



Aviation Investigation Final Report

Location:	Burt, New York	Accident Number:	ERA21LA356
Date & Time:	September 13, 2021, 14:05 Local	Registration:	N8564
Aircraft:	Waco GXE	Aircraft Damage:	Substantial
Defining Event:	Collision with terr/obj (non-CFIT)	Injuries:	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The accident flight was the vintage biplane’s first since it had been restored 2 years prior. During takeoff, once the airplane was in ground effect, the pilot described that the airplane would not climb any further even though the engine was producing power. The pilot elected to land the airplane in a nearby field and during the landing, the airplane nosed over and came to rest inverted, which resulted in substantial damage to the wings and fuselage.

A postaccident examination of the engine revealed that the magnetos were set to fire about 7° away from the proper position in order to obtain full engine power. Furthermore, a historical reference handbook for the vintage engine stated that the magnetos needed to have an external lever connected to a control in the cockpit to mechanically vary the magneto to engine timing while the engine was running. The magnetos installed on the accident airplane did not have these controls installed. Based on this information, it is likely the engine could not produce full power as a result of the incorrect magneto timing.

Probable Cause and Findings

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

The improper magneto timing, which resulted in the engine’s inability to produce full power during the takeoff.

Findings

Personnel issues

Installation - Maintenance personnel

Aircraft

Magneto/distributor - Incorrect service/maintenance

Factual Information

History of Flight

Takeoff	Collision with terr/obj (non-CFIT) (Defining event)
Prior to flight	Aircraft maintenance event

On September 13, 2021, about 1405 eastern daylight time, a Waco GXE, N8564, was substantially damaged when it was involved in an accident near Burt, New York. The airline transport pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, the accident flight was the first flight since the airplane was restored a few years prior. The airplane's most recent annual inspection was completed on the morning of the accident. During takeoff, the airplane departed the turf runway "normally," and once it was in ground effect, it would not climb any further even though the "engine was producing power just fine." The pilot elected to land the airplane in a nearby field to avoid trees in the flight path. During the landing, the airplane nosed over and came to rest inverted, which resulted in substantial damage to the wings and fuselage.

According to the maintenance logs, in March 2013, the engine was reassembled and reinstalled on the airplane. The next maintenance entry, in June 2019, with 0 hours since major overhaul, indicated that the engine and propeller were inspected in accordance with a 100-hr inspection. A high-speed taxi test was performed and the engine and propeller were found to be in airworthy condition. The final entry of the engine log was dated September 9, 2021. It indicated that the engine had 38 hours SMOH, a 100-hr inspection was performed, and the engine was found to be in an airworthy condition.

The airplane was equipped with a vintage Curtis Aeroplane Model OX-5 engine. The engine was designed to be equipped with a variable timing magneto that assisted with engine starting. A postaccident examination of the engine by a Federal Aviation Administration inspector revealed that the accident airplane's magnetos were set to fire about 22° before top dead center (BTDC). The engine logbook indicated that the magnetos should be timed to 30° BTDC. To obtain a "full advanced" setting, the engine historical reference handbook stated that the magnetos needed to have an external lever connected to a control in the cockpit to mechanically vary the magneto to engine timing while the engine was running. In addition, the handbook stated that the magnetos should be timed to 28° BTDC. The magnetos installed on the accident airplane's engine did not have external control levers and without the levers, the ignition could not be timed to 28°-30° BTDC.

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	Age:	42, Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	Seat Occupied:	Rear
Other Aircraft Rating(s):	Glider	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Glider; Instrument airplane	Toxicology Performed:	
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	May 21, 2021
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	March 18, 2021
Flight Time:	12771 hours (Total, all aircraft), 1 hours (Total, this make and model), 9361 hours (Pilot In Command, all aircraft), 48 hours (Last 90 days, all aircraft), 14 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Waco	Registration:	N8564
Model/Series:	GXE	Aircraft Category:	Airplane
Year of Manufacture:	1929	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	1927
Landing Gear Type:	Tailwheel	Seats:	3
Date/Type of Last Inspection:	September 13, 2021 Annual	Certified Max Gross Wt.:	2025 lbs
Time Since Last Inspection:	0 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	1538 Hrs at time of accident	Engine Manufacturer:	Milwaukee Parts Corporation
ELT:	C126 installed, not activated	Engine Model/Series:	Tank V502
Registered Owner:	On file	Rated Power:	115 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:	IAG, 585 ft msl	Distance from Accident Site:	15 Nautical Miles
Observation Time:	13:53 Local	Direction from Accident Site:	215°
Lowest Cloud Condition:	Clear	Visibility:	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	5 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	310°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.09 inches Hg	Temperature/Dew Point:	22°C / 13°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Burt, NY	Type of Flight Plan Filed:	None
Destination:	Burt, NY	Type of Clearance:	None
Departure Time:		Type of Airspace:	Class G

Airport Information

Airport:	OLCOTT-NEWFANE D80	Runway Surface Type:	Grass/turf
Airport Elevation:	315 ft msl	Runway Surface Condition:	Dry
Runway Used:	09/27	IFR Approach:	None
Runway Length/Width:	2500 ft / 60 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None	Latitude, Longitude:	43.306684,-78.745106(est)

Administrative Information

Investigator In Charge (IIC):	Kemner, Heidi
Additional Participating Persons:	Randall Steele; FAA/FSDO; Rochester, NY
Original Publish Date:	July 26, 2023
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=103855

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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](#).