



AVIATION



HIGHWAY



MARINE



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PIPELINE

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MIR-23-02

Engine Room Fire aboard Passenger Vessel *Natchez*

On May 3, 2022, about 1945 local time, the inspected passenger vessel *Natchez*, with one crewmember on board standing a security watch, was moored in the Industrial Canal in New Orleans, Louisiana, undergoing renovations, when a fire broke out.¹ Local firefighters extinguished the fire at 2139. No pollution or injuries were reported. Damage to the vessel was estimated at \$1.5 million.



Figure 1. The *Natchez* before the casualty. (Source: New Orleans Steamboat Company)

¹ (a) In this report, all times are central standard time, and all miles are statute miles. (b) Visit [nts.gov](https://www.nts.gov) to find additional information in the [public docket](#) for this NTSB investigation (case no. DCA22FM017). Use the [CAROL Query](#) to search investigations

Casualty type	Fire/Explosion
Location	Industrial Canal, New Orleans, Louisiana 30°1.58' N, 90°1.93' W
Date	May 3, 2022
Time	1945 central standard time (coordinated universal time -6 hrs)
Persons on board	1
Injuries	None
Property damage	\$1.5 million est.
Environmental damage	None
Weather	Visibility 10 mi, clear, winds east 5 mph, gusts 8 mph, air temperature 86°F, water temperature 67°F
Waterway information	Canal, width 300 ft, depth 30 ft



Figure 2. Area where the *Natchez* fire occurred, as indicated by a red X. (Background source: Google Maps)

1. Factual Information

1.1 Background

The *Natchez* was a 236-foot-long sternwheel passenger vessel powered by two 200-psi fire tube boilers that provided steam to two reciprocating piston propulsion engines capable of producing a total of 1,600 hp. The vessel was built in 1975 by Bergeron Machine Shop in Braithwaite, Louisiana, and was owned and operated by the New Orleans Steamboat Company. The steel-hulled vessel was designed to replicate the layout of a historic nineteenth-century sternwheel steamboat. Above-deck structures included a wheelhouse and internal and external accommodation areas for 1,233 passengers. The main deck spaces from forward to aft included crew accommodations, the captain's salon, the boiler room, restrooms, the galley, the generator room, and an engine room. The generator space within the engine room contained two diesel generators that provided the vessel with electrical power.

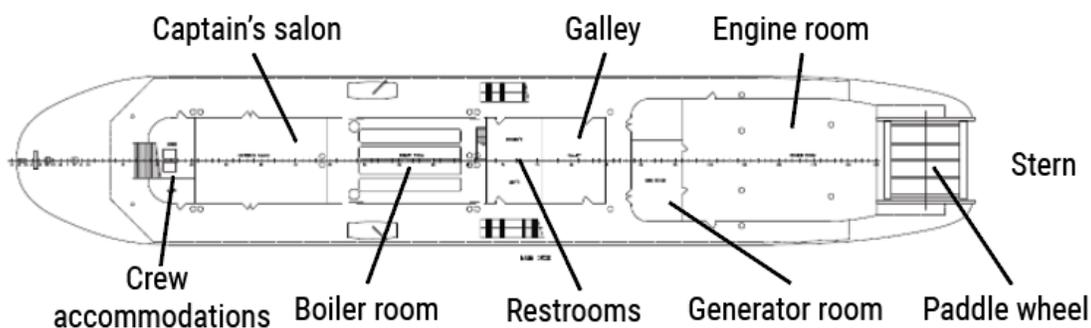


Figure 3. *Natchez* main deck layout. (Background source: New Orleans Steamboat Company)

The *Natchez* operated daytime and dinner jazz cruises daily on the Mississippi River, departing and returning from the French Quarter in New Orleans. When the vessel was underway with passengers, the *Natchez* crew consisted of a captain, a chief engineer, an oiler, a fireman/watertender, and three deckhands.

1.2 Event Sequence

The *Natchez* had been removed from service in January 2021 for an extensive overhaul, with a goal to return to service in 2023. The vessel was docked starboard side to the pier at the Morrison Road Wharf along the Industrial Canal in New Orleans, Louisiana. The scheduled work included the renovation of the passenger areas, refurbishment of the two boilers, and the replacement of one of the two Cummins KT19 DM 6-cylinder diesel generators with a Caterpillar model C18 diesel generator. Several contractors were employed to perform the work on board the vessel.

During the overhaul period, when the vessel was docked with no passengers on board, various *Natchez* crewmembers worked on the vessel during the day assisting the chief engineer, with one deckhand serving as the security watchstander (each of the three deckhands would stand a daily 8-hour security watch to provide 24-hour security coverage for the vessel). Crewmembers came and went depending on the work that was taking place.

The fixed carbon dioxide fire extinguishing system for the engine room (including the generator space) was taken out of operation during the overhaul to prevent accidental discharge. There were no fire detection systems on board the vessel, nor were they required.

The project to remove and replace the starboard diesel generator had been ongoing in the generator space since mid-March 2022. By May 3, the new Caterpillar diesel engine was installed, and the work scheduled for that day was the removal of the generators' electrical panel. Following removal, the plan was to fabricate a new generator electrical panel in its place with new electrical breakers and controls. Contractors would also install new fuel, lube oil, and water lines for the new diesel generator.

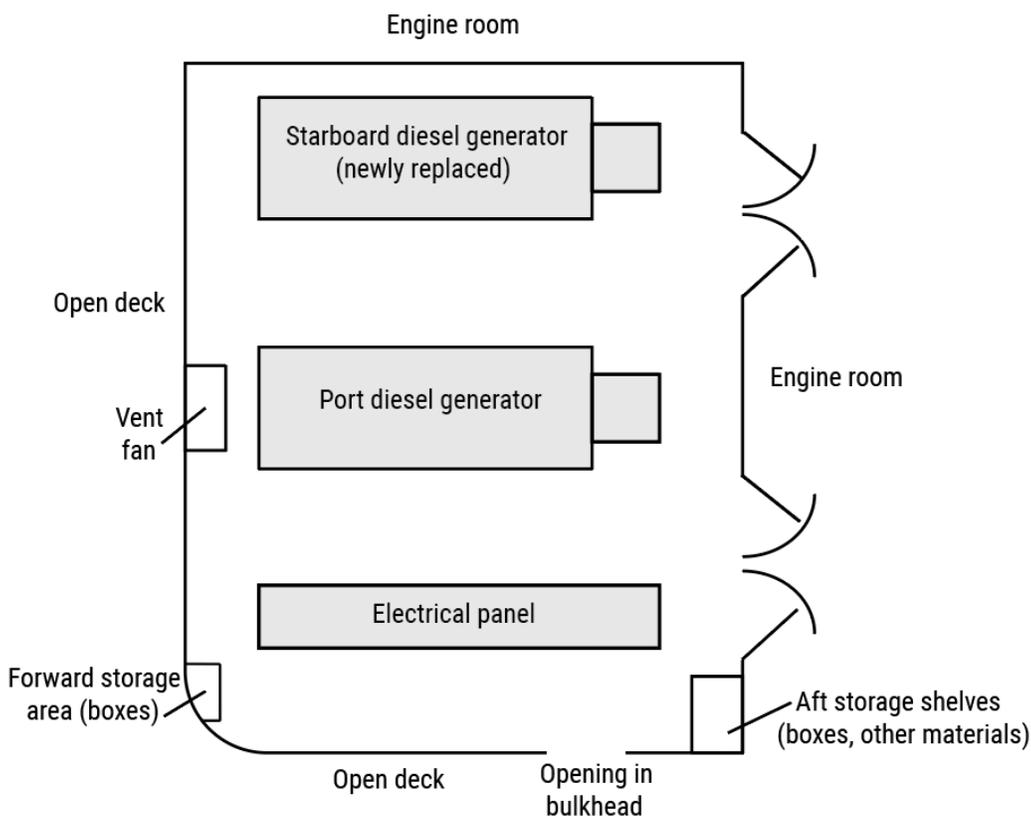


Figure 4. Layout of the *Natchez* generator space, located on the main deck in the forward port corner of the engine room (not to scale).

The work to remove the electrical panel, located on the port side of the generator space, started with the removal of the electrical components by a contractor, Bluewater Electric. Once that was completed about 0830, the project superintendent from the contractor responsible for hot work, Dixie Marine, evaluated the space to determine if it was safe for hot work, including checking the environment for flammable vapors, looking for oil on deck, and ensuring there were no combustible materials next to the hot work area. Once the space was determined safe for hot work, the employees used an acetylene torch to cut the panel's metal framing so it could be removed. As one worker was cutting with the acetylene torch, the other served as the fire watch and had a bucket of water, charged garden hose, and fire extinguisher at the ready in case a fire started. While the hot work was underway, the chief engineer had two *Natchez* crewmembers place a piece of sheet metal along the side of the port generator, about 3 feet from the hot work at the electrical panel, so that the sparks from the acetylene torch cutting would not damage it.

The hot work to remove the framing of the electrical panel was completed about 1545. Following the hot work, workers cleaned up the area and collected and stored the tools while monitoring the area as the cuts cooled down. The hot work contractor employees started to depart the vessel at 1630, with the project supervisor departing at 1650. They told investigators that they did not note any unusual concentration of smoke within the generator space before their departure. While the hot work was in progress on the port side of the generator space, another contractor, Southern Diesel, had been installing the fuel, lube oil, and water lines for the new diesel generator on the starboard side of the room. This work continued after the hot work was completed.

The deckhand on board the *Natchez* who was standing the 1600–2400 security watch conducted a round of the vessel about 1745. During this round, he entered the engine room, looked into the generator space, and saw the diesel technician (contractor). He did not observe any smoke or other issues; he then returned to the captain's salon, located on the forward section of the main deck. The diesel technician worked on the diesel engine piping installations until about 1800. After picking up his tools, the technician talked with the deckhand on the vessel's port bow before departing the *Natchez* about 1830. The technician told investigators that although he noted the smell associated with hot work following the completion of the panel frame removal, he did not smell or see any other indication of smoke before leaving the generator space.

About 1945, while the deckhand was in the captain's salon, he saw smoke passing the window. He exited the space to investigate, looked aft, and saw "a big puff of smoke coming from the overhead of the bottom [main] deck." The deckhand moved down the gangway and along the dock toward the vessel's stern to investigate the source of the smoke. He saw small flames that were growing and expanding inside the open

starboard-side engine room doors. From his cell phone, he immediately called 911, and then he called the captain and additional company personnel to inform them of the fire.



Figure 5. The *Natchez* on fire. (Source: Unidentified witness via US Coast Guard)

The New Orleans Fire Department arrived on scene about 2025, and the fire was reported extinguished about 2139. Most fire damage was contained within the generator space, with minor heat damage to the engine room and minor smoke damage to the external passenger decks located directly above the fire.



Figure 6. Looking forward in the fire-damaged generator space. The electrical panel foundation where hot work occurred before the fire is in the background, behind the port diesel generator. (Background source: New Orleans Steamboat Company)

1.3 Additional Information

1.3.1 Postcasualty Actions

On May 9, investigators from the US Coast Guard; the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF); the National Transportation Safety Board; and private fire investigators representing the vessel owners and the hot work contractor conducted a fire scene examination on board the *Natchez*. In addition to examining the fire scene, investigators were provided with pre-fire photos of the work conducted in the generator space on May 3. While reviewing the photos, investigators noted that cardboard boxes, wooden shelves, and other combustible materials including plastic and rubber were present in corner storage areas on the port side, forward and aft, on the generator space bulkhead.

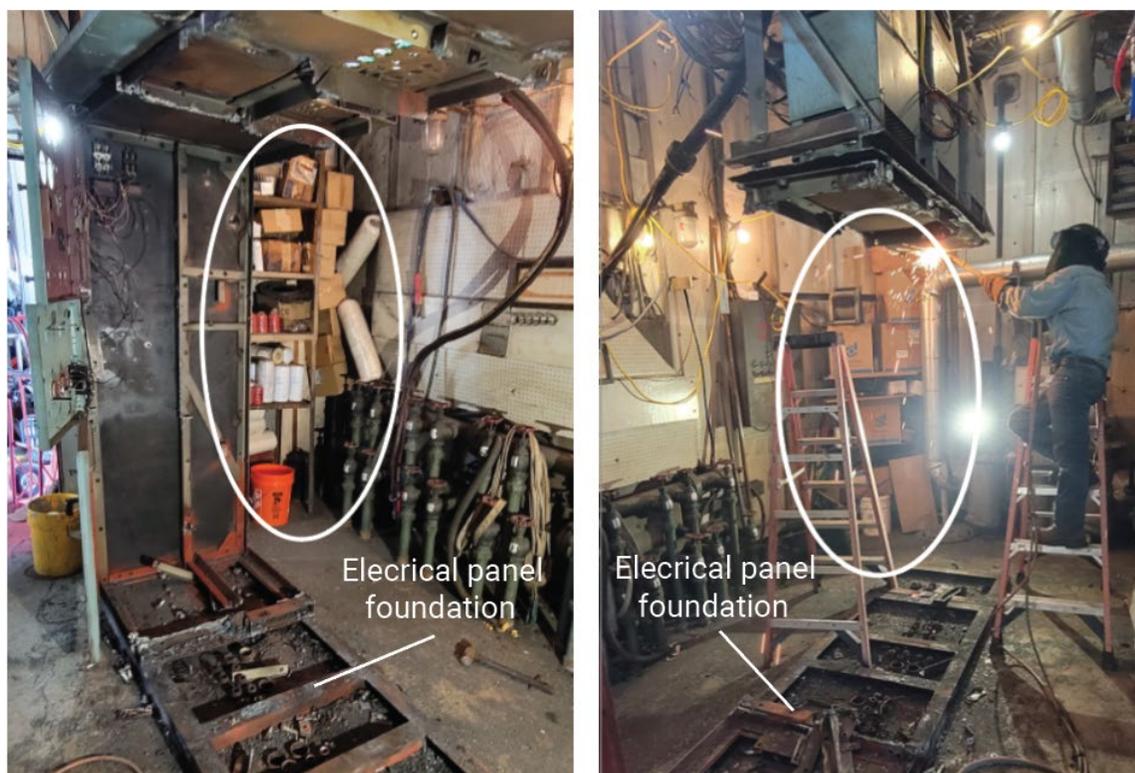


Figure 7. The *Natchez* generator space before the fire. Left photo, looking aft, shows exposed boxes and plastics (circled in white) stored aft of the metal foundation for the electrical panel that was removed during the hot work. Right photo, looking forward, shows exposed boxes (circled in white) forward of the foundation. (Background source: New Orleans Steamboat Company)

During the postfire examination of the generator space, investigators determined that the approximate distance between the area where the hot work was performed and the storage areas that contained combustible materials (forward and aft) was 2-3 feet.

As the ATF fire investigators examined the generator space to identify the location of the initial fire, they discovered a “distinctive V-shaped” fire pattern on the forward bulkhead that was 2 feet away from the forward section of the electrical panel framing. The fire investigators also observed clean burn patterns on the forward bulkhead above the V-shaped pattern and below the vent fan. Based on their observations and examinations, the ATF fire investigators determined that the clean burn patterns were consistent with the type and size of available fuels: the combustible materials that were located along the forward bulkhead as shown in the photos taken the same day before the fire. The fire patterns found within the generator space were determined by the ATF fire investigators to be consistent with a fire originating near the deck along the forward bulkhead, adjacent to where the hot work was performed. Except for the hot work conducted before the fire, no other potential source of ignition was discovered.

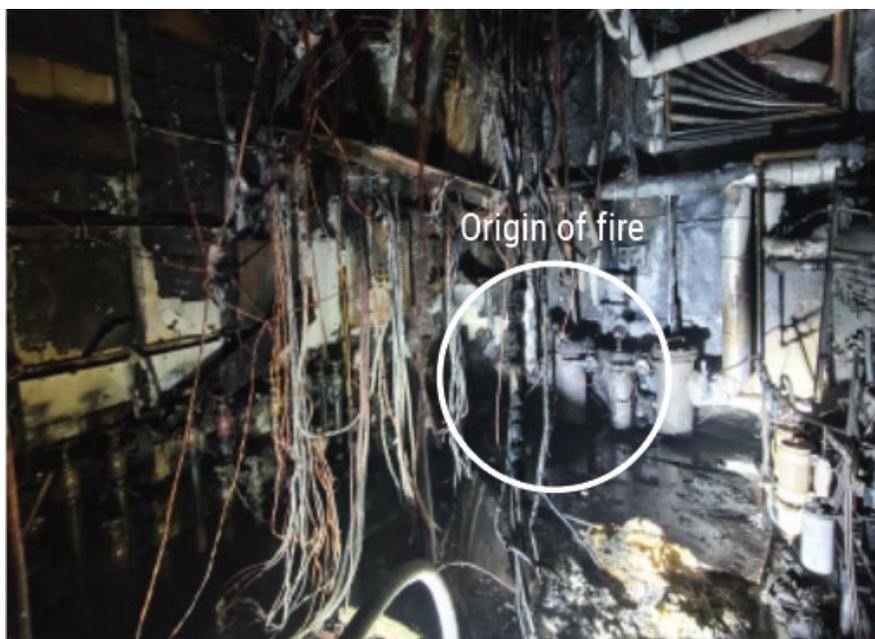


Figure 8. The generator space postfire, looking forward, showing the location on the forward bulkhead identified by the ATF as the fire's origin. (Background source: New Orleans Steamboat Company)

1.3.2 Hot Work and Fire Safety Regulations

Occupational Safety and Health Administration (OSHA) standards are contained in *29 Code of Federal Regulations (CFR) Part 1910*. According to *29 CFR 1910.252*, which contains general requirements for welding, cutting, and brazing, "Where practicable, all combustibles shall be relocated at least 35 feet (10.7 m) from the work site. Where relocation is impracticable, combustibles shall be protected with flameproofed covers or otherwise shielded with metal or asbestos guards or curtains." OSHA standards specifically for shipyard employment are contained in *29 CFR Part 1915*. The regulation for fire safety plans, *29 CFR 1915.502*, requires that a written fire safety plan be developed and implemented that covers all the actions that employers and employees must take to ensure employee safety in the event of a fire. Fire safety plans must include identification of significant fire hazards. OSHA standards for shipyard employment require that fire watches remain in the hot work area for at least 30 minutes after completion of the hot work unless the employer or its representative surveys the exposed area and makes a determination that there is no further fire hazard.

The chief engineer of the *Natchez* told investigators that while he was on board the vessel on the day of the fire, he witnessed the hot work in the generator space. He said he had the hot work contractor personnel and *Natchez* crewmembers place a piece of sheet metal on the side of the port generator. The port generator was located about 3 feet from the hot work area, and the chief engineer was concerned

that sparks from the cutting would hit it. Although the chief engineer was aware of the combustible material near the hot work, he did not raise any concerns or have them moved from the generator space.

The vessel owner's director of operations informed investigators that the company always relied on the contractor conducting hot work on their vessels to have a hot work policy in place and enforce it. Investigators found that the hot work contractor had no written safety policy or procedure in place for the employees to review and follow when preparing for and conducting hot work on board a vessel. All directions regarding the safety preparation of the area for hot work were passed verbally to the employees by the project superintendent. The project superintendent told investigators that he evaluated the generator space before the hot work and determined that it was safe based on his 40 years of work experience conducting hot work. In addition, the project superintendent, the employee conducting the hot work, and the employee who served as the fire watch told investigators that they were unaware of the OSHA regulations concerning the risk of having combustible material near hot work.

2. Analysis

Hot work to remove the electrical panel in the generator space, within the engine room, was completed at 1545. The diesel engine technician, working in a different area of the space, was the last to leave when he stopped working in the generator space about 1800. He did not notice any sign of a fire or smoke before departing the area, and neither he nor the deckhand on vessel security watch noticed any indication of a fire when the technician departed the vessel about 1830. The first indication that there was a fire was about 1 hour and 15 minutes later, at 1945, when the deckhand saw smoke, went to investigate, and saw the fire within the engine room.

During the examination of the generator space following the fire, ATF fire investigators noted a distinctive V-shaped fire pattern on the forward bulkhead of the generator space, which indicated that this was most likely where the fire started. Based on the photos provided to investigators, combustible materials (cardboard boxes) were stored in the ignition area (forward storage area in the generator room), which was located about 2 feet from where the hot work occurred. Although the electrical panel removal work had stopped about 1545, a smoldering hot spot had most likely formed within the boxes from the sparks generated from the acetylene torch cutting the metal electrical panel. Between 1545 and when the fire was discovered at 1945, the hot spot expanded and eventually ignited. The combustible materials provided ample fuel for the fire as it expanded within the generator space.

At the time of the casualty, the *Natchez* had been undergoing an extensive overhaul of its boilers, generators, and passenger spaces for about 16 months, since January 2021. This work required the employment and coordination of several contractors to accomplish the various tasks. The *Natchez* owner/operator, who had crew working on the vessel during the day and a security watch in the evening, did not maintain a safety plan for the work being conducted on the vessel but instead relied on the contractors to have and follow their own safety plans. However, the company that was conducting the hot work in the generator space did not have a fire safety plan for the work on board the *Natchez*.

Mandated by OSHA regulations, fire safety plans are required to identify significant fire hazards. Having a fire safety plan in place and following the plan as instructed reduces risk of fire from hot work—protecting both the space and the people conducting the work. Although the contract workers conducted a safety evaluation of the generator space before initiating the hot work and had a dedicated fire watch, and the vessel's chief engineer directed the placement of a piece of sheet metal on the side of the port generator located about 3 feet from the hot work area, neither the contractors nor the *Natchez* crewmembers identified the fire risk from the combustible material within the generator space about the same distance from the hot work as the generator. According to OSHA regulations, all combustible material closer than 35 feet to the hot work in either the horizontal or vertical direction that cannot be removed had to be protected with flameproofed covers or otherwise shielded with metal or asbestos guards or curtains. This was not performed over two known areas of combustibles.

3. Conclusions

3.1 Probable Cause

The National Transportation Safety Board determines that the probable cause of the fire on board the passenger vessel *Natchez* was the failure of contractor and vessel personnel to identify and then either remove or adequately protect combustible material near hot work.

3.2 Lessons Learned

Combustible Materials and Smoldering Fires

The NTSB has investigated multiple fires following the completion of hot work within a space that were determined to be caused by a smoldering fire. A smoldering fire is formed when combustible material ignites, but the combustion proceeds slowly and steadily on the material's surface with little heat and no smoke or flame. A smoldering fire is not easily detected, and depending upon its surroundings, it can last for hours after the initial ignition and can quickly grow into a flaming fire with no warning.

A smoldering fire can long outlast the time a fire watch observes an area following hot work. Therefore, it is critical to evaluate work areas for fire hazards and ensure that combustibles are relocated or protected with flameproofed covers/curtains or otherwise shielded with sheet metal. In addition, crewmembers involved in hot work should be trained to identify hazards such as combustibles and to take action to remove or protect them from hot work.

Vessel	<i>Natchez</i>
Type	Passenger
Owner/Operator (type)	New Orleans Steamboat Company (Commercial)
Flag	United States
Port of registry	New Orleans, Louisiana
Year built	1975
Official number (US)	563612
IMO number	N/A
Classification society	N/A
Length (overall)	236.0 ft (71.9 m)
Beam	46.0 ft (14.0 m)
Draft (casualty)	7.9 ft (2.4 m)
Tonnage	1,384 GRT
Engine power; manufacturer	2 x 200 psi fire tube boilers and 2 x 1,600 hp (1,193 kW); steam piston reciprocating engines

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

The National Transportation Safety Board (NTSB) is an independent federal agency dedicated to promoting aviation, railroad, highway, marine, and pipeline safety. Established in 1967, the agency is mandated by Congress through the Independent Safety Board Act of 1974, to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident 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 investigating accidents and incidents 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)).

For more detailed background information on this report, visit the NTSB investigations website and search for NTSB accident ID DCA22FM017. Recent publications are available in their entirety on the NTSB website. Other information about available publications also may be obtained from the website or by contacting—

National Transportation Safety Board
 Records Management Division, CIO-40
 490 L'Enfant Plaza, SW
 Washington, DC 20594
 (800) 877-6799 or (202) 314-6551