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Final report on the work of the MRV sub-group on Shipping MRV Monitoring

This document reflects the outcomes of deliberations of the Shipping MRV Monitoring sub-group of the European Sustainable Shipping Forum of which the European Commission is part. It is not an official document adopted by the European Commission.

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1 INTRODUCTION

1.1 Background

Maritime transport emits around 1000 million tonnes of CO₂ annually and is responsible for about 2.5% of global greenhouse gas emissions (3rd IMO GHG study).

Shipping emissions are predicted to increase between 50% and 250% by 2050 – depending on future economic and energy developments. This is not compatible with the internationally agreed goal of keeping global temperature increase to well below 2°C compared to pre-industrial levels, which requires worldwide emissions to be at least halved from 1990 levels by 2050.

As a first step to reduce GHG emissions from shipping, Regulation 2015/757 on monitoring, reporting and verification of carbon dioxide emissions from maritime transport and amending Directive 2009/16/EC ("the shipping MRV Regulation")¹, adopted on 29 April 2015, creates an EU-wide legal framework for the monitoring, reporting and verification of CO₂ emissions from maritime transport. It requires large ships (over 5 000 gross tons) calling at EU ports from 1st January 2018 to collect and later report verified annual data on CO₂ emissions and other relevant information.

The Regulation foresees a number of legal acts to be prepared by the Commission so as to pave the way for the implementation of the MRV Regulation as follows:

- a) The Commission shall, by means of an implementing act, adopt technical rules specifying the parameters applicable for the determination of "cargo carried" per ship categories for ships other than passenger, ro-ro and container ships. These categories shall include, inter alia, tankers, bulk carriers, general cargo ships, refrigerated cargo ships, vehicle carriers and combination carriers.
- b) The Commission has to adopt through implementing acts, templates for standardised monitoring plans including the technical rules for their uniform application, emission reports and documents of compliance, pursuant to Articles 6, 12 and 17 of the MRV Regulation.
- c) Also the Commission has been empowered to adopt delegated acts amending the methods set out in Annexes I and II, so as to take into account relevant international rules as well as international and European standard and refining elements of these monitoring methods in the light of technological and scientific developments.

In order to pave the way for the implementation of the MRV Regulation, the Commission services have decided to establish a specific sub-group under the European Sustainable Shipping Forum on delegated acts on monitoring methods and implementing acts on monitoring of cargo carried and templates.

¹ OJ L 123, 19.5.2015, p. 55–76

(<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015R0757>)

1.2 Objectives

According to the Terms of References of the sub-group as approved by the ESSF Plenary in June 2015, the main objectives for the subgroup are to discuss and provide feedback to the Commission on the following aspects:

1. Identifying and reviewing technical rules for calculating the parameter of cargo carried for categories of ships other than passengers, ro-ro and container ships, falling under the Regulation as mentioned in Annex II, part A, point 2.
2. Identifying and reviewing international rules and international and European standards triggering possible amendments to the monitoring methods and rules set under Annexes I and II.
3. Identifying and reviewing scientific and technical developments triggering possible amendments to elements of the monitoring methods and rules set under Annexes I and II.
4. Reviewing draft templates and related technical rules for monitoring plans and emission reports.
5. Identifying best practices for monitoring fuel consumption, CO₂ emissions, cargo carried for all relevant ships types and other MRV relevant parameters.
6. Identifying relevant input to the discussions at the IMO on a global data collection system, including the method for calculating the parameters of cargo carried for all relevant ship types, in the context of further technical and operational measures for enhancing the energy efficiency of international shipping.

Respective tasks 1 – 6 are defined reflecting the corresponding objectives.

The views expressed by the Subgroup on these issues will be taken into account by the Commission as part of the preparation of the implementing and delegated acts related to monitoring and reporting.

1.3 Composition

In accordance with the ToRs, the Subgroup included members drawn from:

- The European Commission (DG CLIMA and DG MOVE),
- The European Maritime Safety Agency (EMSA),
- Member States (MS),
- European and International Associations representing Ship Owners/Operators,
- Classification Societies,
- Environmental Non-Governmental Organisations,
- Representatives of voluntary schemes with the relevant expertise,
- Academia.

1.4 Activities

Five meetings of the MRV Monitoring Subgroup were held on 8 July, 27 October 2015, 19-20 January 2016, 11-12 April 2016 and on 24 May 2016 where the Subgroup agreed on the recommendations to be addressed to the ESSF Plenary.

To support the activities of the Subgroup, Task Forces have been established for following work packages:

WP	Title	Coordinator
Work package 1	Other ship types	Anna Ziou (UK Chamber of Shipping)
Work package 2	Assessment of the concept of deadweight carried as cargo parameter/ cargo parameters for general cargo ships	Nick Lurkin (Royal Association of Netherlands Shipowners)
Work package 3	Recommendation for cargo parameters for RoRo ships	Poul Woodall (DFDS)
Work package 4	Recommendation for cargo parameters for vehicle carriers	Björn Reppe (Norwegian Maritime Authority) Fredrik Larsson (Swedish Shipowners Association)

Summaries of the results of the work packages are provided in Annex 2.

Furthermore, the work of the Subgroup has been supported by a study commissioned by the European Commission and carried out by a consortium led by PwC. This study produced a number of working papers on relevant aspects for tasks 1, 2, 3 and 4 and also identifying potential issues for further guidance and/ or best practise (task 5). The final report of this study includes for documentation purposes only all working papers as distributed prior to the fourth meeting of the Subgroup on 11 & 12 April 2016. Results of the April meeting are not necessarily reflected in the study report.

Further working papers on templates (task 4) have been provided by EMSA. These working papers facilitated the development of recommendations by the Subgroup.

According to points 2.3 of the ToRs on timetable and on duration, the MRV Monitoring Subgroup is to disband as soon as its core mandate is fulfilled.

At the last meetings of the MRV Monitoring Subgroup it became clear that there are issues where more guidance for the sector would be needed and the members have requested to continue the work of the MRV Monitoring Subgroup as appropriate in the future.

2 DELIVERABLES

2.1 Proposal for additional rules defining the calculation of cargo carried applicable to each category of ships other than passenger, ro-ro and container ships

Relevant ship types have been identified and definitions for each of them provided.

For each ship type, one – or if justified more than one – parameter(s) to express cargo carried have been determined. According to Annex II to the MRV Regulation, these parameters should consider, where applicable, the weight and volume of cargo carried and the number of passengers carried.

For this purpose, the availability of data including legal requirements and industry best practice has been taken into account. Furthermore, the Subgroup considered it relevant to check if cargo parameters yield robust information.

During the discussions it became clear that for some ship types, the variation of cargo density is significant which could lead to challenges of expressing the operational energy

efficiency for fully laden ships (amount of cargo weight or volume restricted). A dedicated Task Force (work package 2) developed a recommendation for a cargo parameter (deadweight carried², for further details see Annex II/WP2) to address this issue which has been considered particularly relevant for general cargo ships.

11 ship types (and a category 'others') have been distinguished for this purpose. For all ship types, definitions are recommended, based on applicable definitions in MARPOL Regulations. The Subgroup agreed on recommendations for all these ship types with mass of cargo as the most common parameter. Volume of cargo and deadweight carried have been recommended for some ship types. **A list of ship types, definitions and recommended cargo parameters is provided in Annex 1.**

For a number of ship types, a memo field and/or additional data fields should be included in the reporting template to convey additional information on a voluntary basis to help understand the efficiency metrics for the ship in question. The data fields will in principle need to be verified. Some members expressed concern regarding the verification requirements as this may be a disincentive to use these voluntary fields and therefore the degree of verification would need to be determined.

Cargo parameters for general cargo ships and RoPax ships have been suggested by Task Forces and confirmed by the Subgroup. The Task Force on vehicle carriers was not able to conclude on a parameter within the mandate of the MRV Monitoring Subgroup; however, the Subgroup – noting concerns expressed by some members – also agreed on a recommendation for this ship type.

The determination of cargo mass for some ship types (Ro-Ro cargo, RoPax, vehicle carriers and container ships) may require (depending on the method applied) the use of default values for the mass of cargo units. The Subgroup agreed that guidance would be the most appropriate tool to provide such values. The Task Force on RoPax ships concluded that such default values should be company or ship specific rather than generic. However, for container ships, one member suggested a set of values which will be further discussed in the context of Task 5 (best practice/ guidance).

2.2 List of possible amendments to the monitoring methods for determining CO2 emissions under Annex I part B and the rules for Annex II taking into account international rules and international and European standards.

As the first step an assessment of potentially relevant international rules and of international or European standards has been carried out in order to identify possible amendments (including their nature and scope) regarding the monitoring methods and rules spelled out in Annexes I and II to the MRV Regulation.

These analyses covered the four monitoring methods (BDN, tank monitoring, flow meters, direct emissions measurement) for fuel consumption and CO₂ emissions, but also covered other provisions of Annex I and II where appropriate, including the parameters used to determine cargo carried for passenger, ro-ro and container ships.

On that basis a list of possible amendments has been compiled. The Subgroup also assessed these possible amendments regarding the effectiveness of the MRV provisions

² deadweight carried (DWT carried) at a load draught condition means the volume displacement of a ship multiplied by the relative water density at departure from port reduced by its lightweight and the weight of fuel stored on-board

in view of providing robust and comparable data on fuel consumption, CO₂ emissions and energy efficiency as well as regarding the administrative costs.

Four issues have been identified and possible amendments are suggested. They concern the measurement of fuel density, IMO emission factors for standards fuels as well as the cargo determination of passenger ships (number of passengers) and Ro-ro ships.

Annex 3 provides the summary of the findings.

2.3 List of suggested refinements to be introduced on particular elements of Annex I and Annex II so as to adapt to scientific and technical developments

As the first step an assessment of potentially relevant technological and scientific developments has been carried out to identify possible amendments (including their nature and scope) to refine the elements of the monitoring methods and rules spelled out in Annexes I and II to the MRV Regulation.

These analyses covered the four monitoring methods for fuel consumption and CO₂ emissions, but also covered other provisions of Annex I and II where appropriate, including the parameters used to determine cargo carried for passenger, ro-ro and container ships.

On that basis a list of possible amendments has been compiled. The Subgroup also assessed these possible amendments regarding the effectiveness of the MRV provisions in view of providing robust and comparable data on fuel consumption, CO₂ emissions and energy efficiency as well as regarding administrative costs.

Two issues have been identified and possible amendments are suggested. They concern the determination of distance travelled and time spent at sea.

Annex 3 provides the summary of the findings.

2.4 Recommendations on templates for monitoring plans and emission reports

Feedback has been provided by the subgroup on working papers (delivered by PwC and EMSA) on draft templates for monitoring plans and emission reports. This included technical rules for their uniform application. The Subgroup agreed to keep the templates, in particular the one for monitoring plans as simple as possible and recommended to provide these templates in English as commercial language in the maritime sector in order to facilitate compliance for companies.

The Subgroup paid special attention to the monitoring and reporting of additional information on a voluntary basis (by specifying data fields for voluntary application) with relevant subjects having been identified during the discussions on other tasks.

A joint session with the Subgroup on Shipping MRV Verification & Accreditation held on 20 January 2016 discussed the working papers and provided feedback on templates.

Another important subject has been the rules for reporting, using automated systems. EMSA provided Working Papers proposing an IT tool which will facilitate the reporting. Its use will be mandatory. The MRV IT tool will be managed by EMSA, building on previous existing tools also managed by the Agency.

The restricted users of the MRV IT tool will be: companies, verifiers, the Commission and Member States (and the Flag States). Each of these entities will be able to manage their own set of restricted users which will have access to information, as foreseen by the Regulation.

Furthermore, voluntary models to facilitate monitoring and reporting (for voluntary) use have been proposed and received support from the Subgroup.

Results of these discussions are summarised in Annex 4.

2.5 Best practices compendium

Relevant issues and examples for best practise for monitoring of fuel consumption, CO₂ emissions, cargo carried for all relevant ships types (including factors influencing ships' operational performance) and other relevant parameters have been identified. This could serve as contribution to guidance to be provided to the actors concerned.

The list of relevant issues covers fuel consumption (boil-off gas) of LNG carriers, fuel tank readings, fuel density measurement, uncertainty of fuel consumption, determination of distance travelled and time spent at sea, determination of cargo carried for Ro-Ro (cargo), Ro-Pax and container ships as well as allocation of fuel consumption/ emissions to passenger and cargo transport (for Ro-Pax ships).

The full list is documented in Annex 5.

Furthermore, some members of the Subgroup raised issues requiring clarification on the legal interpretation. To facilitate a common understanding of the provisions of the MRV Regulation, the Commission is issuing FAQs addressing these issues.

Due to time constraints and priority given to tasks 1 to 4, the content of a best practices compendium has not been developed and should be in the focus of the suggested further activities of the Subgroup.

2.6 List of relevant input to the discussions at the IMO

It can be expected that numerous relevant technical elements developed and discussed by the subgroup could be of relevance for the IMO discussions on a global data collection system. However, due to time constraints and the rather general nature of the respective IMO discussions at that stage, this task has not been carried out.

In case of prolongation of the Subgroup's mandate, it is suggested that all deliverables of the subgroup will be assessed regarding their value for the IMO discussions, in particular the discussions on respective IMO Guidelines. As result, submissions to the IMO might be prepared.

3 REQUESTS TO PLENARY

The Shipping MRV Monitoring Subgroup requests the ESSF Plenary to note and endorse this report.

Furthermore, the Subgroup requests that the ESSF Plenary approves:

- that the Shipping MRV Monitoring Subgroup remains active continuing its work beyond June 2016 and further into 2017;
- that the Subgroup continues its work on open tasks, in particular:
 - a) development of guidance and a best practices compendium, covering inter alia issues identified in task 5 as documented in Annex 5
 - b) analysis of deliverables in view of input in the IMO discussions on IMO Guidelines supporting the global data collection system as approved by MEPC 69 on 22 April 2016

Annex 1: Parameters for cargo carried

Ship type	Definition	Cargo parameter
Oil Tanker	“Oil Tanker” means a ship constructed or adapted primarily to carry crude oil or petroleum products in bulk in its cargo spaces. Note that this definition does not include combination carriers, NLS tankers or gas tankers.	For tankers, cargo carried should be defined as the mass of the cargo on board. Additional data fields should be included in the reporting template to convey additional information on a voluntary basis to help understand the efficiency metrics for the ship in question.
Chemical tanker	“Chemical tanker” means a ship constructed or adapted for the carriage in bulk of any liquid product listed in chapter 17 of the International Bulk Chemical Code (a Chemical Tanker) or a ship constructed or adapted to carry a cargo of noxious liquid substances in bulk (an NLS Tanker)	For chemical tankers, cargo carried should be defined as the mass of the cargo on board. Additional data fields should be included in the reporting template to convey additional information on a voluntary basis to help understand the efficiency metrics for the ship in question.
LNG carrier	“LNG Carrier” means a tanker for the bulk carriage of Liquefied Natural Gas (primarily methane) in independent insulated tanks. Liquefaction is achieved at temperatures down to -163 deg C	For LNG carriers, cargo carried should be defined as the volume of the cargo on discharge, or, if cargo is discharged at several locations, the sum of the cargo discharged and the cargo discharged at all subsequent locations up to the location where new cargo is loaded.
Gas carrier	“Gas Carrier” means a tanker for the bulk carriage of liquefied gases other than LNG.	For gas carriers, cargo carried should be defined as the mass of the cargo on board.
Bulk carrier	"Bulk carrier" means a ship which is intended primarily to carry dry cargo in bulk, including such types as ore carriers as defined in SOLAS chapter XII, regulation 1, but excluding combination carriers.	For bulk carriers, cargo carried should be defined as the mass of the cargo on board. Additional data fields should be included in the reporting template to convey additional information on a voluntary basis to help understand the efficiency metrics for the ship in question.
General cargo ship	"General cargo ship" means a ship with a multi-deck or single deck hull designed primarily for the carriage of general cargo. This definition excludes specialized dry cargo ships, which are not included in the calculation of reference lines for general cargo ships, namely livestock carrier, barge carrier, heavy load carrier, yacht carrier, nuclear fuel carrier.	For general cargo ships, cargo carried should be defined as deadweight carried. Deadweight carried should be defined as displacement deducted by the ship's lightweight and the weight of the fuel stored on board. A dedicated field should be included in the reporting template to allow the reporting of the mass of the cargo on board as an additional parameter on a voluntary basis.
Refrigerated cargo ship	"Refrigerated cargo carrier" means a ship designed exclusively for the carriage of refrigerated cargoes in holds.	For refrigerated cargo carriers, cargo carried should be defined as the mass of the cargo on board.

Ship type	Definition	Cargo parameter
Vehicle carrier	"Vehicle carrier" means a multi deck roll-on-roll-off cargo ship designed for the carriage of empty cars and trucks.	<p>For vehicle carriers, cargo carried should be defined as the mass of the cargo on board which can either be actual mass or be calculated as units or occupied lane meters multiplied by default mass per unit or per lane meter.</p> <p>A dedicated field should be included in the reporting template to allow the reporting of the deadweight carried as an additional parameter on a voluntary basis.</p>
Combination carrier	"Combination carrier" means a ship designed to load 100% deadweight with both liquid and dry cargo in bulk.	For combination carriers, cargo carried should be defined as the mass of the cargo on board.
Ro-pax	"Ro-pax ship" means a passenger ship with roll-on-roll-off cargo space	<p>Ro-pax ships will report two cargo parameters:</p> <ol style="list-style-type: none"> 1. The number of passengers on board 2. The mass of cargo on board. <p>The second cargo parameter can either be actual mass or be calculated as units or occupied lane meters multiplied by default mass per unit or per lane meter.</p> <p>The fuel consumption should be split into fuel used to transport passengers and fuel used to transport cargo using CEN 16258. Further guidance on the use of this standard may be developed.</p>
Container/ Ro-Ro cargo ship	"Container/ Ro-Ro cargo ship" means a hybrid of a container ship and a ro-ro cargo ship in independent sections	For container/ro-ro ships, cargo carried should be defined as the volume of the cargo, calculated as occupied deck area multiplied by deck height for Ro-Ro cargo and container volume for container cargo.
Other ship types	"Other ship types" mean ships not covered by any of the above definitions or by the ship type definitions of the EU MRV Regulation, which fall under the scope of the regulation.	<p>Ships that fall under the definition of other ship types, should determine their amount of cargo carried either by</p> <ol style="list-style-type: none"> 1. Mass of the cargo; or by 2. Deadweight carried.

A memo field should be included in the reporting template for all ship types to convey additional information on a voluntary basis to help understand the efficiency metrics for the ship in question.

Cargo parameters for passenger, Ro-Ro cargo and container ships are already specified in Annex II to the EU-MRV Regulation. Possible adjustments to these parameters or the definitions have been assessed in tasks 2 and 3 (see sections 2.2 and 2.3 and Annex 3).

Annex 2: Summary of work package reports

Work package 1: Other ship types (offshore vessels & dredgers) – Summary of report

Introduction

The work on this report is conducted as part of the European Sustainable Shipping Forum (ESSF) Shipping MRV Monitoring process, where the aim is the development of delegated acts on monitoring methods and implementing acts under the EU MRV Regulation. The Ad Hoc Expert Working Group on Other Ships Types was set up by the European Commission at the first meeting of the ESSF Shipping Monitoring subgroup under the coordination of Ms Anna Ziou (ECSA).

The Terms of Reference and Work Plan of the Working Group were agreed by the Commission and was circulated by correspondence. Given the international expertise of the Group, much of the work has been undertaken via correspondence. Since the establishment of the Expert Working Group there has been a process of substantial engagement between members of the Group, the Commission and EMSA. The work of the Group has also been informed by significant consultation with ship operators.

Terms of reference

The group was assigned with the following tasks:

1. Further assessment on the need for specific rules and parameters determining the amount of cargo carried and propose options, where appropriate, for the category identified as 'other ship types' (See ship type column of table 1, Section 5 "Overview of options" (pages 12 -13 of the concept paper on determination of cargo carried).
2. The "other ship types" category should, in particular, cover service ships, offshore supply vessels, dredgers and drilling ships.
3. Consider the number of ships above 5000 gross tonnage which potentially fall under the scope of the MRV Regulation (if they visit EU ports).
4. Submit a report on the findings of the work package at the 2nd meeting of the Shipping MRV Monitoring subgroup on 27 October 2015.

Methodology

As a first activity, a questionnaire was developed and circulated to the members of the Group, together with a table listing the ship types under consideration to facilitate discussions on the identification of activities that would be covered by the EU MRV Regulation. The questionnaire was also circulated to ship operators by national representatives to obtain a more detailed and accurate picture of their operations. A meeting was held on 22 of September 2015, where the Group considered the questionnaire's feedback and the Commission's legal advice. Following discussions a set of recommendations/conclusions outlined below reflect the areas of focus of the Working Group and are designated to assist the EU MRV Sub-Group and the Commission in shaping and designing a robust system for the implementation of the EU MRV Regulation.

Conclusions

The working group's conclusions can be summarized, as follows:

1. No monitoring, reporting and verification rules would need to be developed for the ships under consideration to the extent their movements and activities fall outside the scope of the EU MRV Regulation.
2. None of the ship types under consideration is engaged in the transport of passengers and transporting of cargo rarely follows the rules of "traditional" maritime transport.
3. In the context of the EU MRV regulation, "ship movements and activities serving the purpose of subordinating or supporting "offshore activities" are not under the scope of the regulation. In applying this interpretation "offshore activities" mean activities in connection with the exploration or extraction of so much of the seabed or subsoil or their natural resources. This also covers the actual task of exploring or extracting.
4. These ships' very complex operations would make it difficult to derive a standardized parameter for cargo carried as there will be regularly new cases and new situations not foreseen. A detailed summary of the circulated questionnaire and minutes of the meeting held on 22 September 2015 together with the list of vessels under consideration and Commission's legal advice is included in the report.

Work package 2: Assessment of the concept of deadweight carried as cargo parameter/ recommendation for cargo parameters for general cargo ships

Introduction

At the last ESSF MRV sub-group meetings on 27 October 2015 and the two-day meeting on 26 and 27 January 2016 it was agreed that a robust cargo parameter for general cargo vessels is needed. On the initiative of the Royal Association of Netherlands Shipowners the independent Dutch maritime institute MARIN gave a presentation on two studies which were carried out regarding a possible robust cargo parameter for this specific ship type under the EU MRV system during the meeting on 27 October 2015. The studies lead to the conclusion that the use of mass of cargo (weight) carried as a single parameter do not contribute to the establishment of an appropriate average energy efficiency indicator for the general cargo fleet. The ratio of volume/mass varies enormously and is every voyage completely different for these ship types.

In the second study MARIN suggested a definition for deadweight carried for general cargo vessels. The MARIN study suggested to include ballast water weight in DWT carried, not only with regard to its influence (reducing scatter) on the average energy efficiency indicators, but also to account for unavoidable voyage specific stability & strength requirements.

As part of the European Sustainable Shipping Forum's (ESSF) efforts towards the implementation of the Shipping MRV-regulation, an ad-hoc taskforce to establish a cargo parameter for general cargo vessels was set up by the European Commission under the coordination of Mr. Nick Lurkin (Royal Association of Netherlands Shipowners). The terms of reference (ToR) for the group was to assess whether deadweight carried could be a robust definition to express the cargo carried for general cargo vessels. The exact definition and how to measure the deadweight carried was also part of these ToR. The

outcomes of this ad-hoc taskforce should be in line with the agreed criteria, which were adopted after the first meeting of the ESSF subgroup on MRV monitoring. On 9 March 2016 a face-to-face meeting took place at ECSA's premises in Brussels. Representatives of shipowners, national administrations and European Commission/EMSA were present at that meeting. Some other members who could not attend, provided the group with comments before the face-to-face meeting.

Terms of reference (ToR) given to the group

1. Recommend one (or two) parameter(s) to express cargo carried for general cargo vessels in the context of the MRV Regulation considering three options:
 - a) Deadweight carried,
 - b) Deadweight carried with the possibility to monitor & report the actual mass of cargo on a voluntary basis,
 - c) Actual mass of cargo with the possibility to monitor & report deadweight carried on a voluntary basis;
2. Consider the criteria for selection of cargo parameters as described in section 3 of the 'Working Paper on determination of cargo carried' of 5 January 2016, in particular the availability of data on board;
3. Take into account the earlier work done by the Dutch independent maritime research institute -MARIN- and the Royal Association of Netherlands Shipowners on 'deadweight carried' for general cargo vessels;
4. Propose a methodology to determine deadweight carried including calculation formulae and data sources, which is least burdensome for ship-owners and verifiers;
5. Organizing a face-to-face meeting to advance the discussions in either KVNR's office (Rotterdam) or at European Commission's or ECSA's premises (Brussels) during the second week of March 2016;
6. Submit by 25 March 2016 a report on the findings of the work package in view of agreeing on parameters for cargo carried for general cargo ships at the ESSF MRV monitoring subgroup meeting on 11 and 12 April 2016.

Conclusions and recommendations of this ad-hoc taskforce

The ad-hoc working group concluded and recommended as follows:

1. To express cargo carried for general cargo vessels in the context of the Regulation 2015/757/EU on a MRV system 'deadweight carried' with the possibility to monitor & report the actual mass of cargo on a voluntary basis (option B under point 1 as stated in the T.o.R.) should be used.
2. For the purpose of this Regulation and its uniform application to general cargo vessels, deadweight carried (DWT carried) at a load draught condition means the measured volume displacement of a ship multiplied by the relative water density at departure from port reduced by its lightweight and the weight of fuel stored on-board at departure time. The lightweight of the ship should be taken from the stability booklet approved by the Administration or an organization recognized by it.

3. Visual readings of the draught can be used to calculate the volume displacement with the help of a certified draft measurement scale. Digital readings could be used to verify whether they match with the overall observations. For the ship's crew it will not be that burdensome, as the crew at almost all times already do visual reading.
4. Draught measurements should be done just before departure/beginning of the voyage.
5. The accuracy of deadweight carried is within the borders of an acceptable margin of uncertainty (well below 5%), which was discussed in earlier ESSF MRV subgroup meetings with regard to the fuel monitoring methods.
6. To calculate the amount of fuel (by mass) the same four proposed monitoring methods (A, B, C and D) as for the fuel consumption should be used.
7. The definitions of displacement and ship's lightweight should be exactly in line with what is stated in the different IMO instruments. The studies lead to the conclusion that the use of mass of cargo (weight) carried as a single parameter do not contribute to the establishment of an appropriate average energy efficiency indicator for the general cargo fleet.
8. Deadweight carried is verifiable as all information needed is logged and available on board.

Work package 3: Recommendation for cargo parameters for RoRo ships - 1st report

Introduction

At the ESSF MRV sub-group meeting on 27/10/2015 it was agreed that a special vessel category representing RoPax vessels would be established. The definition would be along the following lines "Ro-Pax ship "means a passenger ship with roll-on-roll-off cargo space". The exact legal definition is pending.

As part of the European Sustainable Shipping Forum's (ESSF) efforts towards the implementation of the Shipping MRV-regulation, an ad-hoc expert group (AHEG) was established at the meeting. The terms of reference (ToR) for the group was to assess possible parameters that could be used as a measure of cargo carried on board RoPax vessels. The parameter(s) will be used to calculate the energy efficiency of such ships.

It was recalled that "Passenger ships" would submit MRV data on the basis "number of passengers" and that "RoRo [cargo] ships" would submit MRV data on the basis of one of the 3 options as provided for in Annex II to the MRV regulation, all resulting in a set of data based on "mass".

To achieve a fair measurement of transport work for RoPax vessels, the MRV system needs to include both passenger and cargo, two distinct different types of "transport work". For some RoPax vessels the part of the vessels dedicated to passengers represent a significant part of the vessels structure and design, so disregarding passengers all together would result in an unfair figure calculated for the cargoes "transport work". On the other hand, disregarding freight and only measure on number of passengers would also cause misrepresentation.

Terms of reference (ToR) given to the group

1. Recommend one – or if justified more than one – parameter(s) to express cargo carried for Ro-Ro passenger ships in the context of the MRV Regulation
2. According to Annex II, part A, point 1, letter g) to the MRV Regulation, these parameters should consider, where applicable, the weight and volume of cargo carried and the number of passengers. The parameter for 'cargo carried' of similar ship types such as Ro-Ro (cargo) ships (Annex II, part A, point 1, letter e) should be considered as well to ensure consistency of the entire set of rules for 'cargo carried' under the MRV Regulation.
3. Consider the criteria for selection of cargo parameters as described in section 3 of the 'Working Paper on determination of cargo carried' of 9 October 2015, in particular the availability of data.
4. Submit by 18 December 2015 a report on the findings of the work package in view of the ESSF MRV monitoring subgroup meeting in January 2016.

Conclusions

The correspondence groups recommends as follows:

1. For RoPax vessels, cargo carried is reported as two separate figures, one for passenger and one for freight;
2. That a vessels CO₂ emission is split between passenger and freight using the methodology defined in the CEN 16258 standard;
3. That the passenger KPI is calculated based on CO₂ per passenger-nautical miles (as per the CEN 16258 standard³);
4. That the freight KPI is calculated according to the rules laid down in CEN 16258;
5. That default values for RoPax freight need to be established and published, e.g. “tons per lanemeter”;
6. Using identical default values for freight on RoRo (cargo) vessels and RoPax vessels is not recommended.

Work package 3: Recommendation for cargo parameters for RoRo ships – 2nd report

Introduction

As per agreed at the January 19th-20th ESSF MRV Monitoring Subgroup meeting on cargo metrics, a correspondence group was to be re-established to look at default values for RoRo vessels. This work follows the recommendations of the “Ad-hoc expert group on cargo parameters for RoPax vessels” as published in their report dated 17th December 2015.

³ CEN 16258 uses passenger-kilometer as unit. To ensure consistency with the related parameters for other ship categories, it is recommended to use passenger-nautical miles in the context of the EU-MRV.

Revised terms of reference (ToR) given to the group for the second round of discussions

1. Recommend a methodology and default values for the calculation of the share on emissions to be allocated to passenger and cargo transport on an annual basis including the allocation of parts of the freight decks to the passenger area due to its use for passenger cars and the consideration of hanging decks;
2. Recommend sets of default values for the mass of cargo units to be applied to Ro-Ro passenger ships:
 - a) Mass of cargo units per unit,
 - b) Mass of cargo units per lane-meter;
3. The default values should reflect the typical mass of the respective units as carried by Ro-Ro passenger ships under the scope of the MRV Regulation (above 5000 GT, operating at least to some extent on routes from or to EU ports) including the typical share of laden and empty units;
4. Recommend similar sets of default values for the mass of cargo units to be applied to Ro-Ro cargo ships under the scope of the MRV Regulation;
5. Report on progress made at the ESSF MRV monitoring subgroup meeting on 11-12 April 2016;
6. Submit by 29 April 2016 a report on the findings of the work package in view of the ESSF MRV monitoring subgroup meeting in May 2016.

Conclusions

Generally the correspondence group finds that RoRo and RoPax vessel, despite the common categorization, trade is so different that applying one simple common standard, that would provide a fair picture, is not possible.

The CG finds that the comparison of a specific vessel over time is more important than the ability to compare data for 2 or more vessels that may well be providing very different transport services to the community.

The CG recommendations for metrics for RoRo and RoPax vessels are therefore to adopt a system that attempts to measure the individual vessels performance correctly over time. Thus our recommendations aim to ensure the ability to compare the individual vessels CO₂ emissions over time, rather than the ability to compare two different vessels of similar type.

Recommendations for guidance

The capacity of the hanging decks is an element in the calculation when using the CEN 16258 standard to split a vessels CO₂ emission between freight and passenger. The correspondence group has not found it justified to implement a common standard for how to count the lane meters for RoPax vessels, but recommend that each operator- for each vessel - establish the most accurate usage of the hanging deck over the reporting period.

Regarding the allocation of parts of the freight decks to the passenger area, the area allocated to passengers' own cars, motorcycles, bikes etc. busses and passenger trains should be included in the "passenger" segment.

The CG has not been able to identify any published relevant default values that can be used as a reference. There is even not an industry standard for the types of “units” used to which a default weight could be applied. Therefore, the company should specify the relevant default values which must be representative for the trade in which the vessel is intended to trade in the monitoring plan or use actual cargo weight.

Work package 4: Recommendation for cargo parameters for vehicle carriers

Introduction

This document contains the report of the second round of the ad-hoc expert group (AHEG) on cargo parameters for vehicle carriers initiated by the ESSF MRV Monitoring Subgroup. The necessity for a second round of the AHEG became clear as the first round of the AHEG which reported to the ESSF MRV Monitoring Subgroup on the 19-20th of January 2016 was not able to establish a parameter for expressing cargo carried by vehicle carriers with the terms of reference as given to them. The ESSF MRV Monitoring Subgroup therefore decided on the 19-20th of January 2016 to re-establish the AHEG with a revised set of Terms and References and instructed the AHEG to provide a report to the ESSF MRV Monitoring Subgroup meeting scheduled for 11-12th of April 2016.

Terms of reference (ToR) given to the group

The Task Force on an ad-hoc work package on 'Recommendation for cargo parameter for vehicle carriers' will continue its work with the following revised Terms of Reference:

1. Recommend one – or if justified more than one – parameter(s) to express cargo carried for vehicle carriers in the context of the MRV Regulation starting from three options:
 - a) EEOI guidelines offering 3 parameters for choice by company: mass, occupied lane meters, number of car units,
 - b) Deadweight carried,
 - c) Mass with an option of indirect determination using percent occupied deck area (converted to actual “mass” by using design DWT);
2. Duly consider implications of hanging decks;
3. Consider the criteria for selection of cargo parameters as described in section 3 of the 'Working Paper on determination of cargo carried' of 5 January 2016, in particular the availability of data;
4. Due to the variety of cargo, consider the possibility to split the ship type vehicle carriers in further sub types (e.g. PCC; PCTC...);
5. Submit by 18 March 2016 a report on the findings of the work package in view of agreeing on parameter(s) for cargo carried for vehicle carriers at the ESSF MRV monitoring subgroup meeting in April 2016.

Short summary

Numerous times during the considerations in the second round of the group the technical complexity of the matter due to the vast variety of cargoes carried by Vehicle Carriers

became apparent and is without doubt the main reason for the inability of the group to identify and thus recommend a parameter, or parameters.

For the layman it may not be obvious that Vehicle Carriers, despite their connotation as well as the very definition of the ship type for the purpose of the EU MRV regulation, carries a vast variety of cargoes other than automobiles. Cargoes commonly carried by Vehicle Carriers in addition to automobiles, lorries, tractors and buses, includes yachts, timber, windmill blades, excavators, crane jibs, power generators, trains, mining equipment and more. The actual weight or volume of these cargoes varies greatly, and the need to change deck heights to accommodate larger cargoes may modify the relevant cargo density from one trip to another and from one ship to another. This reality is a significant complication that contributed to the difficulty of the group to identify and recommend a parameter, or indeed parameters, which provide for comparable and reliable information which allows for fair comparison of efficiency between these ships

In addition, grave concerns were raised by the AHEG over the possible consequence of the MRV-regulation that a truly energy efficient ship can be operated with a very light cargo giving a poor average "energy efficiency" rating, whereas a not so energy efficient ship if compared on equal terms can be operated with a heavy cargo giving a better average "energy efficiency" rating if mass (weight) is chosen as the parameter. A reversed cargo scenario with the parameter volume will provide the same result.

Furthermore, another example provided by the AHEG was the unintended consequence that a ship steaming from Asia to Europe, or vice versa, opting to circumvent Africa rather than transiting the Suez canal will be considered by the MRV-regulation as having provided far more transport work and thus being considered by the regulation to be more energy efficient, compared to a ship which transits the canal as the distance is greater. However, steaming the extra 3500 nautical miles around the African continent will no doubt emit more CO₂ than the ship transiting the Suez-canal and thus the intent of the inclusion of transport work in the regulation itself was questioned.

Conclusion

The AHEG was unable to establish a parameter for expressing cargo carried by Vehicle Carriers which allow for a fair comparison between ships. The vast majority of the AHEG participants who voiced their opinions did not prefer to include a parameter for cargo carried in a metric expressing energy efficiency for Vehicle Carriers but were rather in support of the design deadweight (DWT) solution that is being considered at the International Maritime Organization (IMO).

Annex 3: Relevant international rules and standards and scientific/ technical developments and possible amendments to Annex I or II to the MRV Regulation

The room for amendments to Annex I and II is very limited by the MRV Regulation and can only be triggered by relevant international rules and international/ European standards or by scientific or technological developments. The discussions of the Subgroup concluded that most methods do not require amendments to the annexes to the MRV regulation.

Concerning possible amendments of methods and rules in Annex I and II, in order to take into account relevant international rules and international/ European standards, the Subgroup identified following issues and recommends amendments:

- It is recommended that the option to measure fuel density in an accredited fuel test laboratory should also be included into Methods A, C and D (reference is made to ISO 3675:1998).
- The exclusive use of the latest IMO emission factors is recommended (reference is made to the guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships, Resolution MEPC 245 (66) 2014).
- ‘Passenger ships’ should be defined as ‘ships that carry more than twelve passengers but not cargo’ (taking into account the SOLAS definition).
- Cargo – ro-ro ships should have the option to monitor and report the actual cargo mass, in addition to ‘the number of cargo units (trucks, cars, etc.) or lane-metres multiplied by default values for their weight’ (reference is made to EEOI guidelines, Resolution [MEPC.1/Circ.684](#)) and the CEN standard EN 16258 (2012)).

Concerning possible refinements of elements of the methods in Annex I and II in the light of technological and scientific developments, the Subgroup identified following issues and recommends amendments:

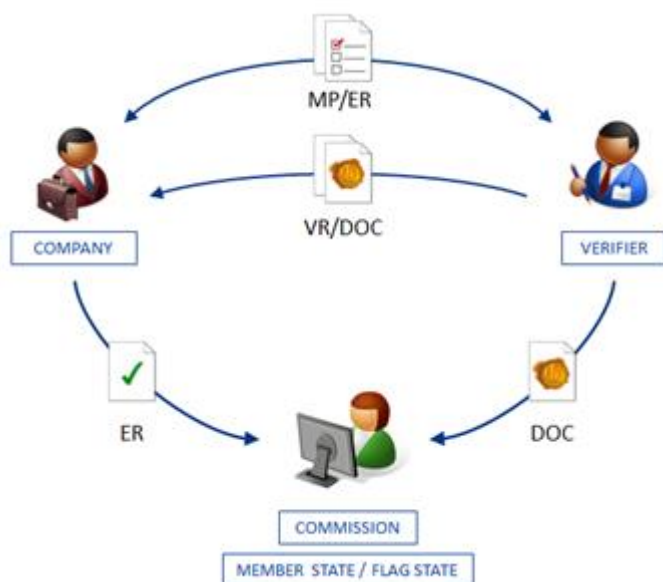
- Distance travelled should be calculated from berth to berth in line with the international and scientific developments and with the relevant definitions provided by the MRV Regulation,
- Time spent at sea should be calculated from berth to berth in line with the international and scientific developments and with the relevant definitions provided by the MRV Regulation,

Annex 4: Executive summary of working papers on templates

This Annex summarises following Working Papers, also reflecting the outcome of the 4th meeting of the subgroup:

- Working Paper on monitoring plan template (prepared by PWC)
- Working Paper on automated system, data exchange formats including electronic templates under the EU MRV Regulation (prepared by EMSA)
- Working Paper on tools facilitating the monitoring and verification workflow under the EU MRV Regulation (prepared by EMSA)

The schematics below display the workflow and the communications to be established between companies, verifiers in accordance with the provisions of the EU MRV Regulation:



Monitoring plan template

Article 6 of the MRV Regulation specifies the minimum content of the monitoring which needs to be fully reflected by the template.

Based on the different versions of the Working Paper, written comments provided and the discussions at the Subgroup meetings, the Subgroup provides following recommendations:

- For practical reasons, the Monitoring plan template could be provided in an electronic format with tables and text fields, e. g. MS Excel. Its design should allow employees responsible to become familiar with it quickly. In several fields companies should be able to choose from predefined inputs ("drop-down lists").
- It is suggested that the monitoring plan template is kept in English as commercial language in the maritime sector in order to facilitate compliance for companies.

- Companies should have the option to split the monitoring plan into a company- and a ship-specific part.
- Where relevant, the company should make reference to procedures in existing management systems, such as the ISM Code, to the extent these procedures overlap with the EU MRV Requirements. This enables the company to prepare a monitoring plan more efficiently.
- The description of all procedures includes a contact person. For this purpose, it should be possible to provide either a name or a function.
- Information on conditions for the use of the exemption from per-voyage monitoring (Article 9 (2)) should be added to the monitoring plan to facilitate monitoring and verification.
- To mitigate risks related the data aggregation, the monitoring plan template should include a section about management, including data management in addition to the requirements of the EU MRV Regulation. Companies could make use of existing management systems, e.g. ISO 14001 or ISO 50001. This section should include a regular assessment of the adequacy of the monitoring plan (as required in Article 7 (1)), description and visualization of data flows, performance of a risk assessment, quality assurance of information technology, internal reviews and validation of data, corrections and corrective actions, outsourced activities and documentation.
- Another section on 'further information' should be added to the monitoring plan to list any (individual) abbreviations, acronyms or definitions as well as to enter any additional information on the MRV matter that they consider relevant for their ship and relevant management procedures.

In the section on identification for the ship (Article 6 (3) (a)), the Subgroup also recommends adding following information for inclusion on a voluntary basis:

- Deadweight and Gross Tonnage;
- Classification Society;
- Ice-class;
- Open description field for additional identification parameters of the ship also covering additional capacity parameters that may be requested concern cargo space/tank volume, lane meters and other cargo capacity (such as weight, numbers of containers etc.) as well as passenger capacity, if applicable;
- Flag State.

Regarding procedures for monitoring the fuel consumption of the ship (Article 6 (3) (f) (iv)), the Subgroup recommends a simplified approach based on default uncertainty values to be provided by relevant guidance documents. The use of default values would not be mandatory. Ships may also use calculated uncertainty values related to CO₂ emissions themselves, provided that these calculations are appropriate and available for assessment by the verifier.

Rules for submission of emissions reports and documents of compliance

In order to guarantee its uniform application, the EU MRV Regulation (in Article 12 and 17), establishes the use of standardised templates and use of automated systems and data exchange formats as follows:

- The verified emissions reports shall be submitted by the company using automated systems and data exchange formats including electronic templates.
- Verifiers shall transmit information on the issuance of documents of compliance using automated systems and data exchange formats including electronic templates.

For these purposes, an IT tool will be provided to facilitate the reporting. Its use will be mandatory. The MRV IT tool will be managed by EMSA, building on previous existing tools also managed by the Agency.

The restricted users of the MRV IT tool will be: companies, verifiers, the Commission and Member States (and the Flag States). Each of these entities will be able to manage their own set of restricted users which will have access to information, as foreseen by the EU MRV Regulation.

- The Companies will be responsible to submit a verified emissions report for each of their ships.
- The Verifiers will have the role of assessing the work done by Companies, outside the system. In the system, they notify the issuance of the document of compliance once the emissions report has been successfully verified.
- Commission will have access to the system to receive information on reporting and notification obligations of the companies and verifiers respectively.
- Member States (and Flag States) will receive/have access to the emissions report and documents of compliance of ships flying their flag.

Enabling access to the Commission and Member States (and Flag States) to check reporting and notification obligations, reduces the administrative burden related to these tasks. In addition, the system would also provide assistance to Member States' authorities supporting their tasks under Articles 19 (2) (3) and 20.

In addition to this mandatory MRV IT tool, EMSA will, within the framework of its mandate, support parties concerned (companies, verifiers, and National Accreditation Bodies (NABs)) in applying the MRV requirements through the development and maintenance of additional functionalities supporting monitoring and verification activities under the mentioned MRV IT tool. The use of these functions will be voluntary.

Emissions report template

Article 11, together with Article 10, of the MRV Regulation specifies the minimum content of the emissions report which needs to be fully reflected by the template:

- data identifying the ship and the company, including:
 - name of the ship,
 - IMO identification number,
 - port of registry or home port,

- ice class of the ship, if included in the monitoring plan,
- technical efficiency of the ship (the Energy Efficiency Design Index (EEDI) or the Estimated Index Value (EIV) in accordance with IMO Resolution MEPC.215 (63), where applicable),
- name of the shipowner,
- address of the shipowner and its principal place of business,
- name of the company (if not the shipowner),
- address of the company (if not the shipowner) and its principal place of business,
- address, telephone and e-mail details of a contact person;
- the identity of the verifier that assessed the emissions report;
- information on the monitoring method used and the related level of uncertainty;
- the results from annual monitoring of the parameters in accordance with Article 10:
 - amount and emission factor for each type of fuel consumed in total;
 - total aggregated CO₂ emitted within the scope of this Regulation;
 - aggregated CO₂ emissions from all voyages between ports under a Member State's jurisdiction;
 - aggregated CO₂ emissions from all voyages which departed from ports under a Member State's jurisdiction;
 - aggregated CO₂ emissions from all voyages to ports under a Member State's jurisdiction;
 - CO₂ emissions which occurred within ports under a Member State's jurisdiction at berth;
 - total distance travelled;
 - total time spent at sea;
 - total transport work;
 - average energy efficiency.

To note that for Ro-Pax ships, to express efficiency, it is recommended to report transport parameters, cargo and passengers and fuel consumption to split the fuel consumption into fuel used to transport passengers and fuel used to transport cargo using CEN 16258.

Following discussions on energy efficiency, it would facilitate the understanding of the reported data if the ship type would be specified as it is required for the monitoring plan. Therefore, a list of relevant ship types should be offered for selection (drop-down menu), taken from the development of parameters for cargo carried (see Annex 1).

The subgroup also recommends adding a field for the verifier's statement to the template.

In addition, companies may also monitor fuel consumed and CO₂ emitted, differentiating on the basis of other criteria defined in the monitoring plan as per Article 10. This mainly concerns the differentiated reporting of annual fuel consumption and CO₂ emissions for laden and ballast voyages.

Furthermore and based on the discussions on cargo parameters, following additional information (annual figures) could be provided by Companies in a specific memo field on a voluntary basis to facilitate the understanding of reported ship average energy efficiency indicators:

- Chemical tankers, bulk and combination carriers: average density of the cargoes transported in a reporting year, fuel consumption for cargo heating;
- General cargo: mass of cargo carried (as additional cargo parameter);
- Vehicle carriers: deadweight carried (as additional cargo parameter);
- Oil tankers, 'other ship types: fuel consumption for dynamic positioning.

A memo field should be included in the reporting template for all ship types to convey additional information on a voluntary basis to help understand the efficiency metrics for the ship in question.

Document of compliance template

Article 17 of the MRV Regulation specifies the content of the document of compliance which needs to be fully reflected by the template.

Following discussions on the document of compliance, it was proposed to include voluntary fields covering 1) Company details and 2) an identifier that could relate to a specific emissions report.

It has also been agreed that all the templates described in this paper should be specified and consequently later filled-in in English, being the language commonly used in the shipping sector.

Annex 5: List of issues for further development of best practise and guidance documents

Based on the discussions at the ESSF sub-group MRV meetings and written comments on the working papers, a number of issues and areas of concern have been identified, which did not trigger amendments to Annex I, but are relevant for possible best practice and guidance documents. These best practice and guidance documents could be developed at a later stage to facilitate implementation and unified interpretation of the MRV regulation.

Regarding best practise and possible further guidance on monitoring in general, following issues have been identified:

- Gap filling: Potential data gaps can be very divers and will require different approaches to fill these gaps in a conservative manner. Guidance on which gap filling approach is most appropriate in which case will help companies to react appropriately in the case of such events.

Regarding best practise and possible further guidance on monitoring of fuel consumption and emissions, following issues have been identified:

- Fuel consumption for LNG carriers using boil-off gas as fuel: For those ships the existing Custody Transfer Management System (CTMS) can serve as a very advanced method to determine the fuel consumed on its voyages. LNG consumed at berth can be derived by the flow meters installed on the piping supplying gas to the consumers (engines, boilers, etc.) or by level gauges and calibration tables.
- Method B (fuel tank readings): In cases of equipment failure, where electronic equipment is used, fuel tank readings can be carried out with manual tank reading methods.
- Fuel density: A number of issues could be addressed including the non-linear relationship between fuel oil density, temperature and pressure (to be taken into account when converting measured volumes into mass at varying temperatures), varying densities due to different measurement methods and the mixture of fuels made on board.
- Emission factors: In case of fuels which are not included in Resolution MEPC 245 (66) 2014 emission factors need to be determined. Guidance might be required on the methodology for sampling and methods of analysis.
- Uncertainty: As no current international and European rules and standards or technological and scientific developments could trigger amendments to Annex I, it is suggested to provide guidance on expected levels of uncertainty for the different monitoring methods including default values which could be applied in the monitoring plans.
- Conditions for the use of the exemption from per-voyage monitoring (Article 9 (2)).
- Guidance on fuel consumption monitoring

Regarding best practise and possible further guidance on the determination of other parameters, following issues have been identified (and in some cases, solutions have already been suggested and backed by the Subgroup):

- Determination of distance travelled (e.g. measurement through the water or over ground, consideration of drifting, movements for tank cleaning);
- Determination of time spent at sea;
- Determination of cargo carried for Ro-Ro (cargo) and Ro-Pax ships: Based on recommendations of Work Package 3, companies could applied either actual or ship- or company-specific default values for the specific weight of cargo units (per lane-meter or per unit), to be specified in the monitoring plan.
- Allocation of fuel consumption/ emissions to passenger and cargo transport (for Ro-Pax ships): Recommendations for the treatment of hanging decks and the area of the freight decks allocated to vehicles belonging to freight paying passengers (concrete proposals provided by Work Package 3).
- The determination of cargo carried for container ships is based on actual mass or number of TEUs multiplied by default values for their weight. The former is linked to applicable instruments pursuant to SOLAS. Guidance could make explicit reference to MSC.1/Circ.1475 (but no change to legal text desired to keep the link to SOLAS flexible in case of any amendments).
- WSC proposed default values for container weight and further clarification on the determination for cargo carried for this ship type. This could be integrated into guidance:

The weight of Cargo should be limited to the Verified Gross Mass Information used under the SOLAS Regulation applicable to packed Containers.

Should a default value be used, it shall be 12 tonnes per TEU.

Table 1: TEU Conversion Factors

Container Size	TEU Conversion Factor (TEU Equivalents)	Default Container Weights (in tonnes)
20' ST TEU 8'6" plus 20' High Cube (HC)	1.0	12
40' ST FFE 8' 6" (forty-foot equivalent unit)	2.0	24
40' High Cube (FFE 9'6") plus 45' and 48'	2.25	27

ST - Standard, TEU - twenty-foot equivalent unit, FFE – forty-foot equivalent, HC – high cube

Empty Containers shall be handled using a Standard default weight of 2 tonnes per TEU.