



National Transportation Safety Board Aviation Accident Final Report

Location:	Winston Salem, NC	Accident Number:	ATL02FA010
Date & Time:	11/07/2001, 1118 EST	Registration:	N7648Q
Aircraft:	Cessna 310Q	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Business		

Analysis

According to Air Traffic Control (ATC) Transcripts, the pilot departed runway 22 at the Smith Reynolds Airport at 1112, enroute to Centerville, Tennessee. At 1113, the pilot reported that he was returning with a problem. At 1116, the pilot reported that he was experiencing "a lot of down pressure on the yoke". The pilot subsequently experienced a loss of control and the airplane collided with a tree in a residential area. Examination of the elevator found a bolt and castellated nut missing on the elevator trim tab control rod at the trim tab jackscrow. There was no evidence that the bolt had broken or sheared as a result of impact forces. Examination of the forward trim tab push-pull rod clevis revealed that its dry, oxidized condition indicated that the attaching bolt was missing for an undetermined time prior to the accident, and that the damage to the trim tab push-pull rod indicated that it was in the full up position (elevator full down) at the time of impact. The airframe had accumulated 3,650 hours of total time at the time of the accident and had accumulated 35 hours since its last inspection when all the flight controls were removed, stripped, re-painted, balanced and re-installed.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Improper installation of the elevator trim tab control rod by maintenance personnel which allowed the control rod to disconnect and jam in the full up position (elevator full down) while in-flight. This resulted in a loss of directional control and subsequent impact with trees and terrain.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION

Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. (C) FLIGHT CONTROL,ELEVATOR TAB - DISCONNECTED
2. (C) MAINTENANCE,INSTALLATION - IMPROPER - OTHER MAINTENANCE PERSONNEL

Occurrence #2: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: DESCENT - UNCONTROLLED

Findings

3. (F) AIRCRAFT CONTROL - NOT POSSIBLE - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH OBJECT

Phase of Operation: DESCENT - UNCONTROLLED

Findings

4. OBJECT - TREE(S)

Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Findings

5. (F) TERRAIN CONDITION - RESIDENTIAL AREA

Factual Information

HISTORY OF FLIGHT

On November 7, 2001, at 1118 eastern standard time, a Cessna 310Q, N7648Q, collided with trees and subsequently the ground in a residential area following a loss of control after takeoff from the Smith Reynolds Airport in Winston Salem, North Carolina. The airplane was registered to Quality Aircraft Sales LLC, and operated by the private pilot under the provisions of Title 14 CFR Part 91, and instrument flight rules (IFR). Visual meteorological conditions prevailed and an IFR flight plan was filed. The pilot was fatally injured and the airplane was destroyed. The flight was originating at the time of the accident.

According to Winston Salem Tower Air Traffic Control (ATC) Transcripts, the pilot departed runway 22 at the Smith Reynolds Airport at 1112, enroute to Centerville, Tennessee. At 1113, the pilot reported that he was returning with a problem. At 1116, the pilot reported that he was experiencing "a lot of down pressure on the yoke". At 1117, the pilot requested runway 04, the controller cleared the pilot for a visual approach to runway 04 but received no response. At 1118, Winston Salem Tower reported that radar contact was lost. At 1120, Winston Salem Tower received a report from the local fire department that they had received a call that there was an airplane crash west of the airport.

PILOT INFORMATION

The pilot held a private pilot certificate with ratings and limitations for airplane single and multi-engine land and instrument airplane's. At the time of the accident the pilot had accumulated 2,825 hours in all aircraft, 2,195 hours in multi-engine airplanes and 34 hours in the Cessna 310Q. The pilot's most recent third class medical certificate was issued on May 1, 2000, with no waivers or limitations.

AIRCRAFT INFORMATION

The Cessna 310Q, S/N 310Q0427, was manufactured and certificated in 1971. It was a six seat, twin engine airplane with tricycle retractable landing gear. Federal Aviation Administration (FAA) records revealed that the airplane was registered to the current owners on December 23, 1971. A review of the airplane's maintenance logbook found that on April 1, 2001, the airplane's total time was 3,615 hours. On that date, the airplane was painted, the interior was refurbished and the airplane underwent a 100 hour inspection. According to the logbook entry, all flight controls were removed, stripped, repainted and balanced prior to being reinstalled on the airplane. At the time of the accident, the airplane had accumulated an additional 35 hours for a total time of 3,650 hours.

METEOROLOGICAL INFORMATION

Weather at the time of the accident was reported by witnesses as clear. Greensboro Flight Service Station was reporting weather at 1054, as winds 320 at 4 knots, visibility 10 statute miles, sky clear, temperature 19 celcius, dew point minus 1 celcius, altimeter 30.29. Greensboro provided a special weather report at 1136, which reported winds as calm, visibility 10 statute miles, sky clear, temperature 21 celcius, dew point 1 celcius, altimeter 30.28.

WRECKAGE EXAMINATION

Examination of the accident site found that the wreckage debris was located in a heavily

wooded residential area. The crash debris line extended through a wooded area on a heading of 055 degrees magnetic. The pitch angle from the first tree contact to the ground crater was approximately 60 degrees, and the roll angle was approximately 55 degrees left wing low. The left wing tip tank was near the first ground contact location. A piece of the cabin overhead was observed embedded in a tree to the left of the crash debris line. There was no fire.

The aileron flight control system continuity could not be established due to impact damage. All aileron control cables, which were observed, were separated in a tension overload type separation. The aileron cables were attached over the sprocket in the control column and were continuous out to the right wing. The cables to the left wing were observed separated. The aileron trim tab was observed separated and loose in the wreckage distribution path. The rudder control cables were observed attached to the rudder and were continuous to the rudder pedals. The rudder trim control cables were observed attached over the sprocket and were continuous up to the cockpit area. All of the attachments observed in the flight control system were bolts with castellated nuts and cotter pins.

The elevator trim tab actuator to rod end attachment bolt and castellated nut were not found in the wreckage. No damage was observed to the screw jack rod end. There was also no damage to the attachment holes in the trim tab actuator rod end. Damage was observed to the elevator forward spar and inside leading edge skin, which matched the actuator rod end. The elevator flight control cables were attached to the bell cranks at both ends. The forward elevator actuation tube rod end at the bell crank and the aft elevator control tube were observed separated. The rod remained attached to the left elevator torque tube. The elevator trim cables remained attached to the trim tab actuator and were observed attached to the trim wheel in the cockpit area. The elevator trim screw jack was observed past the full nose up trim position. All cabin seats were destroyed in the accident sequence, and all seat belts had separated from their attachment points during the impact sequence.

Both main fuel tanks, tip tanks, and the auxiliary fuel tanks (wing bladders) were ruptured at the accident site. All of the fuel lines were separated from the engine. Both of the engine driven fuel pumps were removed from the engines and their drive couplings were intact.

There was extensive damage to both engines. This damage precluded a determination of continuity of either of the engines. Both engines were separated from the airframe. Both propellers were separated from the engines. All propeller blades remained attached to their respective propeller hubs. There was significant twisting and leading edge damage to all of the propeller blades.

Examination of the left engine found the oil sump crushed, the number 2, 4, and 6 cylinders were cracked, the exhaust pipes were crushed, and the number 2, 4, 5, and 6, rocker covers were missing. The fuel pump was removed and the drive shaft was intact. The oil sump was removed and the camshaft and gears were intact. All connecting rods were attached, the crankshaft was intact, all counterweights were on their respective pins and the oil screen was free of contaminants. The spark plugs were gapped in accordance with manufacturers specifications. The crankshaft was broken at the flange. It was not possible to rotate the engine due to cylinder damage. The following items were found separated from the engine: the fuel control unit, vacuum pump, alternator, oil cooler, starter, both magnetos, intake tubes on the number 2, 4, and 6 cylinders and the propeller governor. The overall condition and visual examination of the engine and parts, did not reveal discrepancies which would have precluded normal operation prior to impact.

Examination of the right engine found that the camshaft gear was bent, and the internal engine components would not rotate. The oil sump was removed and the camshaft was intact, the crankshaft was also intact, all connecting rods were attached, and the counterweights were all on their respective pins. The fuel pump was removed and the drive shaft was intact. The crankcase was broken in the forward lower area. The oil sump was peeled back, and the exhaust pipes were crushed. The propeller bolts were pulled from the hub. The following parts were separated from the engine as a result of impact damage; the number 5 rocker cover, intake pipes, prop governor, started, vacuum pump, both magnetos, alternator, tachometer, generator, oil cooler and the fuel control unit. The overall condition and visual examination of the engine and parts did not reveal any discrepancies which would have precluded normal operation prior to impact.

MEDICAL/PATHOLOGICAL INFORMATION

An autopsy examination of the pilot was conducted by the Office of the Chief Medical Examiner, Chapel Hill, North Carolina. The autopsy examination established the manner of death as; Accident, and the cause of death as Multiple Blunt Trauma.

A toxicological examination was performed by the Federal Aviation Administration Civil Aeromedical Institute, in Oklahoma City, Oklahoma. The toxicology report on the pilot indicated that there were no Ethanol or Drugs found in the muscle or liver samples. Tests for Carbon Monoxide and Cyanide were not performed.

TESTS AND RESEARCH INFORMATION

Based on the pilot's statement during the final minutes of his flight, and the on-scene examination of the elevator system, the following components were sent to the Material and Process Engineering Laboratory at the Cessna Aircraft Company in Wichita, Kansas, for further examination; trim tab assembly, push-pull rod clevis and a section of the elevator. The examinations of the above components were witnessed by a representative of the Federal Aviation Administration.

Examination of the forward trim tab push-pull rod clevis revealed that the attaching bolt was missing for an undetermined time prior to the accident, and that the damage to the trim tab push-pull rod showed that it was in the full up position (elevator full down) at the time of impact. Additionally, the geometry of the trim tab push-pull rod would have allow it to pass behind the forward elevator spar. The trim tab actuator to push rod bolt were missing and the rod jammed behind the forward spar of the elevator at the time of the mishap. (See attachment for complete metallurgical report).

ADDITIONAL INFORMATION

The wreckage was released to the owners representative on November 25, 2001, Quality Aircraft Leasing LLC.

Pilot Information

Certificate:	Private	Age:	49, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	Glider	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	05/01/2000
Occupational Pilot:		Last Flight Review or Equivalent:	05/04/2001
Flight Time:	2825 hours (Total, all aircraft), 34 hours (Total, this make and model), 2275 hours (Pilot In Command, all aircraft), 16 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N7648Q
Model/Series:	310Q	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	310Q0427
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	04/01/2001, 100 Hour	Certified Max Gross Wt.:	5300 lbs
Time Since Last Inspection:	35 Hours	Engines:	2 Reciprocating
Airframe Total Time:	3650 Hours at time of accident	Engine Manufacturer:	Continental
ELT:	Installed, not activated	Engine Model/Series:	io-470V
Registered Owner:	Quality Aircraft Sales LLC	Rated Power:	260 hp
Operator:	Allen W. Watson	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	INT, 970 ft msl	Distance from Accident Site:	4 Nautical Miles
Observation Time:	1050 EST	Direction from Accident Site:	50°
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	300°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.3 inches Hg	Temperature/Dew Point:	20° C / 1° C
Precipitation and Obscuration:			
Departure Point:	Winston Salem, NC (INT)	Type of Flight Plan Filed:	IFR
Destination:	Centerville, TN (GHM)	Type of Clearance:	IFR
Departure Time:	1112 EST	Type of Airspace:	Class C

Airport Information

Airport:	Smith Reynolds Airport (INT)	Runway Surface Type:	Asphalt
Airport Elevation:	970 ft	Runway Surface Condition:	Dry
Runway Used:	22	IFR Approach:	None
Runway Length/Width:	3738 ft / 150 ft	VFR Approach/Landing:	Forced Landing; Full Stop; Straight-in

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	36.091667, -80.291667

Administrative Information

Investigator In Charge (IIC):	Butch Wilson	Report Date:	05/30/2003
Additional Participating Persons:	Jeffrey Riddell; Federal Aviation Administration FSDO-05; Greensboro, NC Andrew Hall; Cessna Aircraft Company; Wichita, KS John Burres; Teledyne Continental Engines; Mobile, AL		
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](#).