Beechcraft | Cessna | Hawker

TEXTRON AVIATION

Air Safety Investigations
Aircraft Incident/Accident Technical Report

Aircraft Incident/ Accident Information	Year: 1980	Make: Cessna	Model: 335
	Serial number: 335-0023	Registration: N2707J	
Location: Lake Worth, FL		Date: 09-09-18	Time: 1050 EDT

Aircraft Owner	Aircraft Operator
[redacted] Wilmington, DE 19801-1171	Philip Anglo Castronova [redacted]. Lake Worth, FL 33467-7391

Report Information		
Senior Air Safety Investigator: Andrew L. Hall	Report #: ASI-18-CT-T	Report date: 01-25-19

Airframe

Impact Sequence and Airframe Structure

The airplane impacted trees and terrain in a park. The main wreckage came to rest upright on a heading of about 030° magnetic. The wreckage path was approximately 40 feet in length. The impact area was surrounded by trees; the only damage to branches were those directly above the main wreckage. A series of three ground scars consistent with propeller strikes were located on a heading of 030° which were in line and about 15 feet behind the right engine. The aircraft was subsequently involved in a post impact fire which severely damaged the cockpit and cabin components.

Airframe Systems

Flight Control System Information			
Control lock: Found loose in aircraft			
Flight Control Cable Continuity			
Ailerons: Established	Elevators: Established	Rudder: Established	
Aileron tab: Established	Elevator tab: Established	Rudder tab: Established	
Flap and Trim Positions			
Flap indicator: Mid travel down	Flap handle: Mid travel down	Flap actuator: 12 links	
Elevator trim:	Indicator: Unknown due to damage	Actuator: 1.85 ~10° tab up	
Rudder trim:	Indicator: Full left	Actuator: 1,15 ~ 14° tab right	
Aileron trim:	Indicator: Unknown due to damage	Actuator: 1.25 ~10° tab down	

Remarks:
Flight control cable continuity was established by the NTSB-IIC at the site and confirmed during the review of the wreckage.

Airframe Fuel System Condition, Controls, and Read Outs					
Fuel strainer screen:	Left: See below			Right: See below	
Fuel strainer bowl:	Left: See below			Right: See below	
Main fuel tank gauge:	Left: Undt			Right: Undt	
Auxiliary fuel gauge:	Left: Undt			Right: Undt	
Locker fuel gauge:	Left: Undt			Right: N/A	
Locker transfer:	Left: Undetermined			Right: Not applicable	
Fuel selector handle:	Left: Auxiliary	Fuel selector valve:	Left: Left	Fuel boost pump:	Left: Low
	Right: Auxiliary		Right: Right		Right: Low

Remarks:

Both wing auxiliary fuel tanks were severely damaged by the post impact fire. All fuel caps were observed locked in their receptacles. Both main tip tanks were compromised by the ground impact and the center tank baffles were observed with minimal damage. The left wing locker tank was observed intact and 15 gallons of fuel was drained from it during the review of the wreckage. The left fuel selector valve remained attached to the wing and was confirmed to be in the main tank position. The right fuel selector valve remained attached to the control rod only and appeared to be in the main position, but this could not be confirmed with an air test. Both fuel selector valve plastic filters were melted in the bowl. The cockpit fuel selector handles were found in the auxiliary position, however, there are no detents on the cockpit fuel selector handle.

Landing Gear System Condition and Controls			
Gear position:	Nose: Extended	Left: Extended	Right: Extended
Actuator position:	Nose: Extended	Left: Extended	Right: Extended
Landing gear selector: Undetermined		Aux gear control: Stowed	

Environmental System Controls and Read Outs		
Cabin heater: Undt	Cabin vent: Undt	Defrost: Undt
Air conditioner: N/A	Oxygen system: Undetermined	Oxygen quantity: Undetermined

Icing System Information and Switches			
Certified into known icing? No		De-ice boots installed? Yes	
Pitot heat: Undetermined		Stall heat: Undetermined	
De-ice:	Surface: Undetermined	Propeller: Undetermined	Windshield: Undetermined
Anti-ice:	Surface: Not applicable	Propeller: Undetermined	Windshield: Undetermined

ELT Information			
Installed? Yes	Manufacturer: Doren & Margolin	Model: ELT 6.1	Type: AF
Serial number: 30043	Battery due date: Undt	Armed: Yes	Activated: Undetermined

Remarks:
According to the NTSB-IIC both main landing gear were observed displaced rearward at the accident site.

Cabin and Equipment/Furnishings

Restraint System Information						
Seat	Occupied	Restraint type	Restraint used	Condition	Manufacturer	
1	Yes	3-Point	Undt	Burned	Undetermined	
2	No	3-Point	No	Burned	Undetermined	
3	No	2-Point	No	Burned	Undetermined	
4	No	2-Point	No	Burned	Undetermined	
5	No	2-Point	No	Burned	Undetermined	
6	Yes	2-Point	Undt	Burned	Undetermined	

Seat Condition Information					
Seat	Orientation	Feet intact	Back intact	Base intact	Rail intact
1	Forward facing	Partially	Partially	Partially	Yes
2	Forward facing	Yes	Yes	Yes	Yes
3	Rear facing	Partially	Yes	Yes	Partially
4	Rear facing	Partially	Yes	Yes	Partially
5	Forward facing	Partially	Partially	Partially	Partially
6	Forward facing	Partially	Partially	Partially	Partially

Remarks:
None

Instrument Panel

Navigation Instruments					
Digital primary instruments			Autopilot type: S-Tec		
Suction gage: Undetermined		Magnetic compass: Undetermined		Clock: Undetermined	
	Left side	Right side		Left side	Right side
Airspeed:	Undt	Undt	Turn coordinator (airplane):	Undt	Undt
Attitude (pitch):	Undt	Undt	Turn coordinator (ball):	Undt	Undt
Attitude (roll):	Undt	Undt	Heading indicator:	Undt	Undt
Altimeter:	Undt	Undt	Heading "bug":	Undt	Undt
Altimeter setting:	Undt	Undt	Vertical speed indicator:	Undt	Undt
Stand-by:	Airspeed: 180 Kts		Attitude (pitch): 20° D		Attitude (roll): 30° L
	Altimeter: 200'		Altimeter setting: Undt		

Communication and Navigation Radios							
Radio	Control	Active frequency	Stand-by frequency	Radio	Control	Active frequency	Stand-by frequency
Com 1:	Undt	Undetermined	Undetermined	Com 2:	Undt	Undetermined	Undetermined
Nav 1:	Undt	Undetermined	Undetermined	Nav 2:	Undt	Undetermined	Undetermined
Obs 1:	Undetermined			Obs 2:	Undetermined		
Transponder:	Mode: Undetermined			Active code: Undetermined		Stand-by code: Undetermined	

Electrical Switch Positions	
Master battery: Undetermined	Stand-by battery: Not applicable
Left alternator: On	Right alternator: On
Avionics 1: Undetermined	Avionics 2: Undetermined

Lighting Switch Positions		
Navigation: Undetermined	Rotating beacon: Undetermined	Landing: Undetermined
Taxi: Undetermined	Strobe: Undetermined	Instrument: Undetermined
Wing Ice: Undetermined		

Ignition Switch Positions		
Left engine:	Left magneto: Undetermined	Right magneto: Undetermined
Right engine:	Left magneto: Undetermined	Right magneto: On

Remarks:
One altimeter was observed loose in the wreckage and the setting was 30.11. One electric gyro was observed loose in the wreckage and rotational scoring was observed on the rotor.

Powerplant Description

Engine Instruments					
Hour meter: Undetermined					
	Left engine	Right engine		Left engine	Right engine
Tach RPM:	1,500	2,500	CHT:	Undt	Undt
Manifold press:	Undt	Undt	Fuel press:	Undt	Undt
Oil press:	Undt	Undt	Fuel flow:	Undt	Undt
Oil temp:	Undt	Undt	Ammeter:	Undt	Undt
EGT:	Undt	Undt	Voltmeter:	Undt	Undt

Left Engine Control Positions					
	Cockpit	Engine		Cockpit	Engine
Throttle:	Mid travel	Undetermined	Cowl flaps:	Undetermined	Undetermined
Mixture:	Near Cut off	Undetermined	Alt air:	Undetermined	Undetermined
Propeller:	Mid travel	Undetermined	Primer:	Undetermined	

Right Engine Control Positions					
	Cockpit	Engine		Cockpit	Engine
Throttle:	Full forward	Undetermined	Cowl flaps:	Undetermined	Undetermined
Mixture:	Near Cut off	Undetermined	Alt air:	Undetermined	Undetermined
Propeller:	Low	Undetermined	Primer:	Undetermined	

Engine Condition		
	Left engine	Right engine
Engine attached to airframe:	Yes	Yes
Propeller attached to engine:	No	Yes
Engine compression:	Yes	Yes
Vacuum pump drive shaft:	Undetermined	Undetermined
Valve train continuity:	Yes	Yes

Engine Fuel System Condition		
	Left engine	Right engine
Fuel pump drive shaft:	Intact	See below
Fuel injectors:	Undetermined	Undetermined
Fuel control inlet screen:	Clean	Clean
Distribution valve screen:	Clean	Clean

Engine Magneto Condition		
	Left engine	Right engine
Left magneto attached:	Yes	Yes
Left magneto spark:	All leads	No
Right magneto attached:	Yes	Yes
Right magneto spark:	All leads	All leads

Left Engine Spark Plug Condition (per Champion Check-A-Plug Card)						
	1	2	3	4	5	6
Top	Normal	Normal	Normal	Normal	Normal	Normal
Bottom	Not examined	Not examined	Not examined	Not examined	Not examined	Not examined

Right Engine Spark Plug Condition (per Champion Check-A-Plug Card)						
	1	2	3	4	5	6
Top	Normal	Normal	Normal	Normal	Normal	Normal
Bottom	Not examined	Not examined	Not examined	Not examined	Not examined	Not examined

Remarks:
The right engine was examined, and the pistons and cylinder heads exhibited normal combustion deposits. The fuel pump was removed, and the drive was observed separated. The pump shaft and rotor turned smoothly.

The left engine was examined, and the pistons and cylinder heads exhibited normal combustion deposits. The fuel pump was removed, and the drive was observed intact. The pump shaft and rotor turned smoothly.

According to the CMI Investigator the inspection of the engines did not reveal any pre-impact anomalies that would have prevented its ability to produce rated horsepower.

Propellers

A series of three ground scars consistent with propeller strikes were located on a heading of 030° which were in line and about 15 feet behind the right engine. The left propeller was observed separated from the engine and one blade was separated from the hub. None of the blades for the left propeller exhibited signs of rotation. The right propeller remained attached to the engine and all three blades exhibited signs of rotation.

The propellers were reviewed at McCauley Propellers in Wichita, KS, on 12-11-18. The results of the review were that both propellers were on the low pitch stops at the time of impact. Neither propeller exhibited signs of significant power being developed at the time of impact.

Research & Testing

The primary flight display and the engine monitor, JPI EDM 760, were retained by the NTSB-IIC and forwarded to the NTSB lab in Washington D.C. for analysis. Results have not been made available at the time of this writing.

28 March 2019

Mr. Doug Brazy
National Transportation Safety Board

MEMO: MPS-18-050

SUBJECT: Teardown Inspection of Propellers from:
Cessna 335, N2707J,
File #:(MPS: 2018-09, NTSB: ERA18FA244)

Subject propellers were installed on a Cessna 335, N2707J, which crashed on 9 September 2018 near Lake Worth, FL. McCauley was requested to assist in the examination of the propellers and with the interpretation of the damage indications.

The propellers were inspected at McCauley Propeller Systems Engineering Lab, Wichita, Kansas on 11 December 2018, with the following in attendance:

Christy Eckerman	Federal Aviation Administration-Wichita ACO
Jeff Janusz	Federal Aviation Administration-Wichita ACO
Andrew Hall	Textron Aviation-Air Safety Investigation
Travis Martin	Textron Aviation-McCauley Engineering Lab
Danny Ball	Textron Aviation-McCauley Engineering

The provided wreckage arrived in a single large wooden crate. The crate contained remnants of two propeller assemblies. Additionally, the crate contained a cardboard box holding propeller actuation components and spinner assembly fragments.

The installed position of the two propellers on the airframe was provided by investigators on the scene of the accident.

Blade numbering in the table below is based on the factory stamped hub socket numbering or recovery markings as noted.

The model number and serial numbers of the propellers are as follows: *(Dates of manufacture for the serialized components are shown parenthetically in italics)*

	LH Propeller:	RH Propeller:
Model:	**3AF32C504-C/G-82NEA-5.5**	**3AF32C87-N2R/S-82NC-2**
Serial (S/N):	**950681** *(1995 mfg)*	**714473** *(1971 mfg)*
Blade 1 S/N:	**OC024** *(3/1994 mfg)* ***paint marked "LA"*	**CF121YS** *(6/1982 mfg)* *paint marked "RA"*
Blade 2 S/N:	**OC026** *(3/1994 mfg)* *paint marked "LB"*	**CF285Y** *(6/1982 mfg)* *paint marked "RC"*
Blade 3 S/N:	**KF202** *(6/1990 mfg)* ***paint marked "LC"*	**CF318YS** *(6/1982 mfg)*

***LH prop blades 1 and 3 arrived for examination free from the hub sockets. Socket attribution in this table is based on the recovery paint markings.*

After the examination, the following conclusions are drawn:

1. Both propellers have damage resulting from the impact sequence. There are no indications of any type of propeller failure or malfunction prior to the impact sequence.

2. Both the LH and RH propellers have indications consistent with low level rotational energy absorption (rotation at impact, while likely being driven by some lower engine power) during the impact sequence. Exact engine power levels were not determined. The RH propeller has more rotational damage indications than the LH.

3. Both propellers have impact signature markings or component positions indicating blades operating at or near the low pitch stop during the impact sequence.

The conclusions noted above are based on a variety of observations, some of which are noted below:

1. Both propellers have sudden-failure type damage that is typically associated with impact forces; and gross part deflections. The investigation found no evidence of any type of fatigue failure.

2. Both LH and RH propeller blades and pitch change components have strong damage and witness marks from contact with adjacent pitch change hardware during the accident sequence. The position of these features and components indicates both propellers operating at or near the low pitch stop during the impact sequence.

3. The LH propeller actuating cylinder was found with an impact dent in the feather region of the piston travel. This indicates the propeller pitch change system was not in the feather region during the impact sequence.

4. Both the LH and RH propeller blade bending, twisting, paint scuffing, and overall propeller assembly damage is typical of that associated with lower-level rotational energy absorption (rotation with some lower engine power) during the impact sequence.

5. Both propellers had evidence of prior field service events including part stampings and hub painting.

At NTSB request, the propeller wreckage was return shipped to: Florida Air Recovery, Jacksonville, FL.

Respectfully,

[redacted]

Danny L. Ball
Textron Aviation-McCauley Propeller Engineering