Council of the
European Union

Brussels, 26 November 2018
(OR. en)

14723/18

MAR 178
OMI 66

COVER NOTE

From:	Secretary-General of the European Commission, signed by Mr Jordi AYET PUIGARNAU, Director
date of receipt:	23 November 2018
To:	Mr Jeppe TRANHOLM-MIKKELSEN, Secretary-General of the Council of the European Union
No. Cion doc.:	SWD(2018) 477 final
Subject:	COMMISSION STAFF WORKING DOCUMENT For the Council Shipping Working party IMO – Union submission to be submitted to the 6th session of the Sub-Committee on Ship Systems and Equipment (SSE 6) of the IMO in London from 4 – 8 March 2019 concerning the main topics and structure of the FIRESAFE II study

Delegations will find attached document SWD(2018) 477 final.

Encl.: SWD(2018) 477 final

EUROPEAN
COMMISSION

Brussels, 22.11.2018
SWD(2018) 477 final

COMMISSION STAFF WORKING DOCUMENT

For the Council Shipping Working party

IMO – Union submission to be submitted to the 6th session of the Sub-Committee on Ship Systems and Equipment (SSE 6) of the IMO in London from 4 – 8 March 2019 concerning the main topics and structure of the FIRESAFE II study

COMMISSION STAFF WORKING DOCUMENT
For the Council Shipping Working party

IMO – Union submission to be submitted to the 6th session of the Sub-Committee on Ship Systems and Equipment (SSE 6) of the IMO in London from 4 – 8 March 2019 concerning the main topics and structure of the FIRESAFE II study

PURPOSE

The document in Annex contains a draft Union submission to the 6th session of the Sub-Committee on Ship Systems and Equipment (SSE 6) of the IMO in London from 4 – 8 March 2019, concerning the main topics and structure of the FIRESAFE II study. It is hereby submitted to the appropriate technical body of the Council with a view to achieving agreement on transmission of the document to the IMO prior to the required deadline of 28 December 2018[1].

Article 6(2)(a)(i) of Directive 2009/45/EC applies SOLAS, as amended, to Class A passenger ships. Moreover, Directive 2009/45/EC, Annex I, Chapter II-2 Fire Protection, Detection and Extinction lays down various and extensive requirements for Class B, C and D passenger ships when engaged in domestic voyages, therefore the said draft Union submission falls under EU exclusive competence.

[1] The submission of proposals or information papers to the IMO, on issues falling under external exclusive EU competence, are acts of external representation. Such submissions are to be made by an EU actor who can represent the Union externally under the Treaty, which for non-CFSP (Common Foreign and Security Policy) issues is the Commission or the EU Delegation in accordance with Article 17(1) TEU and Article 221 TFEU. IMO internal rules make such an arrangement absolutely possible as regards existing agenda and work programme items. This way of proceeding is in line with the General Arrangements for EU statements in multilateral organisations endorsed by COREPER on 24 October 2011.

SUB-COMMITTEE ON SHIP SYSTEMS AND EQUIPMENT
6th session
Agenda item 6

SSE 6/6/XX
[...] December 2018
Original: ENGLISH

REVIEW SOLAS CHAPTER II-2 AND ASSOCIATED CODES TO MINIMIZE THE INCIDENCE AND CONSEQUENCES OF FIRES ON RO-RO SPACES AND SPECIAL CATEGORY SPACES OF NEW AND EXISTING RO-RO PASSENGER SHIPS

Main topics and structure of the FIRESAFE II study

Submitted by the European Commission on behalf of the European Union

SUMMARY

Executive summary:	This submission intends to present the main topics and structure of the FIRESAFE II study and suggests a possible way forward.
Strategic direction:	
High-level action:	
Output:	
Action to be taken:	Paragraph 29
Related documents:	SSE 5/INF.4, SSE 5/17

Introduction

1 This document is submitted in accordance with section 6.12.4 of the *Guidelines on the Organization and Method of Work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies* (MSC-MEPC.1/Circ. 5/Rev.1).

2 This submission intends to present the main topics and structure of the FIRESAFE II study and suggests a possible way forward. As mentioned in paragraph 5 of SSE 5/INF.4, the FIRESAFE II study was commenced in 2017. The study was conducted by Bureau Veritas, RISE and Stena Line and has just been finalized.

3 Since the final reports of the study only became available at the end of the submissions deadline for SSE 6, there was not sufficient time to analyse its results and provide specific proposals to be included in the interim guidelines or relevant amendments which are currently being discussed in the FP correspondence group. Therefore, while in general significant information related to the HAZID, the risk analysis and the investigated Risk Control

Options (RCOs) were available at the time of the compilation of this submission; the details and results of the Cost Effectiveness Assessment (CEA) were not yet available.

4 In order to provide accurate and objective information based on the study, parts from the interim reports were extracted for this submission, while the final reports will be made available at: [link will be inserted when available].

Topics of the study

5 The FIRESAFE II study consisted of two main parts following the FSA methodology and two parts which were dedicated to testing, namely of alternative detection systems for open ro-ro spaces and weather decks as well as for alternative fixed fire extinguishing systems. The main parts of the study were intended to compile, in conjunction with the FIRESAFE I study (mentioned as FIRESAFE in the reports of FIRESAFE II), a full FSA study of ro-pax ship fire safety and risk control options. The main topics of the FIRESAFE II study were detection, decision, containment and evacuation, concerning the fire safety of ro-ro, special category and vehicle spaces as well as a combined assessment (with FIRESAFE I) at the end of the study.

Part 1: Detection and decision

6 *The main objective of Part 1 of the FIRESAFE II study was to identify a range of risk control options (RCOs) and assess those most likely to be cost beneficial in relation to detection as well as decision to activate the fire-extinguishing system, due to a ro-ro space fire on a ro-ro passenger ship, with an aim to discuss specific proposals for rule making. The study considers open ro-ro spaces, closed ro-ro spaces as well as weather decks, for both newbuildings and existing ships.*

7 *The Formal Safety Assessment (FSA) methodology, described in the Guidelines MSC-MEPC.2/Circ.12/Rev.2, was followed. In order to perform such investigation, a review of regulations and current practices concerning fire detection systems and the decision-making processes was first conducted.*

8 *Three generic ships were defined to address the diversity of the world fleet of ro-pax ships. The categories were constructed using a lane meter to passenger capacity ratio:*

- *Ferry -RoPax, represent RoPax ships or ferries with focus on carriage of passengers but which can also carry cargo similar to a Standard RoPax. These ships typically only have closed ro-ro spaces or mainly closed ro-ro spaces and a small weather deck;*
- *Standard RoPax, represent the RoPax ships with focus on both carriage of cargo and of passengers. These vessels typically have each of the three types of ro-ro spaces, closed ro-ro spaces, open ro-ro spaces and weather decks. The size of the weather deck/s is generally medium to large within this category; and*
- *Cargo RoPax, represent RoPax ships with focus on carriage of cargo, and basically have a passenger capacity just enough to carry the number of drivers necessary to load the ro-ro spaces with accompanied trailers. These vessels typically have closed ro-ro spaces and large weather deck/s.*

9 *For the detection part, some notable results from the hazard identification were:*

- *The detection system is often deactivated during loading and discharging as well as during maintenance operations. This often implies deactivation of many or all ro-ro spaces;*
- *It is difficult to detect the fire at its early stage if the fire develops inside cargo or a vehicle;*
- *The environment in ro-ro spaces is quite harsh, and it is not uncommon that dirt, salt, exhaust fumes etc. clog the detectors;*
- *The detection system alarm panel can be illogical (confusion regarding the detection frame number, detection section, drencher section, CCTV numbering, etc.) which could imply delayed first response and delayed extinguishing system activation;*
- *No detection system is required for weather deck;*
- *The frequency of fire patrols is undefined and generally quite low;*
- *The accessibility within ro-ro spaces is very limited, which makes manual detection and fire localization difficult; and*
- *Many false alarms reduce the motivation of crew to quickly attend to alarms.*

10 *For decision of extinguishing system activation, notable hazards included:*

- *Alarm system management (e.g. information presentation, coherence, noise levels);*
- *Runner deployment (e.g. speed of deployment);*
- *Way finding, localization and relevant support (e.g. familiarity, markings, signage);*
- *Assembly of key decision-makers (e.g. availability);*
- *Resource management on the bridge (e.g. competing goals/processes, fire management in relation to regular operations);*
- *Drencher activation mandate (including hierarchy, blame culture);*
- *Assessment of fire characteristics, environment and fire spread;*
- *Ventilation management (smoke removal vs. supply of more oxygen to the fire);*
- *Maintaining knowledge and competence (e.g. realism in training); and*
- *Communication issues (between bridge, fire scene, drencher station, engine room).*

11 *The definition of Early/Late Decision has remained the same as in FIRESAFE. "Early" and "Late" decision should be understood in relation to the fire growth rate. "Early" means that the Decision to activate the system has been taken early enough to have a certain chance to extinguish the fire. "Late" means that the fire is already quite developed, and that it is too late to have a chance to extinguish it. However, the fire can still be suppressed upon system activation. In FIRESAFE, the Early/Late Decision concept included fire detection, but in FIRESAFE II it was considered separately.*

12 *The new concept introduced for Early/Late detection is related to whether it is possible to successfully perform first response and extinguish the fire in its initial stage. The criterion for "Early" detection is that the Available Time for Safe First Response (the time available until conditions become untenable around the fire, disallowing first response) is longer than the Required Time for Safe First Response (the time to detect the fire and to set up all actions for first response). Otherwise, the detection is considered to be too late to be able to extinguish the fire at its initial stage (for example with a hand-held fire extinguisher), based on that this cannot be done safely. Based on these definitions, a review and update was made of the main fire risk model. This led to the introduction of dedicated branches in the event tree for Detection, First response, and Decision.*

13 *For the detection part, a range of Risk Control Measures (RCMs) was identified based on the hazards identified in previous steps and on proposals of RCMs identified in former projects. The RCMs were initially ranked by experts with regards to risk reduction potential and estimated costs. Based on the rankings and on the high risk areas needing control identified in the fault tree, the RCMs with the highest potential were:*

- *Combined smoke and heat detection;*
- *Fibre optic linear heat detection (for open and closed ro-ro spaces);*
- *Ban/Permanent closure of side (Portside & Starboard) openings (open ro-ro spaces);*
- *Increased frequency of fire patrols;*
- *CCTV covering all decks;*
- *Thermal imaging cameras on weather decks;*
- *Flame detection on weather decks;*
- *Better addressability;*
- *Detector drone or camera on rail; and*
- *Additional detection means in Alternatively Fuelled Vehicles (AFV) areas.*

14 *Three of the above RCMs were selected as Risk Control Options (RCOs) for further quantitative cost-effectiveness analysis, based on their perceived cost-effectiveness, Technology Readiness Level (TRL), and availability:*

- *Combined smoke and heat detection;*
- *Ban/Permanent closure of side openings; and*
- *Increased frequency of fire patrols.*

15 Similarly, the RCOs that were selected for the quantitative cost-effectiveness analysis in relation to the decision part were:

- Alarm system design and integration;
- Improved markings/signage for wayfinding and localization; and
- Preconditions for early activation of drencher system.

Part 2: Containment, evacuation and combined assessment

15 *The main objective of Part 2 of the FIRESAFE II study was to identify a range of risk control options (RCOs) and assess those most likely to be cost beneficial in relation to containment and evacuation due to a ro-ro space fire on a ro-ro passenger ship, with an aim to discuss specific proposals for rule making.*

16 *For the containment part, some notable results from the hazard identification were:*

- *Side openings were considered a major hazard for fire and smoke spread to LSA, ventilation inlets, decks above, but also end openings pose a significant hazard;*
- *A major concern with ro-ro space fires is that the space is not sub-divided, meaning that an uncontrolled ro-ro space fire may involve the whole length of the ship. The fire will quickly grow intense and could last for a very long time (days);*
- *On general ro-ro cargo ships, thermal insulation (A-30) is required between decks, but this is not required on RoPax ships (except every 10 meters in height). Without insulation, fire vertical spread after about 10 minutes is possible (without extinguishing system activated);*

- *Fire spread to weather deck, due to flame spread though openings or heat transfer through the deck, is difficult to avoid due to lack of fire integrity and limited possibilities for management (only manual efforts, limited equipment, accessibility problems, etc.). Fire spread to weather deck is associated with high risk since there are no fixed means for extinguishment and the accessibility for safe manual firefighting is limited, which gives a high probability of an uncontrolled fire;*
- *Smoke spread from the ro-ro space to the accommodation part of the ship is a major concern and it is difficult to achieve an over pressure in all spaces adjacent to a ro-ro space; and*
- *Doors to the ro-ro space are generally not smoke tight, since this is not tested in accordance with the FTP Code.*

17 *For the evacuation part, some notable results from the hazard identification were:*

- *Side openings were considered a major hazard for fire and smoke spread to LSA, but also end openings pose a significant hazard;*
- *Smoke may spread from side openings and ventilation outlets and affect the possibilities for using LSA, escape routes, embarkation stations, etc.;*
- *A fire in ro-ro space may block the use of LSA by hindering embarkation or deployment, burning guiding ropes, etc.;*
- *Many critical cables run through the ro-ro space and fire deterioration may cause loss of power, navigation impossibility, black out etc., regardless of the current provisions;*
- *Heat spread to escape routes and embarkation stations is critical, in particular if the use of LSA is hindered and since a ro-ro space fire can be very intense and long-lasting;*
- *It is seldom possible to provide of a secondary means of conventional disembarkation of the ship (not considering use of LSA) when berthing a foreign harbour (where gangways are not usable). Evacuation through the stern ramp may not be possible due to fire; and*
- *Passengers are generally not allowed in the ro-ro space before the ship is alongside, but if this occurs, fire in a ro-ro space full of passengers is a worst possible evacuation scenario.*

18 *The relevant containment RCMs were initially ranked by experts with regards to risk reduction potential and estimated costs. Based on the rankings and on the high risk areas needing control identified in the fault tree, the RCMs with the highest potential were:*

- *Ban / Closure of side and end openings;*
- *Requirement for fire insulation (at least) A-30 instead of A-0 between ro-ro decks;*
- *Implementation of new test and requirement for enhanced smoke-tight A-60 divisions for ro-ro space boundaries;*
- *Fire monitors on weather deck;*
- *Subdivision between ro-ro space without openings and space with openings;*
- *Ban / Closure of side openings on ro-ro spaces; and*
- *Increased fire insulation for ro-ro space boundaries, e.g. A-180 towards accommodation areas.*

19 *Two of the above RCMs were selected as Risk Control Options (RCOs) for further quantitative cost-effectiveness analysis, based on their perceived cost-effectiveness, Technology Readiness Level (TRL), and availability:*

- *Ban / Closure of side and end openings; and*

- *Fixed fire-extinguishing systems (e.g. fire monitors) on weather deck.*

20 Regarding the failure of evacuation the main issue addressed was related to SOLAS Ch. II-2, Reg. 20.3.1.5. Based on simulations, the safe distance and arrangement of such openings were estimated. Although other means of failure of evacuation following a fire on a ro-ro deck were also identified, the focus of the study was that of protection of stowage areas, embarkation stations and LSA failure due to heat but not LSA failure due to intrinsic or environmental issues.

Parts 3 & 4: Testing of alternative fixed fire extinguishing systems and fire detection systems for open ro-ro spaces and weather decks

21 For both parts 3 and 4, a desk study was performed before testing of the systems in order to evaluate their expected performance effectiveness and costs. Following this evaluation, it was decided to test the following systems:

- Fibre optic heat detection system for open ro-ro spaces;
- Thermal imaging camera detection system for weather deck;
- Fire-extinguishing Compressed Air Foam System (CAFS); and
- Foam-water sprinkler/spray fire-extinguishing system.

22 It should be noted that testing of the detection systems took place on 26/08/2018 onboard the Stena Scandinavica, thereby recreating particularly realistic conditions. Testing of the alternative fixed fire extinguishing systems took place 01-05/10/2018 in the testing facilities of RISE in Borås, Sweden.

23 For all four systems that were tested, a cost-effectiveness assessment was also performed, the results of which are available in the final reports.

Discussion

24 The FIRESAFE II study follows the same principle and structure for ro-pax ship fire safety as that developed for the interim guidelines by the FP WG at SSE 5, included in Annex 1 and 2 of SSE 5/WP.4 and approved by the Sub-Committee (SSE 5/17, 7.15). Therefore the identified RCOs are either already included in the structure (e.g. 2.3 Flame detectors, 4.2 and 4.3 side openings, 5.1 distance of openings to LSA) or can be introduced therein as deemed appropriate.

25 The provided information is expected to assist the discussions on ro-pax ship fire safety significantly. Based on the information provided above, it should be highlighted that specific proposals for amendments or for inclusion in the interim guidelines will be developed especially for the RCOs proved to be cost-effective. Therefore it is proposed that especially the quantitatively analysed RCOs (paragraphs 14, 15, 19 and 20) are included in the current structure of the interim guidelines. The qualitatively analysed RCOs may also provide useful information in the already identified items of the interim guidelines.

26 The Sub-Committee had endorsed at its fourth session that the method of work on this agenda item should follow a risk based methodology such as FSA, or similar simplified techniques. As mentioned, FIRESAFE II followed the FSA methodology and therefore it is

proposed that the study is reviewed by the FSA Experts Group intersessionally and that the group reports directly to SSE 7.

27 It should be noted that in parallel with the review of the FSA EG the consideration of FIREAFE II by the FP WG regarding its technical elements should be continued since the FSA EG review will only assess the aspects linked to the methodology described in the FSA Guidelines.

28 Having in mind the suggested FSA EG review, the technical considerations that still need to be made on the FIRESAFE II study and other input that may be received by SSE 6, but also the current status of the work on the relevant interim guidelines, it seems unrealistic that this agenda item will be finalised at SSE 6 as originally foreseen and it is hereby proposed that an extension of the deadline until 2021 is given.

Action requested of the Sub-Committee

29 The Sub-Committee is invited to consider the proposals in paragraph 25, 26 and 28 above and take action as appropriate.

***