SAFETY ALERT No. 18-07

Fatality Onboard a Passenger Ship due to Nitrogen Cylinder Explosion

1. Introduction

1.1. Following information obtained from the ongoing maritime incident investigation conducted by the Transport Accident Investigation Commission, New Zealand, this safety alert is issued to raise awareness of the potential serious risk to safety on board a vessel where nitrogen cylinders are used as a stored kinetic energy system for launching lifeboats.

1.2. The Bahamas Maritime Authority wishes to bring the information referenced in Paragraph 2 to the attention of interested parties[1].

2. Description of incident

2.1. The vessel was fitted with hydraulically powered davits with six power packs, three on each side of the vessel. A stored energy system comprising a piston accumulator and a bank of four high pressure (180-210 Bar) nitrogen cylinders were fitted to each lifeboat launching davit.

2.2. In February 2017, one of the nitrogen cylinders of a stored energy system onboard exploded while being topped up to maintain the correct pressure. A crew member died as a result of the explosion. The findings of the ongoing investigation suggest that significant corrosion affected the structural integrity of the cylinder.

3. Casual factors

3.1. The remains of the exploded nitrogen cylinder and other three cylinders from the same frame, along with a randomly selected representative cylinder from another bank of cylinders were taken to the Transport Accident Investigation Commission's technical facility in Wellington, New

[1] This Safety Alert is provided by the Bahamas Maritime Authority with the aim of highlighting incidents, lessons learnt and to increase awareness, which may help avoid similar incidents occurring elsewhere. Any queries on the content of the information provided should be referred to the party providing the information

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Zealand, where an examination was made by a contracted independent expert metallurgist.

3.2. The examination results concluded that the damaged nitrogen cylinder had suffered significant corrosion at the point of failure. The corrosion had developed on the outside of the cylinder and internal wall of the surface was clear of corrosion. Corrosion had reduced the thickness of the cylinder wall by 75% at the point of failure (from 6 millimeters to about 1.5 millimeters).

3.3. The second area of corrosion was noted near the bottom of the cylinder and a third area where the protective coating had been scraped away to observe the cylinder's identification details.

4. Recommendation

4.1. It is recommended to have a visual inspection of the Nitrogen bottles at pre-determined periods and expiry dates should be recorded as part of the vessel's safety management system.

4.2. It is recommended to include a visual inspection to be part of the gas top-up procedure of the high-pressure gas cylinders. The drop in pressure may also indicate that the integrity of the pressure vessel has been compromised which should trigger a visual inspection. The visual inspection should be recorded as part of the vessel's safety management system.

4.3. A pressure vessel management system that ensures the fitness for service and safe operation of the pressure equipment on the vessel should be available upon request.

4.4. Ensure that the SOLAS convention is adhered to in regard to the survey, inspection and maintenance requirements of lifeboat launching appliances.

4.5. It is recommended to have hydraulic accumulators inspected by a competent pressure vessel inspector to ensure any corrosion present is within acceptable limits of the design corrosion allowance

5. Validity

5.1. This alert is valid until further notice.

6. Revision History

Rev.0 (16 August 2018) – First issue