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## Bulletin 668 - 12/09 - Carriage of Direct Reduced Iron, BC Code Changes (Reminder) - Worldwide

**The tragic loss of the Marshall Islands registered vessel YTHAN on 28th February 2004 off Colombia was caused by explosions in four of her five cargo holds, resulting from the ignition of hydrogen that had accumulated in the holds overnight. This flammable gas had been produced from a reaction between her cargo of "HBI Fines" that was loaded at Palua, Venezuela and moisture (fresh water) inherent in it. This was not the first explosion that had occurred during ocean shipment of this material.**

The BC Code of the day recognised two types of DRI, namely hot moulded briquettes or hot briquetted iron (BC016), and pellets, lumps etc (BC015). These were subsequently re-designated as DRI (A) and DRI (B), respectively. The carriage requirements for the former are much less stringent than those applying to the latter. It was claimed by shippers that the YTHAN cargo could be carried in the same manner as DRI (A), although a reasonable interpretation of the BC Code restricted the proportion of fines (smaller than 4mm in size) to less than 5%. In reality, these DRI / HBI fines cargoes that were being carried did not fall within either of the schedules, and the expert advice was to treat it as the more dangerous and reactive type of DRI (B).

A paper concerning the matter was submitted to the IMO Maritime Safety Committee (MSC) by the Marshall Islands in 2004, and the topic has been discussed at every subsequent meeting of the Sub-committee on Dangerous Goods, Solid Cargoes and Containers (DSC). This has most recently been undertaken in parallel with their revision of the BC Code. As can be anticipated, there was substantial disagreement between the manufacturers association (HBIA), led by the main producers in Venezuela, and the shipping community, which severely hampered the agreement of schedules to include all the types of DRI and its derivatives that might be offered for carriage. However, as a result of the concerted efforts of the Marshall Islands, the International Group of P&I Associations, and Intercargo, new schedules were drafted and agreed at DSC 13 in September 2008. These were adopted in their entirety at the MSC Session in November 2008, and published as the new IMSBC Code in 2009. The Code is recommendatory until January 2011 when it will become mandatory. It is also envisaged that this will be a "live" document and subject to biennial revision.

The major step forward has been to include DRI Fines in a separate schedule, designated DRI (C). There remains the limit of 5% fines in DRI (A and B).

The main changes to the Code may be summarised as follows:

### All Types of DRI

- Fines are now defined as particles up to 6.35mm (¼") in size.
- The carrier's representative is to have reasonable access to stockpiles and loading installations for inspection.
- The cargo temperatures are to be monitored during loading and recorded in a log.
- Cargo temperatures and hydrogen concentrations in hold atmospheres are to be monitored on voyage.
- The hydrogen concentration is to be measured in holds prior to opening hatch covers.
- All records of measurements are to be retained on board for 2 years.

#### **DRI (A), Briquettes, hot-moulded**

- There is to be a maximum limit on the moisture content of 1%.
- The cargo is to comprise essentially whole briquettes.
- Surface ventilation only shall be conducted as necessary. When mechanical ventilation is used, the fans shall be certified as explosion-proof and shall prevent spark generation.
- Wire mesh guards shall be fitted over inlet and outlet ventilation openings.



#### **DRI (B), Lumps, pellets, cold-moulded briquettes**

- The average particle size is from 6.35mm to 25mm.
- Loading conveyors are to be dry.
- Prior to loading, an ultrasonic test or another equivalent method with a suitable instrument shall be conducted to ensure weather tightness of the hatch covers and closing arrangements.
- The moisture content must be less than 0.3% and must be monitored during loading.
- Any cargo that has already been loaded into a cargo space and which subsequently becomes wetted, or in which reactions have started, shall be discharged without delay.
- Carriage is only permitted under an inert gas blanket.
- The ship shall be provided with the means of reliably measuring the temperature at several points within the stow, and determining the concentrations of hydrogen and oxygen in the cargo space atmosphere on voyage whilst minimizing the loss of the inert atmosphere.
- The ship shall be provided with the means to ensure that the requirement to maintain the oxygen concentration below 5% can be achieved throughout the voyage. The ship's fixed CO<sub>2</sub> fire-fighting system shall not be used for this purpose.
- The ship shall not sail until the master and a competent person are satisfied that:
  - All loaded cargo spaces are correctly sealed and inerted,
  - The cargo temperatures have stabilised at all measuring points and are less than 65°C, and
  - The concentration of hydrogen in the free space has stabilised and is less than 0.2% by volume.
- The oxygen concentration shall be maintained at less than 5% throughout duration of voyage.



#### **DRI (C), By products, Fines**

- The average particle size is less than 6.35mm, and there are to be no particles greater than 12mm in size.
- "The reactivity of this cargo is extremely difficult to assess due to the nature of the material that can be included in the category. A worst-case scenario should therefore be assumed at all times."

- The carriage requirements are identical to those for DRI (B), including the 0.3% limit on moisture.

#### **CAVEAT**

The IMSBC Code provides for the requirements of carriage of any cargo covered by the Code to be varied by consent of three competent authorities:

*"1.5.1 Where this Code requires that a particular provision for the transport of solid bulk cargoes shall be complied with, a competent authority or competent authorities (port State of departure, port State of arrival or flag State) may authorise any other provision by exemption if satisfied that such provision is at least as effective and safe as that required by this Code. Acceptance of an exemption authorized under this section by a competent authority not party to it is subject to the discretion of that competent authority. Accordingly, prior to any shipment covered by the exemption, the recipient of the exemptions shall notify other competent authorities concerned.*

*"1.5.2 Competent authority or competent authorities which have taken the initiative with respect to the exemption:*

- 1. shall send a copy of such exemption to the Organization which shall bring it to the attention of the Contracting Parties to SOLAS, and*
- 2. shall take action to amend this Code to include the provision covered by the exemption, as appropriate.*

*"1.5.3 The period of validity of the exemption shall be not more than five years from the date of authorization.*

*"1.5.4 A copy of the exemption or an electronic copy thereof shall be maintained on board each ship transporting solid bulk cargoes in accordance with the exemption, as appropriate."*

The door is therefore open for parties to seek exemption from any or all of the requirements for the carriage of this cargo.

Source of information: Carefully to Carry Committee  
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