



# UNITED STATES COAST GUARD

U.S. Department of Homeland Security

## MARINE INVESTIGATIONS LESSONS LEARNED

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Lessons Learned 01-10

### TOWING VESSEL STABILITY REQUIREMENTS

This document presents lessons learned during a casualty investigation. It provides useful information for marine inspection and investigation personnel in addition to owners and operators of Towing Vessels and other vessels having similar characteristics.

#### Stability Requirements

Several years ago an ocean going towing vessel sank forty miles off the Eastern seaboard during inclement weather involving with 40-50 knot winds and 15-20 foot seas. At the time of the casualty the towing vessel was towing a loaded barge containing about 175,000 barrels of oil. Prior to the casualty, the towing vessel had no material failures or deficiencies. Its systems, equipment, and components were all operating as designed. The causal factors of the casualty consisted of multiple human errors which had disastrous results when the vessel was experiencing extreme environmental conditions. Several senior crewmembers onboard the vessel erred by operating the vessel without regard for the vessel's stability letter. They were non-compliant with the letter and also demonstrated a general lack of knowledge of the letter's content, specifically the "Operating Restrictions" section.

Stability letters apply to a vessel at all times and are continuously in effect. Although vessel stability letters are addressed to the master, all of the deck officers are responsible for stability issues. Vessel engineers are also responsible to ensure that the master and other deck officers are aware non-compliance issues that take place within the engine room. The letter's "Operating Restrictions" may state that certain restrictions only apply when the vessel is underway. There are standard phrases that are on every stability letter. The ones that applied to this casualty follow:

- 1) TANKS: No more than one centerline tank or P/S tank pair of potable water, lube oil, dirty oil and ballast water and two P/S pair of fuel oil tanks may be partially filled at one time.
- 2) TANKS: Any cross-connections between port and starboard tank pairs shall be kept closed at all times when underway.
- 3) LIST: You should make every effort to determine the cause of any list of the vessel before taking corrective action.

In this instance the master allowed other deck officers and engineers to initiate ballast operations to correct minor lists. He never directed anyone to determine the cause of the lists. The engineers routinely left fuel tanks cross-connected on the P/S tank pairs that were feeding the day tank per standard company/industry-wide practice. In this specific incident an additional set of P/S fuel oil tank pairs were also cross-connected. These seemingly inconsequential practices and other improper ballasting actions caused the vessel to develop a significant port list which initiated a hydrostatic balancing condition. The practice occurred during a severe storm thus exacerbating the negative effects.

Hydrostatic balancing is a condition that occurs when a vessel heels or lists enough to cause fuel (or other tank fluids) from the higher tanks to flow (through cross-connected valves) to the lower tanks, moving the center of the fuel weight (or other fluid) off of the centerline and increasing the heel angle. Fluids from the higher tank when cross connected with the lower tank may actually “press up” the lower tank and cause fluid to flow out of the lower tank’s vent(s).

In this particular case the vessel’s list continued to increase due to hydrostatic balancing until additional flooding occurred through the stack vents. The engine room eventually flooded sufficiently enough to cause the vessel to sink.

The Coast Guard **strongly reminds** vessel owners and operators to ensure that all deck officers and engineers are fully apprised of the vessel’s stability letter requirements and that the vessel is operated in compliance with those requirements at all times.

The full report of investigation for the TUG VALOUR sinking can be found at <http://marineinvestigations.us> > Marine Casualty Reports> Other Narrative Type Marine Casualty Reports.”

This document is provided for informational purposes only and does not relieve any domestic or international safety, operational or material requirement. Developed by the Headquarters Office of Investigations and Analysis and the Investigations Division. Questions regarding the casualty may be addressed to LCDR Charles Barbee, [Charles.B.Barbee@uscg.mil](mailto:Charles.B.Barbee@uscg.mil) .

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