UNITED STATES COAST GUARD
U.S. Department of Homeland Security

FINDINGS OF CONCERN

Sector Mobile

June 24, 2025
Mobile, AL

Findings of Concern 008-25

INADEQUATE WATER MIST SYSTEM PRESSURE AND NOZZLE POSITIONING

Purpose. The U.S. Coast Guard issues findings of concern to disseminate information related to unsafe conditions that were identified as causal factors in a casualty and could contribute to future incidents. Findings of concern are intended to educate the public, state, or local agencies about the conditions discovered so they may address the findings with an appropriate voluntary action or highlight existing applicable company policies or state/local regulations.

The Incident. On January 4, 2025, a foreign-flagged cargo vessel moored within the Port of Mobile, Alabama, experienced a high-pressure fuel leak originating from the boiler burner assembly located in the vessel's engine room. Atomized diesel fuel, under pressure, escaped from a compromised seal point and subsequently ignited upon the exhaust stack of the number two auxiliary generator. The ensuing fire rapidly propagated from the boiler flat through two additional deck levels via open grating and unsealed penetrations, causing extensive structural and equipment damage. Although the vessel's fixed water mist fire suppression system actuated automatically, the fire was only effectively extinguished following manual activation of the fixed carbon dioxide (CO_2) suppression system. No personnel casualties or injuries were reported.

Contributing Factors and Analysis. The investigation identified multiple deficiencies that contributed to the severity of the incident:

- The primary initiating event was traced to an improperly installed o-ring intended to seal the high-pressure fuel interface between the oil flow meter and the boiler burner. The improper installation likely compromised the integrity of the seal under operating pressures, resulting in the uncontrolled release of atomized diesel fuel. Inadequate thermal protection of the number two auxiliary generator's exhaust stack, which was positioned in close proximity beneath the burner unit, provided a viable ignition source for the fuel spray.

- Witness interviews, onboard surveillance footage, and the on-scene investigation strongly indicated that the fixed water mist fire suppression system likely failed to perform as designed due to improper actuation pressure. Specifically, the system discharged water at suboptimal atomization, producing larger-than-intended droplets. The nozzle's proximity to the burner unit and the resulting droplet size generated a downward force that pushed ignited fuel through open deck gratings. This contributed to vertical fire spread via pooling and migration of the fuel/water mixture, ultimately extending the fire's impact beyond the boiler space into multiple lower compartments.

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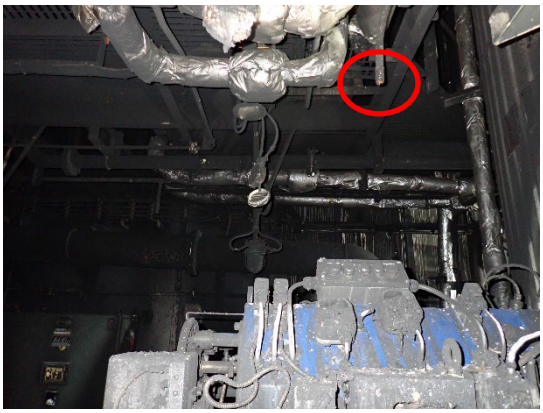
Dispersion of ignited fuel down two additional decks



Water mist nozzle - proximity to burner assembly

Findings of Concern. Coast Guard investigators have identified the following measures to mitigate the risks associated with the contributing factors identified above:

- Verify that water mist systems are calibrated to actuate at the correct pressure and that nozzle placement does not promote unintended fuel dispersion in the event of fire. This is especially important for machinery installed over grated deck plating, which can lead to the rapid spread of fuel-based fires. Maintenance, inspection, and testing of water mist system actuation pressures should be part of routine fire suppression maintenance. Operators are encouraged to utilize the guidance outlined in the International Maritime Organization's (IMO) Maritime Safety Committee (MSC.) 1/Circular (Circ.) 1432, as amended by MSC.1/Circ.1516, in accordance with the International Convention for the Safety of Life at Sea (SOLAS) II-2/14.2.2 to assist in the process.

- Ensure that critical sealing components such as o-rings are correctly installed and inspected during maintenance of high-pressure fuel systems. Vessel crews and maintenance personnel should be trained and supervised to prevent installation errors.

- Confirm that all thermal shielding on exhaust systems is installed in accordance with manufacturer specifications and routinely inspected for proper fit and condition.

Closing. These findings of concern are provided for informational purpose only and do not relieve any domestic or international safety, operational, or material requirements. For any questions or comments please contact the Sector Mobile Investigations Division by email at SECMobile-Investigations@uscg.mil.