

MAIB: Blockage of fixed CO₂ fire extinguishing system pilot hoses

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The UK Marine Accident Investigation Branch (MAIB) has published Safety Bulletin 1/2022 into a fire on board a roll-on/roll-off cargo ship in September 2021.

What happened?

A fire broke out in the auxiliary engine room on board a roll-on/roll-off cargo ship. In an attempt to extinguish the fire, the ship's crew activated the machinery space's carbon dioxide (CO₂) fire extinguishing system, but only half of the system's gas cylinders opened.

What went wrong?

Investigation identified that one of the auxiliary engine room's CO₂ system pilot hoses was completely blocked. Subsequent examination and testing of the vessel's fixed fire extinguishing systems identified two other similarly blocked hoses. It was discovered that the pilot hose couplings had not been fully bored through during the manufacturing process. The testing process also identified several coupling leaks in the pilot lines.



Section through blocked CO₂ pilot hose coupling showing incomplete bore through the stem

What went wrong? (Cont.)

In March 2021, the pilot hoses had been replaced during a routine servicing by a fire safety company. Tests carried out at that time did not identify any faults with the system. Following the accident, tests were made of the high-pressure CO₂ fire extinguishing systems on board the other vessels in the company's fleet. These

tests identified two similar pilot hoses that were blocked on one ship.

All the affected hose assemblies had been supplied to the fire safety company by one supplier. The hose assemblies had been produced under the terms of the classification society type approval held by that one supplier. Although the type approval required each completed hose assembly to be pressure tested, there was no specific test that gas could pass freely through the hose assemblies.

The hose used in the assemblies was provided in accordance with the type approval held by that one supplier, but that supplier had purchased the couplings from another hydraulics supplier, who in turn had sourced the couplings from a different manufacturer.

Lessons learned

- Ensure that crews are fully acquainted with the procedures for the manual activation of CO2 fire extinguishing systems in the event of the pilot actuation system failing.
- The fire safety company did not identify that some of the hose assemblies were blocked and that there were leaks in the CO2 system pilot lines.
- Neither the suppliers' quality assurance processes, nor onboard installation testing processes, identified that the hose couplings had not been fully bored through.
 - Amended procedures to incorporate a pneumatic flow test of the complete hose assemblies to verify that they are not blocked.

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