



National Transportation Safety Board Aviation Accident Final Report

Location:	LAFAYETTE, IN	Accident Number:	CHI97LA098
Date & Time:	04/02/1997, 2230 EST	Registration:	N6148H
Aircraft:	Piper PA-28-161	Aircraft Damage:	Substantial
Defining Event:		Injuries:	2 None

Flight Conducted Under: Part 91: General Aviation - Instructional

Analysis

The CFI and student pilot were conducting night takeoffs and landings. The CFI stated that after the third landing touchdown, at an airspeed of approximately 30 knot, the right main landing gear strut began to shimmy and the gear collapsed. The airplane came to rest on the runway. The CFI stated they had used aft elevator pressure to slow the airplane and not the brakes. Metallurgical examination of the fractured landing gear strut/spar attachment screws revealed that two of the four screws contained fatigue cracking. The other two screw fractures were secondary failures.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: a fatigue failure of the right main landing gear strut/spar attachment screws.

Findings

Occurrence #1: MAIN GEAR COLLAPSED
Phase of Operation: LANDING - ROLL

Findings

1. (C) LANDING GEAR,MAIN GEAR ATTACHMENT - FAILURE,TOTAL
2. (C) MISCELLANEOUS,BOLT/NUT/FASTENER/CLAMP/SPRING - FATIGUE

Factual Information

On April 2, 1997, at 2230 eastern standard time, a Piper PA-28-161, N6148H, flown by a certified flight instructor (CFI) and a student pilot experienced a right main landing gear collapse during the landing roll on runway 28 (6,600' x 150') at the Lafayette-Purdue University Airport, Lafayette, Indiana. The airplane was substantially damaged. Neither pilot was injured. Visual meteorological conditions prevailed and no flight plan was filed for the local 14 CFR Part 91 instructional flight. The flight originated from the Aretz Airport, Lafayette, Indiana, at 2200 est.

The CFI reported that the accident occurred on the third landing of the flight. He reported that after touching down, "We slowed the aircraft by full aft elevator to turn off the runway at C1. At approximately 30 knots indicated, without ever touching the brakes, the right strut began to shimmy and then collapsed, bringing the wheel flush with the bottom of the wing. We skidded about ten yards to a stop and immediately shut down the engine." The airplane came to rest on the runway.

A post accident inspection of the airplane was conducted by Inspectors from the Federal Aviation Administration (FAA) Indianapolis Flight Standards District Office (FSDO). One of the Inspectors reported that the airplane was jacked up under the right wing at which time it could be seen that the right landing gear was "pulled away from the wing spar and positioned up and aft and slightly outboard." He continued to report three of the four screw holes on the gear strut top and bottom attachment flanges were elongated. The Inspector collected four portions of the strut/spar attachment screws which he forwarded to the NTSB for inspection. (See attached FAA Inspector's Statement)

The screw portions were inspected at Engineering Systems, Inc., on April 22, 1997. The metallurgical examination of the screws revealed that two of the screws contained fatigue cracks. One of these contained "...nearly 100% fatigue type cracking with numerous ratchets present." The rim of the other screw contained "...numerous small ratchets, indicating that the fatigue cracking was associated with multiple crack initiation locations. About 90% of the fracture area was instantaneous fracture." The remaining two screw sections did not reveal any fatigue and were deemed as secondary failures. (See attached Metallurgical Report)

Pilot Information

Certificate:	Flight Instructor; Commercial	Age:	23, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Single-engine; Instrument Airplane	Toxicology Performed:	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	11/07/1996
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	875 hours (Total, all aircraft), 520 hours (Total, this make and model), 401 hours (Pilot In Command, all aircraft), 71 hours (Last 90 days, all aircraft), 46 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N6148H
Model/Series:	PA-28-161 PA-28-161	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	287816230
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	03/17/1997, 100 Hour	Certified Max Gross Wt.:	2325 lbs
Time Since Last Inspection:	32 Hours	Engines:	1 Reciprocating
Airframe Total Time:	5183 Hours	Engine Manufacturer:	Lycoming
ELT:	Installed, not activated	Engine Model/Series:	O-320-D3G
Registered Owner:	PURDUE PILOTS, INC.	Rated Power:	160 hp
Operator:	PURDUE PILOTS, INC.	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Night/Bright
Observation Facility, Elevation:	, 0 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	0000	Direction from Accident Site:	0°
Lowest Cloud Condition:	Clear / 0 ft agl	Visibility	20 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	15° C / 8° C
Precipitation and Obscuration:			
Departure Point:	(3AR)	Type of Flight Plan Filed:	None
Destination:	(LAF)	Type of Clearance:	
Departure Time:	2200 EST	Type of Airspace:	Class E

Airport Information

Airport:	LAFAYETTE PURDUE (LAF)	Runway Surface Type:	Concrete
Airport Elevation:	606 ft	Runway Surface Condition:	Dry
Runway Used:	28	IFR Approach:	None
Runway Length/Width:	6600 ft / 150 ft	VFR Approach/Landing:	Full Stop

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	PAMELA S SULLIVAN	Report Date:	09/05/1997
Additional Participating Persons:	EDWIN T HERSHBERGER; INDIANAPOLIS, IN		
Publish Date:			
Investigation Docket:	NTSB accident and incident docket serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).