MARINE OCCURRENCE REPORT

INJURY TO A CREW MEMBER

OF THE OIL TANKER “ENERCHEM REFINER”
ON THE ST. LAWRENCE RIVER
TRACY, QUEBEC
15 NOVEMBER 1995

REPORT NUMBER M95L0183

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

Injury to a Crew Member

of the Oil Tanker "ENERCHEM REFINER"
on the St. Lawrence River
Tracy, Quebec
15 November 1995

REPORT NUMBER M95L0183

Summary

The Canadian oil tanker "ENERCHEM REFINER", with a cargo of 5,882 tonnes of fuel oil, was en route to the marine terminal at Tracy, from the Port of Québec, Quebec.

During berthing manoeuvres, under the conduct of a pilot, the port bow of the vessel struck the middle dolphin of the terminal. One of the terminal's two unloading arms extended outward and struck the bulwark of the vessel. Crew members at the bow mooring station tried to clear it, but while they were doing this, one of them had his hand crushed. The injured crew member was taken to a local hospital by ambulance. The vessel sustained minor damage, and the fender on the middle caisson was slightly damaged.

Ce rapport est également disponible en français.

Other Factual Information

Particulars of the Vessel

Name	"ENERCHEM REFINER"
Port of Registry	Toronto, Ontario
Flag	Canadian
Official Number	329353
Type	Oil tanker
Gross Tonnage	4,982
Length	119.2 m
Draught	Forward: 6.4 m Aft: 6.55 m
Built	1969, Lauzon, Quebec
Propulsion	Two Morse Fairbanks engines, 2 451 kW, driving two propellers
Crew	21
Owners	Enerchem Transport Inc. Montreal, Quebec

At about 0800, 15 November 1995, a north-east wind was blowing at 30 knots. On approaching the marine terminal at Tracy, the crew noted that the winds were gusting stronger in the heavy rain.

At 0855, with the vessel under the conduct of a pilot, the master made an initial bridge-control speed reduction of the two main engines. At first, the ship's centre line formed a sharp angle with the face of the three dolphins of the terminal. Then, the vessel was steered toward the middle dolphin. When the ship's bow was about 20 metres off the downstream dolphin, the third officer, on the forecastle, started calling out the closing distance to the bridge.

At approximately 0908, the port shoulder of the vessel struck the downstream corner of the middle dolphin. The impact caused one rubber section of the fender on the ship's port shoulder to separate from its mount and become wedged in the rubber fender of the middle dolphin. The crew felt no jarring, but the wharf operator, who was taking the No. 2 head spring, felt a jerky movement that shook the middle dolphin and the unloading arms.

The wharf operator heard the lever that holds the lock screw against the coupling ball of the upstream unloading arm fall. The upstream unloading arm, which was no longer secured, extended outward and fell on the forecastle break, then on the port bulwark. The unloading arm slid aft along the bulwark rail, as the vessel still had some headway.

---

1 All times are EST (Coordinated Universal Time (UTC) minus five hours) unless otherwise stated.

The third officer and an ordinary seaman tried to clear the unloading arm to prevent it from striking the landing boom. While they were doing this, the seaman's left hand was crushed between the unloading arm and the landing boom guy wire, which was secured to the bulwark rail. The injured crew member moved away from the bulwark and the third officer was able to clear the unloading arm, while the vessel was manoeuvred astern away from the dolphin. The injured man went to his cabin, where the first mate noted the seriousness of the injury and notified the master.

Meanwhile, the operator called the chief wharf operator by radiotelephone, and then called the Hydro-Québec employee in charge. The turnbuckle connecting the landing boom guy wire to the bulwark rail was severed in two places and the steel cable which served as a guy wire was unravelled. There were rubber scuff marks on the ship's port shoulder.

At the request of the master, the pilot telephoned for an ambulance. The Hydro-Québec equipment mechanics rushed to the middle dolphin, started up the hydraulic system, raised the unloading arm and stowed it in place. At 0923, the bow of the vessel was manoeuvred against the middle dolphin and, at 0925, the injured crew member disembarked. At 0942, the seaman was taken to Hôtel-Dieu Hospital in Sorel, where he underwent surgery on the ring finger and little finger of his left hand.

The tanker was manoeuvred into position and the berthing manoeuvre was completed around 1000. Hydro-Québec personnel inspected the unloading arm and found no apparent damage. The unloading arm was secured to the manifold of the tanker.

The three dolphins are mounted on piles and linked by catwalks. One vertical section of the rubber fender on the middle dolphin was shifted and frayed where the piece of rubber from the ship's fender was wedged.

There are two unloading arms on the middle dolphin, one upstream and one downstream. Each unloading arm has a securing mechanism. The securing mechanism consists of a coupling ball on one end of the unloading arm and a lock screw on a hinged lever at the base of the unloading arm frame. There was no apparent damage to the securing mechanisms or the unloading arm frames. The lock screw lever is not held in the secured position by force of gravity. The lock screw that did not come loose (downstream) has a wing head. The lock screw that did come loose (upstream) has a square head. The axis of the coupling ball is not perpendicular to the axis of the lock screw lever.

Analysis

The crew reported that they felt no jarring when the vessel struck

the middle dolphin, but the wharf operator felt a jerky movement in the dolphin. A conventional wharf will absorb more of the impact from a vessel striking it than will a dolphin mounted on piles. It is possible that the crew felt no jarring from the impact due to the low approach speed of the vessel.

Before the tanker arrived, the two unloading arms were secured in place. As no Hydro-Québec mechanic was on duty on the wharf and the hydraulic system had not been started up, the only event that could have caused the securing mechanism of the unloading arm to release and the unloading arm to move was jarring caused by impact.

The design of the securing mechanism is such that the lock screw lever does not remain in position on the coupling ball if the lock screw is not tightened. The lever must be raised in order to engage it on the coupling ball of the unloading arm. For the securing mechanism of the upstream unloading arm to release without being damaged, the lock screw must not have been tight enough. The square-head lock screw of the upstream unloading arm was more difficult to tighten than the wing-head lock screw of the downstream unloading arm.

In addition, the berthing manoeuvre consisted of bringing the port side of the vessel into contact with the face of the middle dolphin, then slipping the vessel into position alongside the three dolphins. However, the rubber scuff marks on the port shoulder and the damage to the ship's fender indicate that the ship pressed against the downstream oblique corner of the fender. Therefore, before slipping alongside the dolphin, the vessel glanced off the downstream corner of the dolphin.

As the hydraulic system was not in operation, the north-east wind blew the unloading arm outward.

Findings

1. The port shoulder of the vessel struck the downstream corner of the middle dolphin.

2. The striking of the vessel shook the dolphin which was mounted on piles.

3. The lock screw of the securing mechanism of the unloading arm was not tight enough on the coupling ball.

4. The jarring released the lock screw from the coupling ball and, under the pull of gravity, the lever fell, thereby releasing the unloading arm.

5. With no pressure in the hydraulic system and with the force of the wind against it, the unloading arm extended outward.

6. The unloading arm fell on the bulwark rail of the ship as she slipped alongside the dolphin.

7. The crew was unable to clear the unloading arm from the bulwark before it reached the rigging of the landing boom.

8. The seaman's hand was crushed between the unloading arm and a landing boom guy wire.

Causes and Contributing Factors

The crew was unable to clear the unloading arm before it struck the rigging of the landing boom. The crew member's hand got stuck between the unloading arm and the guy wire. The striking of the vessel against the dolphin shook the unloading arms, and a securing mechanism that was not tight enough released. Because of the wind pushing against it, the unloading arm extended outward.

Safety Action Taken

To prevent the unloading arms from falling if they are jarred loose, safety chains have been installed.

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 23 April 1997.