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

FINDINGS OF CONCERN

Marine Safety Unit Portland

March 30, 2022
Portland, Oregon

Findings of Concern 004-22

DON'T REPLACE LOCKNUTS WITH STANDARD HEX NUTS

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 February 2021, the Coast Guard evacuated an injured assistant engineer from an inspected articulated tug and barge 60 miles offshore of Washington state. While the crewmember was conducting a routine round of the engine room, one of the main engine's lube oil filtration system components failed resulting in the oil centrifuge cover being ejected, striking the crewmember in the face and resulting in serious injuries.

Contributing Factors and Analysis. The main propulsion engines involved were Wartsila 8L32s with centrifugal filters for lube oil. The filters had a cover that encapsulated the system, held in place by a clamp ring. Sometime prior to the incident, the manufacturer recommended nyloc nuts intended to secure the clamp ring had been replaced with standard nuts and lock washers. The use of standard nuts and lock washers in lieu of nyloc fasteners resulted in the nuts and lock washers vibrating off the centrifuge clamp ring while the engine was in operation.

Shipboard equipment is routinely exposed to shock, vibration, and other dynamic forces, which can result in threaded fasteners loosening over time. In certain situations, the manufacturer may recommend a locking fastener designed to resist loosening. The two basic types of locking

Failed clamp ring as found post incident

fasteners are free-running and prevailing torque. Free-running types often require an additional component, such as a lock washer or jam nut. Once initially loosened, however, they offer no further resistance to loosening. Prevailing torque types, such as nyloc nuts however, are designed to create friction. Even after the initial loosening of a nyloc nut, friction continues to resist further loosening of the nut. Although most prevailing torque locknuts can be reused, torque may decline with subsequent reuses, which will reduce the fasteners effectiveness.

In direct response to this casualty, Wartsila Engines issued a Service Bulletin to all clients with Wartsila 8L32 engines onboard highlighting the importance of conducting maintenance in accordance with manufacturer recommendations and expressly utilizing recommended parts.

Findings of Concern. Coast Guard investigators have identified the following prudent measures that should be implemented by owners/operators of similar vessels in similar service to mitigate the risks associated with the above-identified contributing factors as well as to be consistent with good marine practice:

- Scheduled preventative maintenance procedures should be periodically reviewed by shipboard personnel to ensure completeness and adequacy of instruction.
- Written preventative maintenance procedures should specifically identify replacement parts in accordance with manufacturer recommendations.
- Maritime Operators should never replace locking nuts and parts intended for use under vibration with standard metal hex nuts.
- When possible, maintenance should be conducted on equipment that has been secured.
- Ensure equipment manuals are kept up to date referencing the latest Service Bulletins.

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 Marine Safety Unit Portland Investigations Division by phone at (503) 247-4019 or by email at pdxio@uscg.mil.