



## IUMI Policy Agenda

### 11. Safety of container vessels

#### *Brief description*

The increasing size of container vessels and recent incidents contribute to the high awareness and importance placed by insurers on several issues related to the safety of these vessels. Fires count among the worst hazards of the global shipping industry, and every ineffective attempt to extinguish a fire puts the crew at risk. Damage to the environment, cargo and the vessel also increases. Misdeclaration of cargo and insufficient firefighting capabilities are currently two of the main challenges related to this peril.

#### Container contents

The contents of a container must be known if it is to be transported safely, but misdeclaration is a recurring safety problem. This applies equally to road, rail, brown and blue water transport.

Containers often contain a wide range of hazardous and toxic substances. It is reported that approximately 20% of containers in transportation are misdeclared. An analysis from the Cargo Incident Notification System (CINS) shows that in just over a quarter of the incidents where causation was detected were attributable to cargo being misdeclared. This may lead to insufficient handling of the container, and worst case an incorrect firefighting strategy that may increase the danger of combustion of the goods in the container.

In July 2019, IUMI co-sponsored a submission to the IMO Sub-Committee on Carriage of Cargoes and Containers (CCC) containing a proposal to undertake a comprehensive review of maritime special provisions that are often used to exempt goods from the safety provisions of the International Maritime Dangerous Goods (IMDG) Code. This was agreed by CCC in September 2019, and a Correspondence Group subsequently submitted a report in June 2020. The Correspondence Group was permitted to continue their considerations under the approved terms of reference and submitted an addendum to the original report in May 2021. Further work of a Correspondence Group on IMDG Code matters continues until CCC 8 in 2022.

#### Firefighting system on container vessels

Insufficient firefighting capacity on board large container vessels poses a challenge that is only increasing with the size of these vessels.

Based on a 2008 impact assessment, the IMO's Maritime Safety Committee (MSC) approved in June 2013 new requirements for fire protection of on-deck cargo areas. The

amended SOLAS regulation II-2/10 requirements only apply to new vessels constructed on or after 1 January 2016. In addition to all other fire protection arrangements as per existing regulations, vessels designed to carry five or more tiers of containers on or above the weather deck shall from then on also be provided with mobile water monitors and at least one water mist lance.

Although these changes were a step in the right direction, a concern remains with the firefighting equipment on existing vessels. With the growing size of container vessels, the challenge of insufficient firefighting arrangements is becoming even greater.

Consequently, IUMI recommended in a position paper from September 2017 that responsible authorities, class and relevant industry stakeholders engage in discussions on how to further improve the fire detection, protection and firefighting capabilities on board container vessels. Together with Germany, Bahamas, BIMCO and CESA, IUMI co-sponsored a submission to the IMO Maritime Safety Committee's 102<sup>nd</sup> session with a view to amending SOLAS. Due to COVID-19 and the interruption of IMO meetings, the adoption of the new output was postponed until MSC 103 in May 2021. MSC 103 agreed, based on paper MSC102/21/3 and 102/21/7, to include in the biannual agenda of the Sub-Committee on Ship Systems and Equipment (SSE) for 2022-23 and the provisional agenda for SSE 8 in February/March 2022 an output on "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", with a target completion year of 2025, in association with the Sub-Committee on the Carriage of Cargoes and Containers (CCC), as and when requested by SSE. The amendments shall apply to new ships and they shall enhance provisions for early fire detection and effective control of fires in containerized cargoes stowed on and under deck of containerships. The amendments shall enter into force on 1 January 2028, provided they are adopted before 1 July 2026. A group of experts had been formed by IUMI to outline a road map for amending SOLAS. Based on input from this group, six flag states, IUMI, BIMCO and IACS submitted in November 2021 a paper with a proposed outline and initial assessment of gaps and regulations to SSE.

In December 2021, EMSA launched a 'Study Investigating Cost Efficient Measures for Reducing the Risk from Cargo Fires on Container Vessels (CARGOSAFE)', which follows the structure of a Formal Safety Assessment (FSA) and includes the tasks of hazard identification, risk analysis, risk control options, cost effectiveness assessment, and making recommendations for decision making. The timetable foresees the project to run for 60 weeks. The outcomes of this study will be fed into the IMO procedures.

#### Loss of containers

According to the World Shipping Council, an average of 1,382 containers were lost overboard on an annual basis between 2008 and 2019. This is in sharp contrast to several incidents where ships have lost large numbers of containers overboard at sea in late 2020 and early 2021. High profile accidents include the One Apus which lost a total of 1,816 containers (November 2020) and the Maersk Essen which lost 750 containers (January 2021) during their respective voyages. These events show the necessity to review the

root causes of the incidents. A complex set of technical and operational aspects play a role requiring a careful assessment.

Container ships have grown at an incredible pace over the past 40 years. While the maximization of economies of scale and the overall impact of transportation costs is impressive, this does come with increased risk.



Source: Allianz Global Corporate & Specialty, Safety & Shipping Review

The growing size of container vessels has led to large beams and container stack heights which result in relatively large metacentric heights (GM). This makes the vessels very stable/stiff which in rough weather conditions can cause high rolling accelerations. The effect of strong winds on the on-deck container stacks, also known as 'sail area' or 'air draft', further increases the windage area causing extreme momentum. Specific wave patterns may also lead to violent movements such as parametric or synchronous rolling, exerting severe loads on the container lashing and securing gear.

The stowing, lashing and securing of containers is another factor potentially contributing to the loss of containers at sea. The distribution of weight within a container stack has an impact on the stability of a vessel. If the weight of a container is not properly declared it may be stowed in an unsuitable location within the stack, causing its collapse. When considering the impact of improper container weight and number of containers transported by these ships, the multiplied effect is an important consideration. Enforcement of the IMO's verified gross mass (VGM) regulation is therefore critical to the safe operation of containerships.

Improper or damaged lashing and securing equipment, twistlocks and containers can also cause the collapse of a container stack. A chain is only as strong as its weakest link,

hence one element in the container stowage and securing process may lead to the collapse of a container stack which in turn may clash with its neighbouring container stack causing the breakdown of several stacks.

On the operational side, calculation methods are used to determine the maximum capacity of containers to be loaded for a vessel. These models are based on “in-design conditions” which preclude, for instance, unfavourable sea conditions. “Off-design” conditions must be averted by the crew at an operational level, e.g. through weather routing and passage planning. The accuracy of these calculation models is an essential safety component. The models also underlie economic considerations to maximize a vessel’s capacity. The rules for the calculations must therefore be based on a level playing field which ensures that they keep within safe boundaries.

Other contributing factors may involve human error, including, but not limited to, errors in cargo stowage plans, improper adherence to container stack plans, correctly following lashing plans, re-securing of lashings during voyages, poor cargo stowage within containers, adherence to weather routing, and prudent vessel navigation while in heavy weather.

Climate change and the increasing frequency of severe weather both at sea and ashore is a factor. Improvements in marine weather forecasting and weather routing services are beneficial in planning for severe weather.

Cargo underwriters have been and will continue to be impacted by the loss of containers overboard. The high number of casualties within a short period of time is unprecedented. IUMI takes the view that although it is premature to define this as a systemic threat, every container lost is one container too many. Losses are not just limited to the containers lost overboard. There is also cargo damaged as a result of container stack collapses, damages to the vessels, and environmental impact. Resulting Cargo, Hull & Machinery, Protection & Indemnity and Marine Liability losses as well as uninsured losses have a significant economic impact. There is also concern that salvage capabilities have not kept pace with the increase in vessel size. Therefore, the various aspects relevant to the safe carriage of containers must be reviewed and action taken to correct the shortcomings.

In May 2021, the IMO Maritime Safety Committee (MSC) agreed to develop measures to facilitate detection, reporting, positioning, tracking and recovery of containers lost at sea as a new work item. The work is expected to commence in 2023 through the Sub-Committee on Carriage of Cargoes and Containers (CCC). The issue is also addressed by the MARIN Institute’s TopTier Project. MSC 104 noted the information provided on this issue, and invited interested Member States to participate in this joint industry project.

*Relevant authority / organisations and documents*

- **IMO - Maritime Safety Committee (MSC) and Sub-Committees on Ship Systems and Equipment (SSE) and Carriage of Cargoes and Containers (CCC)**
  - **CCC1/INF.2:** Investigation on the fire and explosion on board the MSC Flaminia, submitted by Germany, 3 June 2014.
  - **MSC.1/Circ. 1497:** IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTU Code), 16 December 2014.
  - **MSC.1/Circ. 1498:** Informative material related to the CTU Code, 16 December 2014.
  - **CCC6/10/1:** Revision of the inspection programmes for cargo transport units carrying dangerous goods, submitted by New Zealand and ICHCA, 5 July 2019.
  - **CCC6/6/17:** Non-declaration and misdeclaration of dangerous goods – special provisions in the IMDG Code, submitted by Liberia, ICS, IUMI, BIMCO, ICHCA, IGP&I, IVODGA and WSC, 5 July 2019.
  - **CCC6/J/8:** Draft terms of references for a correspondence group under Agenda item 6 on a review of maritime special provisions, 9-13 September 2019.
  - **MSC102/21/3:** Proposal for a new output to evaluate the adequacy of fire protection, detection and extinction arrangements on board containerships to fight container fires, submitted by Marshall Islands, Singapore, IACS and WSC, 7 February 2020.
  - **MSC102/INF.2:** Information on insurance related economic aspects associated with containership fires, submitted by IUMI, 7 February 2020.
  - **MSC102/INF.3:** Analysis of current safety regulations concerning fire-fighting on board containerships, submitted by IUMI, 7 February 2020.
  - **MSC102/21/7:** Proposal for a new output for the fire protection on containerships regarding the review of relevant parts of SOLAS chapter II-2 with regard to fire protection in the cargo area on and under deck, submitted by the Bahamas, Germany, IUMI, BIMCO and CESA, 11 February 2020.
  - **MSC102/21/13:** Proposal for a new output on containers lost at sea, submitted by Vanuatu, 14 February 2020.
  - **FAL44/2020 & CCC7/6/1:** The role of the Rotterdam Rules in safety and facilitation, submitted by CMI, 14 February 2020.
  - **MSC102/21/19:** Comments and proposal for a new output on containers lost at sea, submitted by EU Member States & EC, 20 March 2020.
  - **MSC102/21/24:** Comments on documents MSC 102/21/3 and MSC 102/21/7, submitted by Liberia, ICS, ICHA, IG, IVODGA, ITF and WSC, 24 March 2020.
  - **CCC7/6/2:** Report of the Correspondence Group on a review of Maritime Special Provisions, 5 June 2020.

- **CCC7/6/12:** Documentation requirements for exempted dangerous goods, submitted by Liberia, BIMCO, ICHCA, ICS, IG, IVODGA and WSC, 24 July 2020.
- **MSC103/20/10:** Draft SOLAS amendments for the mandatory carriage of electronic inclinometers on container ships and bulk carriers, submitted by France, Germany, the Netherlands and ICS, 1 March 2021.
- **CCC7/6/2/Add.1:** Report of the Correspondence Group on a review of Maritime Special Provisions, 30 April 2021.
- **MSC103/WP.1/Rev.1:** Draft report of MSC 103, 17 May 2021.
- **MSC104/17/4:** Preventing loss of containers at sea, submitted by Australia, France, Germany and Netherlands, 28 July 2021.
- **SSE8/10:** Proposal for a road map amending SOLAS chapter II-2 to address firefighting capabilities on board container vessels, submitted by Bahamas, France, Germany, Marshall Islands, Norway, Singapore, IUMI, BIMCO and IACS, 26 November 2021.
- **SSE8/10/1:** Proposals for enhancing the capabilities of containerships for early fire detection in cargo holds and on cargo decks, submitted by China, 24 December 2021.
- **SSE8/10/2:** Comments on document SSE 8/10 – proposing draft guidelines for water mist lance, submitted by Denmark, 26 November 2021.
- **SSE8/10/3:** Comments on document SSE 8/10, submitted by Germany, Liberia, Panama, Philippines, ICS, IACS, IG, ITF and WSC, 7 January 2022.
- **IUMI:**
  - Press release 20 September 2016; call for further industry cooperation to tackle containership fires.
  - **Memo & press release 19 September 2017: Fire-fighting on container vessels** (<https://iumi.com/opinions/position-papers>).
  - **IUMI Discussion Paper on Containers lost at Sea, December 2021.**
- **Cargo Incident Notification System (CINS):**
  - Guidance - Safety considerations for ship operators to risk-based stowage of dangerous goods on containerships, 25 November 2019.
  - Guidelines for the carriage of seed cake in containers, January 2020.
- **ABS:**
  - Fighting Fire on Container Ships, 2016.
  - Guide for fire-fighting systems for cargo areas of container carriers, October 2019.
- **German Federal Bureau of Maritime Casualty Investigation:** Investigation Report 15/19 – Fire in the area of the deck cargo on board the container ship Yantian Express in the Atlantic Ocean on 3 January 2019, 30 January 2020.
- **Tokyo MoU:** Safety Bulletin 03/20 – Safety risks of casualties caused by cargoes, May 2020.
- **CINS / IGP&I:** Guidelines for the carriage of seed cake (including seed meal) in containers, June 2020.

- **National Cargo Bureau:** White paper – A comprehensive holistic approach to enhance safety and address the carriage of undeclared, misdeclared and other non-compliant dangerous goods, 6 July 2020.
- **Cargo Integrity Group:** Quick guide to the UN-sponsored Code of Practice for Packing of Cargo Transport Units (the CTU Code), September 2020.
- **European Maritime Safety Agency:**
  - Analysis of marine casualties and incidents involving container vessels, September 2020.
  - Invitation to tender no EMSA/OP/2021 for study investigation cost efficient measures for reducing the risk from cargo fires on container vessels (CARGOSAFE), 15 June 2021.
- **Transport Safety Investigation Bureau – Singapore:** Final report – Fire on board Maersk Honam at Arabian Sea on 6 March 2018, 5 October 2020.
- **CONTAIN:** Pilot project report – Exploring the challenges of containership fires, Danish Institute of Fire and Security Technology, 25 January 2021.

#### *Timeline / important dates & decisions*

- **CTU Code:**
  - Endorsed by
    - the Inland Transport Committee of the UNECE, at its seventy-sixth session, 25 to 27 February 2014,
    - the IMO Maritime Safety Committee, at its ninety-third session, 14 to 23 May 2014, and
    - the Governing Body of ILO, at its 322nd session, 30 October to 13 November 2014.
- Final report Committee on large Container Ship Safety (Japan): March 2015.
- Entry into force of amended FSS Code & SOLAS regulation II-2/10: 1 January 2016.
- IUMI webinar: Mark Russell (Gard) on firefighting of container vessels and misdeclaration of container content, 2 November 2017.
- MSC 101 – IUMI lunch presentation, 5 June 2019.
- Gard conference, Arendal, 17-18 October 2019.
- Tripartite meeting, Tokyo, October 2019.
- SSE 7: 2-6 March 2020. IUMI lunchtime presentation by Are Solum (Gard), 4 March 2020.
- MSC 103: 3-14 May 2021.
- SSE 8: 28 Feb-4 March 2022.
- SSE target completion year output on container fires: 2025.
- SOLAS amendment container fires: 1 January 2028, provided amendments are adopted within 1 July 2026.
- MSC 104: 4-8 October 2021.



*IUMI will:*

- Support a holistic approach to preventing and mitigating fires starting in the cargo on board container vessels.
- Support measures that improve the monitoring of containers and their contents.
- Support internationally harmonized legislation and national regulations based on the CTU Code.
- Monitor and support measures to ensure the structural safety of large container vessels.
- Support an amendment of SOLAS to improve fire safety.
- Support the NCB recommendations from July 2020 to address the carriage of undeclared, misdeclared and other non-compliant dangerous goods.