



Marine Transportation Safety Investigation Report M20A0003

FIRE

Fishing vessel *Newfoundland Lynx*

90 nautical miles northeast of St. Anthony, Newfoundland and Labrador

29 January 2020

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Description of the vessel

The *Newfoundland Lynx* (IMO [International Maritime Organization] No 9158202, Figure 1), operated by Ocean Choice International, is a single-screw stern trawler of 2409 gross tonnage (GT), built in 2003 for the shrimp fishery on the East Coast of Canada. The vessel is of all-welded steel construction and is equipped for on-board shrimp processing and freezer storage. The bridge and crew accommodation are located forward, the shrimp-processing factory is located on Deck 01, and the engine room is located aft. The bridge is equipped with a very high frequency radiotelephone, a satellite phone, and a control panel for the vessel's public address (PA) system. Included in the vessel's original construction was a sauna and tanning room on Deck 03.

Figure 1. The *Newfoundland Lynx* (Source: TSB)



At the time of the occurrence, the *Newfoundland Lynx* was certified and equipped in accordance with existing regulations. The vessel was equipped with 3 self-contained breathing apparatus (SCBA). Each apparatus had a spare air cylinder. One SCBA was located on the bridge, and the other 2 were on the trawl deck.

The vessel's recognized organization,¹ DNV-GL, had last inspected the vessel on behalf of Transport Canada (TC) on 30 August 2019. Two safe manning documents issued by TC were on board, which allowed the vessel to operate with different crew complements depending on the voyage. The vessel was crewed in accordance with existing regulations.

History of the voyage

On 23 January 2020 at 2200,² the *Newfoundland Lynx* departed Harbour Grace, Newfoundland and Labrador, with 29 people on board,³ to trawl for shrimp.

In the afternoon of 29 January, while the vessel was approximately 90 nautical miles northeast of St. Anthony, Newfoundland and Labrador (Figure 2), the second mate and chief mate were on the bridge and the trawl net was out. The chief mate was the officer of the watch and had conduct of the vessel. Some crew members were working in the shrimp-processing factory; others were on duty but taking a break in the messroom. Off-duty crew members were in their cabins.

Figure 2. Area of the occurrence (Source: Google Earth, with TSB annotation)



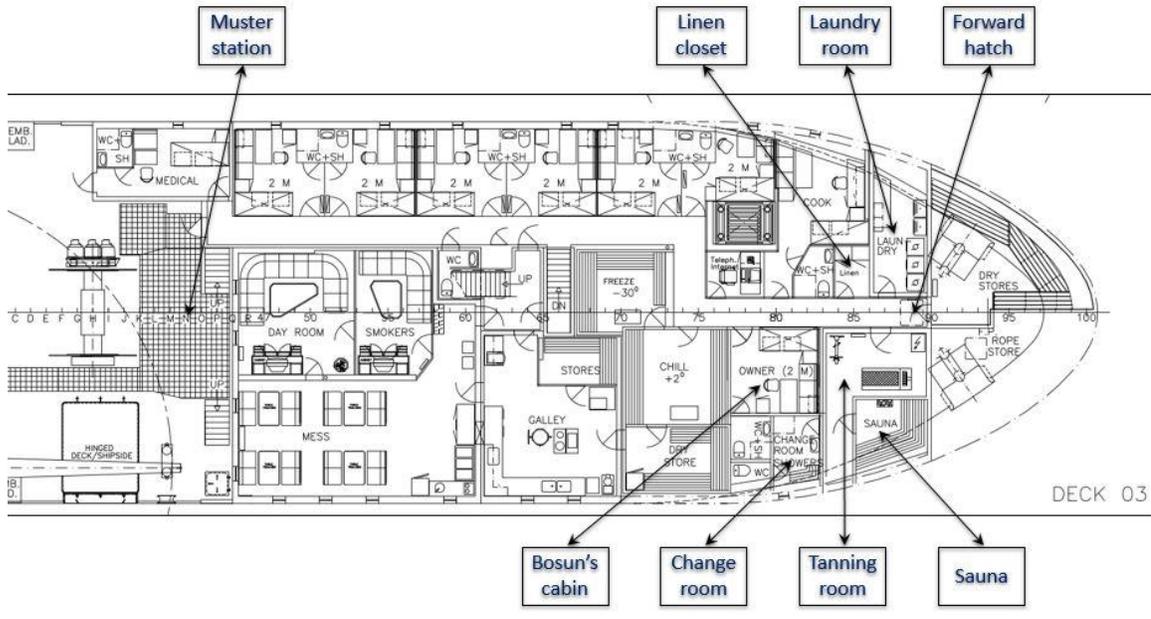
At approximately 1515, the bosun, who was in his cabin adjacent to the vessel's tanning room and sauna (Figure 3), awoke to the smell of smoke and left his cabin to locate the source of the smell. Flames were visible through the window of the closed sauna door, and smoke was escaping between the top of the door and the doorframe. The bosun went to the messroom and alerted other crew members about the fire. One crew member immediately grabbed a fire extinguisher and went with the bosun to the sauna, while another crew member went to the bridge.

¹ « A recognized organization is a classification society that has an authorization agreement with Transport Canada to inspect and certify vessels. » (Source: Transport Canada, Getting your vessel of 24 metres and above inspected and certified, at <https://tc.canada.ca/en/marine-transportation/marine-safety/getting-your-vessel-24-metres-above-inspected-certified> [last accessed on 27 October 2020]).

² All times are Newfoundland Standard Time (Coordinated Universal Time minus 3.5 hours).

³ 28 crew members and 1 fisheries observer.

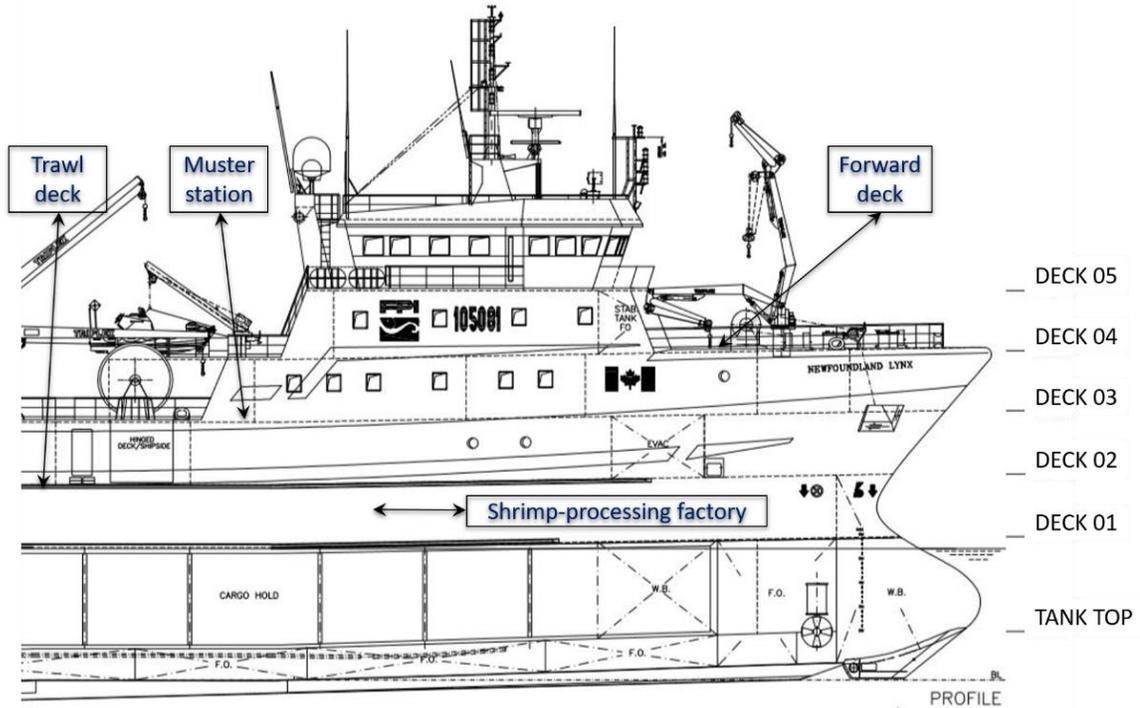
Figure 3. General arrangement of Deck 03 of the *Newfoundland Lynx*, showing the locations of the muster station, the linen closet, the laundry room, the forward hatch, the bosun's cabin, the change room, the tanning room, and the sauna (Source: ShipCon ApS, with TSB annotations)



When the bosun opened the sauna door, the accompanying crew member emptied the fire extinguisher onto the flames. The bosun then closed the sauna door and left with the crew member to go to the muster station, located above the trawl deck on Deck 03 (Figure 4).

Meanwhile, the other crew member had reached the bridge and informed the chief mate about the fire. At approximately 1517, the chief mate activated the fire alarm and announced over the vessel's PA system that there was a fire on board, and that the situation was not a drill. The chief mate instructed the crew member to do a head count at the muster station. The master, who was in his cabin, went to the bridge and took conduct of the vessel.

Figure 4. General arrangement of the *Newfoundland Lynx*, in profile, showing the locations of the trawl deck, the muster station, the forward deck, and the shrimp-processing factory (Source: ShipCon ApS, with TSB annotations)



When the fire alarm sounded, some crew members mustered with their lifejackets at the muster station and then began preparing the vessel's fire hoses at the muster station and the port bridge wing. Other crew members mustered with their lifejackets and awaited instruction from the chief mate. The chief mate was the officer in charge of the fire response and remained on the bridge. The fisheries observer was unaccounted for at this time.

The second mate had donned an SCBA, which was located in a locker on the bridge, and went to Deck 03 to check the cabins. After confirming that Deck 03 had been evacuated, the second mate returned to the bridge, donned a fire suit, exchanged the air cylinder on his SCBA, and left the bridge for the forward deck.

When the fire alarm sounded, the chief engineer, second engineer, and maintenance man were working in the shrimp-processing factory. The chief engineer sent the second engineer and maintenance man to the muster station and then went to the engine control room, where he met the fisheries observer. He sent the fisheries observer to the muster station, then called the bridge and conferred with the chief mate. Approximately 10 minutes after the fire alarm sounded, everyone on board was accounted for. The third engineer arrived in the engine control room to assist the chief engineer; they started the fire pumps and isolated the electrical power to Deck 03.

After mustering, and per the muster list, the second engineer went to the deck store on the trawl deck to retrieve a fire suit and SCBA. He donned them both and went to the forward deck. Meanwhile, the bosun and several crew members went to prepare the fire hoses on the forward deck. One of the crew members closed the vents on the forward deck and then began removing snow and ice from the forward hatch to allow access to the accommodation.

The factory manager went to the bridge upon hearing the alarm, where the second mate informed him of the situation. The factory manager proceeded to the trawl store on the trawl deck to retrieve a fire suit and SCBA. En route, he met another crew member, who accompanied him. The crew member and factory manager retrieved the equipment and brought it to the muster station. The factory manager donned the fire suit and SCBA with some difficulty, as the boots did not fit, the suspenders broke, and the helmet visor was cracked. Once the fire hoses were ready, he proceeded to the forward deck.

When the factory manager reached the forward deck, neither he nor the crew members there received direction on how to fight the fire. He took the initiative to enter Deck 03 alone, with a fire hose and without a safety line, as the line had broken. Another crew member remained on deck to assist with the fire hose and open the forward hatch.

Dense smoke limited visibility as the factory manager descended the ladder and arrived on Deck 03. When he entered the tanning room, he stumbled and fell over boxes that were stored there. Recovering, he used the fire hose to spray in and around the sauna, inside the tanning room, and the adjacent change room. Before returning to the forward deck, he tried to close the sauna door but was unable to do so, and so he left the door open. On his way out of the tanning room, he sprayed water into the laundry room.

When the second mate arrived on the forward deck, he proceeded down the hatch with a prepared fire hose and a makeshift safety line. As he descended the ladder, he was unable to see through the dense smoke, and inadvertently blocked the way of the factory manager, who was ascending the ladder. The factory manager's low-pressure alarm was sounding on his SCBA.⁴

When both the second mate and the factory manager emerged from the forward hatch, they discussed the situation with the second engineer. Meanwhile, the crew members that had mustered and were not actively fighting the fire sought shelter in the bosun store on the trawl deck. The chief engineer entered Deck 03, without an SCBA, to monitor the area for hot spots with a thermal camera.

It was decided that 2 teams would continue to fight the fire: the second mate and another crew member would enter Deck 03 from the door near the muster station, while the factory manager and second engineer would re-enter through the forward hatch. The factory manager exchanged the air cylinder on his SCBA before entering the forward hatch. He was equipped with a fire hose, a flashlight, a portable ultra-high frequency radio, and a makeshift safety line. He descended to Deck 03 with the assistance of the second engineer, who remained on deck.

Meanwhile, the second mate and accompanying crew member entered Deck 03 with a fire hose. The accompanying crew member wore a dust mask, as no SCBA or other fire protective equipment was available to him. Within a few minutes, the low-pressure alarm sounded on the second mate's SCBA. Both crew members returned to the muster station and the second mate also donned a dust mask, as there were no spare air cylinders on board. The second mate and crew member then re-entered Deck 03 with a fire hose.

The second mate and accompanying crew member could see the factory manager in front of the tanning room door, but could not progress further because the fire hose was not long enough to reach the sauna door. They sprayed the entrance to the tanning room while the factory manager

⁴ An SCBA low air alarm generally sounds at 25–33% of the air bottle capacity, equating to 10 minutes of reserve air.

sprayed the inside of the tanning room and the sauna door with water. The tanning room was filled with smoke, but no flames were visible. As the factory manager made his way out of the tanning room, damaged ceiling panels were hanging down above the sauna door, preventing him from closing the door. He continued to spray water around the sauna, tanning room, and laundry room as he retreated to the forward hatch. As he ascended the ladder, the low-pressure alarm sounded again on his SCBA.

At 1549, while firefighting continued, the master called the Canadian Coast Guard (CCG) on the satellite phone to inform them of the situation.

The Joint Rescue Coordination Centre (JRCC) Halifax took the call and issued a Mayday relay. Several vessels in the area responded to the broadcast to provide assistance. JRCC Halifax also tasked a Hercules aircraft, a Cormorant helicopter, and the CCG vessels *Terry Fox* and *Henry Larsen* for search and rescue operations. The nearby fishing vessel *Sivuliq* headed to the *Newfoundland Lynx's* position.

At approximately 1630, after the 3 crew members retreated from the tanning room, they closed up access to Deck 03 to contain the fire. The fire hose nozzles were left open with the water running overboard to prevent freezing. Crew members on the forward deck then closed the accommodation fire dampers in the vents to suffocate the fire.

The factory manager and second engineer went to the bridge to discuss the situation with the master and the bridge team. There were no spare full air cylinders for the SCBAs on board. Smoke continued to escape from the open vents behind the bridge.

Throughout the occurrence, the master and bridge team monitored the situation from the bridge. By approximately 1714, the trawl net had been retrieved and the vessel proceeded to St. Anthony. By approximately 1745, the heat and smoke from the fire was dissipating; the fire was likely contained within the sauna and smouldering.

At approximately 1900, the *Sivuliq* met the *Newfoundland Lynx* to provide an escort to St. Anthony. Around the same time, the Hercules aircraft tasked by JRCC Halifax spotted the *Newfoundland Lynx*, and the Cormorant helicopter spotted it at 1910. Both aircraft monitored the vessel's situation from the air until they were ordered to stand down at 2000 and 2200 respectively.

While the master was in communication with the Cormorant helicopter, the second engineer came to the bridge with spare air cylinders for the SCBAs; these cylinders had some usable air pressure left in them. The factory manager and second engineer prepared to enter the accommodation for a third time, equipped with fire suits, SCBAs, a fire hose, a flashlight, and an ultra-high frequency radio. The factory manager went to the forward deck and re-entered through the forward hatch. After he descended the ladder, the low-pressure alarm sounded on his SCBA, but he continued to spray water around the tanning room door and the linen closet.

The second engineer entered Deck 03 from the door near the muster station. When he was in front of the tanning room, the low-pressure alarm sounded on his SCBA. He could see the factory manager in front of the tanning room door, but could not progress further because the fire hose was not long enough to reach the door. The second engineer and factory manager then retreated to the trawl deck and forward deck, respectively.

At approximately 0030 on 30 January, the vessel docked at St. Anthony. The local fire department boarded the vessel to ensure that the fire was extinguished.

Failure of the fire detection system

The sauna on board the *Newfoundland Lynx* was equipped with a heat detector set at 120 °C, yet this part of the fire detection system did not activate the vessel's fire alarm at any point during the emergency. Instead, the chief mate had to manually activate the fire alarm and make an announcement on the vessel's PA system. The fire detection system on board the *Newfoundland Lynx* was last tested and inspected in September 2019 as part of the annual survey conducted by the recognized organization.

The heat detector in the sauna was destroyed in the fire, and the investigation could not determine the exact cause of the fire detection system's failure.

Location and probable cause of the fire

The fire started in the sauna located on Deck 03 (Figure 5). Burned pieces of a wooden footrest were found below the sauna's electric heater, indicating that the footrest may have been on the heater when the heater was turned on. With the heater left unattended, the heat likely eventually ignited the footrest, starting the fire. The heater controls are located outside the sauna, meaning that objects left on the heater could remain undetected when the heater was turned on.

Ocean Choice International did not have a procedure in place regarding the use of the sauna.

Figure 5. Damage to sauna interior, including electrical heater (Source: TSB)



Regulatory requirements and emergency response

To respond effectively to a fire on board a vessel, it is essential that firefighting appliances are maintained and that crew are trained in the use of, and have practised using, firefighting equipment. Fire drills carried out on a regular basis, in accordance with regulations, familiarize the crew in dealing with emergency situations that may develop on board. Such drills improve crew efficiency and ensure that equipment is tested and its functionality verified. The use of realistic emergency scenarios and post-drill evaluations improves crew preparedness, readiness, and effectiveness.

The *Fire and Boat Drills Regulations*⁵ require crews of fishing vessels over 150 GT to conduct fire drills at a minimum, on a monthly basis. The regulations state that

the master of a vessel shall ensure that enough fire drills and survival craft drills for the crew of the vessel are held to ensure that the entire crew is at all times competent and operationally ready to respond to the emergencies addressed by the drills.⁶

The regulations also indicate that these drills must include varied and realistic emergency scenarios,⁷ so that crews are prepared for “the various emergencies that could occur, depending on the type of vessel and its cargo”.⁸ Firefighting equipment, including personal protective equipment, must be inspected during fire drills,⁹ and a fire muster list containing a description of the duties each crew member is to perform must be posted on each deck. As part of the annual inspection required for vessel certification, the drills are witnessed by the regulator. In the case of the *Newfoundland Lynx*, drills were witnessed by a surveyor from the recognized organization.

The crew of the *Newfoundland Lynx* conducted boat and fire drills while the vessel was docked before every fishing trip, which could last up to 6 weeks. Although vessel records indicate that the crew inspected the vessel’s firefighting equipment on a regular basis, during the occurrence some equipment was found to have deteriorated and did not function as intended. A fire muster list (Figure 6) was posted on each deck of the vessel as required; however, in this occurrence, not all of the roles identified on the muster list were filled as described on the list.

Despite regulatory requirements, the fire drills conducted on board the vessel were repetitive, and did not include realistic emergency scenarios. Crew would start the main and emergency fire pumps, inspect and pressurize the fire hoses, and then simulate a fire on deck by spraying the trawl doors with water. The crew did not perform post-drill evaluations. Without regular fire drills that included varied and realistic emergency scenarios, not all crew members were completely familiar with the duties they were required to perform in an actual emergency, resulting in an uncoordinated firefighting response.

Safety action taken

Following the occurrence, Ocean Choice International removed the sauna from the *Newfoundland Lynx*. The space was converted into a storage area and equipped with a smoke and

Figure 6. Image of the fire muster list posted on board the *Newfoundland Lynx* (Source: TSB)

POSITION	FIRE MUSTER LIST
Captain Substitute – 1st Mate	In command on Bridge
1st. Mate Substitut – 2nd Mate	In charge at fire scene / Take head count
2nd. Mate Substitute-Bosun	In Charge Hose # 1 / Principal communicator
Bosun	In Charge Hose party #2
Ch. Eng. Substitute – 2nd eng.	In charge in engine room/start fire pump/communication control room/take head count of eng. crew and report to Captain.
2nd. Eng. Substitute – 3rd Eng	Self Contained Breathing Apparatus Trawl Deck
3rd. Eng.	Start Emergency Fire Pump
4th. Eng.	Self Contained Breathing Apparatus Net Store Room
Cook	Fire Extinguisher
Stewart	Fire Extinguisher
Factory Manager	Conduct Head Count and Report to First Mate / Assist Breathing Apparatus Net Store Room

⁵ Transport Canada, *Fire and Boat Drills Regulations*, SOR/2010-83 (last amended 06 December 2013), subsection 20(1) and Schedule.

⁶ Ibid., section 22 and Schedule.

⁷ Ibid., section 17.

⁸ Ibid., section 23.

⁹ Ibid., section 24.

heat detector. Ocean Choice International also ordered additional firefighting equipment to be placed on board.

Safety message

It is important that crews perform fire drills on a regular basis to confirm that firefighting equipment is in working order, and to reinforce their knowledge of how to use the equipment and of assigned emergency duties. It is also important that these drills include varied and realistic scenarios so that crews are prepared to respond effectively to emergencies.

This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 04 November 2020. It was officially released on 12 November 2020.

Visit the Transportation Safety Board of Canada's website (www.tsb.gc.ca) for information about the TSB and its products and services. You will also find the Watchlist, which identifies the key safety issues that need to be addressed to make Canada's transportation system even safer. In each case, the TSB has found that actions taken to date are inadequate, and that industry and regulators need to take additional concrete measures to eliminate the risks.

ABOUT THIS INVESTIGATION REPORT

This report is the result of an investigation into a class 4 occurrence. For more information, see the Policy on Occurrence Classification at www.tsb.gc.ca

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