



# National Transportation Safety Board

## Marine Accident Brief

### Engine Room Fire on board Towing Vessel *Susan Lynn*

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<b>Accident type</b>	Fire/Explosion	<b>No.</b> DCA20FM001
<b>Vessel name</b>	<i>Susan Lynn</i>	
<b>Location</b>	Barataria Waterway, Lafitte, Louisiana 029°43.56' N, 090°7.32' W	
<b>Date</b>	October 8, 2019	
<b>Time</b>	0600 central daylight time (coordinated universal time – 5 hours)	
<b>Injuries</b>	None	
<b>Property damage</b>	\$1,350,000 est.	
<b>Environmental damage</b>	None	
<b>Weather</b>	Visibility 10 miles, mostly cloudy, winds 7 knots from north, air temperature 74°F, twilight 0635, sunrise 0659	
<b>Waterway information</b>	Barataria Waterway is part of the Gulf Intracoastal Waterway, a 150-foot-wide, 12-foot-deep channel.	

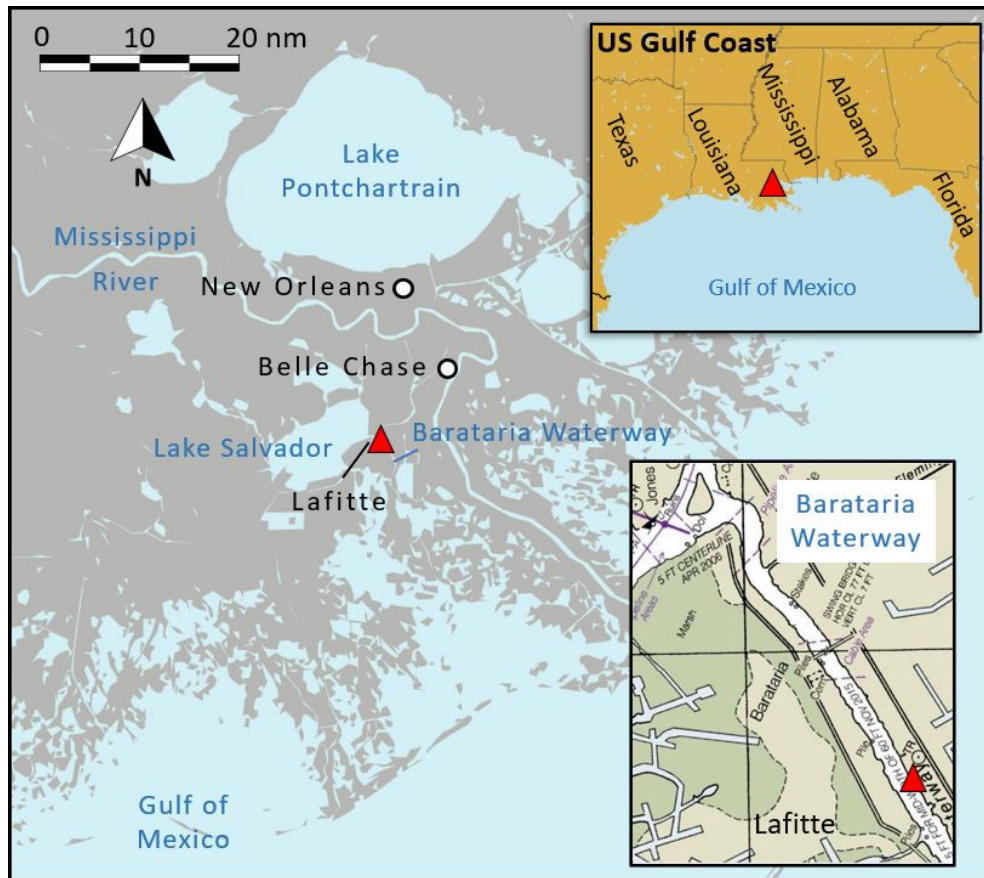
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On October 8, 2019, about 0600 local time, the *Susan Lynn* was docked and in layup status at Tom's Marine & Salvage yard on the Barataria Waterway in Lafitte, Louisiana, when a fire started in the engine room. The vessel's watchman could not contain the fire and evacuated the vessel. Local firefighters extinguished the fire. No pollution or injuries were reported. Damage to the vessel was estimated at \$1,350,000.



The *Susan Lynn* (original name *Rock Bluff*), under previous ownership. (Source: Leslie Jenkins, Jantran Inc.)

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Area of accident where the *Susan Lynn* caught fire, as indicated by the red triangle. (Background source: Google Maps; chart inset: National Oceanic and Atmospheric Administration)

### Background

The 128-foot-long *Susan Lynn*, a twin-propeller towboat, was built in 1963 by Marine Welding & Repair Works in Greenville, Mississippi. Originally named the *Rock Bluff*, the vessel was owned by three different companies before being bought in 2018 by its current owner, H&K Marine Services, LLC. Prior to its purchase in 2018, the vessel had been out of service for over a year and moored at the Jantran river towing facility in Rosedale, Mississippi. The vessel began service for Four Rivers Towing on October 31, 2018, towing barges on the Mississippi River and between New Orleans, Louisiana, and Houston, Texas.

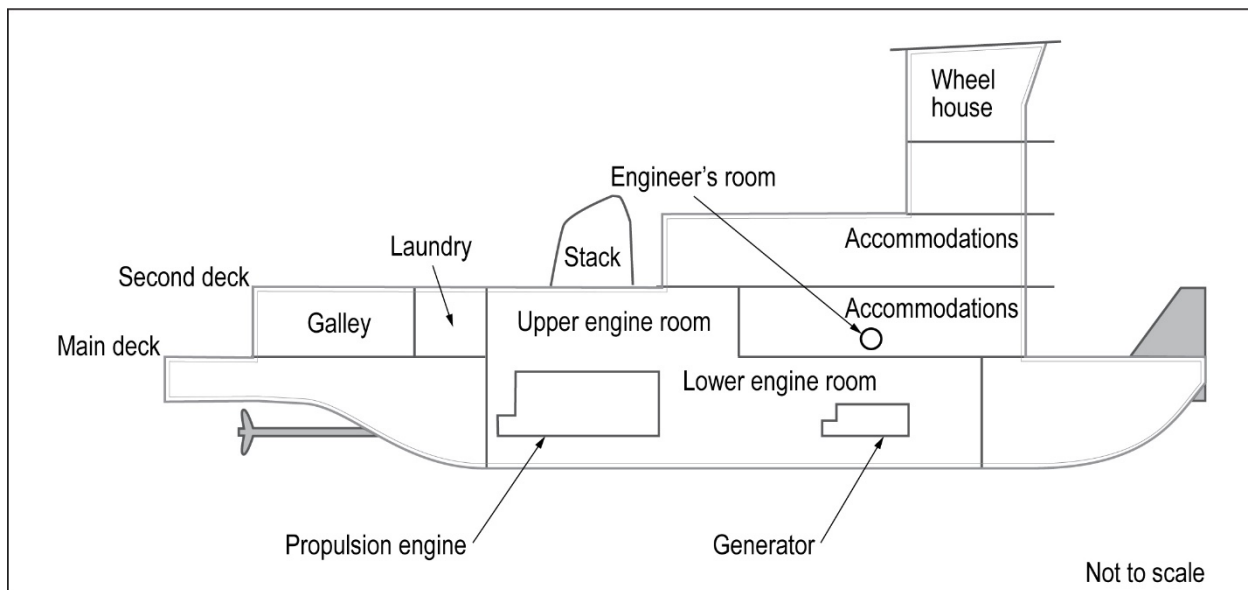
The *Susan Lynn* remained in service until arriving at Tom's Marine & Salvage yard on August 2, 2019, for replacement of its port propeller. The operator had intended to return the vessel to service following US Coast Guard inspection of the propeller installation. However, Coast Guard inspectors prohibited the vessel from operating because, during their visit to inspect the new propeller on August 7, they observed that the condition of the vessel's hull did not meet the standards of Subchapter M towing vessel inspection regulations. Although the vessel did not yet carry a certificate of inspection (COI), during the phase-in period for obtaining a COI, all towing

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vessels were required to meet the Subchapter M requirements.<sup>1</sup> With the *Susan Lynn* unable to operate until the regulatory standards were met, the operator reduced the towboat's crew to an engineer living on board to serve as watchman. The vessel remained docked at Tom's Marine & Salvage yard.

### Accident Events

On October 4, 2019, the engineer who had been serving on the *Susan Lynn* for the previous year came to the shipyard to work on two other vessels operated by Four Rivers Towing that were in the same yard as the *Susan Lynn*. He resided on board the *Susan Lynn*, relieving the previous watchman. The vessel was not hooked up to shore power. He told investigators that the port generator was operating to power the hotel loads during his stay on board and had been the only generator used since mid-August. The starboard generator was not in service because it needed its fuel injectors replaced.



**Simplified inboard profile of the *Susan Lynn*.**

On October 7, after working until 1900 on the towing vessel *Depa Dean* and then going ashore for the evening, the engineer returned to the *Susan Lynn* around midnight and went to bed in his room on the main deck, above the forward portion of the lower engine room where the generators were located. He said that the hinged steel interior centerline upper engine room doors were open when he went to sleep.

The engineer told investigators that at 0600 on October 8, he woke to a “beeping fire alarm.” He got out of bed, observed there was no power, and decided to check the engine room. He peered through the open interior forward centerline door to the upper engine room, observed

<sup>1</sup> The *Susan Lynn* had yet to be issued a Coast Guard Certificate of Inspection (COI) per the new 46 *Code of Federal Regulations (CFR)* Subchapter M, which was effective on July 20, 2018, for towing vessels. There was a phase-in period for vessels to obtain a COI per the new regulations. The first milestone of the phase-in period was on July 22, 2019, when operators were required to have a COI for 25 percent of their vessels. The *Susan Lynn* was not required to have a COI at the time of the accident. Regardless of the vessel's COI status, according to 33 *CFR* Part 136, operators were required to comply with the remaining requirements in Subchapter M by July 20, 2018, for all their vessels.

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smoke, and left to grab carbon dioxide and dry chemical fire extinguishers. He returned to the engine room through an aft door on the starboard side and walked down the ladder to the deck plates at the rear of the lower engine room between the two main engines, but he did not see any flames. “There was nothing there but black smoke . . . it was hot.” The engineer discharged the two extinguishers in the direction of the two generators located forward of the main engines. He said there was no way to secure the exhaust trunk ventilation to the engine room, he did not secure any fuel shutoff valves, and he did not attempt to use the semi-portable fire extinguisher located near the aft starboard-side engine room door on the main deck, which he passed by, telling investigators, “I didn't even think about it. It didn't cross my mind.”

He then left the vessel and called 911 and the vessel operator. The Lafitte Barataria Crown Point Volunteer Fire Department arrived on scene at 0628 and fought the fire with water hoses and foam. The fire was declared out at 1315.

### Additional Information

**Hull condition.** About 2 months before the accident, on August 7, the marine inspectors who examined the *Susan Lynn* when it was out of the water noted numerous concerns with hull integrity, the condition of watertight hatches, hull plating, and weld seams on stern tubes and viewed diesel fuel leaking from the hull into a 5-gallon bucket. The inspectors did not examine machinery during this visit.

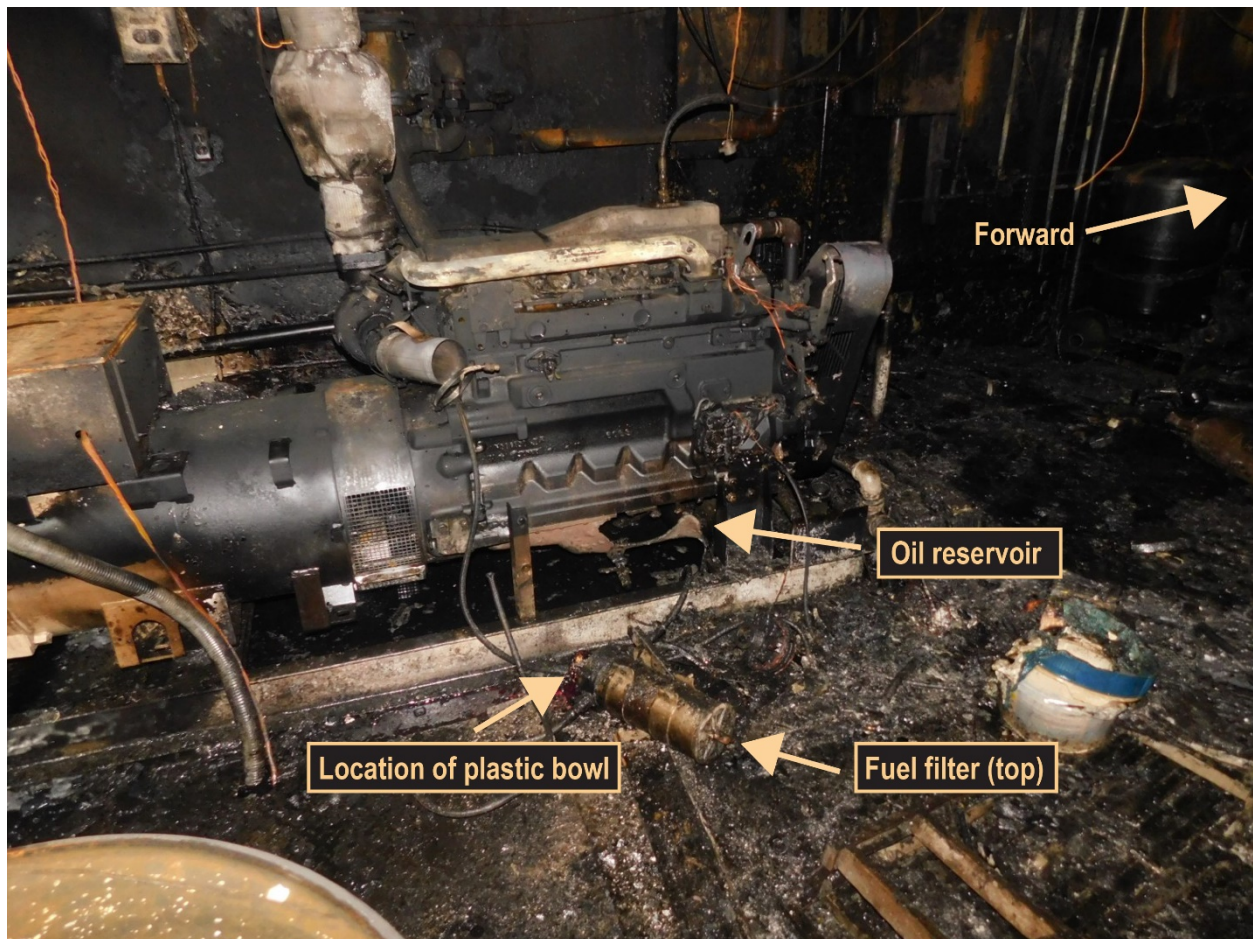
Twelve days later, on August 19, marine inspectors returned to examine the hull of the vessel and allowed the vessel to return to the water as the operator contemplated repairs. As before, the scope of the inspection did not include examination or testing of machinery. The vessel operators did not wish to undergo the required drydock and internal structural examinations or an initial inspection for certification at that time. Little to no work had been done to the vessel since the inspectors were aboard the vessel 2 weeks earlier. Inspectors noted in their inspection report of August 19:

Vessel hull is in a substandard condition, the following issues were found: the entire hull needs gauging conducted to see what hull needs to be cropped, gauging to also be done on the internal hull to see the condition under the external rub rail, fractures in the rub rail may have led to water accelerating the corrosion since stuck in the rub rail. Also found both port & stbd aft external keel coolers were smashed, need to be repaired, rake knuckle on stbd bow has a sharp inset, stbd push knee is smashed and in need of repair, also a further evaluation of hull structure behind the push knee, and doublers found on the port stern side plating, needs to be removed and further evaluated.

**Fire damage.** The engine room and all spaces forward of the galley on the main deck and second deck incurred damage from the fire. On October 10, Coast Guard marine inspectors, investigators from Sector New Orleans, and a Four Rivers Towing representative walked through the engine room and examined the port generator and surrounding equipment. They noted significant damage to the oil pan (or oil reservoir), including a hole in it, and that the generator engine exhaust piping had no lagging installed. The Coast Guard inspection report noted that the damage may have resulted from a crankcase explosion in the port generator. Later that afternoon, a fire investigator from the Louisiana Office of State Fire Marshal and the owner of Four Rivers Towing examined the fire scene. The fire investigator could not identify the cause of the fire, saying

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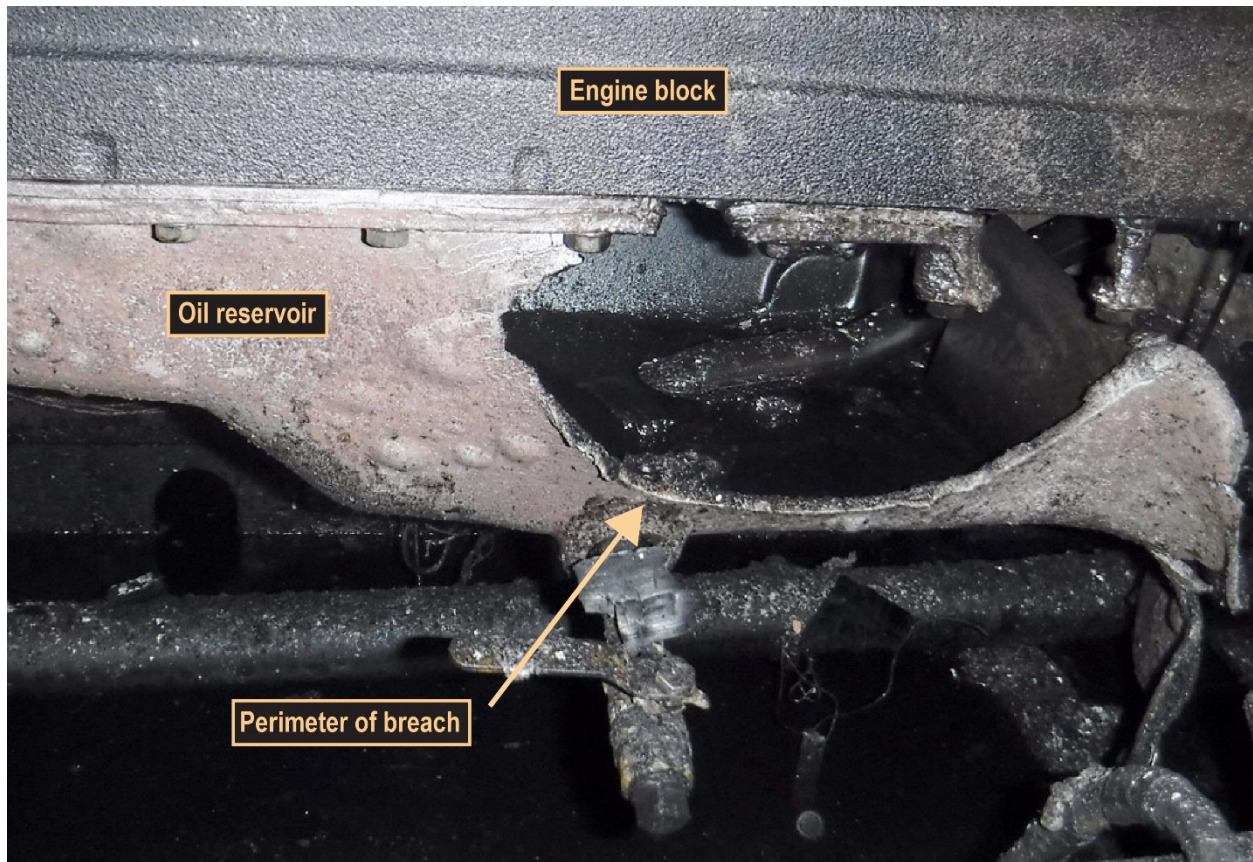
he could not “rule out mechanical/electrical failure” nor identify the heat source that ignited “combustible materials and ignitable liquid fuel.”



The *Susan Lynn* port generator and lower engine room following the fire. (Source: Louisiana Office of State Fire Marshal, annotated by NTSB)

The owner of Four Rivers Towing told investigators that he noticed the connecting rod had separated from piston number 3 and was hanging down through the hole of the ruptured oil reservoir and still connected to the crankshaft. The owner could not identify the heat source that would have ignited the fire. He did note that the plastic bowl at the bottom of the port generator’s Racor fuel filter, adjacent to the engine, was melted. He suspected lube oil may have first ignited near the generator, and then, over a short period of time, ignited the fuel oil that would have fueled the fire after the flames and heat melted the fuel filter bowl, releasing fuel oil into the engine room. Photographs taken after the accident showed the fuel filter laying on the floor plates of the engine room with a damaged bowl, with one of its two supporting brackets attached to the filter and fuel lines still connected.

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Ruptured *Susan Lynn* port generator oil reservoir. (Source: US Coast Guard, annotated by NTSB)

The engine damage and failure described by the owner of Four Rivers Towing was similar to what was found by NTSB investigations of two towboat and one offshore supply vessel accidents since 2014.<sup>2</sup> The previous mechanical engine failures on these three vessels led to the ejection of lube oil mist, which likely ignited on the two towboats, resulting in engine room fires (in the offshore supply vessel accident, the engine failure did not result in a fire).

**Machinery Maintenance.** The owner of Four Rivers Towing told investigators that the two generators were installed on the vessel 3 years before and estimated that each would have had 11,500 operating hours based on having one generator on line, alternating between the two generators each week, for 3 years. The engineer also told investigators that from the time of its purchase in September 2018, the vessel operated by alternating between the two generators each week until the starboard generator was taken out of service in August 2019 at the shipyard. The engineer told investigators that, except when sleeping during the night, he checked the port generator every 2 hours, including the temperature and oil pressure gauges and the amount of water in the expansion tank.

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<sup>2</sup> Recent NTSB investigations involving mechanical engine failure include *Engine Room Fire on Board Towing Vessel Dennis Hendrix, Baton Rouge, Louisiana, October 31, 2014* ([MAB-15/22](#)), *Diesel Generator Failure aboard Offshore Supply Vessel Red Dawn, Amchitka Island, Alaska, December 13, 2017* ([MAB-19/02](#)), and *Engine Room Fire on Board Towing Vessel Leland Speakes, Greenville, Mississippi, February 21, 2018* ([MAB-19/10](#)). These reports are available at [www.nts.gov](http://www.nts.gov).

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The engineer stated that each generator's fuel and lubricating oil filters and lubrication oil were changed every 300 hours of operation. The generator manufacturer's operating manual's service chart recommended changing the fuel filter every 600 hours and the oil and oil filter every 250 hours. Engine maintenance records were on board the vessel and destroyed by the fire. A forensic examination of the port generator engine was not conducted following the fire, nor was the engine rebuilt.

The lubrication and maintenance service interval chart in the operator's manual included checking of the crankshaft vibration damper every 1,200 hours or 2 years. A John Deere parts technician said that some owners decide not to regularly check the damper unless crankshaft vibrations are detected. The owner of Four Rivers Towing said that they had not done this service on the port generator and most likely would not have checked the damper until the engine was overhauled or when engine vibration was detected.



The *Susan Lynn* at its berth following the fire. Inset: crew quarters on board the *Susan Lynn*. (Source: Louisiana Office of State Fire Marshal)

### Analysis

The *Susan Lynn* was nearly 60 years old, laid up by its previous owner, and prevented from operating by the Coast Guard because of a substandard hull in need of gauging and repairs. Maintenance and the condition of the port generator were explored as potential causes of the fire due to the continual use of the port generator for about 63 days (1,512 hours) with the starboard generator out of service. However, other than identifying that the servicing of the port generator did not follow the schedule and tasks recommended by the manufacturer, investigators did not find evidence that the port generator was in an unsatisfactory condition before the accident.

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The heaviest fire damage was in the engine room, near the generators, with additional damage on the main and second decks forward of the galley. The vessel was equipped with fuel shutoff valves, which are intended to secure fuel to the engine and engine room in an emergency. Had they been secured, there would have been less fuel available to feed the fire. The fire's spread beyond the engine room was likely the result of the interior forward and after centerline upper engine room doors being left open while the vessel was laid up and remaining open throughout the fire. Minimal damage was visible in the galley where a similar type door on the centerline between the laundry space and the galley was shut. The only visible damage in the galley was a blackened area of the overhead surrounding the galley vent fan located in the overhead just aft of the door to the laundry space. While the vessel was in layup, the normal position of the engine room doors should have been closed, as a fire safety measure.

Examinations of the vessel by Coast Guard investigators and inspectors, a Louisiana State fire marshal investigator, and the *Susan Lynn*'s operator provided limited evidence to identify the cause of the engine failure and subsequent fire. Detailed evidence was not available because a forensic examination of the port generator engine was not conducted, nor was the engine rebuilt. If the engine had been rebuilt, damaged components could have been identified as it was disassembled, which could have provided additional facts to help conclude the cause of engine failure.

Because of the limited evidence, the exact cause of the fire and the generator's engine casualty cannot be determined. However, based on the evidence that there was damage to the port generator engine's number 3 cylinder connecting rod and oil reservoir, the rupture of the oil reservoir may have been caused when part(s) of the failing connecting rod and/or a piston struck the inside wall of the oil reservoir. A rod and/or piston striking and then rupturing the oil pan would have released oil into the engine room under heat and pressure. This ejected lube oil mist may have ignited off a hot surface, potentially the generator's unlagged (not insulated) exhaust components. The intensity and duration of the fire was likely exacerbated by the melting of the bowl on the bottom of the generator's Racor fuel filter combined with the vessel's fuel shutoff valves not being closed, allowing additional fuel for the fire.

### Probable Cause

The National Transportation Safety Board determines that the probable cause of the fire on board the *Susan Lynn* was a catastrophic engine failure resulting in an oil reservoir breach and an ensuing fire initiated by ejected lube oil igniting off a hot surface. Contributing to the extent of the fire were the open engine room doors and the unsecured fuel shutoff valves.



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### Vessel Particulars

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Vessel	<i>Susan Lynn</i>
Owner/operator	H&K Marine Services, LLC/Four Rivers Towing, LLC
Port of registry	Gulf Shores, Alabama
Flag	United States
Type	Towing Vessel
Year built	1963
Official number (US)	290718
IMO number	N/A
Classification society	N/A
Construction	Steel
Length	119 ft (36.3 m)
Beam/width	28 ft (8.5 m)
Draft	6 ft (1.8 m)
Tonnage	272 GRT / 185 NRT
Engine power; manufacturer	2 x 1,000 hp (746 kW) Caterpillar diesel engines
Persons on board	1

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**NTSB investigators worked closely with our counterparts from Coast Guard Sector New Orleans, Louisiana, throughout this investigation.**

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For more details about this accident, visit [www.nts.gov](http://www.nts.gov) and search for NTSB accident ID DCA20FM001.

### **Issued: January 26, 2021**

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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 Title 49 *United States Code*, Section 1131(b)(1). 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.” Title 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. Title 49 *United States Code*, Section 1154(b).

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