

MARINE OCCURRENCE REPORT

GROUNDING

OF THE FISHING VESSEL "MONA PEARL"

HARDY COVE, NOVA SCOTIA

8 APRIL 1997

REPORT NUMBER M97M0022

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

While returning to Digby, Nova Scotia, from scallop grounds in the Bay of Fundy, the fishing vessel "MONA PEARL" grounded on a rising tide in Hardy Cove. The two crew were forced to abandon the vessel and get into a liferaft. They were rescued by local residents who had observed the vessel's progress along the coast and become concerned. The vessel was subsequently declared a constructive total loss.

Other Factual Information

Particulars of the Vessel

Name	"MONA PEARL"		
Port of Registry	Digby		
Flag	Canada		
Official Number	371154		
Type	Scallop Dragger		
Gross Tons ¹	50.77		
Length	16.76 m		
Built	1981		
Propulsion	1 x 6 cylinder Diesel, 208 kW		
Speed	8 - 9 knots		
Owners	Thomas O'Neil Digby, Nova Scotia		

The "MONA PEARL" was a side dragger with the wheel-house, skipper's cabin and engine-room aft. The fish hold was midships and the crew accommodation forward of the hold. The shucking house extended forward from the wheel-house on the port side of the main deck above the fish hold. This design reduced forward visibility from the wheel-house on the port side. The gallows was rigged on the starboard side.

The Voyage

The "MONA PEARL" departed Digby, Nova Scotia, at 1700 on 6 April 1997 for the scallop grounds in the Bay of Fundy. The vessel's crew of two was reportedly engaged in scallop dragging and preparing the catch for between 18 and 20 hours per day after their arrival on the fishing grounds, anchoring the vessel with the scallop rake while they slept. Radar and other navigational aids were reportedly operational throughout the voyage.

On 8 April 1997, at approximately 2200, the skipper decided to leave the fishing grounds to return to Digby. The gear was hauled in and secured during which time the vessel was drifting. Reportedly using a Loran C fix giving a position of 44°53'50"N, 65°33'23"W, the skipper set a course of 250° - 255° magnetic on the auto-pilot for Prim Point at the entrance to Digby Gut. All the work-deck lights were left on after the vessel departed the fishing grounds. Given the vessel's speed and the flood tide, the skipper estimated it would take three hours to reach the O'Neil Fisheries wharf some 15 miles distant in Digby. About 15 minutes later, he handed the watch over to the deck-hand and went to rest in his cabin. The deck-hand had instructions to call the skipper after one hour and ten minutes.

The deck-hand had been involved in the fishery in Newfoundland and Nova Scotia for a year and a half. He had limited experience on scallop draggers and, had, reportedly, little experience in conning the vessel or in the use

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

of its navigational aids. It was reported, however, that he had been in charge of a bridge watch on fishing vessels similar to the "MONA PEARL" on five previous occasions.

At 2130, an observer on shore reported seeing a vessel with the deck lights illuminated and estimated it to be 1 - 1 ½ miles offshore. At 2230, at Delap Cove, he again observed the vessel, this time very close to shore, and thought that it was in trouble. He and other residents of the area then proceeded to locate the vessel along the shore.

At approximately the same time, the skipper, who was in his cabin, felt two thuds as if the vessel had hit a sea. The vessel vibrated and came to a stop. The skipper immediately went to the bridge. The deck-hand indicated that he did not know the vessel's location, had not seen that they had been heading for shore and had not fallen asleep.

At 2236, the skipper called Yarmouth Coast Guard Radio and reported that the vessel was sinking in position 44°47'39" N, 65°35'57"W. In fact, the vessel was aground in Hardy Cove.

The vessel was about 5-6 metres offshore. Both crew members abandoned the vessel and got into a 6-person liferaft. The local residents arrived in Hardy Cove just as the liferaft drifted ashore and they assisted the crew members, neither of whom had suffered serious injury. Both crew members were transported to hospital by the RCMP.

The vessel had grounded with its bow pointing to the southwest, parallel to the coast.

On the evening of 8/9 April 1997, low water in the area was at 1913 and high water was at 0124 local time. At the time of the grounding the tide was rising and the tidal range was 8.53 metres.

The vessel reportedly had a top speed of 8-9 knots in favourable conditions. Given the skipper's estimate of 3 hours to cover the 15 miles to the wharf it is reasonable to surmise that the vessel was making good 5 knots. In 36 minutes the vessel would have travelled three miles.

Work/Rest Schedule

Throughout the trip the crew maintained a work/rest schedule of 20 consecutive hours on duty (typically from 0700 hrs to 0300 hrs the next day) and four hours off duty (0300 hrs to 0700 hrs). During the four-hour, off-duty period, the crew was able to obtain sleep.

Fatigue and Performance Degradation

Fatigue may be described as a physiological state typically caused by inadequate quantity of sleep and characterized by impaired performance and diminished alertness. On average, a person needs 7.5 to 8.5 hours of sleep per day. A person obtaining less than his/her required sleep develops a *sleep debt* and will exhibit performance degradation.

Performance degradation as a result of fatigue manifests itself in many ways including: failure to respond, slowed physical and cognitive reactions, incorrect actions, flawed logic and judgement, increases in false

responses (responding when no stimulus is present) increases in memory errors, vigilance decrement, reduced motivation, an increased propensity for risk taking and falling asleep against the will of the individual.²

Unplanned and uncontrollable sleep episodes take the form of what is known as a “lapse” or “micro-event”, which can last from seconds to several minutes, and occur at any time of the day or night throughout periods of perceived “wakefulness”. Stimulus, information, and even conversation occurring during a “micro-event” may not register with the affected individual at all, even if their eyes are open.³ Although the existence of “micro-events” can be confirmed by electroencephalogram (EEG) recordings, people are not generally aware of them.

In fact, the last person to recognize fatigue, and often the most unreliable person to ask regarding their performance, is the individual who is already tired.⁴ This statement is supported by the findings of a recent study conducted by the U.S. Department of Transportation, the U.S. Federal Highway Administration, and Transport Canada (Commercial Motor Vehicle Driver Fatigue and Alertness Study). The study concluded that people are not very good at assessing their own levels of alertness and that there is a tendency for people to rate themselves as more alert than performance tests indicate.

Environmental Conditions

METOC weather and surface analysis for the Bay of Fundy for 8 April 1997, reported visibility was generally good with an air temperature of +2°C. Between 0000 and 0200 UTC 9 April 1997, the automatic weather station on Brier Island (44°17' N, 66°21' W) reported winds from 300° - 310° true at 17 - 20 knots with a few gusts near 25 knots. Wave heights in the middle of the Bay of Fundy would have been near 1 metre, closer to shore their height would have been influenced by bottom topography and currents. The most probable wave height in the area of the grounding would have been 1 -2 metres. The tidal stream runs parallel to the coast between 1 ½ knots on the ebb flowing southwest and 2 knots during the flood flowing northeast.

The combined influence of wind and waves on the vessel's beam would have been to set the vessel towards the western shore of Nova Scotia.

² The material in this paragraph is paraphrased from Dinges, David F., *Performance Effects of Fatigue*, Fatigue Symposium Proceedings, November 1995, National Transportation Safety Board and NASA-Ames Research Center.

³ Vincent Cantwell, *Physiological Factors Affecting Safety in Maritime Operations*, Safety At Sea International '97 Conference (SASMEX), Baltimore, MD. April 30-May 1, 1997.

⁴ Rosekind, M.R. et al, NASA-Ames Fatigue Countermeasures Program, Education Training Module, NASA-Ames Research Center, Moffett Field, CA, 1995.

Analysis

Because the deck-hand's experience of navigating a vessel and of using the navigational aids fitted was limited, his effectiveness as a watch keeper was greatly reduced.

Given that the vessel was sighted 1 - 1 ½ miles offshore from Parkers Cove at 2130, it may be concluded that the vessel was closer to shore than the skipper believed when he set course for Prim Point. The crew did not ensure the overall safety of the vessel because the position and progress of the vessel was not adequately monitored. Had the crew been more cognizant of the effects of the wind and tide upon the vessel, appropriate allowances for set and drift could have been applied to the initial course and the grounding may have been prevented.

Analysis of the crew's 72-hour history, in particular their work/rest schedule, revealed that adequate sleep was not obtained by either the skipper or the deck-hand. During the 72 hours prior to the occurrence, a significant sleep debt would have accumulated, resulting in performance degradation.

Notwithstanding the deck-hand's lack of training and limited experience of navigation and of the use of the navigational aids fitted, his performance in this occurrence is consistent with the effects of fatigue in that he was unaware of the vessel's position (vigilance decrement) and accordingly did not adjust the course (failure to respond). Despite the deck-hand's perception that he did not fall asleep, it is probable that he succumbed to unplanned, uncontrollable sleep (lapse or micro-event).

The skipper's performance in this occurrence is also consistent with the effects of fatigue in that he handed over the watch to the deck-hand without first having adequately determined the deck-hand's knowledge and/or abilities with regard to navigation (flawed logic and judgement, increased propensity for risk taking).

TSB records indicate that unqualified crew members with inadequate watchkeeping abilities are, at least in part, contributory in about 45 to 50 per cent of all collision, groundings and striking of fishing vessels in Canada. Although experienced in fishing, many fishermen do not have formal training in navigation, radar skills, bridge procedures, rules of the road, etc; rather they learn through on-the-job exposure.

Following another investigation into the collision between the fishing vessels "CONNIE & SISTERS I" and "RYAN ATLANTIC" in June 1992, (TSB report M92M4031), the Board determined that the collision occurred because neither vessel was effectively navigated by radar and because neither vessel's crew maintained an effective look-out. As a result, the Board recommended that;

The Department of Transport ensure that any person required to have the conduct of a commercial fishing vessel possess the basic skills for safe navigation.

(M94-10, issued 1994)

In August 1997, the *Crewing Regulations* were amended to require certification and training for masters and first officers on fishing vessels over 85 GRT by July 30, 1998, and over 70 GRT after that date. The certification requirements shall be extended to vessels over 60 GRT by July 30, 1999. (SOR 97-390 Art. 29 (5) c) refers). Also, under new initiatives referred to as "*the professionalisation of fishermen*", the fishing industry

itself is planning to take steps towards providing basic skills for safe navigation to persons having the conduct of fishing vessels not required to carry a certificated master.

Findings

1. The vessel grounded in Hardy Cove with the bow in a south-westerly direction, parallel to the coast line.
2. The vessel was much closer to shore than the skipper realized when he set his course for Prim Point.
3. The influence of the wind and tide would have been to set the vessel towards the western shore of Nova Scotia.
4. The influence of the wind and tide on the vessel's course was not fully comprehended by the watch keeper.
5. The watch keeper's lack of training and familiarity with the use of radar and other navigation aids reduced his effectiveness.
6. The design of the vessel and the fact that the work-deck lighting remained on reduced the watch keeper's ability to observe shore lights, which could have warned him of the vessel's proximity to shore.
7. The crew's performance was consistent with the effects of fatigue.

Causes and Contributing Factors

The Board determined that the "MONA PEARL" grounded due to the lack of technical marine knowledge of the person assigned the watch keeping duties, and as a result of the crew not being fully aware of the effects of wind and tide. Fatigue, exacerbated by the work/rest schedule maintained by the crew throughout the trip, had a negative effect on the crew's performance.

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.

Glossary

A	aft
AST	Atlantic standard time
C	Celsius
F	forward
kW	kilowatt(s)
m	metre(s)
M	nautical mile(s)
SI	International System (of units)
TSB	Transportation Safety Board of Canada
UTC	Coordinated Universal Time
°	degree(s)
'	minute(s)
”	second(s)