Aviation Investigation Final Report

Location:	Georgetown, Texas	**Accident Number:**	CEN09LA233
Date & Time:	March 29, 2009, 18:45 Local	**Registration:**	N210BF
Aircraft:	Cessna P210N	**Aircraft Damage:**	Substantial
Defining Event:	Fuel starvation	**Injuries:**	1 Serious, 1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was preparing to land when the engine lost power. He attempted to perform a forced landing to a road west of the airport. During the forced landing, the airplane impacted trees and then the road resulting in substantial damage to the airplane. An examination of the airplane revealed that the left main fuel tank was empty; however, the right main fuel tank and tip tank contained fuel. According to a telephone conversation with the pilot, during his pre landing preparation he noted that the left fuel tank was "low" and switched from the left fuel tank to the right fuel tank. Shortly thereafter he noted that the engine had lost power. He attempted to restart the engine by turning the auxiliary fuel pump on and "cranking" the engine. According to the emergency procedures section in the Pilot's Operating Handbook the correct in-flight engine restart procedure requires the pilot to maintain 85 knots indicated airspeed, check fuel quantity, switch the fuel selector to the fullest tank, mixture set to rich, auxiliary pump to the "on" position for three to five seconds with the throttle open, then off, ignition switch to both, and advance the throttle slowly. An examination of the airplane fuel system revealed no contaminants and no anomalies. An examination and test run of the engine revealed no anomalies. The engine data monitoring unit showed a loss of fuel flow prior to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine power due to fuel starvation as a result of the pilot's inadequate fuel management. Contributing to the accident was the pilot's improper engine restart procedures.

Findings

Aircraft	(general) - Incorrect use/operation
Personnel issues	Use of equip/system - Pilot
Environmental issues	(general) - Contributed to outcome
Personnel issues	Use of policy/procedure - Pilot

Factual Information

History of Flight

Approach	Fuel starvation (Defining event)
Approach	Loss of engine power (partial)
Landing	Collision with terr/obj (non-CFIT)

On March 29, 2009, at 1845 central daylight time, a Cessna P210N, N210BF, was substantially damaged during a forced landing near Georgetown Municipal Airport (GTU), Georgetown, Texas. Visual meteorological conditions prevailed at the time of the accident. The personal flight was being conducted under the provisions of Title 14 Code of Federal Regulation Part 91 without a flight plan. The private pilot received minor injuries and the passenger sustained serious injuries. The local flight departed GTU approximately 1750.

According to a Federal Aviation Administration (FAA) inspector, the airplane was preparing to land at GTU when the engine lost power. The pilot performed a forced landing to a road west of the airport. During the forced landing, the airplane impacted trees and then the road. The airplane slid for several feet before impacting a mailbox. The nose wheel separated from the airframe, the left main landing gear was bent out laterally, and the right main landing gear was folded under the airplane. The left wing auxiliary fuel tank (tip tank) and the left elevator separated from the airframe. The skin on the fuselage was wrinkled and the horizontal stabilizer was bent. An examination of the airplane revealed that the left main fuel tank was empty and the right tip tank was empty. The right main fuel tank contained a measurable amount of fuel. According to the FAA, the right tip tank was damaged during the landing which allowed fuel to leak from the resulting hole.

According to two separate telephone conversations, between the FAA and the pilot and the National Transportation Safety Board (Safety Board) investigator-in-charge (IIC) and the pilot, he was on a base leg for the landing runway and initiated a turn to final approach when he noted that the fuel in the left tank was "low." He had extended his landing gear and his flaps were selected at 10 degrees. The pilot manipulated the fuel selector valve to the right tank. After changing fuel tanks, he noted that he was losing altitude and "noticed the engine power was gone." The pilot stated that he was so low he could "not do anything." He "aimed the airplane for an opening in the trees" and attempted to restart the engine by turning the auxiliary fuel pump on and "cranking" the engine. The pilot stated during this conversation that his headset "drowns out the engine noise."

According to a written statement submitted by the pilot, during his pre landing preparation he switched from the left fuel tank to the right fuel tank and the engine lost power. The propeller continued to rotate. He tried to restart the engine "with the auxiliary pump to no avail."

According to the report issued by the Georgetown fire department fuel was leaking from the airplane; however, it was not stated where the fuel was leaking from. The airplane was loaded onto a wrecker and transported to the local airport where fuel was drained from the airplane. According to a telephone conversation with an employee with B & G Aviation, LLC who assisted the fire department with draining the fuel, approximately 20 gallons of fuel was drained from the right tank, just to the point to prevent the fuel from leaking from the right tank. Inspectors with the FAA examined the airplane the following morning and observed a measurable quantity of fuel in the right tank. The left main tank was empty and the left tip tank had separated during the impact sequence.

According to the emergency procedures section of the pilot's operating handbook for the Cessna 210, the correct in-flight engine restart procedure requires the pilot to maintain 85 knots indicated airspeed, check fuel quantity, switch the fuel selector to the fullest tank, mixture set to rich, auxiliary pump to the "on" position for three to five seconds with the throttle open, then off, ignition switch to both, and advance the throttle slowly. The correct emergency landing without engine power procedure is to maintain 80 knots (with flaps extended), mixture to idle cut-off, fuel selector valve off, ignition off, wing flaps as required (30 degrees recommended), master switch off, touchdown slightly tail low, and apply brakes heavily. According to the pilot, he landed with ten degrees of flaps and turned the master switch, ignition, and avionics off after coming to rest.

On September 29 and 30, 2009, the Safety Board IIC and investigators from Cessna Aircraft and Teledyne Continental Motors examined the engine at the Teledyne Continental Motors facility in Mobile, Alabama. The engine was mounted in an engine test cell and equipped with thermocouples, pressure lines, and test pads for monitoring purposes. The engine started without hesitation and ran for no less than 15 minutes through a series of incremental rpm increases. The engine exhibited the ability to run normally without hesitation or stumbling in addition to the ability to produce rated horsepower.

On October 1, 2009, an investigator from Cessna Aircraft examined the airplane fuel system under the auspices of an FAA inspector. No contamination was noted in any of the fuel lines and the auxiliary fuel pump functioned as designed. It was also noted that the left main fuel tank was not compromised, aside from the separation of the left tip tank. An examination of the remaining airplane systems revealed no anomalies.

The airplane was equipped with a JP Instruments (JPI) Engine Data Monitor (EDM) 700. This unit was removed and sent to the Safety Board Vehicle Recorders Laboratory in Washington, DC, to have the nonvolatile memory downloaded. The unit recorded the following parameters: time, battery voltage, exhaust gas temperature, cylinder head temperature, oil temperature, fuel flow, and outside air temperature. The unit recorded approximately one hour and six minutes, recording a line of data every six seconds, for the accident flight. Fuel flow ranged from 3.7 gallons per hour at the start of the flight to 37.1 gallons per hour. Ten minutes prior to the end of the recording, the fuel flow was 22.1 gallons per hour. At 1842:18 the fuel flow decreased to 14.3 gallons per hour and at 1843:24 the fuel flow had decreased to zero gallons per hour. The

exhaust gas temperature and cylinder head temperature experienced a correlating decrease in recorded temperature shortly after the drop in fuel flow. The unit recorded for an additional two and one half minutes following the loss of fuel flow. According to Teledyne Continental Motors, the temperatures recorded were below maximum allowable temperatures for the TSIO-520-P engine.

Pilot Information

Certificate:	Private	**Age:**	72,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
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 3 With waivers/limitations	**Last FAA Medical Exam:**	June 4, 2008
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	February 1, 2009
Flight Time:	(Estimated) 180 hours (Total, all aircraft), 25 hours (Total, this make and model), 180 hours (Pilot In Command, all aircraft), 25 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N210BF
Model/Series:	P210N	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	P21000688
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	August 22, 2008 Annual	**Certified Max Gross Wt.:**	4016 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	1780.5 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-520 SER
Registered Owner:	On file	**Rated Power:**	300 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:	KGTU,790 ft msl	**Distance from Accident Site:**	
Observation Time:	20:07 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	150°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	22°C / -1°C
Precipitation and Obscuration:			
Departure Point:	Georgetown, TX (GTU)	**Type of Flight Plan Filed:**	None
Destination:	George Town, TX	**Type of Clearance:**	None
Departure Time:	17:50 Local	**Type of Airspace:**	

Airport Information

Airport:	Georgetown Municipal GTU	**Runway Surface Type:**	
Airport Elevation:	790 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 1 Minor	**Latitude, Longitude:**	30.649335,-97.749961(est)

Administrative Information

Investigator In Charge (IIC):	Rodi, Jennifer
Additional Participating Persons:	Tom Fowles; FAA Flight Standards District Office; San Antonio, TX Randall S Mainquist; Cessna Aircraft Company; Wichita, KS Terry Horton; Teledyne Continental Motors; Mobile, AL
Original Publish Date:	December 29, 2009
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=73584