Transportation Safety Board of Canada

Bureau de la sécurité des transp du 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 Occurrence Report

Fatal Injury to Crew Member

F.V. "CAPE BRIER"
Burgeo Bank, South Coast of Newfoundland
13 October 1993

Report Number M93M0006

Synopsis

In the afternoon of 13 October 1993, the "CAPE BRIER" was fishing off the south coast of Newfoundland. As the vessel rolled in a beam sea, a trawl door that came loose from its stowed position struck and fatally injured a crew member. At the time, the crew member was attending the haul-back of the trawl net which was being brought on board the "CAPE BRIER" in near-gale weather conditions.

The Board determined that the trawl door on the "CAPE BRIER" came loose because it had not been adequately secured against the vessel's movement in the sea conditions in which she was operating.

Ce rapport est également disponible en français.

Table of Contents

5.0 Appendices

1.0 Factual Information

1.1 Particulars of the Vessel

	"CAPE BRIER"
Official Number	392729
Port of Registry	Halifax, Nova Scotia
Flag	Canadian
Type	Stern trawler of steel construction
Gross Tons[1]	992
Length (BP[2])	42.02 m
Breadth	11.80 m
Draught	F: 4.26 m A: 4.57 m
Built	1981, Halifax, Nova Scotia
Propulsion	One eight-cylinder marine diesel engine, capable of 3,000 BHP (2,207 kW), driving a controllable-pitch propeller
Owners	National Sea Products Ltd. Halifax, Nova Scotia
Complement	15 crew members plus one DFO observer

1.2 Description of the Vessel

The "CAPE BRIER" is a conventional stern trawler with the fish-processing spaces and fish holds amidships. The navigation bridge and crew accommodation are forward, and the machinery space aft.

1.3 History of the Voyage

The "CAPE BRIER" departed Lunenburg, Nova Scotia, at about 1030[3], 11 October 1993, to fish for ocean perch off the south coast of Newfoundland.

On the afternoon of 13 October, the visibility was reduced in rain with seas running at some 2 to 3 m in near-gale force winds as the "CAPE BRIER" hauled the trawl net back in after a tow in a position some 10 miles to the west of Burgeo Bank, Newfoundland. The vessel was estimated to be rolling as much as 30° when the net was brought on to the stern ramp. At about 1340, five crew members were in attendance at the ramp-side bulwarks, three to port, and two to starboard. The mate was operating the trawl winch from the controls located at the after end of the bridge, and all those involved in the haul-back operation had a clear and unobstructed view of the stern ramp and were clear of the trawl warps.

On a roll to port, the chain securing a spare trawl door parted and the door, a mid-water door that had been stowed upright against the ship-side bulwark on the starboard side, fell inboard. As the door fell, it struck one of the two crew members positioned at the side of the stern ramp, pinning him against the ramp-side bulwark. On the next roll, the trawl door shifted and another crew member was able to pull the victim clear of the door. The haul-back of the net was stopped and aid to the injured crew member was immediately begun. Despite the crew's efforts, the crew member was pronounced dead after radio consultation with a doctor in Halifax, Nova Scotia.

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 (SI) of units.

2 See Glossary for all abbreviations, acronyms, and definitions.

3 All times are ADT (Coordinated Universal Time (UTC) minus three hours) unless otherwise stated.

1.4 *Injuries to Persons*

The crew member who was struck by the trawl door was fatally injured.

1.5 *Personnel Experience and Qualifications*

The master of the "CAPE BRIER" had 19 years' seagoing experience on fishing vessels. He had been a master for 16 years and master on the "CAPE BRIER" since 1989. The mate had 15 years' seagoing experience and had been sailing as mate for 5 years on the "CAPE BRIER". The victim had been employed on fishing vessels for 14 years and on the "CAPE BRIER" for 4 1/2 years.

The master held a Fishing Master Class I Certificate, and the mate held a Fishing Master Class II Certificate. The victim did not hold any formal marine qualification nor was he required to by regulation.

1.6 *Vessel Certification*

A Steamship Inspection Certificate (SIC 31) had been issued to the "CAPE BRIER" and was valid until 11 June 1994 for Home Trade Class I voyages.

1.7 *Weather Information*

The Meteorological and Oceanographic Centre in Halifax provided the following meteorological information for the area in which the "CAPE BRIER" was operating:

Between 0900 and 1500, the wind shifted from easterly to south-easterly at 25 to 35 knots with reports of the wind reaching 45 knots in some areas. The visibility was two to five nautical miles in rain. Seas were forecast and reported to be 3 to 3.5 m.

At 1300, the "CAPE BRIER" recorded the wind as SE force 7 (28 to 33 knots), visibility one nautical mile in rain with seas to 2 m.

1.8 *Trawl Door Stowage*

When used, mid-water trawl doors are launched from trawl gallows on the vessel's quarters. The "CAPE BRIER" was built with recesses in the ship-side bulwarks on each quarter where these doors could be conveniently stowed when not required. However, changes in the fishing industry prompted the owners to have their vessels use larger mid-water trawl doors. These larger doors (some 8 m^2 in area and weighing 1,100 kg) would not fit in the designed recesses in the bulwarks, and the recesses were then used for spare bottom doors. The mid-water doors were stowed at the discretion of the master of each vessel. On the "CAPE BRIER", the doors were stowed against the ship-side bulwarks, inboard of the original stowage recesses.

1.9 *Securing of Trawl Doors*

The mid-water trawl doors were reportedly stowed upright, with one side resting on the deck at a slight angle to the ship-side bulwarks. The stowage arrangement is depicted in Appendix A. The doors were secured by means of a chain which led from the end of the centre web of the door over the upper edge of the door and down to the chain securing

the spare bottom trawl door in the bulwark recess. No turn-buckle or other tightening device was incorporated in the securing chain and there was no chocking arrangement to secure the lower edge of the door which was in contact with the deck. Scratch marks were noted on the deck in the area. Coupling links were used for all securing chain connections. During the investigation, the securing chain and the coupling link used in the connection to the bulwark were recovered, but all parts of the coupling link used in the connection to the trawl door were missing.

1.10 Coupling Links

Coupling links are commonly used on fishing vessels because they are a quick and effective means of joining chains to each other, to securing points, or to other pieces of gear such as hooks. A coupling link resembles a studded chain link and is made up of two symmetrical semi-circular body forgings joined by an alloy load pin which is retained in position by a stud assembly. The unit is put together by driving the load pin into the stud assembly when all the components are in place. The unit then holds together because of the friction fit of the load pin in the stud assembly. The onus is on the user to replace a coupling link when the fit becomes slack. The evidence was that it would not be unusual to replace 12 or more coupling links during a typical fishing trip.

1.11 Laboratory Analysis

Two 16 mm (5/8-inch) coupling links and chain samples from the mid-water trawl door securing arrangement were sent to the TSB Engineering Laboratory for analysis. The two coupling links from the securing arrangement and a new coupling link of the same size were tested to destruction. The laboratory report on these tests shows that, despite the fact that the stud assembly of one unit was in an advanced stage of degradation and the load pin was considerably reduced in diameter within the stud assembly, all three coupling links failed at a load in excess of the manufacturer's specified minimum breaking load of some 32,800 kg (72,300 lb). The chain samples also showed signs of corrosion. However, in spite of the corrosion layer being up to 1 mm thick, the interior of the chain was found to be sound.

2.0 *Analysis*

2.1 *Securing Arrangement*

Because no turn-buckles or other tightening or wedging devices were used and because there was no arrangement to secure the door where it was in contact with the deck, it would not have been possible to render the door completely immobile. The scratch marks on the deck could be considered as being consistent with movement of the door when in the stowed position. The rolling of the "CAPE BRIER" as she operated in the seaway would subject the securing arrangement to repeated snatch/shock loads.

The intended stowage recesses in the ship-side bulwarks had not been modified to take the larger doors, but proper immobilization of the doors could have been achieved without major structural alterations. The addition of minimal fittings such as eye-pads and angles to the deck and bulwarks would have permitted a rigid stow of the doors in the alternate location.

2.2 *Failure of the Securing Arrangement*

Because of the many variable factors involved, it was not possible to determine the load to which the securing arrangement would have been subjected. The manufacturer's minimum breaking load for the coupling links, which the tested links exceeded, was in the order of 30 times the weight of the door. No parts of the coupling link which connected the securing arrangement to the door were recovered, suggesting that the alloy pin failed in shear or that the pin worked its way out. The TSB Engineering Laboratory report suggests that the most probable failure scenario was that the load pin could have slipped out of the missing coupling link if there was wastage of the stud assembly due to corrosion.

3.0 Conclusions

3.1 Findings

1. Introduction of larger mid-water trawl doors required that alternate stowage be found on the vessel for these doors.

2. No provision was made to facilitate the securing of the doors at the selected alternate stowage sites.

3. The securing arrangements made did not incorporate any tightening or chocking devices.

4. With the doors not rigidly stowed, the securing chains were subject to cyclical shock loading when the vessel was working in a seaway.

5. The integrity of the securing arrangements relied on the crew monitoring the condition of the components.

6. One of the coupling links incorporated in the securing arrangement for the door that came loose could not be located after the accident.

7. The normal operation of the vessel required that crew members work in the vicinity of the stowed doors.

8. Prompt first-aid efforts by crew members could not resuscitate the victim.

3.2 Causes

The trawl door on the "CAPE BRIER" came loose because it had not been adequately secured against the vessel's movement in the sea conditions in which she was operating.

4.0 *Safety Action*

4.1 *Action Taken*

4.1.1 *Modification by Owners*

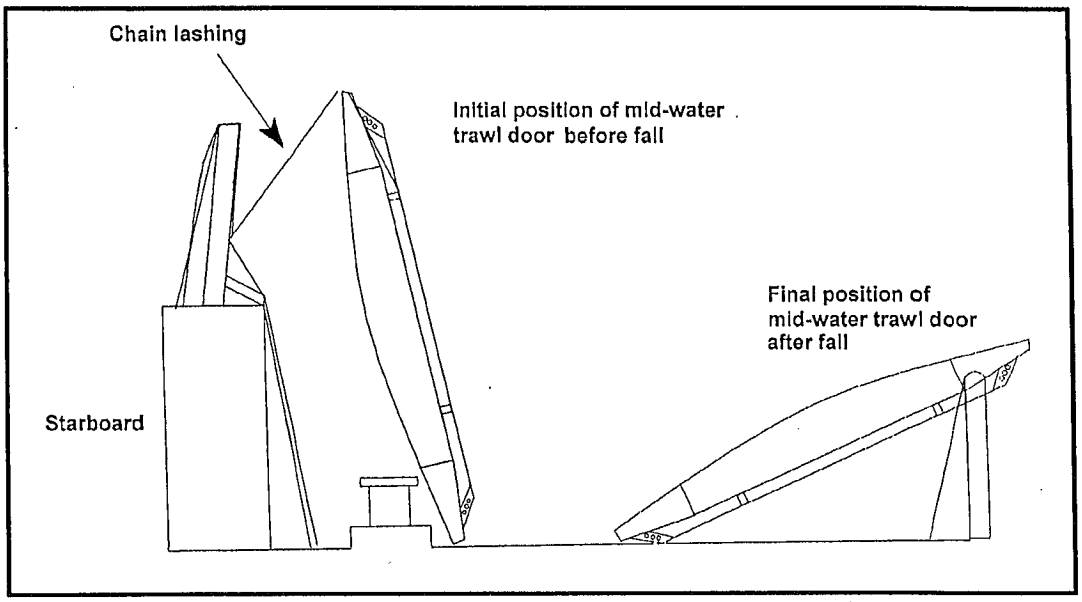
Following the accident, the vessel owners fitted storage pockets on two similar class vessels in order to properly secure large mid-water trawl doors. Since there are only two pairs of large mid-water doors in the fleet, they will be permanently assigned to the modified vessels. A total of four vessels of the same class were modified and fitted with storage pockets for the proper securing of ground trawl doors.

4.1.2 *Stowage of Enlarged Trawl Doors*

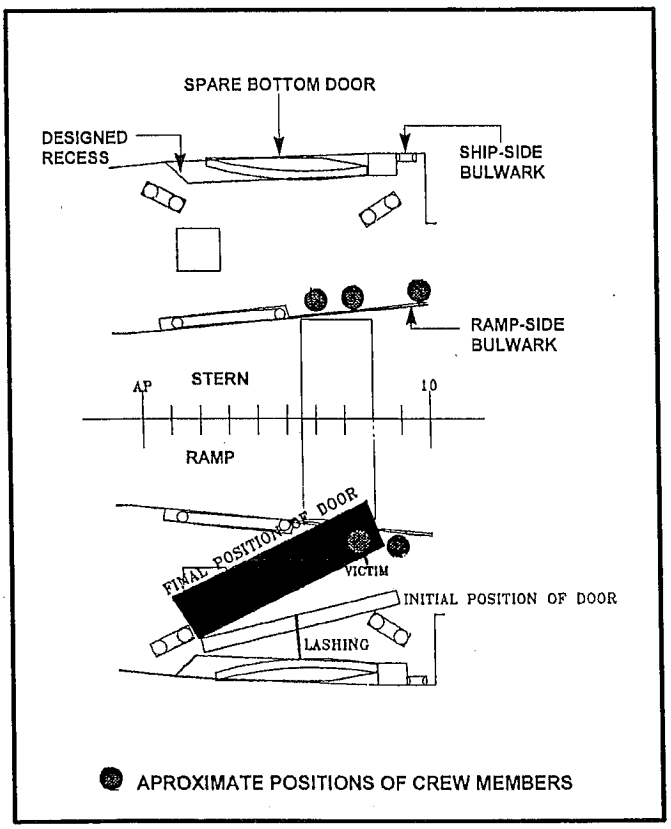
The TSB has no records of similar occurrences. However, given the unsafe condition which could exist on other vessels utilizing trawl doors larger than those for which the securing pockets are designed, the TSB apprised the Canadian Coast Guard of the circumstances of this occurrence.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson, John W. Stants, and members Zita Brunet and Hugh MacNeil, authorized the release of this report on 07 June 1995.

Appendix A - Stowage Arrangement



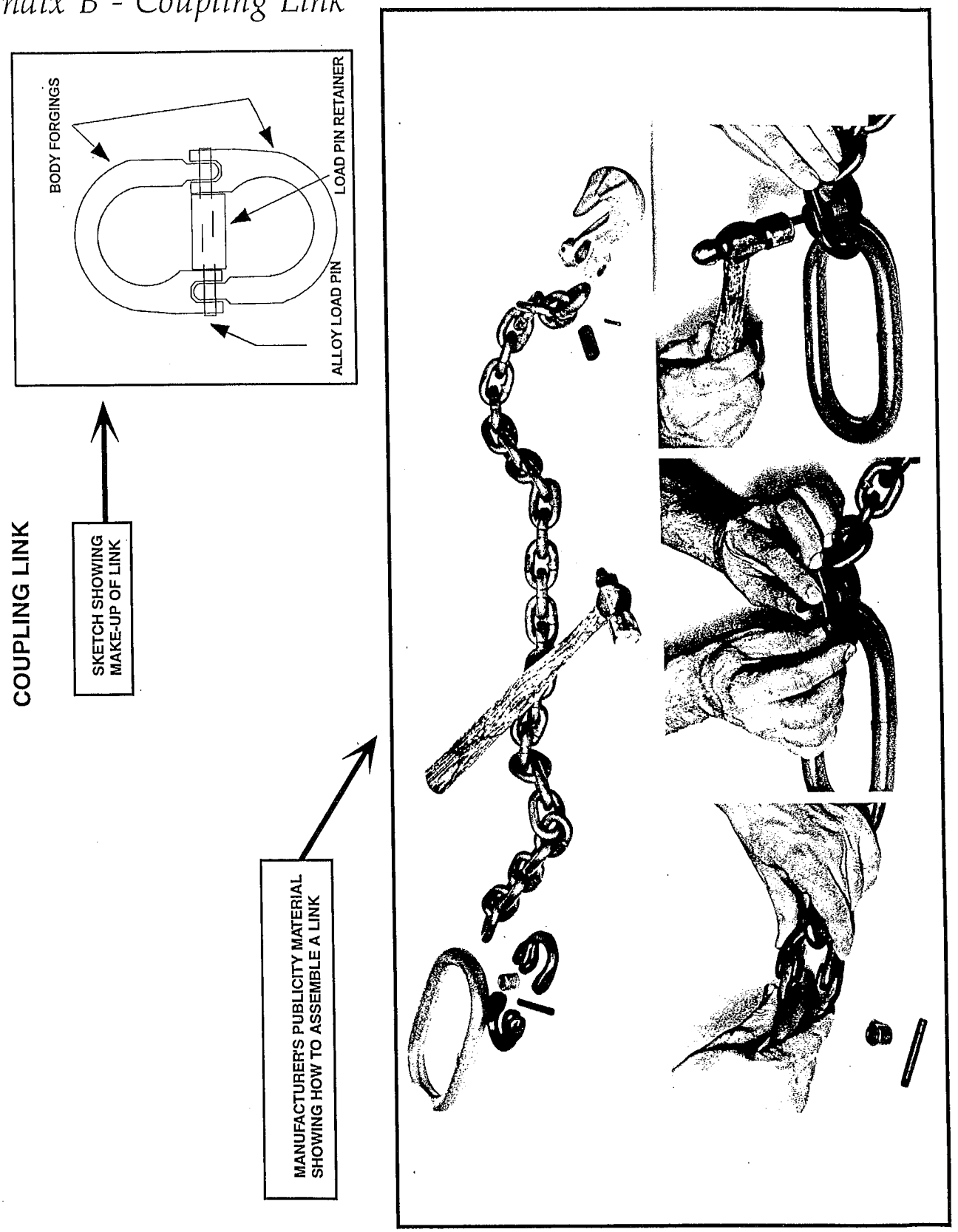
SECTION IN WAY OF SECURING ARRANGEMENT, LOOKING AFT



SECURING ARRANGEMENT OF MID-WATER TRAWL DOOR

PLAN OF AFTER PORTION OF TRAWL DECK

Appendix B - Coupling Link



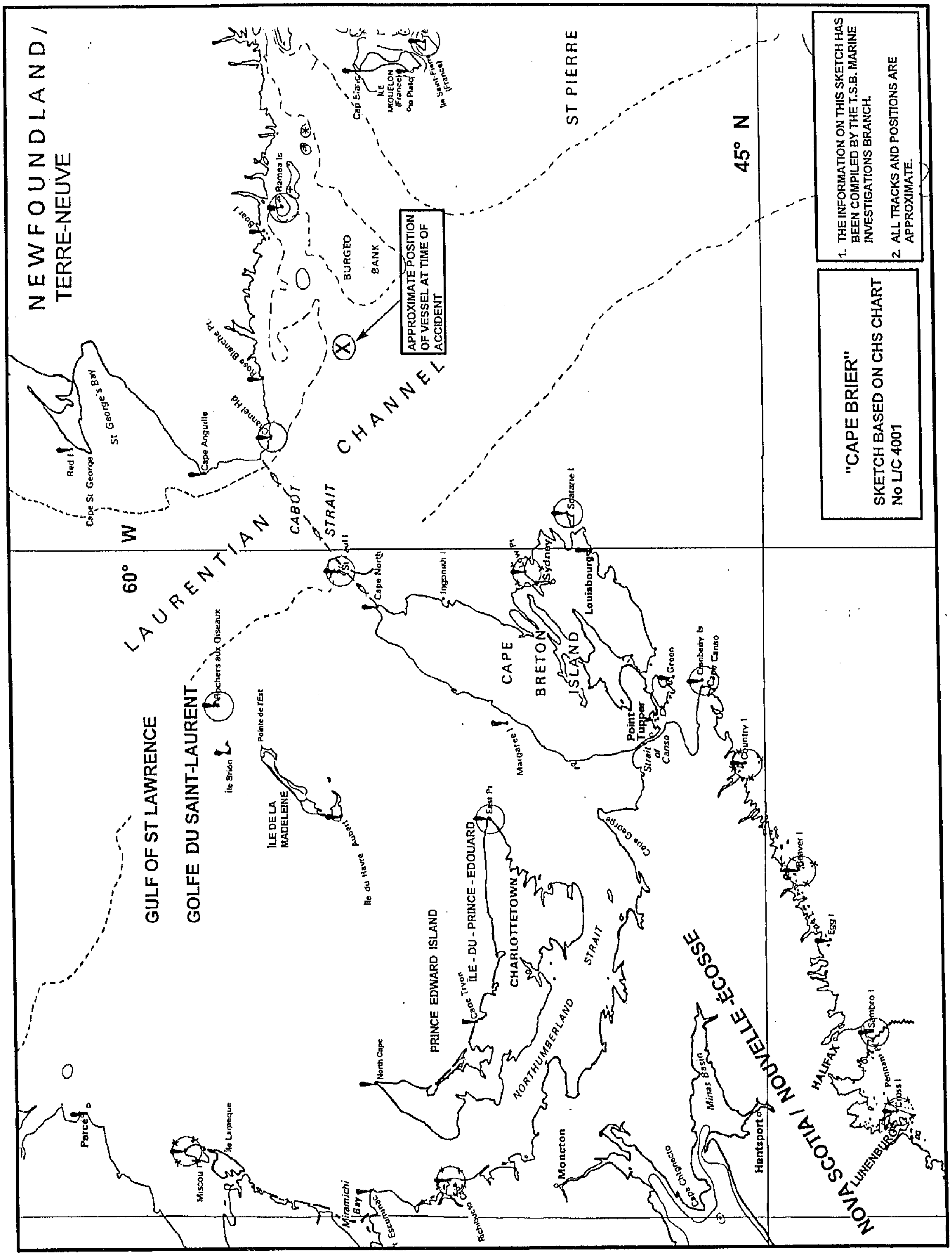
Appendix C - List of Supporting Reports

The following TSB Engineering Branch Laboratory report was completed:

LP 140/93 - Chain/Coupling Links Analysis

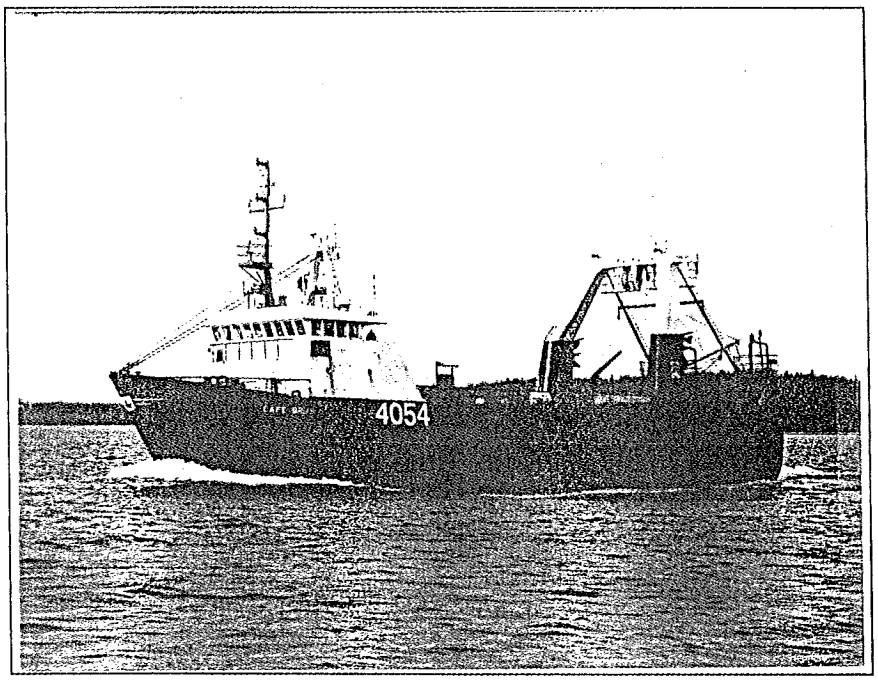
This report is available from the Transportation Safety Board of Canada upon request.

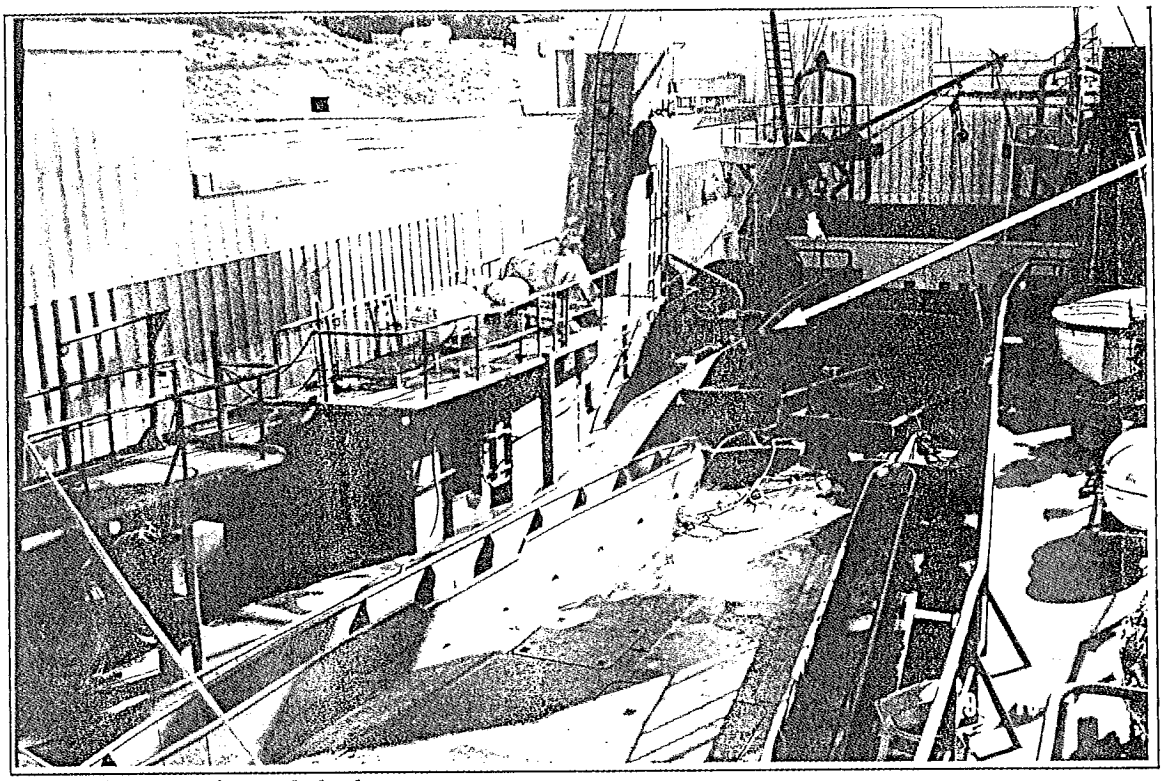
Appendix D - Chartlet of the Area



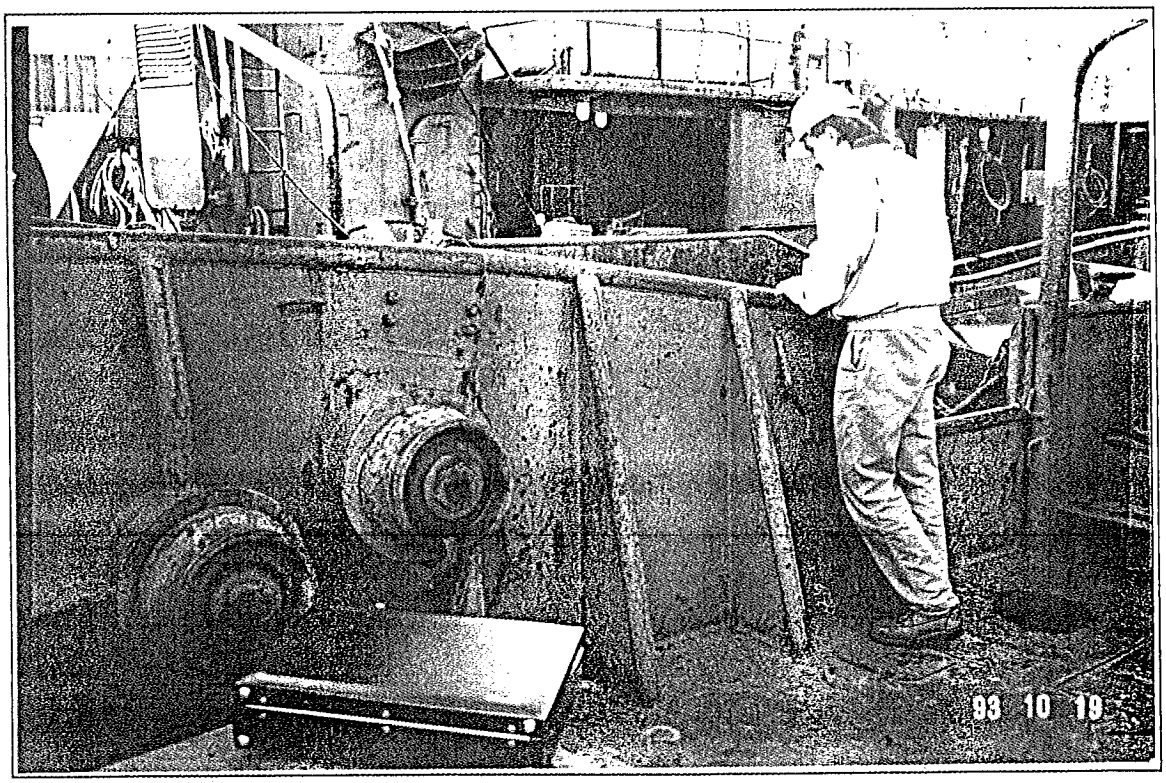
Appendix E - Photographs

"CAPE BRIER"





General view of trawl deck.



Forward

View of accident site.

Appendix F - Glossary

A	aft
ADT	Atlantic daylight time
BHP	brake horsepower
BP	between perpendiculars
bulwark	Vertical plating forming a wall at side of vessel or between deck areas.
to chock	to secure with wedges
coupling link	Similar in appearance to a link of a studded chain, a quickly assembled unit for joining or securing chains and other gear.
DFO	Department of Fisheries and Oceans
E	east
eye-pad	Plate or casting with a loop normal to its surface and formed solid with the plate.
F	forward
F.V.	fishing vessel
IMO	International Maritime Organization
kg	kilogram(s)
kW	kilowatt(s)
lb	pound(s)
m	metre(s)
m^2	metre(s) square
mm	millimetre(s)
mid-water quarter	Mid-depth between the surface and the bottom after portion of ship on either side of the stern.
SE	south-east
SI	International System (of units)
SIC	Steamship Inspection Certificate
trawl door	One of a pair of fabricated rectangular devices attached on each side of the mouth of a trawl net to control the opening.
TSB	Transportation Safety Board of Canada
UTC	Coordinated Universal Time
warp	fibre or wire rope
°	degree(s)