Aviation Investigation Final Report

Location:	Atlanta, Georgia	**Accident Number:**	MIA08LA009
Date & Time:	October 11, 2007, 16:45 Local	**Registration:**	N383SA
Aircraft:	Piper PA-46-310P	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	3 None
Flight Conducted Under:	Part 91: General aviation		

Analysis

While landing with an approximate 50-degree crosswind from the left, between 6 to 17 knots, the airplane "...began to pull to the left violently and uncontrollably for no apparent reason," when the nose landing gear contacted the runway. The pilot applied right rudder to correct, but the airplane traveled off the left side of the runway onto the grass, and came to rest upright with the nose landing gear collapsed. Arching skid marks from the nose and right main landing gear tires were noted on the runway; the mark from the nose landing gear tire was significantly darker. Damage to the right side of the nose gear wheel was also noted. The right lug of the nose landing gear trunnion was fractured; however, no preexisting anomalies were noted during metallurgical examination. No discrepancies with the nose landing gear steering system were noted. Mechanical and operational issues (rudder input) can result in the nose gear tire not being aligned with the runway at touchdown. No determination could be made as to why the nose landing gear wheel assembly was not aligned with the runway at touchdown.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A misalignment of the nose landing gear wheel assembly during landing for undetermined reasons.

Findings

Occurrence #1: LOSS OF CONTROL - ON GROUND/WATER
Phase of Operation: LANDING - ROLL

Findings
1. LANDING GEAR,NOSE GEAR STRUT - TWISTED

Occurrence #2: NOSE GEAR COLLAPSED
Phase of Operation: LANDING - ROLL

Findings
2. LANDING GEAR,NOSE GEAR - OVERLOAD

Factual Information

On October 11, 2007, about 1642 eastern daylight time, a Piper PA-46-310P, N383SA, registered to and operated by Striking Flight Services, Inc., experienced collapse of the nose landing gear during the landing roll at Dekalb-Peachtree Airport (PDK), Atlanta, Georgia. Visual meteorological conditions prevailed at the time and an instrument flight rules flight plan was filed for the 14 Code of Federal Regulations (CFR) Part 91 business flight, from Augusta Regional Airport at Bush Field (AGS), Augusta, Georgia, to PDK. The airplane was substantially damaged and the certificated private pilot and two passengers were not injured. The flight originated about 1545, from AGS.

The pilot stated that he listened to the automated terminal information service (ATIS) when the flight was near the destination airport, which indicated the wind was from 330 degrees at 14 knots, with gusts to 16 knots. The flight proceeded to the destination airport where he entered the traffic pattern for runway 2R. He lowered the landing gear using the normal gear extension system during the downwind leg, turned onto base leg, then onto final leg, and while on final approach, requested a wind check with PDK air traffic control tower (ATCT). The tower controller advised that the wind was from 320 degrees at 6 knots. The flight was cleared to land, and the airplane touched down first on the main landing gears, followed by the nose landing gear. The airplane then "...began to pull to the left violently and uncontrollably for no apparent reason." He applied right rudder input but the airplane traveled off the left side of the runway onto grass, and came to rest upright in a nose-low attitude, with the nose landing gear collapsed.

A surface observation weather report taken at PDK at 1653, or approximately 11 minutes after the accident, indicated the wind was from 310 degrees at 11 knots, with gusts to 17 knots.

The damage to the airplane was initially reported to National Transportation Safety Board as being minor; however, subsequent inspection of it by a manufacturer representative revealed damage to the right wing main spar. At the time of the inspection by the representative (1 week after the occurrence), the nose landing gear assembly was removed.

The airplane and runway were examined by a Federal Aviation Administration (FAA) airworthiness inspector. With respect to the airplane, the nose landing gear was collapsed and displaced to the left, and a lug of the nose landing gear trunnion was fractured. The nose landing gear was removed from the airplane, and the fractured lug was later submitted to the Safety Board's Materials Laboratory, Washington, DC. No other discrepancies associated with the nose landing gear steering system were reported. The right side of the nose landing gear wheel displayed coarse scratches consistent with runway contact. Inspection of the approach end of runway 2R revealed two parallel black colored arching skid marks, which continued off the runway onto grass near taxiway F. The precise origin of the skid marks could not be

determined. The observed marks were consistent with being made by the nose and right main landing gear tires, and were located left of the runway centerline. The mark associated with the nose landing gear tire was darker in color. The inspector examined the skid mark associated with the nose landing gear and estimated it was approximately 70 degrees from being centered, or aligned.

Examination of the fractured right hand lug of the nose landing gear trunnion, by personnel from the Safety Board's Materials Laboratory, revealed it was fractured in two places. The first fracture was located through the lug at a thread hole and the second fracture was approximately 90 degrees around the lug. The observed deformation and fracture patterns at the threaded hole were consistent with tensile overstress separation, while those at the other fracture location were typical of bending fracture.

By design, the nose landing gear assembly extends forward pivoting about the trunnion mount. Located above the trunnion mount is a steering horn and rub block which are connected through the trunnion to the lower strut and tire. The steering horn, rub block, lower strut, and tire rotate 90 degrees clockwise during landing gear extension, positioning the tire parallel to the longitudinal axis of the airplane when it is down and locked. The rub block contacts a portion of the tubular engine mount during extension and causes the 90-degree clockwise rotation of the lower strut. Once extended, the nose wheel steering and rudder are interconnected.

According to the aircraft maintenance manual, there are two mechanical reasons why the nose landing gear tire would fail to straighten during landing gear extension. The first reason is due to incorrect rigging of the nose gear steering, and the second is that the steering arm roller is sheared at the top of the nose landing gear strut. Due to the damage to the nose landing gear trunnion, no determination could be made as to whether the rigging of the nose gear steering was correct. As previously reported, the FAA inspector did not report any discrepancies associated with the nose landing gear steering. An operational issue associated with rudder input at nose landing gear touchdown can also result in the nose wheel not being aligned with the runway as the nose landing gear contacts it. The pilot did not report having rudder input applied at touchdown.

The airplane was last inspected in accordance with an annual inspection on November 6, 2006, using the manufacturer's maintenance manual. The airplane total time at that time was 4,258.9 hours. The airplane had accumulated 244.7 hours since the inspection, at the time of the accident.

Pilot Information

Certificate:	Private	**Age:**	32,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	April 1, 2007
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	March 1, 2007
Flight Time:	456 hours (Total, all aircraft), 121 hours (Total, this make and model), 373 hours (Pilot In Command, all aircraft), 43 hours (Last 90 days, all aircraft), 13 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N383SA
Model/Series:	PA-46-310P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	4608033
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	November 1, 2006 Annual	**Certified Max Gross Wt.:**	4188 lbs
Time Since Last Inspection:	244.7 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4503.6 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-550-C1B
Registered Owner:	Striking Flight Services, Inc.	**Rated Power:**	310 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PDK,1003 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	16:53 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots / 17 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	310°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.84 inches Hg	**Temperature/Dew Point:**	19°C / 3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Augusta, GA (AGS)	**Type of Flight Plan Filed:**	IFR
Destination:	Atlanta, GA (PDK)	**Type of Clearance:**	IFR
Departure Time:	15:35 Local	**Type of Airspace:**	

Airport Information

Airport:	Dekalb-Peachtree PDK	**Runway Surface Type:**	Concrete
Airport Elevation:	1003 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	2R	**IFR Approach:**	Unknown
Runway Length/Width:	6001 ft / 100 ft	**VFR Approach/Landing:**	Full stop;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 None	**Latitude, Longitude:**	33.875556,-84.30194

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	James C Sayre; FAA/FSDO; College Park, GA
Original Publish Date:	September 26, 2008
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=66997