

HYDROGEN SULPHIDE

SUMMARY

Hydrogen sulphide (H₂S) is a toxic gas, which was involved in a recent incident in France. A ship's engineer suffered severe lung oedema when he was exposed to the gas during repair work on a ship. While the gas typically has a rotten egg odour it is not always possible to detect the presence of the gas by smell.

BACKGROUND

1. H₂S is a colourless gas, which is both toxic and flammable. It has a very low odour threshold, with its smell being easily detected at concentrations well below 1 part per million (ppm) in air. The odour increases as the gas becomes more concentrated, with the strong rotten egg smell recognisable up to 30 ppm. Above this level, it is reported to have a sickeningly sweet odour up to around 100 ppm. However, at concentrations above 100 ppm, a person's ability to detect the gas is affected by rapid temporary paralysis of the olfactory nerves in the nose, leading to a loss of the sense of smell. This means that the gas can be present at dangerously high concentrations, with no perceivable odour. Prolonged exposure to lower concentrations can also result in similar effects of olfactory fatigue. This unusual property makes it extremely dangerous to rely totally on the sense of smell to warn of the presence of H₂S. The only reliable way to determine exposure levels is to measure the amount in the air.

2. The gas is found in varying concentrations in many oil and gas wells and is a by product of many industries including pulp and paper manufacturing, rayon textile production, leather tanning, chemical manufacturing and waste disposal. It is also found in septic tanks, sewers, manure pits, or anywhere bacteria can break down organic matter in an oxygen deficient environment.

3. The Shipbuilders and Shiprepairers Association has brought to the attention of the secretariat an incident in France whereby a ship's engineer was overcome by H₂S gas. As part of the repair work on a sulphur tanker, oil from the ship's cargo heating system was drained into a dedicated oil tank in the engine room. The tank started to leak into the engine room releasing H₂S gas. As a result of exposure to the gas the ship's engineer suffered from severe lung oedema from which he made a full recovery following intensive treatment.

4. The existence of H₂S gas onboard vessels is not likely to be limited to sulphur tankers as sulphur is present in most crude oils and as a result, is also likely to be present in ships' bunker fuel. Disturbing the fuel may result in a possible release of the gas. The quantity of the gas released depending partly on the sulphur content of the fuel, which is likely to be relatively low. As

H₂S is also a product of decaying sulphur-containing organic matter it can also be found in the holds of fishing boats.

5. The Secretariat are only aware of 1 incident involving H₂S gas occurring in a UK shipyard since 1995. This incident involved the ignition of H₂S gas that had built up inside a ship's rudder that was undergoing repair. During this time the Secretariat are not aware of any other reported incidents in ship/boat yards involving exposure to the gas.

ACTION

6. Members are asked to note the contents of the paper and to be aware of the potential presence of H₂S gas. It is not however believed to be a major problem.