



Aviation Investigation Final Report

Location:	Geneva, Florida	Accident Number:	ERA17LA037
Date & Time:	November 2, 2016, 11:00 Local	Registration:	N54HY
Aircraft:	AVIAT AIRCRAFT INC A 1B	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (partial)	Injuries:	1 None
Flight Conducted Under:	Part 91: General aviation - Banner tow		

Analysis

The commercial pilot reported that, about 10 minutes into the banner tow flight, the engine began to run roughly. He adjusted the throttle, propeller lever, mixture, and carburetor heat; however, the engine started to backfire and continued to lose power. The pilot performed a precautionary landing on a race track; during the landing roll, the airplane struck a fence before coming to rest. The engine continued to operate during the landing roll until the airplane struck the fence.

Postaccident examination of the engine revealed that the No. 1 cylinder top and bottom spark plug electrodes exhibited mechanical damage; no mechanical damage was noted on the other spark plugs. The No. 1 piston looked like it was "sandblasted" compared to the other cylinders. Further disassembly of the engine was performed; no debris was noted in the carburetor box, carburetor, and No. 1 cylinder.

Maintenance was performed on the engine 2 days before the accident to troubleshoot "hard starting, low static RPM, and a rough engine." The maintenance entry indicated that both No. 1 cylinder spark plugs were damaged and that new spark plugs were installed. A comparison of the photographs of the spark plugs removed from the No. 1 cylinder during maintenance and the spark plugs removed from the No. 1 cylinder after the accident showed similar mechanical damage. Although no debris was found during the postaccident examination, it is likely that both sets of No. 1 spark plugs were damaged by debris in the No. 1 cylinder; the source of the debris could not be located.

Probable Cause and Findings

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

A partial loss of engine power due to debris in the No. 1 cylinder that damaged the spark plugs.

Findings

Aircraft	Recip engine power section - Damaged/degraded
Environmental issues	Fence/fence post - Contributed to outcome

Factual Information

History of Flight

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

On November 2, 2016, about 1100 eastern daylight time, an Aviat Aircraft Inc. A-1B, N54HY, was substantially damaged after it impacted a fence during a precautionary landing near Geneva, Florida. The commercial pilot was not injured. Visual meteorological conditions prevailed, and no flight plan had been filed for the banner tow flight that was operated under the provisions of 14 *Code of Federal Regulations* Part 91. The flight originated from Massey Ranch Airpark (X50), New Smyrna Beach, Florida, around 1050, with an intended destination of Orlando Executive Airport (ORL), Orlando, Florida.

According to the pilot, he performed an engine run up prior to departing X50 with no anomalies noted. About 10 minutes into the flight, the engine began to "run rough." The pilot adjusted the throttle, propeller lever, mixture, and carburetor heat; however, the engine started to backfire and continued to lose power. About that time, he noted a race track below the airplane and elected to perform a precautionary landing. He made a spiraling descent from about 1,000 feet above ground level in order to warn the personnel on the track and maneuvered the airplane to land on a paved area. During the landing roll, the airplane came to rest after it struck a fence. The pilot stated that the engine continued to operate throughout the landing and landing roll until the airplane struck the fence.

According to Federal Aviation Administration (FAA) records, the airplane was issued an airworthiness certificate 2001. It was equipped with a Lycoming O-360-A1P, a 180-hp, engine. According to the airframe maintenance logbook, the most recent annual inspection was performed on September 3, 2016, at a total time of 4,571.3 hours. The airframe total time at the time of the accident was 4,650.3 hours.

An examination of the airplane revealed substantial damage to the left wing. An undetermined amount of fuel was removed from the airplane during the recovery. Engine crankshaft continuity was confirmed from the propeller to the accessory drive section. The spark plugs were removed, and it was noted that the cylinder No. 1 top and bottom spark plug electrodes exhibited mechanical damage. The electrodes had become displaced and shorted to the center electrode. No mechanical damage was noted on the other spark plugs. Furthermore, the No. 1 piston looked like it was "sandblasted" when compared to the other cylinders. The left magneto generated spark on all towers. The right magneto generated spark on only one tower.

Maintenance was performed on the engine on October 31, 2016, to troubleshoot "hard starting, low static RPM, and a rough engine." The maintenance entry indicated that both No. 1 spark plugs were damaged. Subsequently, eight new spark plugs were installed on the engine, then "test runs show smooth mag[neto] drops, leak and op[erational] checks good."

Photographs of the No. 1 spark plugs removed during maintenance on October 31, 2016, revealed that part of the ceramic section around the massive spark plug electrode was absent and mechanical damage was noted on the center and ground electrodes. Furthermore, a comparison of the photographs between the spark plugs removed on October 31, 2016, and the spark plugs removed after the accident flight showed similar mechanical damage between the two sets of spark plugs from the No. 1 cylinder.

Further disassembly of the engine was performed under FAA oversight. The intake system, the carburetor box, the carburetor, the exhaust system, and the No. 1 cylinder were examined with no debris noted inside the components of the engine.

Pilot Information

Certificate:	Commercial	Age:	41, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Unknown
Other Aircraft Rating(s):	None	Restraint Used:	Unknown
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 2 With waivers/limitations	Last FAA Medical Exam:	May 1, 2016
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	AVIAT AIRCRAFT INC	Registration:	N54HY
Model/Series:	A 1B B	Aircraft Category:	Airplane
Year of Manufacture:	2001	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	2130
Landing Gear Type:	Tailwheel	Seats:	2
Date/Type of Last Inspection:	September 3, 2016 100 hour	Certified Max Gross Wt.:	1800 lbs
Time Since Last Inspection:	79 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	4650.3 Hrs at time of accident	Engine Manufacturer:	LYCOMING
ELT:	C91A installed, not activated	Engine Model/Series:	O-360-A1P
Registered Owner:	AERIAL MESSAGES OF DAYTONA & SALES INC	Rated Power:	180 Horsepower
Operator:	AERIAL MESSAGES OF DAYTONA & SALES INC	Operating Certificate(s) Held:	Certificate of authorization or waiver (COA)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	SFB,55 ft msl	Distance from Accident Site:	8 Nautical Miles
Observation Time:	10:53 Local	Direction from Accident Site:	265°
Lowest Cloud Condition:	Few / 3200 ft AGL	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	15 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	80°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.22 inches Hg	Temperature/Dew Point:	28°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	NEW SMYRNA BEACH, FL (X50)	Type of Flight Plan Filed:	None
Destination:	ORLANDO, FL (ORL)	Type of Clearance:	None
Departure Time:	10:50 Local	Type of Airspace:	

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None	Latitude, Longitude:	28.793333,-81.085556(est)

Administrative Information

Investigator In Charge (IIC):	Kemner, Heidi
Additional Participating Persons:	Antonio Gonzalez; FAA/FSDO; Orlando, FL
Original Publish Date:	March 18, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=94350

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).