Aviation Investigation Final Report

Location:	Jeannette, Pennsylvania	**Accident Number:**	MIA08LA168
Date & Time:	August 19, 2008, 18:52 Local	**Registration:**	N9403D
Aircraft:	Piper PA-22-160	**Aircraft Damage:**	Substantial
Defining Event:	Sys/Comp malf/fail (non-power)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot stated that the airplane bounced on landing. He aligned the airplane with the centerline and applied upward pressure on the manual brake; however, there was no response from the brake. He looked down towards the firewall, and observed the brake cable had separated. He started "S" turning the airplane in an attempt to slow down and stop. The airplane was about 50 yards from the end of the runway with an embankment. He applied right rudder to turn the airplane off the right side of the runway. The airplane continued off the runway and the nose wheel collapsed. Examination of the brake lever cable revealed that it failed due to fatigue. The last annual inspection was completed 36 days before the accident. The airframe and power plant mechanic who preformed the annual inspection stated that he also installed a brake booster on the airplane during the inspection. The mechanic stated that he did not totally remove the cable from the airplane during his examination; however he did check the brake cable with a cloth and there were no snags from broken wires. The Federal Aviation Administration advisory circular that pertains to the inspection of the brake cables states, "in addition to passing a cloth over the area to check on wire snags that a very careful visual inspection must be made since a broken wire will not always protrude or stick out, but may lie in the strand and remain in the position of the helix as it was manufactured. Broken wires of this type may show up as a hairline crack in the wire. If a broken wire of this type is suspected, further inspection with a magnifying glass of 7 power or greater, is recommended."

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Failure of the brakes to function due to inadequate inspection of the brake cable by maintenance personnel.

Findings

Aircraft	Brake - Fatigue/wear/corrosion
Aircraft	Brake - Inadequate inspection
Personnel issues	Scheduled/routine inspection - Maintenance personnel
Aircraft	Brake - Failure

Factual Information

History of Flight

Landing-landing roll	Sys/Comp malf/fail (non-power) (Defining event)
Landing-landing roll	Runway excursion
Landing-landing roll	Landing gear collapse

On August 19, 2008, about 1852 eastern daylight time, a Piper PA-22-160, N9403D, registered to Tri Pacer Flyers LLC, operating as a 14 Code of Federal Regulations Part 91 personal flight went off the right side of runway 20 on landing roll out at Greensburg Jeannette Regional Airport (5G8), Jeannette, Pennsylvania. The airplane received substantial damage. Visual meteorological conditions prevailed and no flight plan was filed. The private pilot and one passenger reported no injuries. The flight originated from William T. Piper Memorial Airport (LHV), Lock Haven, Pennsylvania, at 1730.

The pilot stated he over flew 5G8 and obtained the landing direction from the windsock. He entered the traffic pattern on a left downwind leg for runway 20, and made two visual approaches with go-arounds due to the airplane being too high. On the third approach, he landed the airplane 600 feet past the landing threshold. The airplane bounced and touched down on the runway about 1,300 feet past the landing threshold. He aligned the airplane with the centerline of the runway and applied upward pressure on the manual brake to slow the airplane down. There was no response from the brake. The pilot reapplied upward pressure on the brake and there was no response. He looked down towards the firewall, observed the brake cable had separated, and he started "S" turning the airplane on the runway in an attempt to slow down and stop. He then realized he was about 50 yards from the end of the runway and there was an embankment. He applied right rudder to turn the airplane off the right side of the runway. The right main landing gear came up off the runway, and the propeller and left wing tip collided with the runway. The airplane continued off the runway and the nose wheel collapsed.

Examination of the airplane by Federal Aviation Administrator (FAA) inspectors revealed the firewall was buckled. The brake lever cable was removed and forwarded to the National Transportation Safety Board Materials Laboratory for examination. The cable was separated at about mid length. Scanning electron microscope examinations of one end of the brake cable revealed fatigue features on the wires on about two thirds of the cable wires with the remaining wires fractured due to overstress. Further examination of the cable uncovered an additional area of broken wires about midway between the brake handle end and the separation area. Multiple broken wires were visible when the cable was manually flexed as shown in the illustration in advisory circular (AC) 43.13.1B for cable inspections.

Review of the airplane logbooks revealed the last annual inspection was conducted on July 14, 2008. In addition, according to the airport manager at LHV, who is the manager for Tri Pacer

Flyers LLC, a brake booster was installed on the airplane during the annual inspection, and no anomalies were noted with the brake cable.

The airframe and power plant mechanic who performed the annual inspection stated he did not remove the brake cable entirely from the airplane during his inspection and installation of the brake booster nor did he use a magnifying glass to inspect the brake cable. He stated he pulled the cable up one side to the pulley at the bottom of the firewall and inspected the brake cable all the way up to the brake handle. He used a cotton rag to detect any broken wires by running the rag over the cable and there were no snags.

The notes section of the Piper Aircraft Inspection Report for the PA-22 series references FAA Advisory Circular 43.13-1B for cable inspections. For cable inspections the AC reports the following in chapter 7 section 149, paragraph d.

"Close inspection in these critical fatigue areas, must be made by passing a cloth over the area to snag on broken wires. This will clean the cable for a visual inspection, and detect broken wires if the cloth snags on the cable. Also, a very careful visual inspection must be made since a broken wire will not always protrude or stick out, but may lie in the strand and remain in the position of the helix as it was manufactured. Broken wires of this type may show up as a hairline crack in the wire. If a broken wire of this type is suspected, further inspection with a magnifying glass of 7 power or greater, is recommended. Figure 7-16 shows a cable with broken wires that was not detected by wiping, but was found during a visual inspection. The damage became readily apparent when the cable was removed and bent as shown in figure 7-16."

Pilot Information

Certificate:	Private	**Age:**	53,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	July 1, 2008
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 1, 2008
Flight Time:	89 hours (Total, all aircraft), 82 hours (Total, this make and model), 33 hours (Pilot In Command, all aircraft), 10 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N9403D
Model/Series:	PA-22-160	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	22-6376
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	July 1, 2008 Annual	**Certified Max Gross Wt.:**	2000 lbs
Time Since Last Inspection:	23 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3168 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-320-B2B
Registered Owner:	Tri Pacer Flyers LLC	**Rated Power:**	160 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Dusk
Observation Facility, Elevation:	LBE,1199 ft msl	**Distance from Accident Site:**	11 Nautical Miles
Observation Time:	18:50 Local	**Direction from Accident Site:**	123°
Lowest Cloud Condition:	Few / 4000 ft AGL	**Visibility**	15 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	340°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.06 inches Hg	**Temperature/Dew Point:**	27°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lock Haven, PA (LHV)	**Type of Flight Plan Filed:**	None
Destination:	Jeannette, PA (5G8)	**Type of Clearance:**	None
Departure Time:	17:30 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Greensburg Jeannette Regional 5G8	**Runway Surface Type:**	Asphalt
Airport Elevation:	1188 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	20	**IFR Approach:**	None
Runway Length/Width:	2605 ft / 50 ft	**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	40.376388,-79.608329

Administrative Information

Investigator In Charge (IIC):	Smith, Carrol
Additional Participating Persons:	Jeffrey Halliday; Allegheny FSDO; Pittsburg, PA
Original Publish Date:	January 29, 2009
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=68750