

CEN18LA173 Revised Factual Report

This report was modified on 12/11/2019. Please see the docket for this accident to view the original report.

On May 15, 2018, about 0945 eastern daylight time, a Grumman American Aviation Corporation AA 1B airplane, N6550L, impacted terrain during a forced landing at the Butler County Regional Airport-Hogan Field (HAO), near Hamilton, Ohio, following a loss of engine power. The ~~commercial~~private pilot, who was the sole occupant, sustained serious injuries. The airplane received substantial wing and fuselage damage. The airplane was registered to an individual and was operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 test flight. Day visual meteorological conditions prevailed in the area about the time of the accident, and the flight was not operated on a flight plan. The local flight was originating from HAO at the time of the accident.

~~According to the current owner of the accident airplane, the airplane was at HAO for a pre-purchase inspection and for an overhauled engine swap.~~

According to the prior owner of the accident airplane, he flew the accident airplane on April 12, 2018, about 1000. A maintenance test flight was going to be conducted because of an engine swap. The original flight was intended to be with the pilot that purchased the aircraft a month prior to fly the aircraft back to his home base. Since he was a student pilot, he would not have been able to fly the aircraft back himself. After completing a preflight, 2 blocks of wood were found behind the rudder pedals that prevented them from moving. After removing them, the airplane failed a run up because of engine roughness.

The prior owner thought the flying was concluded as there was something wrong with the engine. The mechanic felt that the roughness was caused by oil getting by the new piston rings and fouling the sparkplugs. The mechanic removed the cowlings and the fouled plugs. After cleaning them and reinstalling the plugs, the engine appeared to run "ok." Since the mechanic had an expired flight review, the prior owner ended up taking the right seat with him in the left seat for the maintenance test flight. He mentioned that he would have to run the engine at high power while taxiing to prevent fouling again. On taxi out, the mechanic was the pilot flying and the prior owner was the pilot monitoring. The prior owner was surprised when the mechanic took the active runway without doing an engine runup.

The takeoff power appeared normal until about 100 ft above ground level (AGL) where the engine abruptly lost power without warning. The airplane nosed over immediately, and they put the airplane down on the remaining runway, stopping about 30 ft from the end of the runway. The prior owner was upset that the engine lost power after the mechanic was so certain that it was the fouling of the plugs, and that the mechanic did not conduct a proper engine run up, especially in light of the engine roughness encountered on the previous taxi out.

The ~~current owner reported that the~~ mechanic then removed the carburetor and ~~subsequently~~ sent it out for overhaul ~~and reinstallation.~~

The mechanic reinstalled the overhauled carburetor and conducted a maintenance test flight, which was the accident flight. Witnesses stated that the airplane took off on runway 29; they heard the engine stop, and the pilot attempted to circle back to the airport but did not make it. A witness at HAO heard the sound of the airplane's engine stop while the mechanic was conducting this takeoff. The witness then saw the airplane return to the airport for a landing. The airplane impacted terrain left wing low during the forced landing where it sustained the substantial damage. A video from a local parking lot camera shows the accident sequence and is appended to the docket material associated with this investigation.

The accident pilot held a commercial pilot certificate and an airframe and powerplant mechanic certificate. The pilot completed an accident report that did not contain a narrative of the accident flight and he advised that he did not recall the accident. Further, the pilot did not indicate the date of his last flight review. However, the pilot reported that he had accumulated more than 6,000 hours of total flight time, more than 50 hours of flight time in AA 1B airplanes, and more than 300 hours of flight time in 2-seat Grumman airplanes. Additionally, he forwarded a statement from another airframe and powerplant mechanic, which is appended to the docket material associated with this investigation.

N6550L was a 1974 model Grumman American Aviation Corporation AA 1B airplane, with serial number AA1B 0350. It was a low-wing airplane, with a fixed tricycle landing gear, and was configured for two occupants. The airplane was powered by a direct drive, carbureted, air-cooled, four-cylinder engine. The engine was a Lycoming O-320 C2C, with serial number L 11445 15, which drove a two-bladed, fixed pitch, McCauley 1A105 SCM 7154 propeller. The airplane's logbooks showed that this engine was installed on the airplane and an annual inspection completed on April 3, 2018, at a tachometer time of 1,427.3 hours, total airframe time of 4,126 hours, total engine time of 6,758.4 hours, and 1.4 hours since the engine's last major overhaul. The airplane had a fuel capacity of 24 gallons. The forwarded statement from a mechanic, in part, advised that logbook documents showed that the engine was installed on N9971L from June 9, 2001, until March 5, 2007, when it was removed from N9971L and overhauled. This engine then sat on a shelf until it was installed on an airplane, N1447R, that was sold at auction.

The airplane was equipped with an J.P. Instruments Engine Data Management (EDM) 350 system which is a 3.5-inch square engine-monitoring instrument. Per J.P. Instruments, the EDM 350 unit works in the background, can monitor engine parameters three times a second, and will warn you instantly if any parameter exceeds the programmed limit.

The EDM 350 unit was removed and shipped to the National Transportation Safety Board Vehicle Recorder Laboratory. A Senior Recorder Laboratory Specialist examined the unit and noted that it had a damaged screen. However, it was otherwise in good condition and the data was extracted normally from the 350 unit. The download of the unit produced a manufacturer proprietary file. The proprietary file contained recordings for six flights, however, the data was marked as "BADFLT" and no engine data was recorded within each file. The unit stored the amount of fuel available and the amount of fuel used. The amount of fuel used displayed as 1.5 gallons. The amount of fuel available displayed 14.5 gallons.

On May 15, 2018, at 0953, the recorded weather at HAO was: Wind variable at 5 kts; visibility 10 statute

miles; sky condition clear; temperature 26° C; dew point 17° C; altimeter 29.93 inches of mercury.

~~On April 12, 2018, at 0953, the recorded weather at HAO was: Wind 250° at 13 kts, gusting to 22 kts; visibility 10 statute miles; sky condition clear; temperature 28° C; dew point 17° C; altimeter 30.05 inches of mercury.~~

~~The temperature and dew point data for these days were plotted on a carburetor icing chart. The weather present on the accident day was conducive to moderate carburetor icing at cruise power and serious icing at descent power. The weather present on April 12, 2018, was conducive to serious carburetor icing at descent power. The plotted charts are appended to the docket material associated with this investigation.~~

On May 16 and 17, 2018, a Federal Aviation Administration (FAA) aviation safety inspector and an air safety investigator from Lycoming Engines examined the wreckage. The engine produced a thumb compression at all cylinders when the crankshaft was rotated and the engine was not subsequently disassembled. All bottom sparkplugs were coated with oil which is consistent with gravity settling oil on them. During the wreckage examination, a B-nut fitting on the left fuel tank exhibited discoloration consistent with fuel staining. There were no ~~other~~ preimpact anomalies found that would have kept the accident engine from operating normally.

~~The prior owner reported a similar engine power loss accident that occurred about 35 years ago, in a Cessna 150, when he had an engine failure with a student pilot at approximately 400 ft AGL while taking off at night. It was an abrupt engine failure (without warning) after 30 minutes of doing night touch and go landings. The airplane was force landed straight ahead off the airport. The cause turned out to be a small piece of ice in the fuel selector on the floor that became loose after heating up or vibration, and subsequently lodged in the fuel line shutting off the fuel. The investigators were able to determine this after pulling out the fuel selector and allowing it to warm up in a can in a car.~~

~~The prior owner stated, "Both cases, the only option was a straight ahead landing. I was able to attempt a restart twice in the Cessna, but because of the lower altitude of the Grumman, we did not have time to attempt a restart. In that case it was more critical to get it on the remaining runway. I have no idea as to the cause of the failure in the Grumman, other than everything appeared normal in the initial Takeoff roll and Climb Out (before it failed completely and with very little warning (seconds at most))."~~

~~The emergency procedures section in the FAA Airplane Flying Handbook, in part, stated:~~

~~The altitude available is, in many ways, the controlling factor in the successful accomplishment of an emergency landing. If an actual engine failure should occur immediately after takeoff and before a safe maneuvering altitude is attained, it is usually inadvisable to attempt to turn back to the field from where the takeoff was made. Instead, it is safer to immediately establish the proper glide attitude, and select a field directly ahead or slightly to either side of the takeoff path. ...~~

~~To get back to the takeoff field, a downwind turn must be made. This increases the groundspeed and rushes the pilot even more in the performance of procedures and in planning the landing approach.~~

Secondly, the airplane is losing considerable altitude during the turn and might still be in a bank when the ground is contacted, resulting in the airplane cartwheeling (which would be a catastrophe for the occupants, as well as the airplane). After turning downwind, the apparent increase in groundspeed could mislead the pilot into attempting to prematurely slow down the airplane and cause it to stall.

A review of a map of the area around HAO revealed that there was a business and housing present within a quarter mile from the end of the departure runway.