Aviation Investigation Final Report

Location:	NEPHI, Utah	**Accident Number:**	FTW98FA276
Date & Time:	June 19, 1998, 20:21 Local	**Registration:**	N3861K
Aircraft:	Beech A36	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported to Salt Lake City ARTCC that 'I've lost an engine and the cockpit is filling with smoke.' Five minutes later the pilot reported that 'my cylinders are all blown, I've got smoke comin' through.' He stated that he would shut off the electrical power as soon as the landing gear was down. A witness observed N3861K appear from behind a one-story building flying 'what appeared to be straight up in the air, and then it veered sharply to the right, then went straight down.' The airplane had been modified with a turbonormalizing system and the installer recommended that the tailpipe be removed for internal inspection of the turbocharger every 100 hours. Postaccident examination of the turbine exhaust flange revealed a 3-inch portion was missing and the fuel selector was found on the right main fuel tank. Several items from the airplane were found outside the postimpact fire area and they exhibited fire damage: the cabin entrance door, the cargo door, a passenger's shoe, and the engine cowling. The firewall had an 18 inch hole burned through it. Toxicology tests on the pilot revealed that fluoxetine (trade name Prozac, a non-approved drug for flight status) was present in his blood.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The improper installation of the turbocharger exhaust stack by unknown maintenance personnel and the subsequent fire in the engine compartment due to the exhaust gas leak from the turbocharger. Factors were the total loss of engine power due to fuel line failure and subsequent fuel starvation, the pilot not following proper emergency procedures, and the loss of aircraft control due to the pilot's incapacitation following the spread of the fire to the cabin area.

Findings

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

Findings
1. (C) EXHAUST SYSTEM,TURBOCHARGER - FAILURE,PARTIAL
2. (C) MAINTENANCE,INSTALLATION - IMPROPER - OTHER MAINTENANCE PERSONNEL
3. (C) EXHAUST SYSTEM,TURBOCHARGER - LEAK
4. (C) ENGINE COMPARTMENT - FIRE

Occurrence #2: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL
Phase of Operation: CRUISE

Findings
5. (F) FUEL SYSTEM,LINE - FAILURE,PARTIAL
6. (F) FLUID,FUEL - STARVATION

Occurrence #3: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
7. (F) EMERGENCY PROCEDURE - IMPROPER - PILOT IN COMMAND
8. USE OF INAPPROPRIATE MEDICATION/DRUG - PILOT IN COMMAND

Occurrence #4: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
9. (F) FUSELAGE,CABIN - FIRE
10. (F) AIRCRAFT CONTROL - NOT POSSIBLE - PILOT IN COMMAND
11. (F) INCAPACITATION - PILOT IN COMMAND

Occurrence #5: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
12. TERRAIN CONDITION - OPEN FIELD
13. TERRAIN CONDITION - CROP

Factual Information

HISTORY OF FLIGHT

On June 19, 1998, at 2021 mountain daylight time, a Beech A36, N3861K, was destroyed following an in-flight fire and subsequent impact with terrain while on approach to Nephi Municipal Airport, Nephi, Utah. The instrument rated private pilot and his passenger were fatally injured. The aircraft was being operated by the owner under Title 14 CFR Part 91. Visual meteorological conditions prevailed for the cross-country flight which originated from Las Vegas, Nevada, 1 hour, 39 minutes before the accident. No flight plan had been filed.

According to FAA documents, N3861K departed North Las Vegas Airport at 1842. The pilot contacted Nellis Air Force Base Approach Control at 1845 and requested VFR flight following. At 1920, when N3861K was handed off to Salt Lake City Center ARTCC, the pilot reported that he was at 13,500 feet (see attached transcriptions of voice recordings). At 2009, the pilot said, "bonanza three eight six one kilo, I've lost an engine and, uh, between Delta and Provo." The pilot also reported that his cockpit was "filling with smoke."

At 2014, the controller asked the pilot if he had "run through the [aircraft's] emergency checklist already." The pilot responded, "Ah, my cylinders are all blown, I've got smoke comin' through." The controller said "Can't read anything, ok, um supervisor here says you may want to shut down all your electrical power uh that might help you out a bit. If you've got the airport you don't need to talk to me right now." The pilot replied, "Uh six one kilo roger, and uh I'll shut off the electrical as soon as I, uh, get the gear down." One minute later, the pilot reported that he had "three [landing gear] down." At no time did the pilot declare an emergency or inform the controller that N3861K was a single engine airplane.

A witness reported that he observed the north bound airplane appear from behind a one-story building (located approximately 1,000 feet from the witness) "heading what appeared to be straight up in the air, and then it veered sharply to the right, then went straight down." The airplane impacted the terrain at Nephi Municipal Airport, 264 nm from its departure point, and postimpact fire destroyed the airplane. At 2021, the Juab County Sheriff's Department received a 911 call informing them of the accident at the airport.

PERSONAL INFORMATION

The pilot's most recent FAA Part 61 required flight review was dated February 8, 1997. His last FAA third class medical was issued on July 21, 1997. He purchased N3861K in December 1992, and had accumulated approximately 950 hours of flight experience in it at the time of the accident.

AIRCRAFT INFORMATION

The airplane was a single engine, six seat airplane that was manufactured by Beech Aircraft Company in 1981. It had accumulated approximately 2,228 hours of flight time at the time of the accident. In July 1994, the pilot had the airplane modified by installing a turbonormalizing system (an approved STC modification, see attached documents) and wing tip fuel tanks. The airplane's last annual inspection was on June 30, 1997, and it was scheduled for its next annual inspection during the week after the accident. The last entry in the airframe maintenance logbook was January 19, 1995, and it was for an oil change. A representative from Aerleon, Inc., a maintenance facility in North Las Vegas, Nevada, reported that they had been documenting their work on N3861K on "peel-off insert" paper, and were leaving them in the airplane for the pilot. None of these "peel-off insert" papers with maintenance documentation on them were ever located.

FliteCraft Turbo, Inc., the company that installed the turbonormalizing system in N3861K, published a maintenance and trouble shooting manual for the turbonormalizer (see attached document). In the periodic inspection chart, under 100 hour inspection procedures for the turbocharger, it states "remove tailpipe and ducting, inspect turbine for coking, carbonization, oil deposits, and turbine impeller for damage. Inspect compressor wheel for damage, rubbing on housing, and free rotation." No documentation was located which indicated that this periodic inspection had been performed. Installation instructions of the tailpipe and ducting included specific torque pressures to be used (see attached document) for reattaching the V-band clamps. FliteCraft Turbo further recommends that after the V-bands are attached, the aircraft should be flown and all V-bands be retorqued.

The airplane was equipped, for high altitude flying, with a supplemental oxygen system for its occupants. No documentation was found which indicated the system had been serviced with oxygen or periodic inspections performed.

The last fuel purchase for N3861K was six days before the accident (June 13, 1998) and records indicate that it had been topped-off with 60.9 gallons of 100LL. The airplane had a total fuel capacity of 120 gallons and an estimated 35 gallons were used for this flight. No documentation was located to indicate if N3861K had been flown between the last refueling and the accident flight.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted the terrain near mid field of runway 34 and approximately 220 feet east of the runway's edge (N39 degrees 44.503 minutes, W111 degrees 52.066 minutes). The terrain was a flat alfalfa field with vegetation approximately 12 inches high. The ground scar from the initial impact point extended approximately 185 to 190 degrees. The initial impact point was approximately 12 to 18 inches wide and contained pieces of green len. The main wreckage was found inverted and was located approximately 95 feet from the initial ground scar point (see attached wreckage diagram). The engine was found separated from the

fuselage and in an upright position (see Test and Research for engine tear-down results). All the fuel and oil lines were found burned and/or broken. All the airplane's flight control components were accounted for, but control cable continuity could not be established due to impact damage and postimpact fire.

The landing gear was found in the down position. The nose wheel landing gear had separated from the aircraft (located half way to the initial ground scar point) and showed no signs of fire damage. Examination of the flaps indicated that the flaps were down 20 degrees; however, the flap actuator had been damaged by fire to the extent that the flap position could not be definitively determined. The propeller, spinner, and crankshaft flange were found approximately 20 feet from the beginning ground scar point. The spinner was pushed straight back and exhibited no signs of rotation (see photograph). The propeller blade marked "A" showed no signs of chordwise striations and the midsection was straight with the second half bent forward approximately 5 degrees. The propeller blade marked "B" exhibited some chordwise striations in the form of mud streaks across the blade. It exhibited approximately 20 degrees of twist and was bent back approximately 20 degrees.

A small fire extinguisher was found in the unburned grass and its gauge indicator needle was found in the discharge position. No fire extinguisher safety pin was located. The fuel selector was found on the right main tank.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy on the pilot was performed by Dr. Maureen J. Frikke, a forensic pathologist, at the State of Utah, Department of Health, Salt Lake City, Utah, on June 20, 1998.

Toxicology tests were performed on the pilot by FAA's Civil Aeromedical Institute (CAMI) in Oklahoma City, Oklahoma. According to CAMI's report, the pilot's carbon monoxide, cyanide, and ethanol test results were negative. Fluoxetine, norfluoxetine, ephedrine, phenylpropanolamine, and salicylate were found in the pilot's blood (see attached CAMI toxicological report). NTSB's Medical Officer, Dr. Mitchell A. Garber, stated that "fluoxetine (trade name Prozac) is a prescription antidepressant, also used to treat obsessive-compulsive disorders and certain eating disorders, and the levels detected [in the pilot] suggest that fairly high therapeutic doses of the medication were being regularly ingested." He further stated that "ephedrine is commonly used as a bronchodilator (for cough and chest congestion) and is available over-the-counter in tablet form in the asthma medication Primatene." He said that "the remaining drugs were metabolites of the two drugs mentioned."

Dr. Antunano of CAMI said that Prozac was not on the "approved" list of medications that a pilot my take and continue to perform the duties of a pilot. Reference Title CFR Part 14, 61.53 (see attached documents), Prohibition on operations during medical deficiency: (a) Operations that require a medical certificate. A person who holds a current medical certificate issued under part 67 of this chapter shall not act as pilot in command, or in any other capacity as a required pilot flight crewmember, while that person: (1) Knows or has reason to know of

any medical condition that would make the person unable to meet the requirements for the medical certificate necessary for the pilot operation; or (2) Is taking medication or receiving other treatment for a medical condition that results in the person being unable to meet the requirements for the medical certificate necessary for the pilot operation.

FIRE

Several items from the airplane and personal items from the occupants were found outside the postimpact fire area. The engine's left cowling had an area of its exterior paint which exhibited brown to black heat damage (see photograph). The engine's firewall was found with an approximate 18 inch hole burned through it on the upper left side (see photograph). A shoe was found in the alfalfa which exhibited extreme heat exposure (see photograph). Pieces of the cabin's interior Plexiglas were found sooted and the cabin's passenger entrance door interior was burned in an airfoil shape (see photographs). The latch to this door appeared undamaged (see photograph). A head rest and an arm rest were found with heat damage. The right rear cargo door appeared to have melted from heat exposure; it was found interior side down in fresh alfalfa (see photograph).

The bottom of the aircraft's fuselage was consumed by postimpact fire (see photographs). However the empennage and its tail cone were not totally destroyed and they showed evidence of oil streaking on them. The forward tail cone bulkhead was damp with oil and the leading edge of the right stabilizer showed evidence of oil.

TEST AND RESEARCH

N3861K's engine was shipped to the manufacturer (Teledyne Continental Motors in Mobile, Alabama), and in the presence of the Investigator-In-Charge, it was torn down and documented (see attached engine report). No preaccident anomalies were identified with the engine which would have interfered with its normal operation. The turbocharger was also torn down at the same time and location by a manufacturer's representative from AlliedSignal Inc. The turbocharger turbine exhaust flange had approximately 3 inches of material missing (see photographs). The turbocharger's housing and its respective exhaust V-clamp were sent to the NTSB's metallurgical laboratories in Washington D.C. for further inspection and analysis (see attached metallurgical report). The examination of the failed turbocharger flange revealed multiple sets of contact marks which the metallurgist said "indicated that the coupling [V-clamp] had moved and repositioned itself." He further said that "the fracture of the turbocharger flange was also the result of retainer [V-clamp] mis-installation, which induced localized load concentrations [on the flange]."

Further examination and analysis of the turbocharger's housing, exhaust stack (which was not available to the NTSB's metallurgist), and their respective V-clamp was made by Allied Signal Aerospace. Their overall analysis of turbocharger's housing and respective V-clamp agreed with the NTSB's report. Additionally, they identified fretting on the aft surface of the turbocharger's exhaust pipe inlet flange which extended over approximately one half of the aft

surface of the turbocharger exhaust pipe inlet flange. Allied Signal stated, as did the NTSB, that the "turbocharger turbine housing exit flange fracture was the result of fatigue initiating from multiple fretting sits on the affected surface (see attached report)."

A radar study was performed and it showed that after N3861K's engine power failure, it proceeded directly to Nephi Municipal Airport. The last radar return that was positively identified as N3861K was at 2015:34, and was located at 8,600 feet msl (3,591 feet above the ground) and 5,000 feet from the approach end to runway 34. The last transmission from N3861K was recorded at 2015:38. After that, the pilot had reported that he was going to turn off his electrical power. The loss of electrical power would have turned off N3861K's transponder (positive radar identifier) and radios. Radar data indicated that N3861K had been descending at 600 feet per minute prior to landing gear extension and shutting off the aircraft's electrical power. For the next estimated 5 minutes (time to estimated terrain impact), no transmissions were received from N3861K.

ADDITIONAL DATA

The airplane, including all components and logbooks, was released to the owner's insurance representative on April 28, 1999.

Pilot Information

Certificate:	Private	**Age:**	51,Male
Airplane Rating(s):	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 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	July 21, 1997
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1350 hours (Total, all aircraft), 700 hours (Total, this make and model), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N3861K
Model/Series:	A36 A36	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Utility	**Serial Number:**	E-1842
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	June 30, 1997 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	161 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2228 Hrs	**Engine Manufacturer:**	Continental
ELT:	Installed	**Engine Model/Series:**	IO520BB16B
Registered Owner:	VERTICAL DIMENSIONS INC.	**Rated Power:**	285 Horsepower
Operator:	GARRY C. WAITE	**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PVU ,4491 ft msl	**Distance from Accident Site:**	31 Nautical Miles
Observation Time:	20:15 Local	**Direction from Accident Site:**	350°
Lowest Cloud Condition:	Clear	**Visibility**	7 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	18 knots / 27 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	320°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	21°C / 7°C
Precipitation and Obscuration:	N/A - None - Haze		
Departure Point:	LAS VEGAS , NV (VGT)	**Type of Flight Plan Filed:**	None
Destination:	(U14)	**Type of Clearance:**	VFR on top
Departure Time:	18:42 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	NEPHI MUNICIPAL AIRPORT U14	**Runway Surface Type:**	Asphalt
Airport Elevation:	5009 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	34	**IFR Approach:**	None
Runway Length/Width:	4700 ft / 75 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	In-flight
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	39.67955,-111.83065(est)

Administrative Information

Investigator In Charge (IIC):	Struhsaker, James
Additional Participating Persons:	FLOYD J LANDON; SALT LAKE CITY , UT SCOTT BOYLE; MOBILE , AL HAROLD BARRENTINE; WICHITA , KS
Original Publish Date:	February 16, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=20427