NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Western Pacific Region

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AIRFRAME AND ENGINE EXAMINATION

WPR14FA382

This document contains 10 embedded photos.

Examination Report: N4618J Piper PA28R-180

Tuesday, September 23, 2014

Participants:

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Exam Location:

On-scene
½ mile south of Shively Field Airport
Saratoga, WY

Accident Location:

City:	Saratoga, WY
Latitude/Longitude:	N41 25.932 / W106 50.483
Elevation:	7,129 ft msl

Circumstances/Terrain:

The wreckage was located approximately 1/2 mile south of the departure end of runway 23, Shively Field Airport (KSAA), Saratoga, WY. A rancher spotted the airplane wreckage the morning of Sunday, September 21, and reported it to the Carbon County Sheriff. Both occupants were deceased. The private pilot was in the left seat and a student pilot was in the right seat. The pilot based the airplane in Casper. On Friday, Sept 19, the pilot flew from Casper to Rocky Mountain Metropolitan Airport, Denver, (KBJC) and rented a car to pick his girlfriend (student pilot) in Denver. On Saturday, September 20, they flew from Rocky Mountain Airport to Fort Collins where the pilot received a 0.8 hour of flight instruction in a tail dragger. The pilot's logbook shows a 1 hour day flight from Fort Collins to Saratoga on Sept 20. At 2306 the pilot called the owner of the airplane (his nephew) and left a message that they were in Saratoga were

preflighting in the dark. It is likely they were visiting the local hot springs, which is about a 10 minute walk from the airport. It is also likely the flight destination was back to Rock Mountain Airport, where the rental car was located.

The terrain consisted of rolling hills, prairie grass, and sage brush. The wreckage was located at a terrain elevation that was approximately 100 feet above the runway elevation.

Figure 1: Main Wreckage

Examination Summary:

The initial point of impact was a shallow 7 foot long ground scar that contained green/blue lens fragments. The ground scar was oriented in direct line of the main wreckage on a magnetic bearing of 240°. The main wreckage was located 130 feet from the initial point of impact on the same bearing. The airplane was upright oriented on a bearing of 212° magnetic. The cockpit had split open behind the engine firewall, the left wing was attached, and the right wing had separated at the wing root. The fuselage behind the cabin and tail appeared undamaged. The propeller had separated from the engine at the crankshaft flange. The engine remained on the engine mount, but displaced down and to the right.

Airframe:

Figure 2: View of the left side of the fuselage.

Figure 3: Right side of the entire airplane.

Model: Piper PA28R-180
Serial Number: 28R-30501

The fuselage was examined while it was on its belly, laying on a bearing of 212° magnetic, tail to nose. The left wing was attached and the right wing was separated at the wing root. The vertical stabilizer, rudder, and horizontal stabilator were present on the aft fuselage and exhibited minimal damage. The stabilator trim drum exhibited 4 threads (neutral). The engine was attached to the engine mount which was partially attached to the firewall. The instrument panel was impact damage. The pilot's control yoke was seized, the copilot's control yoke had separated from the control shaft.. Control continuity was established from all control surfaces forward to the cabin area with some restriction due to impact damage to the airframe which restricted cable movement. There was no separation of control cables, and all control cables were attached to their respective bell cranks.

The left wing exhibited leading edge crushing, and 45° buckling of the upper wing skin from midspan to the trailing edge. The fuel cap was in place. A bluish fluid could be seen in the tank through the filler port when the fuel cap was removed. The flap was in the up position, and the landing gear was extended with over center lock in the lock position. The aileron was attached to its hinge, and the balance weight was present.

The right wing was separated from the fuselage at the wing root, but the aft spar remained connected to the airframe. The wing tip leading edge indicated aft and upward crushing. The flap was folded under the wing. The aileron and balance weight were present. The fuel cap was in place, and fuel was observed at the tab level when viewed through the filler port. The landing gear was extended and the over center lock was locked.

Cockpit:

Figure 4: View of the airplane's cabin.

Figure 5: Cockpit and instrument panel.

The cockpit was split open behind the firewall. The wind screen was not present and revealed the entire cockpit and cabin area. The right cockpit floor section by the rudder pedals was deformed inward. The right yoke had separated from the control shaft, the left yoke remained in place. The right seat had separated from the rails, the left seat remained on the rails. Two iPads that were in the cockpit had been ejected out and forward of the fuselage.

Altimeter	8,500 ft 30.32inHg
Compass Card	030
CDI/RMI	034
Airspeed	0
Manifold Pres	0
Tach	0 / 2191.33
Fuel Flow	0
Volt	0
Oil Pres	0
Oil Temp	0
Alternator	0
VOR	116.6/7
Comm	126.25
Ignition	Left (FAA Inspector stated that

	the ignition had been rotated and was not sure it was placed back into the original position.)
Landing Light	ON
Beacon	ON
Fuel Pump	OFF
Pitot Heat	OFF
Gear Handle	DOWN
Flap Handle	25° position
Throttle	Full Back (seized in position)
Propeller	1/3 (seized in position)
Mixture	1/2 (seized in position)
Alternate Air	Closed

Baggage	**Weight (lb)**
Tool Bag/2Qt Oil	6.5
External Power Cables	5
White Bag	8
Camping Seat	1.5
Mesh bag with towels	6
White cloth bag with camera	4.5
Bose bag	1
Headset bag	1
AOPA bag with headset	2
Flight Bag	9
Messenger Bag	5
Fanny pack & ipod case	3
Pilot	232
Copilot	114

Totals:

Total Weight in baggage Comp:	35.5 lbs
Total weight in rear seat:	17 lbs
Total crew weight:	363 lbs

The ELT was a SHARC 7, model 7H-2-175, serial number 125986, and found in its mount undamaged. It was in the ARM position. The ELT was tested by placing it in the ON position and the beacon signal could be heard over an AM radio.

Engine:

Figure 6: Top view of the engine.

Figure 7: Right side, engine mount and accessories.

Model: IO-360-B1E
Serial Number: L-4794-51A
Case Match Number: 533
Crankshaft S/N: UNK
HP: 180 at 2700 rpm

The engine was attached to the engine mount which was partially attached to the fire wall. The propeller had separated from the engine at the crank shaft flange. The throttle cable was connected to the throttle body, the propeller condition cable was attached to the propeller governor control arm, the mixture cable was broken from the fork and exhibited overload signatures. The vacuum pump was removed, could be rotated by hand, rubber shear drive coupling was intact. The vacuum pump was disassembled; the rotor was intact and all vanes showed even ware with no signs of binding. The top spark plugs were removed, Champion REM40E's, and exhibited normal worn wear according to the Champion Check-A-Plug chart. The engine crank shaft was rotated using the

vacuum pump drive. Thumb compression was achieved on all 4 cylinders, and valves moved in sequence. The fuel distribution valve was removed and fuel/fluid observed in the valve. The fuel injectors were removed and found to be clear. The fuel pickup screen was clear. The fuel pump was removed, manually actuated, and fuel was observed to be ejected out of the pump outlet. Oil was observed draining out of the engine, the oil pickup screen was removed and found clear of debris. Both magnetos were removed and spark was produced on all leads by rotating the magneto drive by hand. The propeller governor was removed and the screen on the gasket was clear of debris.

Propeller:

Figure 8: Propeller flange.

Figure 9: Propeller as found in the wreckage.

Figure 10: Propeller blade faces and hub.

Propeller Manufacture: Hartzell
Propeller Model: HC-C2YK-1B
Propeller S/N: CH5297

The propeller had separated from the engine at the crankshaft flange. The propeller was located approximately halfway between the initial point of impact and the main wreckage. The propeller exhibited leading edge polishing on both blades, and longitudinal twisting. Two distinct propeller slashes were identified in the ground 24 inches apart, 45 feet from the initial point of impact.