



# Aviation Investigation Final Report

<b>Location:</b>	Wake, Virginia	<b>Accident Number:</b>	ERA21LA005
<b>Date &amp; Time:</b>	October 1, 2020, 11:15 Local	<b>Registration:</b>	N512FH
<b>Aircraft:</b>	Fokker DR1	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Fuel starvation	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The pilot departed in the experimental airplane for a local flight. While in cruise flight about 25 minutes after departure, the engine lost all power. When his attempts to restore power were unsuccessful, he performed a forced landing to a field, during which the airplane impacted power lines, landed in the field, nosed over, and came to rest inverted. The airplane sustained substantial damage to the top wing and forward fuselage.

The day after the accident, the pilot found the copper ram-air fuel vent tube on the taxiway between the hangar and the runway. The tube had electrical tape wrapped around the mounting end, presumably installed to increase its diameter to fit the larger diameter rubber tubing of the fuel tank vent line where it was previously attached and held in place by a hose clamp. The pilot surmised that the electrical tape had deteriorated due to contact with fuel, allowing the tube to separate from the rubber vent line. He further surmised that the fuel tank was insufficiently vented during the flight due to missing ram air tube, and the negative pressure in the fuel tank after 25 minutes of flight resulted in fuel starvation to the engine. The engine was successfully started and run after the accident during the examination performed by the pilot and his mechanic.

## Probable Cause and Findings

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

A total loss of engine power due to fuel starvation as the result of the improper installation of the ram air fuel vent tube, which resulted in the tube separating from the airplane during taxi and subsequent negative pressure inside the fuel tank.

## Findings

<b>Aircraft</b>	(general) - Incorrect service/maintenance
<b>Aircraft</b>	(general) - Not specified

## Factual Information

### History of Flight

<b>Enroute-cruise</b>	Fuel starvation (Defining event)
<b>Enroute-cruise</b>	Loss of engine power (total)
<b>Enroute-cruise</b>	Off-field or emergency landing
<b>Landing</b>	Collision with terr/obj (non-CFIT)

On October 1, 2020, at 1115 eastern daylight time, an experimental Fokker DR1 airplane, N512FH, was substantially damaged when it was involved in an accident near Wake, Virginia. The commercial pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, he added 6 gallons of fuel to “top off” the fuel tank before the local flight. About 25 minutes after takeoff, while in cruise flight at 1,500 ft mean sea level, the engine lost all power. There were no precursor indications, it did not “surge, sputter or misfire.” The propeller remained windmilling. The pilot attempted to restart the engine but was unsuccessful. As the airplane slowed to about 60 knots, the propeller stopped windmilling. While descending for a forced landing to a field, the airplane impacted a wire and slowed “substantially.” During landing, the airplane impacted the edge of a bean field and nosed over into the adjacent grass field. After the airplane came to rest, the pilot noticed fuel leaking from the fuel tank filler neck.

Examination of the accident site by a Federal Aviation Administration inspector revealed substantial damage to the upper wing, 3 ft inboard of the wingtip. The fuselage structure was deformed near the right landing gear strut attach point. Flight control continuity was confirmed. The engine controls were exercised and operated normally. Fuel sampled from the fuel tank was blue and absent of contaminants. The fuel inlet line was disconnected from the carburetor, and no fuel ran out from the line. First responders reported to the inspector that “several gallons” of fuel had leaked from the fuel filler neck onto the ground. A fuel sample taken from the airport fueling station was blue in color and absent of contaminants.

The pilot subsequently reported that, the day after the accident, he found the fuel vent ram air tube on the ground in the normal taxiing path from the hangar to the runway. One end of the tube had electrical tape wrapped around it, which was “slippery” and appeared to have been deteriorated due to contact with fuel. The copper ram air tube had been held in place by a hose clamp inside a rubber vent line that led from the right forward landing gear strut to the fuel tank. The pilot reported that the outside diameter of the copper ram air tube was smaller than the inside diameter of the rubber vent line.

The pilot and his mechanic examined the engine and fuel system and found no anomalies. They also started the engine and performed a magneto check with no anomalies noted.

## Pilot Information

<b>Certificate:</b>	Commercial; Flight instructor	<b>Age:</b>	61, Male
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea	<b>Seat Occupied:</b>	Single
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Airplane single-engine; Instrument airplane	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 2 With waivers/limitations	<b>Last FAA Medical Exam:</b>	July 2, 2019
<b>Occupational Pilot:</b>	UNK	<b>Last Flight Review or Equivalent:</b>	June 10, 2020
<b>Flight Time:</b>	8395 hours (Total, all aircraft), 25 hours (Total, this make and model), 175 hours (Last 90 days, all aircraft), 73 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Fokker	<b>Registration:</b>	N512FH
<b>Model/Series:</b>	DR1	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2019	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Experimental (Special)	<b>Serial Number:</b>	20190401
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	1
<b>Date/Type of Last Inspection:</b>	September 18, 2020 Condition	<b>Certified Max Gross Wt.:</b>	
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	24 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	O-320-B2A
<b>Registered Owner:</b>	Forgotten Heroes Foundation	<b>Rated Power:</b>	160 Horsepower
<b>Operator:</b>	Forgotten Heroes Foundation	<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>	FYJ,24 ft msl	<b>Distance from Accident Site:</b>	16 Nautical Miles
<b>Observation Time:</b>	11:15 Local	<b>Direction from Accident Site:</b>	257°
<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>	5 knots /	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	250°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	29.97 inches Hg	<b>Temperature/Dew Point:</b>	22°C / 14°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Saluda, VA (W75)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Saluda, VA (W75)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	10:50 Local	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	Hummel Field Airport W75	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	30 ft msl	<b>Runway Surface Condition:</b>	Vegetation
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 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>	1 None	<b>Latitude, Longitude:</b>	37.579813,-76.443103(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Brazy, Douglass
<b>Additional Participating Persons:</b>	Kenny Bain; FAA/FSDO; Richmond, VA Randy Clark; FAA/FSDO; Richmond, VA
<b>Original Publish Date:</b>	June 3, 2022
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=102085">https://data.ntsb.gov/Docket?ProjectID=102085</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](#).