

Republic of the Marshall Islands

Office of the

MARITIME ADMINISTRATOR

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MARINE SAFETY ADVISORY NO. 40-17

To: Owners/Operators, Masters, Nautical Inspectors, Recognized Organizations

Subject: MACHINERY SPACE FLOODING

Date: 12 September 2017

In the past five (5) years, 32 Engine Room or other machinery space flooding incidents not related to a navigational casualty were reported to the Republic of the Marshall Islands (RMI) Maritime Administrator (the "Administrator"). The majority of incidents occurred due to mechanical failures of or during maintenance to pumps, piping systems, and shaft seals. A small number of incidents occurred during ballasting or other vessel operations. The following information is provided in support of marine casualty prevention.

Post-casualty investigations by the Administrator identified the following:

69% of the reported incidents occurred while the vessel was at sea and while maintenance was being performed. Of these:

- Seven (7) resulted in a loss of propulsion, which in some cases also included loss of electrical power or blackout;
- Two (2) required the vessel be towed into port; and
- One (1) case resulted in the vessel grounding and being declared a Constructive Total Loss (CTL).

Identified causes of the flooding incidents that occurred due to a material failure included:

- Ineffective in-service inspections due to the vessel's Preventative Maintenance System (PMS) not providing sufficient guidance regarding the work to be performed;
- Ineffective/inadequate routine maintenance due to preventative maintenance being delayed;
- Excessive wear and tear of pumps and shaft seals, pitting inside of salt water piping systems, including in way of stub pieces for sea valves, and material failure of sea valves; and
- Corrosion of the hull from inside voids, cofferdams, or internal tanks located inside of the Engine Room.

This MSA expires one (1) year after its issuance, unless otherwise noted, extended, superseded, or revoked.

Identified causes of machinery space-flooding incidents that occurred while maintenance was being performed were primarily due to:

- Inadequate pre-task planning, including not conducting a pre-task hazards assessment;
- Inadequate supervision of crewmembers conducting the work; and
- Inadequate training of the crewmembers assigned to perform the maintenance task.

Identified causes of machinery space flooding incidents that occurred during other vessel operations included the failure to close sea valves or not ensuring man hole covers were secured before ballasting operations involving either the vessel's fore or aft peak tanks.

In most of the machinery space flooding incidents, the vessel's crew quickly and effectively controlled the flooding using the vessel's emergency de-ballasting pumps and other pumps, isolating leaking pipes, and installing emergency plugs and patches. However, in several of the Administrator's marine safety investigations, it was noted that not all vessel engineers were adequately prepared to respond effectively to a machinery space flooding incident. In these incidents, the observed inadequate emergency response was due to ship management not having established requirements in their Safety Management Systems (SMS) for conducting machinery space flooding drills, training, and damage control.

The Administrator recommends that ship managers' Designated Persons Ashore (DPAs), Masters, and Chief Engineers of RMI-flagged vessels review and, as appropriate revise the following:

- The applicable procedures in their SMS to ensure compliance with PMS requirements and for approving maintenance extensions for any systems needed to de-water a machinery space or whose failure could result in a machinery space flooding incident;
- The inspection and maintenance protocols prescribed by the vessel's PMS for systems such as sea chests, salt water cooling systems, and shaft seals to ensure they provide sufficient detail regarding the work that should be performed, including precautions that should be taken to reduce the potential for accidental flooding;
- The applicable procedures in their Company's SMS and PMS to ensure they address having damage control equipment ready for use and that the vessel's crew is drilled and ready to respond before starting a task that could result in a machinery space flooding incident; and
- The applicable procedures in the Company's SMS to ensure machinery space flooding drills and training are conducted regularly. This should include a review of emergency procedures that should be followed if their vessel is without power or propulsion.

The Administrator strongly encourages that Masters and Chief Engineers review this Marine Safety Advisory with their vessel's crew and provide appropriate feedback to their DPA.