

MARINE OCCURRENCE REPORT

CAPSIZING

OF THE BARGE "SEASPAN 177"
WITH THE LOSS OF A FULL CARGO OF IRON SCRAP
PUGET SOUND, WASHINGTON, USA
29 JANUARY 1997

REPORT NUMBER M97F0002

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 the evening of 29 January 1997, the unmanned barge "SEASPAN 177" carrying a full deck cargo of iron scrap, under tow from Victoria, B.C. to Tacoma, Washington, capsized and lost its cargo. At the time¹ of the occurrence, the barge was approximately 500m astern of the tug "SEASPAN VALIANT". Neither the exact time of capsizing nor the sequence of events was recorded by the crew of the tug. No pollution and no injuries were reported as a result of this occurrence.

¹

All times are PST (Coordinated Universal Time minus eight hours) unless otherwise noted.

Other Factual Information

Particulars of the Vessel

Name: "SEASPAN 177"
Official Number: 347034
Port of Registry: Vancouver
Flag: Canada
Type: Barge
Gross tonnage: 1211
Length: 61m
Built: 1972, Vancouver, British Columbia
Propulsion: None
Owners: Seaspan International Ltd., North Vancouver, British Columbia

The "SEASPAN 177" is a deck cargo-carrying barge of all-welded steel construction with a cargo deadweight of 3,225 short tons (2,926 tonnes) at 1 ft. 6 ins. (45.7 centimetres) of freeboard. The hull is subdivided into 12 watertight compartments by one longitudinal and five transverse bulkheads.

Steel bulwarks of 5 ft. 5 ins. (1.67m) height, set-in from the port and starboard sides of the barge, form a cargo box on the main deck. The cargo box is open at the forward and aft ends and fitted with freeing ports at the bottom of each side wall.

On 29 January 1997 at approximately 1200, the "SEASPAN 177", loaded with a cargo of shredded metal, departed from Budget Steel berth (a loading site) in Victoria, B.C., in tow of a small harbour tugboat "SEASPAN RASCAL".

According to the Draught Survey Report, after completing loading at the Budget Steel berth, the barge was listed slightly to the port side. The barge was also trimmed 6 ins. (15.2cm) by the stern and had a mean freeboard of 1 ft. 05¹/₈ ins. (43.43cm). The amount of cargo carried by the barge was calculated at 3,025 short tons (2,744 tonnes). The cargo was loaded on deck in a pile sloping fore and aft and transversely with the peak approximately 8 ft. (2.43m) higher than the side walls.

At 1310, the "SEASPAN RASCAL" handed over the barge to the "SEASPAN VALIANT", a larger vessel, designated to tow it to Tacoma, Washington. The skipper of the "SEASPAN VALIANT" reported that when the tow was secured, the barge was apparently upright and the cargo seemed to be distributed evenly on both sides. He also reported that the lighter metal was in the middle.

While the vessel was underway, the towline had a length of approximately 1643 ft. (500m), and the speed of the tug and tow was approximately 5.5 knots at 1200 rpm.

The navigating personnel on the tug checked the tow frequently and did not observe anything that would give them reason to worry. During daylight hours the barge was clearly seen astern, however, at night only the navigational lights on the barge were visible from the tug. Occasionally a searchlight was trained towards the

tow for a brief period to check the barge's condition.

At 1905, the tug recorded the time of passing Point Wilson and, proceeding within the southbound traffic lane, entered Admiralty Inlet. The weather was recorded as rain with a south-easterly wind reaching a speed of 40 knots, and 3 ft. (91cm) seas. The night was dark with visibility reduced by rain to approximately 3 miles.

At approximately 2230, the skipper of the tug observed that the speed of the tug had dropped slightly. Searching for an explanation, he shortened the towline, turned on the searchlight and noticed the capsized barge.

The skipper notified the Marine Communications and Traffic Services (MCTS), the owners and the United States Coast Guard (USCG) Safety Office in Seattle, Washington. At 2350, the USCG ordered the tug to bring the overturned barge to Port Townsend, Washington, where an inspection would take place.

On 30 January at 0945, the tug and barge arrived at Port Townsend where the United States authorities boarded and inspected both the tug and the overturned barge. At 1215, the tug and barge were released and departed Port Townsend bound for Vancouver, on orders from the owners.

On 31 January 1997 at 1025, the tug and barge arrived at Vancouver where another survey of the barge took place. A hull puncture was found on the starboard side, between frames Nos. 6 and 7, and approximately 4 ft. 3 ins. (1.3m) above the base line. That location is about 1ft. 3 ins. (38cm) above the light ship waterline. The opening was approximately 2 ins. (5cm) wide and 5 ins. (13cm) high and, when submerged, allowed for sea water to penetrate the No. 4 starboard compartment.

In preparation for the salvage of the "SEASPAN 177", the damaged cargo-box walls were cropped under water and, on 19 March 1997, the overturned barge was lifted using the shipyard facilities.

The draught survey report, dated 30 January 1997, recorded the pre- and post loading measurements. The mean freeboard of the empty barge before loading on 23 January was 10 ft. 08½ ins. (3.259m). The mean freeboard after the cargo was loaded on 29 January was 1 ft. 05⅛ ins. (43.4cm). The specific gravity of the dock water on both dates was 1.015 tonnes per cubic metre. The quantity of the cargo loaded on the barge was 3,025 short tons (2,744 tonnes).

Based on the Deadweight Tables of the "SEASPAN 177" compiled in 1976, for the freeboard of 10 ft. 08½ ins. (3.259m) the corresponding deadweight is 193.6 short tons (175.6 tonnes). Also, for the freeboard of 01 ft. 05⅛ ins. (43.4cm) the deadweight is 3,219.1 short tons (2,920.2 tonnes). Both figures are corrected for water density.

A Provisional International Tonnage Certificate for the "SEASPAN 177" valid for the period of one year was issued by the Ship Safety Branch of Transport Canada on 4 February 1997.

As an unmanned barge built before 1 September 1977, and not carrying pollutants, the "SEASPAN 177" is not subject to inspection by the Ship Safety Branch of Transport Canada. Moreover, the vessel is not required to comply with Canadian Coast Guard (CCG) regulatory (Interim) stability requirements.

As a barge operating either in Canadian waters or within the treaty zone, the "SEASPAN 177" is not required to

comply with the International Convention on Load Lines (1966). Consequently, no Load Line certificate with a minimum assigned freeboard for this barge was ever issued.

Analysis

The loading of unmanned barges is not regulated in Canada. The amount of cargo carried by any such barge between Canadian ports or between Canadian and United States ports within the treaty zone on the west coast is thus established by practice.

The draught survey data showed that the barge was carrying a weight of approximately 193 short tons (175 tonnes), of an unknown origin, before the loading of the iron scrap began.

It is unlikely that the light ship weight of the barge would increase by this quantity after the deadweight scale was compiled in 1976. The barge did not undergo any modification and no permanent structures were added to the hull or to the cargo box.

Therefore, the only conceivable explanation of this initial load is the presence of water in underdeck compartments. The damaged shell plating obviously allowed for a slow ingress of water into the compartment No.4 during previous voyages of the loaded barge.

A possible scenario leading to the capsizing may be deduced based on the known facts. As soon as the fracture became submerged during the loading of the scrap onto the barge in Victoria, more water was able to flow into the compartment. Consequently, the air pressure in the compartment would have built up, retarding the ingress of water.

However, the air might leak out slowly through deck fittings such as manholes and sounding plugs. Thus, the slow ingress of water would have continued. The loaders, unaware of the water flowing into the hull, corrected the trim and list by simply stowing the cargo accordingly.

During the voyage, the water would have flowed into the same starboard side compartment until there was enough weight to cause the deck edge to submerge and the barge's righting moment to decrease. The list would then increase until the cargo started shifting to one side. The combined weight of the water and the shifted cargo probably caused the barge to capsize.

The weather conditions during the voyage induced a rolling of the barge and added some water to the deck cargo. These additional, external factors certainly hastened the capsizing.

Findings

1. The unmanned barge "SEASPAN 177" capsized while under tow.
2. Damage to the barge's side shell plating allowed for the ingress of water into the underdeck void space.
3. The barge did not have a designated load line establishing safe maximum load and minimum freeboard.
4. The cargo slid off the barge's deck and was lost.

Causes and Contributing Factors

The "SEASPAN 177" capsized because the hull damage allowed for the ingress of sea water into two underdeck compartments. This ingress created a heeling moment and caused the barge to lose its transverse stability.

The cause of the hole in the starboard side of the barge's shell plating was not determined.

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 12 February 1998.