

MARINE OCCURRENCE REPORT

M98L0128

GROUNDING

PETROLEUM TANKER "MORUY"

CHAMPLAIN, QUEBEC

29 SEPTEMBER 1998

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

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Summary

On 29 September 1998, the Venezuelan registered petroleum tanker "MORUY" was proceeding up the St. Lawrence River bound for Montreal, Quebec, with a cargo of 31,653 metric tonnes of diesel oil. Under the conduct of a pilot, the tanker was in the vicinity of Champlain, Quebec, when the vessel experienced a partial electrical failure affecting the steering system. Despite attempts to regain control and before an anchor could be dropped, the vessel grounded near buoy C-17. The vessel's forepeak was ruptured but there was no pollution and no one was injured.

Ce rapport est également disponible en français.

Factual Information

	"MORUY"
Port of Registry	Maracaibo
Flag	Venezuela
Registry/Licence Number	AJZL-11412
Type	Petroleum tanker (refined product)
Gross Tons ¹	34,422
Length	208 m
Draught	Fwd: 10.10 m Aft: 10.30 m (prior to grounding)
Built	1983, Hitachi Shipyard, Innoshima, Japan
Propulsion	One Burmeister & Wain diesel engine developing 13,534 kW, driving a fixed-pitch propeller
Number of Crew	32
Registered Owners	PDV Marina S.A., Caracas, Venezuela

On 17 September 1998 the "MORUY" departed Skikda, Algeria, bound for Montreal, Quebec, with a cargo of 31,653 metric tonnes of diesel oil. Water ballast was carried in the No. 2 wing tanks and in the forepeak. The voyage across the Atlantic was uneventful.

At 2200² on September 27, while westbound in the Gulf of St. Lawrence, the vessel experienced a partial electrical failure affecting the steering system, bridge alarms and navigational equipment. The crew found that rain water had entered the emergency generator room through holes in the corroded deckhead and had leaked into the emergency switchboard, causing circuit failures. The incident was reported to the Canadian Coast Guard (CCG) who were also informed that repairs by the tanker's crew would take two to three hours. Vessels in the vicinity were advised accordingly. The leaking deckhead was temporarily repaired by using epoxy to seal the holes. A relay for the emergency generator breaker had to be changed and the emergency switchboard was sprayed with electrical cleaner. Upon completion of the temporary repairs the "MORUY" proceeded up-river towards Montreal.

On September 29 the weather was described as clear, visibility five miles, with an easterly wind at five knots. At 1422, under the conduct of a pilot, the vessel was passing buoy C-15 near Champlain, Quebec, when the officer of the watch (OOW) noticed a fluctuation of the lights on the bridge alarm panel. The helmsman then reported that the vessel was not responding to

¹ Units of measurement in this report conform to International Maritime Organization (IMO) standards or, where there is no such standard, are expressed in the International System (SI) of units.

² All times are EDT (Coordinated Universal Time minus four hours) unless otherwise noted.

steering commands. Steering control was immediately switched to the alternate power system, and then changed from “wheel” mode to “non follow-up” (nfu). It was reported that, despite these efforts, the vessel still failed to respond to the helm.

The master sent the OOW with a handheld radio, to the emergency steering position in the steering gear flat, where he found the second engineer already awaiting orders from the bridge. The No. 2 (port) steering pump, which receives power directly from the main switchboard, was seen to be operating. Both officers assisted in switching the steering from bridge control over to local emergency control. In response to a radioed bridge command, the rudder was put hard-a-starboard, but at 1424 the “MORUY” had already swung to port out of the channel and had grounded by the bow near buoy C-17 at position 46°25' 54" N, 072°21' 00" W.

The master immediately put into effect the emergency procedure for grounding. A team of crew members proceeded to sound all cargo oil, ballast, and engine-room double-bottom tanks. After ensuring that the vessel's condition was stable and that she was not leaking oil, permission was given by Transport Canada Marine Safety (TCMS) for the transfer of sea water ballast from the forepeak and No. 2 port and starboard wing tanks, in order to make the forward end of the vessel more buoyant.

At 1705 the bosun heard the sound of water flowing into the forepeak tank. The ballast transfer was stopped and the forepeak was found to be holed and taking in river water.

By 2315 the interior of the emergency switchboard had been thoroughly cleaned, various relays and breakers were replaced, and power was restored to the steering and navigation systems.

On October 1 at approximately 1000 the “MORUY” was refloated with the assistance of tugs and escorted to Trois-Rivières, Quebec, for inspection. There was no pollution as a result of the grounding and no one was injured.

TCMS inspected and subsequently detained the vessel in accordance with provisions of the *Canada Shipping Act*, pending completion of the following items:

- Cleaning and verification of electrical connections within the emergency switchboard;
- Provision of complete drawings of the steering gear emergency alarms and indicator lights;
- The emergency switchboard cable entries made weathertight;
- The steering gear audible alarm rendered functional;
- The deckhead of the emergency generator room permanently repaired and satisfactorily water-tested;
- The bell on the steering gear emergency telephone made functional;
- Witnessing of the rudder angle indicator functioning properly on emergency power;
- An underwater inspection conducted to determine the extent of damage to the forepeak; and

- other items not relevant to the actual grounding.

As a result of the grounding, the vessel sustained two cracks in the starboard side bottom plating in way of the forepeak.

Other Factual Information

The “MORUY” was classed by the American Bureau of Shipping (ABS) and complied with Venezuelan and international regulations for her intended trade. The vessel operated in accordance with the International Safety Management (ISM) Code and was certificated, crewed and equipped in compliance with existing regulations.

The vessel’s steering system consisted of two electro-hydraulic pump units serving four rams connected to the tiller head and rapson slide gear. Steering motor-pump unit No. 2 was supplied with electricity directly from the main switchboard in the engine control room.

Motor-pump unit No. 1 was powered from the emergency switchboard located in the emergency generator room on the port side of the boat deck. For the operation of steering gear, regulations stipulate that “where a ship is equipped with two or more steering gear power units that are capable of simultaneous operation, the ship shall have at least two of those units in operation in areas where navigation demands special caution.”³

Steering control was provided by an electric synchro-system utilizing a rotary transmitter on the bridge and a corresponding receiver in the steering flat. The control system was supplied with two independent sources of power, namely from the main or emergency switchboards. On the bridge, the rudder indicator and the steering station alarms and warning lights received 24-volt D.C. electrical power either from the emergency switchboard or directly from an emergency battery pack.

The steering gear arrangement on the “MORUY” met all international standards for a vessel of her size, type and year of construction.⁴

In August 1998 the vessel had been dry-docked in Europe when temporary repairs were carried out to local areas of the corroded deck over the emergency generator/switchboard room.

When undergoing a safety drill on September 26, three days prior to the grounding, the vessel’s crew had practised emergency procedures for grounding.

³ CSA 81 Steering Appliances and Equipment Regulation 11 [Per SOLAS Convention 1974 (1997 edition), Chapter V, Regulation 19-1]

⁴ SOLAS ‘74 (1997 edition), Chapter II-1, Part C, Regulation 29

Prior to the vessel going aground, the engineers on watch had no indication at the control console of any electrical ground faults emanating from the emergency switchboard. Following the grounding, the emergency switchboard was found to be very dirty with evidence of arcing present on several contacts. The switchboard frame and the deck underneath were corroded. After the vessel was repaired and refloated, the repaired deckhead plating of the emergency generator room was ensured weathertight by hose-testing conducted in the presence of a TCMS surveyor.

Analysis

On most vessels, the emergency generator/switchboard room is located as high above the waterline as practicable and the room enclosure, doors, and ventilators are rendered weathertight. This location serves to protect against the ingress of sea water in heavy weather conditions. However, at boat deck level, the emergency generator room deckhead on the "MORUY" was extensively corroded. This allowed rainwater and sea spray to leak into the compartment below where it flowed along a series of electrical cables leading to the emergency switchboard. Because the cable glands entering the switchboard were not weathertight, the water penetrated the switchboard and caused electrical grounds and short circuiting, which affected one hydraulic steering pump unit, alarm/indicator lights, and the rudder angle indicator.

Had the deckhead been permanently repaired and properly hose-tested during the previous month when its deteriorated condition first became known in dry dock, such water damage to the emergency switchboard would not have occurred during the voyage within Canadian waters.

It is standard practice for a vessel such as the "MORUY" to have both pump units in operation when manoeuvring in confined waters. However, it is not known whether both steering pumps or just one had been operating prior to the accident and it is not known with certainty why, just prior to the grounding, the vessel failed to respond to the helm when the navigating crew switched the steering control from one control system to the other. If only one pump unit was in service at the time of the electrical failure, it could have contributed to a momentary loss of steering capability during the emergency switch-over process.

On the "MORUY", one steering control system received electrical power from the main switchboard, and the other from the emergency switchboard. When the emergency switchboard was disabled by water entry, control power was still available from the main switchboard. However, the rudder angle indicator and steering station alarms and warning lights ceased to function, when the 24-volt control power from the emergency switchboard was disrupted. Consequently, the bridge crew were unable to ascertain the operational status of the steering gear. However, an inspection of the system revealed that the steering gear control system powered via the main switchboard was still operational.

Had an alternative power circuit and source been available to the bridge control panel alarms and indicator lights, the helmsman and OOW would have been aware of the true operational status of the steering system and they could have continued to navigate the vessel within the channel and avoided grounding.

Findings

1. Two days prior to the grounding, water entered the emergency switchboard, causing loss of power to navigation instruments and steering equipment.
2. The emergency generator room deckhead was temporarily repaired but not tested weathertight before the vessel proceeded up the St. Lawrence River.
3. When the vessel neared Champlain, the effect of water and dirt in the emergency switchboard caused a partial electrical failure for a second time in Canadian waters.
4. The vessel suffered a temporary loss of power to the steering equipment, and permanent loss of power to the rudder angle indicator and steering gear indicator lights.
5. After the power failure, one steering pump was operational and one means of steering control was still available at the helm position on the bridge.
6. The navigating personnel could not determine that the steering gear was still operational.
7. The "MORUY" grounded, causing damage to the forepeak tank.
8. The extensively corroded condition of the emergency generator room deckhead was known to the crew prior to the vessel entering Canadian waters.
9. International regulations do not require redundant electrical circuits for rudder angle indicators or alarm /indicator lights.
10. The design of the steering control system and instrumentation met all applicable international regulations.

Causes and Contributing Factors

The vessel grounded after water leaked through a corroded deckhead and into the emergency switchboard housing, causing short-circuiting and loss of electrical power to the steering control systems.

Contributing to the occurrence was the lack of maintenance on the deck over the emergency generator room, the dirty condition of the switchboard, and the lack of an alternate power system to the rudder angle indicator and steering gear alarms/indicator lights on the bridge.

Safety Action Taken

As a result of this, and several other occurrences, TCMS - Quebec City has completed a study on steering gear failures. Consequently, TCMS will introduce a proposal to amend *TP 127 Ship Electrical Standards* to provide a redundancy in the steering gear remote control system, alarm and indication system, and the electrical supply to the rudder angle indicator. They will be introduced to the Design and Engineering Working Group at the Canadian Marine Advisory Council early in 2000.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release of this report on 19 August 1999.