National Transportation Safety Board
Aviation Accident Final Report

Location:	TITUSVILLE, FL	**Accident Number:**	MIA94FA057
Date & Time:	01/21/1994, 1445 EST	**Registration:**	N777BE
Aircraft:	CESSNA 421C	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

WITNESSES ON THE GROUND REPORTED THAT THE ENGINES SOUNDED NORMAL WHILE THE AIRPLANE WAS TAXIING TO TAKEOFF. AFTER TAKEOFF WITNESSES REPORTED SEEING WHITE SMOKE TRAILING THE LEFT ENGINE. THE AIRPLANE WAS OBSERVED TO BANK TO THE LEFT WITH A BANK ANGLE OF ABOUT 90 DEG. THE AIRPLANE THEN PITCHED NOSE DOWN, DESCENDED, AND COLLIDED WITH TREES AND THE GROUND. EXAMINATION OF THE LEFT ENGINE OIL SEPARATOR FROM THE TURBOCHARGER ASSEMBLY REVEALED THAT A SECTION OF PIPE NEAR A FLANGE WHICH IS CONNECTED TO THE TURBOCHARGER OIL OUTLET FAILED DUE TO FATIGUE. THERE WAS NO OTHER FAILURE OR MALFUNCTION NOTED WITH THE LEFT OR RIGHT ENGINES AND PROPELLERS. THE MIXTURE CONTROL ARM ON THE LEFT ENGINE FUEL CONTROL UNIT WAS FOUND IN THE 'OFF' POSITION. ADDITIONALLY, THE FUEL SELECTORS AND MAGNETO SWITCHES WERE ALSO FOUND IN THE 'OFF' POSITION. A PILOT-RATED PASSENGER OCCUPIED THE LEFT FORWARD SEAT.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: FAILURE OF THE PILOT-IN-COMMAND TO MAINTAIN VMC RESULTING IN THE INFLIGHT LOSS OF CONTROL. CONTRIBUTING TO THE ACCIDENT WAS THE FATIGUE FAILURE OF A SECTION OF PIPE ADJACENT TO A FLANGE WHICH CONNECTS TO THE TURBOCHARGER OIL OUTLET OF THE LEFT ENGINE ASSEMBLY.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (F) EXHAUST SYSTEM,TURBOCHARGER - FATIGUE

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
2. (C) AIRSPEED(VMC) - NOT MAINTAINED - PILOT IN COMMAND

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

Factual Information

HISTORY OF FLIGHT

On January 21, 1994, about 1445 eastern standard time, a Cessna 421C, N777BE, registered to Heritage Aircraft Corporation, crashed shortly after takeoff from the Space Center Executive Airport, Titusville, Florida, while on a 14 CFR Part 91 personal flight. Visual meteorological conditions prevailed at the time and no flight plan was filed. The airplane was destroyed and the airline transport-rated pilot, commercial pilot-rated left front seat passenger, and one rear seat passenger were fatally injured. The flight originated about 5 minutes earlier.

One day before the accident flight, the airplane had been flown for about 1 hour and the pilot of the previous flight stated that there were no engine related discrepancies. He also stated that the fuel quantity total on landing was about 100 gallons. Before departure based on a request from the pilot-in- command, 20 gallons and 10 gallons of fuel were added to the left and right main fuel tanks respectively. After the fueling the pilot-in-command was observed by the line service individual to check only the right main fuel tank for contaminants. The line service individual became involved in other duties and did not witness any more of the preflight of the airplane. He further stated that he heard both engines start and when the airplane was taxied past his position, both engines sounded normal. He did not witness the ground roll to takeoff but observed the airplane when in was about 200 feet above ground level in a shallow climb. During the climb the engines sounded normal and he then diverted his attention and did not witness the crash.

Several other witnesses reported seeing white smoke trailing the left engine and observed the airplane flying northbound. The airplane was then reported to bank to the left in about a 90 degree angle of bank. The airplane then pitched nose down, descended nose and left wing low, collided with trees then the ground and was mainly destroyed by postcrash fire.

PERSONNEL INFORMATION

Information pertaining to the first pilot and pilot-rated passenger seated in the right and left seats respectively is contained in the NTSB Factual Report-Aviation, and Supplement E. According to the owner of the airplane, the first pilot had his permission to fly the airplane to demonstrate it to the passengers.

AIRCRAFT INFORMATION

Information pertaining to the airplane is contained in the NTSB Factual Report-Aviation, and Supplements A and B.

METEOROLOGICAL INFORMATION

Information pertaining to the weather is contained in the NTSB Factual Report-Aviation.

COMMUNICATIONS

Two-way radio communication was established before takeoff with air traffic control tower personnel.

WRECKAGE AND IMPACT INFORMATION

Examination of the wreckage at the accident site revealed that the airplane collided with trees then the ground while in a 60-degree nose-low attitude. The airplane was mainly

destroyed by postcrash fire; however, examination revealed no evidence of an inflight fire. All components necessary to sustain flight were attached to the airframe. Examination of the aileron, elevator, and rudder flight controls revealed no evidence of preimpact failure or malfunction. The landing gear and flaps were determined to be retracted. Examination of the fuel selectors revealed that they were in the "off" position. The auxiliary fuel pump switches were determined to be in the low position as required by a placard for takeoff and landing. Additionally, all magneto switches were in the "off" position. The engines were removed for further examination.

Examination of the left engine revealed crankshaft, camshaft, and valve train continuity. Thumb compression was obtained for cylinder Nos. 1, 2, 3, and 5. A damaged exhaust valve pushrod for the No. 4 cylinder and contaminants between the No. 6 cylinder valves and valve seats prevented thumb compression on these two cylinders. No other mechanical failure or malfunction was noted to these two cylinders. The magnetos were found to be separated from the engine assembly; therefore, magneto to engine timing could not be determined. The magnetos were rotated by hand which revealed spark at all ignition towers. The engine-driven fuel pump driveshaft coupling was not failed. All fuel injector nozzles were removed and visual examination revealed no evidence of blockage. Examination of the throttle and fuel control unit revealed that the throttle body housing assembly was destroyed by the postcrash fire. The throttle position could not be determined however the mixture control was determined to be in the "idle-cutoff" position. Examination of the turbocharger components revealed that the variable absolute pressure controller assembly was destroyed by the fire. Examination of the wastegate revealed that it was slightly less than fully open. The turbocharger components were removed from the engine and sent to the manufacturer's facility for further examination. Examination of the returned components revealed that the Separator-Turbo, Oil Cessna Part Number 5155163-1 experienced fatigue failure of a section of pipe near a flange which is connected to the turbocharger oil outlet. Heat damage to all other components precluded testing. Examination of the remaining components revealed no evidence of preimpact failure or malfunction. The propeller was removed for further examination which revealed no evidence of preimpact failure or malfunction. Examination of impact signatures suggest that each propeller blade was at or near the low pitch setting at impact.

Examination of the right engine revealed crankshaft, camshaft, and valve train continuity. Differential compression of all cylinders revealed readings higher than 52/80. Both magnetos were found separated from the engine assembly; therefore, magneto to engine timing could not be determined. The magnetos were rotated by hand which revealed spark at all ignition towers. Examination of the engine-driven fuel pump drive shaft coupling revealed that it was not failed. All fuel injector nozzles were visually examined and found to be free of obstructions. Examination of the fuel control and throttle body unit revealed that the throttle was at the "idle" position and the mixture control was near the "full rich position." The turbocharger components were removed and sent to the manufacturer's facility for further examination. Examination of all turbocharger components revealed that heat damage precluded testing. The wastegate was in the fully open position. According to the manufacturer, inspection of the turbocharger components revealed no evidence of preimpact failure or malfunction. The propeller was removed for further examination which revealed no evidence of preimpact failure or malfunction. Examination of impact signatures suggest that each propeller blade was at or near the low pitch setting at impact.

MEDICAL AND PATHOLOGICAL

Postmortem examinations were conducted on the pilot, pilot- rated passenger and passenger by D.J. Wickham, M.D., District Medical Examiner, Rockledge, Florida. The cause of death for all three occupants was listed as multiple blunt force injuries.

Toxicological testing was performed on specimens of the first pilot by the Armed Forces Institute of Pathology (AFIP) and the Holmes Regional Medical Center, Inc (HRMC). The results of the AFIP analysis were negative for cyanide, volatiles, and tested drugs. The results were positive for carbon monoxide, 6 percent saturation. The results of the HRMC analysis were negative for volatiles and tested drugs. The results were positive for carbon monoxide, .3 percent.

Toxicological testing was also performed on specimens of the pilot-rated pilot seated in the left seat by the AFIP and the HRMC facilities. The results of the AFIP analysis were negative for volatiles, and tested drugs. Carbon monoxide was determined to be less than 1 percent. The results of the HRMC analysis were negative for volatiles, and tested drugs. Carbon monoxide analysis was not performed.

FIRE

Examination of the airplane revealed no evidence of inflight fire.

TESTS AND RESEARCH

Metallurgical examination of turbocharger components was performed by the manufacturers facility. Additionally, the NTSB Metallurgy Laboratory reviewed the manufacturer's report.

ADDITIONAL DATA/INFORMATION

The wreckage was released to Mr. Deans L. Rowedder on January 28, 1994.

Pilot Information

Certificate:	Airline Transport; Commercial	**Age:**	53, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Right
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 Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	01/03/1994
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	20000 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	**Registration:**	N777BE
Model/Series:	421C 421C	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	421C0134
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	04/01/1993, Annual	**Certified Max Gross Wt.:**	7450 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	CONTINENTAL
ELT:	Installed	**Engine Model/Series:**	GTSIO-520-L
Registered Owner:	HERITAGE AIRCRAFT CORP.	**Rated Power:**	375 hp
Operator:	HERITAGE AIRCRAFT CORP.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	TIX, 35 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	1448 EST	**Direction from Accident Site:**	175°
Lowest Cloud Condition:	Clear / 0 ft agl	**Visibility**	7 Miles
Lowest Ceiling:	None / 0 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	12 knots / 22 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	360°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	17°C
Precipitation and Obscuration:			
Departure Point:		**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	1444 EST	**Type of Airspace:**	Class G

Airport Information

Airport:	SPACE CENTER EXECUTIVE (TIX)	**Runway Surface Type:**	Asphalt
Airport Elevation:	35 ft	**Runway Surface Condition:**	Dry
Runway Used:	36	**IFR Approach:**	
Runway Length/Width:	6001 ft / 150 ft	**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-Ground
Total Injuries:	3 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	TIMOTHY W MONVILLE	**Report Date:**	01/03/1995
Additional Participating Persons:	R.S. BOYLE; ARVADA, CO CLAUDE C UNDERWOOD; WICHITA, KS TOM KNOPP; VANDALIA, OH STEVEN MACON; PHOENIX, AZ		
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 pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		