Aviation Investigation Final Report

Location:	Yankeetown, Florida	**Accident Number:**	CEN19LA147
Date & Time:	May 17, 2019, 15:15 Local	**Registration:**	N4861P
Aircraft:	Cessna P210	**Aircraft Damage:**	Substantial
Defining Event:	Electrical system malf/failure	**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was conducting a personal cross-country flight at 2,500 ft mean sea level over the Gulf of Mexico when the airplane had a total loss of electrical power about 1 hour 45 minutes into the flight. The pilot was unable to restore electrical power and he turned toward the shore to land at an airport. He manually extended the landing gear and selected the right-wing fuel tank. A couple minutes later the airplane had a total loss of engine power. The pilot did not switch to the left-wing fuel tank or attempt an engine restart because he was focused on ditching the airplane.

The airplane became submerged after the ditching and the right horizontal stabilizer and right elevator were substantially damaged. The airplane was not equipped with a life raft or life preservers. The pilot drifted and swam with the current and tide for over 11 hours until he came ashore an unpopulated barrier island the following morning.

The pilot stated that during his preflight inspection the left and right wing tanks contained about 30 gallons and 40 gallons of fuel, respectively. He further estimated that the airplane had at least 68 gallons of useable fuel, about 4 hours of fuel endurance, before he departed on the planned 3-hour flight. He departed using fuel from the right-wing tank and about 1 hour into the flight he switched to the left-wing tank. About 45 minutes later, shortly after the loss of electrical power, he switched to the right-wing tank because it contained the most fuel.

The postaccident engine examination revealed no evidence of a mechanical malfunction or failure that would have precluded normal operation. The engine had been submerged in saltwater which prevented an operational test run. Any fuel remaining in the wing fuel tanks was displaced by saltwater after the ditching. However, uncontaminated fuel was found in the fuel strainer and a fuel line between the engine's fuel manifold and fuel control unit. Although fuel mismanagement could have resulted in a loss of engine power, the investigation was unable to confirm this with the available evidence after the ditching.

Examination of the airplane's electrical system revealed the battery's positive power cable was loose where it attached to the battery contactor terminal. Additionally, the component stack-up did not include any washers and had a smaller nut when compared to the other cable terminal. The nut had backed off about 2 threads, which resulted in a loose cable connection. The total loss of electrical power during flight was likely due to the loose cable connection on the battery contactor. The engine magnetos produce ignition spark independent of the airplane electrical system; the loss of electrical power did not affect normal engine operation. The reason for the total loss of engine power could not be determined based on available evidence.

Probable Cause and Findings

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

A loss of engine power for reasons that could not be determined based on the available evidence.

Findings

Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Enroute-cruise	Electrical system malf/failure (Defining event)
Enroute-cruise	Loss of engine power (total)
Landing	Off-field or emergency landing
Landing	Ditching

On May 17, 2019, about 1515 eastern daylight time, a Cessna P210N airplane, N4861P, was substantially damaged when it was involved in an accident in the Gulf of Mexico near Yankeetown, Florida. The pilot sustained minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that before the flight he verified the fuel quantity in each fuel tank with a calibrated dip tube and that the left and right wing fuel tanks contained about 30 gallons and 40 gallons, respectively. He further estimated that the airplane had a useable fuel load of at least 68 gallons, or about 4 hours of fuel. The estimated time enroute for the cross-country flight from Sebastian Municipal Airport (X26), Sebastian, Florida, to De Funiak Springs Airport (54J), De Funiak Springs, Florida, was about 3 hours.

The pilot reported there were no anomalies with the airplane or the engine during his preflight check or before-takeoff engine runup. After a normal takeoff, he retracted the flaps and landing gear, and reduced engine power to 21 inches of manifold pressure at 2,400 rpm. He also leaned the fuel mixture to yield a turbo inlet temperature of 1,300° F while at a cruise altitude of 2,500 ft mean sea level (msl).

About 1 hour into the flight, the pilot switched from the right-wing fuel tank to the left-wing fuel tank. About 45 minutes later, the airplane experienced a total loss of electrical power over the Gulf of Mexico at 2,500 ft msl. The pilot cycled the battery/alternator switch and verified that there were no tripped circuit breakers. He was unable to restore electrical power and turned toward Crystal River Airport (CGC) for a precautionary landing. He manually extended the landing gear using the emergency hand pump; however, because there was no electrical power, the down-and-locked green indicator light did not illuminate.

The pilot then switched from the left-wing fuel tank to the right-wing fuel tank because it contained the most fuel. The engine continued to run normally after he increased the fuel mixture to full rich and selected maximum propeller speed. However, about 1-2 minutes after the landing gear was extended, the airplane had a total loss of engine power. The pilot stated that the loss of engine power was sudden and without any warning. The propeller continued to windmill after the loss of engine power. The pilot reported that he did not switch back to the left-wing fuel tank or attempt an engine restart because he was focused on ditching.

The pilot ditched the airplane in the Gulf of Mexico about 5 miles offshore. The airplane initially stayed afloat, but the fuselage eventually took on water and became partially submerged within 15 minutes. The airplane was not equipped with a life raft or life preservers. After the airplane was submerged, the pilot was unable to swim fast enough to keep up with the airplane drifting with the current. The pilot drifted and swam with the current and tide for over 11 hours until he came ashore an unpopulated barrier island around 0300 the following morning. The pilot stated that he was able to signal a fishing boat between 0600 and 0700 who contacted the United States Coast Guard. The pilot was retrieved from the barrier island about 0800 and admitted to a local hospital for treatment of severe dehydration. The airplane was subsequently towed to shore, recovered from the water, and partially disassembled for transport.

The airplane was examined by a Federal Aviation Administration airworthiness inspector. The right horizontal stabilizer and right elevator were substantially damaged. The airplane also exhibited damage attributable to being towed to shore, recovered from the water, and saltwater immersion. The wings were removed for transportation. Both wings, flaps, and ailerons exhibited trailing edge damage attributable to straps used during the water recovery. The filler cap for the right-wing fuel tank was not present during the examination, but photographs provided by the pilot confirmed the filler cap was present before the airplane was recovered from the water. There was no fuel observed in either wing fuel tank. The left wingtip auxiliary tank contained about an ounce of fuel. The right wingtip auxiliary fuel tank was not recovered. The cockpit fuel selector valve was positioned to use fuel from the right-wing fuel tank. The fuel reservoir tanks, located in the lower fuselage, contained murky water. Uncontaminated fuel was observed in the fuel strainer and drained from a fuel line between the engine's fuel manifold and fuel control unit.

The engine remained attached to the airframe mounts. The engine compartment did not exhibit evidence of fire damage or excessive heat. Engine control continuity was verified between the cockpit controls and their respective engine component. Examination of the engine did not reveal any crankcase or cylinder fractures. The intake and exhaust components appeared normal with no evidence of damage. The turbocharger rotated freely by hand. Both magnetos remained securely mounted to the engine and the ignition harness appeared undamaged.

After the spark plugs were removed, internal engine and valve train continuity were confirmed as the engine crankshaft was rotated through the propeller. Murky/oily saltwater discharged from the cylinders as the crankshaft was rotated. Compression and suction were observed on all six cylinders in conjunction with crankshaft rotation. The spark plug leads were contaminated by saltwater. Both magnetos produced an audible snap while the crankshaft was rotated, consistent with their respective impulse coupling functioning. The ignition key switch was seized in the off position. Both magnetos were grounded through their respective P-lead with the ignition switch seized in the off position. The alternator input shaft rotated in conjunction with the crankshaft rotation. The engine examination revealed no evidence of a mechanical malfunction or failure that would have precluded normal operation.

Examination of the airplane's electrical system revealed the battery's positive power cable was loose where it attached to the battery contactor (p/n S-1580A1) terminal. The nut used to

secure the battery's positive power cable was significantly smaller than the nut used on the terminal that secured two cables; one cable to the battery switch and the other cable to the starter motor contactor. Additionally, the loose positive battery cable component stack-up did not include any washers. The nut had backed off about 2 threads, which resulted in a loose cable connection (see the figure below).

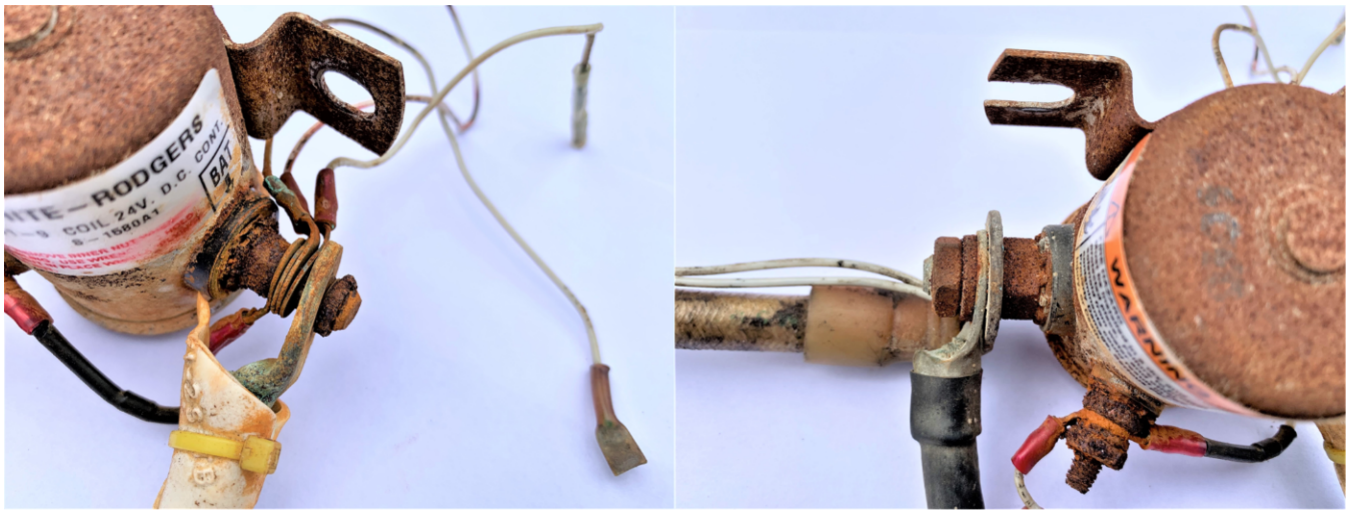

Figure. Battery contactor terminal for the positive battery cable was loose (left). The battery contactor terminal for the battery switch and starter motor contactor cables was tight (right).

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):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	August 22, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 5, 2017
Flight Time:	(Estimated) 792 hours (Total, all aircraft), 39 hours (Total, this make and model), 772 hours (Pilot In Command, all aircraft), 10 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N4861P
Model/Series:	P210 N	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	P21000123
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	April 18, 2019 Annual	**Certified Max Gross Wt.:**	4000 lbs
Time Since Last Inspection:	8 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2819.1 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-520P
Registered Owner:	Roger Ian Gerrard	**Rated Power:**	300 Horsepower
Operator:	Roger Ian Gerrard	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	CGC,9 ft msl	**Distance from Accident Site:**	17 Nautical Miles
Observation Time:	15:15 Local	**Direction from Accident Site:**	120°
Lowest Cloud Condition:	Scattered / 6000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.02 inches Hg	**Temperature/Dew Point:**	32°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Sebastian, FL (X26)	**Type of Flight Plan Filed:**	None
Destination:	DeFuniak Spring, FL (54J)	**Type of Clearance:**	None
Departure Time:	13:30 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	29.007778,-82.845001(est)

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	Loftis J Rollins; Federal Aviation Administration; Tampa, FL Rulon Vilcan; Federal Aviation Administration; Tampa, FL
Original Publish Date:	August 12, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=99463