

Air Safety Investigations Aircraft Incident/Accident Technical Report

Aircraft Incident/ Accident Information	Year: 1981	Make: Beechcraft	Model: C90
	Serial number: LJ-991		Registration: N19LW
Location: Geneva, FL		Date: 12-08-17	Time: 1115 EST
Aircraft Owner		Aircraft Operator	
Planemarketing, LLC [REDACTED]		L3 Airline Academy [REDACTED]	
Report Information			
Senior Air Safety Investigator: Peter J. Basile		Report #: ASI-17-DL-T	Report date: 04-30-18

Airframe

Impact Sequence and Airframe Structure

The aircraft impacted water near the northwestern shore of Lake Harney. The aircraft separated into multiple pieces and was spread over about 200 square feet along the bottom of the lake at a depth of approximately 10 feet.



Wreckage overview

Airframe Systems

Flight Control System Information		
Control lock: Undetermined		
Flight Control Cable Continuity		
Ailerons: See below	Elevators: See below	Rudder: See below
Aileron tab: See below	Elevator tab: See below	Rudder tab: See below
Flap and Trim Positions		
Flaps:	Indicator: Up	Handle: Up
	Left outboard actuator: 1.55" = ~0°	Left inboard actuator: 2.35" = ~0°
	Right outboard actuator: 1.9" = ~0°	Right inboard actuator: Undt
Elevator trim:	Indicator: Undetermined	
	Left actuator: 1.25" = ~3.5° tab up	Right actuator: 1.35" = ~5° tab up
Rudder trim:	Indicator: Undetermined	Actuator: 8.95" = 0-5° tab left
Aileron trim:	Indicator: Undetermined	Actuator: 1.25" = 0-5° tab up

Remarks:

Both wings exhibited accordion style compression damage throughout. The left aileron and inboard flap were separated from the left wing. The outboard left flap remained attached to the left wing. The left aileron control cables remained attached to the left aileron bell crank which was loosely located in the outboard left-wing area. The left aileron control cables had been cut by recovery personnel near the location where the outboard left wing attaches to the outboard side of the left engine nacelle. The left aileron trim cables were separated in the same general area of the nacelle and appeared to have failed in tensile overload.



Left aileron bellcrank

The right inboard flap, outboard flap, and aileron were separated from the right wing. The right aileron control cables and bell crank were separated from the right wing. The right aileron control cables remained attached to the separated bell crank. The right aileron control cables were found separated in tensile overload near the aileron quadrant. One of the right aileron control cables remained connected to the roll servo bridal clamp. The aileron cables were continuous from the control column to the impact damaged aileron quadrant. The left and right engine nacelle structure and the inboard portions of the left and right wing, located between the nacelle and the fuselage, were heavily fragmented.



Right aileron bellcrank



Aileron control cables

The empennage was separated from the fuselage. The left horizontal stabilizer remained attached to the tail; the left elevator was separated. The right horizontal stabilizer and elevator were separated from the tail; the right elevator remained attached to the right horizontal stabilizer. The vertical stabilizer and rudder remained attached to the tail. The top 2-3' of the vertical stabilizer and rudder were crushed aft in a tapering manner. The top portion of the rudder was bent downward. The rudder trim tab remained attached to the rudder.



Left horizontal stabilizer



Left elevator



Right horizontal stabilizer and elevator

The elevator cables remained attached to the forward elevator bellcrank. The elevator cables had been cut by recovery personnel in the fuselage area during the recovery process. The elevator cables remained attached to the aft elevator bellcrank. The elevator push/pull tubes remained attached to the aft elevator bellcrank, but were separated from the elevator torque tubes.



Forward elevator bellcrank



Aft elevator bellcrank

The rudder control cables remained attached to the forward rudder control bellcrank. The rudder cables had been cut by recovery personnel in the fuselage area during the recovery process. The rudder cables remained attached to the rudder horn in the empennage.



Forward rudder bellcrank



Left rudder cable on rudder horn

The rudder trim tab cables were continuous in the tail and the chain remained engaged on the rudder trim tab actuator sprocket. The elevator pitch trim servo cables remained on the capstan and were attached to the elevator bellcrank. The yaw servo cables remained on the capstan and the bridles were attached to the rudder cables.

The electric elevator trim cables remained attached to the capstan. One of the trim cables was fractured just aft of the electric trim motor; the cable appeared to have been severed by surrounding structure. All control cables in the tail had been cut by recovery personnel forward of the dorsal.

Airframe Fuel System Condition, Controls, and Read Outs					
Fuel filter screen:		Left: See below		Right: Clean	
Fuel strainer bowl:		Left: See below		Right: See below	
Main fuel tank gauge:		Left: Undetermined		Right: Undetermined	
Fuel control heaters:		Left: Undetermined		Right: Undetermined	
Fuel selector handle:	Left: Undetermined	Fuel selector valve:	Left: Undetermined	Fuel boost pump:	Left: Undetermined
	Right: Undetermined		Right: Undetermined		Right: Undetermined

Remarks:

The left fuel strainer bowl and screen were coated in mud. The right fuel strainer bowl was not observed. The right fuel strainer screen remained attached to the engine; the screen was clean.

Landing Gear System Condition and Controls			
Gear position:	Nose: Undetermined	Left: Retracted	Right: Retracted
Actuator position:	Nose: Undetermined	Left: Retracted	Right: Retracted
Landing gear selector:	Retracted		Aux gear control: Stowed
Environmental System Controls and Read Outs			
Defrost:	Undetermined	Cabin heater:	Undetermined
Fan speed:	Undetermined	Cabin bleed air:	Left: Undetermined Right: Undetermined
Air conditioner:	Blower: Undetermined	Mode: Undetermined	Temperature knob: Undetermined
Oxygen quantity:	Undetermined		Oxygen control knob: Undetermined
Pressurization System Controls and Read Outs			
Cabin altitude needle:	400'		Difference pressure: Undetermined
Cabin VSI:	Undetermined		Pressurization: Undetermined
Cabin rate knob:	Undetermined		Cabin altitude knob: Undetermined
Cabin vent:	Undetermined		Source selector knob: Undetermined
Icing System Information, Switches, and Read Outs			
Certified into known icing?	Yes		Type of Ice Protection Installed? Boots with heated windshield
Pitot/Static heat:	Left: Undetermined	Right: Undetermined	Stall vane heat: Undetermined
Propeller:	Left: Undetermined		Right: Undetermined
	Left amp gauge: Undetermined		Right amp gauge: Undetermined
Windshield heat:	Undetermined	Surface de-ice:	Undetermined
Windshield alcohol:	Not applicable		
Inertial separator:	Left: Undetermined		Right: Undetermined
ELT Information			
Installed?	Yes	Manufacturer: Artex	Model: 453-6603
Type:	ME406		
Serial number:	197-06045	Battery due date:	04-23
Armed:	Undetermined		Activated: Undetermined

Remarks:

The instrument panel was crushed and fragmented. Multiple switch positions were not obtained.

Cabin and Equipment/Furnishings

Restraint System Information						
Seat	Occupied	Restraint type	Restraint used	Condition	Manufacturer	
1	Yes	4-Point	Undt	Undetermined	Beechcraft	
2	Yes	4-Point	Yes	Cut by first responders	Beechcraft	
3	No	3-Point	No	Undetermined	Beechcraft	
4	S/B	3-Point	Undt	Undetermined	Beechcraft	
5	No	3-Point	No	Undetermined	Beechcraft	
6	No	3-Point	No	Undetermined	Beechcraft	
7	No	3-Point	No	Undetermined	Beechcraft	
8	No	3-Point	No	Undetermined	Beechcraft	

Seat Condition Information					
Seat	Orientation	Feet intact	Back intact	Base intact	Rail intact
1	Forward facing	No	No	No	No
2	Forward facing	No	No	No	No
3	Forward facing	No	No	No	No
4	Forward facing	No	No	No	No
5	Forward facing	No	No	No	No
6	Forward facing	No	No	No	No
7	Forward facing	No	No	No	No
8	Forward facing	No	No	No	No

Remarks:

Seat 1 remained partially attached to the forward floor assembly. Seat 2 separated from the floor and was found separated from the aircraft. The seat 1 and 2 seat bases sustained impact compression damage; the seat backs remained attached and were deformed. All cabin seats were separated from the structure and exhibited impact compression damage.

The seat 2 lap belt buckle was found attached backwards.



Seat 2



Seat 2 restraint

Instrument Panel

Navigation Instruments							
Analog primary instruments				Autopilot type: See below			
Instrument air: Undetermined		Magnetic compass: Undetermined		Clock: Undetermined			
	Left side				Left side		
Airspeed:	Undetermined		Turn coordinator (airplane):	Undetermined			
Attitude (pitch):	~30-40° Down		Turn coordinator (ball):	Undetermined			
Attitude (roll):	Left		Heading indicator:	Undetermined			
Altimeter:	~160'		Heading "bug":	Undetermined			
Altimeter setting:	~29.01 inHg		Vertical speed indicator:	~3,000 Down			
Communication and Navigation Radios							
Radio	Control	Active frequency	Stand-by frequency	Radio	Control	Active frequency	Stand-by frequency
Com 1:	Undt	Undt	Undt	Com 2:	Undt	Undt	Undt
Nav 1:	Undt	108.9	109.3	Nav 2:	Undt	540	108.9
Obs 1:	Undt			Obs 2:	Undt		
Transponder:	Mode: Undt	Active code: Undt		Stand-by code: Undt			
Engine Starter and Ignition Switch Positions							
Ignition:	Left: Undetermined			Right: Undetermined			
Ignition and engine:	Left: Undetermined			Right: Undetermined			
Electrical Switch Positions							
Left gen: Undetermined		Battery: Undetermined		Right gen: Undetermined			
Avionics bus:	Left: Undetermined		Right: Undetermined		Inverter switch: Undetermined		
Propeller Switch Positions							
Governor test: Undetermined				Auto feather: Undetermined			
Lighting Switch Positions							
Landing: Undetermined		Taxi Undetermined		Navigation: Undetermined			
Anti-collision: Undetermined				De-ice: Undetermined			
Seat belt: Undetermined		Oxygen sign: Undetermined		Door: Undetermined			

Remarks:

The instrument panel was crushed and fragmented. Several instruments were not observed. The directional gyro and compass gyro were removed and exhibited rotational scoring.

Powerplant Description

Engine Instruments					
Hour meter: Undetermined			Voltmeter: Undetermined		
	Left Engine	Right Engine		Left Engine	Right Engine
Torquemeter:	1,400	Undetermined	Fuel flow:	320 pph	Undetermined
Np RPM needle:	2,000	1,940	Oil press:	Undetermined	Undetermined
ITT:	Undetermined	Undetermined	Oil temp:	Undetermined	Undetermined
Ng RPM:	86	100	Ammeter:	Undetermined	Undetermined
Left Engine Control Positions					
	Cockpit	Engine		Cockpit	Engine
Power:	Full	Undt	Cowl flaps:	N/A	N/A
Propeller:	Low	Undt	Inertial sep:	Undt	Undt
Fuel control:	Rich	Undt			
Right Engine Control Positions					
	Cockpit	Engine		Cockpit	Engine
Power:	Full	Undt	Cowl flaps:	N/A	N/A
Propeller:	Low	Undt	Inertial sep:	Undt	Undt
Fuel control:	Rich	Undt			
Fire Protection and Propeller Sync Switch Positions					
Covered fire switch:	Left engine: Undetermined		Right engine: Undetermined		
Propeller sync: Undetermined					
Engine Condition					
	Left engine		Right engine		
Engine attached to airframe:	No		No		
Propeller attached to engine:	No		No		

Remarks:

The engines were placed in shipping containers provide by Pratt & Whitney Canada and were shipped to Montreal, Canada. The engine examinations had not been completed at the time this report was written.

Propellers

The propellers were examined by two Hartzell propeller investigators. The left and right propeller blade damage was consistent with rotation under power. The left and right propeller blade angles were not determined. Witness marks observed on the base of the blades were consistent with a near "low" pitch blade position at the time of impact. The left propeller blades were bent and twisted in the opposite direction of rotation. The tip of one of the left propeller blades was fractured. The right propeller blades were also bent and twisted in the opposite direction of rotation. One of the right propeller blades was fractured near the blade shank and exhibited S-bending.

Research & Testing

The engines were shipped to Pratt & Whitney Canada for examination. The NTSB-IIC did not retain any additional parts for testing. The aircraft was equipped with a Bendix King EGPWS, which contains non-volatile memory, but it was not identified in the recovered wreckage.

L3 information compiled by the NTSB-IIC:

L3 Airline Academy is located at KSFB, and specializes in training of students from various countries, from zero flight experience through their flight instructor certificate. The school was originally started in 1989 under the name of Com Air Aviation Academy, and had been sold twice (Delta Connection Academy and Aerosim) before L3 purchased the company in October 2016. The company operates 92 airplanes, which include Cessna 172, Cirrus SR-20, Piper PA-28, Piper PA-44, Diamond DA-42, and Beech C90 aircraft. They employ about 120 people, which include flight instructors, check pilots, and various support staff and have about 500 students at any given time in various programs.

L3 Airline Academy utilizes in-house flight tracking of their fleet with a program called OpsView. Each flight is monitored, and if delayed for any reason, they will initiate an internal overdue aircraft procedure, which includes calling local airports and air traffic control facilities prior to reporting the airplane overdue. Company personnel reported that each airplane has a discrepancy logbook, which is checked by the flight instructor and dispatch prior to the flight being dispatched. The sheets are kept within the flight book for the respective airplane.

The company conducts in-house maintenance on all their aircraft with the exception of the Beech C90's, which are maintained by Aeronautical Repairs, located adjacent to the school. Aeronautical Repairs employs one person and contracts additional mechanics as needed.

Information provided by the Director of Flight Operations and the Chief Flight Instructor revealed that the training course which both students were enrolled in was a CFR 141 approved course, and accredited by the CAAC. Students typically arrive with no experience in aviation and are prescreened to verify their English is sufficient. Upon arrival, the students undergo a one month class that is focused on aviation related English and a second month that is divided between English classes and private pilot ground school prior to starting their flight training. Before a student begins their flight training, the school requires the student to pass the private pilot written test. The students then complete their private pilot training. Upon completion, they are enrolled in the commercial and instrument flight course, which includes transition into the Cirrus SR20. Following completion of their instrument certificate, the students continue to build flight time with a flight instructor, and eventually go to their multi-engine commercial ground school, which is followed by flight training in the Piper PA-44. Upon completion of their commercial multi-engine rating, the students transition into high performance ground school, which is about four weeks in length, before transitioning into the Beech C90, which is taught by four different inhouse instructors and four contract instructors.

Throughout the students training, the company utilizes inhouse check pilots for intermediate progress and stage checks. They also utilize inhouse check pilots and some contracted designated pilot examiners for the final exam flights, which is the issuance of the pilot certificate or rating for the respective program.

L3 Aviation Academy has an initial hire drug test for all employees and has a random drug test program for employees. The random drug test program is not actively used unless there is an incident.