



# Aviation Investigation Final Report

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<b>Location:</b>	Fort Lauderdale, Florida	<b>Accident Number:</b>	ERA19FA060
<b>Date &amp; Time:</b>	December 1, 2018, 13:27 Local	<b>Registration:</b>	N79HP
<b>Aircraft:</b>	Cessna 335	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Loss of engine power (partial)	<b>Injuries:</b>	2 Fatal, 1 Minor
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

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## Analysis

The pilot and pilot-rated passenger were planning to conduct a repositioning flight. Shortly after takeoff, a video depicted white smoke trailing the airplane from the left engine. Subsequently the flight advised the tower controller that there was a fire in the left engine and the airplane was observed turning to the left to return to the airport. While maintaining controlled flight with the landing gear retracted and the left propeller in an unfeathered position, the airplane clipped the roof of a building adjacent to the airport, impacted the ground about 67 knots ground speed, and came to rest after impacting another building. A postimpact fire ensued. At ground impact, the left and right propellers were rotating about 900 rpm and 2,700 rpm, respectively. Postaccident examination of the left engine revealed detonation damage to several pistons, and the rod-oil gauge and cap assembly was not attached to the engine. Examination of the oil filler breather assembly revealed contact marks consistent with the rod-oil gauge and cap assembly coming out. There was no evidence of preimpact failure or malfunction of the right engine, propeller, or propeller governor.

Although the flight reported a fire in the left engine compartment to air traffic control, and the video showed trailing smoke, it is likely the left engine's damaged pistons allowed the crankcase to become pressurized and the missing rod-oil gauge and cap assembly allowed oil to exit the engine and contact either the exhaust or turbocharger exhaust duct, resulting in the smoke.

Although the left propeller and propeller governor were heat damaged, there was no evidence of preimpact failure or malfunction of either that would have precluded feathering of the propeller blades. The pilot's failure to feather the left propeller following the partial loss of left engine power resulted in a negative climb performance. Had the pilot feathered the left propeller following the partial loss of engine power, it is likely that a positive rate of climb could have been attained.

The airplane had been flown once in the last several years before the accident pilot purchased it several months before the accident. Maintenance records located within the wreckage at the accident site

revealed the airplane was deemed unairworthy during an annual inspection 6 months before the accident. The accident pilot then attempted to obtain a ferry permit for the airplane twice from the FAA; however, the FAA inspector did not approve the request due to maintenance discrepancies that were noted during his ramp inspection. After the second denial for a ferry permit, the pilot requested assistance from another maintenance facility. That facility initiated an inspection on the airplane; however, they stopped the inspection after over 100 discrepancies were noted, 9 of which were associated with the left engine. Acquaintances of the pilot stated that progress was made fixing the airplane over the next several months, although problems were still noted as recently as 3 weeks before the accident. The pilot reported that the costs of parking the airplane and his flights to and from where the airplane was located were mounting. On the morning of the accident, the pilot performed engine runs on the airplane and had borrowed some tools, although it could not be determined what maintenance, if any, he performed.

The pilot’s unsuccessful attempts to obtain a ferry permit, the most-recent list of discrepancies identified by a maintenance facility during their inspection, and the fact that the airplane did not pass its annual inspection clearly indicated the airplane was not airworthy. The pilot's desire to reposition the airplane due to mounting costs likely influenced his decision to fly the unairworthy airplane.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's improper decision to fly the unairworthy airplane and his failure to feather the left propeller following a partial loss of power from the left engine after takeoff. Also causal was the partial loss of power to the left engine due to detonation.

### Findings

<b>Personnel issues</b>	Decision making/judgment - Pilot
<b>Personnel issues</b>	Lack of action - Pilot
<b>Aircraft</b>	Propeller feather/reversing - Not used/operated
<b>Aircraft</b>	Recip eng cyl section - Damaged/degraded

## Factual Information

### History of Flight

<b>Initial climb</b>	Loss of engine power (partial) (Defining event)
<b>Initial climb</b>	Fire/smoke (non-impact)
<b>Maneuvering</b>	Off-field or emergency landing
<b>Emergency descent</b>	Collision with terr/obj (non-CFIT)
<b>Post-impact</b>	Fire/smoke (post-impact)
<b>Post-impact</b>	Explosion (post-impact)

On December 1, 2018, about 1327 eastern standard time, a Cessna 335, N79HP, was destroyed when it was involved in an accident in Fort Lauderdale, Florida. The pilot and pilot-rated passenger were fatally injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

According to recorded communications between the pilot and an air traffic control tower controller at Fort Lauderdale Executive Airport (FXE), Fort Lauderdale, Florida, before takeoff, the pilot was instructed to fly runway heading and was told the wind was from 150° at 18 knots, with gusts to 23 knots. The flight was cleared for takeoff from runway 9, and at 1325:17, the controller instructed the pilot to contact the Pompano Beach Airpark tower. The controller then asked the pilot if he was flying low along the shoreline. At 1325:26, Federal Aviation Administration (FAA) radar data indicated that the airplane was about 1.4 nautical miles (nm) east-northeast of the departure end of runway 9. About that time, an occupant of the airplane advised the FXE air traffic control tower, "ground we got a fire left engine turning right back." The controller stated "say again," and the same occupant advised there was a loss of engine power from the left engine and they were turning back. The controller cleared the flight to land on any runway, and the occupant read back the clearance. At 1325:49, the controller again advised the pilot that the flight was cleared to land on any runway and asked any assistance was required. The FAA radar data correlated with data from an on-board GPS receiver. The data showed that at 1325:50, the airplane was on a northerly heading flying slightly higher than 100 ft mean sea level (msl). At 1325:58, an occupant of the airplane made a radio transmission and stated, "sink rate on uh."

According to the GPS data, at 1326:13, the airplane was on a westerly heading about 1.4 nm northeast of the departure end of runway 9 at 301 ft msl and at a groundspeed of about 110 knots, with both the altitude and speed decreasing. The airplane continued briefly on the westerly heading then turned left and flew toward the approach end of runway 27 with altitude and groundspeed continuing to decrease. While descending, the airplane flew over a building, and at the last recorded position at 1327:03, the groundspeed was 67 knots.

An employee at FXE took a video of the airplane departing from the airport. According to the video, as the airplane flew past the departure end of the runway, white smoke was observed trailing from the left engine. The camera diverted away from the airplane and ended without capturing the accident sequence.

A witness who was located about 650 ft north-northeast of the accident site reported seeing the airplane flying in a nose-low attitude and descending. He reported hearing engine noise and did not hear any sputtering. He described the sound as takeoff (high) power. He did not see any fire in-flight. He could not tell if the landing gear was extended or retracted.

A security video recording near the accident site depicted the left side of the airplane as the airplane slid on the ground with the landing gear retracted. White colored mist was noted trailing the airplane. Further examination of the video revealed an access panel on the left upper engine cowling appeared to be open, and once the airplane impacted the building, a large fireball and intense postimpact fire were observed.

### Pilot Information

<b>Certificate:</b>	Commercial; Flight instructor	<b>Age:</b>	51, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Lap only
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane multi-engine; Airplane single-engine; Instrument airplane	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	January 22, 2018
<b>Occupational Pilot:</b>	UNK	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	(Estimated) 2000 hours (Total, all aircraft)		

### Pilot-rated passenger Information

<b>Certificate:</b>	Private	<b>Age:</b>	34, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Lap only
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	May 7, 2011
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	(Estimated) 30 hours (Total, all aircraft)		

On March 3, 2016, and again on March 30, 2016, the pilot received a Notice of Disapproval of Application for the flight portion of his airline transport pilot certificate checkride. The checkride was conducted in a Piper PA-23 airplane. According to the Designated Pilot Examiner (DPE), on the first checkride, the pilot failed to select, tune, identify, and monitor the operational status of ground navigation equipment used for precision approaches; on the second checkride, he failed to maintain the desired altitude during precision and non-precision approaches.

A friend of the pilot, who was also a flight instructor, flew with the pilot in a Cessna 310R airplane during a night flight about 8 to 9 months before the accident. The friend reported that during the flight, he twice simulated unannounced zero-thrust for one of the engines, and on both occasions the pilot misidentified the zero-thrust engine and applied incorrect rudder input. The friend attributed the incorrect action to with the pilot having a duty day greater than 17 hours and suggested the pilot get additional flight training before flying the accident airplane.

### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cessna	<b>Registration:</b>	N79HP
<b>Model/Series:</b>	335 No Series	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1980	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	335-0047
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	6
<b>Date/Type of Last Inspection:</b>	July 18, 2018 Annual	<b>Certified Max Gross Wt.:</b>	5990 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Reciprocating
<b>Airframe Total Time:</b>	4200.1 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Continental
<b>ELT:</b>		<b>Engine Model/Series:</b>	TSIO-520-EB
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	300 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

According to the airplane Type Certificate Data Sheet, the engine limits for all operations up to a critical altitude of 16,000 ft in standard atmosphere were 2,700 rpm, 300 horsepower, and 34.5 inches of mercury.

The airplane's previous owner reported that the airplane sat without being operated for several years at Palm Beach International Airport (PBI), West Palm Beach, Florida. It was then sold, and maintenance was performed to allow it to be flown to FXE. According to the pilot who flew the airplane during the

repositioning flight to FXE about 9 months before the accident, the readings for both engines were within about 20 to 25 rpm of the maximum static red-line rpm; however, just after rotation, the left engine rpm dropped to about 2,300, while the right engine rpm was still about 25 rpm below red line. While maintaining "shy" of blue line airspeed, the airplane was only climbing 100 ft per minute (fpm), which he described as "scary." He attributed the poor performance to the engines not producing full power, though both manifold pressure and engine temperature readings were normal. He continued the flight while climbing between 200 and 300 fpm and levelled off at 600 ft above ground level, which he maintained to FXE. He adjusted the right engine so the rpm matched the left, and the left engine began to operate better. After an uneventful no-flap landing at FXE, he informed the individual who was going to perform the repairs and the then-owner of the airplane not to fly it because it was unsafe.

The airplane was advertised on an internet auction website and sold to the accident pilot in early 2018. The auction listing indicated that although the early logbooks were lost, the airplane total time was 4,200 hours, and each engine had 1,046 hours since major overhaul. The listing also indicated that the times were substantiated by records and "Engines run strong with over 300 hours remain since overhaul. Aircraft needs annual. Clean inside except pilot seat is worn. Needs paint and you will have a sweet ride."

According to maintenance records found in the wreckage, an inspection consistent in scope with an annual inspection was performed on July 18, 2018. The entries for the left and right engines indicated all cylinders had a differential compression reading greater than 64 psi and 68 psi, respectively. For both engines, the fuel injectors were cleaned, and the mixture and idle rpm were adjusted. The entry for the left propeller indicated all systems were checked. The airframe maintenance record entry sign-off for the annual inspection specified that the airplane was not approved for return to service.

On July 31, 2018, the accident pilot/owner of the airplane called the South Florida FAA Flight Standards District Office to request a ferry permit for the airplane. A ferry flight permit was not issued, and on August 5, 2018, a ramp inspection of the airplane was performed by an FAA airworthiness inspector. Several discrepancies were noted during that inspection, which included, "Left engine mounts appear to be sagging." There were no discrepancies noted related to the left propeller. A condition notice (FAA Form 8620-1) was put on the airplane. A second request for a ferry permit was made on August 9, 2018, and the same inspector who performed the initial ramp inspection performed a follow-up inspection of the airplane on August 11. The inspector did not notice any apparent progress to correct the issues listed in the condition notice, and he did not issue a ferry permit.

The accident pilot/owner subsequently requested assistance from another maintenance facility on August 22, 2018. An inspection was initiated, but it was stopped after over 100 discrepancies were noted, 9 of which were associated with the left engine.

Several individuals were asked by the accident pilot/owner to either fly the airplane or accompany it on a repositioning flight to the northeast. The individuals made multiple trips to Fort Lauderdale, Florida, but in all instances the airplane was not ready for the intended flight. One individual did report that progress was being made on the airplane during each of his successive three visits, but during his last visit on November 3, 2018, while performing full power engine runs, a "huge oil leak" in the left engine compartment occurred, which was from a loose oil hose b-nut. He also thought the leak was near the propeller. Several other loose hoses in the engine compartment were also found. Other discrepancies included partial loss of power from the right engine during full power engine runs, which was not corrected by use of the low or high positions of the auxiliary fuel pump. A mechanic adjusted the fuel setting, and, during subsequent full power engine runs, the left turbocharger failed. It was

replaced by a mechanic about 1 week before the accident with a unit provided by the accident pilot, though the mechanic noted that the installed turbocharger appeared worse than the one that was removed. The individual subsequently told maintenance personnel the airplane was not ready and suggested the pilot have the engines removed and the airplane disassembled for transport. The accident pilot reportedly told one of the individuals that the costs of parking the airplane at FXE, and the roundtrip flights to and from Fort Lauderdale because the airplane was not ready as indicated, were mounting up.

The owner of the maintenance facility that last inspected the airplane reported that on the evening of November 30, 2018, the pilot asked one of his employees for a toolbox, which was provided. The owner of the maintenance facility and an employee of a fixed base operator (FBO) who knew the pilot personally both reported that the pilot was running the engine(s) on the ramp as early as 0300 on the morning of the accident. The employee of the FBO reported that during the engine runs, the left engine cowling was removed. He additionally reported that between each engine run he noticed that the accident pilot had several tools and "had his arms in the left engine compartment each time between the run-ups."

Later that same morning, the owner of the maintenance facility observed the airplane taxi out for engine runs with the upper cowling(s) removed, then return to the ramp sometime later. Airport surveillance video depicted a maintenance engine run beginning at 0923 and lasting until 0957. During that time, an occupant was noted outside the airplane near the left and right engines. It could not be determined by the video who was outside the airplane or what portion of the engines were being worked on.

The accident pilot informed the owner of the maintenance facility that the right engine was experiencing detonation. The owner questioned the pilot about what was occurring, and based on the pilot's response, he surmised the issue was the engine was running too rich. The owner advised the pilot to adjust the engine-driven fuel pump by turning the adjustment screw one time. Concerned about the airplane and the pilot wanting to fly it, the owner of the maintenance facility called a friend of his to speak with the pilot to advise him not to fly the airplane, but the pilot refused the advice.

Each main fuel tank was filled with 100 low-lead (100LL) fuel. Visual inspection of postaccident fuel samples taken from the fuel truck that fueled the airplane and from the fuel farm that provided fuel for the truck revealed the samples were blue in color consistent with 100LL and no contaminants were noted. Further testing of the sample of fuel from the fuel truck was not performed but according to the facility and the FAA, there were no reported fuel-related issues from airplanes fueled from the same source.

Examination of the maintenance records did not reflect the installation of the left turbocharger or the correction of the discrepancies from the annual inspection, the FAA ramp inspection or the maintenance facility's most recent airplane inspection.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	FLL,65 ft msl	<b>Distance from Accident Site:</b>	8 Nautical Miles
<b>Observation Time:</b>	12:53 Local	<b>Direction from Accident Site:</b>	177°
<b>Lowest Cloud Condition:</b>	Scattered / 3200 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Broken / 20000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	16 knots / None	<b>Turbulence Type Forecast/Actual:</b>	Unknown / Unknown
<b>Wind Direction:</b>	160°	<b>Turbulence Severity Forecast/Actual:</b>	Unknown / Unknown
<b>Altimeter Setting:</b>	29.97 inches Hg	<b>Temperature/Dew Point:</b>	27°C / 21°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Fort Lauderdale, FL (FXE )	<b>Type of Flight Plan Filed:</b>	VFR
<b>Destination:</b>	Hilliard, FL (01J )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	13:24 Local	<b>Type of Airspace:</b>	

## Airport Information

<b>Airport:</b>	Fort Lauderdale Executive Airp FXE	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	13 ft msl	<b>Runway Surface Condition:</b>	
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	1 Fatal	<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>	1 Minor	<b>Aircraft Explosion:</b>	On-ground
<b>Total Injuries:</b>	2 Fatal, 1 Minor	<b>Latitude, Longitude:</b>	26.203887,-80.158332

The accident site was located in an office park on the north side of the airport about 2,172 ft and 040° from the departure end of runway 09. The nose section, a portion of the cockpit, and both engines were located inside a building that had been occupied; while sections of both wings, the cabin, and empennage were immediately outside the building.



Examination of the building in which the airplane came to rest revealed structural damage to a portion of the concrete wall. The building also sustained impact and fire damage.

Examination of the surrounding area revealed slight damage to the roof of a nearby building, and ground scars beyond the impacted roof, and before the building where the airplane came to rest. The roof was 17 ft 6 inches above ground level, and a ground scar consistent with the outer portion of the left wing was located about 79 ft after the roof impact, indicative of about a 12° angle of descent. Additional ground scars from the fuselage and left and right propellers were oriented on a magnetic heading of about 190°. The airplane came to rest about 173 ft from the roof contact point, or about 94 ft from the contact made on the ground by the left wing.

Examination of the airplane revealed the cockpit, cabin, and sections of both wings were nearly consumed in the postaccident fire. The fuselage came to rest upright on a magnetic heading of 194°. All components necessary to sustain flight remained attached or were found near the main wreckage. Examination of the throttle quadrant revealed both propeller controls were full forward and the tabs in each propeller control slot were in place and appeared undamaged. Aileron, rudder, and elevator flight control continuity was confirmed from each flight control surface to the cockpit except where cut for recovery. All primary and secondary flight control surfaces were accounted for at the accident site and exhibited extensive heat damage. The rudder trim tab, elevator trim tab, and aileron trim tab actuators were extended 1.25 inches, 1.375 inches, and 1.75 inches respectively, which equated to out-of-range to the right, 5° tab trailing edge down (takeoff range), and neutral, respectively. All landing gear were retracted. The flap motor indicator reflected flaps retracted. Blue colored fuel was noted in the remaining section of the right auxiliary fuel tanks.

Examination of the left engine, which was separated from the engine nacelle and located inside the impacted building, revealed it was extensively fire damaged. The rod-oil gauge and cap assembly was not attached to the oil breather assembly and was not located. Oil staining was noted on the engine crankcase halves near the nose-seal, on the induction and exhaust pipes of the Nos. 2, 4, and 6 cylinders (left side of the engine), and on the left side of the lower cowling. The right side of the lower cowling was dry. All fire sleeving of the flexible lines in the aft area of the engine were thermally damaged leaving only the glass mat of the fire sleeve in place. No loose b-nuts were found on the remaining lines. The fuel injector lines were intact and undamaged, and no loose connections were found. The engine, propeller, and propeller governor were retained for further examination at the manufacturer's facility.

Further examination of the left engine at the manufacturer's facility revealed damage to the Nos. 2 and 3 pistons, with the No. 2 piston sustaining greater damage. During pressure testing of the lubrication system, several leaks were noted, including at the relief valve plug of the propeller governor. Components of the turbocharger system were retained for examination at Honeywell's facility (the original designer) and the Nos. 2 and 3 cylinder assemblies and oil filler breather assembly were retained for further examination by the NTSB Materials Laboratory. The oil filler breather assembly had a series of short sliding contact marks on top of in-service wear marks. With respect to the pistons, the damage was consistent with detonation.

The right engine was separated from the engine nacelle and was deep inside the impacted building. The propeller hub remained secured to the engine and one blade remained secured inside the propeller hub. Impact damage precluded rotation of the engine's crankshaft. Borescope inspection of each cylinder

revealed normal combustion signatures. Both magnetos produced spark during rotation. Components of the turbocharger system, propeller, and propeller governor were retained for further examination.

An examination of the turbocharger components from both engines was performed with FAA oversight. The examination revealed evidence that both turbochargers were rotating at impact, and there was no evidence of pre-existing conditions associated with the turbochargers or the corresponding controls that would have interfered with normal operation.

Examination of the left propeller which remained secured to the crankshaft flange revealed varying lengths of all three blades remained secured inside the hub. The right propeller hub was impact damaged. Examination of both propellers at the manufacturer's facility revealed no evidence of preimpact failure or malfunction of either propeller. Both start lock screws of the left propeller and one start lock screw of the right propeller were not damaged, while one start lock screw of the right propeller was missing along with the support plate. The missing support plate section and start latch screw of the right propeller aligned with the broken-out hub section of that propeller. Witness marks on both propeller hubs revealed the propeller blades of both propellers were at an approximate low pitch propeller blade angle at impact. A representative of the propeller manufacturer reported that intact start latch screws are consistent with a propeller having a blade angle greater than the start latch propeller blade angle of 17.3° during the impact sequence.

The left and right propeller governors were examined at the manufacturer's facility with FAA oversight. No discrepancies were noted with the right propeller governor. Because the control lever of the left governor was seized, operational testing of it was not possible. Pressure testing of the left propeller governor to 300 psi revealed no leakage at the pressure relief valve. Disassembly inspection of the left propeller governor revealed no evidence of preimpact failure or malfunction.

## **Medical and Pathological Information**

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Postmortem examination of the pilot was performed by the Broward County Medical Examiner's Office, Fort Lauderdale, Florida. The cause of death was listed as inhalation of products of combustion and thermal injuries.

Forensic toxicology on specimens of the pilot was performed by the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, and the Broward County Medical Examiner's Office. The report by FAA CAMI indicated that no cyanide, volatiles, or tested drugs were detected, while 14% carboxyhemoglobin was detected. The report by the Medical Examiner's Office indicated the same carboxyhemoglobin percent amount was detected, while the results were negative for acid/neutral drug screen, amphetamines/methamphetamines, basic drug screen, and volatiles in blood and vitreous.

## Tests and Research

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Ground scars made by the left and right propellers were documented and the distance between the first and second propeller slashes for the left and right propeller were 30.5 inches and 10 inches, respectively. Using the measured distances and the last reported groundspeed from the NTSB GPS and AHRS Device Report (67 knots), the calculated left and right propeller rpm at ground impact were about 900 and 2,700, respectively.

According to the Rate-Of-Climb – One Engine Inoperative Chart in the Pilot's Operating Handbook and FAA-approved Airplane Flight Manual, based on conditions present at the time of the accident, the single engine climb performance would have been about 360 fpm (with the inoperative engine's propeller feathered). A note on the chart instructed the reader to subtract 400 fpm for a windmilling propeller.

Although residual fuel was noted in the right auxiliary fuel tank, the amount could not be determined. Any amount of fuel in either auxiliary fuel tank beyond the usable amount would increase airplane weight at takeoff which in turn would decrease performance. The empty weight at manufacture was used because the historical maintenance records were not available.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Monville, Timothy
<b>Additional Participating Persons:</b>	Erik M Lee; FAA/FSDO; Miramar, FL Ricardo J Asensio; Textron Aviation; Wichita, KS Christopher Lang; Continental Motors, Inc.; Mobile, AL David Studtmann; Honeywell International; Phoenix, AZ Christy Eckerman; FAA/ACO; Wichita, KS Pete Kelley; FAA/FSDO; Scottsdale, AZ
<b>Original Publish Date:</b>	November 19, 2020
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 2</a>
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=98716">https://data.nts.gov/Docket?ProjectID=98716</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).