Aviation Investigation Final Report

Location:	Rock Hill, South Carolina	**Accident Number:**	ERA14LA425
Date & Time:	September 6, 2014, 10:05 Local	**Registration:**	N4900K
Aircraft:	Navion Navion	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	3 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot reported that the airplane departed on the 52-mile flight with about 30 gallons of fuel on board, of which about 4 gallons were in the auxiliary fuel tank. The pilot stated that the airplane was in cruise flight about 2,800 ft and that the engine power was set at 21 inches of manifold pressure and 2,000 rpm. About 30 minutes after departure, the engine "abruptly" stopped producing power. The pilot turned on the electric fuel pump, switched fuel tanks, applied full throttle and mixture and carburetor heat, and attempted an engine restart. However, the engine would not restart. The pilot stated that, during the descent, he noticed that the fuel pressure reading was 2 to 3 pounds per square inch (psi), which was well below the normal operating range of 11 to 14 psi. The pilot selected an open field about 3 miles from the destination airport for the forced landing, during which the airplane struck a ditch and fence, which resulted in the separation of the landing gear.

Postaccident examination of the airplane and the engine and its accessories revealed no preimpact mechanical anomalies that would have prevented normal operation. Although the pilot stated that, after the accident, he reentered the airplane and turned the fuel selector valve and the electric fuel pump to the "off" position, photographs taken during the airplane's recovery revealed that the fuel selector was in the "aux" position. Fuel was found in the main tanks, but the auxiliary fuel tank was empty. Based on the engine's fuel consumption rates, the estimated 4 gallons of fuel in the auxiliary fuel tank would have been consumed during the accident flight at either a slow or fast-cruise power setting.

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 the exhaustion of the fuel supply in the selected fuel tank and a subsequent total loss of engine power.

Findings

Aircraft	Fuel - Fluid management
Personnel issues	Use of equip/system - Pilot
Environmental issues	(general) - Contributed to outcome
Environmental issues	Fence/fence post - Contributed to outcome

Factual Information

History of Flight

Enroute-cruise	Loss of engine power (total) (Defining event)
Emergency descent	Off-field or emergency landing
Landing-flare/touchdown	Collision with terr/obj (non-CFIT)

On September 6, 2014, at 1005 eastern daylight time, a Navion Navion A, N4900K, was substantially damaged during a forced landing following a total loss of engine power on approach to Rock Hill Airport (UZA), Rock Hill, South Carolina. The private pilot/owner and two passengers sustained minor injuries. Visual meteorological conditions prevailed, and no flight plan was filed for the flight, which departed Triple Tree Aerodrome (SC00), Woodruff, South Carolina, about 0930. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

In a written statement, the pilot said the airplane had a 60-gallon fuel capacity, and he departed with approximately 26 gallons of fuel in the main tanks, and about 4 gallons of fuel in the auxiliary tank, for the 35-minute flight to UZA. He then planned to fill the airplane with fuel for a flight back to Collegedale, Tennessee.

The pilot stated the airplane was in cruise flight about 2,800 feet, and the engine power was set at 21 inches of manifold pressure and 2,000 rpm. About 30 minutes after departure, the engine "abruptly" stopped producing power. The pilot turned on the electric fuel pump, switched fuel tanks, applied full throttle, mixture, and carburetor heat, and attempted an engine restart. The engine would not restart, and the pilot selected an open field for a forced landing about 3 miles from the destination airport.

During the descent, the pilot noticed that the fuel pressure reading was 2-3 psi, which was well below the normal operating range of 11-14 psi. He opened and closed the throttle during the descent, which produced power momentarily, but engine power was never fully restored. The pilot completed the forced landing, and the airplane struck a fence and a ditch, which separated the landing gear. The airplane came to rest upright with substantial damage to the engine compartment, fuselage, and empennage.

The pilot stated that after the accident he reentered the cockpit and moved the fuel selector and the electric fuel pump switch to the "off" position.

The pilot held a private pilot certificate with ratings for airplane single engine land. His most recent Federal Aviation Administration (FAA) third class medical certificate was issued June 20, 2014. The pilot reported 525 total hours of flight experience, of which 194 hours were in the accident airplane make and model.

The airplane was manufactured in 1949, and was equipped with a 205- horsepower Continental E-185-3 six-cylinder engine. Its most recent annual inspection was completed October 1, 2013, at 3,262.9 total aircraft hours.

The wreckage was recovered by local law enforcement and stored in an impound lot, where preliminary examination was performed by an FAA aviation safety inspector. He said the airplane's main fuel tanks, as well as fuel lines to the engine, contained fuel. The airplane wreckage was subsequently recovered by aircraft recovery specialists, who stated there was fuel in the main tanks, but the auxiliary fuel tank was empty. Photographs taken during recovery revealed that the fuel selector was in the "Aux" position.

The engine and airframe were examined in Atlanta, Georgia on October 22, 2014. A borescope examination of the cylinders revealed normal wear signatures. The engine was rotated by hand at the propeller, and continuity was established through the powertrain and valve train to the accessory section. Compression was confirmed using the thumb method. Both magnetos produced spark at all terminal leads. The carburetor was disassembled with no blockages or anomalies noted.

The engine-driven fuel pump was undamaged, and intact in its mount. The pump was removed, and the fuel pump inlet line was submerged in a solvent tank. When actuated with an electric drill, the pump discharged solvent from the outlet port. The electric fuel pumped fluid when actuated, utilizing the airplane's electrical system.

Examination of a Navion "Range Chart" for a Continental E-185-3-equipped airplane revealed fuel consumption rates of 8 gallons per hour at 1,700 rpm, 10 gallons per hour at 1,900 rpm, and 12.5 gallons per hour at 2,180 rpm at 2,000 feet altitude. At 70 percent power, cruise airspeed for the Navion was about 130 knots.

The straight-line distance from SC00 to UZA was 50.2 nautical miles.

Pilot Information

Certificate:	Private	**Age:**	49
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	June 12, 2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	September 7, 2012
Flight Time:	525 hours (Total, all aircraft), 194 hours (Total, this make and model), 280 hours (Pilot In Command, all aircraft), 24 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Navion	**Registration:**	N4900K
Model/Series:	Navion A	**Aircraft Category:**	Airplane
Year of Manufacture:	1949	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	NAV-4-1900
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	October 1, 2013 Annual	**Certified Max Gross Wt.:**	2750 lbs
Time Since Last Inspection:	75 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3263 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed	**Engine Model/Series:**	E-185-3
Registered Owner:	MCKENNEY INC	**Rated Power:**	205 Horsepower
Operator:	MCKENNEY INC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KUZA,666 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	10:11 Local	**Direction from Accident Site:**	60°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 2900 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.1 inches Hg	**Temperature/Dew Point:**	26°C / 22°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Woodruff, SC (SC00)	**Type of Flight Plan Filed:**	None
Destination:	Rock Hill, SC (KUZA)	**Type of Clearance:**	VFR
Departure Time:	09:30 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	ROCK HILL/YORK CO/BRYANT FIELD UZA	**Runway Surface Type:**	Asphalt
Airport Elevation:	666 ft msl	**Runway Surface Condition:**	Rough;Vegetation
Runway Used:	02	**IFR Approach:**	None
Runway Length/Width:	5500 ft / 100 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Minor	**Latitude, Longitude:**	34.94889,-81.181945(est)

Administrative Information

Investigator In Charge (IIC):	Rayner, Brian
Additional Participating Persons:	Steven J Petrossian; FAA FSDO; Columbia, SC
Original Publish Date:	February 17, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=90035