



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

# Aviation Investigation Final Report

<b>Location:</b>	Hillsboro, Oregon	<b>Accident Number:</b>	WPR18LA148
<b>Date &amp; Time:</b>	May 26, 2018, 09:35 Local	<b>Registration:</b>	N152GB
<b>Aircraft:</b>	Cessna 152	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (partial)	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Instructional		

## Analysis

While conducting takeoffs and landings during an instructional flight, the student pilot initiated a go-around. Shortly thereafter, the engine began to run rough and lost partial power. The instructor attempted to troubleshoot the engine, but was unable to restore engine power, and initiated a forced landing to a grass area beyond the end of the runway, during which the airplane nosed over. Examination of the engine revealed that the left magneto was producing spark randomly across its four posts. Internal examination of that magneto revealed that the distributor gear was intact; however, the copper electrode finger was found displaced from the plastic gear assembly.

A service bulletin issued by the magneto manufacturer about three years before the accident stated that some units contained distributor gears that exhibited loose electrode fingers, the symptoms of which included "unusual RPM drop during magneto check, difficulty starting, and/or rough running engines." A separate service bulletin issued 38 years before the accident specified that the magnetos should be inspected internally every 500 hours. The operator reported that, at the time of the accident, the magneto had accumulated 402.7 hours since its most recent internal inspection. The operator further reported they conducted internal inspections of the magnetos every 750 hours. It is likely that the loose copper electrode finger resulted in the partial loss of engine power during the go-around.

## Probable Cause and Findings

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

The partial loss of engine power during a go-around due to the loose copper electrode finger inside the left magneto.

## Findings

Aircraft	Magneto/distributor - Failure
----------	-------------------------------

# Factual Information

## History of Flight

Approach-VFR go-around	Loss of engine power (partial) (Defining event)
Approach-VFR go-around	Off-field or emergency landing
Landing-landing roll	Nose over/nose down

On May 26, 2018, about 0935 Pacific daylight time, a Cessna 152 airplane, N152GB, sustained substantial damage when it was involved in an accident near Hillsboro, Oregon. The flight instructor and student pilot were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

The instructor reported that during their sixth stop-and-go landing, the student initiated a go-around. A short time later, the engine began to make a "plugging sound" and the instructor took control of the airplane. He adjusted the throttle, as the engine was "still making weird sounds," and informed the tower controller that the airplane was losing engine power. As the airplane neared the departure end of the runway, at an altitude of about 200 ft above ground level, the instructor initiated a forced landing. The airplane touched down in the grass area beyond the departure end of the runway and nosed over.

Examination of the airplane by a Federal Aviation Administration (FAA) inspector revealed substantial damage to both wings. The airplane was recovered to a secure location for further examination. The carburetor was replaced, and an external fuel source attached to facilitate an engine run. During the engine run, the engine lost power when the left magneto was selected. No additional evidence of any mechanical anomalies was observed, and the magnetos were removed for further examination.

Examination of the left magneto revealed that when the drive shaft was rotated, spark was produced on each post in a random order. The magneto was disassembled and examined internally. The distributor gear was intact; however, the copper electrode finger was found displaced from the plastic gear assembly. The remainder of the internal components were unremarkable.

The right magneto produced spark in firing order when the drive shaft was rotated by hand. The magneto was disassembled, and all internal parts were unremarkable.

Slick Service Bulletin SB2-80C, issued in February 1980 and last revised in April 1991, specified that all 4300-series magnetos should be inspected externally every 100 hours, and internally every 500 hours. Slick Bulletin SB1-15A, originally published in July 2015 and revised in November 2018, outlined the potential for decreased service life of 4-cylinder magneto distributor gear assemblies, including the 4301 magneto. The service bulletin stated in part that, "...some of the returned products contained distributor gears exhibiting loosening of the electrode finger." In addition, the service bulletin stated that "...typical symptoms are unusual RPM drop during magneto check, difficulty starting, and/or rough running engines." Compliance with the service bulletin included replacement of the distributor gears equipped with a copper electrode.

The operator reported that the left magneto was installed on the engine in June 2016, at a time since overhaul of 1,602.2 hours. At the time of the accident, the left magneto had a total time of 2,632.7 hours, and 402.7 hours since its most recent inspection. The operator further reported that they conducted internal inspections of the magnetos every 750 hours.

## Pilot Information

<b>Certificate:</b>	Student	<b>Age:</b>	29,Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	December 13, 2017
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	41 hours (Total, all aircraft), 41 hours (Total, this make and model), 7 hours (Pilot In Command, all aircraft), 41 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft)		

## Flight instructor Information

<b>Certificate:</b>	Flight instructor	<b>Age:</b>	33,Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>		<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane single-engine	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	October 17, 2016
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	447 hours (Total, all aircraft), 167 hours (Total, this make and model), 369 hours (Pilot In Command, all aircraft), 149 hours (Last 90 days, all aircraft), 49 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cessna	<b>Registration:</b>	N152GB
<b>Model/Series:</b>	152 NO SERIES	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1977	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	15279546
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	
<b>Date/Type of Last Inspection:</b>	April 27, 2018 100 hour	<b>Certified Max Gross Wt.:</b>	1669 lbs
<b>Time Since Last Inspection:</b>	4.8 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	10267.4 Hrs at time of accident	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	C91A installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	O-235
<b>Registered Owner:</b>		<b>Rated Power:</b>	110 Horsepower
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KHIO, 204 ft msl	<b>Distance from Accident Site:</b>	1 Nautical Miles
<b>Observation Time:</b>	16:48 Local	<b>Direction from Accident Site:</b>	149°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Overcast / 4300 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	5 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	210°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.19 inches Hg	<b>Temperature/Dew Point:</b>	13°C / 7°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Hillsboro, OR (HIO )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Hillsboro, OR (HIO )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	09:20 Local	<b>Type of Airspace:</b>	Class D

## Airport Information

<b>Airport:</b>	PORTLAND-HILLSBORO HIO	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	208 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	31R	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	3600 ft / 60 ft	<b>VFR Approach/Landing:</b>	Forced landing;Go around

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 None	<b>Latitude, Longitude:</b>	45.550277,-122.956947(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Cawthra, Joshua	
<b>Additional Participating Persons:</b>	Jason Lawver; Federal Aviation Administration; Hillsboro, OR	
<b>Original Publish Date:</b>	May 25, 2021	<b>Investigation Class:</b> 3
<b>Note:</b>	The NTSB did not travel to the scene of this accident.	
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=97326">https://data.nts.gov/Docket?ProjectID=97326</a>	

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).