



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Billings, Montana	Accident Number:	WPR13LA349
Date & Time:	July 30, 2013, 11:43 Local	Registration:	N5367Y
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

The flight instructor and commercial pilot reported that they were conducting a training flight and that, after performing numerous maneuvers in the local practice area, they returned to the airport to perform practice landings in various simulated situations. After an uneventful takeoff and landing, they set up for a practice short-field landing. Following the landing flare, the airplane touched down on the runway surface, and the left main landing gear collapsed. The propellers contacted the runway, and the airplane skidded, which resulted in damage to the wing spar. Examinations revealed that the left main landing gear was fractured through the lower end of the strut tube, which was bent. The fracture surfaces of the strut tube and fork were consistent with an overstress event. Given the damage to the airplane, it is likely that the left main landing gear collapsed due to a hard landing and/or an excessive side load during the landing.

Probable Cause and Findings

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

The pilots' inadequate landing flare, which resulted in a hard landing and collapse of the left main landing gear.

Findings

Aircraft	Landing flare - Incorrect use/operation
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Landing-flare/touchdown	Landing gear collapse (Defining event)
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On July 30, 2013, about 1143 mountain daylight time, a Piper PA-44-180 Seminole, N5367Y, experienced a left main landing gear collapse during landing at Billings Logan International Airport, Billings, Montana. The airplane was registered to and operated by Rocky Mountain College under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The certified flight instructor (CFI) and the commercial pilot undergoing instruction were not injured; and, the airplane sustained substantial damage. The local instructional flight departed from Billings about 1020. Visual meteorological conditions prevailed and no flight plan had been filed.

In both a written statement and a telephone interview with a Safety Board investigator, the CFI reported that the flight was intended to follow a lesson plan in the multi-engine commercial pilot syllabus for Rocky Mountain College. After performing numerous maneuvers in the local practice area, they returned to the airport and performed a simulated single-engine inoperative landing to runway 28R. After touchdown, the commercial pilot taxied back to the runway and departed, maneuvering onto the downwind leg of the traffic pattern. He configured the airplane with the landing gear extended and visually confirmed that the nose gear was down by utilizing a mirror affixed to the wing; all three landing gear indicator lights in the cockpit were illuminated confirming the down and locked position.

The CFI further stated that with the landing gear appearing to be extended, the commercial pilot continued with the practice short-field landing. After the landing flare, the airplane touched down on the runway surface and the left main landing gear collapsed. The propellers contacted the runway and the airplane skid about 800 to 1,000 feet. During the accident sequence the airplane incurred substantial damage to the wing spar and a section of the fuselage skin was wrinkled. The left wheel assembly had separated at the strut.

The airport supervisor stated that he thoroughly inspected all airfield surfaces before and after the accident. He did not observe any evidence or anomalies that would indicate the airplane struck any objects. He did note that the airplane's propeller made slashes in the asphalt where the wheel was found.

Based on the pilots' statements about the landing, the separated landing gear was shipped to the National Transportation Safety Board Materials Laboratory. A Senior Materials Engineer performed an examination of the fracture surfaces. He observed that the landing gear was fractured through the lower end of the strut tube just above its connection with the fork. The tube was bent, the fracture faces had a rough appearance, and the fracture faces were oriented at 45 degrees to the longitudinal axis of the tube. The fork was bent so that the top of the fork was impinging on the top of the tire. The appearance of the strut tube and the fork were consistent with an overstress event.

A representative from Piper Aircraft looked at photographs of the airplane and stated that the damage was consistent with that of a hard landing.

Flight instructor Information

Certificate:	Commercial; Flight instructor	Age:	20
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 With waivers/limitations	Last FAA Medical Exam:	July 22, 2013
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	June 9, 2013
Flight Time:	567 hours (Total, all aircraft), 63 hours (Total, this make and model), 163 hours (Last 90 days, all aircraft), 76 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Commercial	Age:	23
Airplane Rating(s):	Single-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 1 Without waivers/limitations	Last FAA Medical Exam:	July 22, 2009
Occupational Pilot:	No	Last Flight Review or Equivalent:	June 21, 2013
Flight Time:	208 hours (Total, all aircraft), 13 hours (Total, this make and model), 101 hours (Pilot In Command, all aircraft), 29 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:	N5367Y
Model/Series:	PA-44-180	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	4496175
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	May 31, 2013 Annual	Certified Max Gross Wt.:	3800 lbs
Time Since Last Inspection:	51 Hrs	Engines:	2 Reciprocating
Airframe Total Time:	3305 Hrs	Engine Manufacturer:	LYCOMING
ELT:	Installed, not activated	Engine Model/Series:	O-360-A1A
Registered Owner:	ROCKY MOUNTAIN COLLEGE	Rated Power:	180 Horsepower
Operator:	ROCKY MOUNTAIN COLLEGE	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	BIL,3652 ft msl	Distance from Accident Site:	
Observation Time:	11:30 Local	Direction from Accident Site:	
Lowest Cloud Condition:	Scattered / 9500 ft AGL	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	5 knots / None	Turbulence Type Forecast/Actual:	/
Wind Direction:	310°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.18 inches Hg	Temperature/Dew Point:	22°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Billings, MT (BIL)	Type of Flight Plan Filed:	None
Destination:	Billings, MT (BIL)	Type of Clearance:	VFR
Departure Time:	10:20 Local	Type of Airspace:	

Airport Information

Airport:	Billings Logan International BIL	Runway Surface Type:	Asphalt
Airport Elevation:	3652 ft msl	Runway Surface Condition:	Dry
Runway Used:	28R	IFR Approach:	None
Runway Length/Width:	10521 ft / 150 ft	VFR Approach/Landing:	Stop and go;Traffic pattern

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:	45.807498,-108.542778(est)

Administrative Information

Investigator In Charge (IIC):	Keliher, Zoe
Additional Participating Persons:	Rick Kauffman; Federal Aviation Administration; Helena, MT
Original Publish Date:	December 15, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=87635

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).