transition to a clean, low-carbon, energy system.

Fuel Cell Research Projects and Studies

Over recent years, there have been a number of EU projects evaluating the possible use of hydrogen in maritime applications. There have also been a number of national projects in Iceland, Germany and Norway. Some of these projects assessed the potential use of fuel cells, the use of hydrogen as a fuel and of different fuels. Other projects focused on rule development, concept design, and the installation of fuel cells in various vessels.

DNV-GL have recently carried out a comprehensive study for EMSA on the use of Fuel Cells in Shipping[9]. This study identified 23 fuel cell projects in the maritime sector. The study evaluated seven different fuel cell technologies: the alkaline fuel cell (AFC); the proton exchange membrane fuel cell (PEMFC); high temperature PEMFC (HT-PEMFC); direct methanol fuel cell (DMFC); phosphoric acid fuel cell (PAFC); molten carbonate fuel cell (MCFC) and the solid oxide fuel cell (SOFC).

The three technologies ranked to be the most promising for marine use was the solid oxide fuel cell, the PEMFC and the high temperature PEMFC. The PEM fuel cell is a mature technology that has been successfully used both in marine and other high-energy applications. The operation requires pure hydrogen, and the operating temperature is low. The main safety aspects is in the use and storage of hydrogen on-board a vessel.

The United States Navy's Office of Naval Research programme for a Fuel Cell electrical generator concluded: “Fuel cell systems are a very attractive solution for on-board ship power generation. These systems have the potential of being more efficient and cleaner than the conventional internal

[8] Fuel Cell Technology for Propulsion and Power Generation of Ships: Feasibility Study on Ocean Research Vessel Sagarnidhi, by Rajasekhar D., Deepak Sankar P. S., Ananthakrishna, and Narendrakumar D. Journal of Shipping and Ocean Engineering 5 (2015) 219-228.

[9] Study on the use of Fuel Cells in Shipping for EMSA, by DNV-GL- Maritime, 01/2017. http://www.emsa.europa.eu/news-a-press-centre/external-news/download/4545/2921/23.html

combustion engines and gas turbines. Furthermore, fuel cells can be fully integrated into an all-Electric Ship Concept".

Fuel Cell benefits

Fuel cells have a wide range of potential applications for maritime applications. In recent years, EU and national projects have evaluated the possible use of fuel cells for ships, the use of hydrogen as a fuel, using different fuels, and the installation of fuel cells in various vessels. Royal Caribbean will use hydrogen fuel cells to provide additional power for their new liquefied natural gas (LNG) – powered Icon class cruise ships. These fuels cells will provide electrical power to the vessel's hotel functions.

Fuel cells have several benefits over conventional combustion-based technologies currently used to power ships. They can operate at higher efficiencies than combustion engines, and can convert the chemical energy in the fuel to electrical energy with efficiencies of up to 60%. Efficiencies of up to 85% are possible with a cogeneration scheme to capture waste heat.

Fuel cells also have lower emissions than combustion engines. As fuel cells run without any direct internal combustion, they do not produce any SOx, NOx, or any volatile compound emissions, even when running on e.g. LNG or methanol. They also operate at a good efficiency, even on part-load operation and their conversion efficiency is good regardless of the system size.

Fuel Cell research issues

The maritime industry is already the most efficient form of transportation in terms of shipping goods and conveying passengers. However, new regulations require further reductions in fuel consumption and greenhouse gas emissions. A number of solutions have already addressed these issues, including the use of alternative fuels, (e.g. LNG), hybrid propulsion systems, the all-electric ship concept, and fuel cells. Fuel cells and particularly those using hydrogen as a fuel, have the potential to minimize or even eliminate greenhouse gas emissions for some ship types. A paradigm shift will be for cleaner fossil fuels and renewable fuels, but their adoption will depend upon on several factors, including infrastructure, environmental impact, safety, regulations and technical suitability.

There have been numerous research projects undertaken on fuel cells, but only a limited activity to demonstrate the feasibility of fuel cell technology for maritime applications. The research and development has covered the potential use of fuel cells, the use of hydrogen as a fuel and of alternative fuels, rule development, concept design, and the installation of fuel cells in various vessels.

The MARANDA project clarified the basis of the safety regulations related to fuel cells and hydrogen, as both compress gas and liquid. Despite the recent work with LNG and fuel cell regulations at IMO, numerous gaps in the rules still exist. This presents a bottleneck for fuel cell and hydrogen technology adoption in the marine sector. Knowledge of feasible practices for fuel cell and hydrogen installations are required before the IMO regulations are agreed.

There are several challenges before fuel cell systems can compete with current state-of-the-art maritime solutions. These include the storage and bunkering of hydrogen in its liquid form, infrastructure, availability of fuel, and demonstrations of fuel cells in ships with hydrogen as well as hydrocarbon-based fuels. Bunkering vessels for transferring liquid hydrogen from production sites to harbours as well as the bunkering procedure will require new technology development. The transfer of chemical industry technology to marine applications will therefore be necessary.

ANNEX 4: – Human Factors

The SEAHORSE project[10] is considering technology transfer from air transport to maritime transport focusing on human factors problems, for safer and more resilient shipping operations. Coles[11] identified five topic areas where shipping can learn from aviation in order to improve safety, as described below. Two other topic areas are also included: the first based on the recently published R&D policy of the Netherlands Ministry of Defense and the second on Human Factors related to autonomy in the maritime domain and on unmanned ship handling[12,13].

1. Safety as a Commercial Currency
2. Standardisation of equipment
3. Culture of Strict Adherence to Procedure
4. Reduction of Administrative Burdens
5. Global Traffic Control
6. Human-machine teaming
7. Human factors aspects of shore-based vessel control [34, 35]

1. Safety as a Commercial Currency

"As any major Oil company will tell you, safety can indeed carry significant commercial value. However, with the predominantly human passenger cargo, the commercial advantage safety offers is considerably higher in the aviation sector. A bad incident does not reflect well in customer airline selection".

"Airlines see high commercial value in being considered safe and proactively addressing safety issues. Indeed, the aviation industry is considerably safer than the maritime sector. In a study carried out by Berg (2013), the maritime sector was found to be 25 times riskier than aviation, based on deaths per 100km travelled".

2. Standardisation

"Aviation is, by its nature, far more standardised than the maritime sector with standard 'assets' enabling accredited training and licenses for each aircraft type. While ships look similar to each other, the bridge of one tanker may look similar to a bridge of another, but there can be significant differences in the equipment installed onboard. There can also be differences on how competent crews use the equipment once the crew come onboard for the first time".

"Both the IMO and industry can take more responsibility for driving improved transparency and standardisation within voyage and vessel operations. Equipment could be further standardised, making the user interface easier to understand and use efficiently. While onboard equipment could

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[10] Strathclyde University et al, SEAHORSE Project: www.seahorseproject.eu

[11] Frank J. Coles, Transas, CEO: http://www.thesis2017.com/the-5-things-aviation-can-give-to-shipping/

[12] Broek, J van den, Schraagen, J,M.C, Brake, te G.M, Diggelen, van J, (2017). Approaching full autonomy in the maritime domain: paradigm choices and Human Factors challenges. *Accepted for Proceedings of MTEC2017*, 26-28 April 2017, Singapore.

[13] Y. Man, M. Lundh, and T. Porathe. "Seeking Harmony in Shore-based Unmanned Ship Handling-From the Perspective of Human Factors, What Is the Difference We Need to Focus on from Being Onboard to Onshore?." Advances in Human Aspects of Transportation: Part I 7 (2014): 231.

be subject to more stringent quality assurance standards, they could also be assessed through schemes such as the mandatory Flag State quality assurance systems. This would then be dependent on the Flag States being responsible for raising minimum standards through systems such as the IMO Flag State Audit Scheme".

3. Strict Adherence to Procedure

"A significant problem within the maritime industry is a culture whereby it is acceptable to find 'workarounds' to standard operating procedures. The SEAHORSE project has defined this as behavioural adaptations that the crew have developed in order to cope with operational demands and challenges".

"In a survey carried out with over 450 respondents, more than 65% reported workarounds were carried out, with the majority of these by crewmembers. The most common workarounds are located in the areas of reporting paperwork, personal protective equipment, work-rest hours, navigational rules and standards, and hot-work and permit to work".

"Airline industry firms are far less tolerant of deviations from standard operating procedures. They are not commonly accepted practice and are far more likely to be challenged, or reported".

4. Reduction of Administrative Burdens

"Through automation, aviation has achieved a reduction in administrative duties required in the cockpit through automation. A new Recommended Practice for the maritime sector encourages the use of the "single window" concept, to enable all the information required by public authorities in connection with the arrival, stay and departure of ships, persons and cargo, to be submitted via a single portal without duplication".

"However, the maritime sector has reported an increase in paperwork required by the bridge, despite the introduction of the single window. Although efforts to create and transfer documentation in the maritime sector electronically have so far met with limited success, the electronic exchange of information on cargo, crew and passengers is now advancing".

"In future, more administrative duties undertaken on-board will be automated, to reduce duplication and provide single points of data entry, enabling greater on-board and onshore analysis services in a real-time environment. Developments aimed at reducing the amount of paperwork officers and their crew have to undertake while at sea will accelerate, with the ultimate ambition to realise "the paperless ship"".

"Automation of reporting and regulatory processes in the maritime sector is currently less acceptable than for the aviation sector, where the challenges with paperwork arise from inaccurate information, illegible and out of date records. However, the Maritime sector will need to accept automated reporting and monitoring to reduce the administrative burden on crews, which would have a significant positive impact on the ability to perform better". Moreover, there is a need for a better coordination between the different ruling bodies (e.g. IMO, Flag States, etc.)

5. Global Traffic Control

“Although the aviation sector has had a coordinated air-traffic control for nearly a century, the maritime sector has not adopted a similar system. With the majority of collisions and incidents happening in busy shipping lanes and ports relatively close to land, increased maritime traffic control could have a significant impact on safety”.

“With geopolitical and environmental concerns rising, coastal states are likely to seek additional ways to monitor and manage the passage of all ships through their territorial waters. To this extent, maritime authorities of coastal states and vessel traffic management centres near ports could take a more holistic monitoring approach similar to their counterparts in aviation, thus creating greater transparency and awareness. This concept would be similar to IMO’s Marine Digital Highway”.

6. Man machine Teaming

Technologies such as AI, robotics, cognitive computing are developing fast. Unmanned systems take over from human tasks, and carry out tasks that humans cannot execute. Many developments are currently in a pilot phase, but these will be operational within a decade or even sooner. It therefore becomes urgent to consider new relationships between humans and machines, since the human will remain responsible for the tasks, for legal, ethical, and cultural reasons as well as economic reasons.

7. Human factors aspects of shore-based vessel control

Shore based vessel control entails remotely navigating a ship from a shore support centre (SSC), a concept explored since 1993. This concept is now being considered for unmanned shipping. One way to implement this for unmanned shipping would be to provide the ship with navigational autonomy by technical means. This would allow the navigation to be carried out without human intervention or decision-making. However, implementing this kind of navigational autonomy would be an enormous technological challenge.

Rolls-Royce Marine estimates that fully autonomous ships can be operational in 2035; by 2020, ships will have reduced crew, remotely supported (by other ships or from the shore) and by 2030, there will be unmanned ships, remotely controlled from shore support centres. This shared control system will be a cyber-physical system that operates based on a joint human-automation framework. Within this framework, it is not about the operator taking over navigation from the automation, but adapting a more suitable collaboration style for the navigation. This also applies to fully autonomous systems[14].

[14] Broek, J van den, Schraagen, J,M.C, Brake, te G.M, Diggelen, van J, (2017). Approaching full autonomy in the maritime domain: paradigm choices and Human Factors challenges. *Accepted for Proceedings of MTEC2017*, 26-28 April 2017, Singapore.

ANNEX 5: Ship Recycling Regulations and European Recycling Facilities

The Hong Kong Convention for Recycling of Ships

The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009[15] (the Hong Kong Convention), was adopted at a diplomatic conference held in Hong Kong, China, from 11 to 15 May 2009, which was attended by delegates from 63 countries. The Convention aims to ensure that ships, when being recycled after reaching the end of their operational lives, do not pose any unnecessary risks to human health, safety and to the environment.

The Hong Kong Convention intends to address all the issues around ship recycling, including the fact that ships sold for scrapping may contain environmentally hazardous substances such as asbestos, heavy metals, hydrocarbons, ozone-depleting substances and others. It also addresses concerns raised about the working and environmental conditions at many of the world's ship recycling locations.

Regulations in the new Convention cover the design, construction, operation and preparation of ships, to facilitate safe and environmentally sound recycling without compromising the safety and operational efficiency of ships; the operation of ship recycling facilities in a safe and environmentally sound manner; and the establishment of an appropriate enforcement mechanism for ship recycling, incorporating certification and reporting requirements.

Upon entry into force of the Hong Kong Convention, ships sent for recycling will be required to carry an inventory of hazardous materials, which will be specific to each ship. Lists of hazardous materials, which are prohibited, or restricted, in shipyards, ship repair yards, and ships of Parties to the Convention, are given in an appendix to the Convention. Ships will be required to have an initial survey to verify the inventory of hazardous materials, additional surveys during the life of the ship, and a final survey prior to recycling.

Ship recycling yards will be required to provide a "Ship Recycling Plan", specifying the manner in which each ship will be recycled, depending on its particulars and its inventory. Parties will be required to take effective measures to ensure that ship-recycling facilities under their jurisdiction comply with the Convention.

The Convention is open for accession by any State. It will enter into force 24 months after the date on which 15 States, representing 40 per cent of world merchant shipping by gross tonnage, have either signed it without reservation as to ratification, acceptance or approval or have deposited instruments of ratification, acceptance, approval or accession with the Secretary-General. Furthermore, the combined maximum annual ship recycling volume of those States during the preceding 10 years must constitute not less than 3 per cent of their combined merchant shipping tonnage.

[15] The development of the Hong Kong Convention; http://www.imo.org/en/OurWork/Environment/ShipRecycling/Pages/Default.aspx

The EU Ship Recycling Regulation

The European Parliament and the Council of the European Union adopted the Ship Recycling Regulation[16, 17] on 20 November 2013. The objective of the Regulation is to reduce the negative impacts linked to the recycling of ships flying the flag of Member States of the Union. The Regulation brings forward the requirements of the 2009 Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships, therefore contributing to its global entry into force. The Regulation also includes additional safety and environmental requirements, as authorised by Article 1(2) of the Convention.

To ensure legal clarity and avoid administrative burden, ships covered by the new legislation are excluded from the scope of the Waste Shipment Regulation (EC) 1013/2006.

European List of ship recycling facilities

From a date set in the Regulation to fall between mid-2017 and 31 December 2018, large commercial seagoing vessels flying the flag of an EU Member State may be recycled only in “safe and sound” ship recycling facilities included in the European List of ship recycling facilities[18]. This initial list will be updated through Implementing Acts, either to add more compliant facilities, or to remove facilities, which have ceased to comply.

In order to be included in the European List, any ship recycling facility, irrespective of its location, has to comply with a number of safety and environmental requirements. In April 2016, the Commission issued technical guidelines on these requirements. The Commission assesses applications received from the ship recycling facilities located in third countries. For facilities located in the EU, the national authorities of Member States notifies the Commission of compliant facilities located in their territory.

[16] Regulation (EU) No 1257/2013 of The European Parliament and of The Council of 20 November 2013 on ship recycling and amending Regulation (EC) No 1013/2006 and Directive 2009/16/EC; http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1257&from=EN

[17] Ship Recycling; http://ec.europa.eu/environment/waste/ships/

[18] European List of ship recycling facilities; http://ec.europa.eu/environment/waste/ships/pdf/list_ship_recycling_facilities.pdf

Credit: Rolls-Royce

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