



National Transportation Safety Board

Marine Accident Brief

Engine Room Fire aboard Towing Vessel *Jacob Kyle Rusthoven*

Accident type	Fire/Explosion	No. DCA18FM038
Vessel name	<i>Jacob Kyle Rusthoven</i>	
Location	Lower Mississippi River, mile 673.8; near West Helena, Arkansas ¹ 34°38.77' N, 090°35.12' W	
Date	September 12, 2018	
Time	1005 central daylight time (coordinated universal time – 5 hours)	
Injuries	None	
Property damage	\$1.5 million est.	
Environmental damage	None reported	
Weather	Clear, visibility 10 miles, winds light and variable, air temperature 70°F	
Waterway information	According to the Helena Gage at mile 663.1, located 10 miles south of the accident, the river height was 19.1 feet and rising.	

About 1005 local time on September 12, 2018, a fire broke out in the engine room of the towing vessel *Jacob Kyle Rusthoven* while it was pushing nine barges southbound on the Lower Mississippi River at mile 673.8, approximately 6 miles north of West Helena, Arkansas. As the fire spread, three of the barges broke away from the tow, and one rolled over and lost its cargo. All six crewmembers abandoned the vessel onto the barges, from where they were rescued by a Good Samaritan vessel. Due to smoke inhalation, the crew was later sent to the hospital and discharged the same day. No pollution was reported. The *Jacob Kyle Rusthoven*, valued at an estimated \$1.5 million, burned completely.



Jacob Kyle Rusthoven (formerly the *Capt. George Brumley*) prior to the fire.
(Source: Steve Henderson)

¹ All miles in this report are statute miles.

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Location of the accident where the fire started on the *Jacob Kyle Rusthoven*, as indicated by the red triangle. (Background source: Google Maps)

Background

Formerly the *Capt. George Brumley*, the 85-foot-long towing vessel *Jacob Kyle Rusthoven* was built in 1968 by Jeffboat Inc. in Jeffersonville, Indiana. Driven by twin propellers, it was fitted with two rudders and two flanking rudders. The vessel was powered by two mechanically controlled 12-cylinder Caterpillar D398 turbocharged diesel engines. Each 1,800-horsepower engine was connected to reduction gears and pneumatically operated clutches. The vessel's electrical system was powered by two Cummins 75-kilowatt generators.

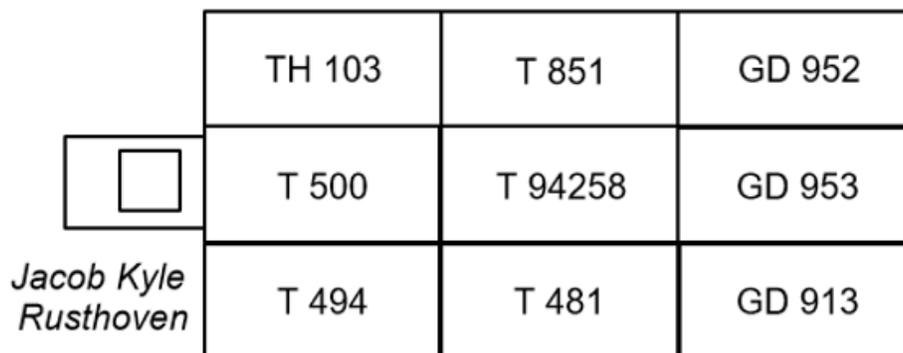
The *Jacob Kyle Rusthoven* was constructed of steel with four decks above the main deck. The bulkheads within the interior accommodation spaces and wheelhouse were covered with wood. The engine room, located aft of the galley and accommodation spaces, had two levels: above was the main deck; below were the main engines, generators, all other associated machinery, and the fire pump. The emergency fuel oil shutoffs for securing fuel to both the main propulsion and electrical generator engines were located on both the port and starboard sides of the main deck outside of the engine room.

Graestone Logistics operated the *Jacob Kyle Rusthoven* with a crew of six under a bareboat charter agreement from the owner, Rock Ridge Investments LLC.² The captain and the pilot, who were in charge of navigating the vessel, worked an alternating 6-hours-on/6-hours-off rotation: the captain

² A bareboat charter agreement involves an owner leasing a barge or towboat without a crew, with less fuel and stores, and with minimum restrictions on the use of the vessel.

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on the 0600–1200 and 1800–2400 watch; the pilot on the 0000–0600 and 1200–1800 watch. A mate, “deckaneer” (a deckhand who performs engineering duties), and two deckhands also crewed the vessel.



Simplified tow arrangement of the *Jacob Kyle Rusthoven* (not drawn to scale).

Accident Events

Early on the morning of September 8, the loading of limestone into the nine barges comprising the *Jacob Kyle Rusthoven's* tow was completed at mile 19 on the Tennessee River. With the barges arranged in three strings of three, the tow measured 680 feet long by 105 feet wide, including the towboat. Afterward, the *Jacob Kyle Rusthoven* tow got under way, traveling southbound on the Tennessee, Ohio, and Mississippi Rivers en route to Baptiste Collette Bayou, Louisiana, where the cargo would be discharged.

On September 12, at 0241, during the pilot's watch, the *Jacob Kyle Rusthoven* passed under the Memphis (or Hernando De Soto) Bridge at mile 736.6, according to the vessel's automatic identification system (AIS) data. The pilot stated that around this time, the captain left the wheelhouse after having been there for about an additional 3 hours following his watch. Approximately three hours later, around 0530, the captain returned to the wheelhouse to relieve the pilot.

According to the pilot, the captain mostly operated the boat “hooked up,” that is, with the engines running full ahead, and worked the rudders “hard over to hard over.” Whenever the pilot would relieve the captain while under way, the (revolutions per minute) rpm would be at 1,050, and the pilot would pull back the rpm by at least a hundred during his watch.

About 0800, the *Jacob Kyle Rusthoven*, with a following current, approached Mhoon Bend near mile 688. According to the nearest river gage (Helena Gage, mile 663.1), the water level was about 19.1 feet and rising. The captain of another towing vessel reported that the current was “swift.” At the time, the two deckhands were also on watch, while the pilot, mate, and deckaneer were sleeping.

Entering Mhoon Bend, the captain attempted to flank the bend (the process of maneuvering a tow with a following current through a turn in a river by using astern propulsion and flanking rudders) but lost control of the tow. He then backed hard astern to stop the tow. Nonetheless, the head of the tow struck the bank, causing the tow's rigging to loosen. He maneuvered his vessel to regain control of the tow. As the deckhands worked to re-tighten the rigging, the captain of the *Jacob Kyle Rusthoven* informed, via VHF radio, the captain of the *Gabe Gattle*, a southbound

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towing vessel traveling about 5 miles behind, that he hit the bank. After maneuvering his tow off the bank, the captain of the *Jacob Kyle Rusthoven* continued southbound.

Upon overhearing the radio communications between the *Jacob Kyle Rusthoven* and the *Gabe Gattle*, the captain of the *Bill Atkinson*, a towboat traveling northbound with 34 empty barges, radioed the captain of the *Jacob Kyle Rusthoven* to agree to a passing arrangement. For the arrangement, the *Bill Atkinson* would “push up on” the right descending bank so that the vessels could pass starboard-to-starboard above mile 673. About 0919, the *Bill Atkinson* pushed up on the west bank at mile 673.6 to wait for the *Jacob Kyle Rusthoven* to pass.

When the *Jacob Kyle Rusthoven* and its tow was about a mile upriver from the *Bill Atkinson*, the captain of the *Bill Atkinson* observed the port corner of the center head deck barge, *GD 953*, was under water. He alerted the captain of the *Jacob Kyle Rusthoven*, who replied that he would investigate the matter. After the call, the captain of the *Bill Atkinson* noticed the speed of the *Jacob Kyle Rusthoven* slowing “considerably.” The captain of the *Jacob Kyle Rusthoven* then contacted the *Gabe Gattle*, still behind him, to inform the captain he was going to stop the tow due to the barge taking on water. Shortly afterward, the captain of the *Gabe Gattle* observed smoke coming from the *Jacob Kyle Rusthoven*.

As the *Jacob Kyle Rusthoven* passed the *Bill Atkinson*, the captain of the *Bill Atkinson* noticed smoke coming from the open starboard-side engine room door of the *Jacob Kyle Rusthoven* when the vessel was about abeam of his wheelhouse. The captain of the *Jacob Kyle Rusthoven* then broadcasted on the radio that his vessel was on fire and adrift.



Smoke emanating from the open starboard-side and aft engine room doors on the main deck. (Source: *Bill Atkinson* captain)

The mate, asleep on the third deck, was awakened by the smell of smoke emanating from the vent in his cabin and the sound of the fire alarm. He stated that at the time he was awakened, he could feel the boat was “backing hard.” He left his cabin and proceeded down five to six steps but went back up the stairs due to the smoke. The mate returned to his cabin, which was now full of smoke, to get his shoes. When he exited through an aft door to the open deck, he saw the two deckhands and deckaneer assembled at the vessel’s port bow and asked them to help extinguish the fire. The mate said that by the time he arrived on the main deck, “everything just shut down.”

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The pilot, whose cabin was on the second deck, stated he was also awakened by the sound of the fire alarm and the boat “backing real hard.” As he was getting dressed, the lights went out and the general alarm sounded. He departed his cabin and proceeded to the wheelhouse, where he met the captain. The pilot recalled that when he arrived there, the vessel and tow were broadside to the current and drifting down the river.

On deck, the mate instructed one of the deckhands to grab a fire extinguisher while he went to get a fire hose. The deckhand went to the open portside engine room door on the main deck and discharged the extinguisher inside. As the mate went to retrieve the fire hose, he discovered the electric fire pump, located in the engine room, was not working. When he went to get a portable pump at the bow, he realized the hose for the pump was on the tow and therefore it could not be used.

The pilot recalled that from the wheelhouse, he saw flames coming from the portside engine room door with smoke so thick that it obscured the visibility of the outer deck steps. Both the pilot and captain evacuated the wheelhouse by climbing over the handrails on each deck and scaling down to the next deck to reach the front of the boat. The captain instructed the crew to abandon the burning vessel onto the barges.

The crew of the *Jacob Kyle Rusthoven* assembled on the tow. The mate, upon seeing the center lead barge listing to port, went with a deckhand forward on the tow, where they observed broken wires in the starboard-side coupling of the center barge. Noticing that there was a lot of strain on the remaining wires of the coupling, he loosened them and then returned to the stern of the tow.

The crews on both the *Bill Atkinson* and the *Gabe Gattle* launched their skiffs to assist the crew of the *Jacob Kyle Rusthoven*. When the burning vessel was above the mouth of the St. Francis River at mile 672.3, the skiff from the *Bill Atkinson* arrived at the *Jacob Kyle Rusthoven*, which had drifted past the *Bill Atkinson* by more than a mile. While the crewmembers were on the tow of the *Jacob Kyle Rusthoven*, the mate noticed that it was drifting toward a bank and then called out to the *Bill Atkinson*'s skiff for assistance. Both skiffs picked up the crewmembers and brought them to the *Bill Atkinson*.

According to the mate on the *Jacob Kyle Rusthoven*, once they were in the skiff, about 200 feet away from the drifting *Jacob Kyle Rusthoven* and tow, the stern of the towboat hit the bank and the tow wires started to part. The center head deck barge, *GD 953*, flipped over, dumped its load of limestone, and settled upside down on top of barge *GD 952*. Three of the barges in the starboard string broke out of the tow. Towing vessels from West Helena arrived on scene to assist in gathering the *Jacob Kyle Rusthoven* and its barges, eventually pushing them up against the right descending bank.

The crew of the *Jacob Kyle Rusthoven* was taken to a local hospital for medical examination, where four of them were treated for smoke inhalation. All were discharged the same day.

Firefighters were dispatched to extinguish the fire, as well as an emergency response and salvage company to contain any environmental hazards. The fire was extinguished later in the evening, at 1913. The *Jacob Kyle Rusthoven* was towed to a shipyard in Mobile, Alabama, for examination and disposal.

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Two towing vessels push toward the bank the remaining barges as the *Jacob Kyle Rusthoven* burns. Barge *GD 953*, which had turned over, sits on top of barge *GD 952*. (Source: Coast Guard)

Additional Information

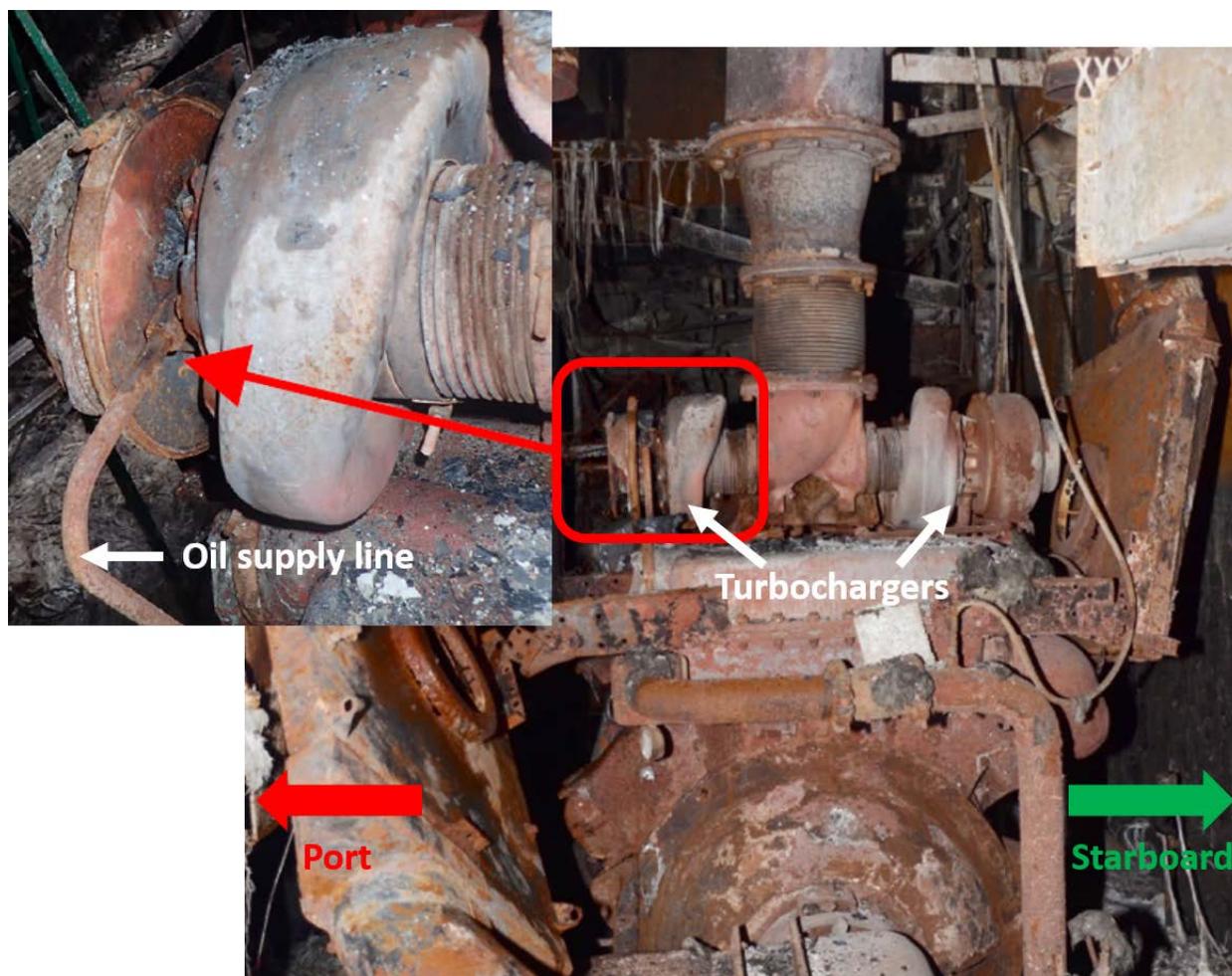
Fire Investigation. The *Jacob Kyle Rusthoven* was destroyed in the fire with only its forward and aft open decks left unburned. All documents and records kept on board the vessel burned in the fire, and the vessel was declared to be a total loss. The emergency fuel oil shutoffs on both the port and starboard sides were found to have not been activated. Based on witness photos and video, all main deck access doors were open before and during the fire.

A commercial forensic science firm contracted by the vessel's insurer conducted an examination of the vessel at the shipyard. According to the firm's representative, fire damage to the starboard main engine was greater than the port main engine. The inboard turbocharger assembly on the starboard main engine had significantly more fire and heat damage than anywhere else. The wires that secured the insulation around the engine's high-temperature exhaust piping and turbocharger components burned away, and the metal components of the casing and compressor wheel of the inboard turbocharger melted. The fitting on the lube oil supply line to the starboard-side turbocharger was found to be loose enough that it could be moved on its threads by a finger. There was no fire damage beneath the engine or in the bilge.

Machinery. About one month before the accident, from August 10 to 24, the *Jacob Kyle Rusthoven* underwent a maintenance and drydock period. According to company personnel, most of the work and inspections during this time were conducted in house. The work included a cylinder change on the starboard engine and replacement of corroded fuel pipes and vent lines. A company drydock inspection checklist indicated that the main engines were inspected (although it did not provide detail on the scope of the inspection) and that there were no changes in the turbochargers. Also inspected were the gearboxes and the clutch, which the checklist indicated was also cleaned. On August 20, the vessel's port engineer conducted an inspection, at which time he documented an operational test of the fuel shutoffs. Neither of the two main engines or turbochargers had been overhauled or replaced during the time the company had been operating the *Jacob Kyle Rusthoven*. The company did not have any records of the running hours on the main engines.

The pilot of the *Jacob Kyle Rusthoven* stated that there were no problems with the engines or generators during his morning watch on the day of the accident. He further stated that the boat handled "as it was supposed to" and that "everything was running fine."

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Fire-damaged starboard main engine, while looking forward. The red box highlights the inboard turbocharger with its casing and compressor missing due to the damage. The inset shows the lube oil supply line fitting that was found to be loose. (Source: SEA Limited)

Toxicology testing. All crewmembers of the *Jacob Kyle Rusthoven*, except the captain, were tested for alcohol and other drugs. The captain refused to be tested, defying the company's drug and alcohol policy and a regulatory requirement for crewmembers involved in a maritime casualty.³ Due to the violation, Graestone dismissed the captain the day of the accident, after less than two months of employment. Because of the captain's refusal to submit to a postaccident drug and alcohol test, it could not be determined if the captain was impaired at the time of the accident. All alcohol samples taken from the remaining crewmembers were determined to be inconclusive, except the pilot's, which tested negative. Results for other drug tests were negative, except the mate's, which reported codeine/morphine in his system.

Investigators were prevented from interviewing any of the crewmembers and therefore were limited in obtaining all facts related to crewmember actions.

³ The regulatory requirement refers to Title 46 *Code of Federal Regulations* (CFR) Section 4.06-3.

Analysis

The fire was determined to have originated at or near the inboard turbocharger on the starboard-side main engine based on the heat damage at that location. A commercial forensics science firm found that a loose fitting on the lube oil supply line was a likely fuel source. Considering witness accounts of the captain operating the vessel at full power (maximum engine rpm), it was likely that when smoke first appeared, the lube oil in the line to the turbocharger was at or near its maximum operating pressure. The pressurized lube oil could have atomized from the loosened fitting and consequently come into contact with a hot surface on the starboard engine near the turbocharger. The atomized oil would have likely ignited and eventually spread the fire to adjacent combustible materials in the engine compartment, before spreading to the upper level. As the engines and generator(s) continued to run until they failed, they would have continued to supply lube oil and eventually fuel from any of the non-metallic fuel hoses and filters that failed as a result of fire exposure. It could not be determined how the lube oil pipe fitting loosened or when it was last serviced, or if the correct torque for that connection was applied.

The *Jacob Kyle Rusthoven* was not fitted with a fixed firefighting system in the engine room, nor was it required to have one. By the time the mate reached a fire hose, the vessel had lost electrical power, and the fire pump in the main engine room where the fire began therefore was not operable. Although there was a semi-portable CO₂ extinguisher inside the engine room on the upper deck, it was not of sufficient size to suppress the fire due to the fire's sustained fuel source and size. Also, the crew would have had to enter a smoke-filled space for which they had no protective equipment (breathing apparatus and fire suits). Because the captain did not instruct the crew to activate the emergency fuel shutoff valves, and no one closed the main deck doors, the fire was able to spread rapidly. Additionally, the vessel was not fitted with a means to secure supply and exhaust ventilation to the engine room. With no means to fight the fire or maneuver the tow (due to loss of propulsion and steering), the captain's order for the crew to abandon the drifting vessel to the barges was prudent.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the engine room fire on board the towing vessel *Jacob Kyle Rusthoven* was an engine lube oil leak that ignited off a hot surface near the starboard main engine turbocharger. Contributing to the severity of the fire was the lack of crew measures to activate the engine fuel supply shutoffs and secure open doors ventilating the engine room.

Vessel Particulars

Vessel	<i>Jacob Kyle Rusthoven</i>
Owner / operator	Rock Ridge Investments, LLC / Graestone Logistics, LLC
Port of registry	Mobile, Alabama
Flag	United States
Type	Towing vessel
Year built	1968
Official number (US)	517145
IMO number	8851003
Construction	Steel
Classification Society	N/A
Length	85.3 ft (26.0 m)
Draft	9.0 ft (2.7 m)
Beam/width	28.5 ft (8.7 m)
Gross tonnage (US)	218
Engine power; manufacturer	2 x 1,800 hp (1,342 kW): 3,600 hp (2,684 kW) total; Caterpillar D398, diesel engines
Persons on board	6

NTSB investigators worked closely with our counterparts from Coast Guard Sector Lower Mississippi River throughout this investigation.

For more details about this accident, visit www.nts.gov and search for NTSB accident ID DCA18FM038.

Issued: October 17, 2019

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).
