



Aviation Investigation Final Report

Location:	Tupelo, Mississippi	Accident Number:	ERA11FA458
Date & Time:	August 17, 2011, 08:05 Local	Registration:	N444YM
Aircraft:	Cessna 310Q	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (partial)	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane had just undergone an annual inspection, at which time the left engine's number two cylinder was replaced. In order to facilitate the cylinder replacement, the B-nut attaching the fuel supply hose to the engine's manifold valve was removed and reinstalled. A postmaintenance engine ground run was performed, and no discrepancies were noted.

The airplane was cleared to depart from runway 36 with an easterly departure. Witnesses observed the airplane roll down the runway, liftoff, and at an estimated altitude of 300 to 500 feet above the runway, about mid-field, witnesses observed the airplane turn to the left on a west heading and descend. Witnesses heard a loss of engine power just before the turn. The airplane impacted the adjacent main road, and all three of the landing gear separated. The airplane struck a vehicle and a tree before its nose section impacted the base of a 3-foot diameter tree in the front yard of a house and then came to a stop. Postaccident propeller examination revealed that both propellers were in a low pitch position; the right propeller impacted while operating at high power, and the left was operating with low power or was windmilling at time of impact.

The on-site wreckage examination found that the B-nut connecting the fuel supply hose to the manifold valve on top of the left engine had backed off about a quarter turn. The B-nut was tightened, and both engines were test run after the accident; no abnormalities that would have prevented normal operation were found. Both engines produced production-rated power. After completion of the left engine test run, the B-nut between the fuel supply hose and the manifold valve was set at finger-tight torque. A wire was attached to loosen the B-nut during the engine run, and a stop was in place to limit the rotation. The engine was started and set at full throttle

and the B-nut was loosened to slightly over a quarter turn. When the B-nut was loosened, the engine immediately lost power. It is likely that the B-nut had been tightened sufficiently to maintain torque during the ground run; however, the vibration of extended engine operation during takeoff led the B-nut to back off, resulting in the loss of power in the left engine.

From the position where the witnesses reported hearing the airplane lose engine power, about half the runway (or about 3,200 feet) remained. In addition, an open field was located past the departure end of that runway. However, the airplane turned left after the loss of engine power, which was contrary to the departure instructions and contrary to the safest option for an emergency landing (the remaining runway or the open field). Further, the propeller blades were in the low pitch position, indicating that the pilot didn't perform the engine failure checklist, which stated that the propeller should be feathered. Thus, it is likely that the pilot was delayed in his reaction to the sudden loss of thrust from the left engine and could not maintain airspeed or straight ahead flight.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's delayed reaction in performing the engine failure procedures and his failure to maintain adequate airspeed, which resulted in a loss of airplane control. Contributing to the accident was maintenance personnel's improper torquing of the B-nut between the fuel supply hose and the manifold valve.

Findings

Aircraft	Propeller feather/reversing - Not used/operated
Aircraft	Airspeed - Not attained/maintained
Personnel issues	Delayed action - Pilot
Aircraft	Fuel distribution - Incorrect service/maintenance
Personnel issues	Replacement - Maintenance personnel
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Initial climb	Loss of engine power (partial) (Defining event)
Emergency descent	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On August 17, 2011, at 0805 central daylight time, a Cessna, 310Q, N444YM, owned by Hamilton Air LLC and operated by an individual, impacted a main road and struck a tree in a residential area during the initial takeoff climb at the Tupelo Regional Airport (TUP), Tupelo, Mississippi. The pilot was fatally injured and the airplane sustained substantial damage. Visual meteorological conditions prevailed and no flight plan was filed for the personal local flight, which was conducted under the provisions of 14 Code of Federal Regulations Part 91.

The airplane just had undergone an annual inspection. The number two cylinder on the left engine was replaced as one of the maintenance items performed; due to low compression when checked. The airplane had a ground run up of both engines as part of the post-maintenance check before the airplane was returned to service. The pilot/owner requested to have the airplane serviced with 15 gallons of aviation fuel prior to departing on the first flight after the annual inspection.

Information provided by the local authorities indicated that the airplane was cleared to depart from runway 36 with an easterly departure. Witnesses observed the airplane roll down the runway and liftoff. Once the airplane reached an estimated altitude of 300 - 500 feet above the runway, about mid field, the airplane was observed to turn to the left on a west heading as it descended. There were disagreements among the witness statements; some heard the engines lose power and others heard the engines still operating at low power. The airplane flew, in a level attitude, under electrical power lines and over the airport's perimeter fence, impacting the adjacent main road separating all three of the landing gear. A vehicle on the road was struck with airplane debris as it was driving by. The airplane continued forward until the left wing outer section impacted a tree, separating a four foot section of the outer left wing. The airplane's nose section then impacted the base of a 3 foot diameter tree in the front yard of a house. There was no communication between the pilot and the controller after the clearance for takeoff was given and no distress calls were heard at the time of the accident.

PERSONNEL INFORMATION

The pilot, age 69, held a commercial pilot certificate with ratings for airplane single engine and multi-engine land, and instrument airplane. He was issued a second-class medical certificate on August 18, 2010, with limitation of must wear corrective lenses. He documented 2,740 total hours at that time. The pilot's flight logbook was not located after the accident and the date of his last biennial flight review could not be determined.

AIRCRAFT INFORMATION

The Cessna 310Q is a six place, all metal, low wing, multi-engine airplane, with retractable landing gear, serial number 310Q0958, was manufactured in 1974, and issued a standard airworthiness certificate, in the normal category. The airplane was powered by 2 Continental IO-470-VO, 260-horsepower engines equipped with McCauley model 3AF32C87-QR/S82NC-4, three bladed, variable-pitch, propellers. The airplane's last annual inspection was August 16, 2011 and the airplane had a total of 3,382.1 hours at that time. The left engine had a total time of 710 .8 hours since overhaul and the right engine had 652.2 total hours since overhaul.

AIRPORT INFORMATION

Runway 36 at TUP is an asphalt/grooved, 6502 foot long by 150 foot wide, at an elevation of 346 feet mean sea level . North of runway 36 is an unobstructed field within the airport's property.

METEOROLOGICAL INFORMATION

The closest official weather observation was at the Tupelo Regional Airport (TUP), Tupelo, Mississippi, adjacent to the accident site. The TUP 0753 automated weather observation was wind calm; visibility, 10 statute miles; sky clear; temperature 24 degrees Celsius (C); dew point 20 degrees C; altimeter 30.09 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

Examination of the crash site showed that initial contact with the road left impact marks consistent with propeller blade strikes and tire marks. The airplane came to rest on a heading of 290 degrees. The airplane's front nose section, cockpit, and cabin area were crushed aft to the middle seat row. The instrument panel was compressed aft to the aft wing spar. A four foot section of the outboard left wing, including the wing's fuel tip tank, separated and came to rest about 10 feet ahead, and to the left, of the main wreckage. The remaining left wing was displaced forward, which separated from its aft wing to fuselage attachment point. The left engine, with the propeller, remained attached to the left wing structure. The right wing remained attached to the fuselage and impact damage was observed. The right engine separated from its mounting points and remained attached by supply lines. The right propeller separated from the engine's crankshaft flange and was located about 40 feet ahead of the main wreckage; impacting the ground and an exterior house wall before coming to rest on the ground.

The fuselage, from the middle seat area, and empennage section remained intact with impact damage observed. All three landing gear separated from their respective attachment points and came to rest behind the main wreckage. All fuel cells, left and right main tanks (wing tips) and aux tanks (wings) were breached. All flight control surfaces were accounted for and located at the accident site. Flight control continuity was established, all damage observed was consistent with impact damage. The left and right fuel selector valves positions could not be determined due to impact damage. Evidence of aviation fuel was present at the accident site and several gallons were recovered during the wreckage recovery process.

Examination of the left engine showed the B-nut on the fuel supply hose to the fuel manifold valve on top of the engine was backed off about a quarter turn and the anti-tamper putty was broken.

MEDICAL AND PATHOLOGICAL INFORMATION

The Mississippi State Medical Examiner's Office, Jackson, Mississippi conducted a postmortem examination of the pilot. The cause of death was multiple blunt trauma.

The Federal Aviation Administration (FAA) Civil Aeromedical Institute (CAMI) conducted toxicology testing on specimens from the pilot. The tests were negative for carbon monoxide, cyanide, and ethanol. The testing was positive for Rosuvastatin in the urine.

TEST AND RESEARCH

A teardown examination on both propellers was performed at the manufacturer's facility with FAA oversight. The examination of the left propeller revealed there was no indication of failure prior to impact and the damage was consistent with impact damage. The propeller was rotating at impact at low power or windmilling in a low pitch position at impact. The examination of the right propeller revealed there was no indication of failure prior to impact and the damage was consistent with impact damage. The propeller was rotating at a high power level in a low pitch position at impact.

With Safety Board oversight the left and right engines were test run at the manufacturer's facility. The right and left engine run did not indicate any abnormalities that would have prevented normal operation and the engines did produce production rated power. After completion of the left engine test run, the manifold valve fuel supply hose B-nut was set at finger tight torque. A wire was attached to loosen the B-nut during the engine run. A stop was in place to limit the rotation. The engine was started and set at full throttle and the B-nut loosened to slightly over a quarter turn; this process was repeated several times. When the B-nut was loosened the engine immediately lost power and shut down; in some cases, the engine was heard backfiring before shutting down.

In an interview with the mechanic that performed the number two cylinder replacement prior to the accident flight, it was revealed that the fuel supply hose B-nut to the manifold valve was removed to facilitate the cylinder replacement. He stated that the B-nut was torqued at the time of reinstallation; however, he did not have any anti-tamper putty to mark the B-nut after the installation.

The airplane's Owner's Manual, Section III, Emergency Procedures, Engine Inoperative Procedure, provides instructions on managing an engine failure prior, during, and after takeoff.

Pilot Information

Certificate:	Commercial	Age:	69, Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 2 With waivers/limitations	Last FAA Medical Exam:	August 18, 2011
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	2740 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N444YM
Model/Series:	310Q	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	310Q0958
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	August 16, 2011 Annual	Certified Max Gross Wt.:	5300 lbs
Time Since Last Inspection:	3382 Hrs	Engines:	2 Reciprocating
Airframe Total Time:	3382 Hrs at time of accident	Engine Manufacturer:	CONT MOTOR
ELT:	C91A installed, activated, did not aid in locating accident	Engine Model/Series:	IO-470 SERIES
Registered Owner:	On file	Rated Power:	260 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	KTUP,346 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	07:53 Local	Direction from Accident Site:	270°
Lowest Cloud Condition:	Few / 10000 ft AGL	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	/	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.09 inches Hg	Temperature/Dew Point:	24°C / 20°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Tupelo, MS (TUP)	Type of Flight Plan Filed:	None
Destination:	Hamilton, AL (HAB)	Type of Clearance:	None
Departure Time:	08:04 Local	Type of Airspace:	

Airport Information

Airport:	Tupelo Regional Airport KTUP	Runway Surface Type:	
Airport Elevation:		Runway Surface Condition:	
Runway Used:		IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	34.268054,-88.771667

Administrative Information

Investigator In Charge (IIC):	Obregon, Jose
Additional Participating Persons:	Jacob Corbett; FAA/FSDO; Jackson, MS Chris Lang; Continental Motors, Inc; Mobile, AL Peter J Basile; Cessna Aircraft Company; Wichita, KS
Original Publish Date:	April 10, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=81516

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](#).