

# **Aviation Investigation Final Report**

Location:	WICHITA FALLS, Texa	is	Accident Number:	FTW94FA091
Date & Time:	March 3, 1994, 20:55 Local		Registration:	N474AR
Aircraft:	CESSNA	310K	Aircraft Damage:	Destroyed
Defining Event:			Injuries:	4 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal			

# Analysis

THE AIRPLANE WAS AT AN IFR ASSIGNED ALTITUDE OF 8,000 FEET ON A DARK VMC NIGHT, WHEN ATC REPORTED THAT THEY WERE NO LONGER RECEIVING THEIR TRANSPONDER. THE PILOT ACKNOWLEDGED THAT THEY WERE EXPERIENCING ELECTRICAL PROBLEMS IN THE COCKPIT, BUT WERE TRYING TO WORK OUT THE SITUATION. A FEW MINUTES LATER THEY LOST RADAR CONTACT AS THE AIRPLANE INITIATED A DESCENT TOWARDS A NEARBY JOINT USE MILITARY-CIVILIAN AIRPORT SERVED BY APPROACH CONTROL RADAR. THE AIRPLANE WAS NOT IDENTIFIED BUT WAS TRACKED ON PRIMARY RADAR TO A POINT 2.8 MILES FROM THE AIRPORT. DURING THE LAST FEW MILES OF THE FLIGHT, THE AIRPLANE WAS HEADED WESTBOUND OVER SPARSELY POPULATED RURAL AREA THAT OFFERED MINIMAL OR NO VISUAL REFERENCE IN THE DARK NIGHT. WITNESSES IN THE AREA REPORTED HEARING THE SOUND OF AIRPLANE ENGINES FOLLOWED BY THE SOUND OF IMPACT. THE AIRPLANE IMPACTED THE GROUND INVERTED, WITH THE LANDING GEAR EXTENDED BY EMERGENCY MODE. THE LEFT GENERATOR WAS FOUND TO BE INOPERATIVE, AND THE GROUNDING WIRE FROM THE RIGHT VOLTAGE REGULATOR WAS FOUND TO HAVE A BURNED OUT TERMINAL END. THE PILOT RATED PASSENGER HAD A FLASH LIGHT IN HIS HAND.

### **Probable Cause and Findings**

The National Transportation Safety Board determines the probable cause(s) of this accident to be: WAS THE LOSS OF CONTROL DUE TO THE PILOT'S SPATIAL DISORIENTATION FOLLOWING A COMPLETE ELECTRICAL SYSTEM FAILURE. FACTORS WERE THE DARK NIGHT AND THE ELECTRICAL FAILURE AS RESULT OF BURNED OUT WIRING TERMINAL.

#### **Findings**

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION Phase of Operation: CRUISE - NORMAL

Findings

ELECTRICAL SYSTEM, GENERATOR - OVERLOAD
ELECTRICAL SYSTEM, ELECTRIC WIRING - SHORTED
ELECTRICAL SYSTEM, BATTERY - OUTPUT LOW
(F) ELECTRICAL SYSTEM - FAILURE, TOTAL
PRECAUTIONARY LANDING - INITIATED - PILOT IN COMMAND

Occurrence #2: LOSS OF CONTROL - IN FLIGHT Phase of Operation: DESCENT - UNCONTROLLED

Findings

6. (F) LIGHT CONDITION - DARK NIGHT

7. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND

8. (C) SPATIAL DISORIENTATION - PILOT IN COMMAND

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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER Phase of Operation: DESCENT - UNCONTROLLED

# **Factual Information**

#### HISTORY OF FLIGHT

On March 3, 1994, at 2055 central standard time, a Cessna 310K, N474AR, was destroyed following a loss of control near Wichita Falls, Texas. The commercial pilot and his three passengers were fatally injured. Visual meteorological conditions prevailed for the personal flight.

The airplane departed the Addison Airport, near Dallas, Texas, at 2003 on an IFR flight plan to the Centennial Airport, near Denver, Colorado. At 2029, while in cruise flight at 8,000 feet, the pilot was advised by ATC that they were not receiving his transponder. The pilot replied that they would recycle the transponder. Two minutes later, ATC advised the pilot that they were still not receiving the transponder, and the pilot replied that they were experiencing electrical problems, the lights were dimming out, and "just bear with us, it's a rental airplane."

Radio communications were lost at 2034, when the airplane was reported crossing the Bridgeport VOR 039 degree radial, at 34 nautical miles (NM). Fort Worth Center lost radar contact with the airplane at 2040, when the airplane was 33 NM east of Wichita Falls, Texas.

Sheppard Air Force Base (AFB) Approach was contacted by Fort Worth Center and advised that N474AR was approaching Wichita Falls; however, they were never able to establish contact with the airplane.

The airplane was located by search and rescue personnel at 0230 the next morning in an open pasture, approximately 2.8 NM east of the Sheppard AFB/Wichita Falls Municipal Airport. During the last few miles of the flight, the airplane was headed west over sparsely populated rural area that offered minimal or no visual references in the dark night environmental conditions that prevailed.

There were no reported eyewitnesses to the accident; however, several residents in the immediate area of the accident reported hearing the sound of an airplane engine revving up the engines around the time of the accident, followed by the sound of impact.

#### PERSONNEL INFORMATION

The pilot started flying in October 1973. He obtained his instrument rating on September 1984, and his multi-engine rating on August 1988. He was initially checked out in the Cessna 310 on July 17, 1988. His last local check out in the Cessna 310 was on January 28, 1993, when he received 1.9 hours of instruction.

The right seat occupant was the pilot's younger brother. He was an instrument rated ASEL private pilot. He assisted the pilot with some of the radio transmissions during the flight. A flashlight was found in his left hand.

#### AIRCRAFT INFORMATION

A review of the airframe and engine records by the FAA inspector, did not reveal any anomalies or uncorrected maintenance defects prior to the flight. The baggage and personal gear for all the occupants accounted for 154 pounds, and based on weight and balance calculations performed, the airplane was within its limits at the time of the accident.

The emergency procedures card was found on the floor of the airplane between the pilot and copilot seats. A current approach plate, opened to the ILS approach for the Wichita Falls Airport was also found in the same area.

#### COMMUNICATIONS

The transcripts from all communications between the airplane and and all the pertinent Air Traffic Control (ATC) facilities are enclosed in this report.

#### WRECKAGE AND IMPACT INFORMATION

Ground scars and imprints made by the right engine, propeller, and wing tip tank were located on the left side of the initial point of impact on a measured heading of 175 degrees. Traces of the red navigational light lens were found on the right side of the initial point of impact. The magnetic compass, and most of the windshield plexiglass were found at the initial point of impact.

The wreckage came to rest in the upright position on a measured heading of 330 degrees. The landing gear was found in the extended position. The landing gear emergency extension handle was found out of the retaining clip with the handle fully engaged and locked.

Flight control continuity was established to the rudder, elevators, and ailerons.

Fuel was found in each of the wing auxiliary tanks. Both wing tip main tanks were destroyed by impact. The fuel selectors were found on their respective main tanks. According to the operator's records, the airplane was topped off with 4 gallons of 100LL Avgas prior to its departure from the Addison Airport.

Both engines were found separated from their respective mounts. Both propeller assemblies were found buried in the muddy ground at the initial point of impact, next to a pond. See wreckage diagram for details on the wreckage distribution pattern.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies and toxicological tests were ordered and performed. The autopsies were performed by Jeffrey J. Barnard, M.D, Chief Medical Examiner for the Southwestern Institute of Forensic Science, at Dallas, Texas, on March 5, 1994. Toxicological tests were negative.

#### TEST AND RESEARCH

A complete wreckage reconstruction and examination was accomplished on March 7, 1994. The two Concord CB-25 lead acid batteries were tested for output. The number one battery had a residual voltage of 1.8 volts while the number two battery had a residual voltage of 1.4 volts. Both batteries were placed on a battery charger for 30 minutes. Battery charging and retention were normal and no defects were observed.

A detailed examination of both engines was completed at the engine manufacturer's facility on April 21, 1994. Engine continuity was established on both engines. The ignition system was tested and the fuel injection system was flow tested. No discrepancies were found on either engine that would have prevented normal engine operation. A copy of the teardown report is enclosed.

Both generators, their respective voltage regulators, and the paralleling relay were tested at an FAA Repair Station on March 11, 1994.

The left generator (Part Number 1105057, Serial Number 27335R) exhibited signs of severe overheating. Signs of internal disintegration was evidenced by several large pieces of copper armature winding wire coming out when the inspection flange was removed. Additionally, evidence of solder being thrown into the generator case was found on the case. Due to the extent of the internal damage to the generator, the generator would not provide any electrical output. Aircraft records indicate that this generator was installed on January 19, 1994, with two other generators previously installed on October 28, 1993, and on June 21, 1993.

The right generator (Part Number 1105057, Serial Number 1030697) was tested on a test stand. Electrical output was found to be within limits and the generator was found operational; however, the electrical output dropped to zero anytime the grounding strap from the generator to the voltage regulator was disconnected. The aircraft grounding wire for the right voltage regulator was found to have a burned out terminal end.

Both voltage regulators were manufactured by Electrosystems Inc, under Part Number VR-300-28-50. Serial numbers for the voltage regulators were 3021595R for the left, and 21111538R for the right. No defects were noted in the operation of the regulators.

#### ADDITIONAL DATA

The wreckage was released to the owner's representative following conclusion of the field investigation.

### **Pilot Information**

Certificate:	Commercial	Age:	41,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:	Yes
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 2 Valid Medicalw/ waivers/lim	Last FAA Medical Exam:	July 23, 1992
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	1204 hours (Total, all aircraft), 244 ho all aircraft)	ours (Total, this make and model), 1 h	ours (Last 24 hours,

### Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	Registration:	N474AR
Model/Series:	310K 310K	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	310K0147
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	December 15, 1993 100 hour	Certified Max Gross Wt.:	5200 lbs
Time Since Last Inspection:	91 Hrs	Engines:	2 Reciprocating
Airframe Total Time:	5637 Hrs	Engine Manufacturer:	CONTINENTAL
ELT:	Installed, activated, aided in locating accident	Engine Model/Series:	IO-470-V
Registered Owner:	WILSON, DAVID J.	Rated Power:	260 Horsepower
Operator:	ARI BEN AVIATOR INC.	Operating Certificate(s) Held:	None
<b>Operator Does Business As:</b>		Operator Designator Code:	

### Meteorological Information and Flight Plan

Conditions at Assident Sites		\	Condition of Light	Night/dork
Conditions at Accident Site.		)	Condition of Light.	Night/dark
<b>Observation Facility, Elevation:</b>	SPS ,1015 ft	msl	Distance from Accident Site:	4 Nautical Miles
Observation Time:	01:56 Local		Direction from Accident Site:	270°
Lowest Cloud Condition:	Scattered / 1	8000 ft AGL	Visibility	25 miles
Lowest Ceiling:	None		Visibility (RVR):	
Wind Speed/Gusts:	/ None		Turbulence Type Forecast/Actual:	/
Wind Direction:	180°		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	1	Temperature/Dew Point:	14°C / 6°C
Precipitation and Obscuration:	No Obscurat	ion; No Precipitat	tion	
Departure Point:	DALLAS	(ADS)	Type of Flight Plan Filed:	IFR
Destination:	DENVER	(APA )	Type of Clearance:	IFR
Departure Time:	20:05 Local		Type of Airspace:	Class E

# **Airport Information**

Airport:		Runway Surface Type:	
Airport Elevation:		Runway Surface Condition:	
Runway Used:	0	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

# Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	3 Fatal	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	4 Fatal	Latitude, Longitude:	33.889907,-98.509445(est)

#### **Administrative Information**

Investigator In Charge (IIC):	Casanova, Hector	
Additional Participating Persons:	LOUIS E VARGO; FORT WORTH , TX	
Original Publish Date:	November 14, 1994	
Last Revision Date:		
Investigation Class:	<u>Class</u>	
Note:		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=18884	

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.