



The BARGE 101

¹ OMS is now part of the Washington State Department of Ecology's Spill Prevention, Preparedness, and Response Program

OVERVIEW

On December 30, 1994, BARGE 101 grounded while being towed by the tug MERCURY to Jack Island, Washington (near Anacortes) from Vancouver, British Columbia. At the time of the grounding, BARGE 101 was carrying 62,404 barrels of number two diesel oil, and had a draft of 16-feet 5 inches forward and 19-feet 5 inches aft.

The grounding punctured the number four and six starboard cargo tanks. Damage to the bottom of BARGE 101 was found on the starboard side of the centerline, beginning at midships then continuing aft in an almost straight line to the stern of the barge. The bottom plating was upset approximately four to six inches in the stern area, with deeper upsets and fractures in cargo tanks number four and six starboard, near the turn of the bilge.

The grounding resulted in an estimated 26, 936 gallons of diesel oil spilled.



-- Chart section showing the area transited. (Not for navigational use.) --

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PROBABLE CAUSE

The Office of Marine Safety (OMS) determines that the probable cause of the grounding of BARGE 101 was the Master's failure to accurately navigate the tug MERCURY and BARGE 101 near charted navigational hazards. This occurred as a result of a failure to follow established navigation procedures.

While it could not be established with certainty, BARGE 101 most likely grounded in the vicinity of Clements Reef (a charted navigation hazard) en route to Jack Island, Washington. The U.S. Coast Guard Vessel Traffic Center (VTC) sector operator described tug MERCURY to be at the southern edge of the southbound traffic lane approaching the Clements Reef area.

Shortly after passing the Reef the sector operator found the tug and barge to be approximately 1/2 mile out of the traffic lane, just north of Matia Island. As the tug and barge were passing the Reef, the tide was ebbing, which would have the tendency to set the vessels south toward the reef.

Contributing to the cause of this incident were:

- Failure of the tug's Master to follow the company's (Crowley Marine Services, Inc.) established plotting procedures - neither a trackline nor fixes were plotted on a chart;
- Failure of the Master to use navigational instruments at his disposal to accurately determine the vessel's position; and
- Failure of the Master to sufficiently compensate for the effect of tidal current.

SAFETY ISSUES

Safety issues discussed in this report are:

- The importance of following established navigation procedures; and
- The significance of checking a vessel's position using multiple navigational instruments and plotting a vessel's position on a chart.

VESSEL INFORMATION

BARGE 101 was built in 1968 in Portland, Oregon. It is 300 feet long, with a breadth of 80 feet and a depth of 27.3 feet. The gross tonnage is 5,498 and the barge is certified by the U.S. Coast Guard to carry Grade A or below petroleum cargo. The tug MERCURY was built in 1966 in San Diego, California. It is 105.7 feet long, with a breadth of 29.7 feet and a depth of 12 feet. MERCURY's gross tonnage is 195 and shaft horsepower is 4,250.

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POST ACCIDENT INVESTIGATION

The Master, who had operated towing vessels for over 16 years in Puget Sound, stated the barge was about 1,000 feet behind the tug and was towing well in calm seas as he assumed the watch at 1915.

At 2109 hours the Master checked into the U.S. Coast Guard Vessel Traffic Service (VTS). At this time the tug and barge were just north of Patos Island and near the outer edge of the southbound traffic lane. Coast Guard VTS reported that there was no other deep draft vessel traffic in the area.

The current was ebbing in the Patos Island and Matia Island area, with predicted maximum ebb north of Matia Island occurring at 1901 hours on December 30, 1994. If not compensated for, the ebb current would set the tug and barge to the south and out of the traffic lanes toward Clements reef. The Master stated that there was a 2 to 3 foot chop (wind wave) in the Clements Reef area.

The Master explained he navigated the tug using only visual and radar bearings and ranges. He did not plot these bearings on a chart and did not prepare a trackline. The chart used by the Master (chart number 18421) contained various penciled tracklines from previous trips and it was not the best scale chart for the area.

The Master stated he passed within 1/4 mile of Clements Reef, but that his estimates of distance may be off by as much as 1/4 mile. While passing the Clements Reef area the Master made two course changes. Each course change was 5 to 7 degrees to port. He stated the course changes were necessary to compensate for the ebbing current. These course changes were intended to maneuver the tug and tow away from the Reef.

The Coast Guard VTS sector watchstander stated that the tug followed the southern edge of the southbound traffic lane as it made its way south. Sometime after the tug passed Clements Reef buoy, the sector watchstander's attention was diverted elsewhere and he did not observe the tug for several minutes.

When the watchstander next observed the tug and barge, they were just north of Matia Island, south of the traffic lane by approximately 1/2 mile. At this time, the watchstander first asked the master his speed and then told him that the VTS radar showed the tug south of the traffic lanes. The Master replied, "Roger, Out," and the VTS watchstander observed the MERCURY return to the southbound traffic lane.

Damage to BARGE 101 was not detected until about 2345, near Jack Island as the MERCURY tied up to BARGE 101. At that time the crew observed diesel oil in the water around the barge. A spill response effort by Crowley Marine Services (CMS) followed.

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INCIDENT ANALYSIS

- Navigation Procedures

Good seamanship and watchstanding require the plotting of fixes and tracklines at periodic intervals on a chart. Radar bearings and ranges, visual bearings, the Global Positioning System (GPS), and the echo sounder were all available to assist the Master in fixing and verifying the tug's position.

During the investigation the Master stated that CMS does not require the plotting of a track line or fixes when navigating. However, the CMS Manual states, "Vessel position shall be fixed and marked on the chart at least every hour (ocean navigation), every half-hour (near coastal), or every quarter hour (inside waters)." In this case, half-hour fixes were required at a minimum under Crowley procedures. The Master of the MERCURY did not use the GPS receiver available to verify the tug's position and did not plot any positions on the chart.

- Currents

The ebb currents in the vicinity of Sucia and Matia Islands set in a southerly direction, but vary in strength between locations. The ebbing currents in the vicinity of Matia Island were predicted to be between 0.5 and 1.5 knots as the MERCURY was transiting the area.

Reid's Primer Of Towing¹ states, "A closer eye is required on the actual navigation of the tug than on conventional ships. Since tugs with a tow are going much slower than the average freighter or tanker, the effects of set and drift are proportionately greater."

With the tug and barge moving at 8.5 to 9.0 knots, by the Master's account, the ebbing current of approximately 1 knot would set the tug and tow off course one mile for every 8.5 to 9 miles traveled. Since the current was from the north, the tug would be pushed in a southerly direction and towards Clements Reef without a compensating course adjustment.

The Master stated that he had to alter course several times while in the vicinity of Clements Reef to adjust for the current. Since the Master was not plotting fixes on the chart, he could not have known the exact location of the tug and barge relative to the reef and could not compute set and drift.

¹ George H. Reid, 1992. Primer of Towing, Second Edition. Centreville, Maryland: Cornell Maritime Press, Inc.

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- Vessel Traffic Service Procedures

Vessels, and especially laden tank vessels, operating near a known navigational hazard such as this reef, and being set by current toward the navigational hazard, may deserve special attention or handling by VTS watchstanders. An earlier call of concern from VTS may have prompted the Master to pay more attention to his position.

RECOMMENDATIONS

As a result of this investigation, the Office of Marine Safety makes the following safety recommendations:

To the Owners/Operators of tugs and barges –

- Review fleet-wide navigational procedures. Ensure that these procedures provide adequate guidance regarding the prudent use of tracklines for voyage planning, and of appropriate fix intervals under varying conditions (i.e., proximity to shoal water, traffic density, tidal current, visibility, etc.);
- Review the training provided to vessel operators and ensure that the importance of following company navigation procedures is clearly conveyed;
- Review fleet navigational procedures regarding the use of available navigational equipment. Emphasize the use of all available navigation equipment and the importance of cross-checking to prevent errors;
- Require the use of the largest scale charts for the area to be navigated;
- Develop and adopt a system to "quality" check a tug's logbooks and charts for proper entries. Actual practices should be gauged against standard practice to determine conformity.

To Vessel Traffic Services –

- Encourage VTS watchstanders to communicate concerns early and directly when a vessel may be straying into danger.

In response to this incident, CMS has reviewed and strengthened their log-keeping requirements; reviewed their training and recommended greater emphasis on voyage planning and bridge management; rededicated their program to regular crew performance and qualification check rides; and publicized pertinent aspects of this incident to all of their tug officers.

Ecology is an equal-opportunity agency. If you have special accommodation needs, contact Mariann Cook Andrews at (360) 407-7211 or (360) 407-6006 (TDD).