

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24FA318

EXAMINATION

7/22/2024

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A. ACCIDENT

Location: Long Island Mac Arthur Airport (ISP)
Date: July 22, 2024
Time: 6:12 pm local EDT
2212 (UTC)
Airplane: BE-A36

B. EXAMINATION (ON SITE AND AT ANGLIN'S AIRCRAFT RECOVERY)

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C. SUMMARY

Shortly after departure, during the initial climb after gear retraction, the airplane's speed began to decrease; witnesses reported that the left wing dropped, and it rolled over onto its back and descended into the terrain just off the departure end of runway 24. Airport security video showed a normal takeoff with a shallow climb out before it disappeared out of the frame.

D. DETAILS OF THE EXAMINATION

1.0 Accident Site

Accident site was relatively compact. The wreckage path consisting of the ground scars was about 40 feet long, but a majority of the wreckage was located in the immediate vicinity of the accident site. All components, flight control surfaces, wings, elevator & stabilizers were located.

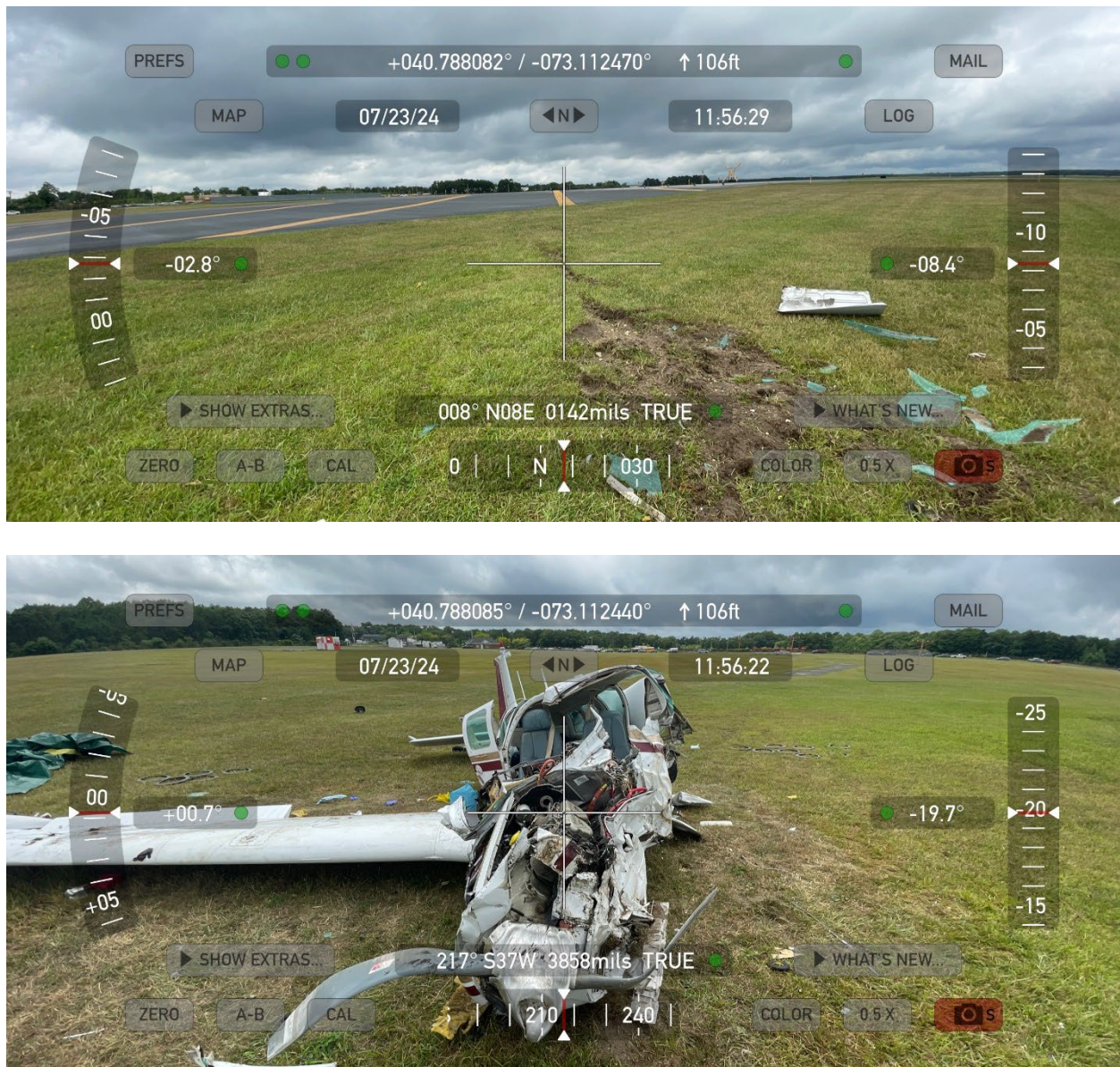


Figure 1: Accident site with location/ direction details.

2.0 Airframe Examination

2.1 Fuselage

Fuselage buckled and crumpled in several areas but mostly intact from behind the pilot seat aft to the empennage. The most severe damage was from the pilot seats forward to the engine compartment. The engine compartment was significantly compromised by impact forces, displacing the engine and propeller. Holes were cut in the fuselage to gain access to control cables and during the off-site examination, the seats and floorboards were removed to facilitate control cable continuity.

2.2 Empennage

The empennage remained attached to the fuselage. The rudder and stabilizer remained attached to the empennage at their respective hinges. The stabilizer trim control surface remained attached. The rudder and stabilator control cables remained intact and continuous from the control column to their respective control attachments; the floorboards and underside of the fuselage pinched the cables and limited their movement but were visually traced and manipulated confirming continuity. The rudder cables remained attached to the rudder bar. The stabilizer control cables remained attached to the base of the control column. Rudder, stabilator and stabilator trim continuity was confirmed.



Figure 2: Empennage with hole cut into interior to access the control cables and ELT.

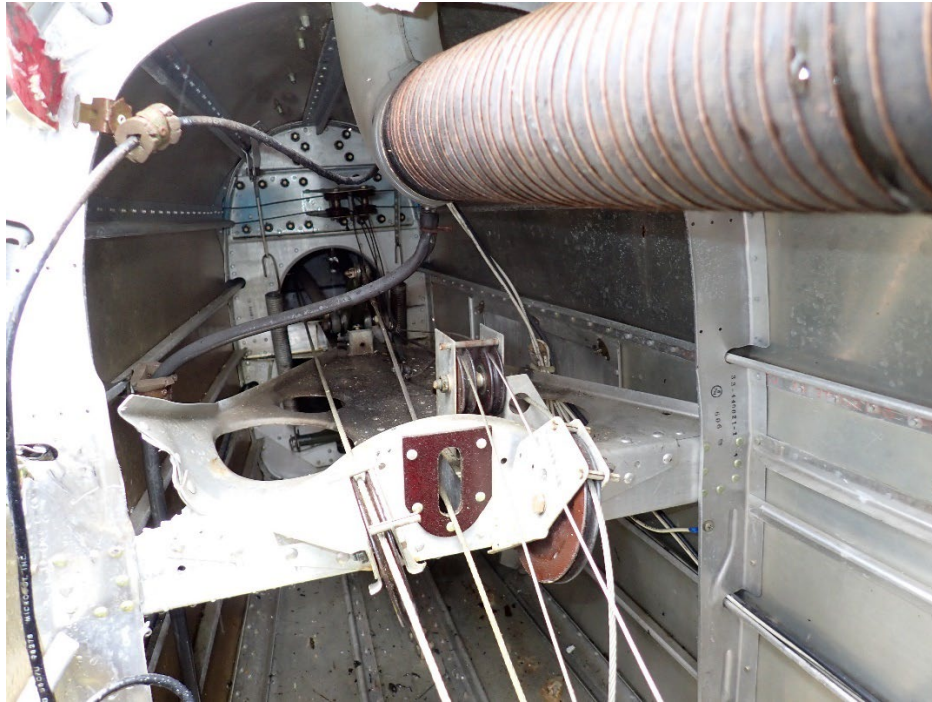


Figure 3: View of inside of empennage looking aft showing control cables and their respective pulleys.

2.3 Wings

The left wing separated by impact forces and was likely the first part of the airplane to contact the ground. It was bent aft and folded flat up against the left side of the fuselage. The 5-foot-long outermost portion of the wing fractured just inboard of the pitot tube and was found in the debris field adjacent to the left wing. The aileron control cables remained attached to the bell crank. The aileron balance cable was separated at the left wing root. Cable separations were consistent with overload.

The right wing remained attached to the fuselage and was relatively intact. It came to rest on the right side of the fuselage with the root end underneath the fuselage. The right flap and aileron remained attached to the wing at their hinges. The right flap appeared to be approximately in the 10-degree position. The flap actuator extension for both wings was approximately 0 degrees extension.

The right flap control rod was broken from the flap torque tube and remained attached to the flap. The right aileron was manually manipulated with the control cables and operated normally through its up/down stops.

2.4 Landing Gear

The landing gear was in the stowed/retracted position.

2.5 Cockpit

- Airspeed indicator was pointed to 0 MPH/KTS
- Clock: Stopped at 6:12
- Altimeter indicated 7,400 ft msl and 30.1 hg.
- Turn/Bank stuck in left wing low 30° Ball on right side.
- NAV/HDG/DG: 175° with track arrow pointing to 240°.
- VOR: Intact.
- Vertical Speed indicated negative about 3,000 fpm.
- Attitude indicator: Destroyed
- Fuel Left and Right: Showing Empty
- Oil Pressure: 0 PSI
- AMPS: 0
- CYL. Temp: 0
- Oil Temp: 0
- Garmin:530 No recorded data. Unit intact but displaced from instrument panel.
- Landing gear Selector: Up
- Manifold Pressure: Unit damaged. Indicated 18.3 Inches
- Fuel Flow: indicating 13 (Note the needles are reversed.
- Master switch was indicating left off, right on.
- Avionics master was indicating off.
- Magnetos: the key was fractured, and it was indicating right mag.
- Alternate air was off.
- Throttle was at about 90% in, but the control cables were pulled out of the engine compartment.
- Propeller: 90% in
- Mixture: Fully Out
- Cowl Flap: Fully Open
- Flaps Selector: Up and indicator: Up
- Aux Fuel Pump: Off
- Alt Air: Fully In
- Trim was indicating neutral.
- EGT and Fuel flow off scale
- Nav 1 and Nav 2 off scale broken needles. OBS was set to 050 degrees on #1 and 350 degrees on 153 # 2
- Heading indicator 016 degrees
- COM and Radios intact but displaced from instrument panel.

- The electric engine monitor unit which likely contained engine and fuel parameters did not record or contain any data.

The control column (1 throwover Yoke) was intact and operated, however, the aileron drive chain had come off the aileron/elevator drive mechanism.

2.6 Fuel/Fuel System

About 20 gallons of aviation fuel (100 LL) fuel was drained/pumped out of the right wing main fuel tank with about 2 gallons recovered from the right tip tank during recovery. The left wing tank was compromised, and no fuel remained however, there was a large area of fuel blight surrounding the fuselage on the left side of the wreckage. There was blue staining on the wing near the root. The left tip tank separated during impact. The fuel was tested for water/contaminants and was negative for both.

2.7 Other Systems

The "paddle" stall warning system was operationally tested by Textron and operated normally.

3.0 Engine Examination

The powerplant, a Continental IO-520-BA (# 249555) is a six-cylinder, air cooled, direct drive, horizontally opposed, fuel injected, engine with a rating of 285HP @ 2700RPM. The engine was largely intact with very little impact damage with the exception of propeller impact damage to the left forward (No. 6) valve cover was damaged but otherwise remained intact. Impact damage was limited to several of the accessories.

Both left and right magnetos (Slick) were removed and manually operated and both magnetos produced healthy blue/purple spark at all the posts and at every RPM setting; The units were then placed on a magneto spark bench tester, yielding similar results. Ops check good.

All twelve spark plugs displayed normal coloration and normal electrodes as compared to the Champion Aerospace AV-27 Check-A-Plug chart. Two lower spark plugs (Nos 1, 3 5) were covered in oil due to the orientation of the engine at the accident site.

The oil filter was opened, and the pleats contained normal trace amounts of ferrous material. The oil appeared dark brown in color and all lubricated components appeared to be well lubricated.

The engine crankcase was manually rotated by the propeller hub through several 720° degrees of rotation to confirm crankshaft continuity and compression suction. Continuity was confirmed and all pistons, valves springs and pushrods operated as designed. There was adequate suction and compression on each of the six cylinders. Continuity of the crankshaft to the camshaft was confirmed throughout the engine. A subsequent borescope of all six cylinders, pistons and valves revealed no anomalies noted on the piston faces, valve faces and interior of the cylinders. No anomalies were noted on the camshaft lobes and no anomalies were noted up through the bottom of the engine.

The engine driven fuel pump was actuated by drill and produced healthy suction of fuel from a test can. Suction and compression were confirmed on the pump. The fuel servo throttle arm remained attached to the control cable. The throttle plate was found to be approximately one third open. The mixture arm was found in a position about 80 to 90% rich. Fuel with the consistency of scent and color of AVGAS came out of each of the fuel distribution (spider) lines. The fuel injectors were open and free of any obstructions. The No 4 injector was impact damaged. The other fuel injectors were clear, and all six injectors appeared normal on the interior face of the injector. The engine oil suction screen was removed and examined. It was free of contaminants.

The fuel selector was removed from the airframe. A diagram was used to assist with the identification of each of the lines and a marker was used on the unit to ensure proper identification. The selector lever moved freely with smooth action and no hinderance or limitation to movement. Each of the detents were felt and low air pressure was used at each of the output/input lines and no obstructions were discovered. There was about 3 ounces of fuel inside the unit when it was removed. The fuel was tested and yielded no findings for debris/water contamination.

All six-cylinder assemblies were removed and disassembled down to their individual components, pistons, valves, pushrods, and springs. Each of the dual valve springs for intake and exhaust were visually examined and no defects were observed. The springs were placed on a RIMAC manual spring tester. All of the springs were free of defects, and each spring test yielded operating results between 32 and 50 lbs as shown below and in figure 4.

	External Spring (Lbs.)	Internal Spring (lbs.)
No 1		
Exhaust	46	40
Intake	41	45
No 2		
Exhaust	46	45
Intake	32	48

No 3		
Exhaust	45	48
Intake	32	35
No 4		
Exhaust	48	50
Intake	35	46
No 5		
Exhaust	50	48
Intake	35	34
No 6		
Exhaust	47	50
Intake	35	36



Figure 4: Number 2 spring testing example.



Figure 5: Typical borescope view of the No 3 cylinder. Representative of all cylinder assys.

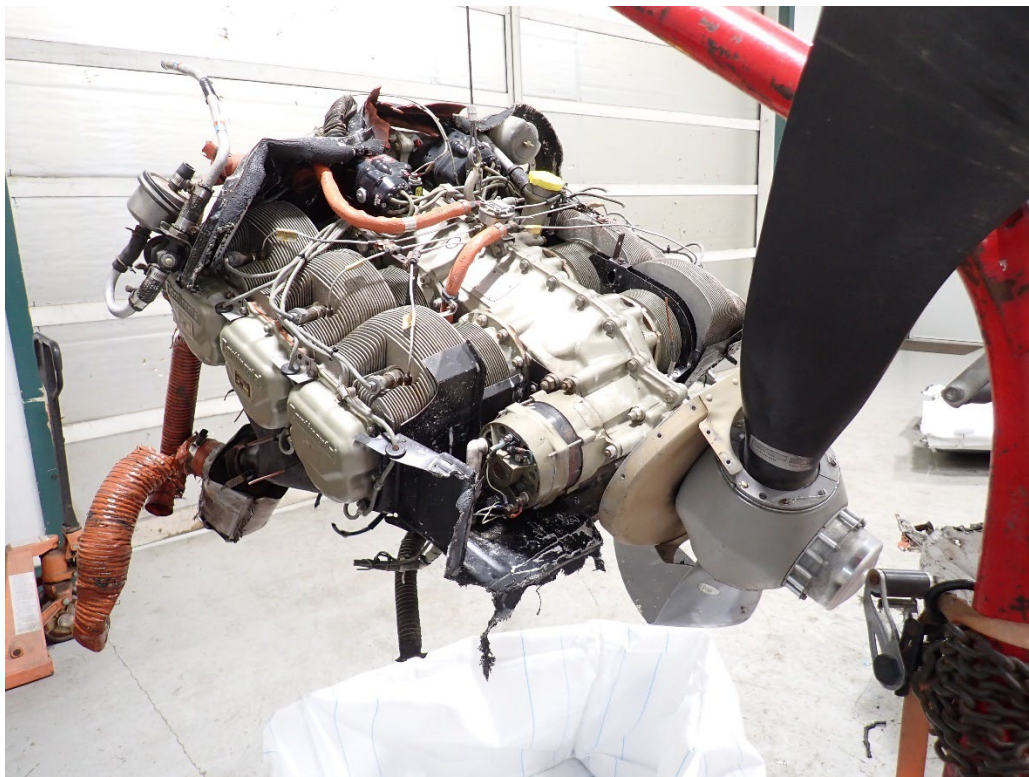


Figure 6: Engine prior to full examination.

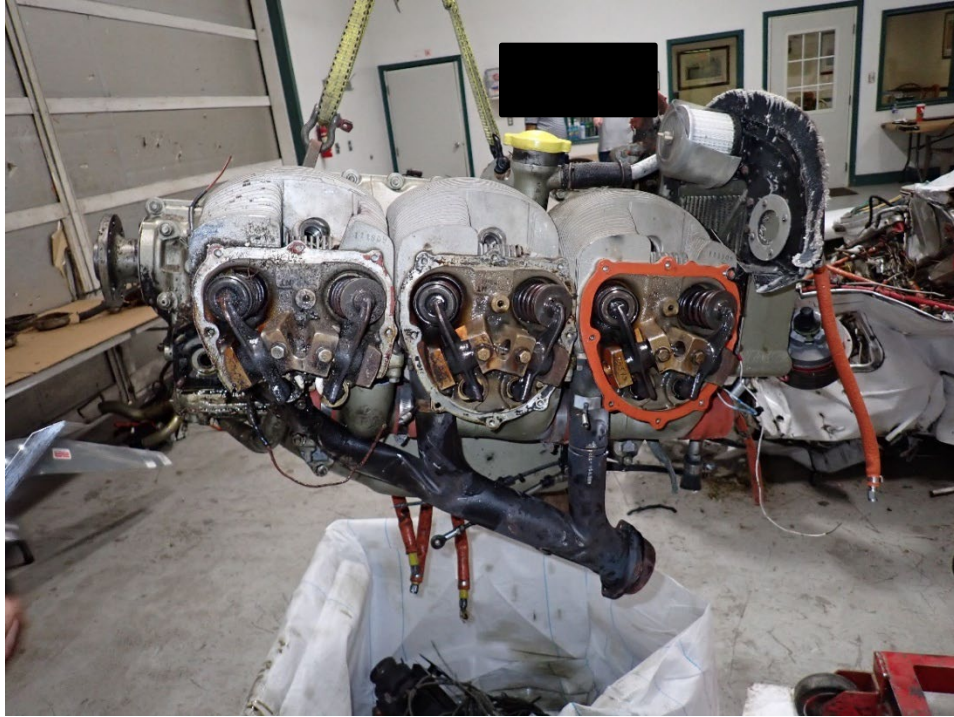


Figure 7: View of left side (Nos 6, 4, 2) of engine with rocker covers off.



Figure 8: View of the number 5 valve and spring assembly.

4.0 Propeller Examination

The propeller (McCauley) hub remained attached to the flange and crankshaft. The blades were designated as A & B. The A blade had a slight wave bend along its span and chordwise scrapes and polishing and was bent aft about 30°. The B blade was bent uniformly aft about 40 degrees and had minor chordwise scrapes and a tip gouge on the leading edge. The spinner was crushed inwards on one side and showed little rotational damage. The propeller governor and control linkage were destroyed due to impact.



Figure 9: propeller on site.

Submitted by:

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