

MARINE OCCURRENCE REPORT

M97L0035

GROUNDING

OF THE BULK CARRIER "JEANNIE"  
IN THE APPROACHES TO LOTBINIÈRE, QUEBEC  
10 MAY 1997





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.

## Marine Occurrence Report

### Grounding

of the Bulk Carrier “JEANNIE”  
in the Approaches to Lotbinière, Quebec  
10 May 1997

Report Number M97L0035

### *Synopsis*

On 10 May 1997, the Greek bulk carrier “JEANNIE” was sailing up the St. Lawrence River bound for Montreal, Quebec, with a cargo of manganese. While the vessel was in the approaches to Lotbinière, the steering gear failed. The vessel yawed to port and grounded on the south edge of the channel. There was no injury or pollution as a result of this occurrence, but the vessel sustained hull damage.

The Board determined that the “JEANNIE” ran aground because a steering gear hydraulic hose failed and the crew of the vessel could not intervene and regain steering control before the two power units became inoperative.

*Ce rapport est également disponible en français.*



---

1.0	Factual Information .....	1
1.1	Particulars of the Vessel .....	1
1.1.1	Description of the Vessel.....	1
1.2	History of the Voyage.....	1
1.3	Injuries to Persons.....	2
1.4	Damage .....	2
1.4.1	Damage to the Vessel .....	2
1.4.2	Damage to the Steering Gear .....	2
1.5	Certification .....	3
1.5.1	Vessel.....	3
1.5.2	Personnel.....	3
1.6	Tide Information .....	3
2.0	Analysis .....	5
2.1	Breaking of a Hydraulic Hose .....	5
2.2	Alarms .....	5
2.3	Reservoirs.....	5
2.4	Regulations.....	5
2.5	Compatibility with International Requirements .....	7
3.0	Conclusions .....	9
3.1	Findings.....	9
3.2	Causes .....	9
4.0	Safety Action.....	11
4.1	Safety Concern.....	11
5.0	Appendices	
	Appendix A - Glossary .....	13



## 1.0 *Factual Information*

### 1.1 *Particulars of the Vessel*

	"JEANNIE"	
Official Number	9407	
Port of Registry	Piraeus, Greece	
Flag	Greece	
Type	Bulk carrier	
Gross Tons <sup>1</sup>	15, 627	
Length	183.04 m	
Draught	Forward: 7.10 m	Aft: 7.67 m
Cargo	Manganese	
Crew	24	
Built	1977, Southwick, Sunderland	
Propulsion	One 7,282 kW diesel engine driving a fixed-pitch propeller <sup>2</sup>	
Owners	Litsopoulos Sotiris, Tomazos Shipping Co. Ltd., Piraeus, Greece	

#### 1.1.1 *Description of the Vessel*

The "JEANNIE" is a conventional bulk carrier for general cargo. The vessel is strengthened for heavy cargoes, and the main deck is equipped with four cranes. The accommodation and machinery spaces are aft.

## 1.2 *History of the Voyage*

On 10 May 1997, the "JEANNIE," on a voyage from Boulogne, France, was bound for Montreal, Quebec. The vessel, under the conduct of a pilot, was abeam of Lotbinière, Quebec, when the bridge watch realized that the rudder angle indicator was hard-a-port. They tried in vain to bring the vessel back on course by changing the steering gear mode from the steering position

<sup>1</sup> Units of measurement in this report conform to International Maritime Organization standards or, where there is no such standard, are expressed in the International System of units.

<sup>2</sup> See Glossary for all abbreviations and acronyms.

on the bridge. At approximately 2255, the “JEANNIE” grounded on the south edge of the channel in the approaches to buoy Q83, before the anchor could be let go or the main engine put astern.<sup>3</sup>

After the grounding, the tanks were sounded and it was found that only the forepeak was holed. The vessel’s pumps were unable to reduce the level of water in the tank below the waterline forward.

On May 11, at approximately 0700, two tugs departed the Port of Québec to assist the bulk carrier. At approximately 1010, as the tugs arrived on the scene, the vessel refloated herself on the rising tide. At 1043, the vessel advised the Quebec Marine Communications and Traffic Services that she had refloated and was anchored on the north side of the channel.

The steering gear of the “JEANNIE”, manufactured by Donkin & Co. Ltd., is of the articulated-cylinder type. The gear consists of two units, each including two double-action cylinders. Each unit is fitted with a constant-speed pump. These pumps are mounted on a single hydraulic fluid reservoir. A multiple-valve collector isolates either of the units for maintenance or emergency manual operation.

### *1.3 Injuries to Persons*

No one was injured as a result of this grounding.

### *1.4 Damage*

#### *1.4.1 Damage to the Vessel*

As a result of the grounding, the forepeak was holed and the hull plates and internal structure of the forepart sustained significant deformation. The repairs to the structure required nearly 43 tons of steel.

#### *1.4.2 Damage to the Steering Gear*

Inspection of the steering gear compartment revealed that a hydraulic system hose separated from the coupling and that the hydraulic fluid reservoir emptied onto the deck of the compartment.

---

<sup>3</sup> All times are expressed in EDT (coordinated universal time (UTC) minus four hours) unless otherwise indicated.



## *1.5 Certification*

### *1.5.1 Vessel*

The vessel met the certification requirements in accordance with existing regulations.

### *1.5.2 Personnel*

The crew held the appropriate certificates for their positions and for the service in which their vessel was employed.

## *1.6 Tide Information*

At the time of the grounding, the tide was rising, with 1 hour 20 minutes to high tide. The predicted height of the high tide was 3.4 m. The next high tide was predicted for 1230, with a height of 3.8 m.



---

## 2.0 *Analysis*

### 2.1 *Breaking of a Hydraulic Hose*

Visual inspection of the hydraulic hose showed that it was hardened and cracked and that it had separated from the coupling. The deterioration of the hose is attributable to the surrounding sources of heat and wear. When a break occurs on a hydraulic component, the single reservoir quickly empties its contents because of the constant-speed pumps.

### 2.2 *Alarms*

When the amount of hydraulic fluid in the reservoir drops to a predetermined level, an alarm sounds in the engine control room. A crew member has to go into the steering gear compartment, identify the problem, shut off four valves using a special wrench, and then open two other valves to isolate the unit in trouble and thereby restore steering capability to the vessel. When the first person arrived in the steering gear compartment, the hydraulic fluid reservoir was already empty; thus, nothing could be done to counter the failure.

The low-level alarm apparently sounded in the engine control room. On the bridge, it was noticed that something was wrong when the rudder-angle indicator read hard-a-port and the helmsman could not return the helm amidships despite his efforts. The alarm was apparently not heard by the personnel on the bridge.

### 2.3 *Reservoirs*

In spite of the direct access to the steering gear compartment from the engine-room, the system was designed in such a way that it would have drained completely even with the intervention of an engineer. The two units are supplied by a single reservoir and there is no storage tank permanently connected to the hydraulic system. Had each of the units been fitted with an independent reservoir, the steering gear would have remained in operation without intervention by the personnel. On some of the more-recently built vessels, the steering gear remains in operation even when one of the units fails.

### 2.4 *Regulations*

Canadian regulations require that in the event of a failure, steering capability be maintained or *speedily* restored. The requirements are more stringent, however, for tankers and chemical tankers of over 10,000 gross tons. Such vessels have to be able to restore steering capability less than 45 seconds after failure of a power transmission system. In confined waters, all vessels should be able to regain steering capability in the event of failure regardless of their size or type.

Several domestic and foreign tankers and chemical tankers of less than 10,000 gross tons that transit the St. Lawrence River and other confined waters in Canada are not subject to these requirements.

The loss of hydraulic fluid from one of the systems must be able to be detected and isolated automatically so that another system or systems can remain operational.

The International Convention for Safety of Life at Sea (SOLAS), Ch. II-1, Part C, contains regulations for steering gear that are adopted by some classification societies and are also found in the *Canada Shipping Act*. These regulations apply to all convention vessels. Some of them read as follows:

– Regulation 29, Art. 1:

. . . [t]he main steering gear and the auxiliary steering gear shall be so arranged that the failure of one of them will not render the other one inoperative.

– Regulation 29, Art. 6.1.3:

. . . the main steering gear is so arranged that after a single failure in its piping system or in one of the power units the defect can be isolated so that steering capability can be maintained or speedily regained.

– Regulation 29, Art. 12.2:

. . . a low-level alarm for each hydraulic fluid reservoir to give the earliest practicable indication of hydraulic fluid leakage. Audible and visual alarms shall be given on the navigating bridge and in the machinery space where they can be readily observed; and

– Regulation 29, Art. 12.3:

. . . a fixed storage tank having sufficient capacity to recharge at least one power actuating system including the reservoir, where the main steering gear is required to be power-operated. The storage tank shall be permanently connected by piping in such a manner that the hydraulic systems can be readily recharged from a position within the steering gear compartment and shall be provided with a contents gauge.

## 2.5 *Compatibility with International Requirements*

Where the main steering gear comprises two identical power units, it should have the same capability and reliability as a main power unit fitted with an auxiliary steering gear, and be capable of being brought into operation from a position on the navigation bridge. In the event of a power failure to either of the steering gear power units, an audible and visual alarm must be given on the navigation bridge.

The steering gear of the “JEANNIE” met regulatory requirements at the time of its construction. This type of steering gear, in use on both foreign and Canadian vessels, can be modified to prevent such a failure.



### *3.0 Conclusions*

#### *3.1 Findings*

1. A steering gear hydraulic system hose separated from its coupling, causing the hydraulic fluid reservoir to empty.
2. The crew could not intervene in time to isolate the defective power unit.
3. A single reservoir supplied both steering gear units, and there was no storage tank permanently connected to the hydraulic system in such a manner that the system could be speedily brought back into operation.
4. No audible or visual alarm indicating the problem was noticed by the crew on the bridge.
5. Following the failure of her steering gear, the “JEANNIE” grounded, causing damage to her forepeak.
6. This type of steering gear is in use on both foreign and Canadian vessels.

#### *3.2 Causes*

The “JEANNIE” ran aground because a steering gear hydraulic hose failed and the crew of the vessel could not intervene and regain steering control before the two power units became inoperative.





## 4.0 *Safety Action*

### 4.1 *Safety Concern*

As a result of this occurrence, a TSB Marine Safety Advisory was forwarded to Transport Canada concerning the risk associated with a steering failure occurring within confined and high-traffic areas of Canadian waterways. The TSB data indicate that between January 1975 and May 1997, steering failures resulted in over 120 groundings, bottom contacts, and strikings in Canadian waters. The TSB determined that at least 15 steering gear failures on ships navigating in confined waters in Canada had been directly attributed to failure of hydraulic system components such as that experienced by the “JEANNIE.”<sup>4</sup> Of the affected vessels, three were loaded petroleum tankers under 20,000 gross tons, and one was a passenger ferry.

In reply to the TSB Advisory, Transport Canada indicated that the current requirements for hydraulic systems were considered to be adequate and that the incident rate of failures did not warrant a review of the requirements.

Subsequent to Transport Canada’s reply, five other vessels have grounded in confined waters of the St. Lawrence River and Great Lakes area as a result of steering gear failures,<sup>5</sup> including the 17,677 gross tons Liberian bulk carrier “APTMARINER” which went aground on 16 June 1998 in the St. Lawrence Seaway. The “APTMARINER” sheered and grounded on the edge of the channel in the Canal de la Rive Sud, suspending the traffic in the seaway. The causes of the steering failures in the latest five incidents are varied; however, what is common is that all the failures resulted in groundings due to either the failure being undetected by the crew or to the fact that when the failure was noticed, there was insufficient time for the crew to take corrective actions.

The vessels involved in these latest incidents apparently met the current requirements for hydraulic steering systems; yet, it was failures in these systems that precipitated the groundings that had the potential for severe consequences. The Board believes that additional measures—such as changes in operating and watchkeeping procedures on ships entering or operating in confined waters—could facilitate the timely detection of, and response to, steering system failures. Such a timely response would allow affected vessels to be controlled, either by rectifying the malfunction or by activating a standby system before an accident or incident occurred. Thus, the Board is concerned that the industry and regulators, notwithstanding the inherent risks of operating vessels in confined and congested waters, are not pursuing additional means to reduce the probability of occurrences in these waters as a result of steering system failures.

*This report concludes the Transportation Safety Board’s investigation into this occurrence. Consequently, the*

---

<sup>4</sup> Of the 15 incidents, 6 occurred after the 1990 promulgation of the current Marine Machinery Regulations.

<sup>5</sup> The “CANADIAN MARINER” on 18 June 1997, the “CANADIAN PROGRESS” on 15 May 1998, the “APTMARINER” on 16 June 1998, the “TADOUSSAC” on 09 July 1998, and the “GRANT CARRIER” on 13 July 1998.

*Board, consisting of Chairperson Benôt Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release of this report on 26 August 1998.*

*Appendix A - Glossary*

EDT	eastern daylight time
kW	kilowatt
m	metre
SOLAS	International Convention for Safety of Life at Sea
TC	Transport Canada
TSB	Transportation Safety Board of Canada