Aviation Investigation Final Report

Location:	Levelland, Texas	**Accident Number:**	CEN15LA182
Date & Time:	March 26, 2015, 14:55 Local	**Registration:**	N136DB
Aircraft:	AIR TRACTOR INC AT 400	**Aircraft Damage:**	Substantial
Defining Event:	Flight control sys malf/fail	**Injuries:**	1 Serious
Flight Conducted Under:	Part 91: General aviation - Flight test		

Analysis

The pilot reported that, shortly after takeoff on a postmaintenance test flight, the flight controls felt "stiff." The pilot flew a traffic pattern and intended to conduct a precautionary landing on the runway. However, after the pilot turned the airplane to the final leg in the traffic pattern, the airplane started to roll left. While attempting to level the wings, the pilot observed the left aileron traveling up and down. During the landing, the airplane bounced twice, rolled left, and then cartwheeled.

The airplane had undergone extensive maintenance throughout the year before the accident, and, during this maintenance, maintenance personnel reinstalled the ailerons. The accident flight was the first flight following this maintenance. A postaccident examination of the airplane revealed that the hardware that attached the long aileron pushrod to the aileron bellcrank was not present, and the hardware was not found at the accident site; therefore, it could not be determined whether new or existing hardware was installed during the recent maintenance. However, given that the flight control malfunction occurred immediately following the extensive maintenance, it is likely that maintenance personnel either did not install the attachment hardware at all or did not install it properly, either of which would have resulted in the loss of airplane control and subsequent impact with terrain.

Probable Cause and Findings

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

The in-flight separation of the left aileron's attachment hardware at the connection between the long aileron pushrod and the left aileron bellcrank. Contributing to the accident was maintenance personnel's improper installation of, or failure to install, the left aileron attachment hardware.

Findings

Aircraft	Aileron control system - Incorrect service/maintenance
Personnel issues	Installation - Maintenance personnel

Factual Information

History of Flight

Initial climb	Flight control sys malf/fail (Defining event)
Landing-flare/touchdown	Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On March 26, 2015, about 1455 central daylight time, an Air Tractor Inc., AT-400 airplane, N136DB, was substantially damaged during a precautionary landing on runway 35 at the Levelland Municipal Airport (KLLN), Levelland, Texas. The commercial pilot was seriously injured. Visual meteorological conditions prevailed for the flight, which without a flight plan.. The airplane was registered to and operated by Devil Dusters Inc., under the provisions of 14 Code of Federal Regulations Part 91 as a post maintenance test flight. The local flight was originating at the time of the accident.

According to the pilot, he was asked by HSI Turbine to "test fly" his airplane which they had just rebuilt. During a ground run of the engine an issue with the throttle linkage was found and corrected. The pilot conducted a preflight of the airplane and did not note any issues. After restarting the engine, the pilot went through his preflight checklist including verification that the flight controls were free and correct. The pilot did not discover any discrepancies during the preflight check and the takeoff roll was uneventful.

As the airplane leveled out on the crosswind leg of the traffic pattern, the flight controls felt "stiff." The pilot elected to land the airplane and have the flight controls examined. During the downwind and crosswind legs of the pattern the flight controls continued to feel stiff. After turning to the final leg in the traffic pattern, the airplane started to roll to the left. The pilot attempted to level the wings at which time the flight controls "became loose" and the pilot observed the left aileron "flopping" up and down. The right aileron continued to work correctly.

While trying to land on runway 35, the airplane bounced and rolled to the left. On the second bounce the pilot added power to try and regain control of the airplane. The airplane immediately rolled to the left and the left wing impacted the ground. The airplane cartwheeled and came to rest to the west of runway 35. The empennage, fuselage, and both wings were substantially damaged.

According to the pilot, he had purchased the airplane as a "wreck" in Minnesota. It did not have an engine or propeller and had damage to the right wing and landing gear. He brought the airplane to HSI Turbine during the summer of 2014 to have it repaired. According to the owner of HSI Turbine, the right wing was sent to Air Tractor to be repaired. Several mechanics and mechanic's assistants worked on the airplane and during interviews, they recalled that it was a long project that they worked on sporadically over the winter and spring. All of the mechanics and assistants reported using the maintenance manuals provided by Air Tractor to guide all of their work. All of the mechanics and assistants reported using the existing hardware on the airplane to reinstall the wings and flight controls.

One assistant recalled helping to remount the wings on the airplane and recalled that was in October or November of 2014. Another mechanic recalled installing the ailerons in January of 2015. The maintenance on the airplane was signed off on just prior to the accident flight. Work orders for the airplane, provided by HSI Turbines, indicated that "new hardware" had been used for the installation of the horizontal stabilizer, elevator, rudder, and wings. Specific work on the ailerons was not documented in the work orders provided.

An inspector with the Federal Aviation Administration and an investigator with Air Tractor examined the wreckage of the airplane. Control continuity to the elevator and rudder was confirmed. Separation points were consistent with overload. Control continuity was established to the right aileron control. All of the hardware was installed correctly and separation points were consistent with impact forces and methods used to recover the wreckage from the accident site.

Control continuity was established from the left aileron control, inboard to the long aileron pushrod. The hardware to connect the long aileron pushrod to the aileron bellcrank was not present. The mounting surface on the aileron pushrod was not damaged or elongated, consistent with the hardware not being present prior to the impact sequence. An examination of the remaining wreckage and accident site did not locate the missing hardware.

According to the Air Tractor AT-400 Owner's Manual and Parts Manual, an AN24-19A clevis bolt and an AN364-428 nut should be used to connect the pushrod to the bellcrank. The hardware should be torqued between 30 and 40 inch pounds.

Pilot Information

Certificate:	Commercial	**Age:**	57
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Single
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	November 5, 2014
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	July 14, 2014
Flight Time:	15792 hours (Total, all aircraft), 200 hours (Total, this make and model), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	AIR TRACTOR INC	**Registration:**	N136DB
Model/Series:	AT 400	**Aircraft Category:**	Airplane
Year of Manufacture:	1983	**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	400-0504
Landing Gear Type:	Tailwheel	**Seats:**	1
Date/Type of Last Inspection:	March 15, 2015 Annual	**Certified Max Gross Wt.:**	6000 lbs
Time Since Last Inspection:	0 Hrs	**Engines:**	1 Turbo prop
Airframe Total Time:	10680 Hrs as of last inspection	**Engine Manufacturer:**	Pratt & Whittney
ELT:	Not installed	**Engine Model/Series:**	PT6A 15AG
Registered Owner:	DEVIL DUSTERS INC	**Rated Power:**	680 Horsepower
Operator:	DEVIL DUSTERS INC	**Operating Certificate(s) Held:**	Agricultural aircraft (137)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KLBB,3282 ft msl	**Distance from Accident Site:**	28 Nautical Miles
Observation Time:	14:53 Local	**Direction from Accident Site:**	90°
Lowest Cloud Condition:	Few / 26000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots / None	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	310°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.18 inches Hg	**Temperature/Dew Point:**	16°C / -7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Levelland, TX (KLLN)	**Type of Flight Plan Filed:**	None
Destination:	Levelland, TX (KLLN)	**Type of Clearance:**	None
Departure Time:	14:55 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Levelland Municipal Airport KLLN	**Runway Surface Type:**	Asphalt
Airport Elevation:	3514 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	35	**IFR Approach:**	None
Runway Length/Width:	6110 ft / 75 ft	**VFR Approach/Landing:**	Forced landing;Go around;Precautionary landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	33.552501,-102.372497(est)

Administrative Information

Investigator In Charge (IIC):	Rodi, Jennifer
Additional Participating Persons:	William J Fitzgerald; FAA Flight Standards District Office; Lubbock, TX Kyle Schroeder; Air Tractor; Olney, TX
Original Publish Date:	July 23, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=90947