

Liquefaction of cargoes of iron ore

Background

Members may be aware of the problems that have arisen in recent times with respect to the liquefaction of cargoes of iron ore fines originating in India and loaded at Indian ports¹. However, similar problems have been experienced in the past with similar cargoes elsewhere in the world and, as such, these cargoes must always be treated as liable to liquefy regardless of their origin.

Liquefaction of mineral ores, resulting in cargo shift and loss of stability, has been a cause of some major marine casualties for many decades. However, a spate of incidents leading to several losses in recent times involving iron ore fines loaded in Indian ports has led to considerable focus on the lack of compliance with the requirements for safe carriage of this cargo². There have also been incidents involving cargoes of nickel ore from Indonesia, the Philippines and New Caledonia.

The Southwest Monsoon generally prevails from June to September and mainly affects India's west coast. The Northeast Monsoon generally prevails from December to March and mainly affects India's east coast. The advent of the Southwest Monsoon gives us good reason to revisit this subject through this circular.

Main causes of casualties

The main cause of the casualties and near misses appears to be the poor compliance of some shippers with the testing and certification requirements that are required under SOLAS and the IMSBC Code 2009 and designed to ensure that cargoes are loaded only if the moisture content is sufficiently low to avoid liquefaction occurring during the voyage. Indian iron ore fines tend to be left in the open prior to shipment, and as a consequence, are entirely subject to weather conditions during this period. The problems related to wet cargo and its moisture content particularly worsen during the wet monsoon seasons.

In cargoes loaded with a moisture content in excess of the Flow Moisture Point (FMP), liquefaction may occur unpredictably at any time during the voyage. Some cargoes have liquefied and caused catastrophic cargo shift almost immediately on departure from the load port, some only after several weeks of apparently uneventful sailing. While the risk of liquefaction is greater during heavy weather, in high seas, and while under full power, there are no safe sailing conditions for a cargo with unsafe moisture content. Liquefaction can occur unpredictably even in relatively calm conditions on a vessel at anchorage or proceeding at low speed.

Given this unpredictability, it is of utmost importance that the length of voyage and prevalent and forecasted weather conditions do not serve to encourage the carriage on ships of cargoes prone to liquefaction with a Transportable Moisture Limit in excess of that which is accepted as safe for carriage. It is for these reasons that SOLAS and the IMSBC Code incorporate provisions intended to ensure that only cargoes with sufficiently low inherent moisture content to avoid liquefaction are loaded. Strict adherence to these provisions is the only safe way of carrying these types of cargoes.

¹ See Gard Loss Prevention Circular No. 10-07: Loading of iron ore fines in India.

² Liquefaction of cargoes of Iron ore has also been addressed in Gard News 197 (Feb/April 2010) "Liquefaction of unprocessed mineral ores – Iron ore fines and nickel ore", by Dr. Martin Jonas, Brookes Bell, Liverpool. The article describes the SOLAS/IMSBC Code Regulations, Certification of TML / moisture content and principles of liquefaction.

For more information please contact Loss Prevention Manager Terje R. Paulsen, email terje.paulsen@gard.no or Loss Prevention Executive Marius Schønberg, email marius.schonberg@gard.no

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Preventive measures

Based on previous experiences with respect to cargoes of iron ore fines loaded from India, Members are advised to exercise extreme caution when loading such cargo on their vessels. It is important that cargoes of iron ore fines unsuitable for shipment are identified and rejected before coming onboard the vessel and proper measures are taken to ensure that the cargo loaded on board complies with SOLAS and meets the requirements of the IMSBC Code. Additional sampling will be required if the cargo is subject to sources of moisture during loading.

Although the IMSBC Code places the burden of certification on the shipper, in many cases the information contained in the certificates may be incorrect. This may be due to failure to correctly analyse the samples, or use of facilities not geared to properly test the samples, or the test samples not being properly representative of the cargo to be loaded. It is thus extremely important that the ship owner and master ascertain that the cargo is suitable for sea transport.

Although exposure to moisture is heightened during the monsoon seasons, ship owners should ensure that the same level of caution is exercised with respect to the loading of iron ore fines irrespective of the time of the year. The Association strongly recommends Members to contact the local correspondent or the Association in good time to assist them in engaging the services of a competent and experienced surveyor to act on the Member's behalf to assist the master both before and during loading operations in order to ensure that the cargo is loaded in compliance with SOLAS and that the IMSBC Code is adhered to.

Freight disputes³

Although not directly connected with the safe transport of iron ore fines from India, this seems like an opportune time to highlight this issue.

We understand that some Chinese ports do not allow the discharge of low grade iron ore without an import permit. This can cause considerable delay of vessels and disputes concerning, e.g. freight, demurrage or deadfreight may arise in relation to iron ore from India.

We understand that "China Chamber of Commerce of Metals Minerals and Chemicals Importers and Exporters" and "China Iron & Steel Association" notified their members in April of this year to stop importing iron ore with an Iron (Fe) content below 60%. This has made it difficult to obtain import permits from the government through these two Associations.

It is therefore recommended that before transporting Indian iron ore or iron ore with less than 60% Fe content from other countries into China, shipowners should check with the Charters/ Shippers/Cargo Receivers if the Chinese buyers have obtained the import permit so as to avoid unnecessary disputes over freight, demurrage and detention of vessels. Similar caution should also be exercised with respect to spot cargoes of low grade iron ore into China.

³ We are grateful to "Hai Tong and Partners" of Beijing, China for providing the information with respect to the Freight disputes.

For more information please contact Loss Prevention Manager Terje R. Paulsen, email terje.paulsen@gard.no or Loss Prevention Executive Marius Schønberg, email marius.schonberg@gard.no

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