NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Western Pacific Region

January 28, 2016

AIRFRAME EXAMINATION

WPR16FA059

Santa Rosa, California

January 28, 2016

1900 PST

Piper PA-24-260 – N9362P

EXAMINATION PARTICIPANTS:

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WRECKAGE AND IMPACT INFORMATION

The airplane impacted a grass field about 2 nautical miles from STS. The initial impacted point (IIP) was identified by a fragments from the left wing and a red position light that spanned about 2 feet in length. A crater was located about 31 feet from the IIP on a 297 degree magnetic heading. The main wreckage was about 133 feet from the IIP and oriented 306 magnetic. All four corners of the airplane were identified at the accident site. Portions of the left wing came to rest in the debris path about 40 feet south of the main wreckage. Both the main and auxiliary bladder tanks to the left wing were breached. The right wing, which was co-located with the main wreckage, was intact and displayed compression wrinkles and dents. All the main wreckage sections, comprised of the fuselage, right wing, a portion of the left wing, and engine, were inverted. Both propeller blades exhibited aft bending and twisting. The rudder, trim and elevator cables were traced from the cockpit to their respective control surfaces.

COCKPIT/CABIN OBSERVATIONS

Several cockpit instruments were located throughout the debris field and some were not recovered.

Landing gear lever was in the down position.
Auto pilot lever was switched to NAV2.
The glideslope indicator switch panel contained several modes including NAV, OMNI, HDG, LOC NORM, and LOC REV. The switch panel was set to the HDG mode.
The flap handle was in the flaps down position.
The carburetor heat was OFF.
The attitude indicator was OFF.
The glideslope at the top of the instrument panel was tuned to a 0 degree heading with a localizer indication about 0.5 degrees to the right and a glideslope indication about 0.5 degrees below.
The glideslope at the bottom of the instrument panel was tuned to a 155 degree heading with a localizer indication about 2 degrees to the right and a glideslope indication pegged to the top.
The altimeter readings was about 3,420 feet.
The heading indicator was oriented on a 195 degree magnetic heading.
The mixture knob was retarded to lean.
The propeller knob was in the DECREASE RPM position.
The throttle knob was retarded to IDLE.
Rotating beacon was OFF
NAV LIGHTS OFF.
LANDING LIGHT OFF.
LDG Light ON.
The ignition switch was turned to the BOTH position.
The transponder was set to ALT.
The airspeed indicator was unreadable.
The turn and slip indicator was slightly left of center.
The vertical speed indicator indicated a 30 feet per minute climb.
Oil temp was about 200 degrees.
Cylinder head temperature was pegged over 500 degrees.
Air Left and Air Right were OFF.
Heat was ON.
Defrost (DFR) was ON.
Oil pressure was about 40 PSI.
The fuel gauge was near the F position.

Both rudder pedals were broken.

Both the front left and right seat lap belts and shoulder harnesses were found inside the cockpit, which had separated from the fuselage at their respective mounts. The lap belt and shoulder harness for both occupants were in the fastened position.

AIRFRAME

The main wreckage, which was inverted, was comprised of the empennage, both wings, the fuselage, cockpit, and engine. The stabilator was intact and exhibited no signatures consistent with flutter. Compression wrinkling and skin deformation were noted along the left and right leading edges of the stabilator. The stabilator pitch trim jackscrew inner shaft top extension was about .35 inches, consistent with a neutral pitch setting. The vertical stabilizer displayed some vertical crush damage at the top. Rudder and stabilator control continuity were confirmed from the cockpit to their respective control surfaces. A portion of the left wing, which included the flap and a section of the left aileron, was folded back underneath the fuselage and empennage. Right and left aileron continuity were established from the cockpit to each control surface. The right flap and aileron remained attached to the right wing. The right aileron cable was separated at the wing root and exhibited broomstrawing, consistent with overload separation. The flap jackscrew, located in the fuselage, displayed 17 threads consistent with a 10 degree flap setting and normal approach setting. The electric flap is normally operated by a spring-loaded switch, which was impact damaged. A female end connector for the auto pilot roll servo, installed near the flap jackscrew, remained attached to the male connector, which indicates that both ends were connected at impact.

Both the left main and auxiliary tanks were breached and void of fuel. The right main tank remained and intact, but the fuel line was open. The right auxiliary tank contained about 8 gallons of blue colored fuel with an odor consistent with 100 LL aviation gasoline. The fuel selector separated from the fuel lines and came to rest a few feet forward of the engine. The selector handle was in the left main tank position and could not be rotated by hand. After the unit was disassembled, the selector was rotated to each of the four fuel tank ports. Air was blown through each of the four ports and no obstructions were observed.

Both main landing gear were attached to their respective wings; however, the nose landing gear was located about 100 feet beyond the engine. The main landing gear control cables were impact damaged and extended about 8 inches from the outer cable shroud, consistent with the a gear extended position. The landing gear selector switch was impact damaged and bent to one side against the instrument panel; however, the switch position was below the extended gear detent.

Three gyroscopic instruments, a heading indicator and two attitude indicators, were disassembled and examined at the accident site. The pendulous vane housings and vanes all exhibited light circumferential scoring, which indicates they were operating at the time of impact.

The parts manufacturer approval dry air vacuum pump, part number RAP215CC, was manufactured by Rapco. The drive coupling functioned normally when manipulated by hand. The vanes and carbon rotor were intact and unremarkable.

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ENGINE EXAMINATION

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ENGINE

All six cylinders remained attached to the engine crankcase. The fuel injection servo and air intake screen separated from the engine. The left magneto and the oil filter were partially separated. A crack in the engine case was located between the number no.1 and no. 3 cylinder, and around the no. 2 cylinder.

The engine crankshaft was manually rotated by hand at the propeller and rotational continuity was established throughout the engine and valve train. Thumb compression and suction were obtained on all six cylinders. The cylinder combustion chambers and barrels were examined with a borescope and no evidence of foreign object ingestion or detonation were observed. The combustion chambers displayed color signatures consistent with normal operation. Examination of the rocker arms revealed no evidence of unusual wear. The intake and exhaust pushrod tubes for the No. 2 cylinder exhibited impact damage.

The top and bottom spark plugs, Champion REM-40E's, were removed and each spark plug displayed signatures consistent with normal wear.

The oil filter exhibited impact damage and partial separation, but was not disassembled. The oil sump pick up screen was removed and examined, and no contaminants were observed.

The engine driven fuel pump exhibited impact damage and partial separation. The pump operated normal when actuated by hand. During the pump test, water and mud were directed out of a port hole under pressure.

The fuel flow divider was disassembled and examined; about one table spoon of residual fuel remained in the unit. The fuel diaphragm was unremarkable. The fuel nozzles were removed and no evidence of debris was observed.

The fuel injection servo was separated and exhibited impact damage. A large portion of the throttle body near the throttle plate was damaged during impact. The fuel inlet screen was void of contaminants. The mixture control arm and throttle plate moved from stop to stop when actuated by hand. The throttle arm was crushed and bound.

The left magneto was exhibited mounting flange damage, but was intact and produced spark on two of the six terminals. Disassembly of the unit revealed that the case was depressed onto the distributer gear which inhibited the full rotation of the magneto drive.

The right magneto remained attached to the accessory case and displayed spark on all six terminals when rotated by hand.

The propeller remained attached to the propeller hub, and the propeller hub to the engine. One propeller blade exhibited "S" bending and was twisted opposite the direction of rotation. Chordwise scratching was observed on the forward face. The other propeller blade displayed chordwise scratching and a bend about 6 inches from the propeller opposite the direction of rotation.