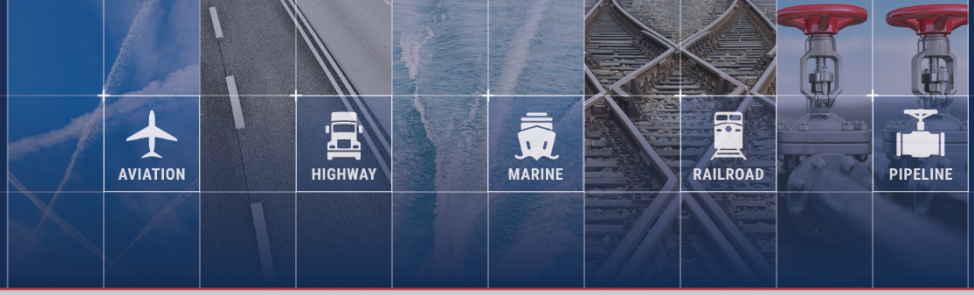

Aviation Investigation Final Report

Location:	Warrenton, Virginia	**Incident Number:**	ERA12IA237
Date & Time:	March 14, 2012, 15:45 Local	**Registration:**	N1358H
Aircraft:	Piper PA-32R-300	**Aircraft Damage:**	None
Defining Event:	Flight control sys malf/fail	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

During the landing flare, the pilot heard a "boom," the airplane's nose dropped, and the airplane contacted the runway. Examination of the airplane revealed that the lower stabilator control cable turnbuckle had fractured as a result of stress corrosion cracking. An annual inspection was completed on the airplane the day before the accident. According to the airframe logbook entry, the inspection was performed in accordance with the PA32R-300 inspection checklist, which required, in part, inspection of the stabilator cable terminals and turnbuckles. The NTSB issued recommendations in 2001 to the FAA regarding the failure of control cable turnbuckles and recommending issuance of an airworthiness directive to require inspections of affected aircraft. On August 2, 2012, the FAA issued a notice of proposed rulemaking indicating the intention to adopt a new airworthiness directive (AD) that would require inspections of the stabilator control system and replacement of parts as necessary. The AD would be applicable for PA-28, PA-32, PA-34, and PA-44 airplanes.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: Maintenance personnel's failure to identify stress corrosion cracking in the stabilator control cable during the most recent inspection, and the subsequent failure of the cable on the flight after the inspection.

Findings

Aircraft	Stabilizer control system - Failure
Personnel issues	Scheduled/routine maintenance - Maintenance personnel
Aircraft	Stabilizer control system - Inadequate inspection

Factual Information

History of Flight

Landing-flare/touchdown	Flight control sys malf/fail (Defining event)

HISTORY OF FLIGHT

On March 14, 2012, about 1545 eastern daylight time, a Piper PA-32R-300, N1358H, experienced a loss of elevator control while landing at Warrenton-Fauquier Airport (HWY), Warrenton, Virginia. The airplane was not damaged. The certificated commercial pilot and the certificated flight instructor were not injured. Visual meteorological conditions prevailed, and no flight plan was filed for the instructional flight, which departed Manassas Regional Airport (HEF), Manassas, Virginia about 1505. The flight was operated under the provisions of 14 Code of Federal Regulations part 91.

The commercial pilot stated that they departed HEF to the west in order to conduct practice maneuvers in a local practice area. After completing the maneuvers, they departed the practice area to conduct takeoffs and landings at HWY. The pilot conducted one landing, and stated that the approach for the second landing was normal, but "slightly high." During the landing flare, the pilot heard a "boom," the airplane's nose dropped, and the airplane contacted the runway.

Examination of the airplane revealed that the lower stabilator control cable turnbuckle had fractured.

The turnbuckle (manufactured by Bell-Memphis Inc.) and cable were sent to the NTSB Materials Laboratory for further examination. The examination revealed that the turnbuckle fractured in the chamfered transition region between the shank and the wrench flats. The fracture surface was rough with crack branching consistent with stress corrosion cracking. The stainless steel turnbuckle assembly also exhibited areas of corrosion.

The airplane's most recent annual inspection was completed on March 13, 2012. The accident flight was the airplane's first flight since the inspection.

According to the maintenance logbook entry for the annual inspection, the airframe inspection was conducted in accordance with the Piper PA32R-300 inspection report.

The Piper PA32R-300 inspection report details every component that should be checked on the airframe during an annual inspection. Item 28, under the Fuselage and Empennage Group states, "Inspect all aileron, rudder, stabilator, and stabilator trim cables; and cable terminals, turnbuckles, guides, fittings, and pulleys for safety, condition, and operation."

The NTSB issued safety recommendations A-01-6 through A-01-8 in April 2001 to the FAA, suggesting remedial action for the failure of Bell-Memphis stainless steel turnbuckles from chloride-assisted transgranular stress corrosion cracking. The recommendations noted the previous failure of control cable turnbuckles and recommended issuance of an airworthiness directive to require inspections of affected aircraft.

In response, the FAA issued a Special Airworthiness Information Bulletin (SAIB) in November 2001 (SAIB number CE-02-05) recommending the inspections of all aircraft with 303SE stainless steel turnbuckles installed, and advised operators of corrosion and cracking being experienced with control cable terminals. The bulletin recommended inspection of flight control cables and replacement of any cables showing signs of corrosion or cracking.

Additionally, Piper issued a maintenance alert service letter (dated March 31, 2003), which noted that corrosion may be found on control cable attachment fittings; especially in airplanes which were in service for 15 years or more. The service letter recommended inspection of cable terminals, turnbuckles, and fittings for corrosion or cracking within the next 100 hours time in service, or to coincide with the next scheduled maintenance event. For airplanes in service for 15 years or more, the letter suggested the use of a 10X magnifier. Any evidence of corrosion or cracking was cause for replacement according to the service letter.

The current revision of the airplane service manual (dated July 15, 2006) included the special control cable fitting inspection for airplanes in service 15 years or more, as outlined in the prior service letter.

In January 2004, the FAA issued a revision to the 2001 SAIB, to include the use a magnifying glass for the corrosion inspections.

An additional FAA SAIB (number CE-11-01), issued October 4, 2010, advised operators of specific failures related to the horizontal stabilator turnbuckle/control cable assembly on Piper airplanes. The SAIB recommended that operators incorporate the previously issued Piper service letter into their inspection procedures. It also noted that any evidence of corrosion or cracking was cause for replacement of the cable assembly.

As referenced in the previously issued NTSB Safety Recommendations and the FAA SAIB, as of the date of this report, the NTSB is aware of 15 instances of turnbuckle failures. The breakdown of these failures is as follows:

Piper PA-28 series aircraft: 8 failures
Piper PA-32 series aircraft: 3 failures
Piper PA-44 series aircraft: 3 failures
Cessna 172: 1 failure

On August 2, 2012, the FAA issued a Notice of Proposed Rulemaking (NPRM) indicating the

intention to adopt a new airworthiness directive (AD) which would require inspections of the stabilator control system and replacement of parts as necessary. The AD would be applicable for PA-28, PA-32, PA-34, and PA-44 airplanes.

Pilot Information

Certificate:	Commercial	**Age:**	48,Male
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 2 With waivers/limitations	**Last FAA Medical Exam:**	January 10, 2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	September 25, 2010
Flight Time:	1251 hours (Total, all aircraft), 781 hours (Total, this make and model), 1134 hours (Pilot In Command, all aircraft), 1 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	74,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; 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 2 With waivers/limitations	**Last FAA Medical Exam:**	April 11, 2011
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 3, 2012
Flight Time:	10400 hours (Total, all aircraft), 20 hours (Total, this make and model), 10300 hours (Pilot In Command, all aircraft), 48 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N1358H
Model/Series:	PA-32R-300	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	32R7780155
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	March 13, 2012 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	1 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3944 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540 SER
Registered Owner:	LANDERS MORRIS JOHN JR	**Rated Power:**	300 Horsepower
Operator:	LANDERS MORRIS JOHN JR	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HWY,336 ft msl	**Distance from Accident Site:**	
Observation Time:	15:55 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:	30.12 inches Hg	**Temperature/Dew Point:**	30°C / 12°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Manassas, VA (HEF)	**Type of Flight Plan Filed:**	None
Destination:	Warrenton, VA (HWY)	**Type of Clearance:**	None
Departure Time:	15:05 Local	**Type of Airspace:**	

Airport Information

Airport:	Warrenton-Fauquier Airport HWY	**Runway Surface Type:**	Asphalt
Airport Elevation:	336 ft msl	**Runway Surface Condition:**	
Runway Used:	15	**IFR Approach:**	None
Runway Length/Width:	5000 ft / 100 ft	**VFR Approach/Landing:**	Full stop;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	None
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	38.586387,-77.710556(est)

Administrative Information

Investigator In Charge (IIC):	Demko, Jill
Additional Participating Persons:	Ramon Smeltz; FAA/FSDO; Herndon, VA
Original Publish Date:	December 11, 2012
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=83176