



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Lawrenceville, Georgia	Accident Number:	ERA12LA117
Date & Time:	December 19, 2011, 11:00 Local	Registration:	N790GK
Aircraft:	Piper PA-44-180	Aircraft Damage:	Substantial
Defining Event:	Landing gear collapse	Injuries:	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

While configuring the airplane for a power-off stall, the pilots noted that there was an unsafe gear indication after selecting the landing gear to the down position. The flight instructor made several unsuccessful attempts to extend the landing gear using the emergency gear extension procedures, but the light did not illuminate. The pilot reported the condition to the air traffic controller, and he maneuvered the airplane for a low approach, and the controller advised the pilot that the gear appeared to be down. During the landing roll all three landing gears remained extended, but as the airplane slowed, the right main landing gear collapsed, and the airplane veered off the runway colliding with a runway light. A postaccident examination of the right main landing gear revealed that the truss assembly hook assembly did not travel over the truss pin. The landing gear was tested, and the right main landing gear did not lock on any attempt. In addition, the right main landing gear truss bracket and stud had excessive friction and prevented the side brace from fully rotating, subsequently preventing the truss hook from traveling over the lock pin. The right main landing gear truss bracket pin had little or no grease present; however, the left main landing gear truss bracket pin had grease indications around the pin and zerk fitting. A review of the airframe maintenance records indicated that about a month before the accident, the airplane had completed a 100-hour inspection and a side brace mount assembly was installed in the right main landing gear. The mechanic who performed the maintenance stated that he could not find any guidance in the maintenance manual on how to remove and install the new bushing; therefore, he replaced the bushing and verified that there was movement between the two parts, and then reinstalled the side brace assembly on the airplane. The mechanic did not follow the proper procedures as described in the manufacturer maintenance manual. The accident occurred about 38 hours after the 100-hour inspection.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
The mechanic's improper installation and lubrication of the bushing on the right main landing gear truss assembly, which resulted in the landing gear not locking in the down position.

Findings

Personnel issues	(general) - Maintenance personnel
Personnel issues	Installation - Maintenance personnel
Aircraft	Main landing gear - Malfunction

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Landing-landing roll	Landing gear collapse (Defining event)

On December 19, 2011, at 1100, eastern standard time, a Piper PA-44-180, N790GK, registered to and operated by Airline Transport Professionals (ATP), incurred substantial damage when the right main gear collapsed during the landing roll at the Gwinnet County Airport (LZU), Lawrenceville, Georgia. The flight instructor and pilot rated student were not injured. Visual meteorological conditions prevailed and no flight plan was filed for the 14 Code of Federal Regulations Part 91, instructional flight. The flight originated, earlier that day, from the DeKalb-Peachtree Airport (PDK), Atlanta, Georgia, about 1000.

While configuring the airplane for a power off stall, the pilots noted an unsafe gear indication after selecting the landing gear down position. There were two green lights, but the right main landing gear indicator light was not on. The flight instructor recycled the landing gear, but right main landing gear indicator light did not illuminate.

The flight instructor changed the landing gear indicator light bulbs in an unsuccessful attempt to get the right main landing gear indicator light to ignite. He recycled the landing gear five more times, but the light still did not illuminate. The flight instructor followed the emergency landing gear extension procedures in the pilot’s operating handbook (POH), but the right main landing gear indicator light would not illuminate.

The pilots reported the condition to an air traffic controller and he maneuvered the airplane for a low approach and the controller advised them that the gear appeared down. The flight instructor then entered the traffic pattern and landed on runway 07. During the landing, all three main landing gear were extended, but as the airplane slowed, the right main landing gear collapsed, the airplane veered off the runway, and struck a runway light. The airplane incurred damage to the right engine’s propeller, right wing outboard leading edge, right flap, and the right aileron incurred structural damage.

The airplane was manufactured in 1979 and was equipped with two Lycoming O-360 series, 180-horsepower engines. The airplane's most recent 100-hour inspection was completed on November 16, 2011. At the time of the inspection, the reported aircraft time was 9781.3 total hours and the recorded hobbs time was 7073.6 hours. The accident occurred about 38 hours after the most recent 100-hour inspection.

A postaccident examination of the right main landing gear revealed that the truss assembly hook assembly did not travel over the truss pin. Federal Aviation Administration inspectors

tested the landing gear and the right main landing gear did not lock on any attempt. In addition, the right main landing gear truss bracket and stud had excessive friction and prevented the side brace from fully rotating, subsequently preventing the truss hook from traveling over the lock pin. The right main landing gear truss bracket pin had little or no grease present; however, the left main landing gear truss bracket pin had grease indications around the pin and zerk fitting.

A review of the airframe maintenance records indicated that a new bushing was installed in the right main landing gear side brace mount assembly on November 16, 2011. The mechanic who performed the maintenance stated that he could not find any guidance in the maintenance manual on how to remove and install the new bushing; therefore, he replaced the bushing and verified that there was movement between the two parts, and then reinstalled the side brace assembly on the airplane. In the same maintenance entry the mechanic noted that he greased the landing gear and performed a landing gear retraction, extension, and free-fall test without defects.

The Piper Aircraft PA-44-180/180T Airplane Maintenance Manual, Page 32-15, Installation of the Main Landing Gear, indicated that the procedures for installing the gear side brace link assembly were:

- A. Position link support bracket with swivel stud installed at its attachment point on the web of the spar and secure with bolts and washers.
- B. Ascertain that the upper and lower links are assembled with downlock hook, retraction fitting, c.. attached, and through travel of the links and downlock hook clearance checked.
- C. Attach the upper link to the swivel stud of the support fitting and secure with bolt, bushing, washer, nut and cotter pin.
- D. The actuating cylinder rod end bearing and lower side brace link may be attached respectively to the retraction fitting and strut housing during the adjustment of the landing gear.

In addition, the airplane maintenance manual stated "when assembling components of the landing gear, lubricate bearings, bushings, and friction surfaces with proper lubricant as described in Chapter 12."

Pilot Information

Certificate:	Commercial; Flight instructor	Age:	28,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	
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 1 Without waivers/limitations	Last FAA Medical Exam:	May 3, 2011
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	June 29, 2010
Flight Time:	1212 hours (Total, all aircraft), 312 hours (Total, this make and model), 123 hours (Last 90 days, all aircraft), 64 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Private	Age:	41,Female
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 2 Without waivers/limitations	Last FAA Medical Exam:	December 12, 2011
Occupational Pilot:	No	Last Flight Review or Equivalent:	December 20, 2011
Flight Time:	360 hours (Total, all aircraft), 5 hours (Total, this make and model), 260 hours (Pilot In Command, all aircraft), 5 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N790GK
Model/Series:	PA-44-180	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	44-7995316
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	November 16, 2011 100 hour	Certified Max Gross Wt.:	3800 lbs
Time Since Last Inspection:	38 Hrs	Engines:	2 Reciprocating
Airframe Total Time:	9819 Hrs at time of accident	Engine Manufacturer:	LYCOMING
ELT:	C91 installed, not activated	Engine Model/Series:	O&VO-360 SER
Registered Owner:	AIRLINE TRANSPORT PROFESSIONALS CORP OF USA	Rated Power:	180 Horsepower
Operator:	AIRLINE TRANSPORT PROFESSIONALS CORP OF USA	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	LZU, 1003 ft msl	Distance from Accident Site:	
Observation Time:	10:50 Local	Direction from Accident Site:	
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	/	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.35 inches Hg	Temperature/Dew Point:	11°C / -22°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Atlanta, GA (PDK)	Type of Flight Plan Filed:	None
Destination:	Lawrenceville, GA (LZU)	Type of Clearance:	None
Departure Time:	10:00 Local	Type of Airspace:	

Airport Information

Airport:	Gwinnett County Airport LZU	Runway Surface Type:	Asphalt
Airport Elevation:	1062 ft msl	Runway Surface Condition:	Dry
Runway Used:	07	IFR Approach:	Visual
Runway Length/Width:	6000 ft / 1000 ft	VFR Approach/Landing:	Full stop

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:	33.978054,-83.962219(est)

Administrative Information

Investigator In Charge (IIC):	Obregon, Jose
Additional Participating Persons:	Adalberto Munet; FAA/FSDO; Atlanta, GA Ron Maynard; Piper Aircraft, Inc.; Vero Beach, FL
Original Publish Date:	January 31, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=82551

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