Aviation Investigation Final Report

Location:	Sacramento, California	**Accident Number:**	WPR17LA210
Date & Time:	September 20, 2017, 13:14 Local	**Registration:**	N7330E
Aircraft:	Cessna 210	**Aircraft Damage:**	Substantial
Defining Event:	Landing gear collapse	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane was occupied by its new owner, a private pilot, and a flight instructor; they had just completed a personal flight. During the landing roll, the main landing gear partially collapsed and the airplane departed the runway surface, resulting in substantial damage to the left horizontal stabilizer. Both pilots gave conflicting statements regarding their roles during the flight but agreed that the landing gear was extended during the landing approach.

Postaccident examination did not reveal any anomalies with the landing gear system that would have precluded normal operation, and the gear was successfully extended and retracted multiple times using the gear handle during the examination; therefore, the reason for the partial gear collapse could not be determined.

Probable Cause and Findings

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

Partial retraction of the main landing gear during the landing roll for reasons that could not be determined because postaccident examination and functional testing of the gear revealed no anomalies.

Findings

Not determined	(general) - Unknown/Not determined
Aircraft	Main landing gear - Not specified

Factual Information

History of Flight

Landing-landing roll	Landing gear collapse (Defining event)
Landing-landing roll	Abnormal runway contact

On September 20, 2017, at 1314 Pacific daylight time, a Cessna 210F airplane, N7330E, sustained substantial damage to the left horizontal stabilizer after the main landing gear collapsed during the landing roll at Sacramento Executive Airport, Sacramento, California. The private pilot and passenger, who held a flight instructor certificate, were not injured. The airplane had just been purchased by the private pilot, and at the time of the accident was registered to the previous owner. The airplane was being operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed, and no flight plan had been filed for the local flight.

Both occupants provided differing accounts of their operational roles during the flight. The pilot, who was seated in the left seat, stated shortly after the accident that this was his first flight in the airplane, and that it was his understanding that it would be a training flight. The instructor had no previous experience flying the Cessna 210 series and stated that he had explicitly explained to both the pilot and the pilot's mechanic (who had arranged for the two to fly together), that he would not be operating the airplanes controls or providing instruction, and that he was simply acting as an observer.

The pilot stated that his intention was to perform a flight in the traffic pattern and then perform a touch-and-go landing. He reported that the flight was uneventful, and that he flew the airplane during the takeoff and landing approach legs, and that the instructor operated the landing gear handle, and was assisting with the flight controls during the landing roll. He stated that prior to landing, he visually confirmed the landing gear had extended by viewing them through the gear mirrors. Shortly after landing, the airplane began to shake and then after traveling about 100 ft, veered left. He immediately applied right rudder and felt the instructor was doing the same. The airplane then dropped onto its belly.

The pilot did not complete an National Transportation Safety Board Pilot/Operator Aircraft Accident/Incident Report Form 6120.1, provide any further updates to his statement, or respond to multiple requests to clarify the circumstances of the accident.

The instructor provided an extensive statement, reporting that the mechanic who had approached him to fly requested that he be especially vigilant that the landing gear was down and locked before landing. The instructor reiterated in the statement that he did not manipulate any controls until the airplane began to veer off the runway, and that at no time did he operate the landing gear handle. The instructor reported that after the pilot extended the landing gear, he observed the green landing gear indicator light illuminate, and confirmed through the gear mirrors that they had extended.

Photographs taken shortly after the accident revealed that the nose gear was in the extended position, and both main landing gear had partially retracted, with their gear doors remaining open. The flaps

appeared to be fully extended. A series of three black skid marks were observed on the runway, swerving from the centerline through to the airplane's final resting location just left of the runway edge. The outer width of the skids marks were about 34 inches.

Pilot Information

Certificate:	Private	**Age:**	51,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:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	January 1, 2015
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 200 hours (Total, all aircraft), 0 hours (Total, this make and model)		

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	30,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	November 1, 2016
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	1550 hours (Total, all aircraft), 0 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N7330E
Model/Series:	210 F	**Aircraft Category:**	Airplane
Year of Manufacture:	1959	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	57030
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	March 1, 2017 100 hour	**Certified Max Gross Wt.:**	2900 lbs
Time Since Last Inspection:	10 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5981.4 Hrs as of last inspection	**Engine Manufacturer:**	CMI
ELT:	C91A installed, not activated	**Engine Model/Series:**	IO-470
Registered Owner:		**Rated Power:**	260 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:	KSAC,25 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	19:53 Local	**Direction from Accident Site:**	193°
Lowest Cloud Condition:	Scattered / 4300 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.85 inches Hg	**Temperature/Dew Point:**	24°C / 14°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Sacramento, CA (SAC)	**Type of Flight Plan Filed:**	None
Destination:	Sacramento, CA (SAC)	**Type of Clearance:**	None
Departure Time:	13:10 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	SACRAMENTO EXECUTIVE SAC	**Runway Surface Type:**	Asphalt
Airport Elevation:	23 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	20	**IFR Approach:**	None
Runway Length/Width:	5503 ft / 150 ft	**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	38.5125,-121.493331(est)

Tests and Research

Landing Gear Operation

The landing gear and flaps are extended and retracted by hydraulic actuators, powered by an engine-driven hydraulic pump and a pressure accumulator. The nose gear retracts forward and up, with its doors remaining open when the gear is extended. The main gear rotates aft and up into wells under the fuselage, with the doors remaining closed except during gear transition. Both the main and nose gear have positive mechanical up and down locks, operated by separate hydraulic actuators. Limit switches control two position indicator lights, which show that the gear is either up (red), or down and locked (green). The limit switches are connected in series, so that all three gears must be locked before either indicator light comes on. During the extension sequence, the nose landing gear locks into position before the main gear.

The landing gear is controlled by the pilot through a four-position gear handle. The handle positions are, "Up-Operating", "Up-Neutral", "Down-Neutral", and "Down-Operating". To reposition the gear, the handle is pulled out and moved to the desired operating position, then released. A detent holds the handle in the operating position until the cycle is completed, at which point the handle automatically returns to the cycle's respective neutral position. A safety switch, actuated by the nose gear strut, restricts the gear position handle to prevent inadvertent retraction whenever the nose strut is compressed by the weight of the airplane.

The instructor stated that he could not specifically recall if the gear handle was in the "Down-Neutral" or "Down-Operating" position, but that the mechanic, who was one of the first to arrive on scene, immediately entered the cabin, turned on the master switch, and moved the gear handle.

The mechanic provided a statement indicating that when he arrived at the airplane, the gear handle was in the "Down-Operating" position, and it was not until later when he lifted the airplane with a hoist that he turned on the airplanes master switch. As soon as he did, the gear completed its cycle, the gear handle moved to the "Down-Neutral" position, and the green indicator light came on.

Landing Gear Testing

The airplane was removed from the accident site and stored at the mechanic's shop, where it was mounted on jack stands and examined by an FAA inspector the following week. No mechanical anomalies were observed to the landing gear system, beyond damage to the gear doors. The gear was successfully extended and retracted multiple times utilizing the gear handle, and both the red and green gear position lights illuminated appropriately.

Administrative Information

Investigator In Charge (IIC):	Simpson, Eliott
Additional Participating Persons:	Joseph Mitchell; Federal Aviation Administration FSDO; Sacramento, CA
Original Publish Date:	March 18, 2019
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96046