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Pre-loading Inspection Requirements for Nickel Ore and Iron Ore

I. Introduction

Recently, the Panamanian- flag bulk carrier *Ocean Winner* capsized and sank in the Bay of Bengal due to liquefaction of loaded iron ore concentrate, leaving 22 crew members missing. This accident once again highlights the significance of pre-loading inspection for Group A cargoes.

II. Basic Principles of Cargo Classification under the IMSBC Code

The *International Maritime Solid Bulk Cargoes Code (IMSBC Code)* has been a mandatory regulation since 1 January 2011. It classifies solid bulk cargoes into three groups according to risk:

Group	Core Risks	Representative Cargoes
Group A	Potential liquefaction (when moisture content exceeds the Transportable Moisture Limit (TML))	Nickel ore, iron ore concentrate, some bauxite
Group B	Chemical hazards (self-heating, flammability, toxicity, etc.)	Direct Reduced Iron (DRI), coal, etc.
Group C	Neither Group A nor B; relatively safe	Grain, lump ore

Key Reminder: The list of Group A cargoes set out in the IMSBC Code is not exhaustive. Any fine-particle dense bulk cargo containing sufficient moisture may in practice liquefy. Carriers shall always strictly comply with the provisions of the IMSBC Code when loading bulk cargoes.

Practical differentiation between Group A and Group C cargoes: Group A cargoes contain sufficiently fine particles and turn into a slurry when adequately wetted. Group C cargoes are gravel-like and will not turn into slurry even with large quantities of added water — any added water drains away through gaps between particles. Masters may perform a simple qualitative on-site test by taking a cargo sample and adding water: if the sample turns into slurry, the cargo is likely to be Group A.

III. Group A Classification Status of Nickel Ore

All nickel ore falls within Group A under the IMSBC Code. Since 1 January 2015, the IMSBC Code has included a dedicated cargo schedule for “nickel ore” in Appendix 1, explicitly assigning it to hazard Group A. Nickel ore is heterogeneous in form, consisting of very fine clay-like particles and larger rock-like lumps. Combined with its high moisture content, it presents a particularly prominent liquefaction risk.

IV. Classification Differentiation for Iron Ore

The classification of iron ore depends on its physical form:

Cargo Form	IMSBC Group	Risk Profile
Lump Ore	Group C	Low risk; not prone to liquefaction
Iron Ore Fines	Group A	Fine particles and high moisture content; subject to liquefaction risk

Iron ore fines are by-products generated in the production of lump iron ore. They have higher moisture content than lump ore and are frequently stockpiled in open yards, making them vulnerable to weather conditions.

V. Physics of Liquefaction and Inspection Standards

5.1 Physical Mechanism of Liquefaction

Liquefaction describes the process whereby cargo that appears relatively dry and granular on loading transforms into a fluid state under compaction and vibration during sea transit owing to its contained moisture.

5.2 Inspection Standards

Term	Definition	Certificate Validity Requirements
Flow Moisture Point (FMP)	The percentage moisture content at which cargo begins to change from a solid state to a flowing liquid state	—
Transportable Moisture Limit	90 % of the Flow Moisture Point; the maximum safe-to-transport	Tested by an accredited laboratory using methods specified in the

(TML)	moisture content of the cargo	Code; completed within six months prior to the loading date
Actual Moisture Content (MC)	The percentage actual moisture content of the specific cargo to be loaded	Sampling shall be carried out no more than seven days before the commencement of loading. Re-testing is required if significant rainfall or snowfall occurs in the interim.

Loading Criterion: Cargo whose actual moisture content exceeds the TML must never be loaded.

VI. Mandatory Notification Obligations and P&I Insurance Cover

6.1 Nickel Ore

Major loading locations for nickel ore are concentrated in Indonesia, the Philippines, New Caledonia and India. Principal Indonesian loading ports include Weda Bay, Labota and Obi Island in North Maluku Province. Most of these ports are situated on remote islands with generally rudimentary infrastructure, and ore is frequently transferred via barges to large vessels at anchorages. Philippine nickel ore exports centre on the Surigao mining area; substantial exports also originate from Palawan and Tawi- Tawi. Loading operations are heavily influenced by the rainy season, with low production from November to March each year. Nickel ore from New Caledonia is mainly exported through Nouméa, its capital, which has relatively well-equipped berth facilities.

Given the special characteristics of nickel ore shipments, IG P&I Clubs have incorporated nickel-ore clauses into policies or repeatedly emphasised requirements in circulars since 2012. Mandatory notification requirements apply to nickel ore loaded from Indonesia and the Philippines. Clubs may, at their discretion, require cargo surveys before loading commences; such surveys may continue throughout loading operations. Where advance written notification is not provided as required, or any subsequent Club requirements or recommendations are not followed, cover shall not apply to liabilities, losses, costs or expenses arising directly or indirectly from cargo-related events. The relevant clause is reproduced below:

Nickel Ore Clause It is a condition of this insurance that a Member who intends to load any nickel ore Cargoes from ports in Indonesia or the Philippines must provide advance notice to the Managers as early as possible before loading. Such notice shall be in writing to the Managers and shall include the following information where possible:

- ship name;

- port/anchorage of loading and estimated time of arrival;
- date of intended loading;
- Charterer's/shipper's details;
- agent's details;
- a copy of the shipper's Cargo declaration and supporting certificates.

The Managers may, at their discretion, require that a survey of the Cargo be conducted on behalf of the Member to determine the condition of such Cargo before loading is allowed to commence, which survey may be continued into loading operations.

Unless the Club in its sole discretion otherwise determines, there shall be no recovery from the Club in respect of liabilities, losses, costs or expenses to the extent that such liabilities, losses, costs or expenses result from events relating directly or indirectly to the condition of the Cargo where the above-specified written notice has not been provided in advance of the loading of the Cargo, or where any subsequent requirement or recommendation of the Managers in relation to the Cargo has not been complied with.

According to the *Circular on Safe Carriage of Nickel Ore Cargoes in the South- Western Pacific Ocean* issued by the International Group of P&I Clubs (IG) on 22 June 2026, the Group has for the seventh time highlighted the significant hazards posed to shipping by nickel ore exports from the Solomon Islands and the Philippines, whose cargo liquefaction risk is well-recognised as a major safety concern. The relevant IG circular is available at: <https://www.igpandi.org/article/safe-carriage-of-nickel-ore-cargoes-in-the-south-western-pacific-ocean/>

It should be noted that these safety requirements are not limited to the above-mentioned locations. Circular No. [2012]09 issued by the China P&I Club in 2012 designated Indonesia, the Philippines and New Caledonia as high-risk areas for nickel-ore carriage and introduced mandatory notification requirements. The circular is available at: <https://www.chinapandi.com/index.php/cn/rules-circulars-cn/circulars-cn/4482-article-4482>

6.2 Iron Ore

Major iron-ore loading locations are overwhelmingly Australia and Brazil. Other important loading ports are found in India, South Africa, Canada, Chile, Peru, Guinea and elsewhere. Nevertheless, the International Group of P&I Clubs focuses on load ports with severe safety hazards stemming from inadequate supervision or poor operational management:

- Pepel Port in Sierra Leone was specifically warned in a joint 2021 IG circular due to iron ore fines stored long-term in open yards with severely elevated moisture content during rainy seasons (often 13 – 16 %; levels above 14 % fall within the high-risk range). Reference: <https://www.igpandi.org/article/iron-ore-fines-liquefaction-risk/>
- India has been identified as a high-liquefaction-risk location since 2009. Following the resumption of exports from Goa in 2024, Skuld P&I renewed warnings to exercise extreme caution over ore stockpiled for many years. Reference: <https://www.skuld.com/topics/cargo/solid-bulk/cargo-liquefaction/india-safe-shipment-of-iron-ore-fines/>
- Yuzhny Port, Ukraine, was flagged in 2013 over problems with falsified moisture-content certificates and restricted surveyor access. Reference: <https://www.londonpandi.com/insights-resources/ukraine-carriage-of-iron-concentrate-and-iron-ore-fines-cargoes-5476/#main-footer>
- In addition, Direct Reduced Iron (DRI), a processed iron-ore product, remains a special-risk category subject to recurring IG circular attention following the disastrous Ythan explosion in 2004. Reference: <https://www.chinapandi.com/index.php/cn/rules-circulars-cn/circulars-cn/4527-article-4527>

As with nickel-ore shipments, Clubs have issued circulars warning that mandatory notification requirements apply for loading IMSBC Group A iron ore fines in Sierra Leone, India, Ukraine, Brazil and other locations. Failure to provide advance written notification may result in loss of insurance cover in the event of an incident.

VII. Loss-Prevention Considerations for Shipowners

7.1 Pre-loading Inspection Considerations for Group A Cargoes

- Where carriage of **IMSBC Group A cargoes (nickel ore and certain iron-ore products)** is planned, shipowners shall **consult the Club's loss-prevention department in advance, regardless of whether the load port falls within high-risk geographies**. For the high-risk regions listed above, shipowners shall **furnish shipment information to the Club well ahead of time and cooperate with Club-arranged surveys**. Failure to notify beforehand may prejudice P&I insurance cover.
- Should commercial pressure, coercion or unreasonable demands arise at the load port or at sea (e.g. forced signing of documents, obstruction of independent surveys), record all circumstances immediately and report to the Club, so that the Club may raise concerns with relevant authorities through industry channels.

7.2 On-voyage Routine Monitoring and Mitigation for Group A Cargoes

- Plan the route, obtain meteorological forecasts in advance and consider engaging weather-routing services. Sail, whenever practicable, head-on or following the sea, and avoid beam seas which cause excessive rolling, thereby minimising cyclic stresses imposed on the cargo.
- Open hatches and inspect cargo-hold surfaces daily when weather permits, keeping detailed records. Pay special attention to the following danger signs:
 - Marked lowering of the cargo surface (subsidence);
 - Flattening of originally conical cargo peaks (slumping);
 - Softening and outward spreading of cargo edges;
 - Free water or slurry appearing on the cargo surface (dynamic separation);
 - Gaps forming between cargo and hold bulkheads / ship's shell plating;
 - Rhythmic shifting of cargo in phase with vessel motion.
 - For voyages exceeding one week or where prolonged heavy weather is anticipated, increase inspection frequency (e.g. every 4-6 hours) and retain photographic and video evidence.
 - **Sound bilge wells in each hold weekly;** record water-level variations, pumping times and pumped volumes. Report any abnormal increases promptly.
 - If any anomalies, free water or local slumping are observed, take photographs and video for evidence and immediately notify the P&I Club and third-party specialists to obtain remote expert support.

7.3 Emergency Measures in Case of Vessel List, Cargo Shift or Suspected Liquefaction

- Alter course at once to reduce rolling (e.g. steer head-on or following the sea) and proceed to the nearest port of refuge or safe anchorage.
- Immediately notify the P&I Club and request urgent assistance including specialist guidance.
- If conditions and water depth permit, anchor in shallow water (as shallow as possible without grounding) to reduce capsizing risk.
- Use the ballast-water system to correct vessel list. Attempt to pump bilge wells in cargo holds, or use submersible pumps to remove surface cargo water if safe to do so.

VIII. Summary

This document reiterates that compliance with the IMSBC Code constitutes the minimum standard for carrying nickel ore and iron ore concentrate. Shipowners must obtain valid TML and moisture-content certificates prior to loading and verify that $MC < TML$. When loading from locations such as Indonesia, the Philippines and Sierra Leone, advance written notification to the P&I Club is mandatory to enable timely survey arrangements. Only strict adherence to these compliance safeguards can prevent a repeat of the loss of *Ocean Winner*.