

SUB-COMMITTEE ON CARRIAGE OF
CARGOES AND CONTAINERS
10th session
Agenda item 15

CCC 10/15/1
19 June 2024
Original: ENGLISH
Pre-session public release:

ANY OTHER BUSINESS

Mitigating the risks and consequences of cargo fires on containerships

Submitted by IACS

SUMMARY

Executive summary: This document proposes risk-prevention-related areas which should be considered by the Sub-Committee in order to mitigate the risks and consequences of cargo fires on containerships.

*Strategic direction, 7
if applicable:*

Output: 7.15

Action to be taken: Paragraph 28

Related document: SSE 10/20

Introduction

1 This document proposes risk-prevention-related areas to be considered by the Sub-Committee in relation to the IMDG Code with a view to mitigating the risks and consequences of fires in the cargo areas of containerships, as invited by SSE 10 (SSE 10/20, paragraph 10.40.2).

Background

2 The Maritime Safety Committee, at its 103rd session, agreed to include in the biennial agenda of the SSE Sub-Committee a new output on the "Development of amendments to SOLAS chapter II-2 and the FSS Code concerning detection and control of fires in cargo holds and on the cargo deck of containerships", in association with the CCC Sub-Committee as and when requested by the SSE Sub-Committee. In accordance with the agreed road map, SSE 10 commenced the discussion after the CARGOSAFE FSA study report by EMSA became available and compliance with the provisions of the *Revised guidelines for Formal Safety Assessment (FSA) for use in the IMO rule-making process* (MSC-MEPC.2/Circ.12/Rev.2) was verified (SSE 10/10).

3 SSE 10 discussed the recommendations of the CARGOSAFE FSA study, evaluated and prioritized the most viable risk control options (RCOs) in view of utilization in preparing draft amendments to SOLAS and the FSS Code.

4 Also, SSE 10 identified a non-exhaustive list of risk-prevention-related areas to be noted and considered by the CCC Sub-Committee, with a view to taking action as deemed appropriate, and invited interested Member States and international organizations to make relevant submissions to CCC 10 under the agenda item on "Any other business" (SSE 10/20, paragraph 10.40.2).

5 In that respect, document SSE 10/10/1 (IACS) provided an initial technical evaluation of the RCOs of the CARGOSAFE FSA study, *inter alia*, proposing to review the IMDG Code regarding quantity limitations, stowage location and testing to reduce both the probability and spread of fire, i.e. to prevent the fire from developing into an out-of-control fire. This document elaborates on some of the discussions in document SSE 10/10/1.

Discussion

6 The analysis of casualty reports on containership cargo fires (124 reports) provided by the CARGOSAFE FSA study showed that about 42% of all cargo fires have their origin in dangerous goods, regardless of whether they are properly declared or not. However, it is also noted that in 48% of the cargo fires, the underlying cause could not be established. The consideration of only cases with a known cause shows that 81% of all cargo fires relate to dangerous goods. The CARGOSAFE study further estimates that 27% of fires caused by dangerous goods was the result of misdeclared cargoes.

7 The results of the hazard workshop of the CARGOSAFE FSA study, *inter alia*, listed the following IMDG Code-related topics:

- .1 self-heating goods (testing procedures);
- .2 special provisions and limited quantities exemptions used to circumvent declaration requirements; and
- .3 cargo types responsible for a large share of cargo fires: calcium hypochlorite, charcoal and Li-batteries.

8 In document SSE 10/10/1, IACS suggested to verify whether the IMDG Code needs improvements with respect to:

- .1 quantity limits of dangerous goods (thresholds for declaration);
- .2 stowage location of class 5.1 cargo;
- .3 segregation requirements of part 7 of the IMDG Code; and
- .4 test methods for self-heating cargo.

9 Furthermore, the document noted that addressing the issue of (declared) dangerous goods has the potential to improve safety by:

- .1 reducing the probability of cargo fires;
- .2 increasing the effectiveness of fire-fighting by using appropriate means;

- .3 reducing the probability of getting an out-of-control fire; and
- .4 increasing safety of fire-fighters.

Misdeclaration

10 The issue of misdeclaration has already been highlighted in the first FSA study on containership cargo fires (FP 54/INF.2). The misdeclaration means false, misleading or inadequate declaration of dangerous goods. The misdeclaration can be traced back to either intentional or unintentional behaviour. The latter may be caused, for instance, by insufficient competence.

11 Even if the annually submitted information on the results of inspections on packaged dangerous goods are not statistically significant (e.g. CCC 9/INF.2 (Secretariat)), the accumulated data for the period from 2009 to 2022 (~850,000 inspections) shows deficiencies relating to, for example:

- .1 placarding and marking: ~5.5% of the inspected containers;
- .2 marking/labelling of packages: ~1.1%;
- .3 inappropriate or damaged cargo packing: ~0.5%; and
- .4 stowage/securing inside freight containers, vehicles and other CTUs: ~2.7%.

12 These figures appear small; however, it should be noted that the CARGOSAFE FSA study determined an ignition frequency of 3.7 E-07 per TEU year.

13 The issue of insufficient competencies could be addressed by improved training of shore-side personnel throughout the supply chain (e.g. consideration of identification/certification regimes for shippers/handlers) and extended mandatory training requirements. It is noted that in chapter 1.3 of part 1 of the IMDG Code, the training provisions of paragraphs 1.3.1.4 to 1.3.1.7 are currently recommendatory.

14 Furthermore, the quality assurance and enforcement aspect should be considered, including the evaluation of potential safety benefits of a certification regime for shore-side personnel that are involved in the transport of dangerous goods under the IMDG Code. A certification regime related to some of the functions mentioned in table 1.3.1.6. of the IMDG Code could significantly reduce the misdeclaration of goods.

15 Besides the shortcomings in placarding/marking/labelling of cargo/containers, IACS notes that the quality and reliability of the shipper's declarations could be improved. The shipper's declaration or the cargo information, as required by SOLAS regulation VI/2.1 currently, provides insufficient means for verification by the master/crew and shore personnel.

16 In order to reduce the misdeclaration of goods and improve the verification process by the master/crew and shore personnel, new provisions could, for example, include photo documentation of cargo for artificial intelligence (AI) analyses to provide risk rating of the unit and third-party verification of the shipper's declaration.

17 Dangerous goods packaged in limited and excepted quantities are not subject to the main requirements of the IMDG Code; however, they are required to come with mandatory certification/documentation as per the requirements in chapters 3.4 and 3.5 of the IMDG Code. In practice, this is not always followed, and it could be considered that there is room for improvement by requiring a combination of photo documentation and third-party verification.

Stowage requirements

18 The effectiveness of fire fighting may be negatively impacted by the cargo in a container, e.g. by a cargo that starts a chemical/biological reaction when in contact with the extinguishing agent. The analysis of casualty reports for containership cargo fires indicates that the fixed fire-fighting CO₂ system was ineffective in several cases. The IMDG Code allows stowage of class 5.1 cargo (oxidizers) partly below deck in cargo holds. However, this cargo has the potential to react with CO₂ releasing O₂ which is reducing the effect of CO₂.

19 IACS is of the view that water-based fire fighting inside cargo holds, as recommended by the CARGOSAFE FSA study, should be carefully considered, as this may have an impact on the stowage of class 4.3 substances on board as they react in contact with water and release flammable gases.

20 IACS has observed that most large containership operators have stowage software, which includes restrictions which go well beyond the IMDG Code stowage and segregation requirements, and that risk-based stowage is now the practice of some of the major containership operators, e.g. Cargo Incident Notification System (CINS) guidance on stowage of dangerous goods. The current stowage and segregation requirements of the IMDG Code could therefore be reviewed with respect to suitability/adequateness for large containerships, taking into account the performance of fire-fighting means.

21 In this context, it is highlighted that currently the IMDG Code does not consider requirements for a minimum distance of stowage of toxic products.

Improved test methods

22 According to S. Moon et al. (*Examination of the United Nations self-heating test for sulphides*), the UN test of self-heating substances can result in false negative classification when testing sulphide materials.

23 The CARGOSAFE FSA study identifies the need for improved test methods for classification of self-heating cargoes as one of the RCOs (PS5). That RCO intends to reduce false negative classification, i.e. cases when a self-heating cargo is not identified as such in the test (negative test result), leading to the risk of ignition of self-heating substances inside a container.

24 Section 2.4.3.2 of the IMDG Code on class 4.2 substances refers to the UN *Manual of Tests and Criteria*, part III, 33.4.4, 33.4.5 and 33.4.6. Self-heating can be caused by biological, chemical or physical processes. The test method in the Manual of Tests and Criteria, part III, 33.4.6, was originally developed for charcoal; the classification scheme is based on the self-ignition temperature of charcoal. Therefore, not all of these processes (biological, chemical or physical) are adequately covered in this N.4 (33.4.6 – test method for self-heating substances) test method.

25 Notwithstanding that, IACS believes that the N.2 (33.4.4 – test method for pyrophoric solids), N.3 (33.4.5 – test method for pyrophoric liquids) and N.4 test methods as mentioned in these paragraphs, respectively, were intended by PS5 RCO.

Proposal

26 With the above discussion in mind, IACS proposes that the following IMDG Code aspects be further considered with a view to mitigating the risks of cargo fires on containerships:

- .1 misdeclaration of cargoes (paragraphs 10 to 17);
- .2 stowage requirements (paragraphs 18 to 21); and
- .3 test methods for self-heating cargoes (paragraphs 22 to 25).

27 Consideration should not only focus on how to prevent a fire but should also consider the situation where there is already a fire, i.e. to prevent a fire from getting out of control.

Action requested of the Sub-Committee

28 The Sub-Committee is invited to consider the foregoing proposal in paragraph 26 and take action, as appropriate.
