Aviation Investigation Final Report

Location:	Lake City, Florida	**Accident Number:**	ERA16LA190
Date & Time:	May 16, 2016, 11:06 Local	**Registration:**	N9077C
Aircraft:	Cessna R182	**Aircraft Damage:**	Substantial
Defining Event:	Landing gear collapse	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot stated that, while on a cross-country flight, he noted that the airplane was losing electrical power and decided to make a precautionary landing. The pilot attempted to extend the landing gear and advised air traffic control of the emergency before all electrical power was lost. Since electrical power was lost before the landing gear extension cycle completed, he was unable to verify that the landing gear was down and locked in place, as the gear position indicator light would not illuminate due to the loss of electrical power. The pilot also referenced the manufacturer's emergency checklist for "Landing Without a Positive Indication of Gear Locking" and visually confirmed that the gear appeared to be fully extended. Upon touching down on the runway, the main landing gear collapsed, and the nose gear remained extended.

Postaccident examination of the airplane revealed that the cause of the electrical power failure was the main electrical contactor, which had shorted out internally and burned. The part was original to the airplane and had accrued about 3,235 total hours.

The landing gear was extended and retracted by hydraulic actuators operated by an electrically-driven hydraulic pump. It is likely that, when the pilot moved the landing gear selector to the down position, the extension cycle did not complete due to the loss of electrical power, resulting in insufficient hydraulic pressure to fully extend and lock the gear. The airplane was equipped with an emergency gear extension handle that would have allowed the pilot to manually complete the extension; however, the checklist that the pilot used did not instruct the pilot to manually lower and lock the gear. If the checklist had included the use of the emergency landing gear extension procedure, the pilot would likely have been able to manually increase hydraulic pressure in the system and avoid a gear collapse on landing.

Probable Cause and Findings

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

Internal failure of the main electrical contactor, which resulted in a complete loss of electrical power and an inability to extend the landing gear through normal means.

Findings

Aircraft	AC power distribution system - Failure
Aircraft	Main landing gear - Failure

Factual Information

History of Flight

Enroute	Sys/Comp malf/fail (non-power)
Landing-flare/touchdown	Landing gear collapse (Defining event)

On May 16, 2016, about 1106 eastern daylight time, a Cessna R182, N9077C, sustained substantial damage when the main landing gear collapsed during a precautionary landing at Lake City Gateway Airport (LCQ), Lake City, Florida. The private pilot was not injured. The airplane was registered to and operated by a private company. A visual flight rules flight plan was filed for the flight that originated from Punta Gorda Airport (PGD), Punta Gorda, Florida, about 0945, and was destined for DeKalb-Peachtree Airport (PDK), Chamblee, Georgia. Visual meteorological conditions prevailed for the personal flight conducted under 14 Code of Federal Regulations Part 91.

The pilot stated that about one-hour into the flight, the entire instrument panel "began flickering then went completely dead." He checked all of the circuit breakers and reset the avionics master switch, but was unable to restore electrical power. Before losing all power, the pilot informed air traffic control of the electrical failure and that he would be making a precautionary landing at LCQ. He then reduced speed and extended the landing gear via the landing gear extension handle. The pilot said that when he visually checked the left main gear (pilot side) it appeared to be down and locked, but he was unable to verify because the gear down-and-locked light was not working due to the loss of electrical power.

When the pilot arrived at LCQ, the control tower used light gun signals to instruct him to fly by the tower, after which, they cleared him to land with a solid green light signal. When the airplane touched down, the main landing gear collapsed and the nose gear remained extended. This resulted in substantial damage to the right horizontal stabilizer. Several antennas and the rightwing tip were also damaged.

According to the Cessna R182 Pilot Operating Handbook (POH), page 7-11 to 7-12, Landing Gear System, "The landing gear extension, retraction, and main gear down and lock operation is accomplished by hydraulic actuators powered by an electrically-driven hydraulic power pack. Power pack operation is started and stopped by a pressure switch and hydraulic pressure is directed by the landing gear lever." Once the lever is moved to the up or down position, it directs hydraulic pressure to move the gear to the selected position. Two position indicator lights are provided to show the landing gear position; a green light indicates the gear is down and locked and an amber light means the gear is up or retracted. The POH also said, "During a normal cycle, the gear retracts or extends and locks, limit switches close, and the indicator lights comes on indicating completion of the cycle. After indicator light illumination, the power pack will continue to run until the fluid pressure reaches 1500 PSI, opens the pressure switch, and turns the power pack off. A normal operating pressure of 1000 PSI to 1500 PSI is automatically maintained in the landing gear system, and is sufficient to provide a positive up pressure on the main landing gear. The nose gear incorporates an over-center mechanical linkage which provides a positive mechanical up and down lock." If electrical power was interrupted at any point prior to or during the extension cycle, the hydraulic power pack would have been unable to maintain sufficient pressure in the system to fully extend the landing gear.

A review of the airplane's POH Emergency Procedures, page 3-9, LANDING WITHOUT POSITIVE INDICATION OF GEAR LOCKING stated:

1. Before Landing Check - - COMPLETE.

2. Approach -- NORMAL (full flap).

3. Landing Gear and Gear Pump Circuit Breakers --IN.

4. Landing -- TAIL LOW as smoothly as possible.

5. Braking -- MINIMUM necessary

6. Taxi -- SLOWLY.

7. Engine -- SHUTDOWN before inspecting gear

The pilot stated that he followed this checklist prior to landing, in addition to visually checking the landing gear himself. Though the airplane was equipped with an emergency landing gear extension handle, though this checklist did not call out for its use. The POH only instructed the pilot to use the emergency landing gear extension handle when the landing gear failed to extend. A review of the emergency checklist procedures for Electrical Power Supply System Malfunctions also did not mention for the pilot to use the emergency hand pump to extend the landing gear in the event of a complete electrical failure.

A postaccident examination of the airplane by a mechanic revealed the main electrical contactor was installed correctly, but was burned and had shorted out internally. The part was original to the airplane and had accrued about 3,235 total hours of operation.

The pilot held a private pilot certificate with a rating for airplane single-engine land. He reported a total of 369 hours of flight experience, of which 272 hours were in a Cessna R182.

Weather reported at the airport around the time of the accident was clear skies, visibility 10 miles, and light winds.

Pilot Information

Certificate:	Private	**Age:**	69,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:**	September 2, 2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	October 30, 2014
Flight Time:	369 hours (Total, all aircraft), 272 hours (Total, this make and model), 303 hours (Pilot In Command, all aircraft), 5 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N9077C
Model/Series:	R182 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	R18200388
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	January 19, 2016 Annual	**Certified Max Gross Wt.:**	3100 lbs
Time Since Last Inspection:	5 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3235.1 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-540
Registered Owner:	On file	**Rated Power:**	235 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:	LCQ,200 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	10:54 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	120°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.1 inches Hg	**Temperature/Dew Point:**	32°C / 17°C
Precipitation and Obscuration:			
Departure Point:	Punta Gorda, FL (PGD)	**Type of Flight Plan Filed:**	VFR
Destination:	Chamblee, GA (PDK)	**Type of Clearance:**	VFR;VFR flight following
Departure Time:	09:45 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	LAKE CITY GATEWAY LCQ	**Runway Surface Type:**	Asphalt
Airport Elevation:	200 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	28	**IFR Approach:**	None
Runway Length/Width:	8003 ft / 150 ft	**VFR Approach/Landing:**	Full stop;Precautionary landing;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	30.181943,-82.576942(est)

Administrative Information

Investigator In Charge (IIC):	Read, Leah
Additional Participating Persons:	Alexander Honig; FAA/FSDO; Orlando, FL
Original Publish Date:	July 20, 2017
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=93211