National Transportation Safety Board

Marine Accident Brief

Capsizing and Sinking of Fishing Vessel *Langley Douglas*

Accident no.	DCA17FM027
Vessel name	*Langley Douglas*
Accident type	Capsizing
Location	60 miles[1] east of Cape Charles, Virginia, 37°12.22' N, 074°31.41' W
Date	September 11, 2017
Time	1117 eastern daylight time (coordinated universal time – 4 hours)
Injuries	None
Damage	Loss of vessel, $1.95 million est.
Environmental damage	No pollution reported; 6,000 gallons of diesel fuel and 700 gallons of hydraulic and lube oil on board; some floating debris noted near the site of the sinking
Weather	Clear, visibility 8 miles, winds northeast at 20 mph, 6–8-foot seas, air temperature 73°F, water temperature 70°F
Waterway information	Atlantic Ocean along the edge of the continental shelf just north of the Norfolk Canyon, depth 850–900 feet.

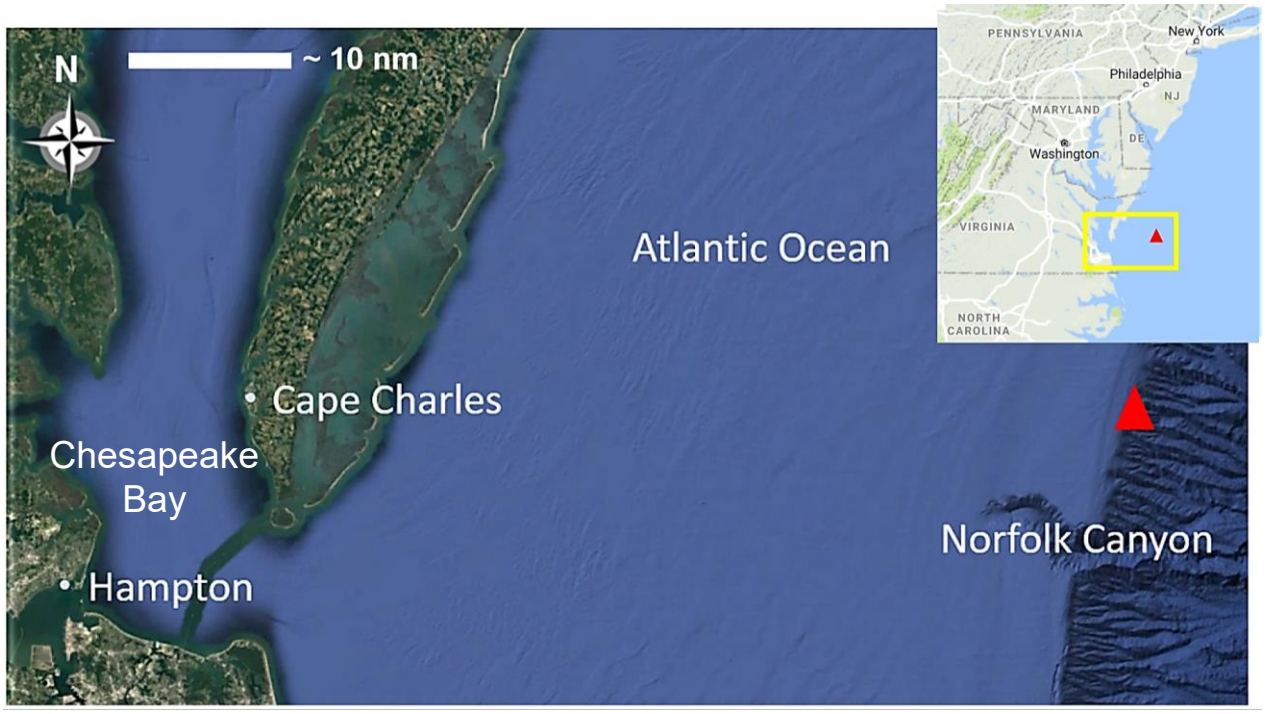
On the morning of September 11, 2017, the commercial fishing vessel *Langley Douglas* developed a port list, capsized, and subsequently sank 60 miles east of Cape Charles, Virginia. A US Coast Guard helicopter rescued the five people on board. No injuries or pollution were reported. The *Langley Douglas* was valued at $1.95 million.

Langley Douglas **at a repair facility in Newport News, Virginia, before the accident. (Photo by crewmember)**

[1] All miles in this report are nautical miles (1.15 statute miles).

Background

The *Langley Douglas*, a 79-foot-long, 143-gross ton, welded-steel trawler, was built in 1979 by Quality Marine, Inc. in Bayou La Batre, Alabama.[2] The vessel was originally named the *Angela Joy* and later the *Vaud J*. The owner and operating company, A & D Fisheries LLC, purchased the vessel in May 2012 and outfitted it for squid fishing. The captain had 31 years of experience in the fishing industry, 5 years on the vessel and, for the last 10 years, served as captain on several trawlers of similar size along the US East Coast. He was credentialed as master of 100-gross-ton vessels.



Satellite image of the site of the sinking, 60 nautical miles east of Cape Charles, Virginia. (Background by Google Earth)

Accident Events

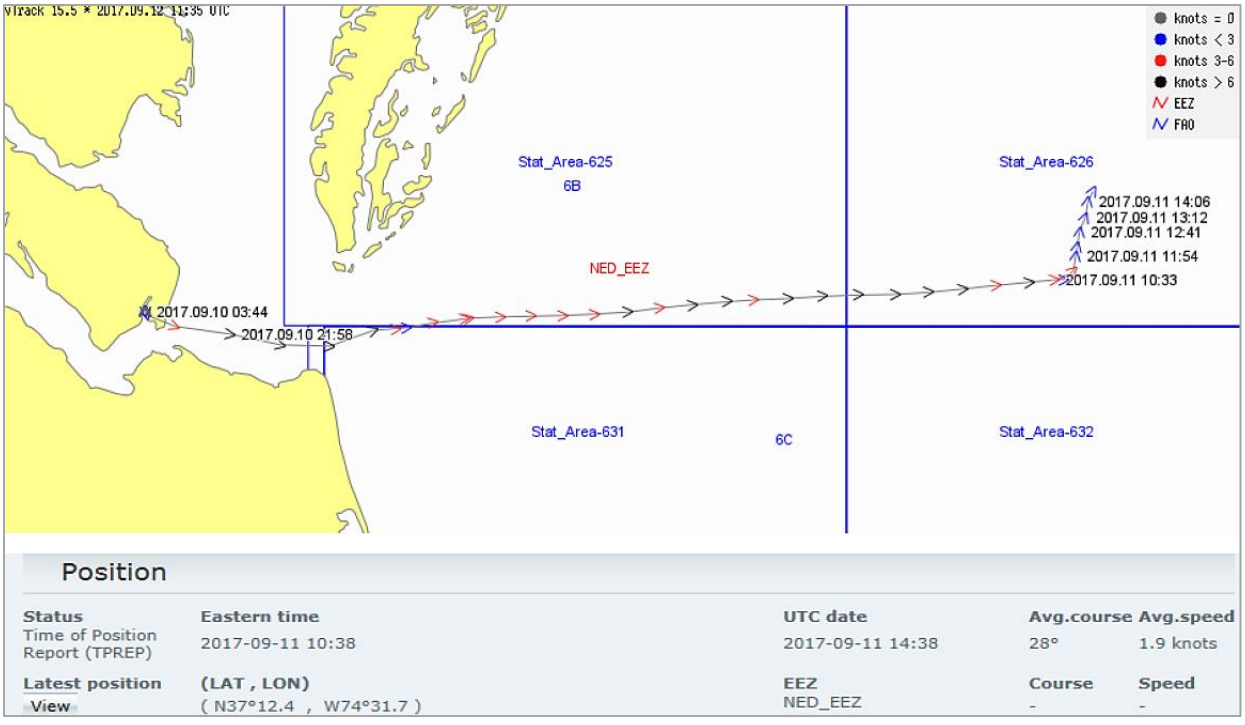
On the afternoon on September 10, the day before the sinking, the *Langley Douglas* departed the Amory's Seafood Market pier in downtown Hampton, Virginia, with five people on board (the captain, a first mate, two deckhands, and a National Oceanic Atmospheric Administration [NOAA] observer) to fish for northern shortfin Illex squid. The crew had planned a 4-day trip with a scheduled return to the Amory pier to offload the catch.

The transit to the fishing grounds took about 17 hours. After exiting the Chesapeake Bay and heading into the Atlantic Ocean, the crew extended the trawler's outriggers and lowered the port and starboard paravanes into the water. Paravanes, sometimes nicknamed "fish" or "birds," are designed to ease the rolling motion of vessels by creating a constant downward force. Also during the outbound voyage, the senior deckhand filled the fish holds with seawater to about waist depth, using an external pump.

[2] *Trawling* is a fishing practice that herds and captures the target species by towing a net through the water.

***Langley Douglas* with its outriggers extended and paravanes stowed at the end of the outriggers. (Photo courtesy of Steven Collingwood)**

The crew rotated watch every 3 hours. At 2100, the captain went to bed and the deckhand began the 2100–midnight shift. The senior deckhand took the next watch, followed by the first mate and then the captain. The following morning, at 0725, the captain altered the vessel's course to about 030 true and reduced the vessel's speed to 3 knots to prepare for trawling. The first mate stayed in the wheelhouse while the captain and crew set the trawl net. For about the next hour and 45 minutes, the vessel towed the net with both paravanes in the water.



The *Langley Douglas* trackline and heading on the day of the sinking. (Screenshot courtesy of NOAA Fisheries Atlantic Region Vessel Monitoring System)

At 0910, the captain ordered the crew to haul in the net and prepare the main deck and hog pen area.[3] The crew also placed scupper plates in front of the port and starboard freeing ports to prevent catch from going overboard.[4] The captain told investigators that he remembered seeing the cod-end sensor flashing, indicating that catch was present in the net.[5] As the net approached the stern, the crew noticed a 25-foot-long basking shark stuck in the cod end. The first mate stated that he knew the catch was large and heavy because the hydraulic winches were "a bit under pressure," but the crewmembers brought the entire catch on board and emptied the net into the centerline hog pen. They estimated that the total catch weighed about 35,000 pounds (the shark about 10,000 pounds).

***Langley Douglas*' main deck during a previous voyage, with about 18,000–20,000 pounds of squid in the hog pen. (Photo by crewmember)**

[3] The catch-processing area on the centerline main deck (about 3 feet high, 26 feet long, and 10 feet wide) is referred to as a *hog pen*. It is constructed with lumber boards (which the crew called checkerboards). The hog pen holds the catch for distribution to the fish holds. The boards are individually removed to funnel fish to adjacent fish holds via hatch openings on deck.

[4] *Freeing ports* are openings on the lower part of the bulwarks of a vessel that allow water on deck to drain overboard. *Scupper plates* block the freeing ports to keep catch from spilling overboard; the plates aboard the *Langley Douglas* allowed some water to escape through the freeing ports.

[5] The *cod end* is the narrow end of a tapered trawl net. As fish pass through the cone-shaped opening, the net narrows to the cod end. The cod-end sensor is a catch-monitoring device that measures the expansion of the mesh netting at the cod end. As the volume of the catch increases, the mesh netting expands, triggering the cod end sensor to flash to alert the crew.

The crew planned to remove the shark from the vessel using the centerline boom (the NOAA observer said the shark had likely died in the net). However, after the crew discharged the shark and squid into the hog pen, the squid started to overflow the pen and spill out onto the port side of the deck, and the vessel immediately developed a port list. In addition, the vessel was beam to the 6–8-foot seas and taking waves over its port quarter, which the crew said further increased the list. Normally, the crew would open fish hatches on both the port and starboard side to distribute the squid evenly into the fish holds, but to try to counter the port list, the captain ordered the crew to open the hatches to the two forward starboard fish holds and commence sweeping (with brooms) the squid from the pen into those holds. The senior deckhand and the deckhand started to carry out the captain's order, but the vessel continued to take seas over its port quarter, heeling the vessel further to port with each passing wave.

The crew saw that the totes, bins, boards, and gear on the back deck also began to shift to port. The vessel now listed about 10–20 degrees and the port quarter of the vessel was submerged as waves continued to break over the bulwark. The crew reported that the near-20-degree port list caused the body of the shark to shift to the port side of the hog pen and about 2,500 pounds of squid to slide toward the stern and collect against the aft portside bulwark, blocking the freeing ports and preventing release of trapped seawater on deck.

The captain raised the vessel's portside paravane out of the water, altered course to port, and gave full throttle to try to counter the list, to no avail. The captain then instructed the crew to come up from the main deck as he proceeded to grab immersion suits that were stored in the wheelhouse. He instructed the crew to don their suits; however, the rough seas and continuously increasing port list made it difficult for the crew to don the suits on board. The first mate went forward to manually launch the liferaft located on the bow.

As the *Langley Douglas* continued taking seas over the port side, the shark rolled out of the hog pen and slid toward the portside bulwark. Eventually, the vessel listed 45–60 degrees and then rolled completely onto its port side (80–90 degrees by the captain's account). Seawater entered the vessel through downflooding points on deck and in the wheelhouse, resulting in loss of electrical power. Shortly thereafter, the vessel began to sink by its stern. At 1117, the vessel's emergency position-indicating radio beacon (EPIRB) activated and alerted NOAA's Mission Control Center and the Coast Guard's Rescue Coordination Center at District 5, in Portsmouth, Virginia. The Coast Guard launched an MH-60 Jayhawk helicopter from Elizabeth City, North Carolina.

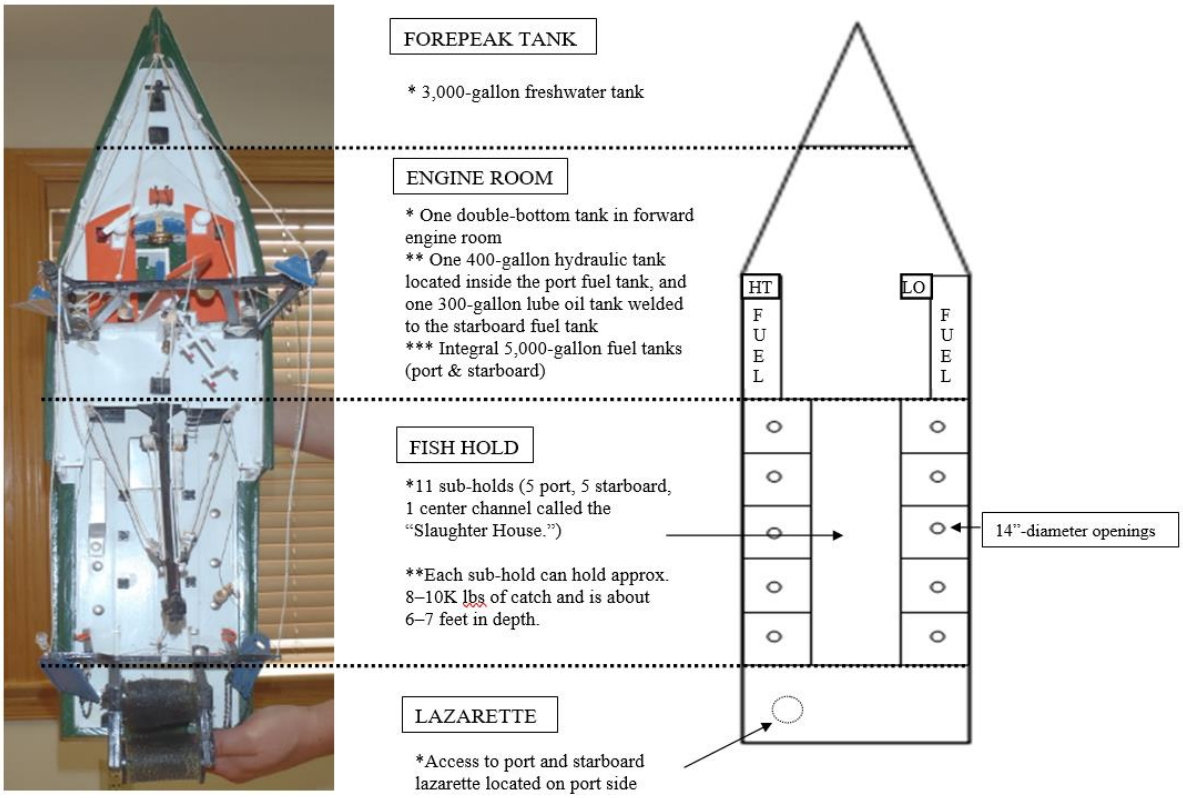
The five people on board the *Langley Douglas* entered the 70-degree water while holding on to their immersion suits. The captain grabbed the sea anchor of the deployed liferaft. The NOAA observer and the senior deckhand swam away from the sinking vessel off its port quarter. When safely away from the vessel, they donned their immersion suits in the water and then grabbed hold of a floating cooler that had previously been located on deck. Meanwhile, the feet of the deckhand's immersion suit had become tangled in the raised portside outrigger while he was trying to don the suit in the water. The first mate assisted the deckhand, freeing him from the tangled immersion suit. The first mate and the deckhand then swam toward the liferaft, where the captain and the first mate assisted the deckhand into the liferaft. The captain then tried to swim with the liferaft, holding on to the sea-anchor line, toward the NOAA observer and the senior deckhand who were floating on the cooler. However, the sea-anchor line parted and the captain then swam toward them and joined them on the cooler. Simultaneously, the first mate had entered the liferaft.

The bow of the *Langley Douglas* remained above water for about 20 minutes before disappearing from view. Shortly thereafter, the NOAA observer and the captain spotted the EPIRB floating on the surface; the first mate eventually picked it up. During the next hour, the two groups tried to paddle and swim toward each other in the rough seas but were unsuccessful; they were about 30 yards apart when the Coast Guard helicopter arrived on scene. A rescue swimmer entered the water and swam toward the three crewmembers on the cooler. He maneuvered them toward the liferaft as they clung to the cooler. All three entered the liferaft and rejoined the first mate and the deckhand.

By 1246, the helicopter crew had hoisted all five persons to safety and then flew them to Elizabeth City. Postaccident toxicological testing was completed in accordance with regulations. All alcohol results were negative. The senior deckhand and the deckhand tested positive for marijuana; all other drug-testing results were negative.

Other Information

Investigators interviewed the crewmembers to understand the approximate weights on board and the prevailing conditions before the *Langley Douglas* sank. The captain stated that the waves were 6–8 feet with a wave period of 8–10 seconds, winds were 10–15 knots from 030 degrees true, with max winds at 30 knots. He also said that 6,000 gallons of fuel (3,000 gallons in each port and starboard saddle tank), 250–300 gallons of lube oil (83–100-percent capacity), 3,000 gallons of freshwater (100-percent capacity), and 1,900–2,400 gallons of seawater and ice in the fish holds (depth of about 2.5–3 feet) were on board. The estimated weight of the catch on deck was 25,000–35,000 pounds (squid and the basking shark). The aft centerline boom was centered and secured. The cod end of the trawl net was empty and on the spool.



Simplified top-view diagram of below-deck compartments on the *Langley Douglas*. (Image provided by the Coast Guard)

Investigators determined that the vessel had at least five downflooding points on the main deck: one 36-inch access to the fish hold; two 36-inch deck vents on the stern; and the first and second cargo hold hatches on the starboard side, which the crew opened in an attempt to move cargo (squid) into those holds to correct the port list.

The last condition and valuation survey of the *Langley Douglas* was conducted on May 15, 2013. The most recent Coast Guard dockside safety examination took place about a week before the accident, on September 6, 2017, when inspectors from Sector Hampton Roads issued a valid fishing vessel decal and marked the vessel as "excellent." Safety examinations of commercial fishing vessels primarily address lifesaving equipment and do not include hull or other machinery assessments that are required for Coast Guard-inspected vessels.

Analysis

The *Langley Douglas* was not salvaged; therefore, a postaccident vessel examination could not be conducted to determine the cause or primary location of the flooding. However, investigators interviewed the crew and reviewed the sequence of events and maintenance performed on board the vessel to determine any relevance to the accident. The crewmembers said they knew of no prior damage to the vessel.

Investigators provided vessel information, the loading condition, wind and weather conditions, and crew statements to the Coast Guard Marine Safety Center (MSC). The owners of the *Langley Douglas* were not required to conduct a stability test, and therefore the vessel's initial stability characteristics were not quantified. The MSC did, however, conduct a post-capsizing stability analysis and found the following (summarized):

1. Insufficient information was available to provide a quantitative evaluation of the vessel's intact condition or the casualty scenario, but a qualitative discussion was provided. Although unable to determine an estimated impact to the righting energy of the vessel, it was evident that the combination of the external forces and the shifting internal cargo reduced vessel stability. Crew statements appear to align with this assessment as the vessel rolled heavily, causing the cargo shift, and then the vessel remained heeled to port, ultimately sinking by the stern.

2. When the vessel rolled past 20 degrees to port per witness statements, the squid and shark spilled onto the deck. This weight shifting to the port side would have increased the vessel's roll. The crew indicated that the main cargo hold was about half full of water, and the two fuel tanks were each about three-quarters full, while other small tanks were nearly full. In this case, when the vessel rolled to port, the liquid in the partially filled tanks would have displaced to the low side of the tank and moved the center of gravity of the liquid in the same direction as the roll. Collectively, weight of the cargo on deck and liquid in the tanks shifted and settled to the port side. The vessel was trimmed slightly by the stern; therefore, any water trapped on deck would flow toward and settle at the stern, as would any liquid in the vessel's tanks.

3. It was not possible to determine the relative impact of these forces on the vessel, but for a vessel of this size, the impact would have been dramatic and greatly reduced the righting energy of the vessel. If left in this condition without further wind or wave action, it is possible that the vessel would have righted itself or reached some angle of static heel and trim. However, at the time, wind and wave action continued to act on the vessel.

4. The crew indicated that the deck freeing ports were blocked by squid, thus preventing water or cargo runoff back to the sea. Without knowing the amplitude and period of the vessel's rolls, it is not possible to fairly evaluate if the freeing ports—if not blocked by squid—could have allowed sufficient water runoff to prevent the sinking. Therefore, it could not be determined how the blocked freeing ports contributed to the sinking. However, entrapment of water on deck would have had a negative effect on stability.

5. As the vessel listed more dramatically, water likely began to downflood into the hull through non-watertight fittings and openings, further compounding the weight shifting aft and to the port side of the vessel.

6. The captain stated that he raised the portside paravane out of the water in an effort to counteract the list of the vessel; however, it is unlikely that doing so had any noticeable impact on vessel stability. Paravanes rely on a combination of forward speed, surface area, rolling, and length of the boom to resist or dampen rolling. If the vessel is actively rolling to port, the starboard paravane will resist the roll. The paravanes are generally tuned to minimize resistance and therefore are lightly loaded (and impart minimal moment on the vessel) if the vessel is not rolling. The benefit of lifting the paravane would be that rolls to starboard had less resistance. Also, elevating the port paravane likely did not significantly degrade stability.

The captain and crew knew that the catch was very large. They still chose to empty the entire catch on board, which exceeded the capacity of the hog pen, overflowed the pen, and caused a large weight-shift to port. Although the general intent of fishing operations is to catch as much as possible, crews should consider the impact on vessel stability of bringing large loads on board. Additionally, the NTSB has previously encouraged owners and operators of fishing vessels to consult qualified professionals to determine vessels' overall range of stability and suitability for the intended service, and for senior crewmembers to have general awareness of the principles of stability.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the capsizing and sinking of fishing vessel *Langley Douglas* was the captain's decision to unload a large catch that overflowed the pen and spilled out on deck, which—coupled with trapped water on deck due to blocked freeing ports and shifting of liquids in partially filled tanks—caused the vessel to roll to port and downflood.

Precautions when Unloading Catch

Fishing vessel operators are reminded to avoid unloading large catches that exceed the pen height and can result in spillover and cargo on deck. Catch sliding around on deck has an adverse effect on vessel stability. Additionally, freeing ports (scuppers) in the bulwarks should be kept clear for rapid draining of water on deck. A deck filled with water creates an undesirable free-surface effect, and the weight of the additional water also increases the height of the vessel's center of gravity and decreases its freeboard, consequently reducing overall stability.

Vessel Particulars

Vessel	*Langley Douglas*
Owner/operator	A & D Fisheries, LLC
Port of registry	Scituate, Massachusetts
Flag	United States
Type	Fishing vessel
Year built	1979
Official number (US)	606719
IMO number	7944413
Classification society	N/A
Construction	Steel
Length	79.9 ft (18.2 m)
Draft	12.9 ft (1.45 m)
Beam/width	24.5 ft (6.1 m)
Gross or ITC tonnage	143 gross tons
Engine power, manufacturer	1,000 hp (380 kW) Detroit 12-149 marine diesel engine
Persons on board	5

NTSB investigators worked closely with our counterparts from Coast Guard Sector Hampton Roads throughout this investigation.

For more details about this accident, visit www.ntsb.gov and search for NTSB accident ID DCA17FM027.

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