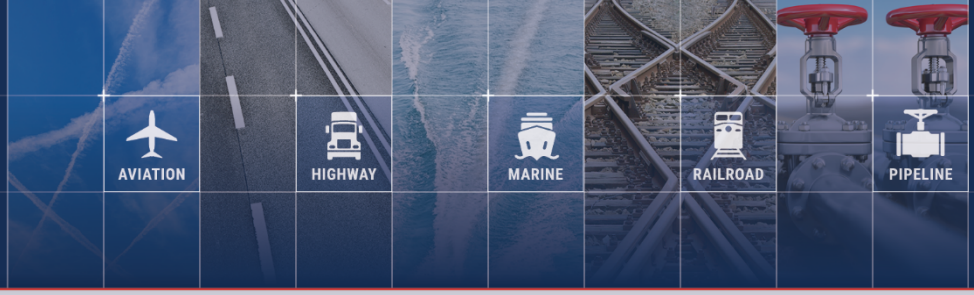


# Aviation Investigation Final Report

| | | | |
|---|---|---|---|
| **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 Furthermore, a historical reference handbook for the vintage engine stated that the magnetos needed to have an external lever connected to a control in the cockpit to mechanically vary the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 |