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**UNIFIED INTERPRETATION OF PROVISIONS OF IMO SAFETY, SECURITY, AND
ENVIRONMENT-RELATED CONVENTIONS**

**Draft unified interpretations of appendix 1 – Individual schedules of solid bulk cargoes
of the IMSBC Code (resolution MSC.268(85))**

Submitted by IACS

SUMMARY

Executive summary: This document proposes draft unified interpretations of appendix 1 – Individual schedules of solid bulk cargoes of the International Maritime Solid Bulk Cargoes Code (IMSBC Code) (resolution MSC.268(85)), which have been developed with a view to facilitating uniform and universal implementation.

Strategic direction, if applicable: 7

Output: 7.1

Action to be taken: Paragraph 0

Related documents: None

Introduction

1 The information available to IACS has revealed two serious incidents on bulk carriers involving transportation of coal, so-called Material Hazardous only in Bulk (MHB), emitting methane. In both incidents, one of the cargo hold access hatches was located inside an adjacent enclosed space with non-explosion-proof electrical equipment installed. An explosion occurred when the methane gas migrated from the cargo hold through the cargo hold access hatch into the adjacent enclosed space.

2 Methane is a highly flammable gas; a methane/air mixture, containing between 5% and 16% methane, constitutes an explosive atmosphere that can be ignited by any ignition source, such as a spark or naked flame. As methane is lighter than air, it tends to accumulate in the upper region of the cargo hold and may seep through into spaces adjacent to the cargo hold, if the cargo hold boundary is not gastight.

3 Similar to flammable gases, heat sensitive cargoes pose a threat to ship's safety.

Discussion

4 Understanding of the nature of the cargo and the requirements for the management of the transportation of that cargo by a ship, given in the IMSBC Code, is the key to safe transportation of the MHB cargoes which are capable of creating explosive gas and/or dust atmosphere, and/or for cargoes which are sensitive to heat. In order to mitigate the risk of explosion, adequate safety measures should be in place for all spaces and areas having the potential for relevant accumulation of explosive gas and/or containing cargo sensitive to heat.

5 Section 3.4.2 of the IMSBC Code states:

"Some cargoes may emit flammable gases in sufficient quantities to constitute a fire or explosion hazard. Where this is indicated in the cargo schedule in this Code or by the cargo information provided by the shipper, the cargo spaces shall be effectively ventilated as necessary. The atmosphere in the cargo spaces shall be monitored by means of an appropriate gas detector. Due consideration shall be paid to the ventilation and monitoring of the atmosphere in the enclosed spaces adjacent to the cargo spaces."

6 Further, section 13 of the IMSBC Code refers to standard IEC 60092-506:2003 related to gas detection and ventilation. However, section 13 is only "recommendatory or informative" (paragraph 1.4.2 of section 1 of the IMSBC Code). The IMSBC Code provides no other references to standard IEC 60092-506:2003 nor to mandatory regulations covering the IEC provisions.

7 IACS is of the view that elimination of ignition sources in spaces having the potential of containing an explosive atmosphere is an effective risk mitigation measure which is obtained by following the requirements applicable to electrical equipment in enclosed or semi-enclosed spaces with direct access to the cargo hold when the ship is carrying the MHB cargoes defined in the IMSBC Code that emit flammable gases.

8 Paragraph 4.3.2 of standard IEC 60092-506:2003 contains provisions for electrical equipment operated in areas with explosive atmosphere, as follows:

"4.3.2 Class 4.3 capable of creating explosive gas atmosphere

Hazardous areas (comparable with zone 1):

- a) closed cargo spaces as indicated in Annex B, item A;
- b) ventilation ducts, if any, serving the spaces identified in 4.3.2 as indicated in Annex B, item B;
- c) areas on open deck, or semi-enclosed spaces on open deck, within 1,5 m of any exhaust ventilation outlet of a hazardous area as indicated in Annex B, item G;
- d) enclosed or semi-enclosed spaces having a direct opening into any of the areas as identified in 4.3.2a) or 4.3.2b) as indicated in Annex B, item C, unless appropriate measures are taken to prevent flammable gas or dust entering such spaces as indicated in Annex B, items D, E or F;

Extended hazardous areas (comparable with zone 2):

- a) enclosed or semi-enclosed spaces having a direct opening into any of the areas identified in 4.3.2a) or 4.3.2b) which are provided with the closing arrangements indicated in Annex B, item D, and inside the air lock itself if arranged as indicated in Annex B, item F;
- b) areas of 1,5 m surrounding open or semi-enclosed spaces of Zone 1 as specified in 4.3.2c) as indicated in Annex B, item G."

9 However, paragraph 4.3.2 of standard IEC 60092-506:2003 is only applicable for the MHB cargoes creating an explosive dust atmosphere and not for the MHB cargoes creating explosive gas atmosphere as reported in the casualties.

10 Further, standard IEC 60092-506:2003 provides adequately for addressing the risk of heat sensitive cargo.

Proposal

11 In order to adequately address the identified safety issues, IACS proposes a unified interpretation, contained in annex 1 to this document, for the consideration of the Sub-Committee. This draft interpretation provides a list of phrases in the individual cargo schedules in appendix 1 of the IMSBC Code, as amended by resolution MSC.500(105), with the potential of creating explosive gas atmosphere and/or dust atmosphere, and/or for cargoes which are sensitive to heat. All these cargoes require the consideration of standard IEC 60092-506:2003 (interpretation 1 in the annex to this document).

12 IACS is of the opinion that paragraph 4.3.2 of standard IEC 60092-506:2003 adequately addresses the identified risk and, therefore, should apply also for the MHB cargoes creating explosive gas atmosphere (interpretation 2 in the annex of this document). For clarity with respect to application, a list of the MHB is provided.

Action requested by the Sub-Committee

13 The Sub-Committee is invited to consider the foregoing, the proposed unified interpretations in the annex, and take action as appropriate.

ANNEX

DRAFT UNIFIED INTERPRETATIONS

CERTIFIED SAFE TYPE ELECTRICAL EQUIPMENT FOR SHIPS CARRYING MATERIALS HAZARDOUS ONLY IN BULK (MHB)

Appendix 1 of the IMSBC Code contains the following phrases for certain MHB cargoes:

"The detectors shall be of certified safe type for use in explosive atmosphere."
(for example, ALUMINIUM SMELTING / REMELTING BY-PRODUCTS, PROCESSED, FERROPHOSPHORUS (including briquettes), FERROSILICON with at least 25% but less than 30% silicon, or 90% or more silicon);

"In order to avoid heating up of the cargo, all electrical equipment or other equipment capable of developing heat, other than that of approved safe type, in the cargo spaces to be used for this cargo shall be electrically disconnected from the power source, by appropriate means other than a fuse, at a point external to the space."
(for example, AMMONIUM NITRATE BASED FERTILIZERS MHB);

"All electrical cables and components situated in cargo spaces and adjacent enclosed spaces are free from defects. Such cables and electrical components are safe to be used in a flammable and/or dusty atmosphere or positively isolated."
(for example, BROWN COAL BRIQUETTES, COAL);

"When mechanical ventilation is used, the fans shall be certified as explosion-proof and shall prevent any spark generation thereby avoiding the possibility of ignition of hydrogen-air mixture."
(for example, DIRECT REDUCED IRON (A) Briquettes, hot-moulded);

"The detector(s) shall be suitable for use in an oxygen-depleted atmosphere and of a type certified safe for use in an explosive atmosphere."
(for example, DIRECT REDUCED IRON (A) Briquettes, hot-moulded, DIRECT REDUCED IRON (B) Lumps, pellets, cold-moulded briquettes, DIRECT REDUCED IRON (C) (By-product fines));

"Ventilation fans shall be of certified safe type for use in a flammable atmosphere."
(for example, FERROPHOSPHORUS (including briquettes));

"Electrical circuits for equipment in cargo spaces which is unsuitable for use in an explosive atmosphere shall be isolated by removal of links in the system other than fuses."
(for example, FERROSILICON with at least 25% but less than 30% silicon, or 90% or more silicon, SEED CAKES AND OTHER RESIDUES OF PROCESSED OILY VEGETABLES);

"The cargo spaces shall be ventilated by at least two separate fans which shall be explosion-proof and arranged so that the escaping gas flow is separated from electrical cables and components."
(for example, FERROSILICON with at least 25% but less than 30% silicon, or 90% or more silicon);

"The detectors shall be suitable for use in an atmosphere without oxygen and of certified safe type for use in explosive atmosphere."
(for example, SILICOMANGANESE (low carbon));

"Sugarcane Biomass Pellets may ferment over time if moisture content is over 15% leading to generation of asphyxiating and flammable gases which may cause spontaneous combustion."
(for example, SUGARCANE BIOMASS PELLETS)

"Use of cargo hold lighting such as hot halogen lamps shall be avoided in the proximity of cargo spaces containing this cargo. Fuses to such lights shall be removed or secured while this cargo is present in the cargo space."
(for example, SUGARCANE BIOMASS PELLETS)

"Wood pellets may ferment over time if moisture content is over 15%, leading to generation of asphyxiating and flammable gases which may cause spontaneous combustion."
(for example, WOOD PELLETS CONTAINING ADDITIVES AND/OR BINDERS)

Interpretation 1

Phrases listed above are for the MHB cargoes capable of creating explosive gas and/or dust atmosphere, and/or for cargoes which are sensitive to heat. For these cases, the provisions of IEC 60092-506:2003: Special features – Ships carrying specific dangerous goods and materials hazardous only in bulk, should be applied for cargo spaces including ventilation ducts/openings and adjacent spaces not separated by gastight bulkheads and decks.

Interpretation 2

Paragraph 4.3.2 of standard IEC 60092-506:2003 should also be applied to the MHB cargoes capable of creating explosive gas atmosphere.*

Footnote:

* The IMSBC Code indicates for the following MHB cargoes that they are capable of creating explosive gas atmosphere (future amendments of the IMSBC Code should be always considered):

ALUMINIUM SMELTING / REMELTING BY-PRODUCTS, PROCESSED
BROWN COAL BRIQUETTES
COAL
DIRECT REDUCED IRON (A) Briquettes, hot-moulded
DIRECT REDUCED IRON (B) Lumps, pellets, cold-moulded briquettes
DIRECT REDUCED IRON (C) (By-product fines)
FERROPHOSPHORUS (including briquettes)
FERROSILICON with at least 25% but less than 30% silicon, or 90% or more silicon
SEED CAKES AND OTHER RESIDUES OF PROCESSED OILY VEGETABLES
SILICOMANGANESE (low carbon)
SUGARCANE BIOMASS PELLETS
WOOD PELLETS CONTAINING ADDITIVES AND/OR BINDERS