



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

# Aviation Investigation Final Report

<b>Location:</b>	Knoxville, Tennessee	<b>Accident Number:</b>	ERA23LA347
<b>Date &amp; Time:</b>	July 27, 2023, 14:41 Local	<b>Registration:</b>	N15417
<b>Aircraft:</b>	Piper PA28	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Fire/smoke (non-impact)	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Instructional		

## Analysis

When the flight instructor initiated a takeoff roll, the engine rpm initially increased to 2,200, then decreased to 800, followed by flames emanating from the engine cowling. The flight instructor rejected the takeoff, secured the engine, and exited the airplane on the runway; however, the fire continued in the engine compartment until airport personnel were able to extinguish it.

Postaccident examination of the engine compartment revealed that about a 25 to 30-in length of starter motor electrical lead was not clamped and had drooped down on top of the fuel primer line. Metal beads on top of the fuel primer line were consistent with chaffing and welding due to contact from the electrical lead. It is likely that arcing from the lead ignited fuel in the fuel primer line.

The airplane had been operated for 73 hours during a 1-month period following its most recent 100-hr inspection. The electrical lead drooping down and resting on top of the fuel primer line was contrary to Federal Aviation Administration (FAA) and aircraft manufacturer maintenance instructions regarding proper routing and should have been identified and corrected during the most recent 100-hr inspection.

## Probable Cause and Findings

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

An in-flight fire that resulted from an inadequate 100-hr inspection, which failed to detect and correct improper electrical cable routing in the engine compartment.

## Findings

<b>Aircraft</b>	Electrical pwr sys wiring - Incorrect service/maintenance
<b>Personnel issues</b>	Scheduled/routine maintenance - Maintenance personnel

# Factual Information

## History of Flight

Prior to flight	Aircraft maintenance event
Takeoff	Fire/smoke (non-impact) (Defining event)

On July 27, 2023, about 1441 eastern daylight time, a Piper PA-28-180, N15417, was substantially damaged when it was involved in an accident near Knoxville, Tennessee. 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 flight instructor reported that the accident flight was the student pilot’s first flight (discovery flight). The flight instructor added that the preflight inspection, engine start, taxi, and run-up were normal. He initiated a takeoff roll on runway 26 by letting the student pilot advance the throttle. The engine rpm initially increased to 2,200, then decreased to 800, followed by flames emanating from the engine cowling. The flight instructor rejected the takeoff, advanced the throttle lever, retracted the mixture level, and turned off all electrical equipment, including the master switch. He also instructed the student pilot to turn the magnetos and fuel selector to off, which he did. They then exited the airplane on the runway and called the fixed based operator for assistance.

Examination of the engine compartment by a Federal Aviation Administration inspector revealed substantial damage to an engine mount tube. The inspector also noted that about a 25 to 30-in length of starter motor electrical lead was not clamped and had drooped down on top of the fuel primer line. He also observed metal “beads” on top of the fuel primer line, consistent with chaffing and welding due to contact from the electrical lead.

Review of maintenance records revealed that the airplane had been operated for 73 hours during a 1-month period following its most recent 100-hr inspection.

FAA Advisory Circular AC 43-13-1, Section 2 Fuel Systems, revealed: “...b Routing. Make sure that the line does not chafe against control cables, airframe structure etc., or come in contact with electrical wiring or conduit...In no case should wiring be supported by the fuel line...”

Review of Piper Cherokee Service Manual, Table III-I Inspection Report, B. Engine Group, revealed: “...39. Inspect engine compartment wiring for condition (chafing, cracked insulation, general deterioration), security, proper routing, and correct installation...”

## Flight instructor Information

<b>Certificate:</b>	Commercial; Flight instructor	<b>Age:</b>	25, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<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; Instrument airplane	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	January 24, 2023
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	July 21, 2023
<b>Flight Time:</b>	912 hours (Total, all aircraft), 300 hours (Total, this make and model), 848 hours (Pilot In Command, all aircraft), 201 hours (Last 90 days, all aircraft), 78 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

## Student pilot Information

<b>Certificate:</b>	None	<b>Age:</b>	
<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>	
<b>Medical Certification:</b>	None	<b>Last FAA Medical Exam:</b>	
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	0 hours (Total, all aircraft), 0 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Piper	<b>Registration:</b>	N15417
<b>Model/Series:</b>	PA28 180	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1972	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	28-7305073
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	June 27, 2023 100 hour	<b>Certified Max Gross Wt.:</b>	2550 lbs
<b>Time Since Last Inspection:</b>	73 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	8449 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	C91 installed, not activated	<b>Engine Model/Series:</b>	O-360-A4A
<b>Registered Owner:</b>	BREMFOUR AVIATION GROUP INC	<b>Rated Power:</b>	180 Horsepower
<b>Operator:</b>	KNOXVILLE FLIGHT TRAINING ACADEMY	<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>	DKX,833 ft msl	<b>Distance from Accident Site:</b>	0 Nautical Miles
<b>Observation Time:</b>	14:35 Local	<b>Direction from Accident Site:</b>	0°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	4 knots /	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	270°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	30.11 inches Hg	<b>Temperature/Dew Point:</b>	32°C / 21°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Knoxville, TN	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Knoxville, TN	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>		<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	Knoxville Downtown Island Airport DKX	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	833 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	26	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	3499 ft / 75 ft	<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 None	<b>Latitude, Longitude:</b>	35.963833,-83.873667

## Administrative Information

Investigator In Charge (IIC):	Gretz, Robert
Additional Participating Persons:	David Clouse; FAA/FSDO; Nashville, TN
Original Publish Date:	June 20, 2024
Last Revision Date:	
Investigation Class:	<a href="#">Class 3</a>
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	<a href="https://data.nts.gov/Docket?ProjectID=192929">https://data.nts.gov/Docket?ProjectID=192929</a>

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](#).