

ICMA XVII –HAMBURG

LIQUEFACTION OF IRON ORE FINES WITH CASE STUDIES

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Introduction

- What is Liquefaction?
- Conversion from non flowable to flowable state requiring presence of moisture.
- What are its General aspects?
- Only fines suffer liquefaction. Lumps do not.
- Intended only in pipeline transportation/processes.
- Only raw materials like ores would contain moisture and suffer liquefaction.

UNDERSTANDING LIQUEFACTION:

In cargoes with Moisture Content , with a certain proportion of fines (small particles) and Moisture, Cargo is rendered fluid under stimulus of compaction/Ship dynamics vibration. The resulting viscous state would neither follow rolling nor can be arrested; this may progressively lead to dangerous heel/sudden capsizes.

Impact of Liquefaction:

▣ Load Port:

Induced by static compaction;
Virtually nil casualty prospects;
Scope for minor claims;
High Loading rates can affect timely detection/prudent decisions.

▣ Sea-Passage:

Induce by Ship vibration compaction;
Probability of major casualty beyond Ship control;
Scope for major claims involving salvage and total loss.

▣ Disport:

Virtually nil causality prospects;
Scope for minor claims

COMBATING LIQUEFACTION:

- Strict adherence to BC Code;
- Detection of liquefaction prospects during loading with Flow Moisture Point , Transportable Moisture Limits, Moisture Content and 'Can Test' parameters;
- Proper Trimming;
- Hold Bilge monitoring and pumping out.

CASE STUDIES:

- Case Study – I:

Name of Ship : AAA

Type : G.C.

Cargo : Bulk Iron Ore Fines

Year Built : XXX

Details of casualty : During Load port Heavy Listing to 20°;
Headed back to Load port anchorage;
International grounding;
LOF signed;
Refloating with tug assistance;
Cargo Dried by exposure;
No crew casualty

Case Study - II

Name of Ship : BBB
Type : G.C.
Cargo : Bulk Iron Ore Fines
Year Built : XXX
Details of casualty : During monsoon;
Departure Load Port heavy listing to 20° s;
Headed back to Load Port anchorage;
Accompanied by C.G. Tugs;
At anchorage, list corrected to 5° P and Vessel
seemingly stabilized;
Tugs disengaged;
After one hour elapse, Port list increased till
capsizing;
All crew saved.