

5. Summary (Conclusion)

Based on our investigation reports on fatal and injury accidents related to oxygen deficiency or gas poisoning including the four serious accident investigation cases mentioned in this digest, we summarized as follows how these accidents occurred, and what the lessons which will help prevent recurrence are.

■ How “Fatal and injury accidents caused by oxygen deficiency or gas poisoning” occurred ■

◆ Breakdown by cause category

Most of the accidents were due to “failure to measure oxygen or gas concentration”.

While the number of fatal and injury accidents caused by oxygen deficiency or gas poisoning occurring on chemical tankers was 18 (involving 18 vessels), the number of such accidents due to “failure to measure oxygen or gas concentration” was 15, accounting for a majority of all the cases.

◆ Breakdown of the fatalities and injured

Accounting for a majority, the fatal accidents contain a high risk once they have occurred.

The number of the fatalities and injured involved in the 18 accident cases was 41, with a breakdown of 24 fatalities (58.4%) and 17 injured (41.5%). The fact that the number of the fatalities accounted for a majority indicates that they contain a high fatality risk once they have occurred.

■ Lessons from the accident investigation cases ■

◆ For working inside enclosed space

- Lesson 1. **Oxygen and gas concentration should be properly measured** before entering enclosed space.
Lesson 2. Be aware of the details of such onboard work as may endanger the crew, establish safety check procedures during work as well as working procedures, and give them instructions on these procedures and ensure observance by them.

◆ For handling tank washing water

- Lesson 3. In order to prevent mixing different types of tank washing water likely to cause a dangerous chemical reaction while recognizing that tank washing water includes cargo residue on board and bears similar properties as cargoes, it is necessary to identify in which case mixing tank washing waters is dangerous, such as by making a chemical interaction chart for dangerous types of cargo when mixed while referring to procedures for handling dangerous goods or material safety data sheet (MSDS). This should be fully disseminated to the crew. It is also necessary to fully disseminate the method of tank washing water treatment and slop tank usage to the crew in the form of a manual in order to ensure that they observe such procedures at all times.
Lesson 4. In case a toxic substance like hydrogen sulfide gas is generated by chemical reaction while transporting tank washing water without checking the condition inside a slop tank, the manhole hatch covers of the slop tank should not be opened, and crew members staying near the discharge port of the slop tank's exhaust pipe should evacuate to the windward side of the discharge port of the exhaust pipe while those staying near the accommodation space should evacuate without delay to the closed accommodation sections.

A word from Director for Analysis, Recommendation and Opinion

Considering most of the fatal and injury accidents caused by oxygen deficiency or gas poisoning occurring on chemical tankers are due to “failure to measure oxygen or gas concentration”, as explained in this digest, it should be noted that one of the most important safety actions that should be taken first is to implement the measurement properly without delay.

Since accidents occurring due to oxygen deficiency or gas poisoning can be prevented by measuring oxygen or gas concentration or using a gas detector in advance, it is earnestly desired to implement these safety actions appropriately without fail.

Your comments are most welcome

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(Starting from September, 2013)