



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

March 22, 2018

AIRFRAME AND ENGINE EXAMINATION SUMMARY

WPR18LA105

This document contains 1 embedded photo.

A. ACCIDENT

Location:	Montague, California
Date:	March 10, 2018
Aircraft:	Piper PA28-180, N6611J
NTSB Investigator-in-Charge:	Maja Smith

B. SUMMARY

Examination of the recovered engine was conducted at the facilities of Nu Venture Air Services, Oregon, on March 22, 2018.

C. DETAILS OF THE INVESTIGATION

1.0 Airframe



Photo 1. Airplane wreckage

The left wing was separated from the fuselage to facilitate recovery efforts. The left wing was impact damaged and exhibited “W” shaped deformation around the aileron bellcrank area of the wing. An

approximate 24"x24" section of inboard leading-edge wing was separated at its rivet lines from the remainder of the wing. The main gear remained secured to the wing. The pitot port was observed to be obstructed with a material consistent to that of soil, but the static port was clear of obstruction. The fuel tank exhibited inboard leading-edge impact damage and no fuel was observed within the fuel tank; however, the recovery personnel reportedly recovered fuel from the wing. The fuel cap was secured to its receptacle and the fuel tank vent and fuel tank pick-up screen was free of obstructions when field tested with low pressure air. The flap and aileron remained attached to their respective wing attach points. The flap was observed in the "up" position, and the flap lever and flap torque tube were indicative of the flaps being retracted/up. The flap control rod was separated to facilitate recovery. The aileron balance weight remained secured to the aileron, and the inboard area of the aileron exhibited deformation. The aileron cables remained attached to the aileron bellcrank assembly which was partially separated from its wing attaching points. The aileron cables separated from their turnbuckles in the center section of the fuselage to facilitate recovery. Aileron control continuity was established from the T-bar chain through the recovery separated area to the aileron.

The right wing was separated from the fuselage to facilitate recovery. There was no major visible damage observed to the right wing except for the main gear which was separated from its wing attaching point. The fuel cap was secured to its receptacle and approximately 10 gallons of liquid consistent in color and odor to that of 100LL type aviation gasoline was observed within the fuel tank. Fuel tank pick-up screen and fuel tank vent were clear of obstructions. The flap exhibited minor impact or recovery damage but remained attached to the wing. The flap control rod was separated to facilitate recovery and was observed in the "up" position. The position of the flap control lever in the cockpit and the flap torque tube were indicative of the flaps being set to "retracted/up" position. The aileron and aileron balance weight remained attached to their respective mounts. There was no visible major damage observed to the aileron. The aileron control cables remained attached to the aileron bellcrank assembly and they were separated from their turnbuckles in the fuselage center section by recovery personnel. Aileron control continuity was established from the T-bar chain through the recovery separated areas to the aileron.

The vertical stabilizer and rudder assembly remained attached to their respective attach points and did not exhibit any visible major damage. The rudder control cables remained attached to the rudder and they were continuous to the rudder pedal assembly. Rudder control continuity was established from the rudder pedals to the rudder. No anomalies were observed to the rudder travel limit stops.

The stabilator was separated from its attaching points to facilitate recovery efforts. The stabilator exhibited minor impact or recovery damage to its left leading-edge skin and left stabilator tip. The stabilator trim tab remained attached to the stabilator and was relatively undamaged. The stabilator balance weight was separated from the stabilator by recovery personnel. The stabilator control cables remained attached to the stabilator balance weight and they were continuous to the T-bar assembly. Stabilator control continuity was established from the T-bar assembly to the stabilator balance weight mast. No anomalies were observed to the stabilator travel stops except for the upper left travel limit stop which was fractured and was not located within the recovered wreckage.

The stabilator trim barrel assembly was separated by recovery personnel from the aft bulkhead and from the stabilator trim control rod which remained attached to the trim tab. The trim barrel jack screw exposed 6 threads protruding from the top of the trim barrel assembly which is indicative of a neutral to slight nose up stabilator trim setting. The stabilator trim control cables remained attached to the trim barrel assembly and they were continuous to the cockpit stabilator trim control wheel; however, during recovery the trim cables were unwrapped from the stabilator trim barrel assembly. The fuselage exhibited impact damage to the lower firewall and belly skin in the cockpit area of the fuselage. The pilot's side window was fractured and partially separated from its retainers. There was

no visible major damage to the cabin door and baggage door, and they remained attached to their respective attaching points. The rear bench seat (#3 & #4 seat) remained attached to its fuselage mounts and there was no visible impact damage observed to the rear bench seat assembly. The #3 & #4 seat lap belt assemblies remained attached to their respective attaching points and were determined to be functional during field test. There were no shoulder harnesses installed for the #3 & #4 seats. The pilot's seat was attached to its seat tracks, but the forward seat stops were separated and were not observed within the recovered wreckage; however, the recovery personnel reportedly removed the pilot and copilot seats and their outboard lap belts to facilitate recovery efforts. The copilot's seat was observed within the recovered wreckage and neither copilot nor pilot's seat exhibited any major visible impact damage. The pilot and copilot's inboard lap belts remained secured to their respective fuselage attach points; however, their outboard lap belt sections were separated and were not observed within the recovered wreckage. There were no shoulder harnesses installed for the pilot and copilot's seat. The flap lever was stowed which is indicative of zero degrees of flap extension. The pilot and copilot's control wheel remained attached to the T-bar assembly, but the T-bar chain was partially separated from its sprockets. The instrument panel was intact was not observed to exhibit any major visible impact damage. The recording tach time displayed 5858.59 hours and the Hobbs time displayed 28.2 hours. The carburetor heat control was in the "off" position and the engine primer was stowed. The heat and defrost controls were in the "off" position, and all the visible circuit breakers were set. The magneto switch was in the "off" position and the key was not located within the recovered wreckage. The throttle and mixture levers were observed to be in the aft position/Throttle at idle and mixture at lean positions. All observed electrical switches were in the "off" positions. The nose gear was impact damaged and partially separated from the engine mount. The fuel selector was observed selected to the left fuel tank position. The fuel lines were separated in the fuselage center section area by recovery personnel. The gascolator bowl and screen, and electric fuel pump screen were observed to be clear of debris and fuel was observed within the gascolator bowl and electric fuel pump.

2.0 Engine

Examination of the Lycoming O-360-A4A serial number L-11940-36A engine, revealed that it remained attached to the airframe via all its mounts. All engine accessories remained attached to their respective mounts. The top spark plugs were removed. The cylinders were examined internally using a lighted borescope and were unremarkable. Cylinder number 1 and 2 spark plugs exhibited a black coloration within the electrode area and cylinder 3 and 4 exhibited a light gray / white coloration within the electrode area. Magneto to engine timing was verified at about 25 degrees. The crankshaft was rotated by hand and compression was noted on all four cylinders. The top spark plugs were reinstalled. Throttle, mixture, and carburetor heat control continuity was established from the cockpit controls to the engine. The airframe fuel filter bowl was removed and contained a few ounces of fuel, which was free of debris.

3.0 Propeller

The propeller remained attached to the engine. One propeller blade was bent aft about 90 degrees and approximately mid-span of the blade and exhibited chord wise scoring and leading-edge gouges. The other propeller blade was bent forward over the blade back about 120 degrees and approximately mid-span of the blade and exhibited chord wise scoring and leading-edge gouges.

Test and Research

The engine was prepped for a functional check as follows. An external fuel source was attached to the left inlet port on the fuel selector valve. Cut P leads from both magnetos. activated the starter with jumper wire. The engine was started, warmed up, and advanced to 1800 rpm. A magneto check was not conducted as the P leads were cut off. The throttle was advanced to the full forward stop and the engine accelerated to about 2375 RPM. The oil pressure and fuel pressure were in the normal/green operating range, and the magneto check at 2000RPM was less than 100RPM drop between the left and right magnetos. The engine was run uneventfully for about 15 minutes throughout various power settings before it was shut down using the mixture.