Transportation Safety Board of Canada
Bureau de la sécurité des transports du Canada

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M17C0220

DEC 14 2017

Ms. Jane Weldon
Director General, Marine Safety and Security
Transport Canada
Tower C, Place de Ville, 11th Floor
330 Sparks Street
Ottawa, ON
K1A 0N5

Dear Ms. Weldon:

RE : Marine Safety Advisory Letter No 04/17
Overheating of hydrodynamic fluid coupling and subsequent fire

On 15 September 2017, the tug *Brochu*, with 3 people on board, sustained a starboard fluid coupling malfunction resulting in a fire in the engine compartment. Using its port engine, the tug returned to its berth where fire fighters and the tug's crew extinguished the fire. No injuries or pollution were reported but the fire caused extensive damage to the tug. The Transportation Safety Board of Canada (TSB) investigation into this occurrence is ongoing (TSB Occurrence M17C0220).

The tug is equipped with 2 cycloidal propellers coupled to 2 main engines by 2 hydrodynamic fluid couplings. Each fluid coupling is equipped with a mechanical thermal switch that will trigger an audible and visual alarm to alert the operator when the couplings overheat. The fluid coupling is also equipped with three fusible plugs that melt when the temperature reaches a higher preset value in order to drain the coupling oil, which stops all power transmission thus preventing excessive pressure build-up inside the coupling.

Canada

On the day of the occurrence, the tug *Brochu* and a sister vessel, the *Vachon*, were assisting a fully loaded bulk carrier leaving the port at low tide. When the stern of the bulk carrier touched bottom, the aft tug began pulling at maximum power. Shortly after, the tug's starboard fluid coupling high-temperature alarm sounded in the wheelhouse. The tug continued to pull at maximum power increasing the internal temperature of the coupling, melting the fusible plugs and releasing the oil into the machinery space. The hot oil vaporized and ignited when it made contact with a hot surface (either the engine exhaust manifold or by a spark that may have come from the nearby generator).

The TSB's post-occurrence examination of the *Brochu* revealed the following unsafe conditions that affected the crew's health and safety, and the tug's machinery operation, rendering it vulnerable to extensive damage in case of a coupling malfunction:

- The engine was kept at maximum power when the high-temperature coupling alarm sounded;
- The crew was not aware of the significance of the alarm, nor was it provided with specific training on what to do in such cases;
- The operational temperature of the coupling, being the principal indication of its condition, was not monitored by a continuous temperature monitoring system or monitored with a manual mean.

The on-going investigation has determined that at least 798 vessels worldwide may have similar arrangements.

The aforementioned is provided so that you may take whatever measures are considered appropriate in the circumstances. The TSB would appreciate being advised of any such action. Moreover, an investigator may follow up with you at a later date.

Yours sincerely,

Marc-André Poisson
Director of Investigations – Marine

cc Department of National Defence
National Transportation Safety Board
Lloyd's Register, Marine
American Bureau of Shipping
Océan
Halifax Transit, Ferry service
Atlantic Towing Ltd.
Newfoundland Transshipment Ltd.
Coastal Transport Limited
Waterbridge Ferries Inc
Northumberland Ferries Ltd.
Canada Govt Transnova Scotia

BACKGROUND INFORMATION

TSB Occurrence No: M17C0220

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TYPES OF TSB SAFETY COMMUNICATIONS

GENERAL

The purpose of a safety communication is to ensure that identified risks are communicated to those persons or organizations best able to effect change to convince them to take remedial action.

OCCURRENCE BULLETINS

An occurrence bulletin is a formal, written, safety communication used to inform regulatory or industry stakeholders of potential operational or technical concerns that were uncovered by the TSB's initial examination of the circumstances surrounding an occurrence. Bulletins contain only factual information.

SAFETY INFORMATION LETTERS

Safety information letters are generally concerned with safety deficiencies posing relatively low risks, and are used to inform regulatory or industry stakeholders of unsafe conditions that do not require immediate remedial action. Safety information letters are used to pass information for the purposes of safety promotion or to support or clarify issues that are being examined by a stakeholder.

SAFETY ADVISORY LETTERS

Safety advisory letters are concerned with safety deficiencies that pose low to medium risks, and used to inform regulatory or industry stakeholders of unsafe conditions. A safety advisory letter suggests remedial action to reduce risks to safety.

SAFETY CONCERNS

Safety concerns focus on an identified unsafe condition for which there is insufficient evidence to validate a systemic safety deficiency. However, the risks posed by this unsafe condition warrant highlighting. A safety concern provides a marker to the industry and the regulator that the Board has insufficient information to warrant further recommendations at this time; however, as more data and analysis become available, the Board will return to this unsafe condition if it is not readily redressed.

SAFETY RECOMMENDATIONS

The *Canadian Transportation Accident Investigation and Safety Board Act* (*CTAISB Act*) makes specific provision for the Board to make recommendations to correct identified safety deficiencies. Recommendations are used to address those systemic safety deficiencies posing the highest risks to the transportation system and, therefore, warranting the highest levels of regulatory and corporate attention.

RESPONSES TO TSB SAFETY COMMUNICATIONS

The *CTAISB Act* requires that federal ministers provide formal responses as to actions taken or planned in response to TSB recommendations. The Act does not mandate responses by other stakeholders to whom Board recommendations are issued. Notwithstanding, these stakeholders are requested to provide a response, and normally do so.

Although responses to other forms of safety communications are not requested or expected, the TSB often receives responses to safety advisory and safety information letters, and the substance of these responses are reflected in the Board's investigation report.