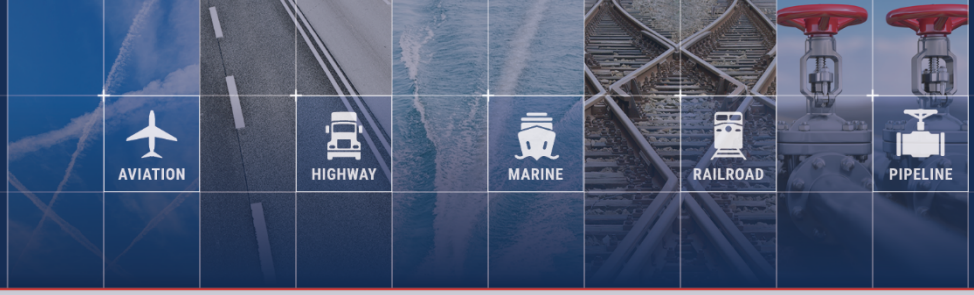

Aviation Investigation Final Report

Location:	Knoxville, Tennessee	**Accident Number:**	ERA23LA347
Date & Time:	July 27, 2023, 14:41 Local	**Registration:**	N15417
Aircraft:	Piper PA28	**Aircraft Damage:**	Substantial
Defining Event:	Fire/smoke (non-impact)	**Injuries:**	2 None
Flight Conducted Under:	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

Aircraft	Electrical pwr sys wiring - Incorrect service/maintenance
Personnel issues	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

Certificate:	Commercial; Flight instructor	**Age:**	25,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	January 24, 2023
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	July 21, 2023
Flight Time:	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

Certificate:	None	**Age:**	
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	0 hours (Total, all aircraft), 0 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N15417
Model/Series:	PA28 180	**Aircraft Category:**	Airplane
Year of Manufacture:	1972	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	28-7305073
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	June 27, 2023 100 hour	**Certified Max Gross Wt.:**	2550 lbs
Time Since Last Inspection:	73 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	8449 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	C91 installed, not activated	**Engine Model/Series:**	O-360-A4A
Registered Owner:	BREMFOUR AVIATION GROUP INC	**Rated Power:**	180 Horsepower
Operator:	KNOXVILLE FLIGHT TRAINING ACADEMY	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	DKX,833 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	14:35 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	270°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.11 inches Hg	**Temperature/Dew Point:**	32°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Knoxville, TN	**Type of Flight Plan Filed:**	None
Destination:	Knoxville, TN	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Airport Information

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

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	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:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=192929