

MARINE INVESTIGATION REPORT

M98M0003

ACCIDENT ABOARD SHIP

FISHING VESSEL "CAPE CHIDLEY"

105 MILES EAST OF LOUISBOURG, NOVA SCOTIA

3 FEBRUARY 1998

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

Before daybreak, the stern trawler "CAPE CHIDLEY" was fishing off the coast of Nova Scotia when the crew experienced difficulty in retrieving the trawl net. During an attempt to clear a riding turn of gilson wire on a winch drum, a trawlerman positioned himself near a block which was rigged to help pull the gilson wire free. As the pulling force was increased, the block assembly tore from its corroded support and struck the trawlerman, killing him.

Ce rapport est également disponible en français.

Other Factual Information

	"CAPE CHIDLEY"
Port of Registry	Halifax, Nova Scotia (N.S.)
Flag	Canada
Registry/Licence Number	370542
Type	Large Fishing Vessel
Gross Tonnage ¹	792
Length	42.73 m
Built	1976
Propulsion	2400 brake horsepower
Number of Crew	14
Registered Owner	National Sea Products Limited, Lunenburg, N.S.

The "CAPE CHIDLEY" is a large stern trawler of steel construction with the wheelhouse and accommodation forward and a mechanised working deck over the fish hold aft. A forward gantry straddles a winch platform just aft of the wheelhouse. The after gantry, which stands astride the stern ramp, houses the port and starboard gallows frames, towing blocks, and trawl door stowage.

The vessel had been engaged to catch fish for the French island of Saint-Pierre. On 2 February 1998 at 1010 the trawler departed Saint-Pierre bound for the fishing grounds off the coast of Nova Scotia.

Just before daybreak on February 3, the "CAPE CHIDLEY" was trawling approximately 105 miles from the coast, east of Louisbourg, when the crew experienced difficulty in retrieving the trawl net. Both trawl doors had been hauled up and secured at each port and starboard gallows frame when the hammer lock (steel coupling) at the port door let go, releasing the end of the sweep line pennant. This meant that the sweep lines from the trawl door to the net could not be harnessed using the pennant in the normal way for bringing the net on board.² In order to correct the situation, the port trawl door had to be manoeuvred from the gallows frame and brought on deck to capture the free end of the pennant for normal net retrieval.

¹ Units of measurement in this report conform to International Maritime Organization standards or, where there is no such standard, are expressed in the International System of units.

² The pennant is a wire cable with one end attached to the net's sweep lines and the other secured at the trawl door with a releasable hammer lock. The pennant at each door is used to transfer the sweep lines and net from the trawl doors for independent hauling of the net on deck via the stern ramp.

The master had approximately 27 years' working experience with National Sea Products of Lunenburg. He was relatively new to this vessel, having sailed on her for three trips. He had asked the chief mate to remain on the bridge to demonstrate the procedure used on board this vessel for retrieving the trawl door.

Using the gilson winch and cable over the gilson block at the head of the forward gantry, the crew attempted to lead the cable aft to the port trawl door. When slackening-off the gilson cable by rotating the winch drum, a riding turn of wire on the gilson drum jammed the cable and prevented it from being hauled out by hand. The capstan winch was then used to forcibly clear the riding turn of cable on the gilson drum (see Appendix A - Arrangement of Cable, Rope and Blocks).

In order to free the jammed cable, a rope was harnessed to the end of the gilson cable. It was then led through an overhead guide block at the top of the port gallows frame, down through a yo-yo block with a working limit of five tons, attached at the aft bulwark, and led to a capstan winch located on the port side of the afterdeck. The master warned all hands to stand clear as the cables and rope under strain ran the full length of the working deck.

There was partial success in clearing the riding turn on the gilson drum and this provided some additional cable aft for eventual hook up to the port trawl door. The process to free the cable from the drum was such that there were times of maximum strain on the capstan winch and others when the cable would go slack as it was being cleared.

The trawlerman went aft to handle the required slack in the gilson cable and to hook it onto the port trawl door. This placed him immediately in front of the yo-yo block and approximately 2 m from the capstan winch operator. There was no communication between them. The crew member who was operating the capstan winch continued to take the strain on the cable as it became slack. At a coincident moment when the strain was being taken, and the trawlerman was immediately in front of the block, a section of the bulwark stay in way of the block ripped away from the after ship's structure. The five-ton block, together with its safety chain and the lug, hit the trawlerman on the left side of his lower jaw and he fell to the deck.

The trawlerman, who had approximately seven years' fishing experience, was wearing a Canadian Standards Association-approved hard hat at the time.

The master rushed down to the afterdeck from the wheelhouse to determine the status of the trawlerman. Unable to get a pulse, the master, via the ship's radio and a Canadian Coast Guard radio station, was able to communicate with a doctor ashore. Together they determined that the trawlerman was deceased. The vessel initially steamed for North Sydney and subsequently changed course for Louisbourg, where representatives from National Sea Products and other interested authorities including the RCMP and Nova Scotia's Department of Environment and Labour,³ met the vessel.

³ Formerly called Department of Labour.

Block Securing Arrangement

The bulwark was stiffened by bulwark stays which comprised 12.7 cm x 7.62 cm x 0.95 cm inverted ordinary angle irons (see Appendix B - Photographs). The long flange of the angle iron (the standing flange) was at right angles and welded onto the bulwark. The face flange was parallel to the bulwark and had a pad-eye and a lug welded to it, which were used for securing blocks during fishing operations. Of the two rigging attachments, the one near the upper end was a lug and the other, approximately 12.5 cm below it, was a pad-eye. The general practice was to shackle the yo-yo block to the lower pad-eye and secure the safety chain to the upper lug. In this instance, both the yo-yo block and the safety chain were shackled to the upper lug.

Post-Occurrence Examination

Following the occurrence, the accident site was examined; observations included the following:

- The face flange of the bulwark stay in way of the upper lug to which the yo-yo block was secured was severely corroded, wasted, and bent beyond the original 90-degree angle; this was particularly noticeable in the area of the upper rigging attachment.
- Other bulwark stays on the after deck, which were used for similar purposes, were in like condition and some had holes cut in the standing flange to take the block safety chain.
- The open link safety chain for the yo-yo block in use had one partially wasted link.

TSB Engineering Laboratory

The Engineering Laboratory of the TSB conducted an examination and in-depth analysis of the bulwark stay and the lug to which the yo-yo block was fastened, and the conclusions drawn included the following:⁴

- The fracture occurred in the angle iron.
- No metallurgical defects were found in the weld nor was it considered to have adversely affected the strength of the adjacent metal.
- The strength of the fractured structure at the time of the failure was roughly of the same magnitude as the maximum pull of the winch. The pull of the winch combined with the dynamic loading effects were such that the weakened section of the bulwark stay failed.

Regulatory Ship Inspection by Transport Canada

⁴ TSB Engineering Laboratory Report No. *LP 039/98 - Examination of Fractured Lug* is available upon request from the Transportation Safety Board of Canada.

Periodic inspection of the external and internal hull of the vessel was carried out by a Transport Canada, Marine Safety (TCMS) surveyor on 16 January 1998, some two weeks before the occurrence. Following inspection, the vessel was issued an unqualified ship inspection certificate. The record indicates that no SI-7 was issued to the vessel; SI-7s identify deficiencies that do not materially affect the seaworthiness of the vessel but, being safety-related, are required to be rectified as soon as possible or within a period indicated on the certificate.

Occupational Health and Safety—Workplace Legislation and Training

The *Occupational Health and Safety Act (1996)* of Nova Scotia and the regulations made pursuant thereto apply to the work deck space aboard fishing vessels. The regulatory requirements call for every lifting device to be thoroughly examined, at least annually, by a competent person and for a record of such inspection to be maintained by the employer. The onus is:

- on the employer/supervisor of fishermen to take every reasonable precaution to ensure their safety and to ensure that regulations are complied with,⁵ and
- on workers to take reasonable precautions to ensure the health and safety of themselves and other persons.

No periodic inspections are required to be carried out by the regulatory authority, the Department of Environment and Labour. However, according to the Department of Environment and Labour, the Department carries out random and targeted workplace inspections, issues orders (where deemed necessary) and tracks compliance. In this instance, no inspection of the vessel was carried out prior to the occurrence, but inspection of the work deck space and investigation was carried out by departmental officials following the occurrence.

The occupational health and safety (OHS) program requirement under the Act includes:

- the provision of training and supervision of employees;
- a hazard-identification system that includes procedures and regular inspection by the employer;
- prompt follow-up and control of identified hazards; and
- a safety committee meeting at least once a month.

At the time of this occurrence, National Sea Products was in the process of training the ships' crew to take an active roll in the OHS program; however, none of the senior officers of the "CAPE CHIDLEY" had taken part in this training. Two of the crew had taken the OHS safety training and had been designated as safety officers aboard the vessel.

On-Board Safety Meetings

⁵ S. 13 of the *Occupational Health and Safety Act (1996)* of Nova Scotia.

Vessel records indicate that prior to this occurrence, the last two onboard safety committee meetings were held on 20 July 1997 and 24 September 1997. The minutes from the safety meetings indicate that there were no complaints or safety hazards identified.

Split Jurisdiction, Division of Responsibility, and Safety

TCMS provides fishermen with a national regulatory system that applies to the structural and operational safety of the vessel, compliance with which ensures that the vessel can be navigated safely.⁶ However, the national regulatory system does not establish standards for those parts of the vessel employed in the “business of fishing” nor does it establish standards for how a fisherman is to use those parts. The Department of Environment and Labour, on the other hand, has the responsibility to ensure that the “business of fishing” is conducted in a safe manner. The result of this division of responsibility is that only part of a fishing vessel is subject to TCMS regulations and inspections, and the work deck spaces and equipment used in fishing operations are not effectively monitored to establish reasonable safety standards. The Board is concerned that an approach that lacks coordination and harmonization between the federal and provincial authorities results in reduced workplace safety and, therefore, the overall safety of fishing vessels.

Company Operation Procedures

According to company practices for draggers, the job of the crew is to safely operate the vessel while at sea to catch fish. While in port, the crew is replaced by the company’s shore-based maintenance staff who are responsible for preventative maintenance on board, including the ship’s lifting appliances and rigging equipment. In addition to requests from the ship for work to be performed, the shore maintenance staff carry out assessments and inspections of their own. They report the findings to their supervisor who maintains records and prioritizes the work to be carried out.

Company Inspection and Maintenance Records

On 7 July 1997, some seven months prior to the occurrence, an internal shore-based maintenance record identified deficiencies in the rigging on board the “CAPE CHIDLEY”. The record shows that the safety chain for the yo-yo block was worn, and that the eye of the block was stretched and its sheave broken. No action was taken to rectify the situation. Further, the information contained in the record was not shared with the ship’s master and, while the record was maintained ashore, there was no copy of the record on board the vessel.

Analysis

Workplace Supervision

⁶ The term “navigated” includes all activities that are essential for the vessel to remain in a seaworthy condition to complete the voyage safely.

The chief mate and the master were in the wheelhouse, the boatswain was down below-decks and the crew on deck were not being directly supervised at the time of the occurrence. The number of crew is limited and, therefore, trained supervisors are not always available and on the scene during all deck operations. There is a heavy reliance on both the individual, who at times must act independently, and the deck team, who must be able to anticipate each other's actions and reactions to ever-changing, dynamic conditions.

Communication and Safety

The method of communication used was to shout out information on the deck, which is subject to varying degrees of noise associated with fishing operations, main-engine operation, and environmental conditions. Thus, the transfer of information, which may be critical for the safe operation, cannot always be ensured. The master had warned the crew to stay clear of the wire, which warning was heard by the majority of the crew on deck. As the trawlerman lost his life, it could not be established whether he also heard the warning. There was no communication between the operator of the capstan winch and the trawlerman immediately prior to the occurrence. This permitted a dangerous situation wherein the trawlerman stepped immediately in front of the block while the operator of the capstan winch was attempting to haul the gilson cable from its drum.

Deviation from Established Practice and Safety

In this instance, the crew deviated from the general practice of securing the block to the lower pad-eye; instead the upper lug was used. Because the lower section of the bulwark stay was less corroded, it would have withstood a larger load than the upper lug. However, given the dynamic load effect in existence at the time of the occurrence, the precise load placed on the lug is unknown. Consequently, it could not be determined with certainty whether the lower pad-eye could have withstood the load imposed.

Rigging Arrangement for Fishing Tackles and Safety

Pad-eyes generally spread load over a larger area than a lug. In this instance, because the block was shackled to the upper lug, the load was concentrated over a smaller area of the stay flange. Further, the pad-eye and lug were welded on the face flange of the bulwark stay instead of the standing flange, which was better able to withstand the loads imposed on it. As the points for fitting blocks and tackles were to be used primarily during fishing operations, loads imposed on the pad-eye or lug could be subjected to dynamic effects in excess of the static load (pull) imposed by the winch. No additional local stiffening was provided in way of the pad-eye or lug (a commonly used ship construction practice). In this instance, the area in way of the lug was severely and extensively corroded, further weakening the area.

Safety Chain and Safety

The open link safety chain had one partially wasted link. This could have rendered the chain ineffective for its intended purpose. Even though not attached independently, its very presence may have offered a false sense of security to the crew. The safety chain is intended to serve as a back-up safety feature should the lug/eye to

which the block is shackled fail. In this instance, the back-up function of the safety chain was effectively negated, as the safety chain and the block were secured to the same lug.

OHS-related Procedures

The owner's primary place of business is located ashore, and a shore-based maintenance staff are responsible for repairs and upkeep of the vessel, including lifting appliances and rigging. The shore-based staff work in isolation, separate from the sea-going staff, and their inspection records were maintained ashore. The procedures followed by the shore staff did not ensure that a copy of the inspection record was placed on board the vessel and that the master was informed of the deficiencies. Thus, the ship's complement, who would be exposed to the hazards, were not made aware of these deficiencies. In the absence of information that identifies deficiencies, there could be a tendency for the ship's staff to assume that all is well. This is reflected in the record of two previous safety meetings, both of which indicated that no complaint or safety hazard was identified or discussed. This would suggest that the need for a closer working relationship between the ship staff and shore maintenance supervisor—essential for the safe operation of the vessel—was not fully appreciated.

Shipboard Procedures

As the points used for fitting blocks and tackles during fishing operations are subject to wear and tear, and as the vibrations generated could adversely affect the safe operation, good seamanship practices dictate that this rigged equipment be examined prior to its use. There is no information to suggest that the rigged fishing gear is examined prior to its use on a routine basis, and it would appear that the dangers associated with the use of the stays as anchor points for rigging fishing gear were not fully appreciated by the ship's crew. Further, the fact that maintenance was carried out by the shore staff did not exempt the ship's complement from instituting appropriate safety measures/procedures. Such measures are essential to ensure safety in the workplace.

Safety Meetings and Safety

The purpose of the safety meetings is to discuss safety issues and rectify identified deficiencies. Hence, it is necessary that all of the ship's personnel take initiatives to identify deficiencies, and active participation by senior staff is essential for safe and efficient shipboard operations. It is, therefore, critical that the senior ship's personnel encourage a climate where the crew can comfortably provide input in the expectation that their input will be considered. In this instance, safety meetings on board the vessel were not held at regular intervals, nor did they achieve their intended objective, in that despite the presence of safety hazards, none was identified or discussed during the meetings.

Follow-up Action to Address Deficiencies

Although the deficiencies in the rigging were noticed by the shore-staff some seven months before the occurrence, remedial action was not taken to address these deficiencies. This permitted the unsafe conditions to

continue unaddressed until the occurrence. This would suggest that the current follow-up procedures do not reflect the urgency essential for prompt remedial measures to address identified deficiencies.

Quality of TCMS Inspection

The deterioration of the bulwark stays had occurred over a period of time during which the vessel had undergone steamship inspections. During steamship inspection, the defects in the bulwark stays and/or the lug should have been readily visible. However, there is no record of an SI-7 having been issued to the vessel to repair these deficiencies. The last inspection had been carried out some two weeks before the occurrence. This would suggest that the inspection carried out by TCMS surveyor was less than thorough. Further, the deficiency was not brought to the attention of the Department of Environment and Labour. The state of the stays and the deformation of the lug would suggest that the deficiency persisted for a period of time. This lack of coordination and harmonization between the federal and provincial authorities, as identified in a previous occurrence (involving the "S.S. BROTHERS", TSB Report No. M96M0144), continues to compromise crew safety.

Findings

1. The trawlerman had approximately seven years' fishing experience and was wearing safety gear at the time of the occurrence.
2. Although the metal in way of the upper lug was more severely corroded than that in way of the lower pad-eye, the crew deviated from the established practice and secured both the block and the safety chain to the upper lug.
3. The section of the bulwark stay and the upper lug ripped away from the after ship's structure and struck the trawlerman, killing him.
4. The upper section of the bulwark stay in way of the lug was severely corroded and the face flange, which was bent beyond the original 90 degrees, was readily visible.
5. Substantial corrosion and distortion of the bulwark stay was evident for some time prior to the occurrence; however, remedial action had not been initiated.
6. Although the pad-eye and the lug were welded on the face flange and not the standing flange, the bulwark stay in way of the pad-eye and the lug was not stiffened to provide additional strength.
7. There was lack of coordination between the shore maintenance staff and the ship's crew, in that the deficiencies identified by the former were not brought to the attention of the latter, who would be exposed to the hazards at sea.

8. Rigged gear used in fishing operations is not examined by the ship's crew prior to its use on a routine basis.
9. The current follow-up procedures for deficiencies identified by the shore maintenance staff did not reflect the urgency essential for remedial measures. Effective action was not taken to correct the deficiencies identified some seven months prior to the occurrence.
10. Safety meetings on board the vessel were not conducted on a regular basis, and those that were conducted did not meet the stated objective, in that the readily visible deficiencies were not reported by the crew and the deficiency or hazard was not discussed.
11. The current approach lacks coordination and harmonization between the federal and provincial authorities and results in reduced workplace safety and reduced overall safety of fishing vessel.
12. The last steamship inspection was carried out some two weeks prior to the occurrence and was less than thorough, in that it did not detect the level of corrosion of the bulwark stays.
13. The open link safety chain had one partially wasted link, which could have rendered the chain ineffective for its intended purpose.
14. The practice of securing the block and the safety chain to a single anchor point effectively negates the back-up prevention function of the safety chain.
15. The method of communication on the deck , where there are varying degrees of noise is such that the transfer of information, which is critical for safe operation, is not always ensured. Immediately prior to the accident, there was no communication between the operator of the capstan winch and the trawlerman.

Causes and Contributing Factors

The lug which formed part of the rigging was attached to a severely corroded face flange of the bulwark stay. While engaged in fishing operations, a section of the bulwark stay in way of the lug tore away from the structure and struck the trawlerman, killing him. The corrosion reduced the factor of safety to a point where the pull of the capstan winch together with the dynamic loading effects was able to tear the lug away from the weakened face flange of the bulwark stay. Contributing to the occurrence were the fact that the bulwark stay in way of the lug was not strengthened, the crew deviated from the normal rigging practices, the rigging was not examined by the crew prior to its use, and there was poor communication on the deck.

Safety Action Taken

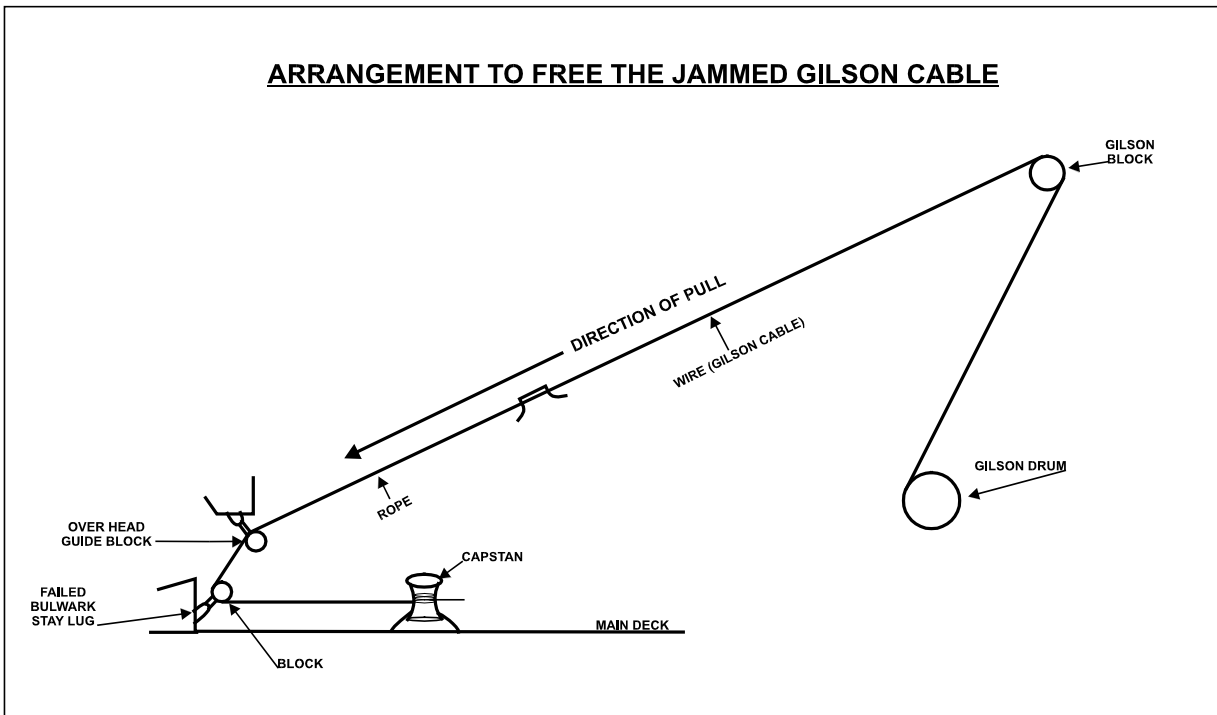
Following the occurrence, Nova Scotia's Department of Environment and Labour carried out an investigation into the occurrence. Under an order issued by the department, a comprehensive examination of all standing and running rigging for fishing operations including safety chains, anchor points for rigging and wire sizes of lifting purchases and rigging gear onboard was carried out for all vessels of the fleet, including the "CAPE CHIDLEY". Changes, repairs and/or replacements effected to "CAPE CHIDLEY" included, among others, the fitting of a new header to the bulwark stay and returning the bulwark stay to its original scantlings.

Following this occurrence, National Sea Products reported that the company has extensively reviewed its internal procedures with respect to the repair and maintenance of its vessels and safety training for its crews. The importance of regular safety meetings has been reinforced. Crew have continued to participate in training. In particular, the crew of the "CAPE CHIDLEY" have taken further training in occupational health and safety, incident investigation, marine first aid, emergency measures and workplace hazardous materials handling. In May 1998, the company installed a software-based maintenance planning tool. Accountability of management for the effective monitoring of the tackle inspection procedures has been reinforced.

With regard to the need for effective coordination and harmonization between federal and provincial authorities, Transport Canada, Marine Safety officials at both national and regional levels have started a process of consultations with the appropriate departments of the provinces and territories.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 26 July 2000.

Appendix A - Arrangement of Cable, Rope, and Blocks



Appendix B -

Photographs

