



ERA19LA232

Ocean City, Maryland

July 19, 2019

Vans RV-7A N849GS

NTSB ENGINE EXAMINATION REPORT

October 29, 2019

PARTICIPANTS IN THE EXAMINATION

**Heidi Kemner
Air Safety Investigator (IIC)
National Transportation Safety Board
Ashburn, VA**

**Dan Boggs
Air Safety Investigator
National Transportation Safety Board
Daytona Beach, FL**

**Steven O'Rourke
Aviation Safety Inspector
Federal Aviation Administration
Baltimore, MD**

HISTORY OF FLIGHT

On July 19, 2019, about 1210 eastern daylight time, an experimental, amateur-built Vans RV-7A, N849GS, was substantially damaged after it experienced a partial loss of engine power during the initial climb after takeoff from Ocean City Municipal Airport (OXB), Ocean City, Maryland. The commercial pilot sustained minor injuries. The airplane was registered to and operated by the pilot as a Title 14 Code of Federal Regulations Part 91 flight. Visual meteorological conditions prevailed at the time of the accident and a visual flight rules flight plan was filed for the personal flight destined for Manassas Regional Airport (HEF), Manassas, Virginia.

ENGINE INFORMATION

Engine Manufacturer: Superior Air Parts
Engine Model Number: IO-360-B1A2
Engine Serial Number: S0643
Recent Inspection: August 8, 2018 – condition inspection
Last Overhaul: August 8, 2018 – 431.0 hours
Total Engine Time in Service: 459.5 hours

DATE: 08/08/18	HOBBS: 163.3 HRS
ENGINE MAKE: SUPERIOR AIR PARTS, INC.	ENGINE SERIAL NO. S0643
ENGINE MODEL: IO-360-B1A2	ENGINE TOTAL TIME: 431.0
ENGINE TIME SMOH: 0.0 HRS	INSTALLED ON VANS RV-7A, N712RL, S/N 71000

DISASSEMBLED ENGINE AND PERFORMED INSPECTION AND OVERHAUL IN ACCORDANCE WITH FAR 43.2 AND SUPERIOR AIR PARTS OVERHAUL MANUAL. CLEANED, INSPECTED AND MEASURED CONNECTING RODS, CRANKSHAFT, PISTONS, CAM SHAFT, ENGINE CASE, CYLINDERS, VALVE PUSH RODS, - ALL FOUND TO BE WITHIN NEW LIMIT TOLERANCES. INSTALLED NEW STANDARD SIZED MAIN BEARINGS, CONNECTING ROD BOLTS AND GASKET KIT. SERVICE ENGINE WITH 8QTS AEROSHELL 80 MINERAL OIL, INSTALLED NEW OIL FILTER. PERFORMED OPS CHECK, OPS CHECK OK. VERIFIED ALL FLUID LEVELS AND INSPECTED ENGINE FOR LEAKS, NO LEAKS NOTED. I CERTIFY THAT THIS ENGINE HAS BEEN INSPECTED IN ACCORDANCE WITH SCOPE AND DETAIL OF FAA 14 CFR PART 43 APPENDIX D AND FOUND TO BE IN CONDITION FOR SAFE OPERATION.

SIGNED _____

Figure 1. Most Recent Inspection (condition inspection)

EXAMINATION NOTES

- The engine remained attached to the airframe and the engine cowl was removed to facilitate examination.
- The Hobbs meter indicated 459.5 hours of time.

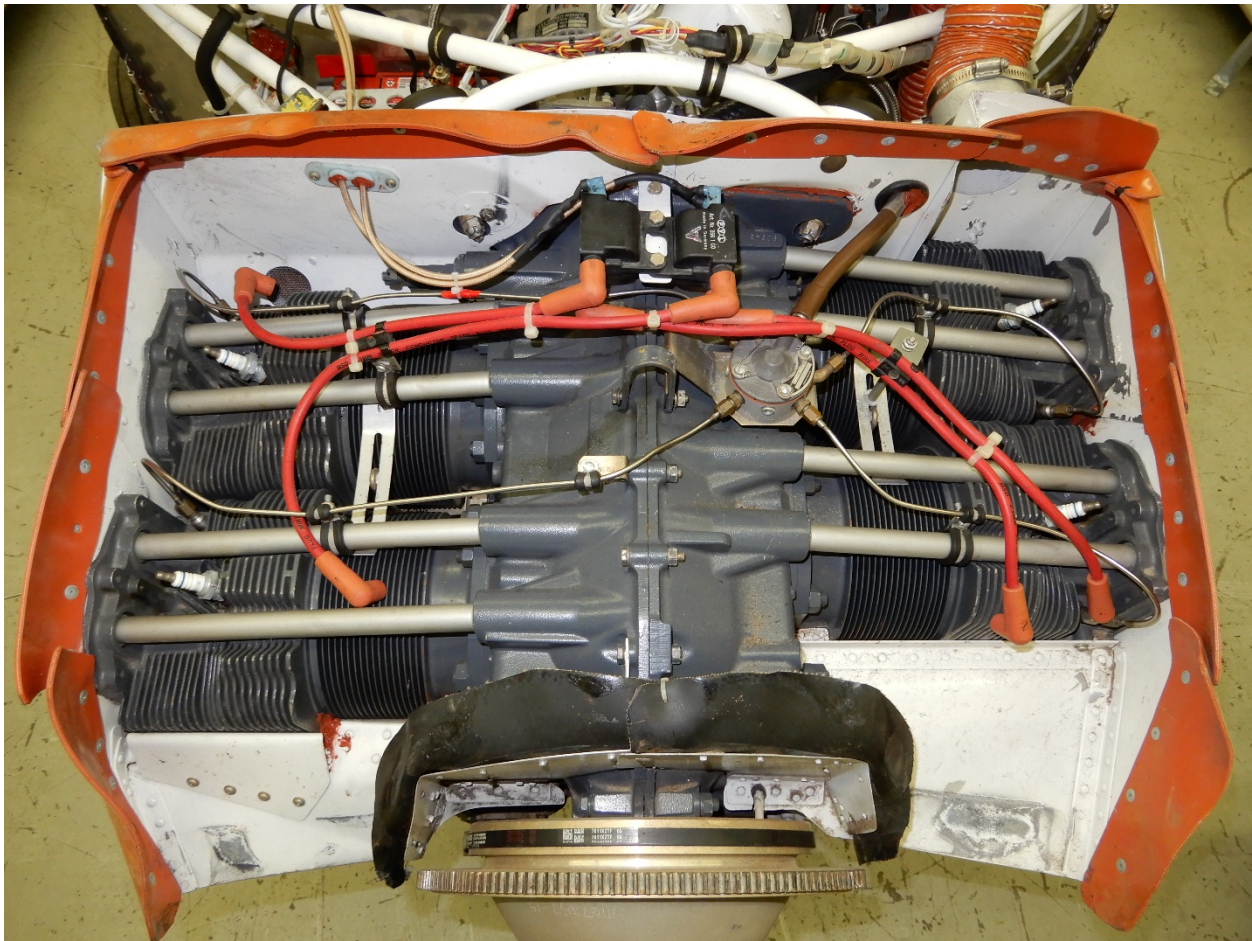


Figure 2. View of engine as found.

- The governor control arm was disconnected from the propeller governor and the control arm locking bolt was missing. In addition, the secondary control arm/spacer was not located, nor was the spring. Furthermore, the governor control arm pin that slid into the secondary control arm/spacer was not sheared and remained intact.



Figure 3. View of control arm not attached to propeller governor.

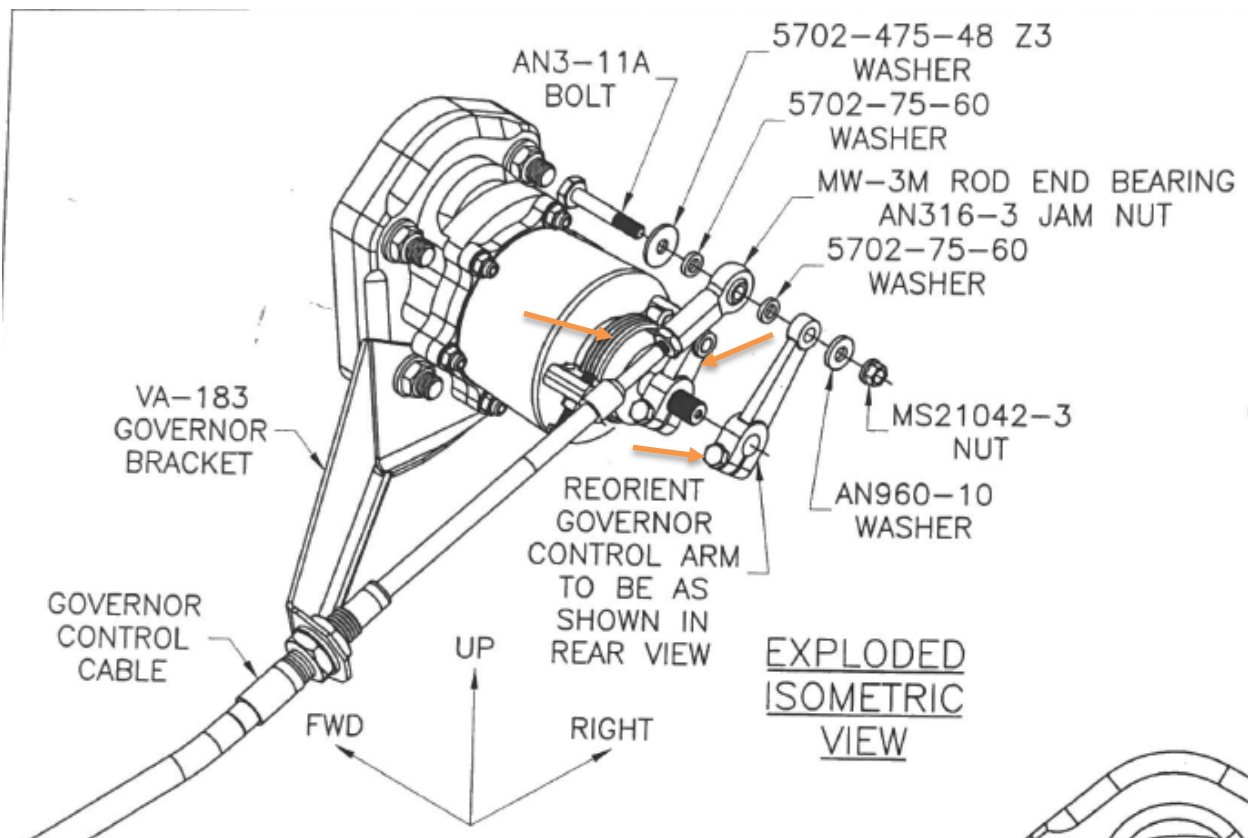


Figure 4. Propeller Governor Parts Drawing with orange arrow pointing to missing parts.

- The top spark plugs were removed. The Nos. 1 and 4 exhibited carbon deposits.
- The bottom spark plugs were removed and examined. They exhibited carbon deposits on the spark plugs.
- The cylinders were examined with a lighted boroscope. All valves and pistons were examined with no anomalies noted.
- The left magneto timing was checked and no anomalies were noted.
- The right magneto was an electronic magneto and could not be tested.
- The governor control arm was re-attached, fuel was plumbed into the engine, the engine started and operated without anomalies. The engine throttle was advanced and the engine ran smoothly. The propeller lever was operated and the propeller moved from low pitch, high RPM, to high pitch, low RPM multiple times without anomaly. The propeller control was returned to low pitch, high RPM and the engine was shut down.
- Then, the governor control arm was positioned in the low pitch, high RPM position to simulate takeoff conditions. Furthermore, the governor control arm was disconnected since that was how it was initially found by investigators. The engine was restarted, the throttle was advanced, and the engine RPM would not rise above 1400 RPM at maximum power.
- After the engine was shutdown, the governor control arm had vibrated/turned and was observed in a high pitch, low RPM setting.
- There was a Grand Rapid Technologies Model 4000 Engine Information System installed in the instrument panel. It was downloaded and the data was examined. The most recent flight data indicated that the RPM increased to about 2,600 RPM about 8 minutes and 15 seconds into the recording. Then about 450 ft in the air, and 8 minutes and 30 seconds into the flight, the tachometer decreased to about 1,500 RPM and maintained that RPM over the next one minute and 12 seconds until the engine power reduced to about 800 RPM for about 20 seconds and finally to 0 RPM. Data Recording information can be found in the docket for this accident.

