



NATIONAL TRANSPORTATION SAFETY BOARD

**Office of Aviation Safety
Western Pacific Region**

SITE & ON-SCENE INFORMATION

WPR16FA172

Accident Date: August 30, 2016

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A. ACCIDENT

Location: Sparks, NV

Date: 08/30/2016

Aircraft: Beechcraft A36, N985CA, Serial #: E-1901

NTSB IIC: Michael Huhn

B. EXAMINATION PARTICIPANTS

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C. ACCIDENT SUMMARY

On August 30, 2016, about 1801 Pacific daylight time, a Beechcraft A36 Bonanza, N985CA, was destroyed when it impacted in a recreational vehicle (RV) park while on approach to runway 16L at Reno/Tahoe International Airport (RNO), Sparks, Nevada. The two persons on board were fatally injured. The airplane was registered to Venture Aviation Services LLC, and operated by Flying Start Aero of Sparks, NV under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed, and no flight plan was filed for the flight. The two persons had departed in the airplane from RNO about 0410 on the morning of the accident, flew to Las Vegas, NV, then on to southern California, and then back to Las Vegas. The accident occurred on the return leg to RNO.

D. AIRPORT INFORMATION

The Reno/Tahoe International Airport was equipped with an air traffic control tower (ATCT) that was operating at the time of the accident. The airport elevation was 4,415 feet above mean sea level (msl). Runway 16L/34R measured 9,000 feet by 150 feet, and runway 16R/34L measured 11,001 feet by 150 feet. Although the paved approach (north) ends of runways 16L and 16R were abeam one another, runway 16R had a displaced threshold of 1,000'. The runway centerlines were separated by 700 feet.

Runway 16R was equipped with a 4-light PAPI (precision approach path indicator) system with an approach slope of 3.06 degrees, and a threshold crossing height (TCH) of 77 feet. It was also equipped with an ILS (instrument landing system) approach with a glide slope of 3.1 degrees, and a TCH of 59 feet. Runway 16L was equipped with a 4-light PAPI system with at 3.0 degree slope, and a TCH of 75 feet. Runway 16L did not have an ILS approach system or procedure.

E. METEOROLOGICAL INFORMATION

The nearest weather reporting station to the accident site was located at RNO. The automated 1755 RNO observation included winds from 260 degrees at 17 knots, wind gusts 20 knots, visibility 10 miles, few clouds at 10,000 feet agl, few clouds at 20,000 feet agl, temperature 31° Celsius (C), dew point -4° C, and altimeter 30.01 inches of mercury (Hg).

About 1757, the RNO ATCT controller advised the pilot that the winds were from 260 degrees at 13 knots, with gusts to 20 knots.

F. SITE INFORMATION

The airplane impacted in the River's Edge RV Park, which was situated about 1/2 mile north of the RNO 16L threshold. The impact location was adjacent to park-designated spots K-4 and K-5. The geographic coordinates for the impact site were N 39.52166 degrees, W -119.76667 degrees. The site was directly on the extended centerline of runway 16L/34R, 2,843 feet north of the 16L threshold. Site elevation was 4,436 ft msl.

Several ground vehicles were damaged by the post-impact fire, but no persons on the ground were injured. Ground scars, tree damage, and wreckage distribution were all consistent with a near-vertical descent trajectory. With the exception of a few small fragments and the forward right cabin door, the wreckage was entirely contained within a semi-circle approximately 25 feet in radius. Ground scars and airplane damage patterns were all consistent with a vertical, airplane nose-down, impact attitude.



Figure 1 - Overall Site



Figure 2 - Main Wreckage



Figure 3 - Main Wreckage



Figure 4 - Main Wreckage



Figure 5 - Main Wreckage and Left Wing



Figure 6 - Left Wing and Main Wreckage



Figure 7 - Main Wreckage Close Up

G. WITNESS REPORTS

The airport and surrounding businesses were queried in search of surveillance cameras that might have captured the accident flight; however, none of the cameras that were located in the vicinity of the airport captured the accident flight.

The following are excerpts from some witness accounts that were provided by the Sparks Police Department.

A witness who was looking out her window at the RV park at the time of the accident reported that she observed the airplane upside down prior to impact and added that the airplane "seemed to speed up the closer it got to the ground."

Another witness who was in his vehicle exiting the RV Park reported that he observed the airplane over the RV park make a turn towards the airport, and the right side of the airplane "went up in the air." The airplane then "took a nose dive, [and] crashed into [the] RV park."

One witness, who was at the river that was situated between the accident site and the airport, reported that he "heard a plane coming in, looked back, and saw a small plane do a half barrel roll and then nose dive down into the RV Park."

A witness who was driving northbound on the road that bounded the east side of the airport observed a "large jet approach for landing," then observed a smaller airplane approaching from the east make a turn toward the airport, and noted that the "large jet had not yet touched down on the runway." The witness further reported that after the smaller airplane rolled out of the turn, the right wing "dropped rapidly causing the plane to roll inverted while pushing the nose down." The witness did not observe the impact due to obstructions in his line of sight.

H. PERSONNEL INFORMATION

The pilot, age 73, held commercial pilot and flight instructor certificates with airplane single engine land and instrument ratings for both. The pilot's most recent Federal Aviation Administration (FAA) third-class medical certificate was issued on March 24, 2016, with the limitation that the pilot must wear corrective lenses. On his application for that certificate, the pilot reported 11,100 total flight hours, including 315 flight hours in the preceding six months. As of a week after the accident, the pilot's logbooks had not yet been located.

There were conflicting reports about the pilot experience of the other person who was on board the airplane at the time of the accident. He was determined to be age 50, but no pilot certificates or FAA medical history information could be located in the week after the accident.

I. AIRPLANE INFORMATION

The accident airplane, a 1981 six-seat Beech Bonanza A36 (Serial number (s/n) E-1901) was powered by a six cylinder, 300 horsepower Continental Motors IO-550-B (s/n 824492). The airplane was equipped with a three-bladed, constant-speed Hartzell propeller. Airplane configuration details included retractable tricycle-style landing gear, jackscrew-operated trailing edge flaps, and conventional horizontal and vertical stabilizer arrangement. According to FAA documentation, the airplane was equipped with a Garmin 530 NavComm unit.

J. ON-SCENE ACTIVITY & EXAMINATION

1. Response Summary

Personnel and equipment from multiple agencies responded to the accident shortly after it occurred. These agencies included the Sparks Police Department, Sparks Fire Department, RNO Fire Department, Washoe County Medical Examiner, and the FAA.

Investigators from the NTSB, the FAA, and Textron Aviation examined the wreckage in situ on August 31, and were joined by a Continental Motors investigator on September 1. The wreckage was removed for transport the afternoon of September 1, transported to a secure facility in Sacramento, CA, and examined in further detail on September 2.

2. Wreckage/Damage Overview

The bulk of the wreckage was very tightly contained, and consisted of the remains of both wings, and the fuselage, empennage, and engine. The propeller was embedded flat (lying horizontal) in the asphalt, about 15 feet northeast of the main wreckage. The forward right cabin door was situated about 35 feet east-northeast of the main wreckage. Two wing leading edge fragments, and an electronic tablet, were found in the parking lot about 30 feet south of the main wreckage. All components in the main wreckage exhibited extensive aft crushing and/or thermal damage or consumption.



Figure 8 - Propeller (in situ)



Figure 9 - Starboard Cockpit Door

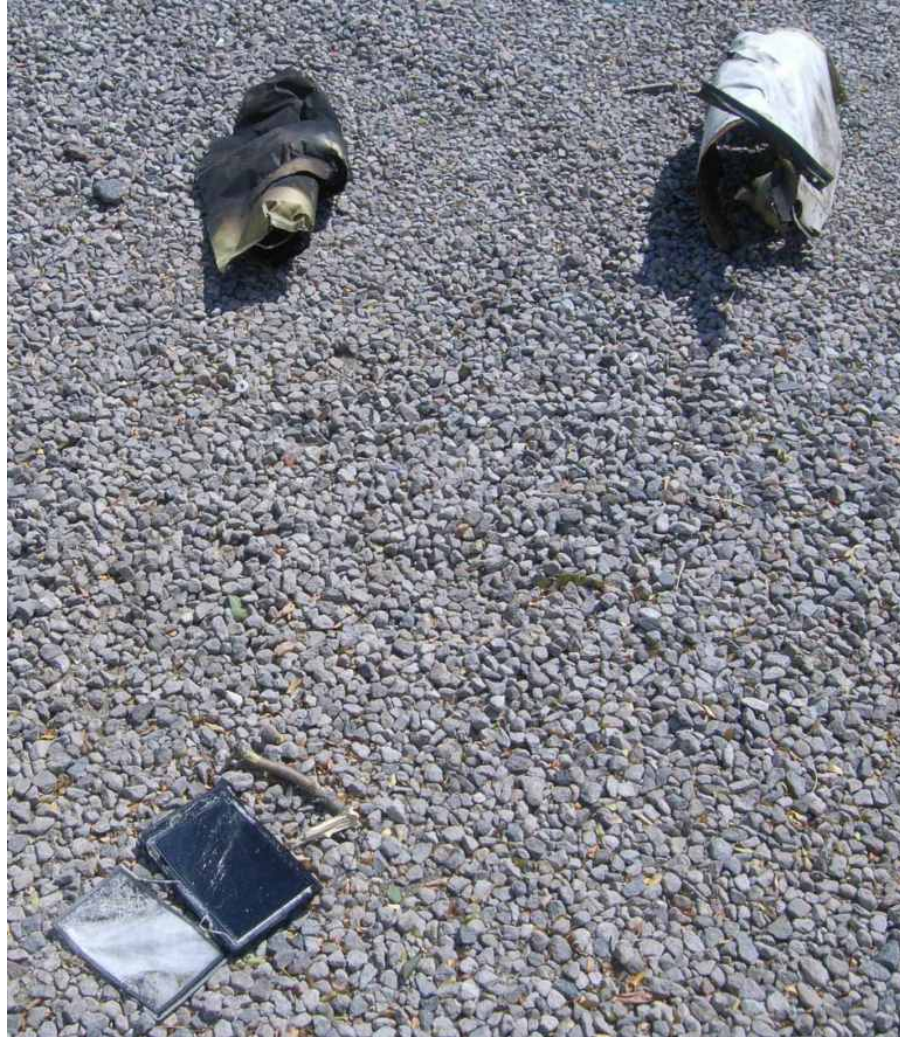


Figure 10 - Wing Skins and Tablet (in adjacent parking lot)



Figure 11 - Tablet

Multiple tree limbs directly above the propeller displayed evidence of strike damage. No other impact-related tree or pavement damage was observed.



Figure 12 - Cut/Broken Tree Branches (Located directly above propeller)

3. Fuselage and Cabin

The fuselage sustained extensive impact and thermal damage. The top cabin roof section was completely destroyed by post impact fire. The seat assemblies were mostly destroyed by the post impact fire. The cabin floor area sustained impact damage and was mostly destroyed by the post impact fire.



Figure 13 - Cockpit/Cabin Wreckage



Figure 14 - Cockpit/Cabin Wreckage

The fuel selector valve was fracture-separated from the fuselage and was located within the main wreckage. The valve was determined to be set to the "right tank" position.

The fuel strainer was fracture-separated from the fuselage and was located within the main wreckage. There was no fuel in the strainer, and the strainer screen was free of contaminants.



Figure 15 - Fuel Selector Valve (in situ)



Figure 16 - Fuel Selector Valve with Handle



Figure 17 - Fuel Strainer



Figure 18 - Fuel Strainer Screen

4. Wings

There was wing continuity from the right tip to nearly the left tip via the main wing spar; the rear spar had been compromised by the fire. The two wings remained in their as-built relative positions and orientations. The wing assembly exhibited significant crush and thermal damage.

The left flap was almost completely consumed by fire. The steel flap jackscrew extension was unable to be measured, because its aluminum housing had been consumed by the fire. One of the left flap tracks and its roller assembly was identified in the wreckage. Although its roller position was almost fully-forward, consistent with the left flap being in the fully retracted position, due to impact and thermal disruption, it could not be determined whether that was a reliable indication of the in-flight (pre impact) flap position.

The left aileron remained attached to the wing, and extensive wrinkle/crush-type deformation was noted. The left wing tip had fracture-separated from the wing, and exhibited direct and significant fore-aft crush damage.



Figure 19 - Left Wing Tip



Figure 20 - Left Wing Tip (showing aft crush)

The right flap was almost completely consumed by fire. The steel flap jackscrew extension was unable to be measured, because its aluminum housing had been consumed by the fire. Both of the right flap tracks and their roller assemblies were identified in the wreckage; the roller positions were almost fully-forward, consistent with the right flap being in the fully retracted position. However, similar to the case with the left flap roller, the reliability of this roller position as an indication of the in-flight (pre impact) flap position could not be determined.

The right aileron remained attached to the wing, and extensive wrinkle/crush-type deformation was observed.

NOTE: When considered in conjunction with the evidence of the airplane impact attitude and trajectory, the as-found forward locations of the flap roller assemblies in their tracks could have been a result of impact/inertial loads. Therefore, the available evidence is insufficient to positively determine flap position during the approach, or at impact.



Figure 21 - Left Flap and Wing Portions



Figure 22 - Right Flap and Wing Portions



Figure 23 – First Exemplar Flap Roller and Track



Figure 24 - Second Exemplar Flap Roller and Track

The left wing fuel bladder was consumed by fire. The left fuel cap and fueling port were not identified in the wreckage. The right wing fuel bladder was destroyed by fire. The fuel cap remained securely installed in the fueling port. Two fuel quantity float and sending unit assemblies were found fracture-separated from the airplane and clear of the main wreckage; neither was sooted or fire-damaged.



Figure 25 - Right Fuel Cap and Receptacle



Figure 26 - First Exemplar Fuel Quantity Sensor



Figure 27 - Second Exemplar Fuel Quantity Sensor

5. Empennage

The aft fuselage, including the three stabilizers, was fracture- and/or thermally- separated from the fuselage near fuselage Station 233. The entire assembly exhibited moderate thermal damage, but retained its overall shape and most primary structure.

The two horizontal stabilizers remained attached to the aft fuselage, and both elevators remained attached to their respective stabilizers. The left elevator balance weight remained attached to the left elevator. The right elevator balance weight had fracture-separated the right elevator, but was located in the wreckage. The extension of the left pitch trim actuator was measured to be 1.4 inches, consistent with a neutral (faired) position. The extension of the right pitch trim actuator was measured to be 1.5 inches, also consistent with a neutral (faired) position.

The vertical stabilizer remained attached to the fuselage, and the rudder remained attached to the vertical stabilizer. The rudder balance weight remained attached to the rudder. The vertical stabilizer exhibited leading edge crushing and thermal damage.



Figure 28 - Empennage



Figure 29 - Empennage



Figure 30 - Left Horizontal Stabilizer/Elevator



Figure 31 - Right Horizontal Stabilizer/Elevator

6. Flight Control Continuity

The aileron "Up" cables remained attached to their respective wing bellcranks, and were continuous to their cockpit controls. The aileron balance cable was intact, and remained attached to both (left and right) aileron bellcranks.

The aft fuselage elevator aluminum bellcrank was not located in the wreckage, and was presumed to have been consumed in the fire. However, the elevator control cable terminal ends that attached to this bellcrank were identified, and their attachment bolts, with their retaining hardware, remained installed in the aft cable ends. The elevator cables were traced to the forward cockpit area and were observed with a separation consistent with tension overload near the elevator bob weight.

The rod ends for the two push-pull rods that extended from the aft fuselage elevator bellcrank to the elevators were identified, and had sustained thermal damage. Both rods were observed attached to their respective elevator-actuating arms, but their forward sections were not identified in the wreckage, and were presumed to have been separated and partially or fully consumed by the fire.

The rudder cables were observed attached to the rudder bellcrank at the base of the rudder, and traced forward to the forward cockpit on the left side. The rudder cables terminated in the region of the rudder forward bellcrank; damage in that region precluded absolute determination of rudder control continuity.



Figure 32 - Aft Fuselage with Rudder Cables and Elevator Rods



Figure 33 - Pitch Bobweight and Failed Cable Ends



Figure 34 - Rudder Pedals

7. Cockpit Instrumentation and Controls

Most of the cockpit instruments and controls were destroyed by the combination of impact and fire. Most of the instruments that were not destroyed were not identifiable. The face of the altimeter was fracture-separated from the housing, and was found in the main wreckage. The setting observed in the Kollsman window was 30.02.

The cockpit flap position indicator was found loose in the debris, and was observed to indicate that the flaps were in the up/retracted position. According to a Textron Aviation representative, the flap position indicator needle will revert to the "flaps up" indication when electrical power is removed from the gauge.

Two control yokes were identified in the wreckage. Two sets of rudder pedals (one with, and one without brake pedals) were identified in the wreckage.

The engine throttle, mixture, and propeller controls were identified in the wreckage; they remained installed in the cockpit/panel structure, but were impact- and thermally-damaged.



Figure 35 - Miscellaneous Panel/Instrument Components



Figure 36 - Altimeter Face



Figure 37 - Cockpit Flap Position Indicator



Figure 38 - Switch Sub-Panel



Figure 39 - Engine Control Sub-Panel

8. Landing Gear

The three main landing gear assemblies, including struts, wheels, and tires, were all identified in the wreckage. The positioning of the components of the landing gear retraction/extension bellcrank assembly in the center fuselage was consistent with the landing gear being in the extended position at impact.



Figure 40 - Main Landing Gear Assembly



Figure 41 - Center Fuselage Landing Gear Actuating Linkage Assembly



Figure 42 - Center Fuselage Landing Gear Actuating Linkage Assembly

9. Engine

The engine was situated within the main wreckage. According to the engine manufacturer's representative, the data plate identified the engine as having been built as a model IO550C, and then field-converted (as opposed to being converted by Continental Motors) to an IO550B.

The engine crankcase halves were mostly intact, with the exception of the lower- forward portion; that region had fractured and exposed some internal components. The No. 6 connecting rod exhibited a bending deformation on the fore-aft direction, consistent with the crankshaft translating aft in the engine. The crankshaft propeller flange separated and remained with the separated propeller. The forward crankshaft main bearing saddle and bearings separated and were found outside of the crankcase, in the debris pile adjacent to the engine. The "face gear" remained attached to the forward crankshaft, but was impact damaged.

All cylinders remained attached to their respective mounts on the crankcase halves. All exhibited impact and thermal damage to their cooling fins. All rocker box covers, except that for cylinder 6, remained attached. All top spark plugs remained installed, but the upper spark plug bodies for cylinders No. 1, 5, and 6 were fractured, leaving only the spark plug base installed in each respective cylinder.

The alternator was fracture-separated from its engine mount but remained attached by its wiring.

The left and right magnetos were fracture-separated from the engine, and were found near the propeller. One magneto drive gear was found near the propeller. The second magneto drive gear was found embedded in debris near the engine data plate on the upper right crankcase half. The magneto mounting rings failed at the hold-down brackets. The ignition leads were thermally distressed and/or fracture/impact separated.

The fuel flow transducer was fracture-separated, and was located near the propeller.

The fuel manifold valve was fracture-separated from the upper crankcase but was located in the wreckage. The manifold valve was disassembled and examined. The diaphragm was thermally destroyed. All other components of the manifold valve were intact but exhibited thermal distress. No fuel was observed in the manifold valve.

The engine oil "rod gauge and cap assembly" (oil quantity rod) was located in its respective receptacle but not secured. The oil cap was found displaced approximately 1.5 inches above its normally-closed position. Impact damage was observed on the oil cap, and no oil was present on the oil rod.

The oil cooler remained intact but was displaced from its mount. The spin-on external oil filter was fracture-separated from its mount, but remained attached by its safety wire. The filter exhibited significant impact and thermal damage; the filter gasket was charred and brittle. The oil filter adapter remained attached to the oil pump, which was intact and remained attached to the engine.

The engine starter was fracture-separated from the starter adapter, and exhibited significant thermal damage.

The engine-driven fuel pump displayed significant thermal damage. The fuel pump was removed and further examined on site. The fuel pump drive coupling was slightly bent. The pump shaft and impeller blades exhibited signatures consistent with exposure to excessive heat. The pump was physically intact, but could not be manually rotated, likely as a result of thermal damage.

The engine induction system displayed evidence of impact and thermal damage. The rear induction wye pipes were fracture-separated and were not recovered. Because they were aluminum, it is possible that they were severely damaged or consumed by the fire.

The throttle body-metering unit fracture-separated from its engine oil sump mount, but was located in the main wreckage. The individual throttle and mixture control arms remained attached and secured to the throttle body. The throttle and mixture control cables remained attached to the throttle body arms. These cables were cut to facilitate removal and examination of the throttle body-metering unit. Exclusive of impact and thermal damage, no other anomalies were noted.

The exhaust system displayed impact damage, but remained attached to the individual cylinder ports and/or engine. The collector tubes, both mufflers, and both tail pipes displayed impact and crush damage.

The engine oil sump displayed significant impact damage; multiple portions of the oil sump were fracture-separated and were found in the surrounding main wreckage.



Figure 43 - Engine (in situ)



Figure 44 - Engine (in situ)



Figure 45 - Engine Data Plate



Figure 46 - Engine Aft Face



Figure 47 - Engine Left Side



Figure 48 - Engine Aft Face



Figure 49 - Fracture-Separated Engine Components

10. Propeller

The propeller and hub assembly was fracture-separated from the engine crankshaft. All three blades remained installed in the hub. The assembly was found with the forward ("blade back," or cambered) side down, partially embedded in the asphalt. The propeller impact damage and the ground scars were consistent with the impact occurring with the plane of rotation parallel to the ground plane. For identification/discussion purposes, the propeller blades were marked as A, B, and C.

Blade A exhibited the least amount of impact damage, with slight aft bending beginning approximately 16" from the blade root. Chordwise scoring/scratching and paint transfer was present from the blade root to approximately 10 inches outboard, on the blade back (cambered) side.

Blade B exhibited forward bending, and slight twisting beginning approximately 10 inches from the blade root. Chordwise scoring/scratching was present on the blade back (cambered) side, along the entire span of the blade.

Blade C essentially retained its manufactured profile and shape. It exhibited chordwise scratches from the blade root outboard to about 2 inches from the blade tip, on the blade back (cambered) side.

All three propeller blade tips were essentially intact and undamaged.

The propeller model was a Hartzell PHC-C3YF-1RF, and the hub s/n was EE1219.

The propeller spinner, spring, and dome exhibited severe crush/impact damage, and portions remained in the impact depression when the propeller was lifted from the pavement.



Figure 50 - Propeller (in situ)



Figure 51 - Propeller (in situ, close up)



Figure 52 - Propeller (in situ, blades labeled)



Figure 53 - Propeller Forward Face



Figure 54 - Propeller Ground Scar



Figure 55 - Propeller Hub and Spinner



Figure 56 - Blade A Cambered Side



Figure 57 - Blade B Cambered Side



Figure 58 - Blade C Cambered Side

K. EMERGENCY LOCATOR TRANSMITTER (ELT)

The only identifiable component of the ELT that was located was the battery pack, which sustained impact and thermal damage.

L. OFF-SITE ENGINE EXAM

Examination of the airframe and engine was conducted on September 2, 2016 at the facilities of Faeth Aircraft Parts, Sacramento, California, by representatives from Textron Aircraft and Continental Engines, under the supervision of the National Transportation Safety Board investigator-in-charge. No evidence of preimpact mechanical malfunction or failure was noted during the examination of the engine.

The magnetos had been marked as "A" and "B" for photo identification. It was not possible to determine the pre-accident clocking (magneto to engine timing) of the fracture-separated magnetos.

Magneto "A" was identified as Model 6310, s/n 04070208. The forward portion of the ignition lead cap displayed evidence of impact and thermal damage. Some of the ignition leads were separated from the magneto. The magneto drive was manually rotated, the impulse coupling was heard to engage-disengage., but no spark was observed due to the impact/thermal damage to the points and coil.

Magneto B was identified as Model 6310, s/n 04070206. The forward portion of the ignition lead cap separated from the magneto body. The magneto drive was manually rotated, the impulse coupling was heard to engage-disengage., but no spark was observed due to the impact/thermal damage to the points and coil.

The throttle body and metering unit was identified as P/N 646637A8, s/n A05AA335R. The unit sustained extensive impact and thermal damage. The engine side of the throttle body was fractured. The fuel inlet screen security wire was in place and intact. The fuel inlet screen was removed and no debris was noted.

The instrument air pump remained attached to the engine and displayed extensive thermal damage. The instrument air pump was removed to examine the plastic drive gear and internal components. The drive gear was found to be thermally destroyed. The internal carbon rotor was fractured, but the six vanes were essentially undamaged. The pump cavity was thermally damaged.

The top spark plugs were removed and examined. When compared to a Champion Spark Plug "Check-A-Plug" chart, the spark plug wear appeared to be "normal," with normal coloration. The center electrodes on all six top spark plugs were displaced and contacting the ground (side) electrodes. The No. 3 center electrode ceramic insulator was fractured.

A lighted borescope examination was performed on all six cylinders. All exhaust and intake valves were intact, in-place, and exhibited normal combustion deposits and coloration.

The fuel injector nozzles sustained varying degrees of impact and thermal damage. All were heavily contaminated by thermal debris. They were removed from the cylinders and inspected. Injectors No. 5 and 6 were intact. The bodies of injectors No. 1, 2, 3, and 4 were fractured or crushed/bent. The internal passageways in injectors No. 2 and 5 were visually observed to be open/clear.

Additional information and photographs regarding this portion of the examination are documented separately, and can be found in the NTSB public docket for this accident.

M. MAINTENANCE RECORDS

The FAA inspector obtained copies of the airplane's most recent annual inspection, which indicated that that inspection was completed on November 17, 2015. The records indicated that as of that inspection, the airplane had a TT of 5,527.7 hours, and the engine had a TT and TSMOH of 997.9 hours.

The investigation requested additional airplane maintenance records from the operator, and those will be documented separately.