

The IMSBC Code 2013

Immediate
challenges and
beyond

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Iron ore and iron ore fines have been a subject of much deliberation over the last decade or so. Seafarers may well find themselves asking ‘What are fines? Is there a difference between concentrates and fines? What percentage of ‘fine’ material can iron ore lumps contain before they must be treated as fines?’ The answers to these questions are available. But the challenges are getting bigger, and the stakes are getting higher. We need to develop our own perspective on the interpretation of the changes in the International Maritime Solid Bulk Cargo Code (IMSBC Code) while keeping its spirit intact.

Why all the fuss?

Iron ore and iron ore fines are two separate cargoes. Iron ore largely comprises lumpy material resembling small rocks or stones of 10-25 mm in diameter. It is defined as a category ‘C’ cargo under the IMSBC Code, meaning it is not liable to liquefy. Iron ore fines are largely made up of powdery material below 10 mm in size, and may be produced by sieving the natural ore. The IMSBC Code defines iron ore fines as a category ‘A’ cargo, meaning that it may liquefy if shipped at a moisture content in excess of its Transportable Moisture Limit (TML).

The transportation of iron ore fines has increased massively since the process of sintering – that is, coagulating iron ore fines with coke to enable their use in the blast furnace – came of age in the late 20th century. Before sintering became common, just 10-20% of all iron ore produced was used. The rest – fines and micro-fines – was dumped as waste. With the introduction of sintering, there was suddenly a market for the so called ‘dumps’. In addition to this, demand for iron ore has increased exponentially in recent years. India alone exported over 100 million tonnes annually to China in the years 2009-2011.

Suddenly, there was so much margin and so much money involved in the iron ore trade that ‘export at all costs’ became the name of the game. In the complete disregard for anything but business that followed in some quarters, many seafarers lost their lives. The *Bulk Jupiter* in Jan 2015, *Harita Bauxite* in 2013, *Jian Fu Star*, *Nasco Diamond* and *Hong Wei* in 2010 and the *Asian Forest* in 2009 are only a few of the vessels affected by liquefaction.

While the price of iron ore has been heading

south for some time now, shippers and traders are (conveniently) still not ready to believe in the consequences of liquefaction, their common motto being ‘We have transported ore for the last 50 years without a mishap’. Ignorance coupled with commercial pressure leads to unprofessionalism and malpractice. Essential and mandatory information is being treated as a cumbersome paper exercise.

Owners, guided by P&I Clubs and associated surveyors, are in direct confrontation with the shippers. Shippers do not cooperate with owner’s representatives. This has to change if we are to address the appalling safety record in the industry.

The IMSBC Code

The understanding that liquefaction will kill is not new. There has been plenty of work in this regard since 2004. The Code of Safe Practice for Solid Bulk Cargoes (BC Code) has been replaced by the IMSBC Code, adopted in 2008 and mandatory from 2011.

The IMSBC Code is considered the Bible of dry bulk cargo carriage. Adherence to the code is mandatory under the SOLAS Convention, and the P&I Clubs have been working hard to keep members abreast of the latest developments. However, while the code is widely available and fairly well comprehended within the surveyor/seafarer community, there is still a fair amount of debate upon its actual interpretation and implementation. Issues which have emerged over the past ten years include:

- **No separate schedule for iron ore fines**

While DSC.1/Circ.71 addresses this issue, it becomes mandatory only from 1 Jan 2017. This means iron ore fines are still being shipped as ‘iron concentrates’. However, the definition of the word ‘concentrate’ is very generalised and encompasses a wide range of mineral ores. The shipping industry is of the opinion that iron ore fines should not be generalised with other minerals (eg nickel ore or similar ore concentrates).

- **Ambiguous definitions**

The Code is very ambiguous in its definitions of quantity. For example, when it says ‘Any substantial portions of material which appear to be contaminated or significantly different in characteristics or moisture content from the bulk of the consignment shall be sampled and analysed separately’ – how much is a ‘substantial quantity’? There is no context to place this correctly. What does ‘certain proportion’ mean? When it says ‘If there has been significant rain or snow between the time of testing and loading, check tests shall be conducted,’ how much rain is ‘significant rain’?

● **Poor understanding of English**

While the overall command of the English language in the seafaring world is improving, interpreting specific requirements remains a challenge for many nationalities.

The current Code – IMSBC Code 2013

Since the IMSBC code became mandatory in 2011, specific amendments have been made to address some of issues:

Competent authority

The definition of a ‘competent authority’ now includes a requirement for the competent authority to operate independently of the shipper.

Section 4 – Assessment of acceptability

Sub-section 4.3 states that certificates of test are to be issued by an entity recognised by the competent authority at the port of loading.

A new paragraph 4.3.3 has been added requiring the shipper to have in place procedures for sampling, testing and controlling the moisture content of the cargo to ensure it is below the TML. These procedures are to be approved by the competent authority at the port of loading. A copy of the approved document issued by the competent authority is to be provided to the Master or his representative.

Barging

MSC.1/Circ1454 adds a new paragraph 4.3.4 addressing the problem of uncovered barges with low freeboard transporting Group ‘A’ cargoes to other vessels. Shippers are to include measures to protect cargo on barges from precipitation and water ingress. This amendment will have a major impact on loading in Goa, where nearly all cargo is transported by open barges and loaded by either ships’ own cranes or by trans-shippers.

Sampling procedures

Under sub-section 4.4 – Sampling procedures, a new paragraph 4.4.3 requires shippers to facilitate access to stockpiles by the ship’s nominated representative for the purposes of inspection and sampling for subsequent testing. This amendment is of particular significance as between 2009 and 2013, a practice of blacklisting of particular surveyors by shippers had become common place in India. A provision was included in the charterparty barring owners from appointing specific surveyors. Even if owners managed to appoint their own surveyors, these surveyors were seldom allowed to access the stockpiles of the shippers.

Test procedures

Sub-section 8.4, covering test procedures for cargoes which may liquefy, has been divided into two sub-sections. Subsection 8.4.1 retains the complementary test procedures for determining the possibility of liquefaction (Master’s use of an auxiliary method for determining the possibility of flow, aka the can-test). Sub-section 8.4.2 advising that even if a sample remains dry following the can-test, the moisture

Can-test results



Moisture content 10.87%



Moisture content 12.58%



Moisture content 14.16%



Moisture content 15.62%

content of the material may still exceed the TML. This amendment is particularly intriguing and needs to be discussed in greater detail.

It may seem obvious to question why the can-test should be included in the IMSBC, if it does not indicate whether or not the moisture content exceeds the TML. However, it is important to emphasise that the can-test must not be confused with section 4 of the IMSBC Code, which defines criteria for accepting cargo for shipment. The can-test must not be used as a criterion for accepting cargo for shipment. However, it can be an extremely important tool, if not the only one, in the Master’s hands.

The can-test can give a lot more information than may previously have been thought. eDOT Marine Lab has analysed over 100 different samples using all methods in the IMSBC Code including the type D test, and compared the results with those of the can-test. The can-test unquestionably gives recognisable evidence of how the physical attributes of the cargo change when close to its TML/FMP.

Let us look at the TML set by the IMSBC, and compare the results of the can-test (column, left).

Method used (As specified by the IMSBC code)	TML
Flow table test	13.1 %
Penetration test	13.3 %
Proctor & Fagerberg test, type C	13.0 %
Proctor & Fagerberg test, type D	14.9 %

Note the degree to which the cargo is compacted, and how that compaction changes as the moisture content increases. We can safely deduce that compaction of the cargo begins when the moisture level is somewhere between 12.58 % and 14.16 % (the cargo at 14.16% is compacted quite nicely). If the Master or his representative was carrying out a can-test of the cargo being loaded; assuming that he has accepted the cargo for loading as per the provisions of Sec 4 of the IMSBC Code 2013, loading could still be halted as soon as the can-test shows that significant compaction begins (significant meaning when the cargo ceases to crumble, as shown in the first couple of pictures, and starts forming a hard jelly-like mass). The moisture level at that point would be around the 13-13.5% mark; very close to the TML obtained by the three older methods and well below the TML obtained using the new type D method. This will negate the possibility of loading any unsafe cargo into the ship’s holds.

The role of the can-test becomes even more important in the Indian context where cargo is often loaded at the anchorages from barges.

Challenges – The Indian context

There are a number of concerns about compliance with both the existing and future regimes in the Indian context in particular. Brazil and Australia are claiming to comply fully, not only with the IMSBC Code 2013, but also with the amendments scheduled for mandatory entry in 2017:

Compliance with the present regime – IMSBC Code 2013

Requirement in the Code	State of compliance (in India)
Competent authority to operate independently of the shipper	In place
Certificates of test to be issued by an entity recognised by the competent authority at the port of loading.	In place – DGS India has implemented an excellent laboratory inspection and certification programme all over India
Shipper to have in place procedures for sampling, testing and controlling the moisture content of the cargo to ensure it is below the TML. These procedures are to be approved by the competent authority at the port of loading. A copy of the approved document issued by the competent authority is to be provided to the Master or his representative. (MSC1/Circ 1454).	A major challenge. None of the shippers have this in place. Owners have asked their agents/shippers to provide a certificate in the form of the Circ 1454 appendix, which essentially is the pro forma for the certificate issued to the shipper by the competent authority certifying that their procedures have been approved. This must be given to the Master prior to loading. Vessels are already facing delays on account of this.
Shippers are to include measures to protect cargo on barges from precipitation and water ingress.	Another challenge. P&I Clubs may not accept tarpaulin for covering the ore.
Shippers to facilitate access to stockpiles by the ship's nominated representative for the purposes of inspection and sampling.	A few shippers have indeed started opening up their stockpiles for inspection and sampling. Due to limited export at present, the real picture will have to wait until export resumes.
Introduction of Sec 8.4.2- Even if a sample remains dry following a can-test, the moisture content of the material may still exceed the TML.	Cargo consignment once sampled, tested and certified may be transported via barges to the vessels at the anchorage where loading takes place using either vessel's own cranes or by deploying a trans-shipper. Master must perform the can-test to check whether cargo resembles the description in the test certificate; he must have sufficient data in way of guidance to reasonably gauge the existing condition of the cargo. The majority of P&I Clubs and experts world-wide believe that the contents of every barge arriving alongside a vessel must be sampled and tested again. Presently the can-test procedure is poorly understood.

Compliance with Circ.71 amendments: The IMSBC Code 2017

These amendments will have major ramifications on the existing culture. Brazil and Australia are already complying with these amendments.

<p>New schedule for iron ore fines</p> <p>The provisions of this schedule shall apply to iron ore cargoes containing both:</p> <ol style="list-style-type: none"> 1. 10% or more of fine particles less than 1 mm ($D_{10} \leq 1$ mm); and 2. 50% or more of particles less than 10 mm ($D_{50} \leq 10$ mm). <p>Notwithstanding the above provision, iron ore fines where the total goethite content is 35% or more by mass may be carried in accordance with the individual schedule for iron ore (ie as a category 'C' cargo), provided the Master receives from the shipper a declaration of the goethite content of the cargo which has been determined according to internationally or nationally accepted standard procedures.</p>	<p>Goethite content is determined by XRD technology – X-Ray Diffraction. However, there is presently no standard for determination of the goethite content.</p> <p>It is feared that unscrupulous shippers may try and ship group 'A' cargoes as group 'C' by incorrectly declaring goethite content.</p>
<p>Modified Proctor/Fagerberg test procedure for iron ore fines (Type 'D' test)</p> <p>The existing Proctor/Fagerberg test method has been modified to reduce the weight of the hammer to 150 gms.</p> <p>The TML of iron ore fines is taken as equal to the critical moisture content at 80% saturation.</p> <p>The test procedure is applicable when the degree of saturation corresponding to Optimum Moisture Content (OMC) is 90% or higher.</p>	<p>The eDOT Marine Lab in Goa has conducted exhaustive research on the test and compared the results of nearly 100 samples, wherein each sample was tested by all methods in the code.</p> <p>The new method gives a TML of + 1.75 %. This is an average and individual results may vary between +1.2% & +2%.</p>

The way forward

While the international iron ore price has been heading south for some time now, and shipping volumes have also been falling, this is no reason to take our eye off the ball. This article is not about the commercial viability of ore export but about safety of the lives of fellow

seafarers. It is important that we understand the code, gear up for it and use it for overall advantage. 🌊

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