Aviation Investigation Final Report

Location:	Nunica, Michigan	**Accident Number:**	CEN11LA651
Date & Time:	September 17, 2011, 18:07 Local	**Registration:**	N217RK
Aircraft:	North American AT-6	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

According to the pilot, the airplane had been refueled to its full capacity prior to the flight to the accident airport. The pilot indicated that the "flight to the accident airport required 50 minutes, which would have burned, with start-up, taxi, and flight time, 29 gallons." The pilot then departed the accident airport and stated that he applied full takeoff power. On climbout, the low fuel pressure light illuminated just before gear retraction, the fuel pressure then dropped to zero, and the engine abruptly lost power. A video taken at the airport where the accident occurred revealed that the airplane lost power during takeoff, impacted a tree on the left side of the departure runway, and subsequently impacted terrain. The airplane's engine monitor data revealed no recorded engine anomalies and fuel flow monitor data indicated 32.5 gallons of fuel used up to the time of the accident, and 77.1 gallons remaining. The pilot stated that he verified the fuel prior to departure at the accident airport by visual reference of fuel gauges and airplane fuel flow meter. Examination of the wreckage revealed that the right fuel tank was full. No anomalies were detected during the examination of the engine-driven fuel pump, gascolator, and the wobble pump. The fuel selector was found selected to the reserve position, which feeds from the reserve fuel retained within the standpipe and any additional left tank fuel above that retained reserve amount. The left main and reserve standpipes and screens were installed correctly and were free of obstructions. The left fuel tank contained about four gallons of fuel when it was defueled. The pilot did not visually check the level of the fuel tank's contents prior to departure; had he done so, he would have recognized that the left tank's fuel level was below what was expected. Fuel usage figures provided by both the pilot and the engine monitor data indicated there should have been over 20 gallons of fuel remaining in the left tank at the time of the accident. The reason for the discrepancy between the expected and actual fuel amounts could not be determined.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The loss of engine power due to fuel starvation during climbout for undetermined reasons, because postaccident examination of the fuel system did not reveal any discrepancies that would have precluded normal engine operation. Contributing to the accident was the pilot not visually checking the fuel level prior to departure.

Findings

Aircraft	Fuel - Fluid level
Personnel issues	Preflight inspection - Pilot

Factual Information

History of Flight

Takeoff	Loss of engine power (total) (Defining event)
Takeoff	Fuel starvation
Takeoff	Collision during takeoff/land

On September 17, 2011, about 1807 eastern daylight time, a North American AT-6, N217RK, impacted a tree and terrain after a loss of engine power during takeoff from runway 8 (3,600 feet by 100 feet, dry turf) at the Hat Field Airport (5N7), near Nunica, Michigan. The commercial pilot received serious injuries. The airplane sustained substantial firewall, fuselage, and wing damage. The airplane was registered to Tailwinds Inc. and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Day visual flight rules (VFR) conditions prevailed for the flight, which was not operated on a VFR flight rules flight plan. The flight was originating at the time of the accident and was destined for the Mason Jewett Field Airport, near Mason, Michigan.

Review of a video taken at 5N7 revealed that the airplane was the fourth airplane in a flight of multiple airplanes to depart the airport. The video revealed that the accident airplane lost power during its takeoff, impacted a tree on the left side of the departure runway, and subsequently impacted terrain.

The pilot's accident report indicated that the airplane was "ground checked" and each aircraft took off as briefed in a single-ship sequence leaving nine seconds between each departure, which allowed any departing aircraft time to abort its takeoff roll. The pilot indicated that he applied full takeoff power. As the airplane passed about two-thirds of the runway's length, the airplane had a positive rate of climb. The low fuel pressure light illuminated just before gear retraction, the fuel pressure dropped to zero, and the engine abruptly quit. The pilot lowered the airplane's nose and impacted a tree during the forced descent. The impact turned the plane, causing it to hit the ground at a vertical angle tearing the engine and propeller from the plane.

According to the pilot, the airplane had been refueled prior to flying to the accident airport to its full capacity of 110 gallons, of which, 106 gallons is usable. The airplane had two 55-gallon fuel tanks, one in each wing. The fuel selector has four positions; right tank on, left tank on, left tank reserve, and off. The pilot indicated that the "flight to the accident airport required 50 minutes, which would have burned, with start-up, taxi and flight time, 29 gallons. This was verified prior to departure at the accident airport by visual reference of fuel gauges and aircraft fuel flow meter." However, the pilot did not visually check the level of the fuel tank's contents.

A Federal Aviation Administration inspector examined the wreckage. The inspector indicated

he observed that the right fuel tank was full. The gascolator contained a cup of fuel and the screen was clean. The engine driven fuel pump was removed from the engine and the pump produced suction when rotated by hand. The fuel selector was found set to the reserve position. The wobble pump was able to pump fluid and produced pressure at its output port. The left main and reserve standpipes and screens were installed correctly and were free of obstructions. The left fuel tank contained about four gallons of fuel. The airplane's engine monitor and fuel flow monitor were shipped to the National Transportation Safety Board Recorder Laboratory for downloading.

The airplane was equipped with a J. P. Instruments EDM-700 panel mounted engine monitor gauge. The gauge monitored and recorded exhaust gas temperature, cylinder head temperature, and battery voltage. The gauge was in good condition and its data was extracted normally from the device. The download contained approximately 11 hours of data over 18 power cycles. The data from the accident flight and the flight prior to it were plotted. The plot of the flight prior to the accident, on September 17, 2011, covered a time period from 14:24:00 to 15:28:12. The accident flight plot covered a time period from 17:58:46 to 18:07:10 and no recorded engine anomalies were detected in the plot.

The airplane was also equipped with a Shadin Avionics Miniflo-L fuel flow monitor gauge, which was a digital fuel management system, designed to provide fuel management information under real time flight conditions to the pilot. The unit does not interface with an airplane's fuel quantity indicating system. The unit required the pilot to enter the initial fuel on board the aircraft. All calculations and data provided by the unit were based on fuel flow. The fuel flow indicator unit was received in good condition and it reported a value of "good" when it self-tested as power was applied. Its data indicated 32.5 gallons of fuel used and 77.1 gallons remaining.

The pilot's safety recommendation, in part, stated:

> I do know that wearing my seat belt with shoulder harness and aviation flight helmet likely saved my life. When flying these types of planes, please always wear your safety gear. You can't choose when an accident may occur, but you can be prepared when it does.

Pilot Information

Certificate:	Commercial	**Age:**	62,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	August 9, 2011
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 7, 2010
Flight Time:	4496 hours (Total, all aircraft), 1209 hours (Total, this make and model), 4397 hours (Pilot In Command, all aircraft), 96 hours (Last 90 days, all aircraft), 27 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	North American	**Registration:**	N217RK
Model/Series:	AT-6	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	43942
Landing Gear Type:	Retractable - Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	February 15, 2011 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	10073 Hrs at time of accident	**Engine Manufacturer:**	Pratt & Whitney
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	R-1340-AN1
Registered Owner:	On file	**Rated Power:**	600 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:	MKG,629 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	17:55 Local	**Direction from Accident Site:**	305°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	130°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.29 inches Hg	**Temperature/Dew Point:**	20°C / 6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Nunica, MI (5N7)	**Type of Flight Plan Filed:**	None
Destination:	Mason, MI (TEW)	**Type of Clearance:**	None
Departure Time:	18:07 Local	**Type of Airspace:**	

Airport Information

Airport:	Hat Field Airport 5N7	**Runway Surface Type:**	Grass/turf
Airport Elevation:	625 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	08	**IFR Approach:**	None
Runway Length/Width:	3600 ft / 100 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	43.097221,-86.094444(est)

Administrative Information

Investigator In Charge (IIC):	Malinowski, Edward
Additional Participating Persons:	James Gotha; Federal Aviation Administration; Grand Rapids, MI
Original Publish Date:	February 27, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=81838