

Bermuda Shipping and Maritime Authority

BERMUDA SAFETY BULLETIN

Unintentional Release of Fixed Fire Fighting CO₂ Systems

Notice to all Ships and Vessel Owners, Ship Operators and Managers; Masters and Officers of Bermuda Registered ships

The Bermuda Shipping and Maritime Authority has become aware of incidents occurring on non-Bermuda Registered ships where CO_2 cylinders have been unintentionally released or been found empty.

On a number of ships multiple CO_2 cylinders have been found empty due to the cylinder safety discs bursting. These are designed to burst at a pressure of 180-200 bar, which would not normally be exceeded if the temperature of the CO_2 room is kept below 55°C. The vessels in question had previously traded in areas of high temperature (>40°C) and the CO_2 room exhaust fans were not being run continuously.

Investigation into the accidental release of 65 CO_2 cylinders found the cause to be a leak on at least one CO_2 cylinder valve which pressurized the manifold and then the trigger line, discharging all of the cylinders into the manifold. Both the manual and remote CO_2 system releases were undisturbed and CO_2 was not released into any machinery spaces as the manifold section valves remained tight, however CO_2 did escape into the CO_2 room. The vessel in question was fitted with Schmöle type cylinder valves and it is likely that one or more incorrectly torqued Schmöle valve set screws may have allowed CO_2 to escape into the manifold when the vessel entered a hot region and the CO_2 within the cylinders rose above the critical temperature.

Investigation into a subsequent release of all CO_2 cylinders apart from the 2 master bottles on a different vessel found that at least one cylinder valve had leaked and pressurized the manifold which opened the remaining cylinder valves through the trigger line leading from the manifold. It is suspected that incorrect refurbishment of the DAB cylinder valves may have led to entrapment of brass particles on the sealing face of one valve which caused it to leak. CO_2 was not released into any of the machinery spaces, however it did escape into the CO_2 room.

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Recommendations:

- BSMA recommends that during transits of high temperature regions the temperature of the CO_2 room be monitored and kept below 55°C.
- Vessels carrying CO₂ systems equipped with Schmöle type valves should, at the annual service ensure that all valve set screws are set at the correct torque.
- Refurbishment of cylinder valves should only be carried out in line with manufacturer's requirements.
- It is good practice to ensure that the CO₂ manifold and pilot lines are fitted with vent valves to stop gradual pressurization leading to activation of the CO₂ system. Such valves are typically designed to remain open in normal conditions, and to close when the pressure exceeds 1.5 bar.
- It is good practice to ensure that the CO₂ manifold is fitted with leakage alarms. Where systems already have these alarms fitted, they should be set to trigger at the lowest pressure possible.

For a more detailed explanation of the above incidents please see:

- MAIB Report on the investigation of unintentional release of carbon dioxide: Eddystone on the Red Sea on 8 June 2016 and Red Eagle in Southampton Water on 17 July 2017
- ABS: Chief Surveyor Alert Dated 17 July 2018

For more information please contact: survey@bermudashipping.bm

Chief Surveyor Bermuda Shipping and Maritime Authority