



## **FINDINGS OF CONCERN**

### **Sector Virginia**

March 29, 2022  
Norfolk, VA

Findings of Concern 003-22

## **HEAT SENSITIVE ELECTRICAL COMPONENTS IN STEERING CONTROL SYSTEMS**

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. In the spring of 2021, a foreign-flagged RO-RO vessel was transiting the York Spit Channel in Hampton Roads, VA when the rudder failed to respond to the commands given at the helm. The vessel subsequently veered outside the channel and ran aground in the Chesapeake Bay without sustaining any damage or personnel injuries. The vessel had been experiencing issues with intermittent loss of its steering controls for the past two years, but the vessel's crew were not replicate the issue and it had remained undiagnosed.

Contributing Factors and Analysis. Among other issues, the Coast Guard investigation revealed that excessive ambient heat had built up in the steering gear room and reduced the lifespan of the relays, contactors, and Programmable Logic Computer (PLC) units, causing them to prematurely wear out and fail. When those relays and contactors failed, the signals from the helm could no longer be received, interpreted, and executed by the steering gear. Several contributing factors led to the excessive heat accumulated in the steering gear room. First, the vessel had hot oil tanks in the space that generated a large amount of heat during normal operations. Second, the steering pumps were running constantly in the direct online (full speed) mode, which caused additional ambient heat build-up. Third, the electrical control cabinet, storing the relays and contactors responsible for delivering the signals from the helm to the steering gear, did not have adequate ventilation. Finally, the steering gear room, which housed the electrical control cabinet and the heat generating equipment, had no mechanical power ventilation or adequate natural ventilation to dissipate the accumulated heat.

Recommendations. In light of this investigation, the Coast Guard encourages owners and operators of vessels with similar design arrangements, which may allow for accumulation of excessive ambient heat, to consider taking the following actions to mitigate risks identified with the causal factors in this case:

- Limit the consolidation of high-heat generating components in a close quarter location to reduce heat accumulation.
- Install mechanical ventilation and/or cooling systems in susceptible electrical cabinets and steering gear rooms to dissipate excessive heat accumulation.



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

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- Install heat monitoring equipment in areas that house heat sensitive electrical components and remain within parameters of manufacturers' temperature range recommendations.
- Until issues with excessive heat accumulation in areas with heat sensitive electrical components are resolved, consider an accelerated renewal timeline for those susceptible components, to include contactors, relays, and PLC units and update the vessel's safety management system to reflect any new maintenance procedures.

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 Sector Virginia Investigations Division by phone at (757) 668-5500 or by email at [D05-SMB-IO-SECTVA@uscg.mil](mailto:D05-SMB-IO-SECTVA@uscg.mil).