Aviation Investigation Final Report

Location:	Ankeny, Iowa	**Accident Number:**	CEN10LA312
Date & Time:	June 9, 2010, 18:20 Local	**Registration:**	N104NW
Aircraft:	Piper PA-34-220T	**Aircraft Damage:**	Substantial
Defining Event:	Hard landing	**Injuries:**	3 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that when he pulled back on the control yoke during the landing flare the nose of the airplane did not pitch up. The airplane landed hard on the nosewheel and bounced several times before stopping on the runway. A postaccident examination of the airplane revealed that the stabilator control cable had fractured in two pieces. The location of the fracture was in the unobstructed area in the tail cone; the location of the fracture was not associated with a pulley, fairlead, or bulkhead, and no rubbing or chaffing was found in the area of the fracture. The entire length of the cable was covered with dried black grease and the majority of the fractured ends of the individual wires exhibited wear damage with the exposed surfaces of the wires covered in grease. The ends of the fractured wires exhibited features typical of overstress separation, with no evidence of fatigue cracking. Federal Aviation Administration guidance states that the inspection and repair of control cables should be accomplished during annual inspections. The aircraft maintenance logbooks indicated that the last annual maintenance inspection was conducted about three months prior to the accident, equating to 17 flight hours. The logbook entry for that inspection indicated that the control cables were checked for correct rigging and cable tensions. The logbook entry stated, “Stabilator OK.” There was no indication of any repair or replacement of the stabilator control cable.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the stabilator control cable due to wear. Contributing to the accident was the inadequate maintenance inspection of the stabilator control cable.

Findings

Aircraft	Stabilizer control system - Failure
Aircraft	Stabilizer control system - Fatigue/wear/corrosion
Personnel issues	Scheduled/routine maintenance - Maintenance personnel

Factual Information

History of Flight

Landing-flare/touchdown	Hard landing (Defining event)

On June 9, 2010, at 1820 central daylight time, a Piper PA-34-220T, N104NW, sustained substantial damage during a hard landing on runway 36 (5,500 feet by 100 feet, concrete) at the Ankeny Regional Airport (IKV), Ankeny, Iowa. The pilot and two passengers were not injured. The 14 Code of Federal Regulations Part 91 personal flight departed Detroit Lakes (DTL), Minnesota, about 1622 with IKV as the destination airport. Visual meteorological conditions prevailed and an instrument flight rules(IFR) flight plan was filed.

The pilot reported that the flight was normal until the final approach for landing. He reported that when he pulled back on the control yoke during the flare, the nose of the airplane did not pitch up. The airplane landed hard on the nose wheel and bounced several times. The pilot maintained directional control of the airplane before he stopped it on the runway. Once stopped, he taxied the airplane to the ramp. The firewall and fuselage sustained substantial damage.

A Federal Aviation Administration (FAA) airworthiness inspector examined the airplane. Maintenance personnel removed the floorboards and tunnel panels for inspection of the control cables. The inspection revealed that the stabilator control cable had fractured in two pieces. The location of the fracture was in the unobstructed space in the tail cone. The location of the fracture was not associated with a pulley, fairlead, or bulkhead, and no rubbing or chaffing was found in the area of the fracture or tail cone. The entire length of the cable was covered with dried black grease. The cable was removed and sent to the National Transportation Safety Board's (NTSB) Materials Laboratory for examination.

The NTSB Materials Laboratory's inspection revealed that the cable's composition was consistent with stainless steel. The cable fractured approximately 18 inches from the turnbuckle end and approximately 65 inches from the ball portion of the single-shank ball-end terminal. The entire length of the cable was covered with grease. The individual cable wires in the area of the fracture were found partially unraveled and the exposed surfaces were covered with grease. A majority of the fractured ends of the individual wires exhibited wear damage at a slant plane relative the length of the cable that reduced the ends of the wire to a knife edge. Wear damage reduced the majority of a wire's cross section. The ends of the remaining fractured wires exhibited elongation deformation and cup and cone fracture features typical of overstress separation. The fractured end of the wires showed micro-void coalescence dimple features typical of overstress separation with no evidence of fatigue cracking.

On January 3, 2001, the New Piper Aircraft Company issued Service Bulletin (SB) 1048,

"Stainless Steel Control Cables." It identified Piper manufactured airplanes that had stainless steel cables installed. According to the SB-1048, the accident airplane, N104NW, serial number 34-8133059, had stainless steel control cables installed during its manufacture. The bulletin stated, "Service reports have been received stating that stainless steel cables in the aircraft control system have a considerably shorter service life as compared to galvanized cables for the same application." The service bulletin stated that it was mandatory to inspect and maintain the control system cables in accordance with the FAA Advisory Circular (AC) 41.13.

On July 11, 2001, the FAA issued Special Airworthiness Information Bulletin (SAIB) No. CE-01-30. The SAIB recommended that owners or operators of the affected aircraft perform an inspection and possible replacement of the stainless steel cables as outlined in the Piper SB-1048. The FAA recommended that the inspections be accomplished at each 100-hour or annual inspection.

FAA AC-41.13, "Acceptable Methods, Techniques and Practices – Aircraft Inspection and Repair," stated that the inspection and repair of control cables should be accomplished at annual inspections and during 100-hours inspections. It stated that a cloth should be passed over the cable to snag on broken wires.

The aircraft maintenance logbooks indicated that the last annual maintenance inspection was conducted on March 18, 2010. The total time on the airframe at the time of the inspection was 7,240.2 hours. The airplane had flown about 17 hours since the last annual inspection. The logbook entry indicated that the control cables were checked for correct rigging and cable tensions. The logbook entry stated, "Stabilator OK." There was no indication of any repair or replacement of the stabilator control cable.

Pilot Information

Certificate:	Commercial; Private	**Age:**	72,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	March 9, 2010
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	4168 hours (Total, all aircraft), 1460 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N104NW
Model/Series:	PA-34-220T	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	34-8133059
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	March 19, 2010 Annual	**Certified Max Gross Wt.:**	4773 lbs
Time Since Last Inspection:	17 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	7240 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-360 SER
Registered Owner:	MCLAUGHLIN JOHN H	**Rated Power:**	220 Horsepower
Operator:	MCLAUGHLIN JOHN H	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	IKV,903 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	18:00 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	330°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.93 inches Hg	**Temperature/Dew Point:**	28°C / 10°C
Precipitation and Obscuration:			
Departure Point:	Detroit Lakes, MN (DTL)	**Type of Flight Plan Filed:**	IFR
Destination:	Ankeny, IA (IKV)	**Type of Clearance:**	IFR
Departure Time:	16:22 Local	**Type of Airspace:**	

Airport Information

Airport:	Ankeny Regional Airport IKV	**Runway Surface Type:**	Concrete
Airport Elevation:	910 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	36	**IFR Approach:**	None
Runway Length/Width:	5500 ft / 100 ft	**VFR Approach/Landing:**	Full stop

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:**	41.691112,-93.56639(est)

Administrative Information

Investigator In Charge (IIC):	Silliman, James
Additional Participating Persons:	Joe Quiring; FAA-Des Moines FSDO; Ankeny, IA Robert Martellotti; Piper Aircraft; Vero Beach, FL
Original Publish Date:	April 7, 2011
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=76274