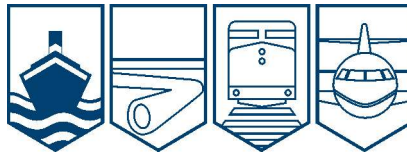


Transportation Safety Board
of Canada



Bureau de la sécurité des transports
du Canada

MARINE INVESTIGATION REPORT
M04W0225



CAPSIZING

FISHING VESSEL *PROSPECT POINT*
TAHSISH INLET, KYUQUOT SOUND, BRITISH COLUMBIA
29 OCTOBER 2004

Canada

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 Investigation Report

Capsizing

Fishing Vessel *Prospect Point*
Tahsish Inlet, Kyuquot Sound, British Columbia
29 October 2004

Report Number M04W0225

Summary

During the afternoon of 29 October 2004, the commercial fishing vessel *Prospect Point*, with a crew of five on board, was fishing for sardines, in Kyuquot Sound, off the west coast of Vancouver Island, British Columbia. After pursing in the net, while the crew was in the process of preparing to haul in the catch of sardines, the vessel heeled to starboard and capsized, forcing all the crew members into the water. The crew members were recovered and landed on board a coastal freighter anchored in the vicinity. The vessel was subsequently recovered and towed to Steveston, British Columbia. No injury was reported.

Ce rapport est également disponible en français.

Other Factual Information

Particulars of the Vessel

Name	<i>Prospect Point</i>
Official Number	383442
Port of Registry	Vancouver, British Columbia
Flag	Canada
Type	Fishing vessel – seine
Gross Tonnage ¹	70.2
Length	18.29 m
Built	1977, Vancouver
Propulsion	Six-cylinder, single-screw, Caterpillar diesel, 242 kW
Crew	5
Owner	Networth Industries Ltd., Coquitlam, British Columbia

Description of the Vessel

The *Prospect Point* is a hard-chined, welded aluminum fishing vessel of closed construction, built and certified as “fitted and equipped for drum seining.” The transom stern has a hydraulic ramp and roller, used for fishing operations. Below the main deck, the vessel is subdivided by four transverse watertight bulkheads enclosing, from forward, the crew accommodation, over the water ballast tank; the engine room, with fuel tanks to port and starboard; and two forward and two after insulated fish holds divided by a centreline bulkhead. Two additional fuel tanks are on either side of the fresh water tank located in the lazarette.

Propulsion is provided by a six-cylinder Caterpillar marine diesel engine, driving a single fixed-pitch propeller. The vessel is fitted with a single-plate centreline rudder.

The deckhouse is just forward of amidships and houses the galley, captain’s cabin, washrooms, mess, and kitchen areas. From the main deck, three steps lead up to the wheelhouse, and three steps down lead to the crew accommodation. Entrance to the engine room is through the deckhouse.

The main mast, located amidships abaft the deckhouse, is equipped with a main cargo boom. The hydraulic Gearmatic power block, fitted to the cargo boom, is used to haul the nets aboard. The *Prospect Point* also has a pair of outrigger booms equipped with roll-reduction paravanes. The seine winch is located between the deckhouse and the fish holds. The seine drum is located

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 of units.

behind the after fish holds. Access to the fish holds is through aluminum hatch covers fitted to the raised coaming above the fish holds.

The vessel was engaged mainly in seine fishing.

Purse Seining

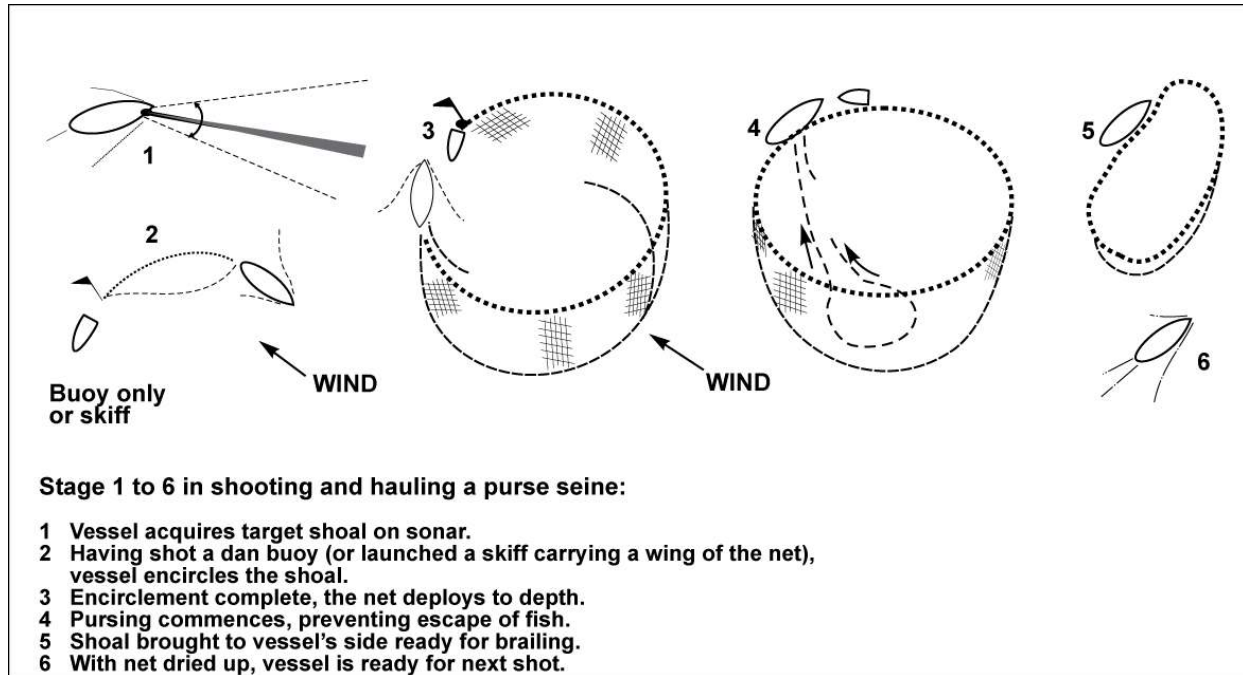


Figure 1. Sketch showing six stages in shooting and hauling purse seine

Purse seining is a method used to catch schooling fish near the ocean surface by encircling them with a net. Once the fish have been encircled, a wire (purse line) running through the bottom of the net is winched tight to “close the purse” from below.



Photo 1. Photo of a fishing vessel engaged in purse seining

When setting the net, a power skiff secures to the free end of the 410 m long net, then draws it off the seine drum and away from the fishing vessel (seiner). The upper edge of the net is buoyed with floats and remains on the surface. Approximately 35 m below the surface, the lower edge of the net is weighted so that it is suspended vertically in the water. Metal rings connect the “purse line” to the lower edge of the net.

After the net is drawn away from the seiner, the fish are encircled and the skiff then brings the free end of the net back to the seiner’s starboard side, where it is secured. The skiff is then repositioned at the seiner’s port side, where it is used (as a side thruster) to prevent the fishing vessel from overriding the net.

The seine winch on the seiner then draws in the purse line, closing off the bottom of the net like a giant drawstring. As the purse string is pulled in, the metal rings are collected on a “stripper bar” at the side of the seiner.

Once the bottom of the seine is closed, preventing the catch from escaping, the net is “dried”; that is, it is progressively brought on board, reducing the portion in the water that contains fish to a minimum. The drying is achieved by running the free end of the net through a hydraulic “power block” located on the boom. This process slowly pulls the portion of the seine net still in the water toward the seiner, forming a concentrated pocket of fish. The fish are transferred from the net into the fish holds using either large dip nets, known as brails, or fish pumps.

Drying is a crucial stage in the purse seining operation because sardines (whose behavioural characteristics are similar to those of adult herring when trapped) are known to panic and “sound” (dive to the bottom).

History of the Voyage

On 14 October 2004, the *Prospect Point* departed Steveston, British Columbia, near the mouth of the Fraser River, with a crew of five: skipper, engineer, and three deckhands. The vessel sailed to Nootka Sound on the west coast of Vancouver Island to fish for sardines. The catch from that fishery was delivered to a fish plant at Zeballos, on Vancouver Island. Subsequently, the *Prospect Point* headed north to Kyuquot Sound, on Vancouver Island, to continue fishing. The last delivery of approximately 39 tons of sardines was made in Zeballos on 27 October 2004. The crew had to make four sets to catch that quantity.

On October 29, the *Prospect Point* returned to a small cove off Tahsish Inlet and, at about 1600 Pacific standard time,² set its net. The winds were light, and the water was rippled. One deckhand was in a skiff attached to the *Prospect Point*'s port quarter by a bridle. The skiff was towing gently to prevent the *Prospect Point* from overriding the net. The electronic fish sounder gave indications of a large set. Two deckhands were engaged in “pursing in” the net; one was operating the winch, the other was collecting the rings from the purse line on the stripper bar. Another crew member was drumming in the net. The skipper was at the stern of the vessel, supervising. The set was to the starboard side of the vessel.

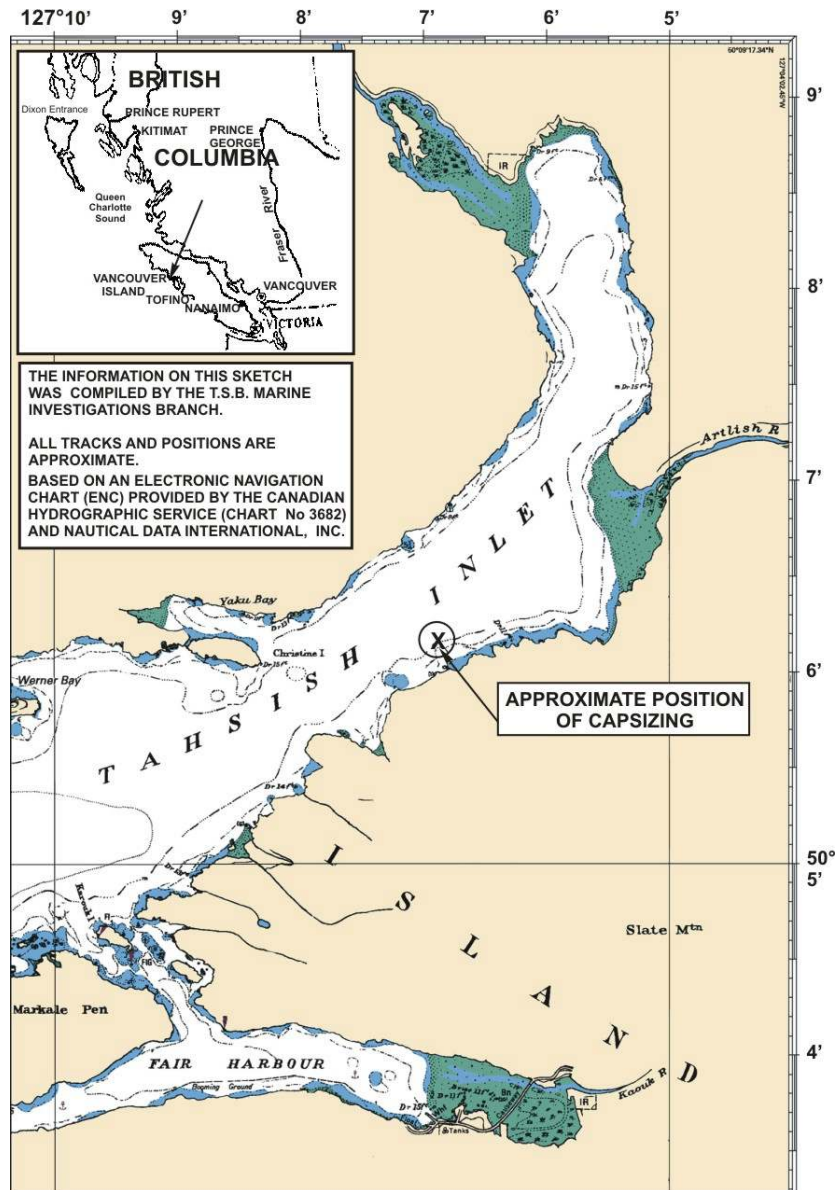


Figure 2. Approximate position of capsizing

² All times are Pacific standard time (Coordinated Universal Time minus eight hours).

A breast rope to the net, secured just forward of amidships of the *Prospect Point's* starboard side, kept the set in place. In an emergency, releasing this rope opens up the net and releases the catch.

The net was now ready to be dried. A strap from a power block on the *Prospect Point's* boom was secured around the net and that portion of the net was raised.

When a net is being recovered, it is normal for fishing vessels to heel toward the side on which fishing operations are occurring. In this instance, when the strap suspending the net was approximately 3 m above the water, the *Prospect Point* heeled further than usual to starboard, paused, and then continued to heel.

As this was happening, the skipper signalled to the deckhand working amidships to release the net that was being drummed in. The skipper then attempted to run amidships to release the breast rope attached to the net and set the fish free. The removal of the suspended weight of the net and catch would enable the vessel to return to an even keel.

Instead, the *Prospect Point* inclined further to starboard and took water on deck rapidly; the skipper was, by now, waist deep in water. The vessel downflooded rapidly through the open galley door into the accommodation, and into the fish holds that were open in anticipation of loading. As the vessel rolled over, the crew climbed atop high points of the vessel before eventually jumping into the water. The crew was wearing rain gear.

The vessel capsized within two minutes in position 50°05'48" N, 127°07'24" W. The crew member on the skiff came around and recovered the others from the water. They were transported aboard the coastal freighter *Klassen*, which was anchored in the bay. None of the crew was injured.

The vessel was subsequently recovered and towed to Steveston. It was later sold to United States interests in Washington State.

Damage to the Vessel

All of the vessel's electronic equipment and machinery sustained extensive water damage.

Certification

Vessel Certification

As a small fishing vessel of 70.20 in gross tonnage and less than 24.4 m in length, the *Prospect Point* was subject to quadrennial inspections by Transport Canada (TC).³ The vessel was certificated as a home trade, Class II vessel. Its safety inspection certificate (SIC 29) was issued 17 June 2002, and was valid until 16 June 2006.

The checkbox on the SIC 29 that indicates whether the vessel is certified for capelin or herring fishing was left blank.

Personnel Certification

The skipper of the *Prospect Point* held a fishing master, third-class certificate of competency, issued in Vancouver in 1982. He was trained in Marine Emergency Duties (MED A1, Basic Safety), as required by that certification.

One of the deckhands on the *Prospect Point* similarly held a fishing master, third-class certificate of competency, issued in Vancouver in 1985. He was also trained in Marine Emergency Duties (MED A1, Basic Safety).

Personnel Experience

The skipper had some 30 years of experience in the fishing industry, including 17 years as skipper of the *Prospect Point*.

All of the other crew members were experienced fishers.

Department of Fisheries and Oceans Fishing Licences

The *Prospect Point* held the following fishing licences: salmon by seine (AS), herring roe by seine (HS) for two areas, halibut by hook and line (L), and sardines by seine (ZS).

Weather on Scene

The winds were from the southeast at 10 knots. The sea was rippled.

Stability Information

The *Prospect Point* was built in 1977. On 20 March 1978, stability data for the vessel were approved by TC as fitted and equipped for drum seining.

³

The Ship Safety Branch of the Canadian Coast Guard became the Marine Safety Branch of Transport Canada in 1995, and for the purpose of this report, is referred to as Transport Canada.

In February 1986, a revised stability booklet was submitted to TC by a naval architect, on behalf of the owners, as a result of the then-recent alterations and addition to the length of the vessel. The stability booklet was stamped by TC as “noted” and was returned to the architect. The accompanying letter stated that discrepancies had been found in the original stability booklet with respect to the draughts and the longitudinal centre of gravity of the lightship condition used in the calculations. In a subsequent letter, TC concurred that the alterations had not adversely affected the stability of the vessel, but requested the naval architect to submit a new “worst operating” condition for approval using the new lightship figures and centres of gravity. These communications were the last on this subject; there is no record of further vessel stability submissions.

Vessel Modifications

The owner at the time of this occurrence had bought the vessel in 1988, at which time the only stability booklet on board was the original stability data for the vessel as approved on 20 March 1978. The vessel remained certified as “fitted and equipped for drum seining.”

In 1994, after the original cargo boom broke, the owner replaced it with a heavier boom. The new boom was installed in a local shipyard under the guidance of a naval architect.

At about the same time, the main seine drum was enlarged to increase the drum width by 30 cm, the object being to increase the capacity of the drum to use a longer (heavier) seine net. This modification was performed by a private welder. Along the British Columbia coast, two types of seine nets are in use for salmon fishing; the ones for the Juan de Fuca Strait are the larger, at 550 m (300 fathoms) in length and 80 m in depth; the ones used for the rest of the coast are 400 m in length and 52 m in depth. At this time, the steel pursing winch was replaced with an aluminum one.

TC was not advised of these latter modifications, nor was a naval architect consulted during the drum enlargement process. The vessel’s stability booklet was not modified to reflect these changes.

Condition of the Vessel at the Time of Capsizing

Since the precise quantity of consumables and fish on board the vessel at the time of the accident could not be established, it was estimated that

- The vessel had approximately 10 to 12 tons of crushed ice distributed equally among the four fish holds.
- The port and starboard forward fuel tanks were half full and two-thirds full respectively. This equates to a range between 4550 litres and 6060 litres of diesel fuel in each of the tanks.
- The port after fuel tank contained approximately 450 litres, and the starboard after fuel tank contained approximately 1800 litres. This inequality was to correct an inherent list to port.

- The forward ballast tank contained 1800 litres of water and the after fresh water tank contained 4550 litres.

Regulatory Requirements in the Fishing Industry

Transport Canada

Part I of the *Small Fishing Vessel Inspection Regulations* (SFVIR) applies to vessels that exceed 15 in gross tonnage, but do not exceed 150 in gross tonnage and that are 24.4 m and under in length. Under these regulations, vessels of closed construction, built on or after 06 July 1977 and engaged in fishing for herring or capelin, are required to have approved stability data on board. The *Prospect Point* had fished for herring and capelin in the past and was in possession of valid herring roe by seine fishing licences. At the time of the capsizing, the vessel was engaged in the sardine fishery. Although British Columbia sardines exhibit behaviour similar to that of herring, they are a separate species; therefore, by strict interpretation, a stability booklet is not required. The *Prospect Point* was required to have a valid stability booklet to participate in the herring roe fishery. The vessel did have its 1978 stability booklet on board, but subsequent modifications to the vessel had rendered that booklet invalid.

Department of Fisheries and Oceans

The Department of Fisheries and Oceans (DFO) 2004 Pacific Region Integrated Fisheries Management Plan for roe herring specifies that “designated vessels must . . . have a valid herring stability certificate for harvesting herring as required under the *Canada Shipping Act*.” The DFO’s 2004 sardine management plan makes no reference to vessels requiring stability data for harvesting sardines.

Transport Canada and Department of Fisheries and Oceans Fishery Licensing Information

A review of DFO’s licensing site revealed that 252 herring roe by seine licences were issued for 2004. These licences were held by 136 vessels. A review of TC’s Ship Inspection Reporting System (SIRS III) database revealed that data are entered in the Stability section for only 70 of those vessels. Those data range from date of “Last Inclining Survey” or “Approved Stability Book” or “Is Stability Book on board? - YES.” Where dates for an inclining survey or approval of stability booklet were available for vessels, 18 of the dates were in the 1970s, 18 were in the 1980s, 9 were in the 1990s, and none were after that.

Analysis

Sardine Fishery

Pacific sardine is a relatively new fishery still under development. DFO began issuing licences for this fishery in 2003 with limited annual participants. Twenty-five ZS sardine licences were available for the 2004-2005 fishery. Fishers may not as yet have developed much experience with fishing this species.

Although sounding behaviour is not officially documented, fishers report from practical experience that a catch of sardines, when trapped in a net and concentrated into a smaller pool, will panic and sound; that is, dive to the bottom. When a vessel is dealing with a large catch, this action creates a heeling moment that may exceed the righting moment of the vessel and be of sufficient magnitude to significantly incline the vessel. This heeling, when combined with other factors including free surface effect, an inherently low freeboard, and the possibility of downflooding, may ultimately result in capsizing.

Fishers also report that sardines are livelier in their movement than herring when trapped. In this occurrence, because the exact load condition of the vessel at the time of capsizing cannot be verified and because the vessel was in the process of lifting a large catch on board, it is reasonable to expect that the cause of the capsizing was catch sounding.

Ad hoc Application of Stability Requirements for Small Fishing Vessels

Under the SFVIR, vessels of closed construction such as the *Prospect Point*, which are between 15 and 150 in gross tonnage and do not exceed 24.4 m in length, are not required to have approved stability data except when fishing herring or capelin.

At the time of this occurrence, the *Prospect Point* was fishing for sardines. Given that the behavioural characteristics of sardines are similar to those of herring, the hazards associated with vessel stability during fishing activities are also similar. However, vessels engaged in sardine fishery are not afforded the same level of safety as those engaged in the herring fishery. The investigation revealed that some TC inspectors, including the one who inspected the *Prospect Point*, are not aware of the behavioural aspects of these two fish and of the risks posed to vessels engaged in the sardine fishery.

TC has not provided appropriate guidance for the benefit of all inspectors across Canada. For example, in the Saint John, New Brunswick, district, sardines are considered to pose risks similar to those posed by herring, and on the West Coast, they are not. In the Saint John district, vessels used in the aquaculture industry to carry fish either live, in bulk, or in liquid form are required to have approved stability data on board for the guidance of the crew. These decisions by the district were based on the risk associated with such operations. In the absence of uniform guidelines for the administration of the stability data requirement for small fishing vessels, vessels at risk are not readily identified, and the stability assessment requirement is not uniformly applied across Canada, to the detriment of fishing vessel safety.

The *Prospect Point* held two valid roe herring by seine licences and had been fishing herring by seine since at least 1984. The only approved stability booklet for the vessel was dated 20 March 1978. No updates had been made to account for modifications to the vessel in subsequent years. During the periodic quadrennial inspections, TC did not check the stability information to determine if it was current.

In 1999, the format of SIC 29 certificates was altered to include a checkbox to note whether a vessel has a valid stability booklet on board. At the time of the *Prospect Point's* most recent quadrennial inspection in 2002, this checkbox was left blank.

Periodic Verification of Stability Data for Small Fishing Vessels

Recognizing that vessels undergo modifications over time, the International Convention for the Safety of Life at Sea (SOLAS)⁴ and TC both have a requirement that, at intervals not exceeding five years, under certain conditions, passenger vessels undergo lightship surveys to verify changes, if any, in lightship displacement and longitudinal centres of gravity. If a deviation falls outside allowable limits, the vessel is required to be re-inclined. However, this requirement does not apply to fishing vessels, which do not fall under the SOLAS, but which are subject to frequent modifications and design changes to suit different fisheries. In most cases, these changes would adversely affect the vessel's transverse stability.

Currently, small fishing vessels (between 15 and 150 in gross tonnage) represent the majority of Canadian fishing vessels. In 2004, these vessels exceeded 19 500 in number. Only 136 of those operating on the West Coast are licensed to fish for herring roe and are required to have a TC-approved stability booklet on board. The booklet is intended for the guidance of the vessel's crew so that they may safely fish within the limitations of their vessel.

The investigation has shown that fishing vessels that have TC-approved stability booklets continue to capsize. On the West Coast, despite the requirements of two federal departments (TC and DFO), nearly 50 per cent of small fishing vessels do not have the required approved stability data for guidance. Also, given that fishing vessel modification is an ongoing reality and that the stability data approval date for many of these vessels exceeds 20 years, the accuracy and validity of those data are called into question, and the benefits afforded by the requirement to have up-to-date stability data are negated.

Exchange of Information Between Transport Canada and the Department of Fisheries and Oceans

The 2004 DFO Integrated Fisheries Management Plan makes reference to the fact that vessels fishing for herring roe are to have a valid herring stability booklet as required under the *Canada Shipping Act*. However, the TSB investigation revealed that the DFO (Pacific) Licensing personnel were unclear as to the purpose of the stability booklet, and did not know what the booklet looked like, or whether vessels applying for a fishing licence were actually in compliance with the requirement. Therefore, the intent of this requirement is not being met.

TC and DFO both require that appropriate stability data be carried by vessels fishing for herring or capelin, but the investigation found no beneficial exchange of information between these departments with regard to fishing vessel safety. Each department operates in isolation from the other. The need to have a linkage between the granting of a fishing licence and the issuance of a safety certificate has been acknowledged in a number of studies over the past 15 years.⁵ Given

⁴ SOLAS, Chapter II-1, Part B, Regulation 22

⁵ *A Coast Guard Study into Fishing Vessel Safety* (TP 8694), Part VII, Recommendations 29 and 37, 1987.

that the occasion of licensing may be the last opportunity to verify whether a vessel is safe for the particular fishery being licensed, it is imperative that vital information that affects vessel safety be communicated/shared between departments.

Despite the regulatory requirements of the *Canada Shipping Act*, TC inspections, and DFO licensing conditions, it would appear that requirements intended to improve the safety of fishing vessels have lost their effectiveness through weaknesses in the systems in place. Fishing vessels continue to experience stability-related mishaps at a rate greater than is seen in other marine sectors.

Finding as to Causes and Contributing Factors

1. The vessel capsized as a result of having insufficient transverse stability to withstand the dynamic heeling forces imposed upon it while fishing sardines. The sardines trapped in the net sounded, which increased the load on the head of the boom to a condition in which the heeling moment exceeded the maximum righting moment, causing the vessel to capsize.

Findings as to Risk

1. The application of the Transport Canada (TC) safety provision regarding stability requirements for small fishing vessels is hampered by the absence of uniform guidelines to help inspectors in readily identifying fishing vessels at risk.
2. Under the current regulations pursuant to the *Canada Shipping Act*, there is no requirement for fishing vessels to undergo stability data verification on a periodic basis.
3. TC and the Department of Fisheries and Oceans (DFO) develop and implement some of their regulations, policies, and management plans in isolation, to the detriment of fishing vessel safety.
4. The lack of information exchange between TC and DFO can undermine TC's mandate to ensure that vessels proceeding to sea are in a seaworthy condition and DFO's mandate to ensure that vessels fish safely.
5. A stability booklet is not mandatory for vessels engaged in the sardine fishery in British Columbia.

Safety Action

Action Taken

Subsequent to the accident, under the auspices of the Inter-Agency Marine Action Group, the TSB met with Transport Canada (TC) Pacific Region, and the Department of Fisheries and Oceans (DFO) Licensing, Pacific Region, in February 2005, to discuss concerns regarding the safety issues that came to light during this investigation.

DFO and TC agreed to exchange information and data to ensure that fishing vessels are in possession of appropriate and relevant stability data before a fishing licence is issued.

Specific instructions were issued to all inspectors in TC's Pacific Region, outlining a process that must be followed to conduct inspections of vessels engaged in fishing herring or capelin.

To provide a cohesive approach to fishing vessel safety, DFO has provided TC with a list of vessels that hold licences to fish herring and a list of the species prefixes used on licensing decals (displayed on fishing vessels) that identify the type of fishery a vessel may engage in.

TC has forwarded to DFO a copy of an approved stability booklet so that, before granting a herring or capelin licence, fishery officers can ensure that vessel owners have such a booklet.

TC's Pacific Region designated two inspectors to visit ship repair facilities on an ad hoc basis to specifically look out for vessels that are undergoing modifications that are apparently unsafe. This information will be passed to DFO Licensing, thus creating a linkage between DFO's granting of a fishing licence and TC's issuing of a safety certificate. It will also help DFO officials to make informed decisions about licences for a requested fishery.

As part of the licence-issuing consideration, DFO Licensing personnel will pay close attention to information received from the fishing vessel owners/operators and will consult with TC where modifications have been made to a vessel to meet DFO's length restrictions.

During the recent food and bait fishery, before issuing licences, DFO forwarded to TC a list of vessels requesting licences, to verify from TC's database whether such vessels possessed the required stability booklet.

TC and DFO jointly recognized that DFO's length restriction policies and TC's classification of vessels under 15 in gross tonnage as uninspected enable fishing vessel owners to carry out modifications that may be unsafe.

Additional Information

A meeting was held on 15 November 2005 between the Assistant Deputy Minister, TC Safety and Security, and the Assistant Deputy Minister, DFO Fisheries and Aquaculture Management. The objective of this meeting was to discuss increased cooperation between both departments with a view to promoting the safety at sea of fishers. As a result, a Memorandum of

Understanding (MOU) between DFO and TC was developed. The MOU provides a framework for cooperation, including a commitment to hold regular head office and regional meetings, and national and regional Fishing Vessel Safety Advisory Committees.⁶

Further Action Taken by Transport Canada

In advance of the new Fishing Vessel Safety Regulations, TC established an interim policy for determining, based on a list of risk factors, whether a small fishing vessel requires a stability booklet. The booklet sets out, in standard form, the results of various flotation and stability calculations and is used to instruct the master and the crew about the safe limits of the vessel under a variety of loading and operating conditions. This interim measure will provide important additional information for the master. It takes effect immediately.

TC issued Ship Safety Bulletin 04/2006, titled *Safety of Small Fishing Vessels: Information to Owners/Masters about Stability Booklets*. The bulletin outlines the process that vessel owners and operators must follow to determine if their vessel requires a stability booklet, and the method for obtaining one. The bulletin applies to all owners and operators of fishing vessels, new and existing, that are between 15 and 150 in gross tonnage and less than 24.4 m in length.

The new proposed Fishing Vessel Safety Regulations will require that, at periodic intervals, not exceeding five years, or upon completion of modifications or alterations to a vessel, a lightship survey be conducted by the vessel's authorized representative and be witnessed by a marine inspector. The results of that survey will determine whether the vessel requires a new stability assessment.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 06 December 2006.

⁶