Aviation Investigation Final Report

Location:	Sanford, Florida	**Accident Number:**	ERA16LA058
Date & Time:	October 17, 2015, 11:15 Local	**Registration:**	N381MB
Aircraft:	Cessna R182	**Aircraft Damage:**	Substantial
Defining Event:	Landing gear collapse	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The private pilot and his instructor were performing practice takeoffs and landings. Following an uneventful short field takeoff and landing, the pilot set up for a short field touch-and-go landing. After a "normal" touchdown and before the application of full power, the instructor noted a "shudder" and "nose wheel shimmy," and the nose landing gear collapsed. The propeller struck the paved surface of the runway and the airplane came to a stop. Postaccident examination of the nose gear revealed that its actuator remained secured to the drag attachment fitting and that the nose landing gear was in the "down and locked" position. The drag attachment fitting was separated from the airframe. Subsequent examination revealed that the rivets that secured the drag attachment fitting to the airframe were sheared in overload. The shear loads were in the forward direction, which was inconsistent with the loads typically encountered during landing, suggesting that the damage predated the accident flight. The operator was not aware of any recent damage to the airplane; however, it had been recently rented for an extended period of time.

Probable Cause and Findings

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

A collapse of the nose landing gear due to a separation of the drag attachment fitting from the airframe. The separation was likely due to preexisting damage from an undetermined event.

Findings

Aircraft	Gear extension and retract sys - Damaged/degraded
Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Prior to flight	Unknown or undetermined
Takeoff	Landing gear collapse (Defining event)
Takeoff	Nose over/nose down

On October 17, 2015, about 1115 eastern daylight time, a Cessna R182, N381MB, was substantially damaged during a touch-and-go landing at Orlando Sanford International Airport (SFB), Sanford, Florida. The private pilot and a flight instructor were not injured. The airplane was privately owned and operated under the provisions of 14 Code of Federal Regulations Part 91 as an instructional flight. Day, visual meteorological conditions prevailed, and no flight plan was filed. The local flight originated at SFB about 1100.

The flight instructor reported that he was scheduled with his private pilot-rated student for one hour of practice landings. The pilot performed the pre-flight inspection with no anomalies noted. Following an uneventful short field takeoff and landing, the pilot set up for a short field touch-and-go landing. The approach was normal and the landing gear indicated down and locked. After a normal touchdown, the pilot configured the airplane for the takeoff. Just prior to the application of full power, the instructor noted a "shudder" and "nose wheel shimmy" and then the nose gear collapsed. The propeller struck the paved surface of the runway and the airplane came to a stop. After securing the engine other systems, the pilots exited the airplane and waited for emergency personnel to arrive.

Inspectors with the Federal Aviation Administration (FAA) responded to the accident site and examined the wreckage. They observed structural damage to fuselage, adjacent to the nose gear attachment point. The nose gear actuator was in the down and locked position and connected to the nose gear drag attachment fitting, part number 2243009-1. The nose gear drag attachment fitting was not accessible for further examination. The inspectors also reported that the airplane had been rented for an extended period since its most recent 100-hour inspection; however, the operator was not aware of any recent damage to the airplane.

Subsequent to the FAA inspector's examination of the airframe, the purchaser of the wreckage removed the nose gear drag attachment fitting and photographed it at the request of the NTSB investigator-in-charge. The photographs were then provided to Textron Aviation for their examination. According to the aircraft manufacturer's representative, the rivets that attached the drag attachment fitting to the airframe appeared to be sheared from overload. The shear loads also appeared to be in the forward direction relative to the airplane. This type of damage was consistent with an abrupt force in the forward direction.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	58,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 multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	August 20, 2015
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	June 25, 2015
Flight Time:	6813 hours (Total, all aircraft), 358 hours (Total, this make and model), 6538 hours (Pilot In Command, all aircraft), 95 hours (Last 90 days, all aircraft), 26 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Private	**Age:**	28,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	September 20, 2013
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	270 hours (Total, all aircraft), 24 hours (Total, this make and model), 221 hours (Pilot In Command, all aircraft), 24 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N381MB
Model/Series:	R182 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	R18200385
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	June 25, 2015 Annual	**Certified Max Gross Wt.:**	3100 lbs
Time Since Last Inspection:	86 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5328 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:	SFB,55 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	10:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	340°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.11 inches Hg	**Temperature/Dew Point:**	26°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Sanford, FL (SFB)	**Type of Flight Plan Filed:**	None
Destination:	Sanford, FL (SFB)	**Type of Clearance:**	VFR
Departure Time:	11:00 Local	**Type of Airspace:**	Class C

Airport Information

Airport:	Orlando Sanford Intl SFB	**Runway Surface Type:**	Asphalt
Airport Elevation:	55 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	09L	**IFR Approach:**	None
Runway Length/Width:	11002 ft / 150 ft	**VFR Approach/Landing:**	Touch and go

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:**	28.776945,-81.235(est)

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	Matthew H Harper; FAA/FSDO; Orlando, FL Andrew Hall; Textron Aviation; Wichita, KS
Original Publish Date:	May 23, 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=92397