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

MARINE SAFETY ALERT
Inspections and Compliance Directorate

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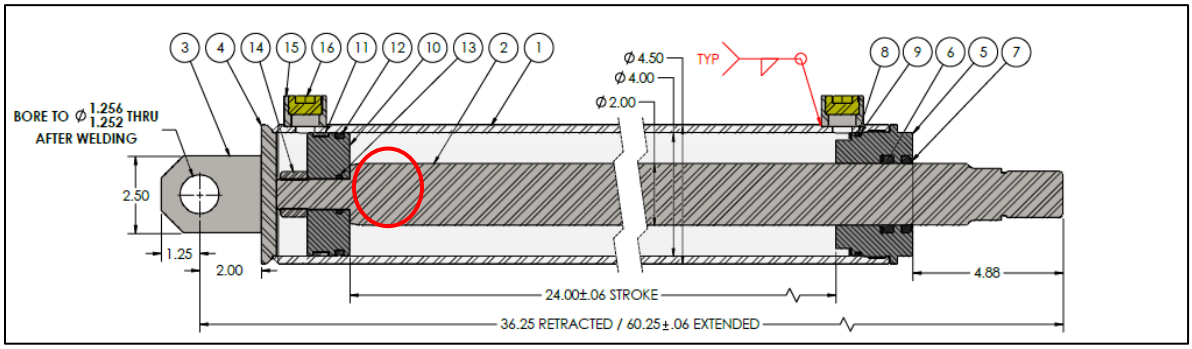
Washington, DC

Safety Alert 06-21

RISK OF STEERING LOSS FROM DEFECTIVE RAMS

Recently, an inspected towing vessel experienced a reduction in steering when the port hydraulic steering ram failed. Technicians replaced the ram with a spare part located on-scene; however, the cause of the failure was undetermined. Within 24 hours, the vessel experienced a second steering reduction when the starboard ram failed. Due to the abnormal consecutive failures, the rams were sent to the manufacturer to undergo inspection. Testing revealed the threads on the rod studs for both rams were machined out of specifications. Specifically, the rod stud threads were not properly machined to measure the required 0.995 inch outside diameter (OD), but instead measured 0.950 inch OD. The rod stud is the portion of the rod that is turned down and threaded for the piston and retaining nut. The improperly sized threads reduced the surface contact with the lock-nut threads and the fastener's holding ability.



Schematic of ram assembly. Red circle indicates location of 1" stover (retaining) nut and stud location.

Photographs taken of disassembled ram showing rod stud threads and retaining nut.

The manufacturer stated that approximately 36 ram units were produced in 2017. It is unknown how many of those units were created with improper thread sizes. The below table lists manufacturer information.

Manufacturer: All Phase Hydraulics Hudsonville, MI	Model #: 590491
Serial #: ABC 4024-S3	Serial # Range: 155451 – 155486

Both rams that failed in the aforementioned marine casualties were installed during the vessel's construction in 2018. Based on this timeline, failure may not occur immediately. If these particular rams are installed on vessels, the absence of steering casualties does not necessarily indicate they were made with proper thread specifications. The manufacturer stated, "[T]he cylinders will be able to perform without incident if normal maintenance of setting stops is executed." However, the vessel that experienced these casualties had limit switches installed, indicating these stops may not completely prevent steering casualties over time. It is important to note that not all vessels are required to have setting stops and will not have this type of defense in place to counteract this specific failure. Limit switches and associated linkage components can wear set points, which reduces protection against excessive force and exerts pressure on the steering rams.

The Coast Guard **strongly recommends** that vessel Owners and Operators:

- Periodically ensure set points are still within acceptable parameters for steering systems.
- Conduct checks of all installed and spare ram information for any of the manufacturer information listed in this alert.
- Regularly observe steering gear operation and inspect for signs of hydraulic oil leakage and excessive pump noise, which could indicate impending problems or failure.
- Contact the manufacturer for further guidance if any of the above referenced rams are identified. At this time, the manufacturer has not issued a recall.

Investigations and inspection personnel are encouraged to maintain an acute awareness of these issues and initiate corrective actions as needed.

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