

Examination Summary
NTSB Accident Number CEN20FA076



EXAMINATION SUMMARY

ACCIDENT

Location: Granbury, Texas
Date: February 8, 2020
Time: 1317 CST
Aircraft: Beech F33A Bonanza
Registration: N6665U

PARTICIPANTS

Josh Lindberg

Air Safety Investigator
National Transportation Safety Board

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Textron

Gary Watson

Airworthiness Inspector
NTX FSDO

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Air Safety Investigator
Continental Motors

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HISTORY OF FLIGHT

On February 8, 2020, about 1315 central standard time, a Beech F33A airplane, N6665U, impacted terrain near Granbury Regional Airport (GDJ), Granbury, Texas. The private pilot was the sole occupant and was fatally injured and the airplane sustained substantial damage. The airplane was registered B & J Aviation LLC and was operated by a private individual under the provisions of Title 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed at the time of the accident and no flight plan had been filed. The flight had departed Mineral Wells Airport (MWL), Mineral Wells, Texas, about 1248 and was en route to GDJ.

The recorded radar and ADS-B data revealed that the airplane had approached Granbury Regional Airport (GDJ), Granbury, Texas, from the northwest about 1301 and overflowed runway 14 at 900 ft above ground level (agl). After the runway overflight, the track turned right toward northwest on a wide downwind leg and gradually descended to about 400 ft agl. The airplane then made a right base turn where the first set of data ended at 1305:07, about 440 ft agl, and 93 knots groundspeed. At 1314:18, radar data showed a target on the southwest side of GDJ, which proceeded to the north toward the accident site and ended at 1316:51. The accident site was located 0.39 nautical miles north-northeast of the final radar return. Figure 1 shows the recorded flight track with the accident site and GDJ airport labeled.



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Figure 1 – Radar and ADS-B track in red with the accident site and GDJ airport labeled

A further review of the ADS-B data showed that at least three other airplanes were also flying in the immediate GDJ airport environment at the same time as the accident airplane. As the accident airplane was on short final, one airplane had just departed GDJ and proceeded southeast. The second airplane was in a right traffic pattern and ahead of the accident airplane. The third airplane was circling above the traffic pattern, then descended and followed behind the accident airplane into the traffic pattern. The pilot of this third airplane remembered the accident airplane and stated that he entered the traffic pattern behind the it and completed an S-turn maneuver to slow down for appropriate spacing. He continued in the pattern behind the accident airplane and observed it land and taxi toward the hangars. The GDJ airport manager stated that his employees did not see the accident airplane arrive that day.

AIRCRAFT INFORMATION

1979 Beech F33A Bonanza, s/n: CE-880.

Continental IO-550B

3,944.04 hours tach time, at the beginning of the accident flight

Annual Inspection 10/11/2019 at 3,939.87 hours on tach. Completed by Walker Aviation Services LLC, Weatherford, TX, 817-629-3890.

It appears that the pilot recorded the tach start/stop time for every flight in the airframe logbook.

METEOROLOGICAL INFORMATION

ARCHIVED METAR OF: 20200208 // 1800 to 2200 UTC (Feb 8, 2020 - 1200-1600 CST)

AIRPORTS REQUESTED: KMWL KGDJ

KMWL 081853Z AUTO 13012G22KT 10SM CLR 16/M01 A3014 RMK AO2 SLP204 T01611011

KMWL 081953Z AUTO 16010G21KT 10SM CLR 17/M01 A3009 RMK AO2 SLP188 T01721006

KMWL 082053Z AUTO 14015G22KT 10SM CLR 18/00 A3006 RMK AO2 SLP175 T01830000 56042

KMWL 082153Z AUTO 14015KT 10SM OVC039 17/01 A3004 RMK AO2 PK WND 16026/2115 SLP170 T01720006

KMWL 082253Z AUTO 15015G20KT 10SM OVC039 16/00 A3002 RMK AO2 SLP165 T01610000

KGDJ 081815Z AUTO 12009KT 10SM CLR 16/00 A3021 RMK AO2 T01561003

KGDJ 081835Z AUTO 12010KT 10SM CLR 16/00 A3020 RMK AO2 T01601002

KGDJ 081855Z AUTO 13012G15KT 10SM CLR 17/M01 A3019 RMK AO2 T01661006

KGDJ 081915Z AUTO 13011G14KT 10SM CLR 17/M01 A3017 RMK AO2 T01721014

KGDJ 081935Z AUTO 15011KT 10SM CLR 18/00 A3015 RMK AO2 T01781002

KGDJ 081955Z AUTO 13014KT 10SM CLR 18/00 A3013 RMK AO2 T01801002

KGDJ 082015Z AUTO 15011KT 10SM BKN043 18/00 A3012 RMK AO2 T01791003

KGDJ 082035Z AUTO 14007G16KT 10SM OVC043 18/00 A3011 RMK AO2 T01760000

KGDJ 082115Z AUTO 15011KT 10SM OVC043 17/00 A3010 RMK AO2 T01711002

KGDJ 082135Z AUTO 14011G16KT 10SM OVC043 17/M01 A3009 RMK AO2 T01721008

KGDJ 082155Z AUTO 14008G16KT 10SM OVC043 17/00 A3008 RMK AO2 T01710000

KGDJ 082215Z AUTO 14010G16KT 10SM OVC043 17/00 A3008 RMK AO2 T01720000

KGDJ 082255Z AUTO 15012KT 10SM SCT038 OVC043 18/01 A3006 RMK AO2 T01770007

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FLIGHT RECORDERS OR NON-VOLATILE MEMORY UNITS

NO NVM – Insight Avionics GEM 602 (EGT/CHT).

NO NVM – Shadin Miniflo p/n 912021-D.

NO NVM – Electronic Tachometer.

WRECKAGE AND IMPACT INFORMATION

The accident site was located at 32.497067° x -97.861700°, at an elevation about 830 ft msl. The airplane impacted trees and flat, rocky terrain about 2.3 nautical miles northwest (337°) of the final track data point. The airplane impacted the ground with a nose low attitude, estimated about 45° down, and oriented on a 068° true heading. The empennage was bent upward and slightly left and oriented on a 090° heading; the elevators were resting on a tree. The surrounding area was made of up mesquite and spruce trees.



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Overall summary

The leading edges of both wings were breached at the rivet lines and were split open. The fuel bladders in each wing had ruptured and were significantly damaged. A large portion of the right main fuel bladder and the entire fuel transmitter assembly had ejected and were found about 10 ft in front of the wing. The fiberglass wing tip tanks sustained impact damage and large portions of the tanks were fractured and displaced forward and outward. The dirt and organic debris in front of the wings was displaced forward. The fuel selector handle was positioned to the left main tank. The flap actuator revealed that the flaps were retracted during the impact and the landing gear were extended.

The engine remained partially attached to the airframe through wires, hoses, and cables. The firewall and a portion of the airframe had wrapped around the back of the engine. There were no holes in the crankcase and all six cylinders remained attached; most of the impact damage was sustained to the bottom of the engine. When manually rotated, the crankshaft was continuous from front to back and the camshaft operated normally. Five of six cylinders produced suction and compression and the sixth cylinder had damage to the intake pushrod. The inside of each cylinder was examined with a lighted borescope; they displayed normal operating signatures with no anomalies noted. The two magnetos had broken free from their installation points and displayed impact damage signatures. The left magneto drive was actuated with a drill and produced a spark at all six ignition leads in the correct order. The right magneto exhibited significant impact damage and the driveshaft would not completely rotate. The right magneto was disassembled and the internal components displayed impact damage and normal operating signatures. The top spark plugs were examined after removal and the bottom spark plugs were examined using a borescope. The electrodes all displayed normal wear and operating signatures. The fuel manifold valve remained attached to its installation point and was undamaged. The fuel line from the fuel flow transducer and the manifold valve was disconnected from the transducer and a small amount of liquid was drained. The liquid odor was consistent with fuel, was clear in color, and tested negative for water contamination. A small amount of gray, fibrous material was found in the fuel system in several places but not enough material was built up to block fuel passage. The material was found in the unfiltered side of the manifold valve, in the inlet screen of the metering assembly, and in the fuel selector strainer.

The propeller assembly was found in the initial impact crater, embedded in the ground under the engine, and was separated from the engine crankshaft. Two of the propeller blades remained attached to the hub; one blade was mostly straight and unremarkable and the other was bent slightly forward. The third blade was separated from the hub; it was found directly under the engine and was bent aft about mid-span. This blade also exhibited scratches and superficial damage near the blade sleeve which extended outward about 1 ft.

Detailed airframe exam

Flight controls:

All flight control surfaces were observed attached to the aircraft. Flight control cable continuity was established from the control surfaces to the cockpit area. Flaps were in the up position. The elevator trim was

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10° tab down. The fuel selector handle and valve were in the left fuel tank position. Both fuel tanks were impact damaged and no fuel was recovered from any of the fuel tanks.

Fuel system:

Fuel selector handle positioned to the left main tank. No fuel was observed at the selector valve strainer. A small foreign soft material was observed in the inner screen at the selector strainer. A small amount of fuel was recovered from an engine line by the engine investigator and tested for water using water finding paste and no water was detected. The color and smell did not match 100 LL.

Landing gear:

Gear was extended as confirmed by the landing gear box position and the handle in the cockpit was down.

Propeller:

The three bladed propeller separated from the engine during the impact sequence and was found in a crater underneath the engine. One blade separated at the hub and was observed with multiple gouges. All three propeller blades were bent with surfaces polishing.

Research & Testing:

No pre-impact abnormalities on the airframe were noted during the examination. No further research or tests are scheduled.

According to the FAA Airworthiness documents, the aircraft had the following STC's installed:

- SA01714WI Garmin GTX 345 ADS-B In/Out
- SA01933LA Garmin GNS 430W GPS/COM/NAV System
- SA00638WI Wilco Concorde battery
- SA800EA Whelen Beacon
- SA2200 D-Shannon Continental IO-550-B engine
- SA449GL D-Shannon Low fuel Indicator
- SE1688GL D-Shannon Fuel Flow Transmitter
- SA5491NM Horizon P100100 Digital Tach
- SA1176SO D-Shannon Aileron and Flap Gap Seals
- SA153EA D-Shannon Fiberglass Tip Tanks (15 Gal)
- SA5100SW-D S-TEC Yaw Damper
- SA1836SO Aero Trim Inc. Model 400 Electric Rudder Trim
- SA4835SW Aerosafe Standby Vacuum Pump
- SA157NE Insight Graphic Engine Monitor
- SA1164CE KFC 200 A/P

Detailed engine exam

Engine Model: IO-550-B

Engine S/N: 296838-R

Engine Assembly Date: 06/04/1996

Engine Spec BHP: 300 BHP @ 2700 RPM

Initial overview:

The engine remained partially attached to the airframe through wires, hoses, and cables. The firewall and a portion of the airframe had wrapped around the back portion of the engine. There were no holes in the

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crankcase that would indicate a catastrophic internal engine failure. The propeller flange had broken free from the rest of the crankshaft and remained attached to the propeller hub which was found at the initial impact point. All six cylinders remained attached to their cylinder bays and displayed varying amounts of impact damage with most of the damage occurring to the bottom portions of the cylinders. The bottom of the engine displayed the most impact damage and portions of the crankcase and the oil sump had broken free from the rest of the engine.

Engine Core:

Crankcase: The crankcase displayed impact damage with most of the damage to the bottom portion of the crankcase. There were no holes in the crankcase that would indicate a catastrophic internal engine failure.

Crankshaft: The propeller flange had broken free from the rest of the crankshaft and remained attached to the propeller hub. The fracture surface was noted to have several ratchet fractures. The crankshaft was rotated using a tool in the rear of the crankshaft and continuity was established.

Camshaft: During crankshaft rotation the camshaft operated normally. Portions of the camshaft were visible through the broken oil sump and displayed normal operating signatures.

Connecting Rods: During crankshaft rotation the connecting rods operated normally.

Cylinders: The cylinders were borescope and displayed normal operating and combustion signatures. During crankshaft rotation the #1 cylinder did not have any compression (consistent with impact damaged intake push rod). The #1 intake rocker arm was removed and the #1 cylinder then displayed good thumb compression. The rest of the cylinders displayed good thumb compression and suction. It was observed that the #3 cylinder had a bayoneted style CHT probe; the rest of the cylinders used spark plug washer probes.

Valves: The valves displayed normal operating and combustion signatures. During crankshaft rotation all of the valves were capable of movement and there were no signs of a stuck valve.

Rocker Arms: The rocker arms displayed normal operating and lubrication signatures and were capable of movement during crankshaft rotation.

Pistons: The pistons displayed normal operating and combustion signatures. The pistons operated normally during crankshaft rotation.

Lubrication System:

Oil Pump: The oil pump was removed and disassembled. The pump gears, housing, and pressure relief valve displayed normal operating signatures.

Oil Filter: The oil filter housing was cut open and the pleats were inspected. There was no metallic material noted in the filter pleats.

Ignition System:

Magnetos: Both magnetos had broken free from their installation points and displayed impact damage signatures. The left magneto drive was spun using a drill and the magneto was capable of producing a spark to all six ignition lead ends in the correct order. The right magneto displayed significant impact damage and the driveshaft could be rotated only part way through. The magneto was disassembled and the internal components displayed impact damage as well as normal operating signatures.

Ignition Harness: The harness was secured to both magnetos and to each spark plug and displayed impact damage signatures. The left magneto ignition harness was tested and was capable of conducting a spark from the magneto to each ignition lead end.

Spark Plugs: The top spark plugs were examined after removal and the bottom spark plugs were examined using a borescope. The electrodes displayed normal wear and operating signatures.

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Fuel System:

Fuel Pump: The fuel pump displayed impact damage signatures. The fuel pump drive coupling was noted to be intact and the driveshaft was capable of rotation. The fuel pump was disassembled and visually examined. It was observed that fluid consistent with 5606 hydraulic fluid was within the fuel pump (it was noted that the fuel return jet housing had broken free and the top portion of the fuel pump was open). The rest of the fuel pump components displayed normal operating signatures.

Throttle and Metering Assembly: The throttle and metering assembly sustained a significant amount of impact damage and the throttle valve was not located at the time of the examination. The throttle arm was located and was noted to still be attached to the throttle control cable rod end. The mixture control cable rod end was secure to the mixture control arm and the control arm was capable of spinning freely around the mixture control shaft which was consistent with impact damage. The metering assembly was disassembled. It was noted that there was fibrous material within the inlet screen; however, the screen was not blocked. The rest of the components displayed normal operating signatures.

Fuel Manifold Valve: The fuel manifold valve remained attached to its installation point and was undamaged. The fuel line going from the fuel flow transducer and the manifold valve was disconnected from the transducer and a small amount of fluid was drained; the odor was consistent with fuel, however, the fluid was not blue in color and was more of a clear color. The fluid was tested for water using Sar-gel and the Sar-gel did not test positive for water. The manifold valve was disassembled, and more fibrous material was found on the unfiltered side of the manifold valve. The rest of the valve displayed normal operating signatures.

Nozzles: The nozzles remained installed in their cylinders and displayed varying amounts of impact damage. The nozzles were removed and were all noted to be clear of any obstructions.

Exhaust and Induction System

Exhaust: The exhaust displayed impact damage signatures with the most damage occurring to the tailpipes; both tailpipes were noted to be crushed almost completely flat. The heat exchanger shroud was removed and there were no signs of exhaust leaks within the heat exchanger. There were no signs of exhaust leaks observed with any of the exhaust risers.

Induction: The induction system displayed significant impact damage signatures and several of the induction tubes and risers had broken free. There were no signs of induction leaks observed.