



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Patuxent River, Maryland	Accident Number:	IAD02LA080
Date & Time:	August 1, 2002, 14:20 Local	Registration:	N1177M
Aircraft:	Cessna 172K	Aircraft Damage:	Substantial
Defining Event:		Injuries:	1 Serious, 1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Prior to his departure, the pilot performed a preflight inspection and determined the fuel onboard the airplane by observing the fuel gauges in the cockpit. The gauges indicated the fuel tanks were about 1/4 - 1/2 full, or 8 gallons of fuel per tank. The pilot stated he did not visually check the fuel tanks because he did not have a way to measure the fuel. The pilot added 20 additional gallons of fuel, for a total of 36 gallons of fuel onboard, which he estimated to be 4 1/2 hours flight time. After fueling the airplane, the fuel gauges read about 3/4 full on each tank. The pilot flew direct to his destination; however, he did not perform any fuel burn calculations en route. Approximately 3 miles from the airport, the airplane's engine lost power. The pilot checked the fuel gauges, which indicated 1/8 full on the left side and 1/4 full on the right side. He unsuccessfully attempted to restart the engine, and performed a forced landing approximately 1/2 mile short of the runway. Examination of the airplane revealed that the left wing tank was completely empty and 1/8 inch of fuel remained in the right wing tank. The airplane's fuel system was examined and no pre-impact anomalies were noted. A test run of the engine was performed on the airframe, and it started without hesitation and ran continuously through a variety of power settings. An accurate test of the fuel level transmitters and fuel gauges was unable to be performed during the initial examination, because they were removed and retained by the operator. The pilot had accumulated 124 hours of fixed-wing flight experience, 9 of which were in make and model, and 691 hours in rotorcraft.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
The pilot's inadequate fuel calculations, which resulted in fuel exhaustion and a subsequent loss of engine power.

Findings

Occurrence #1: LOSS OF ENGINE POWER

Phase of Operation: APPROACH

Findings

1. FLUID,FUEL - EXHAUSTION
2. (C) FUEL SUPPLY - INADEQUATE - PILOT IN COMMAND
3. (C) FUEL CONSUMPTION CALCULATIONS - INADEQUATE - PILOT IN COMMAND

Occurrence #2: FORCED LANDING

Phase of Operation: DESCENT - EMERGENCY

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: EMERGENCY DESCENT/LANDING

Findings

4. TERRAIN CONDITION - GROUND

Occurrence #4: GEAR COLLAPSED

Phase of Operation: EMERGENCY LANDING

Factual Information

On August 1, 2002, at 1420 eastern daylight time, N1177M, a Cessna 172K, was substantially damaged during a forced landing while on approach to Patuxent River Naval Air Station/Trapnell Field (NHK), Patuxent River, Maryland. The certificated commercial pilot received serious injuries and the passenger received minor injuries. Visual meteorological conditions prevailed, and a visual flight rules (VFR) flight plan was filed for the flight which originated at Myrtle Beach International Airport (MYR), Myrtle Beach, South Carolina at 1155. The personal flight was conducted under 14 CFR Part 91.

The pilot reported that he had flown from Patuxent River to Myrtle Beach 2 days prior to the accident for a short vacation before beginning Navy test pilot school. The pilot flew direct to Myrtle Beach, and upon landing the airplane's Hobbs meter indicated the flight duration had been 3.7 hours.

On the day of the accident, the pilot received a weather briefing from Anderson Flight Service Station (FSS) for the return flight from Myrtle Beach to Patuxent River, and filed a VFR flight plan. He then performed a pre-flight inspection and visually checked the fuel gauges inside the airplane. According to the pilot, the gauges indicated that the tanks were about 1/4 - 1/2 full, which he estimated to be about 8 gallons of fuel per tank. The pilot stated that he was unable to determine exactly how much fuel was in the tanks because he did not have a way to measure it.

The pilot added 20 gallons of fuel to the tanks, and estimated that he had a total of 36 gallons of fuel onboard, or 4 1/2 hours of flight time. He started the airplane around 1145, taxied to the runway, performed a runup check, and checked the fuel gauges again. They indicated about 3/4 tank each side, which he estimated to be 36 gallons of total fuel.

The pilot flew direct to Patuxent River at an altitude of 5,500 feet, and a power setting between 2,400-2,500 rpm. The carburetor heat was applied "occasionally" as the carb ice detector indicated "prudent" and the engine was leaned "periodically." The pilot performed several ground speed calculations during the flight, indicating a consistent groundspeed of 100-110 mph. The pilot did not perform any fuel burn calculations during the flight.

When the pilot was about 10 miles from the airport, he was instructed by the tower controller to expect a left base entry for a full-stop landing on runway 02. About 3 miles from the airport, the pilot was instructed to perform a 360-degree turn for spacing and to change to a straight-in approach for runway 06. As the pilot was leveling the airplane from the turn, the airplane's engine "stopped producing power." The pilot then checked the fuel gauges which indicated 1/8 full on the left side, and 1/4 full on the right side. He increased the throttle, which momentarily brought power back to the engine. The airplane then pitched up, and the engine

lost power again. The pilot initiated a 90-degree turn and held a nose-high attitude to clear trees in the flight path. Once over the tree line, the pilot lowered the nose and performed a forced landing to a field.

According to a Federal Aviation Administration (FAA) inspector, the airplane impacted the ground approximately 1/2 mile short of runway 06, on an approximate heading of 150 degrees. Visual examination of the fuel tanks revealed that the left wing tank was "completely dry," and approximately 1/8 of an inch of fuel was observed in the right wing fuel tank. The fuel selector was observed between the "both" and "right" positions, and the mixture and throttle control levers were observed in the full forward position.

The engine was examined at a salvage facility in Clayton, Delaware, under the supervision of a Safety Board Investigator. The fuel lines from the wing roots to the gascolators were absent of debris and obstructions, and the carburetor and gascolator fuel screens were also absent of debris. Less than 1 teaspoon of fuel was observed in the gascolator bowl. A test run of the engine was performed, on the airframe, by introducing fuel directly to the carburetor. The engine started without hesitation and ran continuously through a variety of power settings.

During the examination, it was noted that the Stewart Warner fuel level transmitters had been removed from the airplane and were unable to be tested with the fuel gauges at the salvage facility. The manager of the Patuxent River Navy Flying Club was questioned regarding the disposition of the transmitters. He stated that he had removed them from the airplane prior to the salvage company's arrival, and retained them for his own testing. He further stated that when he removed the transmitters, he was aware of Safety Board instructions specifying that the airplane had not been released.

The fuel level transmitters were then shipped to the Safety Board, and tested with the fuel gauges. No mechanical anomalies were noted.

According to flight logs kept by the Patuxent River Navy Flying Club, the accident airplane was checked out by the pilot on July 29, 2002 at a Hobbs time of 2214.5 and returned at a Hobbs time of 2215.9. An entry for 16.8 gallons of fuel was displayed on the same line, and an interview with a representative of the flying club revealed that aircraft are always refueled when they return from a flight. Another entry on the following line of the log indicated that the airplane was checked out again by the pilot on the day of the accident, at a Hobbs time of 2215.9. The Hobbs time at the accident site was 2222.8.

A Service Bulletin (SEB99-18) was issued by the Cessna Aircraft Company on November 1, 1999, which addressed inspections of the Stewart Warner fuel quantity indicating system. The purpose of the inspections was to verify that each fuel tank gauge indicated empty when the fuel tank contained only unusable fuel. The Service Bulletin stated that these inspections shall be accomplished within the next 100 hours of operation or 12 months, whichever came first. After the initial inspection, the inspection should be reaccomplished every 12 months thereafter.

Examination of the airplane and engine logbooks revealed no entries which addressed compliance with the Service Bulletin.

The pilot reported 815 hours of total flight experience, 124 of which were in fixed-wing aircraft, and 691 were in rotorcraft. In addition, the pilot had accumulated 9 hours in make and model.

The weather reported at Patuxent River, at 1355, included winds from 040 degrees at 9 knots, visibility 7 miles, few clouds at 3,000 feet, temperature 34 degrees, and dew point 19 degrees.

Pilot Information

Certificate:	Commercial	Age:	28, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	
Instrument Rating(s):	Airplane; Helicopter	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	May 24, 2002
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	June 21, 2002
Flight Time:	815 hours (Total, all aircraft), 9 hours (Total, this make and model), 310 hours (Pilot In Command, all aircraft), 46 hours (Last 90 days, all aircraft), 21 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N1177M
Model/Series:	172K	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	17258677
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	July 18, 2002 100 hour	Certified Max Gross Wt.:	2300 lbs
Time Since Last Inspection:	13 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	3430 Hrs at time of accident	Engine Manufacturer:	Lycoming
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	O-320
Registered Owner:	Samuel W Carson Jr.	Rated Power:	150 Horsepower
Operator:	Patuxent River Naval Flying Club	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	NHK,39 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	13:55 Local	Direction from Accident Site:	0°
Lowest Cloud Condition:	Few / 3000 ft AGL	Visibility	7 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	9 knots / None	Turbulence Type Forecast/Actual:	/
Wind Direction:	40°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.9 inches Hg	Temperature/Dew Point:	34°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Myrtle Beach, SC (MYR)	Type of Flight Plan Filed:	VFR
Destination:	Patuxent River, MD (NHK)	Type of Clearance:	None
Departure Time:	11:45 Local	Type of Airspace:	Class D;Restricted area

Airport Information

Airport:	Patuxent River NAS NHK	Runway Surface Type:	Grass/turf
Airport Elevation:	39 ft msl	Runway Surface Condition:	Dry
Runway Used:	06	IFR Approach:	None
Runway Length/Width:	11809 ft / 200 ft	VFR Approach/Landing:	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	Aircraft Damage:	Substantial
Passenger Injuries:	1 Minor	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Serious, 1 Minor	Latitude, Longitude:	38.308334,-76.416114

Administrative Information

Investigator In Charge (IIC):	Andrews, Jill
Additional Participating Persons:	Bruce McGray; Dulles, VA Todd Sigler; Cessna Aircraft Company; Wichita, KS David Moore; Lycoming Engines; Ardsley, PA
Original Publish Date:	November 25, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=55356

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](#).