



National Transportation Safety Board

Marine Accident Brief

Fire on Board Saturation Diving Support Vessel *Ocean Patriot*

Accident no.	DCA14LM003
Vessel name	<i>Ocean Patriot</i>
Accident type	Fire
Location	Gulf of Mexico, about 50 miles south-southwest of Port Fourchon, Louisiana 28° 13.1' N, 090° 23.4' W
Date, time	November 28, 2013 2215 central standard time (coordinated universal time – 6 hours)
Injuries	None
Damage	\$9.8 million
Environmental damage	None
Weather	Clear, visibility 10 miles, winds 10 knots, seas 1–3 feet
Waterway information	Gulf of Mexico

A fire that broke out in the forward machinery space of the saturation diving support vessel *Ocean Patriot* while under way in the Gulf of Mexico on the evening of November 28, 2013, was brought under control by the vessel's fixed fire suppression system without serious injury, and no pollution resulted from the accident. Damage to the *Ocean Patriot* was estimated to be \$9.8 million.



Saturation diving support vessel *Ocean Patriot*.
(Photo courtesy Oceaneering International)

On the day of the accident, the *Ocean Patriot* departed Port Fourchon, Louisiana, at 1600, transiting at 10 knots with 42 personnel on board for the voyage southwest toward lease block Green Canyon 205 in the Gulf of Mexico. The weather was clear with good visibility, winds were at 10 knots, and seas were 1 to 3 feet. The vessel was about 50 miles southwest of Port Fourchon when the fire broke out in a machinery space below the main deck in an electrical cable tray above an area where cardboard, air filters, and other housekeeping items were stored.

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A saturated diving support vessel (SDSV) provides a platform for saturation diving and transports supplies, cargo, and personnel to and from oil drilling installations and can also be equipped to provide a variety of operational services. Saturation diving refers to a breathing-gas mixture that allows the vessel's professional deep-sea divers to work more safely under pressure for longer periods.

The 240-foot-long *Ocean Patriot*, built in 2002 as a bulk supply vessel, was purchased by Oceaneering International in 2011 and converted to a saturation diving support vessel. The vessel is home ported in Morgan City, Louisiana, and operates primarily in the Gulf of Mexico. Vessel personnel inspect and maintain offshore platforms and perform pipeline work and salvage operations. The vessel is equipped with a dynamic positioning system, remote-operated vehicle (ROV), a saturation diving chamber, and a moon pool, which is an opening in the base of the hull that provides access to the water below for equipment and instruments, divers, and small craft in a protected environment rather than exposing machinery and workers to the elements on deck.



Ocean Patriot accident site, 50 miles southwest of Port Fourchon, Louisiana.
(Background by National Geographic MapMaker Interactive)

The *Ocean Patriot* crew operated on a 28-days-on/28-days-off rotation, and the majority of crewmembers interviewed had been on board for about 21 days at the time of the fire. The crewmembers had undergone shipboard firefighting drills and exercises in the previous weeks as part of their training program.

The *Ocean Patriot* is equipped with a fixed fire suppression system comprised of heptafluoropropane, known by the trade name “FM-200,” that can be manually released from pressurized storage cylinders into specific areas of a ship to break the chemical reaction of the fire and extinguish it quickly. The FM-200 system, which is waterless, nonconductive, and leaves no residue after release, was introduced in the industry to facilitate the phase-out of ozone-depleting chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and bromine-containing fluorocarbons (halons).

On board the *Ocean Patriot*, the engine room, propulsion thruster room, emergency generator room, saturation generator room, and the engine control room are separately protected by FM-200. Each protected space contains FM-200 and a nitrogen charging system. The engine control room monitoring system is equipped with an alarm point that will alert the watch

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engineer in the event of a release in any of the five spaces. Pressure gauges and liquid level indicators provide visual indication of tank status.

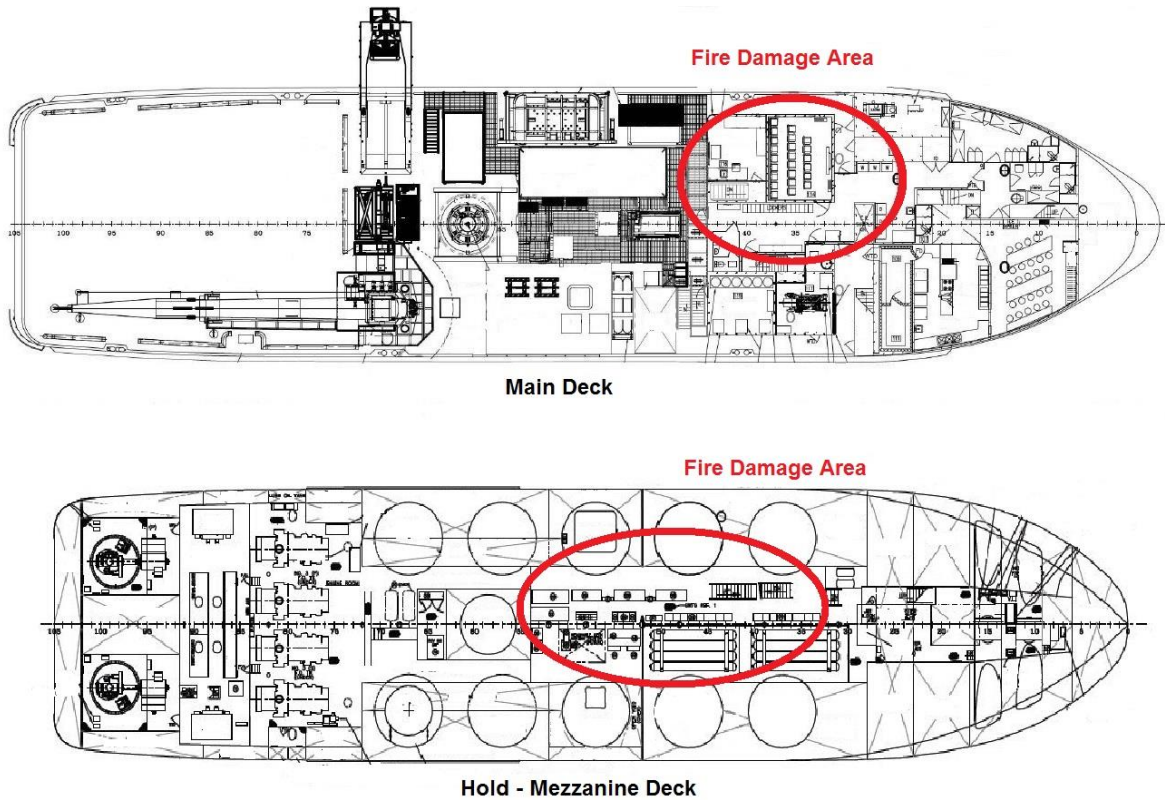
In addition, the *Ocean Patriot* is outfitted with a fire detection system as well as an oxygen monitoring system. The oxygen sensing system alarms when the oxygen concentration falls below or rises above a normal level in the areas where the saturation dive equipment and dive gas tanks are located. The fire detection system monitors 12 zones throughout the vessel using a combination of smoke and heat sensors. The thermal units alarm when the temperature in a monitored space rises above 270 degrees Fahrenheit. Both systems send alarms to the bridge and engine control room. These monitoring systems are inspected and maintained as part of the shipboard maintenance systems.

At 2215 on November 28, the day of the *Ocean Patriot* fire, alarms from both the fire detection system and oxygen sensor system alerted the watchstanders of a situation in the machinery space, which was monitored by zone 7. The zone 7 detector was located on the main deck outside the saturation tech shop in the overhead above the ladder well. The assistant engineer, who was on watch in the engine room, informed the mate on the bridge that he was leaving the engine control room to investigate the alarms. He headed forward on the mezzanine deck and encountered smoke, then continued forward to the galley where he reported the fire to the bridge via the ship's telephone system.

According to the assistant engineer, the fire was located in a cable tray above an electrical motor control center; the area directly underneath the cable tray was used for storing sundry items such as cardboard and air filters. He was first on the scene and attempted to fight the fire with a portable extinguisher, emptied the unit, but was not able to extinguish the fire. He returned to the engine room using an emergency escape hatch to muster with the rest of his department. On the bridge, the chief mate called the captain, rang the general alarm, and made a public address announcement to inform the crew of the situation. When the captain arrived on the bridge, he was briefed by the watch team and then notified the company via satellite phone, sent a distress signal via Global Maritime Distress and Safety System (GMDSS), ordered the ship's heading to be put into the wind, and directed the crew to be mustered. The captain then went below to the scene to assess the situation. Upon return, he ordered mayday to be called over the VHF radio. The crew gathered at their muster location, and all were accounted for. The fire teams assembled at their respective fire gear lockers.

The fire teams donned fire suits and self-contained breathing apparatus (SCBA) from the emergency gear lockers. Initially, they used portable fire extinguishers to combat the fire on the mezzanine deck. The first fire team advanced from the forward direction but then retreated, reporting that they could not move forward due to the smoke and heat. The second fire team approached from the aft direction but also encountered excessive smoke and heat. They began boundary cooling operations around the perimeter of the affected area with hoses charged by the fire main. The engineers went to the engine room to secure fuel systems, ventilation fans, and dampers in preparation to release the FM-200 system.

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Schematic drawings indicating location of fire damage on the main deck, top, and the mezzanine deck, bottom. (Drawings courtesy Oceaneering International)

During the fire, the vessel's electrical generators began struggling to maintain power. Three engines were running before the fire started. An electrical safety device automatically tripped one engine offline when it sensed a reduction in engine speed. The chief engineer secured the other two generators as their speed and system voltage began dropping rapidly. The assistant engineer secured the fuel oil purifier to prevent fuel dumping to the bilge and attempted to raise the fire pump pressure in the engine room by adjusting a bleeder valve, but he was unable to see the pump in the smoke. He inhaled some smoke through his SCBA mask and began coughing badly. After the main generators were secured, the emergency generator started and supplied power to the vessel. While the emergency generator was supplying power, the vessel had no main power to some systems such as lighting and propulsion systems, but maintained GMDSS, radar, and VHF radio systems. After the engineering personnel secured the equipment, they evacuated the engine room via the emergency escape hatch to the stern, using EEBDs (emergency escape breathing devices) because of the smoke.

After both fire teams reported excessive heat and smoke, the *Ocean Patriot's* captain ordered the FM-200 system released at 2240. All personnel were accounted for before releasing the extinguishing agent into the affected area. The crew did not receive an alarm via the engine room monitoring system. They believed this was because the communication wires were severed by the fire, but they were confident the system was discharged as they heard a "hissing roar" when the system was activated.

About 15 minutes after the FM-200 was released, the chief engineer entered the change room directly above the fire to monitor the temperature of the deck. The deck was smoking and had buckled due to the heat, and the steel deck appeared to be breached. He used a fire axe to break cement above the steel deck to allow cooling water to be applied directly onto the steel; the water was continuously applied to the deck and temperatures began to drop. The crew consulted the FM-200 manual and was advised not to enter the space where the chemical was discharged.

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The FM-200 agent extinguished the fire, and the areas above continued to be cooled and monitored through the night and into the following morning until the vessel reached port.

The offshore supply vessel *Lily Jane*, the first responding vessel to arrive on scene, was secured to the *Ocean Patriot*'s port quarter. A Coast Guard helicopter, the cutter *Razorbill*, and several other vessels also arrived to assist. Twenty-seven nonessential personnel were transferred from the *Ocean Patriot* to the *Lily Jane*, including the assistant engineer who needed oxygen due to smoke inhalation, and were then transferred to the *Harvey Hurricane*, another offshore supply vessel, and taken ashore. The tug *Delta Faith* towed the *Ocean Patriot* for about 12 hours, reaching Bollinger Ship Repair in Port Fourchon the following afternoon. Upon arrival, the local fire department entered the affected space wearing full bunker gear and inspected the area to ensure the fire had been extinguished.

Oceaneering International hired an integrated forensic engineering investigation firm to conduct a survey of the damage to the vessel. The firm determined that the source of ignition was damaged electrical cables located in a cable tray that contained combustible material in storage racks just below. The fire damaged motor control centers and their associated cabling, helium storage bottles, a ventilation trunk, and various piping systems. Considerable smoke and soot damage was found in the machinery space, and the diving deck equipment stored there was also damaged. A main generator and frequency drive sustained water damage, and heat from the fire caused severe buckling to the main deck in the changing area.



Damaged electrical cables and cable tray, left, and motor control center, right.
(Photos courtesy Oceaneering International)

Probable Cause

The National Transportation Safety Board determines that the probable cause of the fire on board the *Ocean Patriot* was damage to electrical cables due to the tightly installed metal securing bands in a cable tray chafing the protective layers of the cables and creating an ignition point. Contributing to the extensive damage was the combustible material stored immediately below the cable tray area, fueling the fire.

Vessel Particulars

Vessel	<i>Ocean Patriot</i>
Owner/operator	Oceanearing International Inc.
Port of registry	New Orleans, LA
Flag	United States
Type	Offshore supply vessel
Year built	2002
Official number (US)	1129810
IMO number	9264518
Construction	Steel
Length	240 ft (m)
Draft	15.5 ft (4.7 m)
Beam/width	54 ft. (16.5 m)
Tonnage	2,308 gross tons
Engines/propulsion	5,440 hp (4,056 kW) Five Caterpillar 3512 diesel electric engines Two 1,920 hp azimuthing stern thrusters Two 918 hp bow tunnel thrusters
Persons on board	42

For more details about this accident, visit www.nts.gov/investigations/dms.html and search for NTSB accident ID DCA14LM003.

Adopted: January 21, 2015

The NTSB has authority to investigate and establish the probable cause of any major marine casualty or any marine casualty involving both public and nonpublic vessels under 49 *United States Code* 1131. This report is based on factual information either gathered by NTSB investigators or provided by the Coast Guard from its informal investigation of the accident.

The NTSB does not assign fault or blame for a marine casualty; rather, as specified by NTSB regulation, “[NTSB] investigations are fact-finding proceedings with no formal issues and no adverse parties . . . and are not conducted for the purpose of determining the rights or liabilities of any person.” 49 *Code of Federal Regulations*, Section 831.4.

Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by conducting investigations and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report. 49 *United States Code*, Section 1154(b).