Aviation Investigation Final Report

Location:	Dunnellon, Florida	**Accident Number:**	ERA20LA271
Date & Time:	August 1, 2020, 16:00 Local	**Registration:**	N7192L
Aircraft:	American Aviation AA 5	**Aircraft Damage:**	Substantial
Defining Event:	Fuel related	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot, who was not a certified airframe and powerplant mechanic, had recently reassembled the airplane, which had been in storage for 14 years. He told people that he was having problems with the fuel system and had an engine failure on a previous test flight. On the day of the accident, the pilot told his girlfriend that he was going to fly around the airport's traffic pattern a few times but never returned. The airplane was located the following day about 1 mile west of the airport in heavily wooded terrain.

Postaccident examination of the engine revealed the engine-driven fuel pump was heavily corroded, and water was found in the carburetor. Debris was found in the fuel line that connected the auxiliary fuel pump and the engine driven fuel pump. Rubber debris was also noted in the hose, consistent with damage to the rubber hose lining during fitting installation. The auxiliary fuel pump switch was found in the ON position at the accident site, which was consistent with normal takeoff and landing operations. The pilot had purchased 23 gallons of fuel about 1 month and a half before the accident and, according to the tachometer, had flown only 1.55 hours since the last annual inspection. The fuel burn rate for the engine was about 5.2 gallons per hour, thus giving the pilot about 14 gallons or more than 2 hours of fuel on board at the time he departed.

A review of maintenance records revealed that the airplane had not had an annual inspection—as required by Federal Aviation Administration regulations—in almost 19 years prior to the accident. The engine had not had an annual inspection for almost 23 years or been overhauled in 23 years prior to the accident.

Though the pilot was mechanically inclined, he had no experience maintaining aircraft and was not certified to do so. As a result, critical components that provided fuel to the engine were not properly installed or inspected. This lack of maintenance resulted in operating with water in the carburetor, corrosion on the engine driven fuel pump, and debris in the fuel system which

impeded proper fuel flow to the engine and resulted in a loss of engine power while operating at a low altitude in the traffic pattern.

Probable Cause and Findings

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

A total loss of engine power due to fuel starvation as a result of improper installation and inspection of the airplane's fuel system. Contributing to the accident was the pilot's lack of certification and knowledge in aircraft maintenance.

Findings

Aircraft	Fuel pumps - Fatigue/wear/corrosion
Aircraft	Fuel distribution - Incorrect service/maintenance
Personnel issues	Unauthorized maint/repair - Owner/builder
Personnel issues	Qualification/certification - Owner/builder
Aircraft	Scheduled maint checks - Not serviced/maintained

Factual Information

History of Flight

Maneuvering	Fuel related (Defining event)
Maneuvering	Loss of engine power (total)
Emergency descent	Collision with terr/obj (non-CFIT)

On August 1, 2020, at an unknown time, a Grumman American AA-5, N7192L, sustained substantial damage when it was involved in an accident near Marion County Airport (X35), Dunnellon, Florida. The private pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* (*CFR*) Part 91 personal flight.

The pilot held a private pilot certificate with a rating for airplane single-engine land. According to the airport manager, the pilot texted his girlfriend at 1527 eastern daylight time and said he was going to "fly a couple laps" around the X35 traffic pattern. The pilot did not file a flight plan and was not in communication with air traffic control. When his girlfriend did not hear back from the pilot later that afternoon, she contacted the airport manager, who in turn notified law enforcement. A search was initiated, and the airplane was located the following morning less than 1 mile west of the airport in heavily wooded terrain. There was no post impact fire.

According to the airplane's co-owner, she and the pilot had recently purchased the airplane. She said it had not flown in 14 years and the airplane was "in pieces" when it was purchased. The unassembled airplane was transported to the pilot's home, where it was partially assembled by the pilot then moved to X35 where it was fully assembled. The pilot did not hold a Federal Aviation Administration (FAA)-issued mechanic certificate but was known to restore, build, and repair vehicles and boats. The co-owner, who is not a pilot, said the pilot performed a test-flight of the newly assembled airplane on July 14, 2020, and reported that some of the gauges were not working. She thought one of the gauges was a fuel gauge.

The airport manager said the pilot was a "staple" at the airport and liked to "tinker" with things. His goal was to get the airplane to a point where he could have an FAA-certificated airframe and powerplant mechanic perform an annual inspection. The airport manager said the pilot had flown the airplane a few times before the accident flight. On one flight, the engine sputtered and lost power, but the pilot was able to land safely back at the airport. The pilot told the airport manager he had a problem with the left fuel tank and one of the gauges was "acting up."

A friend of the pilot stated that the pilot had told him that he had an issue with one of the fuel gauges (could not recall which one), the fuel pump and there was a fuel leak with one of the fuel bladders. The friend thought the pilot had fixed those fuel problems, but he was not sure how that was done.

The airplane collided with several trees and came to rest inverted. All major components of the airframe were accounted for at the accident site. Both wings and their associated flap/ailerons sustained impact damage. The left and right fuel tanks were breached. Both horizontal stabilizers and respective elevators had separated from the airframe due to impact. It was noted that the tips of both elevators were secured to the airplane via duct tape. The rudder remained attached to the empennage. Extensive corrosion was observed to the elevators' and rudder's internal structure. Though there were several breaks in the flight control system due to impact forces, flight control continuity for each flight control surface was established to the cockpit area.

Examination of the engine revealed the carburetor sustained impact damage and partially separated from the engine. The fuel inlet fitting bore was fractured, and the fuel inlet fitting and hose separated from the carburetor. The fuel inlet fuel screen was not observed. The carburetor was disassembled, and the bowl contained about 1 teaspoon of water and no fuel. The presence of water was verified via the use of water finding paste. Corrosion was observed on the internal surfaces of the carburetor.

The engine-driven fuel pump was fractured, and the pumping section separated from the engine. The pump was partially disassembled and no damage to the rubber diaphragms were noted. However, the pump's internal check valves and other interior surfaces were heavily corroded.

Debris was also observed in the hose between the auxiliary fuel pump and the engine driven fuel pump. Air was blown by mouth through the hose and a partial obstruction was noted. The hose fitting was removed, and additional rubber debris was noted in the hose consistent with rubber hose lining damage during fitting installation. The auxiliary fuel pump switch was found in the "on" position at the accident site. This is consistent with the airplane's pilot operating handbook, which instructs the pilot to turn the pump on for takeoff and landing. There were no other pre-impact anomalies noted with the airframe or engine.

The airplane was equipped with two fuel tanks (one in each wing) that held a total of 38 gallons (37 gallons usable). The pilot purchased fuel at X35 on June 13, 2020 (18 gallons) and June 16, 2020 (5 gallons), for a total of 23 gallons.

A review of the airplane's maintenance records revealed that the last annual inspection was completed on August 18, 2001, at an airframe total time of 2,029.66 and a tachometer time of 1,920.66. At the time of the accident, the tachometer read 1,922.21, for a total 1.55 hours since the annual inspection that was done almost 19 years before.

The engine (a Lycoming O-320-E2G), which has an average fuel burn rate of about 5.2 gallons per hour, was last overhauled on March 31, 1996, and underwent an annual inspection on July 2, 1996 (a tachometer time was not provided in the logbook entry). There was no record of the engine being overhauled in the 23 years since it was last overhauled. According to the engine manufacturer, the engine should be overhauled within 12 calendar years of the date they first entered service or of last overhaul "…to mitigate engine deterioration that occurs with age,

including corrosion of metallic components and degradation of non-metallic components such as gaskets, seals, flexible hoses and fuel pump diaphragms."

The FAA requires the airplane and engine to undergo an annual inspection as per Title 14 *CFR* 91.409.

The pilot's last FAA third-class medical was issued on November 21, 2017 and expired at the end of November 2019. He did not report his flight hours at the time the medical certificate was issued, and his logbooks were not made available for review.

Pilot Information

Certificate:	Private	**Age:**	48,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	None
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	November 21, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	American Aviation	**Registration:**	N7192L
Model/Series:	AA 5 Undesignat	**Aircraft Category:**	Airplane
Year of Manufacture:	1973	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	AA5-0492
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	August 18, 2001 Annual	**Certified Max Gross Wt.:**	2200 lbs
Time Since Last Inspection:	2 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2031.21 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C91A installed, not activated	**Engine Model/Series:**	O-320 E2G
Registered Owner:	On file	**Rated Power:**	150 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:	OCF,89 ft msl	**Distance from Accident Site:**	10 Nautical Miles
Observation Time:	15:51 Local	**Direction from Accident Site:**	50°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.96 inches Hg	**Temperature/Dew Point:**	35°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Dunnellon, FL (X35)	**Type of Flight Plan Filed:**	None
Destination:	Dunnellon, FL (X35)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Unknown

Airport Information

Airport:	Marion County X35	**Runway Surface Type:**	
Airport Elevation:	65 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	29.061388,-82.397224

Administrative Information

Investigator In Charge (IIC):	Read, Leah
Additional Participating Persons:	Luis Vanga; FAA/FSDO; Orlando, FL James M Childers; Lycoming; GA
Original Publish Date:	August 16, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=101720