

US Coast Guard Safety Alert 07/17 – CO₂ hazards

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During two recent vessel inspections Coast Guard marine inspectors participated in and witnessed occasions where the testing and maintenance of a CO₂ system resulted in serious safety threats that could easily have led to loss of life.

Incident 1

A chief mate and a Coast Guard inspector were testing the fire detection system. The mate and inspector went to the vessel's hydraulic equipment room and the mate stood on a spare parts box in order to apply a heat gun to the heat actuator.

The CO₂ subsequently discharged directly above their heads and filled the room. The mate was overcome by the CO₂ release and had to be revived by CPR after being pulled out of the space unconscious.

The problem was that the mate directed the heat to a 'heat actuator' and not a 'heat temperature transmitter'.

The crew were unfamiliar with the vessel's systems and had not referred to the associated manuals.

Thus, their testing of the system was conducted without an understanding of the impacts of their actions, placing them and the Coast Guard inspectors at risk.

Incident 2

A certification inspection was taking place while technicians were working on the CO₂ system. A Coast Guard inspector in the machinery space was told that CO₂ technicians were going to release the CO₂ which was not part of the planned inspection. He was informed that the system became accidentally primed for release when the pilot system was activated by a technician in training. As the technician was reconnecting the cable-actuated release levers attached to the tops of the bottles, the activation cables remained connected to the levers. When the bottles were moved later in the servicing process, the cable tension increased to the point where the levers were lifted resulting in the release of charged bottles against a closed valve which prevented immediate release into the space.

The technicians ultimately decided they needed to release the entire engine room CO₂ system to remedy the situation. They communicated their intentions to the vessel's engineers, who accounted for all vessel personnel in the space. However, their count was incorrect as they missed a Coast Guard inspector who was still in the engine room. The inspector was found and left the engine room.

As a result of inadequate accountability measures and poor understanding of, and

communication of, the hazards involved, the safety of crew members and a Coast Guard inspector was placed at risk.

The US Coast Guard writes:

"CO2 fire extinguishing systems present an inherent risk to the personnel involved with their inspection, testing, and maintenance. Over the years the Coast Guard has become aware of multiple events where these systems have inadvertently released or leaked and caused the deaths of shipboard personnel, technicians and inspection personnel. CO2, system inspection, testing, and maintenance require thoughtful planning and risk mitigation efforts to prevent such events from happening."

What lessons were learnt? What actions were taken?

The Coast Guard notes that both of these instances reflect a lack of knowledge and risk awareness by the persons involved. The Coast Guard strongly recommends that:

- Only persons adequately trained and properly evaluated be permitted to participate in CO2 testing and maintenance procedures on board vessels.
- Every person involved must know and consider the resulting outcomes for each step of the testing procedure prior to it taking place.
- Risks associated with CO2 and other systems should never be underestimated. Risk prevention activities should always lean towards providing the greatest safety margins for those involved including 100% accountability of all personnel aboard the vessel prior to conducting an operational test of a system.

The Coast Guard has previously released CO2 related safety alerts. Safety Alert 15-14 recommends conducting a comprehensive pre-test meeting and simulated step-by-step 'walk-through' between involved parties prior to actual testing of complex or potentially confusing systems.

Operational controls for those involved should be implemented to maximise safety and reduce risk. Additionally, the Coast Guard strongly reminds all maritime operators of the importance in performing regular vessel specific emergency drills and to ensure that all crew members have the proper knowledge, skills, and abilities to respond to any potential emergency.

The alert can be found at the [US Coast Guard](#) website.

Members may wish to review the following incident:

- Awareness: CO2 flooding system activation points

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