Aviation Investigation Final Report

Location:	San Diego, California	**Accident Number:**	WPR19LA060
Date & Time:	December 30, 2018, 15:53 Local	**Registration:**	N4161X
Aircraft:	Piper PA46	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control on ground	**Injuries:**	4 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that the airplane began to pull to the left shortly after touchdown. He applied corrective control inputs, but the airplane continued to veer left and departed the runway, and the main landing gear collapsed.

Examination did not reveal any anomalies with the steering system that would have precluded normal operation, and all appropriate service bulletins had been complied with. The nose gear actuator had detached at an area on the airframe that was prone to fatigue failure; however, examination of the actuator assembly revealed that it had detached during an overload event, likely from the impact as the airplane departed the runway.

Probable Cause and Findings

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

Loss of directional control during the landing roll for reasons that could not be determined based on the available information.

Findings

Aircraft	Directional control - Attain/maintain not possible
Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Landing-landing roll	Loss of control on ground (Defining event)

On December 30, 2018, at 1553 Pacific standard time a Piper PA46-350P, N4161X, was substantially damaged when it was involved in an accident near San Diego, California. The private pilot and three passengers were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot stated that the landing approach and flare to runway 28R were normal and the touchdown was smooth. Shortly after the nose landing gear made contact with the ground, the airplane started to pull to the left. He applied corrective control inputs, but the airplane continued to turn left. The airplane then departed the runway surface, and the landing gear collapsed.

Both wings and the aft cabin structure sustained substantial damage during the accident sequence, and all occupants were able to egress from the aft cabin door unaided.

Due to the US federal government shutdown of 2018–2019, the NTSB was unable to respond to this accident, gather perishable evidence (such as tire pressures, or the airplane's immediate postaccident state), or oversee the airplane's removal to a secure facility. An examination of the airplane was ultimately performed by the NTSB on February 19, 2019. A complete examination report is contained in the public docket.

Photographic evidence provided by the manager of a local fixed base operator, who recovered the airplane, indicated that it came to rest about 1,300 ft beyond the displaced threshold of runway 28R, and 50 ft left of the runway edge. Runway 28R was 4,598 ft long, and 150 ft wide. The main landing gear had collapsed, and three black tire transfer marks were present in a sweeping arc from the runway centerline through to the area where the airplane entered the adjacent infield.

Examination of the airplane revealed that both the left and right landing gear actuators were in the extended position. The left actuator had detached from its mounting points at both the wing spar and the landing gear trunnion. The right actuator remained attached to the trunnion; its piston was bent, and the upper section of the actuator had detached from the wing spar. All failure areas exhibited grainy surface features, and there was no evidence of corrosion or beach markings on any of the detached faces.

The nose landing gear had partially retracted and rotated, with the wheel hanging just below the open gear doors. The oleo strut and trunnion assembly remained attached to the fuselage, the scissor link appeared undamaged, and the steering horn remained attached to the nosewheel.

The down spring was intact, the tire was firm, and the left side of the tire lip exhibited scuffing and material removal when compared to the right edge, which was undamaged.

The lower section of the landing gear actuator remained attached to the trunnion, and the upper section had broken free from its engine mount attach point and was impinging against the firewall. The actuator's internal locking system appeared to have engaged, and the piston exhibited 7 1/8 inches of extension, consistent with full landing gear extension.

Control continuity was established from the foot pedals aft to the rudder and from the foot pedals forward to the steering bellcrank, bungee, and steering arm; movement of the foot pedals resulted in appropriate movement of the steering arm.

With the actuator removed, the nose landing gear trunnion fell forward, and the gear locked into place with the aid of the down spring. In this mode, the steering arm made contact with the steering horn and rollers, and no significant play was observed. Subsequent movement of the foot pedals resulted in appropriate steering movement of the nose wheel.

The brake lines sustained damage, preventing an accurate assessment of the brake system; however, both wheels could be freely rotated, and both rotors were bright in appearance, with no evidence of thermal discoloration.

A series of five Piper service bulletins (SB) relating to the steering system were applicable to the accident airplane.

SB 1060 required the removal of a spring washer in the pin that attached the brake pedal to the master cylinder. It had been discovered that the spring washer could potentially restrict rudder medal movement, resulting in binding brakes, and inconsistent ground steering. Maintenance records indicated that the SB had been complied with in November 2001.

SB 1075 called for the modification of the steering horn to prevent contact with the engine mount during ground tow. Maintenance records indicated that the SB had also been complied with in November 2001.

SB 1256 Provided instructions for replacing the nut and reorienting the bolt used to connect the upper and lower torque links on the nose landing gear after it was discovered that, under certain conditions, use of tow straps may cause the loss of the nut cotter pin. Maintenance records indicated that the SB had been complied with in August 2013.

SB 1103F called for a repetitive fluorescent penetrant inspection of the engine mount for fatigue cracks in the area of the nose landing gear actuator attach point. It was required to be performed at 100-hour intervals unless the airplane was upgraded with a strengthened engine mount. The airplane appeared to have the original engine mount, and maintenance records indicated that it was inspected in accordance with SB 1103F during the last annual inspection on January 26, 2018, 52.2 flight hours prior to the accident.

SB 1193 recommended the replacement of the nose landing gear down spring due to its tendency to develop a permanent set over time. The SB stated that failure to replace the spring

could result in the nose landing gear taking an excessively long time to extended. Maintenance records indicated that the spring was replaced at the last annual inspection.

The actuator and the damaged upper engine mount components were removed for further examination at the NTSB Materials Laboratory to confirm compliance with SB 1103F.

Examination revealed that the engine mount had fractured in the area specified by SB 1103F: at the right attachment foot for the actuator and at one of the support tubes on the left attachment foot. The nose landing gear actuator remained bolted to pieces of the left and right attachment feet. The fractures were examined using an optical stereomicroscope, and all fracture features had a uniform matte-gray appearance on slant angles, consistent with ductile overstress fracture. A complete examination report is contained in the public docket.

At the time of the accident, the wind was from 210° at 8 knots.

Pilot Information

Certificate:	Private	**Age:**	54,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:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	August 6, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1432 hours (Total, all aircraft), 763 hours (Total, this make and model), 1284 hours (Pilot In Command, all aircraft), 4 hours (Last 90 days, all aircraft), 3 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N4161X
Model/Series:	PA46 350P	**Aircraft Category:**	Airplane
Year of Manufacture:	1999	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	46-36240
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	January 26, 2018 Annual	**Certified Max Gross Wt.:**	4299 lbs
Time Since Last Inspection:	52 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1741.3 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	TIO-540 SER
Registered Owner:		**Rated Power:**	350 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:	KMYF,427 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	23:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	210°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.97 inches Hg	**Temperature/Dew Point:**	15°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	San Diego, CA (KMYF)	**Type of Flight Plan Filed:**	None
Destination:	San Diego, CA (KMYF)	**Type of Clearance:**	None
Departure Time:	14:30 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	Montgomer-Gibbs Executive Airp KMYF	**Runway Surface Type:**	Asphalt
Airport Elevation:	427 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	28R	**IFR Approach:**	None
Runway Length/Width:	4598 ft / 150 ft	**VFR Approach/Landing:**	Unknown

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	3 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 None	**Latitude, Longitude:**	32.815834,-117.139442(est)

Administrative Information

Investigator In Charge (IIC):	Simpson, Eliott		
Additional Participating Persons:	Bill McGowen; Federal Aviation Administration FSDO; San Diego, CA		
Original Publish Date:	April 1, 2022	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98831		