



National Transportation Safety Board Aviation Accident Final Report

Location:	Corona, CA	Accident Number:	LAX05FA041
Date & Time:	11/25/2004, 1434 PST	Registration:	N747JU
Aircraft:	Cessna 411	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The multiengine airplane impacted terrain shortly after departing from the airport. The airplane began the initial climb after liftoff and initially maintained a track along the extended runway centerline. Witnesses indicated that about 1 mile into the initial climb, the aircraft began to make erratic yawing maneuvers and the engines began to emit smoke. The airplane rolled to the left and dove toward the ground, erupting into fire upon impact. Prior to the accident, the pilot had reportedly been having mechanical problems with the fuel tank bladder installations and had attempted to install new ones. He was performing his own maintenance on the airplane in an attempt to rectify the problem. The day before the accident, the pilot told his hangar mate that he took the airplane on a test flight and experienced mechanical problems with an engine. Neither the nature of the engine problems nor the actions to resolve the discrepancies could be determined. On site examination of the thermally destroyed wreckage disclosed evidence consistent with the right engine producing significantly more power than the left engine at ground impact. The extent of the thermal destruction precluded any determination regarding the fuel selector positions, the positions for the boost pump switches, or the fuel tanks/lines.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine(s) power for undetermined reasons. Also causal was the pilot's failure to maintain the airplane's minimum controllable airspeed (V_{mc}) during the initial climb following a loss of power in one engine, which resulted in a loss of aircraft control and subsequent impact with terrain.

Findings

Occurrence #1: LOSS OF ENGINE POWER

Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. (C) 1 ENGINE
 2. (C) REASON FOR OCCURRENCE UNDETERMINED
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Occurrence #2: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

3. (C) AIRSPEED(VMC) - NOT MAINTAINED - PILOT IN COMMAND
 4. (C) DIRECTIONAL CONTROL - NOT MAINTAINED - PILOT IN COMMAND
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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Findings

5. TERRAIN CONDITION - SWAMPY

Factual Information

HISTORY OF FLIGHT

On November 25, 2004, at 1434 Pacific standard time, a Cessna 411, N747JU, impacted terrain shortly after departing from the Corona Municipal Airport, Corona, California. The pilot/owner was operating the airplane under the provisions of 14 CFR Part 91. The private pilot and one passenger sustained fatal injuries; the airplane was destroyed. The personal cross-country flight was originating at the time of the accident and had a planned destination of Las Vegas, Nevada. Visual meteorological conditions prevailed, and a flight plan had not been filed.

Federal Aviation Administration (FAA) inspectors interviewed witnesses immediately after the accident transpired. Witnesses reported observing the accident airplane at the airport fueling pumps, and remember a male closing the airplane door after fueling. The engines started and the airplane taxied to the departure end of runway 25; they did not recall if the airplane preformed a run-up check. The airplane departed from the runway and began the initial climb following a course consistent with the runway centerline. About 1 mile into the initial climb, the aircraft began to yaw from one side to another, veering more to the left. The airplane's right wing rotated down about 45 degrees followed by the nose abruptly pointing downward. The airplane maintained a steep downward path until it disappeared behind trees. The witnesses then observed a plume of smoke.

Additional witnesses were contacted by National Transportation Safety Board investigators. They stated that after departing the surface of runway 25, the airplane began to climb following the same flight path as the runway centerline. Shortly thereafter, the airplane began to yaw from the left to the right and the right engine began to emit smoke. As the airplane continued the erratic maneuvers, the left engine also began to smoke. After several seconds, the engines quit smoking and the airplane subsequently dove toward the trees below.

During a telephone conversation with a Safety Board investigator, another witness stated that he was piloting his airplane while approaching the Corona Municipal Airport cruising at 2,000 feet above ground level (agl). With his airplane configured on the 45-degree entry for runway 25, still about 4 to 5 miles from the airport, he heard the accident pilot make a transmission over the common frequency. A pilot stated that he was leaving the airport and intended to perform a straight-out departure. He observed the accident airplane climb several hundred feet and begin a left turn. He thought that was unusual because it was contrary to the pilot's prior transmission informing the local area traffic of his intention to complete straight-out departure. The airplane continued in the left turn, became inverted, and dove straight toward terrain. The witness did not notice smoke emanating from either of the engines.

PERSONNEL INFORMATION

A review of FAA airman records revealed that the pilot held a private pilot certificate with ratings for airplane single engine, multiengine land, and instrument. The original issuance date of his certificate was April 2001. The pilot's most recent medical certificate was issued as a second-class on September 02, 2004, and contained limitations that he shall possess glasses for near and intermediate vision.

The pilot's personal flight records were not recovered. On his last application for a medical certificate the pilot reported a total flight time of 650 hours.

AIRCRAFT INFORMATION

No airplane or engine maintenance records were located. A review was conducted of the material maintained by the FAA in the Aircraft and Registry files for the airplane. The twin-engine, low-wing Cessna 411, serial number 411-0050, was manufactured in October 1965, and purchased by the pilot in August 2004. According to the original application for a normal category airworthiness certificate completed by Cessna Aircraft, two Teledyne Continental Motors GTSIO-520-C series engines (serial numbers: 150085-5-C and 150335-5-C) were installed on the airplane at the time of manufacture [the data plates on the engines in the wreckage listed the same serial numbers].

A Safety Board investigator interviewed a pilot that rented a hangar located near the accident pilot's hangar in El Monte, California. He reported that several days prior to the mishap, the accident pilot asked him for assistance with installing a fuel tank bladder that he had recently purchased. The accident pilot indicated to him that several months before he had hired a maintenance shop in Corona to work on the airplane's fuel tanks, but was not satisfied with their work. He added that he was attempting to finish the job by himself. He noted that because of his profession and schooling as an engineer, he knew how to perform the installation.

The pilots worked several hours on both the left inboard and outboard fuel tanks, but could not get the tubing installed correctly. The accident pilot stated that he had been flying the airplane solely on the tip-tanks and was also performing all of the maintenance by himself (since picking it up from the maintenance facility). He also recalled the accident pilot talking about a prior flight where oil was pouring out from the cowl flaps on one of the engines. The accident pilot mentioned that he had flown Cessna 310 airplanes in the past and the Cessna 411 airplane was a unique airplane to fly due to it being equipped with a small rudder.

A Safety Board investigator additionally interviewed an aircraft owner who shared a hangar with the accident pilot. The owner stated that the accident pilot had purchased the airplane around August 2004, and moved into the shared hangar sometime in September. Immediately after storing the airplane in the hangar, the accident pilot continuously performed maintenance on it. The accident pilot indicated that he had numerous problems with the fuel tank bladders and ongoing disputes with mechanics who had attempted to work on the airplane. The accident pilot stated that after installing all the fuel bladders himself, he took the airplane on a test flight the day before the accident. He said that during the test flight he experienced a problem with the left engine, which he attributed to probably being a result of debris in the fuel lines [the owner was not sure as to the nature of the problem but recalled it was an engine failure].

The aircraft owner further stated that the day of the accident he observed the accident pilot draining the fuel lines to the left engine. He estimated the pilot and his friend departed the El Monte airport around 1230. The pilot would regularly fly to Corona to acquire fuel and would also frequent a restaurant at that airport.

The airplane is designed so that each engine is supplied with fuel from a main tank (50 gallons usable) located on each wing tip and an auxiliary tank (35 gallons useable) located in each wing. The Cessna Owner's Manual states that "operation near the ground (below 1,000 feet) using the auxiliary fuel tanks is not recommended." This limitation exists because the tanks are not equipped with fuel pumps.

METEOROLOGICAL INFORMATION

The closest weather observation station was, Chino Airport, Chino, California, located about 5 nautical miles (nm) north of the accident site. A routine aviation weather report (METAR) for Chino was issued at 1453. It reported: winds calm; visibility 7 statute miles; skies clear; temperature 21 degrees Celsius; dew point 04 degrees Celsius; altimeter 30.02 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane wreckage was located in a swamp about 1 mile from the departure end of runway 25, at an estimated elevation of 350 feet mean sea level (msl). The global positioning satellite (GPS) coordinates for the crash site were 37 degrees 04.54 minutes north latitude and 121 degrees 35.49 minutes west longitude.

The airplane was found on a flat dry surface surrounded by dense trees and brush, with the nose pointing toward a magnetic heading of 280 degrees. The entire airplane was found at the accident site, with all debris located within a 75-foot radius. All the wreckage was subjected to thermal damage, as it had been consumed by fire.

The first identified point of contact consisted of wreckage debris mixed with broken tree limbs at the base of a tree. The principal impact crater was oriented about 10 feet from the first point of contact. The surrounding debris path was strewn along 360 degrees magnetic. The main wreckage, consisting of the fuselage and empennage, came to rest upright about 50 feet from the first point of contact. Fire consumed the cockpit and cabin area. Investigators accounted for all control surfaces and both wing tips in the debris field.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Los Angeles County Coroner. The FAA Toxicology and Accident Research Laboratory performed toxicological testing of specimens of the pilot and passenger. The results of analysis of the pilot's specimens were negative for ethanol, but it was not possible to test for carbon monoxide or cyanide. The toxicological testing results of the passenger were negative for carbon monoxide and cyanide.

TESTS AND RESEARCH

Investigators from the Safety Board and Cessna Aircraft Company examined the wreckage on scene. Due to weather conditions and difficulty of accessing the site, investigators were limited to a 30-minute on-scene investigation. Several days after the accident, the swamp where the wreckage was located became flooded and the wreckage could not be recovered.

Airframe:

All flight controls were accounted for at the mishap site. The main wreckage, consisting of the fuselage and empennage section was crushed and consumed by post-impact fire. The upper portion of the fuselage was completely consumed by fire, with the remaining cabin area filled with dense ash. Both wings were separated from the airframe outboard of the engine nacelles with all remnants thermally damaged. The fuel boost pump system and switch position could not be ascertained on site. The fuel selector handles were destroyed and the valve positions were not reliable. Investigators could not confirm control continuity due to the extensive thermal damage.

Engines:

A cursory on-site inspection was performed on both engines.

The left engine was separated from the airframe and came to rest about 25 feet in front of the wreckage. Investigators removed several of the top spark plugs, noting that all were clean with no mechanical deformation. The spark plug electrodes were gray in color, which corresponded to normal operation according to the Champion Aviation Check-A-Plug AV-27 Chart. The turbocharger compressor contained debris and would not rotate.

Two of the left propeller blades remained attached to the propeller hub, which was affixed to the engine. The third blade had separated and was located under the turbocharger and other debris. The propeller blades displayed signatures of s-bending.

The right engine remained attached to the airframe. Investigators removed all top spark plugs, which were also uniformly gray in color and consistent with normal combustion signatures. The turbocharger compressor was free of debris and rotated freely by hand.

The crankshaft on the right engine was fractured just aft of the propeller flange where the propeller separated. The crankshaft fracture surface exhibited a 45-degree angle to the longitudinal axis around most of the circumference of the shaft. The separated propeller was located behind the right wing and forward of the right horizontal stabilizer. One propeller blade was separated from the hub and not located, while the remaining two blades were affixed. One of the two attached blades was straight, with the other exhibiting torsional twisting and showing a polished effect on its leading edge.

Neither propeller appeared to be in a feathered condition at the accident site.

ADDITIONAL INFORMATION

Single-Engine Flight Operations:

The Airplane Flying Handbook, FAA-H-8083-3, discusses the identification of, and the effects caused by, a failure of the critical engine in a multiengine airplane.

"In most U.S. designed multiengine airplanes, both engines rotate to the right (clockwise) when viewed from the rear, and both engines develop an equal amount of thrust. At low airspeed and high-power conditions, the downward moving propeller blade of each engine develops more thrust than the upward moving blade. This asymmetric propeller thrust or P-factor, results in a center of thrust at the right side of each engine." The turning (or yawing) force of the right engine is greater than the left engine since the center of thrust is much farther away from the centerline (CL) of the fuselage because it has a longer leverage arm. When the right engine is operative and the left engine is inoperative, the turning (or yawing) force is greater than in the opposite situation of an operative left engine and an inoperative right engine. In other words, directional control is more difficult when the left engine (the critical engine) is suddenly made inoperative."

The Cessna 411 Owners Manual (aircraft s/n 411-0161 and on) indicates:

"MINIMUM CONTROL SPEED (V_{mc}). The twin-engine airplane must reach the minimum control speed (103 mph) before full control deflections can counteract the adverse rolling and yawing tendencies associated with one engine inoperative and full power operation on the other engine."

"RECOMMENDED SAFE SINGLE-ENGINE SPEED. Although the airplane is controllable at the minimum control speed, the airplane performance is so far below optimum that continued flight near the ground is improbable. A more suitable recommended safe single-engine speed is 105 mph, since at this speed altitude can be maintained more easily while the landing gear is being retracted and the propeller is being feathered."

"FUEL SYSTEM. Since the auxiliary fuel tanks are designed for cruising flight, they are not equipped with pumps and operation near the ground (below 1,000 feet) using auxiliary fuel tanks is not recommended because of this limitation."

The wreckage was not recovered due to flood conditions that occurred shortly after the accident ensued.

Pilot Information

Certificate:	Private	Age:	51, Male
Airplane Rating(s):	Multi-engine Land; Single-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:	09/01/2004
Occupational Pilot:		Last Flight Review or Equivalent:	08/01/2005
Flight Time:	650 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N747JU
Model/Series:	411	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	411-0050
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	Unknown	Certified Max Gross Wt.:	6500 lbs
Time Since Last Inspection:		Engines:	2 Reciprocating
Airframe Total Time:		Engine Manufacturer:	Continental
ELT:	Installed, not activated	Engine Model/Series:	GTSIO-520-C
Registered Owner:	M3 Services Inc	Rated Power:	340 hp
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	CNO, 679 ft msl	Distance from Accident Site:	14 Nautical Miles
Observation Time:	1453 PDT	Direction from Accident Site:	140°
Lowest Cloud Condition:	Few / 20000 ft agl	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.02 inches Hg	Temperature/Dew Point:	21° C / 4° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Corona, CA (AJ0)	Type of Flight Plan Filed:	None
Destination:	Las Vegas, NV (VGT)	Type of Clearance:	None
Departure Time:	1433 PST	Type of Airspace:	

Airport Information

Airport:	Corona Municipal Airport (KAJO)	Runway Surface Type:	Asphalt
Airport Elevation:	250 ft	Runway Surface Condition:	Dry
Runway Used:	25	IFR Approach:	None
Runway Length/Width:	3200 ft / 60 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	33.897778, -117.602500

Administrative Information

Investigator In Charge (IIC):	Zoe Keliher	Report Date:	04/25/2006
Additional Participating Persons:	Brad Howard; Federal Aviation Administration; Riverside, CA Michael Grimes; Teledyne Continental Motors; Mobile, AL Emile Lohman; Cessna Aircraft; Wichita, KS		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinquiry@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).