



Cargo Liquefaction Incident - Fluorspar from Huangpu

An entered vessel recently loaded a part cargo of bulk fluorspar in two holds at Huangpu, China. Heavy weather was encountered while on passage causing the vessel to roll and pitch heavily. Several hours later the vessel suddenly developed a 14° port list and would not return to the upright position.

After inspecting the cargo holds internally it became evident that the fluorspar in both holds had liquefied and shifted bodily to port. The cargo was also covered by a significant amount of free standing water. It was clear that the situation was critical, therefore the master broadcast a “Pan” urgency message and altered course towards the nearest coast, reaching a port of refuge the following day. Although only two of the vessel’s holds contained fluorspar, the liquefaction of part cargoes may still be catastrophic. It was therefore fortunate that the situation did not become a disaster.

Fluorspar

Fluorspar is mineral from which hydrofluoric acid and aluminium fluoride is produced. It may also be utilised during the production of steel, aluminium, glass, cement and other products. It is usually shipped as a coarse dust which may be yellow, green, purple or grey in colour.

IMSBC Code requirements

The International Maritime Solid Bulk Cargoes (IMSBC) Code classifies fluorspar as both Group A and Group B. Consequently fluorspar may liquefy if the moisture content of the material exceeds its Transportable Moisture Limit (TML). This cargo also presents a chemical hazard due to the caustic nature of fluorspar dust.

Fluorspar may only be handled during precipitation provided this will not increase the moisture content to a level which exceeds the TML. All non-working cargo holds must be closed when fluorspar is loaded and the cargo must be trimmed level on completion.

The machinery and accommodation spaces must be protected from fluorspar dust, and personnel who may be exposed to such conditions must wear goggles and dust filter masks. Measures must also be taken to prevent cargo from entering the bilge wells.



Appearance of the fluorspar cargo during loading

Previous fluorspar liquefaction incidents

In May 2005 a 12,000 gross tonnes general cargo ship was lost after two holds were loaded with approximately 5,000 metric tonnes of bulk fluorspar in Hong Kong. The cargo liquefied during bad weather off Sri Lanka and the vessel developed a 15° list. The crew abandoned ship and were rescued soon afterwards. The vessel later sank.

There were several other serious incidents involving the liquefaction of bulk fluorspar in 2005 and 2006, but very few cases in recent years. This appears to be the first major occurrence since that time.

Huangpu

Approximately 80,000 metric tonnes of fluorspar is shipped from Huangpu each year, usually in parcels of around 10,000 metric tonnes. The cargo is reportedly delivered to the port in open trucks shortly before loading and stored in a covered warehouse until the ship arrives.

Prior to loading the shippers produced an “Inspection Report” specifying the TML, moisture content, particle size and stowage factor of the cargo. According to the information set out in this document, the moisture content of the fluorspar was significantly less than the TML, indicating that there was no risk of liquefaction and that the cargo was safe to load.

Since the fluorspar seemed to be dry and the test results and other information provided by the shippers appeared to be within permitted limits, the cargo was loaded thereafter.

Safety Alert



Free water on top of the liquefied flourspar



Bodily shift of cargo clearly apparent



Condition of the flourspar after liquefaction

However, as subsequent events have shown, the actual moisture content of the flourspar was considerably more than the TML, resulting in the cargo liquefying when the ship began to roll, pitch and vibrate when the weather deteriorated.

The reasons for the high moisture content are still being investigated but it seems that on this occasion the cargo was stockpiled on the quay rather than stored in a covered warehouse. Although tarpaulins had been placed over parts of the stockpile, they may have been insufficient to protect the flourspar from the unusually heavy rain in the Guangdong region this year.

Recommendations

This incident clearly demonstrates that no assumption can be made regarding the propensity of a Group A cargo to liquefy based on the visual appearance of the material alone.

Vessels due to load flourspar in Huangpu are strongly advised to notify the Managers beforehand so that a local surveyor can be appointed to identify the location of the cargo, check the shipper's cargo documentation and carry out "can" tests on representative samples of the cargo before and during loading. Should the shippers fail to provide the cargo information required by the IMSBC Code or if there are any doubts regarding the validity or accuracy of the test certificates or if a "can" test results in the appearance of free moisture or fluid conditions, loading should be halted or postponed as appropriate. In such an event the Managers should be notified immediately as it may be necessary to draw and send cargo samples to an independent laboratory to verify the TML and moisture content. Additional advice from an expert may also be required.

Members requiring further information should contact the Loss Prevention department.