Solid bulk liquefaction: who is it to be blamed?

Solid bulk cargoes, such as: nickel ore and iron ore, have a tendency to liquefy. Such goods can transform from hard-to-liquid state very rapidly leaving no time for the master or crew to do anything but face their imminent fate. The liquefaction of solid bulk cargoes has lately claimed the loss of many seafarers’ lives and dozens of ships due to high demands for transporting such materials by sea to be used in construction projects. The moisture content present in these cargoes can be dramatically increased to unsafe limits even by the mere reason of the vessel’s rolling on sea waves. In response to the alarming number of liquefaction casualties, 13 incidents within 7 years with death toll of more than 100, the IMO has introduced the International Maritime Solid Bulk Cargo (IMSBC) Code and empowered it with a mandatory application upon all SOLAS states.

The aim of the Code is to provide information about the dangers associated with the shipment of solid bulk cargoes and procedures to be adopted by the relevant parties in order to facilitate the safe carriage of such goods. It outlines the obligations required from shippers to provide all the necessary documents to the master prior to shipment, and it sets out loading and carriage precautions to be followed by the master when handling and stowing the cargo in question. In addition, the Code includes several test procedures to determine the moisture content of the cargoes to be followed by laboratories and surveyors, and it also provides a wide list of individual schedules for various solid bulk cargoes that detail specific precautions to be followed in the carriage of such goods. Therefore, strict adherence to the provisions of the IMSBC Code is required in order to harmonise globally best practices for the safe carriage of such goods. However, the Code has not brought an end to the occurrence of liquefaction incidents, and five more serious liquefaction casualties have been reported since it was made mandatory in 2011, resulting in 2 different views; one blames the parties for improper application of the Code and another casts doubts about certain flaws found in it. In order to determine who is guilty for causing these incidents, either the ineffective Code or the reckless parties, we shall assess what went wrong in the IMSBC Code and what is required from those involved in the carriage of solid bulk cargoes.

**The IMSBC Code obligations**

The Code obligations are aimed at identifying the properties of the cargo to be within safe limits, and following best practices during cargo operations to minimise the risk of liquefaction. Therefore, it sets out certain obligations required from shippers, masters and terminal representatives to ensure compliance with the Code and achieve its goals. The obvious obligation required from shippers is to provide all information on the cargo, including signed certificates of the moisture content level, sufficiently in advance of loading operations, which must then be approved by the competent authority. In addition, the master is required to follow the SOLAS obligations that are reintroduced in the IMSBC Code, which require full co-operation with terminal representatives during loading operations. Masters, or any party responsible for cargo operations, are also obliged to follow the procedures laid down in the IMSBC Code in connection with loading, stowing and trimming the cargo, and carefully follow the measures provided in the individual schedules of solid bulk cargoes listed in the Code. Importantly, the master has the right to suspend cargo operations if any of the safe limits within the Code are exceeded.

The question then arises is that why the parties are allegedly falling short of meeting their obligations under the IMSBC Code? There are many practical issues involved in the carriage of solid bulk cargoes that hinder the compliance with the Code, for instance: unreliable laboratories and inadequate facilities in the countries of shipment where the tests to determine the moisture content are carried out. Also, the high demand behind these goods meant loading operations may be carried out during monsoon seasons, exposing piles of cargoes at the terminal to heavy rain that in turn increases the moisture content and enhances the chances of liquefaction and, on part of the parties, the unwillingness of shippers to allow independent surveyors, grant access to stockpiles, accurately describe the cargo in the shipping documents or provide reliable test results of the cargo’s moisture content. Consequently, all the aforesaid are valid reasons for not complying with the Code, and could point to the verdict of guilty on part of the parties. However, one could argue that if there were no lax application of the Code by the relevant authorities, parties would not have breached the Code in the first place, would they?

There seems to be an oversight about port authorities’ role in stopping liquefaction-related incidents. Shippers, charterers and even carriers would not have poorly applied the IMSBC Code if the relevant authorities were not in fact turning a blind eye to its implementation. Although it is the shipper’s responsibility to carry out procedures for sampling, testing and controlling the moisture content of the cargo to ensure it is within safe limits, such procedures must be approved, and their implementation checked, by the port authority which should then issue a document to the master confirming the safety of the cargo. Although, the heart of the liquefaction problem lies on forged certificates and inaccurate declarations, such documents must have been, in principle, approved and investigated by the terminal authorities, but such authorities are in fact adding insult to the injury because they often exercise high pressure themselves upon the parties to load as quickly as possible leaving the cargo untrimmed before sailing, for example: shipments from Sierra Leone were reported to have poor infrastructure at load ports with lack of facilities to discharge cargo once loaded if found in wet condition, and it has also been reported that the tests to determine the moisture content level in solid bulk cargoes shipped from Indonesia and the Philippines are usually conducted by the mines’ owners themselves who may not necessarily have appropriate facilities and reportedly use their own testing methodology rather than following the IMSBC Code procedures, save alone their commercial interests to sell the cargo regardless of its safety.

Such practices significantly result in the shippers, and authorities, falling short of complying with their legal obligations under the IMSBC Code, and pressure must be exercised upon states to ensure rigid enforcement of safety regulations, though of course the IMO lacks such powers. However, It is hoped that the IMO Member State Audit Scheme, which was made mandatory in January 2016, could achieve its goal enhancing the performance of those nations with poor enforcement records, as it entitles the IMO to assess the effectiveness of its Member States with the implementation of the mandatory maritime instruments. The IMO will set up internationally recognised standards for all Member States to follow in order to ensure proper implementation of mandatory instruments, and if a state falls short of such standards, the IMO may then carry out an audit on that state to enhance its ability to meet the established standards and fulfil its obligations. Though, with only auditing and reporting tasks rather than effective enforcement plan, the answer does not seem very promising to provide an immediate answer to our prayers.

**The mischief in the IMSBC Code**

The IMSBC Code is quite ‘brand new’ and not a magic tool to stop liquefaction incidents right off our casualty reports. Its effectiveness have rightly been questioned lately for certain flaws found in the Code, but being a living document, subject to amendments biennially, would certainly advance its standards to answer the emerging solid bulk carriage issues.

The Code, for instance, categorises solid bulk cargoes into three groups; A cargoes which may liquefy, B cargoes which possess a chemical hazard, and C cargoes which are not liable to liquefy nor possess chemical hazards. Surprisingly, however, some identified as- Group C cargoes had liquefied causing severe casualties. In late 2010, three ships capsized due to liquefaction of nickel ore which was listed as Group C cargoes, but later was amended to be listed as Group A cargoes after extensive research following these incidents. Similarity, and recently in 2015, ships carrying Group C, un-liable to liquefy, bauxite have experienced liquefaction and, as history repeats itself, extensive research is now being carried out to better understand the proprieties of bauxite to check whether amendments are needed. Possibly, other Group C cargoes may have a similar fate, so masters should not be rest assured when Group C cargoes are presented for shipment to be risk free and should consult other safety measures, not provided in the Code, in order to avoid loss.

Furthermore, the IMSBC Code outlines several test procedures to determine the moisture content of solid bulk cargoes to be followed by laboratories and surveyors. The tests are fully detailed in Appendix 2, which are: the Flow Table test, Penetration test and Proctor/Fagerberg test. The appropriate method of testing is determined by local practices or by the appropriate authorities. However, a recent study has highlighted some controversy about these tests, whereby the accuracy and precision of the results are doubted. The research established that applying the Flow Table Test and the Proctor/Fagerberg test on the same sample of solid bulk material indicated significant variances with each test finding different results.[[1]](#endnote-1) Another research criticises that the Flow Table test is unreliable because it heavily relies, subjectively, on the person conducting the test, and that the Penetration Test and Proctor/Fagerberg test are more complex and require special expertise which are not believed to be currently in use in the main countries of shipment.[[2]](#endnote-2) This adds to the uncertainty surrounding solid bulk trade where a party relies on the results of these tests but may later be found to be inaccurate. Although masters are entitled to carry out the ‘can test’ during loading operations to determine the possibility of liquefaction, which is an on-site examination to check whether any liquid appears on a sample of the cargo by sharply banging it against a hard surface that in turn would indicate higher moisture content, the ‘can test’ is not intended to be conclusive in determining the safety of the cargo but can only be an indicative measure to keep an eye on the moisture content during loading operations.

Finally, it is also unclear what the legal outcome might be for failing to comply with the IMSBC Code provisions. The Code does not provide penalties or offences against any breach, and recourse will be drawn to national laws that are implementing the Code in order to find an answer. We only know that the Code is mandatorily applicable but cannot be sure whether the parties are strictly liable to comply with the rules, or may be pardoned by the exercise of 'due diligence' when things go wrong. Failing to have a coherent system of liability in place would result in conflicting interpretation of the Code amongst various jurisdictions.

In conclusion, there remain major areas of development required from the IMO to further improve the IMSBC Code. Test methods need to be developed in order to accurately deliver precise and reliable results for the moisture content present in the cargo. This will enhance the parties’ confidence in the results to be truly representative of the cargo and immensely contribute to the safe shipment of solid bulk goods.

**The verdict**

So, who is it to be blamed for all the liquefaction incidents? The aforesaid outlines that all those involved in the solid bulk trade have jointly, and significantly, contributed to the occurrence of the casualties. Shippers want their cargoes loaded and transported as quickly as possible, owners are placed under extreme pressure to accept the cargo and may be willing to slightly relax the rules to make any profits during this harsh market conditions, port authorities are not effectively ensuring compliance with mandatory instruments, and the regulatory IMSBC Code in place suffers lack of confidence due to many serious faults. In order to ensure the safety of all those put at risk from solid bulk trade, we need not point the finger of liability at one party but rather collectively work toward establishing a safer environment for shipping such goods.

The IMSBC Code has undoubtedly raised awareness about the issue of solid bulk liquefaction, but its provisions and test procedures need to be developed in order to determine the precise breaking point for such goods to change from hard to fluid state. All those involved in the shipping of solid bulk cargoes must be made fully aware of the risks at hand and commercial pressure exercised by any party must be extinguished in order to save lives of all those at risk from such trade. In addition, any contractual terms agreed between the parties must not contravene the master’s rights to suspend/refuse loading operations of any cargo that is deemed to be unsafe. In the meantime, parties are strongly advised to insert contractual terms that address all the practical issues with the carriage of solid bulk cargo, for instance: who bears the costs for sampling and testing the cargo, and the right to appoint an independent surveyor. However, with the severity of the shipping market at the present, it may not be very easy for owners to include such clauses in the contract, though, at the bright side, courts may take this in their favour. The parties need to be vigilant when they anticipate the carriage of solid bulk cargoes and literarily follow the IMSBC Code seeking the support of their P&I Clubs and consulting the relevant port authorities to fully engage them in supervising the compliance with the IMSBC Code.

*Moustafa Fkhir*

*(LLM, PhD candidate Soton)*

1. Rose, T. (2013). *The Liquefaction of Solid Bulk Cargoes During Seaborne Transportation.* Thesis submitted to the University of Oxford. [↑](#endnote-ref-1)
2. The Standard Club. *‘Liquefaction of Mineral Ores and Minerals Concentrates’* (available on: <http://www.standard-club.com/media/23989/StandardCargoLiquefactionFeb2011.pdf>) [Accessed March 2016] (Loss Prevention issue - April 2015). [↑](#endnote-ref-2)