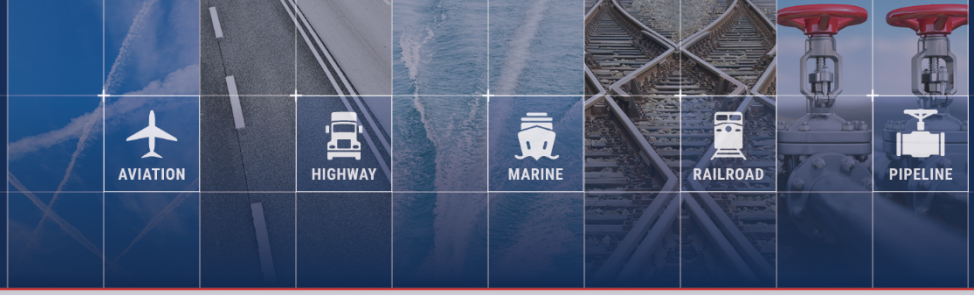

Aviation Investigation Final Report

Location:	Hamilton, Ohio	**Accident Number:**	CEN18LA173
Date & Time:	May 15, 2018, 09:45 Local	**Registration:**	N6550L
Aircraft:	GRUMMAN AMERICAN AVN. CORP. AA 1B	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Serious
Flight Conducted Under:	Part 91: General aviation - Flight test		

Analysis

About 1 month before the accident, the prior owner of the accident airplane performed a maintenance test flight after an engine replacement. The airplane failed a run-up because of engine roughness. The mechanic/accident pilot who performed the engine replacement felt that the roughness was caused by oil getting by the new piston rings and fouling the spark plugs. The mechanic/pilot cleaned and reinstalled the plugs.

The maintenance test flight was then reattempted, and the prior owner flew in the right seat with the mechanic/pilot as the pilot flying. The prior owner indicated that the mechanic/pilot took the active runway without completing an engine run-up. The takeoff power appeared normal until about 100 ft above ground level, when the engine failed abruptly and without warning. The airplane's nose dropped, and the pilot landed the airplane, stopping it about 30 ft from the end of the runway.

The mechanic/pilot subsequently sent the carburetor out for overhaul. After reinstalling the carburetor, the mechanic/pilot attempted another maintenance test flight, which was the accident flight. Witnesses stated that the airplane took off; they heard the engine stop, and the pilot attempted to circle back to the airport but did not make it. The airplane impacted terrain during the landing, which resulted in substantial damage to the wing and fuselage.

The mechanic/pilot completed an accident report that did not contain a narrative of the accident flight and advised that he did not recall the accident. Further, the pilot did not indicate the date of his last flight review.

A postaccident engine examination revealed no evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation. The engine monitor sustained damage; no engine data was recorded for the accident flight.

At the time of the accident, the weather conditions were conducive to moderate carburetor icing at cruise power and serious carburetor icing at descent power. However, the engine was operating at takeoff power; the investigation was unable to determine if the pilot conducted any ground operations during which carburetor ice could have formed.

Thus, a reason for the loss of engine power could not be determined.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The loss of engine power during takeoff for reasons that could not be determined because postaccident examination revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

Findings

Not determined	(general) - Unknown/Not determined
Personnel issues	Qualification/certification - Pilot

Factual Information

History of Flight

Takeoff	Loss of engine power (total) (Defining event)
Emergency descent	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)

****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 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 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 cowling 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 mechanic then removed the carburetor and sent it out for overhaul.

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. 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 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.

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.

The weather present on the accident day was conducive to moderate carburetor icing at cruise power and serious icing at descent power.

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 preimpact anomalies found that would have kept the accident engine from operating normally.

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.

Pilot Information

Certificate:	Commercial; Private	**Age:**	63,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	January 2, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	6000 hours (Total, all aircraft), 50 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	GRUMMAN AMERICAN AVN. CORP.	**Registration:**	N6550L
Model/Series:	AA 1B	**Aircraft Category:**	Airplane
Year of Manufacture:	1974	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	AA1B-0350
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	April 3, 2018 Annual	**Certified Max Gross Wt.:**	1560 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	4126 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed	**Engine Model/Series:**	O-235-C2C
Registered Owner:		**Rated Power:**	108 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KHAO,634 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	09:53 Local	**Direction from Accident Site:**	273°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.93 inches Hg	**Temperature/Dew Point:**	26°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Hamilton, OH (HAO)	**Type of Flight Plan Filed:**	None
Destination:	Hamilton, OH (HAO)	**Type of Clearance:**	None
Departure Time:	09:45 Local	**Type of Airspace:**	

Airport Information

Airport:	BUTLER CO RGNL-HOGAN FIELD HAO	**Runway Surface Type:**	Asphalt
Airport Elevation:	633 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	39.363887,-84.521942(est)

Administrative Information

Investigator In Charge (IIC):	Malinowski, Edward
Additional Participating Persons:	Benjamin Roller; Federal Aviation Administration; Cincinnati, OH David Harsanyi; Lycoming Engines; Williamsport, PA
Original Publish Date:	February 11, 2020
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97253