UNITED STATES COAST GUARD
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MARINE SAFETY ALERT
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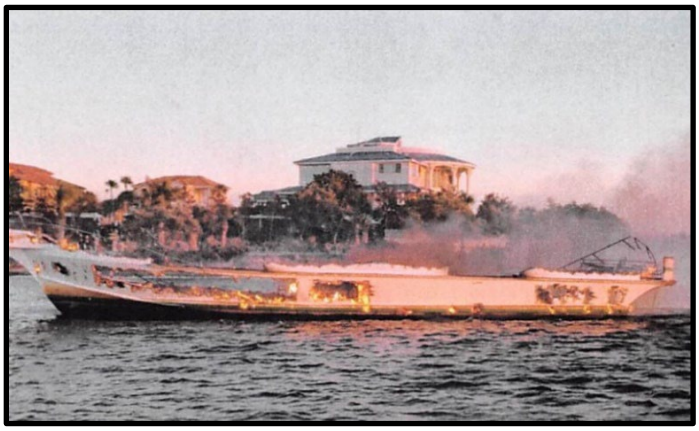
Safety Alert 07-26

KNOW YOUR BOAT: RESPONDING TO AN ENGINE HIGH TEMPERATURE ALARM

A fire aboard a small passenger vessel resulted in the death of one passenger, injuries to multiple passengers, and the total loss of the vessel. The investigation into the cause of the fire yielded several findings that warrant immediate review by all vessel operators.



While underway, in response to a high jacket water temperature alarm, the Master shifted the engine to neutral to minimize heat build-up. The Master kept it running, believing that circulating water would help reduce the temperature. However, the crew was unaware that the raw water pump had failed. Though the engine was in neutral, combustion was still taking place while cooling water was not circulating. As a result, the engine and exhaust line began to severely overheat.

A water leak onto a hot surface subsequently caused steam to emanate from the engine room. While focusing on the steam, the vessel's crew failed to identify a fire originating in the aft lazarette, which was ignited by an overheated exhaust line suspended by wooden supports. This delayed response allowed the fire to breach the engine room bulkhead and quickly propagate throughout the vessel. The Master intentionally ran the vessel aground to allow the 48 passengers and five crew members to escape ashore. One passenger was fatally injured, and 14 others were treated at local hospitals. The vessel burned to the waterline and was a total loss.

This incident highlights the importance of regular engine maintenance, responding appropriately to high-temperature alarms, conducting engineering casualty drills, and fully investigating vessel systems when there is an indicator that something has gone wrong.

Regular Engine Maintenance

The best way to protect against engine casualties and extend the lifespan of an engine is through regular maintenance. Engine manufacturers provide schedules for various maintenance items, including raw water pumps. Raw water pump impellers, typically made of flexible rubber, are

constantly exposed to abrasive seawater and temperature fluctuations, making them prone to cracking, wear, and disintegration over time. The lifespan of an impeller is dependent on a clean and properly functioning seawater strainer, as these strainers are often clogged by debris such as seaweed, plastic, and marine growth, leading to reduced cooling water flow and impeller failure. Running the pump dry, even briefly, can cause the impeller to overheat, and further shorten its lifespan. In addition, heat exchangers for the engine jacket water and lubricating oil systems require periodic maintenance to ensure that they continue to work correctly and are not leaking or fouled. **The Coast Guard strongly recommends all operators perform regular maintenance in accordance with the engine's manual**, including impeller inspection and replacement timelines.

Response After an Alarm

An engine high water temperature alarm requires an immediate response. Vessel operators are strongly encouraged to consult their engine's manual for manufacturer recommended response procedures. In general, the recommended sequence of response steps are as follows for a wet exhaust diesel engine installation:

1. Reduce load immediately: If safe and feasible, reduce engine load to reduce heat generation within the engine.
2. Check exhaust for cooling water flow: Visually inspect the exhaust discharge. Is there a normal flow of cooling water present? If not, shut the engine down!
3. Check for cooling system leaks. Presence of steam likely indicates a jacket or raw water leak.
4. Review gauges: Are any other readings abnormal?
5. If the engine temperature continues to rise, shut the engine down!

Following the immediate action steps, conduct a systematic inspection of the raw water system (strainer, hoses, pump), jacket water system, lube oil system, and exhaust system.

Engineering Casualty Drills

In addition to regular emergency drills required by federal regulations, the Coast Guard ***strongly encourages*** all operators to also conduct drills related to engineering casualties. By regularly practicing emergency procedures, crew members can build confidence and gain familiarity with protocols, allowing for quicker and better coordinated responses during actual emergencies.

Conduct a Full Investigation

At any sign of engine trouble, check all spaces where engine-related piping may be located. Exhaust lines and fuel lines often penetrate bulkheads into spaces forward or aft of the engine room. Both configurations represent potential fire hazards at any time, but especially when the engine is not functioning properly. In the case described above, the crew was unaware that very high temperatures in the exhaust line caused a fire, and, as a result, did not take measures to fight the fire. Checking all the spaces with engine-related piping may reveal critical issues that would otherwise be missed.

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