

The accident occurred on November 6, 2020 at approximately 1225. Aircraft is an experimental homebuilt RV-12, registration as N975G. Aircraft took off from runway 23 the engine failed at approximately 450' AGL. Pilot executed a steep turn and returned to runway 05. Landing was fast and rough, there was a 18-23 knot tailwind, aircraft porpoise' d on landing and may have damaged the nose gear at this point, evidenced by skid marks. The aircraft continued along braking for 450' eventually departing left of the runway and striking a taxiway marker for 23-5, a strong tailwind exacerbated the situation.

The NTSB investigator Fabian Salazar has ruled this an accident at this time, NTSB investigator indicated an engine teardown will take place. The PIC is a private instrument rated pilot. The passenger was his 21 year old son.

Aircraft total time is 302.1, engine total time is 349.9. The aircraft engine is seized, it had fuel and oil at the time of the accident. Engine analyzer data showed fuel and oil pressure up to the point the engine stopped. All other parameters were normal. The nose gear snapped off, both main gear are bent aft and splayed. The firewall was deformed on the lower half. Both wing spars at the center bulkhead assembly had a forward bow to them. The horizontal section of the center bulkhead assembly where the MLG attaches sheared the attachment rivets and had a 45 degree curl to it increasing incident to aircraft left. The right wing tip was bent up approximately 1 inch with associated skin distortion. The right wing leading edge had impact damage from a runway marker sign. Damage was approximately 12" wide and centered on a wing rib approximately 36" outboard of the fuselage. The impact caved in and ruptured the skin approximately 6" affecting multiple skin panels and a wing rib. The wing spar appeared unaffected, other than previously noted. The aircraft right wing flaperon had trailing edge damage approximately 6' long at the center of the flaperon, bent up 1". The left wing had skin buckling on the upper aft inboard section approximately 18"x18". Both wing undersides had underwing punctures from the MLG wheel pants and tires. The tail and empennage was undamaged.

The AC owner Mr. Gawer indicated that all 4 cylinders had been replaced approximately 150 hours ago due to oil leaks. Approximately 20 hours after that a drop in oil pressure was noted. At the advice of engine manufacture tech rep advice an analog oil pressure gage was installed. The engine is a UL power UL350IS, S/N 135001.

The aircraft propeller a Whirlwind GA-UL350-2B, s/n UL350-2009, blades s/n 2007 and 2008 had ground impact damage to one blade at the tip. Approximately 4" had bent aft at a 90 degree angle. The other blade had a small quarter sized abrasion 12" from the blade root. The propeller shaft had a slight bend in it, this is suspected to have occurred as a result of the sudden stoppage and torque energy transfer to the shaft.

The alternator was removed and showed no damage. The Throttle cable barrel nut was missing, this is suspected to have occurred due to excessive force applied after engine shutdown. The intake was inspected and was clear of obstruction, the throttle assembly moved freely. Fuel was present in the fuel lines upon disassembly. The air filter was clear of obstruction and showed minimal contamination. The muffler and exhaust tubes were inspected and clear of obstructions

An inspection of all four valve trains revealed no damage or abnormalities. The pushrods were straight and undamaged. The camshaft followers were insignificant. The piston heads were removed and revealed nothing of note. All valves were intact and had normal appearance. The cylinder walls of all

four pistons were unremarkable. Once removed all four pistons were unremarkable. The connecting rods and pin were intact and showed normal wear.

An inspection of the crankshaft with the engine cases still intact revealed crankshaft separation aft of the number two connecting rod and before the number three bearing. The separation occurred at the balance weight. There is metal smearing evident on the case aft of the number two bearing. There is less significant smearing on the forward side of the number 3 bearing case. The right case is missing a small $\frac{1}{4}$ " piece of material aft of the number 1 bearing at 6 o'clock. At the number 2 bearing 6 o'clock the case appears slightly misaligned. The cam shaft is intact and shows normal wear. The camshaft gear and crankshaft gear are intact and unremarkable.

The engine has two oil temperature probes installed on the left hand side of the case at the lower oil gallery. The forward probe is a Lycoming 1B3 5/8-18 and protrudes into the gallery approximately $1 \frac{1}{16}$ into the gallery. The aft probe is a Kavlico probe and is factory installed. The gallery the Lycoming probe protrudes into is $1 \frac{3}{8}$ " deep, the probe did not block the oil passage to the number 2 bearing.

The engine was removed and taken to a local mechanic for disassembly. Upon splitting the cases it was evident that oil starvation was not a cause. All bearings were aligned appropriately and no evidence was present of a bearing spinning. An inspection of the crankshaft yielded a finding that the crankshaft separated due to material failure. Further analysis would be required to determine the reason for the failure. This investigation is considered closed.