Aviation Investigation Final Report

Location:	Westwood, Massachusetts	**Accident Number:**	ERA16LA258
Date & Time:	July 16, 2016, 15:17 Local	**Registration:**	N11MT
Aircraft:	Piper PA24	**Aircraft Damage:**	Substantial
Defining Event:	Fuel related	**Injuries:**	1 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot/co-owner of the airplane departed on a roundtrip flight with the right main fuel tank full and the left main fuel tank "down about three gallons." He stated that, based on his preflight performance planning and visual inspection of the fuel supply, the fuel in the main tanks would be sufficient for the flight. The outbound leg was conducted with the fuel selector on the right main tank, and the return leg was flown with the fuel selector on the left main tank. Shortly after being cleared for landing near the end of the return leg, the airplane experienced a total loss of engine power, and descended into wooded terrain about 1 mile from the airport.

Postaccident examination of the wreckage revealed that the right main fuel tank contained 2 gallons of fuel, that the left main tank was empty, and that both 15-gallon auxiliary fuel tanks were full. The engine was subsequently placed in a test cell where it started immediately, accelerated smoothly, and ran continuously at all power settings. The co-owner of the airplane stated that the left fuel tank leaked when the tank was full and that they mitigated the problem by not completely filling the left main fuel tank. The pilot likely mis-estimated the fuel available in the tanks during his preflight visual inspection, and it is likely that fuel leaked from the left tank during the flight, further reducing the available fuel quantity. These factors resulted in a loss of engine power consistent with fuel starvation.

Probable Cause and Findings

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

The pilot's improper fuel management, which resulted in exhaustion of the fuel in the selected fuel tank and a total loss of engine power due to fuel starvation.

Findings

Aircraft	Fuel - Fluid management
Personnel issues	Use of equip/system - Pilot
Personnel issues	Decision making/judgment - Pilot

Factual Information

History of Flight

Prior to flight	Preflight or dispatch event
Approach	Fuel related (Defining event)
Approach	Loss of engine power (total)
Emergency descent	Off-field or emergency landing
Landing-flare/touchdown	Collision with terr/obj (non-CFIT)

On July 16, 2016, at 1517 eastern daylight time, a Piper PA-24-260, N11MT, was substantially damaged during a forced landing in Westwood, Massachusetts, during approach to Norwood Memorial Airport (OWD), Norwood, Massachusetts. The private pilot/co-owner was seriously injured, and the passenger was fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the personal flight, which departed from Knox County Regional Airport (RKD), Rockland, Maine, and was conducted under the provisions of 14 Code of Federal Regulations Part 91.

The pilot was not available for interview due to his injuries. He was interviewed by his attorney, who provided a written statement on his behalf.

According to the statement, the pilot and passenger planned a round-trip flight from OWD to RKD to attend a fly-in event. The pilot estimated his outbound and return legs each took 1 hour and 20 minutes, and that the airplane consumed 22 gallons of fuel on each leg. According to his statement, the pilot "…reasonably assumed that he had sufficient fuel with approximately 5 gallons of reserves to safely arrive back at Norwood without the need to switch to the auxiliary tanks during his return flight."

Prior to departure, the pilot performed a preflight inspection of the airplane "generally consistent" with the manufacturer's pilot's operating handbook. His visual inspection of the main fuel tanks "confirmed" that the right wing tank was full, the left wing tank was "down about 3 gallons," and that both right and left auxiliary tanks were full.

The pilot stated that the flight to RKD was completed with the fuel selector on the right main fuel tank, and the return flight to OWD was completed with the fuel selector on the left main fuel tank. After being cleared for landing at OWD, the engine "abruptly" lost power, and the pilot conducted a forced landing to wooded terrain.

Information from the OWD local controller revealed the airplane was about 3 miles north of the airport when it was cleared to land on runway 28. Shortly thereafter, the pilot reported a loss of engine power and the controller watched as the airplane descended into wooded terrain about 1 mile from the airport.

In an interview with Federal Aviation Administration (FAA) aviation safety inspectors, a witness close to the accident site said he watched the airplane overfly the woods at low altitude before it flew out of sight and he heard the sounds of impact. He said the airplane made a "funny noise" but that he could not associate the sound with the engine.

According to FAA records, the pilot held a private pilot certificate with ratings for airplane single-engine land and instrument airplane. He was issued an FAA third-class medical certificate on April 21, 2016. The pilot reported 4,550 total hours of flight experience on that date.

The four-seat, single-engine, low-wing airplane was manufactured in 1968, and was equipped with a Lycoming IO-540, 310-horsepower engine. There was a 30-gallon main fuel tank (28 gallons useable) and a 15-gallon auxiliary fuel tank mounted in each wing.

The airplane's most recent annual inspection was completed July 28, 2015. It had accrued 4,239 total aircraft hours as of that date.

The co-owner of the airplane reported to his mechanic prior to the accident, and later to the FAA inspector who responded to the accident site, that the airplane's left main fuel tank leaked. The mechanic reported to an FAA inspector that one of the owners of the airplane had contacted him a few weeks before the accident and requested that he order replacement bladders for both the left and right main fuel tanks so they could be replaced at the next annual inspection. According to the mechanic, the owners mitigated the leak by not filling the left main tank completely.

Examination of the wreckage by the FAA inspector revealed substantial damage to the airplane's wings and fuselage. Control continuity was confirmed, and examination of the fuel tanks revealed that the left main fuel tank was empty, the right main fuel tank contained about 2 gallons of fuel, and both auxiliary fuel tanks were full. Disassembly of the airplane by recovery specialists confirmed continuity of the fuel system, and the fuel quantities previously observed in each tank. The fuel selector was found between the "Left Main" and "Off" positions. The pilot reported to first responders that he had "turned the fuel off" prior to their arrival on scene.

At 1453, the weather reported at OWD included clear skies and wind from 290 degrees at 10 knots gusting to 16 knots. The temperature was 34 degrees C, dew point was 16 degrees C, and the altimeter setting was 30.00 inches of mercury.

Examination of the airplane's flight log and fuel receipts revealed that prior to the accident, the airplane was last fueled on July 12, 2016, at which time the right main and left auxiliary tanks were "topped off." The airplane had accrued an estimated 2.6 total hours of flight time (hobbs meter) since its last fuel service. Fueling instructions over the month previous to the accident specified servicing the right main and right auxiliary tanks only, or right main and left auxiliary tanks only.

The engine was removed from the airframe and subsequently placed in a test cell at the manufacturer's facility under the supervision of an NTSB investigator. The engine started immediately, accelerated smoothly, and ran continuously without interruption at all power settings.

Pilot Information

Certificate:	Private	**Age:**	65,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	April 21, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	4550 hours (Total, all aircraft), 150 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N11MT
Model/Series:	PA24 260	**Aircraft Category:**	Airplane
Year of Manufacture:	1969	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	24-4842
Landing Gear Type:	Tricycle	**Seats:**	
Date/Type of Last Inspection:	July 28, 2015 Annual	**Certified Max Gross Wt.:**	3201 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	4239 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:		**Engine Model/Series:**	IO-540 SER
Registered Owner:	On file	**Rated Power:**	310 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:	KOWD,49 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	14:53 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots / 16 knots	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	290°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	34°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Rockland, ME (RKD)	**Type of Flight Plan Filed:**	None
Destination:	Westwood, MA (OWD)	**Type of Clearance:**	VFR
Departure Time:	14:15 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	NORWOOD MEMORIAL OWD	**Runway Surface Type:**	Asphalt
Airport Elevation:	49 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:	28	**IFR Approach:**	None
Runway Length/Width:	3995 ft / 75 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 1 Serious	**Latitude, Longitude:**	42.209445,-71.158332(est)

Administrative Information

Investigator In Charge (IIC):	Rayner, Brian
Additional Participating Persons:	Michael Masterson; FAA/FSDO; Burlington, MA Michael McClure; Piper Aircraft; Vero Beach, FL James Childers; Lycoming Engines; Williamsport, PA
Original Publish Date:	March 6, 2017
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=93612

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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.