Aviation Investigation Final Report

Location:	AUGUSTA, Georgia	**Accident Number:**	ATL95FA036
Date & Time:	January 12, 1995, 09:04 Local	**Registration:**	N13SE
Aircraft:	CESSNA 414	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	4 Fatal, 2 Serious
Flight Conducted Under:	Part 91: General aviation		

Analysis

WHILE CLIMBING THROUGH 6300 FT, THE PILOT REPORTED THE COMPLETE LOSS OF POWER ON THE RIGHT ENGINE. APPROX 4 MIN LATER, AND AFTER THE PILOT HAD ESTABLISHED AN EMERGENCY DESCENT FOR A LANDING, HE REPORTED THAT THE LEFT ENGINE HAD ALSO LOST POWER. THE AIRPLANE IMPACTED A DRIVEWAY AND SKIDDED INTO A BUILDING. EXAMINATION REVEALED THAT THE RIGHT ENGINE FAILED DUE TO SHIFTING OF THE ENGINE CASE HALVES. REVIEW OF THE ENGINE MAINTENANCE RECORDS INDICATED THAT SEVERAL CYLINDERS HAD BEEN REPLACED IN RECENT MONTHS; THE CYLINDER THROUGH BOLTS ARE USED TO TORQUE THE ENGINE CASE. A REASON FOR THE LOSS OF POWER ON THE LEFT ENGINE WAS NOT DETERMINED.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: THE LOSS OF POWER ON THE LEFT ENGINE FOR UNDETERMINED REASONS. A FACTOR WAS THE FAILURE OF THE RIGHT ENGINE DUE TO MAINTENANCE PERSONNEL'S FAILURE TO PROPERLY TORQUE THE CYLINDER THROUGH BOLTS.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF
Phase of Operation: CLIMB - TO CRUISE

Findings

1. 1 ENGINE
2. (F) ENGINE ASSEMBLY,CRANKCASE - UNDERTORQUED
3. (F) MAINTENANCE,MAJOR REPAIR - IMPROPER - OTHER MAINTENANCE PERSONNEL
4. (F) ENGINE ASSEMBLY,CRANKCASE - LOOSE PART/BOLT/NUT/CLAMP/ETC

Occurrence #2: LOSS OF ENGINE POWER
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
5. 1 ENGINE
6. (C) REASON FOR OCCURRENCE UNDETERMINED

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY DESCENT/LANDING

Factual Information

HISTORY OF FLIGHT

On January 12, 1995, at 0904 eastern standard time, a Cessna 414 N13SE, collided with the ground and burst into flames as the pilot attempted an emergency landing, two miles southwest of Bush Field in Augusta, Georgia. The business flight operated under the provisions of 14 CFR Part 91 with an instrument flight plan filed. Visual weather conditions prevailed at the time of the accident. The airplane was destroyed by impact forces and the post impact fire; a single story office building also sustained extensive fire damage. The four people on board the airplane were fatally injured, and two people in the office building received serious injuries. The flight departed Swainsboro, Georgia, at 0840 hours.

At 0747, the pilot of N13SE telephoned Macon Automated Flight Service Station (AFSS), and requested an instrument flight weather briefing from Swainsboro, Georgia, to Columbia, South Carolina. The pilot was given the current and forecasted weather for the planned route of flight. At the conclusion of the weather briefing, the pilot filed an instrument flight plan to Columbia.

At 0844, the pilot reported off Swainsboro to Atlanta Center, and requested an instrument flight clearance to Columbia. The pilot was issued a flight clearance, and was instructed to climb to 5000 feet, the pilot later requested a cruise altitude of 7000 feet. At 0847, N13SE was handed off to Augusta Approach Control.

At 0858, 15 miles south of Augusta, at 6300 feet mean sea level, the pilot reported that his right engine was out. The pilot declared an emergency, and reported that he had the airport in sight. The flight was cleared for a visual approach to Augusta. The Air Traffic Controller cleared the flight for a visual approach to runway 35. During the pilot's reply to the controller, a voice was heard in the background explaining to the passengers the emergency. The voice was later identified as the pilot rated passenger.

Within four minutes of the first emergency, and 1 1/2 miles south of the airport, the pilot reported that the left engine had also quit; the pilot further stated that he did not think they were going to make it. At 0903:30, the controller reported that the aircraft was one mile south of the airport; the pilot replied, "pray for us please."

Witnesses near the accident site observed the airplane as it maneuvered over a pulpwood plant, and cleared several utility lines. The airplane impacted the ground, burst into flames, skidded 90 feet, and collided with an office building.

PERSONNEL INFORMATION

Information about the pilot is included in this report at the data field labeled " First Pilot Information." A review of the pilot's training records revealed that he completed the Cessna 414 initial training on December 22, 1994. The training records also indicated that the pilot completed all phases of the training with satisfactory grades. No adverse comments or remarks were noted in the training records.

AIRCRAFT INFORMATION

Information about the airplane is contained in this report at the data field Labeled "Aircraft Information." The historical review of the right engine revealed that it had been overhauled in December 1988, and had a total time of 2760.2 flight hours. A review of the right engine logs also revealed that four cylinders, 2, 3, 4, and 6, had been changed within the previous 127 hours (see attached aircraft maintenance logs).

METEOROLOGICAL INFORMATION

Visual weather conditions prevailed at the time of the accident. Additional weather information is contained in this report at the data field labeled "Weather Information."

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site disclosed that wreckage debris was scattered over an area 250 feet long and 80 feet wide. The wreckage path was orientated on a 305 degrees magnetic heading. The distance from the initial contact point on the driveway to the main wreckage was about 125 feet. The aircraft rested on a easterly magnetic heading with the left wing spar cap embedded into the building. Further examination of the airframe revealed that the fuselage sustained extensive fire damage which destroyed the cockpit and cabin areas. Despite the fire and impact damage, the empennage section remained attached to the airframe. Both wings sustained extensive fire and impact damage.

The landing gear actuator was in the gear down position, and the wing flap actuator was in the flaps up position. The rudder trim tab appeared to be neutral; the tab actuator extension indicated it was about 4 degrees, tab left.

The aircraft's five tank fuel system sustained extensive impact and fire damage. The left fuel tank control handle was in the off position as indicated by the length of the bent control cable at the inboard end. The impact damaged left fuel selector valve (outboard the engine nacelle) was in the crossfeed position. The right fuel tank selector handle was in the crossfeed position, with the selector valve beyond the off position. The right side selector system was subjected to impact forces, and positions were not considered to be reliable.

Examination of the accident site disclosed that the left engine was located on the left side of the fuselage adjacent to the office building. The engine remained attached to the firewall by

the control cables. The engine assembly mounts were attached to the broken cradle assembly. The engine examination also disclosed that the induction system was fire damaged, and melted away. The propeller assembly remained attached to the engine assembly.

The teardown inspection of the left engine assembly failed to disclose a mechanical failure or subsystem malfunction.

Examination of the right engine assembly revealed that it was inverted at the accident site and covered with wreckage debris. The engine sustained extensive fire damage which melted several external engine components. When wreckage debris was removed from the engine and it was turned over to it's normal position, a hole under the left magneto was discovered in the engine case.

The teardown of the right engine disclosed that the number 2 connecting rod had separated at the junction of the beam section and big end. Pieces on the connecting rod big end, shreds of bearing material, and pieces of aluminum were found in the sump; each connecting rod bolt was broken into three pieces. The crankcase was extensively damaged which included a hole above the number 2 cylinder, and gouges in the cylinder deck area at cylinders 1, 3, 5, and 4.

The examination also discovered that the crankcase halves were fretted at main bearing webs number 1, 2, 3, and 4. Fretting was heavy at 2 and 3, and light fretting around the backbone bolts (see attached Aircraft Accident Investigation Glossary). Examination of the crank assembly disclosed that the main bearings had shifted from their normally installed position (see attached engine examination). The teardown inspection also discovered gouging and discoloration on the number 2 main bearing journal; number 2 and 3 rod journals sustained evidence of oil starvation.

During the examination of the propellers, the left and right propeller systems were found in the feather position at the accident site. The left engine propeller teardown inspection revealed that the blades were in the feather position at impact as indicated by blade scoring and bending, and the lack of classical rotational damage. The right engine propeller teardown inspection revealed identical physical damage, but the internal examination revealed overload damage to the latch mechanism (see attached propeller examination report).

MEDICAL AND PATHOLOGICAL INFORMATION

The postmortem examination on the pilot was performed by Dr. Kris L. Sperry on January 13, 1995, at the Georgia Bureau of Investigation, Department of Forensic Sciences in Atlanta, Georgia. The cause of death for the pilot and passengers were reported as smoke inhalation. The toxicological examination of the pilot was negative for alcohol. It also revealed 28.000% carboxyhemoglobin in the blood, and a 0.290 (ug/ml) level of cyanide in the blood. Nicotine metabolites were detected in both the urine and blood.

ADDITIONAL INFORMATION

A review of estimated weight and balance data revealed that the flight departed Swainsboro, Georgia, 360 pounds over the designed takeoff gross weight. The gross weight at the accident site was estimated at 272 pounds over the designed gross weight; the airplane was within the extended fore and aft center of gravity limits (see attached estimated eight and balance).

According to the aircraft owners manual, in the event of a double engine failure condition, maximum gliding distance can be obtained by feathering both propellers, and maintaining approximately 130 mph/114 knots indicated airspeed with the landing gear and wing flaps up (see attached maximum glide chart). The forced landing checklist indicated that the mixture control levers should be in the idle cut off position, the propeller levers should be in the feather position, and the fuel selectors should be in the off position. The landing gear extention is dependant upon the landing type of terrain where the forced landing is to be made.

According to recovered radar data, from 0858:46 to 0902:55, the average ground speed was 118 mph with an average descent, over a distance of 12 miles from 6300 feet, or 1170 feet per minute (see profile view of the final approach).

The wreckage was released to:

Mr. Harry Brooks (Insurance Adjustor) P.O. Box 888525 Atlanta, Georgia 30356.

Pilot Information

Certificate:	Commercial	**Age:**	33,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):	Airplane single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	October 11, 1994
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1312 hours (Total, all aircraft), 23 hours (Total, this make and model), 1201 hours (Pilot In Command, all aircraft), 108 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	**Registration:**	N13SE
Model/Series:	414 414	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	0437
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	June 29, 1994 Annual	**Certified Max Gross Wt.:**	6350 lbs
Time Since Last Inspection:	102 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	4526 Hrs	**Engine Manufacturer:**	CONTINENTAL
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-520-N
Registered Owner:	MERRILL, CHARLES B. JR.	**Rated Power:**	310 Horsepower
Operator:	MERRILL, CHARLES B. JR.	**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:	AGS ,145 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	09:09 Local	**Direction from Accident Site:**	45°
Lowest Cloud Condition:	Clear	**Visibility**	7 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	0°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	11°C / 8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	SWAINSBORO , GA (SBO)	**Type of Flight Plan Filed:**	IFR
Destination:	COLUMBIA , SC (CAE)	**Type of Clearance:**	IFR
Departure Time:	08:30 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	BUSH FIELD AGS	**Runway Surface Type:**	Asphalt
Airport Elevation:	145 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	35	**IFR Approach:**	Visual
Runway Length/Width:	8001 ft / 150 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	2 Serious	**Aircraft Explosion:**	None
Total Injuries:	4 Fatal, 2 Serious	**Latitude, Longitude:**	33.34962,-81.969482(est)

Administrative Information

Investigator In Charge (IIC):	Powell, Phillip
Additional Participating Persons:	GERARD A BOISVERT; COLLEGE PARK , GA LARRY E PAYNE; COLLEGE PARK , GA
Original Publish Date:	October 26, 1995
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=3467