

MARINE INVESTIGATION REPORT

M99C0008

CONTACTING BOTTOM WITHOUT GROUNDING

BULK CARRIER "JEAN PARISIEN"

NEAR JOHNSON POINT, ST. MARYS RIVER, ONTARIO

23 APRIL 1999

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 faults or determine civil or criminal liability.

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Summary

On 23 April 1999 the Canadian bulk carrier "JEAN PARISIEN" was upbound in ballast in the St. Marys River with a maximum draught of 7.0 m aft. At 1815, the ship's bottom struck the 6.4 m project depth of the Middle Neebish Channel. The stern of the vessel had just cleared buoy Q16 and Q17 when the bridge navigating personnel felt an impact that caused the ship to shudder and observed a muddy swirl in the water astern of the vessel. After an initial inspection by the crew to determine the extent of the hull damage, the vessel proceeded to Sault Ste. Marie for an underwater inspection. The bottom shell plating had been breached with the resulting loss of watertight integrity.

Ce rapport est également disponible en français.

Other Factual Information

	"JEAN PARISIEN"
Port of Registry	Toronto, Ontario
Flag	Canada
Registry/Licence Number	368347
Type	Self-unloading bulk carrier
Gross Tonnage	22 772
Length	224.37 m
Breadth	22.94 m
Draught	Forward: 3.7 m Aft: 7.0 m
Built	Davies Shipbuilding, Lauzon, Canada, 1977
Propulsion	Twin 10-cylinder Pielstick diesel engines, 9000 brake horsepower, with a four-blade controllable-pitch Kort nozzle propeller
Number of Crew	23
Registered Owner	Canada Steamship Lines, Montréal

Description of the Vessel

The "JEAN PARISIEN" is an Inland Waters Class I (Great Lakes/St. Lawrence Seaway) self-unloading bulk carrier with the machinery space, crew accommodation, and navigation bridge located aft. The vessel has six holds, a set of side shell ballast tanks for each hold and a double bottom subdivided by a centre girder into port and starboard compartments. The vessel is equipped with main engine bridge controls, a Kort nozzle propeller and a 1000 brake horsepower bow thruster. The maximum open water speed is 13 knots.

History of the Voyage

On 22 April 1999, at 1905 eastern daylight time, the "JEAN PARISIEN" departed Lambton, Ontario, bound for Superior, Wisconsin, in ballast. The departure draughts were 3.7 m forward and 7.0 m aft. It was the crew's initial voyage of the season on the Great Lakes. The voyage was proceeding normally and without incident. All the mechanicals, electrical and navigation systems were operating satisfactorily.

On 23 April 1999, 45 minutes before the vessel arrived at De Tour Reef Light, the master was called on the bridge to take control of the navigation. At 1610 the "JEAN PARISIEN" entered the St. Marys River. The bridge watch consisted of the master, the officer of the watch (OOW), and the helmsman. The master was piloting the vessel by visual means. The OOW was monitoring the navigation using the radar and an electronic chart. The visibility was good, and winds were northeast at 10 knots. The ship's position was reported to the United States Coast Guard (USCG) Vessel Traffic Services, known as "Soo Control." A notice to mariners cautioned the bridge navigating personnel of the low water level in the St. Marys River. There was no ice or traffic reported in the vicinity of the vessel.

At Mud Lake Junction Buoy, the engine speed was reduced to slow the vessel's speed from 10 to 7.8 knots. While on the Winter Point range, the gyro compass was checked for error and verified accurate. The OOW reported the ship's position to Soo Control. The master altered the vessel's heading and proceeded on Course 9. At about 1806 the "JEAN PARISIEN" was steered on the Sailor's Encampment range, 017° true (T) in the 8.2 m (27 foot) project depth lane of the Middle Neebish Channel. The helmsman steered the vessel as directed using the left-hand range lights. When the vessel passed buoy Q14 with an approximate speed of 7 knots, the master further reduced the engine's revolutions per minute in preparation for the next alteration at Johnson Point. In this section of the river, a southeasterly current tends to set the vessel to starboard of the range's recommended track. By steering 016°T the vessel made good a course of 017°T over the ground.

Anticipating a port set after buoy Q16, the master favoured the centre of the Neebish Channel as he adjusted the course to steer between the two recommended navigable tracks provided by the sets of ranges and day beacons. The helmsman, as directed, adjusted the heading by steering 017°T. Upon completion of the new heading change, the vessel continued to set to starboard, not to port as anticipated. The ship's drift to starboard was confirmed visually by observing that right-hand day beacons continuing to close. At 1815, with more than half the ship's length past buoy Q16 and Q17 and the ship's speed at 6.7 knots, a noise was heard as the bottom shell plating contacted the river bottom. The vessel scraped the river bottom momentarily but maintained its course and heading as it passed buoy Q16. At that point the helmsman observed that the right-hand side day beacons were aligned, indicating that the vessel was in the eastern, shallower 6.4-m-deep section of the channel. The vessel contacted the river bottom at position latitude 46°14.75' N, longitude 084°06.3' W.¹ In this section of the channel, the river bottom is hard and forms a ledge with a minimal clearance below chart datum of 6.5 m (see Appendix A).

Upon impact, the master again reduced the engine speed to bare steerage way and turned on the bow thruster. He then ordered a series of helm orders to clear the obstacle, after which the vessel's course and speed were resumed to negotiate the turn at Johnson Point. He then ordered an officer to sound the water ballast tanks to determine if there was flooding in any of the compartments. He advised Soo Control and the vessel's owner of the situation.

The impact had breached starboard water ballast tank No. 5 and the engine room void spaces. As a result, the ship soon developed a port list due to the loss of the starboard ballast water that had gravitated overboard until pressure equilibrium was reached at the waterline. There was no change in the soundings or ullage of any of the fuel tanks in the engine room; however, the cofferdams had been breached and flooded with water. There was no release of pollutants.

The vessel resumed its course until Ninemile Point, where the anchor was dropped at 2130. On April 24 the vessel left the anchorage, crossed Lake Superior, and reached Thunder Bay on April 26 for inspection and repairs.

Damage to the Vessel

The vessel was dry-docked 27 April 1999, and subsequent inspection showed extensive damage to the bottom shell plating and associated internal structure in way of the starboard side of starboard water ballast tank No. 5, its forward and after cofferdams, sea inlet bays, a controllable pitch propeller oil sump tank, and the oil fuel sump drainage tank.

¹

Chart US 14883.

Starboard water ballast tank No. 5 and the cofferdam at its forward end were breached. The bottom shell plating of the tank was buckled and penetrated between frames 33 and 36 by a split approximately 1.5 m long and 20 cm wide. The bottom shell plating was damaged and set in approximately 12 to 16 cm, and extended inboard from the turn of bilge at frame 55 and aft to frame 24.

The starboard side bottom shell plating was also buckled and set in between frames 21 and 14, with the damage outboard of and approximately parallel to the keel.

Repairs requiring the replacement of approximately 14.4 tonnes of steel were completed to the classification society's approval and owner's standards.

Vessel Certification

The vessel had been inspected by Transport Canada (TC) a few weeks before the occurrence and met the certification, manning, and equipment requirements for the area of operations.

Personnel Qualifications, Experience and Fitness

The master held a CN I certificate (master of an inland water steamship) issued in 1998. He had six years of service as a master with Canada Steamship Lines and had started his third season on the "JEAN PARISIEN". He had taken a ship-handling course in Port Revel, France, bridge simulator courses in LaGuardia, New York, and in Toledo, Ohio, and a bridge resource management course in St. John's, Newfoundland. He was qualified to navigate on the Great Lakes and had made several voyages on the St. Marys River. He had slept six hours the previous night on Lake Huron. He indicated that he was well rested and physically and mentally fit to carry out his navigation duties.

The chief officer had been going to sea since 1967. He held an ON II certificate issued in St. Catharines in 1998. He had been working for the company since March 1987 and had been serving in this capacity for close to seven years on various vessels. He took a bridge resource management course in 1995. He reported being well rested and felt fit for his duties.

The helmsman had been going to sea since 1969 and had accumulated 20 years of experience as helmsman. He worked mainly on Great Lakes vessels. He indicated that he was rested and alert to his duties and did not experience any steering difficulties while at the helm.

Neebish Channel

The West and Middle Neebish Channels are important waterways connecting Lake Huron and Lake Superior. Channel improvements were completed in 1958 by the US Army Corps of Engineers. Work included dredging to allow for the passage of vessels with deeper draughts. The Middle Neebish channel was contoured and dredged with the aid of explosives. Rock debris was removed and piled on the canal banks. The river bottom remains hard and rocky. Since the construction of a downbound channel on the west side of Neebish Island, the east side channel is now a one-way channel for upbound vessels. Several sections of the Neebish channel pass through Canadian waters. The channels of the St. Marys River meet the Canadian Coast Guard *Canadian Waterways National Manoeuvring Guidelines* and, as there has been no report of problems, the Canadian Coast Guard has never conducted dredging activities in these sections.

Information for the St. Marys River is widely available to all mariners through various sources, such as US chart number 14883 and the Canadian *Sailing Directions*, Volume 2. The *United States Coast Pilot for the Great Lakes*, Volume 6, describes the Neebish Channel as follows:

The dredged channel of the St. Marys River divides to lead around Neebish Island. The upbound channel to the east and north sides of Neebish Island is 17.5 miles long. The courses through this stretch are well marked by lighted ranges and buoys. Course 9 leads 3.6 miles NNE [north-northeast] to Johnson Point on the SE [southeast] side of Neebish Island. The E [east] side of the Channel has a depth of 21 feet for a width of 200 feet. The W [west] side has a depth of 27 feet for at least 300 feet. The west side is marked by a 016°55' lighted range at the upper end.

After the occurrence, a USCG survey confirmed that buoys Q16 and Q17 were in their advertised positions. An US Army Corps of Engineers survey shows that both the deep and shallow draught channels conformed to their respective controlling depths of 8.2 m and 6.4 m.

Other Accidents in Neebish Channel

There are other grounding occurrences on record that have occurred in split channels of the St. Marys River. On 5 April 1999, the “ALGONTARIO” was upbound in the St. Marys River when the vessel overshot the turn and grounded in the 21 foot (6.4 m) project depth channel between buoys Q20 and Q22 (TSB Report No. M99C0005). In May 1999 the “JOSEPH L. BLOCK” grounded at light 29 near the rock cut.

Navigation and Steering Equipment

The “JEAN PARISIEN” was equipped with the required navigation equipment and also fitted with a noncompulsory electronic chart with an integrated navigation system. All navigation equipment appeared to be operating correctly at the time of the occurrence. However, a post-occurrence replay of stored electronic chart data provided graphic information on certain segments of the voyage only. An intermittent equipment malfunction resulted in no historical positioning data being recorded for a period of more than two hours while the vessel navigated the St. Marys River. The electronic chart data records did not allow the determination of the vessel’s track in the minutes before the occurrence.

The vessel is steered from a centerline console, with good visibility forward. The Kort nozzle steering system and bow thruster were working properly, and there was no indication of any steering gear malfunction.

Vessel Traffic Services

Vessel Traffic Services have been established in St. Marys River to reduce the risk of ship collisions, groundings, and environmental, shoreline and waterway damage. The Vessel Traffic Services station responsible for the area, Soo Control, regulates the routing and movement of vessels. Participation in St. Marys Vessel Traffic Service is mandatory for vessels of 40 m or more in length. There is a 7.8 knot speed limit in effect between Everens Point and Reed Point.² Johnson Point is a calling-in point only in the winter.

²

United States Coast Pilot Number 6 table 162.117 (g)

The last ship to proceed in Neebish Channel before the “JEAN PARISIEN” was the “ROGER BLOUGH,” a full size laker, 260 m in length with 32 m beam, that had transited the sector two hours before. The “ROGER BLOUGH” had taken the precaution to discharge sufficient water ballast at Mud Lake Junction Buoy to bring the after draught to 6.4 m (21 feet) until the vessel reached the Sault Ste. Marie Locks.

Pilotage Waters

By agreement between the United States and Canada, the waters of the Great Lakes and the St. Lawrence River have been divided into designated and undesignated pilotage waters. For foreign vessels, the (US) Western Great Lakes Pilots Association provides pilotage service in District 3, which includes the waters of the St. Marys River.

The Canadian *Great Lakes Pilotage Regulations* require Canadian companies applying for pilotage exemptions for their ships to provide an affidavit annually to the Great Lakes Pilotage Authority. The affidavit lists the names of the ships for which the exemption is requested and the names of the qualified masters and officers on board.

Water Level Fluctuations and Currents

According to the pilot book, the water levels of the Great Lakes are subject to three types of fluctuations: seasonal, long range, and short period. In spring 1999, long range and seasonal water fluctuations affected Lake Superior, and water levels were reported lower than normal. Changes in levels have a direct effect on the available depth in the channel. The depths of water in the dredged channels on the St. Marys River are known as the federal project depths. The US Army Corps of Engineers makes periodic bar sweeps through all the dredged reaches of the St. Marys River, and any depths found to be less than the project depths are published in Notices to Mariners. According to the master of the “JEAN PARISIEN”, the lower pool was two inches below chart datum at the time of the occurrence.³ The lower pool is a gauge level used to represent the general area below the Sault Ste. Marie locks.

Analysis

Underkeel Clearance

For course 9, the two upbound lanes of the Neebish Channel have different depths: 8.2 m on the west side and 6.4 m on the east side. The west lane is marked by a set of ranges; the east by day beacons on Sailor’s Encampment hill. The sounding survey conducted by the US Army Corps of Engineers indicated normal depths in both the 8.2 m and 6.4 m channels. The width of the deeper upbound lane is 91 m (300 feet); the width of the shallower lane is 61 m (200 feet). Vessels approaching buoy Q16 need to proceed at a reduced speed to minimize shallow water or squat effect. Local pilots report using a speed of seven knots to control the turn at Johnson Point. It was also reported that some lake masters stay close to the middle of course 9 before initiating the next turn.

³

Water levels in US waters are given in feet and inches above or below datum.

Normal navigation practices were followed on the “JEAN PARISIEN”. With a pronounced trim by the stern of 3.3 m and a draught of 7.0 m aft, the “JEAN PARISIEN” was too deep to enter the east side, 6.4 m-deep lane of the Middle Neebish channel. As a result, the ship’s bottom shell struck the river bank and the No. 5 starboard tank was set in some 20 cm.

Many companies of the US Great Lakes fleet have adopted the practice of adjusting the vessel’s trim to increase the underkeel clearance before transiting the Neebish channel. This practice was not common in the Canadian fleet. After loading, or before entering the St. Marys River, the trim of the “JEAN PARISIEN” was not adjusted, and the passage plan was not modified. The master “middled the channel” between buoys Q16 and Q17. This took the starboard side of the vessel closer to the shallow side of the channel.

Pilotage Practices

Canada Steamship Lines operates a fleet of 12 vessels on the Great Lakes-St. Lawrence waterway. Like most domestic vessels, the “JEAN PARISIEN” was exempted from having to take a pilot. The bridge navigation team was in charge of the navigation and, as a regular practice, the master conned the ship and the OOW monitored the radar and other navigation systems. Company policy required bridge personnel to prepare a detailed port-to-port passage plan. The passage plan available for the St. Marys River did not include provisions to trim the vessel to increase underkeel clearance in the Neebish Channel.

While piloting the vessel, the OOW’s duties included monitoring the helmsman and estimating the vessel’s speed by noting the time of passing certain points along the river. There is no indication that the OOW participated in the adjustment of courses or alerted the master when the vessel drifted toward the east side channel. Although the bridge team was trained in bridge resource management, the OOW did not provide any significant inputs to the master to ensure the effectiveness of the passage plan.

The pilotage method used on the “JEAN PARISIEN” consisted of steering in the middle of the sets of ranges and beacons on Sailor’s Encampment and aligning the vessel in the middle of the channel at buoys Q16 and Q17. This practice, combined with vessel’s greater-than-anticipated drift to starboard, brought the vessel onto an alignment near the edge of the shallow, 6.4 m channel, which it struck.

It appears that the bridge watch did not fully appreciate that the vessel’s passage should have been made in the 8.2 m depth lane only.

Like most Great Lakes bulk carriers, the “JEAN PARISIEN” has a large block coefficient (0.86). When the vessel approached the shallow side of the Neebish channel, it is likely that the vessel experienced increased squat. It is possible that bank suction effect also played a role in the incident.

Findings as to Causes and Contributing Factors

1. The "JEAN PARISIEN" contacted bottom in the 6.4 m (21 foot) project depth lane of the Middle Neebish Channel because the vessel's 7.0 m draught exceeded the channel depth.
2. The "JEAN PARISIEN" has a large block coefficient (0.86). When it approached the shallow side of the Neebish channel, it is likely that the vessel experienced increased squat. It is possible that bank suction effect also played a role in the accident.
3. No precautionary measures were taken to deballast or trim the vessel prior to transiting the Neebish Channel.
4. The company required each master to produce a port-to-port passage plan. The bridge team, however, did not adapt its passage plan to take into account the circumstances which required a departure from normal pilotage practices.

Safety Action

Action Taken

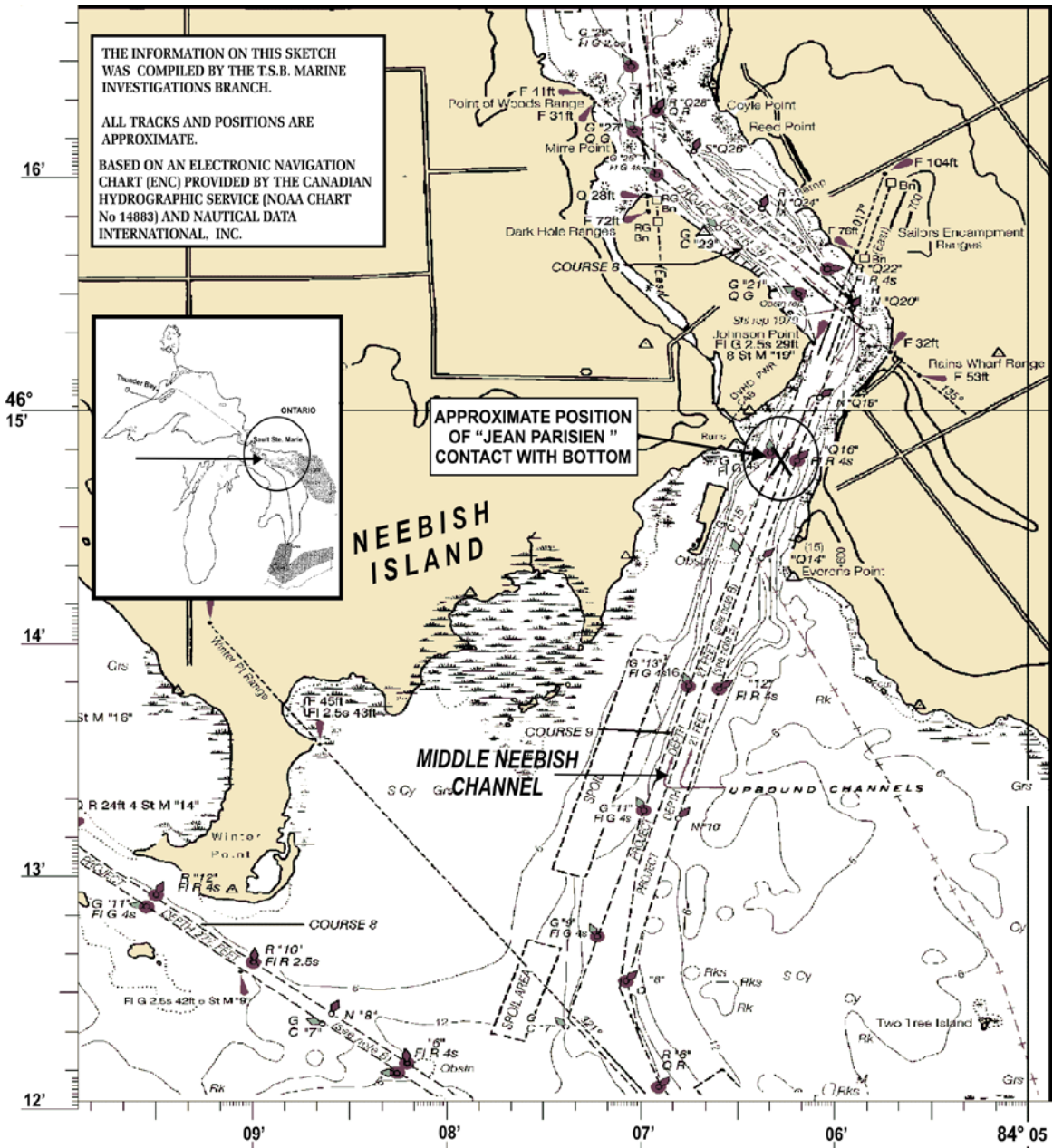
On 24 April 1999, the vessel owners issued a safety alert to company masters warning them of the low water level on the St. Marys River. The masters were requested, prior to departing, entering port or transiting a river system, to ballast their vessels to increase underkeel clearance after correcting for squat.

The USCG Soo Control issued the following Notice to Mariners:

Mariners are advised of incidents of vessels grounding and other shallow water effects along course 8 and 9 in the vicinity of Johnson's Point. Mariners are reminded to consider the effects of shallow water, current, vessel speed, squat, underkeel clearances and related directional stability when transiting Middle Neebish Channel.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 11 December 2001.

Appendix A – Chart of Area Showing Position of Grounding





Appendix B – Photographs

