

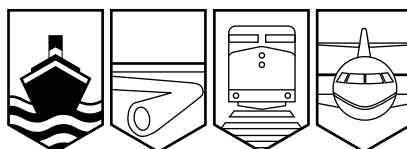
Transportation Safety Board
of Canada



Bureau de la sécurité des transports
du Canada

MARINE INVESTIGATION REPORT

M99M0062



GROUNDING

MOTOR POWERED SAILING VESSEL "BLUENOSE II"

HALIFAX HARBOUR

9 JUNE 1999

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

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Summary

Whilst proceeding on a harbour cruise in Halifax harbour under sail and not under power, the vessel grounded on Pleasant Shoal. The weather at that time was fair, winds southeasterly at 15 to 20 knots and visibility was unrestricted. There were 53 passengers and a crew of 16, including the master, on board. The vessel suffered minor hull damage. No one was injured and there was no pollution.

Ce rapport est également disponible en français.

Other Factual Information

"BLUENOSE II"	
Port of Registry	Lunenburg, Nova Scotia
Flag	Canada
Official Number	320756
Type	Motor Powered Sailing Vessel
Gross Tons ¹	191
Length	49 m
Draught	3.6 m
Built	1963
Propulsion	Two Caterpillar diesel engines, 186.4 kilowatts (250 horsepower)
Number of Crew	16
Number of Passengers	53
Register Owner	Government of Nova Scotia
Operator	Bluenose II Preservation Trust Society

Description of the Vessel

Although inspected and certificated by Transport Canada as a "motor powered sailing vessel," the vessel is a schooner built to the same classic lines as the "BLUENOSE". The hull was constructed of red oak, spruce and pine. She has two inspection certificates, the first of which authorizes her to trade with up to 90 passengers and a crew of 18 on cruises in Halifax harbour, while the second certificate permits her to make coastal voyages without passengers with the same number of crew members. Passengers are carried on deck. Under-deck accommodation is designated for the use of the crew.

The Vessel's Management Structure

The Bluenose II Preservation Trust Society is appointed by the Province of Nova Scotia to operate and maintain the vessel as an educational and historical ambassador for the Province of Nova Scotia.

For practical and administrative purposes the Society is composed of four members. The Society provides the Province, through the Minister of Tourism and Culture, with a copy of its annual Financial Statements with respect to the operation of the vessel and is bound by the terms of an agreement dated 2 April 1998 for a period of seven years.

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.

To assist in the day-to-day running of the vessel, the Society employs an operations manager who acts as a liaison between the master and the Society. All hands are screened by the Society prior to being appointed to the vessel. There are written job descriptions/duties for the master/officers and crew; however, at the time of the occurrence, the Society had not issued Standing Orders or Operational Policy/Instructions to the master.

History of the Voyage

At 1302 on June 9, the “BLUENOSE II” departed her usual berth in Halifax, the Maritime Museum of the Atlantic wharf, under power, with no sails set and with a crew of sixteen.² This size of crew was deemed to be sufficient to safely handle the vessel in a harbour cruise. The normal procedure was to back out from the dock using both engines until the vessel was in a good position to set her sails. Usually, these are the jib, jumbo, foresail and mainsail and are set—supervised by the mate and second mate—under the command of the master. The normal sail-handling duties were carried out with the mate supervising the main sail from his station on the afterdeck and the second mate supervising the forward sails from his station on the foredeck. As commanded by the master, the engineer operates the engines from a control position at the forward end of the after house.

The master and the engineer were both equipped with radiotelephones but, due to technical problems in the sets, the master’s unit could transmit but not receive; while the unit supplied to the engineer could receive but not transmit. Communication between the master and the engineer was one way and was also reportedly disrupted by background noises and the sound of the passengers talking. Whilst under way, passengers are allowed to mingle with the crew and move freely in and around the conning position.

After the vessel had backed out of her berth to a position between the berth and Georges Island, she was manoeuvred head into the southeasterly wind by her engines, and the sails were set. Reportedly, the master requested the engineer to feather the vessel’s propellers at this time; however, the engineer misunderstood and, in addition to feathering the propellers, shut down the engines. He then left the engine control position. The master believed that he had gone below to the engine-room.

At 1323 the vessel was on a port tack and heading for the Hen and Chickens Buoy (Number HQ2; see sketch of area). The buoy was visible from the conning position and the master was estimating the vessel’s position by referencing the buoy and other visual clues. When it became apparent to him that the vessel’s course was taking her towards Pleasant Shoal, he ordered that the vessel be brought onto the starboard tack. He considered restarting the engines to assist in bringing the bow across the wind but was reluctant to do so in case the engineer was in the engine compartment in a potentially hazardous position. The vessel had begun tacking when she ran aground on Pleasant Shoal at about 1330.

² All times are Atlantic daylight time (Coordinated Universal Time minus three hours).

A small ingress of water was reported in the engine compartment. The rate of the ingress was measured and was found to be well within the capabilities of the bilge pump. Passengers were requested to move to the starboard side forward. With the engines going astern, the vessel refloated at 1353. There was no pollution.

Subsequent to the grounding, an underwater survey was carried out in Halifax when it was found that approximately 3 m (9' 8") of the shoe was missing. Closer to the turn of the stem, 0.6 m (2') of shoe was also missing. Open seams were found near the keel and on both sides of it. The open seams were approximately 2 mm wide and 50 mm deep, and were 1.5 to 2.5 m long. Repairs to the hull were carried out afloat. There was no pollution.

Marine Communications and Traffic Services

The Marine Communications and Traffic Services (MCTS) Centre monitors very high frequency (VHF) channel 12, which covers the outer area of Halifax harbour. Prior to and after the time of the grounding of "BLUENOSE II", this channel was heavily burdened with various marine radio traffic, including traffic related to vessel manoeuvres within the harbour. The radio traffic was practically non-stop and mostly did not concern the "BLUENOSE II".

In addition to the MCTS duty officers' responsibility to monitor and communicate by VHF radio, the same personnel maintain a radar watch. A "boundary" line on the radar display indicates the shallowing water to the west of the channel and to the east of Pleasant Shoal. To attract the attention of the watch officer, a red light at the radar flashes when a vessel approaches the "boundary line." Coinciding with the time at which the "BLUENOSE II" reached the "boundary line," a small, powered pleasure craft was zig-zagging along the line. This action caused the warning light at the duty officer's position to flash intermittently.

MCTS monitored the course of "BLUENOSE II" by radar and at 1327 noted that the vessel was crossing the boundary line, to the west of which vessels should not pass. The officer, who was handling the traffic in the lower section of Halifax harbour, did not call "BLUENOSE II" to caution her that she was standing into danger.

At 1329 radio communication between MCTS and "BLUENOSE II" confirmed that the vessel was "inside Pleasant Shoal."

At 1333 MCTS asked the vessel if she was aground and was informed that the vessel was stuck but would be off (the shoal) in a few minutes. MCTS also requested to be informed of the number of persons on board and, about a minute later, received an answer: there were 69 including crew members (i.e. 53 passengers and 16 crew members).

Navigational Equipment

This equipment, which includes an electronic chart with a repeater in the master's room, a Loran C, a Koden radar display, a GPS navigator, an echo sounder and a NAVTEX, is mainly in the chartroom on the starboard side aft. The only navigational equipment visible or accessible from the conning station are a GPS, an echo sounder repeater and a VHF.

At the conning position a chart of Halifax harbour, showing soundings in metres, is on display.

Repeaters from some of the navigational equipment are mounted in the companionway and are visible from the conning position on the main deck abaft the steering wheel.

The echo sounder repeater in the companionway is calibrated in feet, although other options are available. Although the main unit in the chart room operated properly, the repeater occasionally did not exhibit a reading. An audible depth alarm, which could be preset to sound at a selected depth, had been switched off.

It was believed that the echo sounder transducer was positioned 10 feet above the keel but it was later determined that this distance was 3 feet. At the time of the occurrence, 10 feet was added to the reading indicated on the echo sounder repeater, to obtain the depth of water.

The vessel is also equipped with two magnetic compasses. A "spare" radar is unused and stowed in the after alleyway at the access ladder to the chart room and accommodation.

Radio Equipment

The vessel is well fitted with radio equipment and, at the time of the incident, was correctly monitoring and communicating on VHF channel 12. There is a two-way internal speaker system from and to the conning position and a lookout position forward. The radios supplied to facilitate communications between the master and the engineer did not function as designed.

Experience of the Master and Crew

The master had recently joined the vessel, having spent 35 years in the fishing industry, 25 of which were as fishing master. He had also owned and sailed his own smaller sailing vessel and had, on his own vessel, been in Halifax harbour 10 to 12 times. He holds a valid certificate as master for a vessel of this size and class. On the afternoon of June 9 he was on his second trip of the day in Halifax harbour. Earlier he had exercised the crew in several "shake down" cruises out of Lunenburg, before sailing to Halifax for the summer season.

Although there were no written management procedures, the mate, with 13 seasons on board the vessel, was familiar with management expectations, shipboard duties and sail handling.

The master and mates had not attended a bridge resource management (BRM) course, and the master had not considered adapting such a concept to the "BLUENOSE II".

Passenger Safety

The vessel may carry up to 90 passengers on cruises in Halifax harbour. Before the passengers boarded, they were addressed by a member of the crew in an information session. The information imparted was limited to a description of the vessel. The address did not touch upon safety information relating to emergency procedures nor upon the location or use of life-saving equipment.

A "head count" of passengers embarking is made from the sale of tickets on the dock and by a member of the crew with a counter at the gangway. This number was not automatically communicated to the master, who, prior to leaving the berth, was unaware of the number of passengers on board. When Vessel Traffic Services asked the master for the number of passengers on board, he was able to obtain this figure in about a minute.

Once on board, no demonstration was made on the use or location of life-saving equipment, nor was information given relating to emergency procedures.

During the cruise, passengers are permitted free access to all areas on deck, including the area around the conning position on the afterdeck from which the vessel was navigated. They are also permitted to mingle with the crew in areas where sail is being worked and are subject to the dangers inherent in this aspect of a working ship.

Analysis

Marine Communications and Traffic Services

At the MCTS centre, the officer responsible for monitoring marine traffic in the outer section of Halifax harbour was, immediately prior to the grounding of "BLUENOSE II", involved in numerous radio conversations and reports with other vessels.

Because a small pleasure craft manoeuvring in the immediate vicinity of the "boundary line" caused the warning light to flash on and off intermittently, the officer possibly paid less attention to the light than he might otherwise have, and a warning to the "BLUENOSE II" that she was standing into danger was not issued.

Communications Aboard the Vessel

The radios, which were designed to facilitate communication between the master and engineer, were not functioning as designed. Since the radio of the master could transmit but not receive and that of the engineer could receive but not transmit, no means existed for the master to know that the engineer had understood his order to "feather the propellers." The engineer understood the order to mean "feather the propellers and shut down the engines" and executed the order as he had understood it. As he did not have the means to confirm that the action he took was correct, the engines were shut down. As a result, the engines were not available to assist the vessel's head through the wind when the time came to go about onto the starboard tack.

The heavy radio traffic concerning vessel movements in the lower section of Halifax harbour, which was received on board through three radios, and monitored aboard the vessel, was a source of constant background noise. Most of this traffic did not concern the "BLUENOSE II" and distracted the master's concentration from the navigation of his vessel.

Navigational Equipment

The location of the navigational equipment in the chart room was not optimal. As a result, positional information displayed on the radar, electronic chart, and GPS, which could have indicated that the vessel was standing into danger on Pleasant Shoal, was not visible from the conning position and not available to the master.

The positioning of these aids to navigation was apparently due to the wish to preserve the on-deck appearance of the "BLUENOSE II" as an "old schooner."

It appears that the echo sounder repeater readout was intermittent and known to be so. The value of the readout was also compromised by the fact that the master and officers believed that instrument's transducer was 10 feet above the keel when it was, in fact, 3 feet above the keel. As a result of a miscalculation, the master believed that the water was 7 feet deeper than it was. In addition, the echo sounder indicated depths in feet and the Halifax harbour chart indicated them in metres.

Knowledge of BRM

Traditional duties of the officers and crew of the "BLUENOSE II" required that the officers be stationed away from the vessel's conning position area to supervise sail handling. The reasons were two-fold: to ensure that the master's orders were expedited; and to oversee the passengers who had free access to all parts of the deck.

No BRM regime was in place on the "BLUENOSE II". Neither the master nor the mates were familiar with the concept of BRM or had attended a BRM course. Since each officer was employed in his traditional role in the working of the ship, the master did not maximize the use of his officers to assist him in the navigation of the vessel. The mate, who had been on the vessel for 13 seasons and was experienced in sailing in Halifax harbour, was at his station on the afterdeck, and was not available to assist the master by relaying accurate electronic navigational information available in the chart room.

Although the master had reportedly been into Halifax harbour on his own sailing vessel and was familiar with the area, he had not prepared a voyage plan or identified range marks or transit bearings to assist him in the navigation of the much larger "BLUENOSE II". He was confident he could fix a position by sighting landmarks.

The master assumed complete responsibility for the navigation of his ship and, given the background noise of the radios and passenger conversations, it is likely that he became distracted and lost situational awareness at this time. Although he was aware that Buoy H19 was about four points on his port bow and this indicated that the vessel was heading towards Pleasant Shoal, it did not give him cause for alarm.

Findings

1. The chain of command from the owners to the master, via the Society, is tenuous, as there are no Standing Orders from the owner to the master.
2. The master was confident in his ability to visually navigate and had not prepared a voyage plan or identified range marks or transit bearings that would assist him with the navigation.
3. The master reserved the responsibility for the navigation of the vessel and communications to himself, choosing not to delegate some of these tasks to his officers.
4. Neither the master nor the mates were familiar with the concept of BRM. None had attended a BRM course, and the master had not considered adopting such a concept.
5. The master did not maximize the use of his officers to assist him in the navigation of the vessel, particularly the first mate who had been on the vessel for 13 seasons and had experience sailing in Halifax harbour.
6. Most of the aids to navigation, radar, electronic chart and GPS were placed in the chart room such that they were not visible to a person in the conning position.
7. The sounding machine repeater occasionally did not exhibit a reading although a reading was available on the main unit in the chart room.
8. The master and officers believed that the echo sounder transducer was 10 feet above the keel, when in fact it was 3 feet above the keel. As a result of a miscalculation, the master believed that the water was 7 feet deeper than it was.
9. The sounding machine and its repeaters showed depths of water in feet, while the chart of Halifax harbour indicated soundings in metres. The conversion necessary to assimilate echo sounder information caused some confusion.
10. Three radios, the two-way transmitter/receiver from forward, and the two-way walkie-talkie with which the master was fitted made the noise level most distracting for the master. The almost non-stop voices broadcasted information which was of little or no relevance to the master.
11. The radios, which were designed to facilitate easy communication between the master and engineer, did not function as designed. As a result, the engines were shut down and were not available to assist the vessel's head through the wind when the time came to go about onto the starboard tack.

12. Passengers were permitted to transit and wait in the area of the afterdeck from which the vessel was being navigated. Their presence and conversation was an additional source of noise and distraction to the master.
13. It is likely that the master lost situational awareness due to multitasking and to being distracted by radio and passenger conversation.
14. Neither before nor after boarding were the passengers instructed in the use or location of the vessel's life-saving equipment.
15. The MCTS duty officer handling radio traffic in the lower reaches of Halifax harbour did not respond immediately to warn the vessel when the target presented by "BLUENOSE II" was approaching the boundary line and standing into danger.
16. The damage sustained by the vessel in grounding was minor and localized.
17. There was neither injury nor pollution as a result of the grounding.

Causes and Contributing Factors

The vessel grounded because the master did not avail himself of all of the ship's aids to navigation; did not use the services of all his officers to his fullest advantage; had not prepared a voyage plan nor identified leading marks or transit bearings to assist him in monitoring the progress of the vessel; and was distracted by the proximity of passengers and the background noise of radio communications. All of the above factors may have lead him to lose situational awareness. In addition, the master did not receive a warning from the MCTS officer that his vessel was standing into danger.

Safety Action Taken

Prior to departing a berth with passengers on board, a safety announcement is made and the correct method of donning a life jacket demonstrated. Other safety equipment is explained, such as inflatable life rafts. A tally of the number of passengers is given to the master prior to departure. When the vessel is underway, an officer is now positioned in the chartroom to watch the electronic chart display, radar, etc., and to provide navigational information from these sources to the master at the conning position on deck.

The circumstances surrounding this incident, the importance of MCTS duties, the state of equipment, and the responsibilities of MCTS Officers was discussed by the Acting Regional Superintendent, the Officer in Charge, and staff.

An annual training program is currently being developed. Courses such as Distress Procedure Refresher training and Radar Navigation Assistance will be used to assist MCTS Officers in the maintenance of their professional skills.

MCTS Halifax is operating with equipment which, in some cases, is 18 to 20 years old. A major project is underway to replace all VTS radar equipment with state-of-the-art equipment. This also includes recording equipment for video radar displays which will be used for accurate interpretation of incident information.

A project is also underway to replace the outdated audio recording equipment, which will make accurate interpretation of information possible.

A project to test the viability of the Automatic Identification System is underway. This project involves MCTS Halifax, the Halifax Port Authority and the Atlantic Pilotage Authority. It is being conducted in anticipation of the future mandatory carriage requirements which will provide additional, timely information to the MCTS Centre and other ships.

TCMS has made a recommendation to the Chairman of the Bluenose II Preservation Trust that prior to appointing individuals as masters or persons in charge of a watch, who are not familiar with the vessel, they shall sail on the vessel, or similar vessel of its size and rig, for a sufficient period of time to allow them to gain experience in handling and coping with the constraints, layout, and construction of the vessel.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 8 August 2000.

Appendix B - Photographs



Depth sounder repeater (under clock), with taped instructions to add 10 (feet). Soundings indicated in feet.



Radar display in the chart room—not visible from the conning position



Electronic chart display—not visible from the conning position