



# Aviation Investigation Final Report

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<b>Location:</b>	Marshville, North Carolina	<b>Accident Number:</b>	ERA16FA108
<b>Date &amp; Time:</b>	February 18, 2016, 19:10 Local	<b>Registration:</b>	N61WB
<b>Aircraft:</b>	Beech A36	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Fuel exhaustion	<b>Injuries:</b>	1 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation		

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## Analysis

The airline transport pilot departed on the instrument flight rules cross-country flight in night visual meteorological conditions with about 45 gallons of fuel, which, based on fuel burn rates, was sufficient for about 3 hours of flight. About 3 hours after departure and 50 miles from the destination airport, the pilot told air traffic control he was having engine problems and requested a vector to the nearest airport. A witness near the accident site heard the airplane descending and described the sound of an engine being re-started several times. The airplane came to rest in wooded terrain. Postaccident examination revealed the wing bladder tanks were intact, and no visible fuel was observed in either tank. When the wings were removed, a total of less than 2 quarts of fuel was drained from both the left and right fuel tanks. Examination of the airplane and engine revealed no pre-accident mechanical deficiencies that would have precluded normal operation. The pilot was aware that the left and right fuel tank bladders were bulging prior to the accident flight. The bulging fuel bladders may have resulted in erroneous fuel quantity readings during the flight. Given the absence of fuel in the airplane's fuel tanks and the length of flight that corresponded to the fuel available, the pilot likely departed without sufficient fuel to complete the flight to the intended destination and the loss of engine power was likely the result of fuel exhaustion.

The pilot was found deceased, slumped over in the left seat, still wearing his lap belt. Although the airplane was equipped with a single shoulder harness (across the left shoulder), it was not secured to the lap belt at the time of the accident. The pilot's failure to have properly secured the shoulder harness at the time of the accident likely contributed to the severity of his injuries. Examination of the pilot's seatbelt and shoulder harness assembly revealed that the seat belt shoulder harness attachment post elastic grommet was not installed, nor was it found in the wreckage. When manually assembled, the shoulder harness attachment buckle would not seat securely to the seatbelt attachment post.

## Probable Cause and Findings

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

The pilot's improper preflight fuel planning, which resulted in a total loss of engine power due to fuel exhaustion. Contributing to the severity of the pilot's injuries was his failure to have a properly secured shoulder harness at the time of the accident.

## Findings

<b>Personnel issues</b>	Fuel planning - Pilot
<b>Aircraft</b>	Fuel - Fluid level
<b>Aircraft</b>	(general) - Damaged/degraded
<b>Aircraft</b>	Flight compartment equipment - Incorrect use/operation

## Factual Information

### History of Flight

<b>Prior to flight</b>	Preflight or dispatch event
<b>Enroute</b>	Fuel exhaustion (Defining event)
<b>Emergency descent</b>	Off-field or emergency landing
<b>Emergency descent</b>	Collision with terr/obj (non-CFIT)

On February 18, 2016, about 1910 eastern standard time, a Beech A36, N61WB, made a forced landing after a total loss of engine power near Marshville, North Carolina. The airline transport rated pilot was fatally injured. The airplane was substantially damaged. The airplane was registered to and operated by Indigo Air LLC as a 14 *Code of Federal Regulations* Part 91 business flight. Night visual meteorological conditions existed near the accident site at the time of the accident, and the flight was operated on an instrument flight rules flight plan. The flight originated at Daytona Beach International Airport (DAB), Daytona Beach, Florida, about 1554, and was destined for Davidson County Airport (EXX), Lexington, North Carolina.

According to a representative of the operator, the pilot flew part-time for Indigo Air LLC. The flight originated earlier that day from EXX, where the airplane was based, and departed with full fuel (80 gallons total, 74 usable). The pilot flew to Piedmont-Triad International Airport (GSO), Greensboro, North Carolina, picked up the company's owner and a passenger, then flew direct to DAB. No fuel was purchased at GSO. At DAB, the pilot parked the airplane at a fixed-base operator (FBO). According to the owner, the pilot told him he was "going to put 15 [gallons of fuel] in a side." The owner went inside the FBO, paid for the fuel, and left because he "was in a rush." The lineman that fueled the airplane stated that the bladder tanks were "bulging" out of the fuel port on each tank. When the lineman, along with the FBO's safety director, pointed out the bulging tanks to the pilot, the pilot touched the bladder, then told the lineman it was okay to fuel. The FBO fueling records indicated that 30 gallons of 100LL fuel were purchased and distributed evenly between the two tanks. The flight then departed for EXX.

About 3 hours into the flight, while at a cruise altitude of 5,000 ft mean sea level, about 50 miles south of EXX, the pilot reported a loss of engine power to air traffic control and requested vectors to the nearest airport. The pilot subsequently made a forced landing about 10.5 miles east-northeast of Charlotte Executive Airport (EQY), Monroe, North Carolina. A witness, who was located about 3.5 miles east of the accident site, stated that he was in his shop when he heard the airplane. He said the engine was cutting in and out like it "ran out of gas." The witness went outside and saw the airplane in level flight about 1,000 to 1,500 ft above the ground. The airplane's landing light and navigation lights were turned on. He said the pilot tried to start the engine 4 or 5 times, but the engine would only start and run for a few seconds, then quit. On the last attempt, the engine started, and it sounded like the pilot pulled the throttle to idle. The witness watched as the airplane descended "in a gradual glide" before it disappeared from view.

## Pilot Information

<b>Certificate:</b>	Airline transport; Commercial	<b>Age:</b>	68, 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>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 With waivers/limitations	<b>Last FAA Medical Exam:</b>	October 13, 2015
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	17000 hours (Total, all aircraft)		

The pilot held an airline transport pilot certificate with a rating for airplane multiengine land, and a commercial pilot certificate with ratings for airplane single-engine land and instrument airplane. He also held numerous corporate jet type ratings. His last Federal Aviation Administration (FAA) second-class medical certificate was issued on October 13, 2015, with a restriction to wear corrective lenses. At that time, he reported a total of 17,000 flight hours. The pilot's logbooks were not located.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Beech	<b>Registration:</b>	N61WB
<b>Model/Series:</b>	A36 UNDESIGNAT	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1983	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	E-2110
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	May 15, 2015 Annual	<b>Certified Max Gross Wt.:</b>	3651 lbs
<b>Time Since Last Inspection:</b>	41 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	1884.28 Hrs at time of accident	<b>Engine Manufacturer:</b>	Continental Motors Inc
<b>ELT:</b>	C91 installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	IO-520-BB
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	285 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

The airplane was a single-engine, 6-seat, low-wing airplane, equipped with a Continental Motors Inc. IO-520-BB, 6-cylinder engine. The engine was equipped with a three-blade Hartzell constant-speed

propeller.

The most recent annual inspection was conducted on May 15, 2015, at a total tachometer time of 1,843.60 hours.

A review of the airplane's flight and refueling history revealed that the pilot landed in DAB with about 15 gallons of total of fuel. With the fuel added at DAB about 45 gallons was onboard at the time of departure. According to the airplane's Pilot Operating Handbook, the IO-520-BB engine burned about 15.2 gallons per hour, not including taxi, takeoff and climb.

### Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Night
<b>Observation Facility, Elevation:</b>	EQY,679 ft msl	<b>Distance from Accident Site:</b>	11 Nautical Miles
<b>Observation Time:</b>	18:53 Local	<b>Direction from Accident Site:</b>	247°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	5 knots /	<b>Turbulence Type Forecast/Actual:</b>	/ None
<b>Wind Direction:</b>	30°	<b>Turbulence Severity Forecast/Actual:</b>	/ N/A
<b>Altimeter Setting:</b>	30.43 inches Hg	<b>Temperature/Dew Point:</b>	9°C / -2°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Daytona Beach, FL (DAB )	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	Lexington, NC (EXX )	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	15:54 Local	<b>Type of Airspace:</b>	Unknown

The 1853 weather observation at Charlotte Executive Airport (EQY), Monroe, North Carolina, included clear skies, visibility 10 miles, and wind 030&deg; at 5 knots. The temperature was 9&deg;C, dewpoint -2&deg;C, and the altimeter setting was 30.43 inches of mercury.

### Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Fatal	<b>Latitude, Longitude:</b>	35.008609,-80.368614(est)

The airplane came to rest upright in wooded area behind a private residence on a heading of 180° magnetic. There was no postimpact fire. Examination of the wreckage revealed that the airplane initially collided with a stand of about 60-ft-tall trees in a left-wing-low attitude and traveled about 134 ft to where it came to rest in a nose low, slightly tail-high attitude. The landing gear and flaps were fully retracted. The firewall, leading edges of both wings, a propeller blade, and the leading edge of the right horizontal stabilizer were damaged. Pieces of the windscreen were dispersed just forward of the engine. The throttle, mixture, and propeller controls were all full forward.

Examination of the airplane's fuel system revealed the fuel selector handle was set to the right tank. A visual examination inside each fuel tank revealed there was a small amount of fuel in each bladder. When electrical power was applied to the airplane, the left and right fuel gauges each indicated about 1/8 full. The remaining fuel was then drained from each fuel tank; just under 1 quart of fuel was drained from each. The fuel was absent of debris and water. The bladder tanks were inspected, and no breaches were observed; however, neither bladder tank was properly seated and they were pushing up on their respective fuel sensor.

There was no fuel staining observed on the airplane. The main fuel line to the fuel pump was removed, and no fuel was found in the line. Air was blown back through the line into each fuel tank and no obstructions were noted. The fuel pump was removed and rotated and no fuel was observed in the pump. The top of the fuel manifold was disassembled, and a small amount of fuel was noted in the manifold chamber. About 2 ounces of 100LL fuel was drained from the airframe fuel filter and the fuel was absent of debris and water. The fuel strainer screen exhibited some light corrosion, but no debris was observed.

Flight control continuity was established for all flight control surfaces. Examination of the airframe revealed no anomalies that would have precluded normal operation.

The propeller remained attached to the engine crankshaft propeller flange. The crankshaft flange appeared to be undamaged and no ladder cracking was noted. Two of the three propeller blades were undamaged, and the third propeller blade was bent rearward about 90°.

The engine was removed from the airframe and an initial examination was performed. The top spark plugs were removed and inspected. When compared to a Champion Spark Plug "Check A Plug" chart, the spark plugs appeared to be "normal" with light coloration signatures. The engine was rotated manually via the propeller; thumb compression was verified for each cylinder and spark was produced to each spark plug ignition lead. A lighted borescope inspection on each cylinder revealed that all valves were intact and exhibited normal combustion signatures.

The engine was placed on a test stand for an operational check. The engine ran through all power settings with no abnormalities. There were no mechanical discrepancies that would have precluded normal operation before the accident.

A handheld Garmin 496 GPS unit was found in the wreckage; however, the accident flight was not captured.

## Medical and Pathological Information

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Examination of the pilot's lap belt and shoulder harness assembly revealed that it remained intact, but was found unbuckled with the shoulder harness not attached. The pilot's lap belt shoulder harness attachment post elastic grommet was not installed (or found in the wreckage), and, when manually assembled, the shoulder harness attachment buckle would not seat securely to the lap belt attachment post.

According to the death investigator's notes, the pilot was found deceased, slumped over in the left seat, still wearing his seatbelt. Although the airplane was equipped with a single shoulder harness (across the left shoulder), injuries sustained by the pilot were consistent with the pilot not being restrained by the shoulder harness at the time of the impact.

According to the autopsy performed by the Mecklenburg County Medical Examiner's Office, the cause of death was blunt force injuries due to airplane crash and the manner of death was accident. No significant natural disease was identified. The pilot's injuries included contusions and abrasions of the face, fractured teeth, contusions, abrasions, and fractures of the torso, disruption of the proximal descending aorta with massive left hemothorax.

At his last FAA medical, the pilot reported hypertension and high cholesterol and was being treated with doxazosin (also called Cardura) and simvastatin (also called Zocor), respectively. Toxicological analysis was conducted by the FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The tests were positive for doxazosin in blood and urine. Doxazosin is not considered to be an impairing medication.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Read, Leah
<b>Additional Participating Persons:</b>	Robert Reynolds; FAA/FSDO; Charlotte, NC Brian Weber; Textron Aviation; Wichita, KS Michael Council; Continental Motors Inc; Lucedale, MS
<b>Original Publish Date:</b>	January 9, 2018
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</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=92744">https://data.nts.gov/Docket?ProjectID=92744</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](#).