Aviation Investigation Final Report

Location:	Canandaigua, New York	**Accident Number:**	ERA16LA296
Date & Time:	August 20, 2016, 10:00 Local	**Registration:**	N51TM
Aircraft:	MANTELL ALLAN T KITFOX 4 1200	**Aircraft Damage:**	Substantial
Defining Event:	Sys/Comp malf/fail (non-power)	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot, who was also the owner/builder of the experimental, amateur-built, tailwheel-equipped airplane, was conducting a cross-country personal flight. He reported that, during landing, a rudder pedal torque tube separated, which resulted in a loss of directional control and the airplane departing the right side of the runway.

Metallurgical examination revealed that the vertical torque tube for the right rudder pedal had fractured at a fillet welded intersection where it attached to a horizontal torque tube. The fracture surface exhibited a small thumbnail-like fatigue region followed by an overstress region.

The pilot had assembled the airplane about 16 years before the accident, and it had accrued about 551 hours of operation. The actual kit model was manufactured 22 years before the accident, and 1 year later, the kit manufacturer published a service letter (SL) applicable to the accident airplane model, which advised owners that the company had recently noticed signs of fatigue in rudder pedal torque tubes. The SL instructed owners to inspect the areas for fatigue and offered a reinforcement kit. Further, 6 years later, the kit manufacturer redesigned the rudder pedal torque tubes for subsequent models to include a reinforcement similar to the reinforcement that had previously been offered in the reinforcement kit. The accident airplane was not equipped with the reinforcement kit recommended in the SL nor was it equipped with the newer rudder torque tube design.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the right rudder pedal torque tube due to fatigue, which resulted in a loss of directional control during landing. Also causal to the accident was the airplane owner/builder's failure to install a rudder torque tube reinforcement or replacement in accordance with the kit

manufacturer's recommendation.

Findings

Aircraft	Rudder control system - Fatigue/wear/corrosion
Aircraft	Rudder control system - Failure
Personnel issues	(general) - Owner/builder
Personnel issues	Lack of action - Owner/builder

Factual Information

History of Flight

Landing	Sys/Comp malf/fail (non-power) (Defining event)
Landing	Loss of control on ground
Landing	Runway excursion
Landing	Collision with terr/obj (non-CFIT)

On August 20, 2016, about 1000 eastern daylight time, an experimental amateur-built Kitfox 4-1200, N51TM, was substantially damaged while landing at Canandaigua Airport (D38), Canandaigua, New York. The private pilot was not injured. The airplane was registered to and operated by the private pilot as a personal flight conducted under the provisions of 14 *Code of Federal Regulations* Part 91. Visual meteorological conditions prevailed and no flight plan was filed for the flight that originated from Whitfords Airport (B16), Weedsport, New York, about 0920.

The pilot reported that while landing on a turf airstrip adjacent to runway 31, a rudder pedal torque tube separated and the airplane departed the right side of the runway. The airplane subsequently impacted an uneven field and came to rest upright.

Examination of the wreckage by a Federal Aviation Administration inspector revealed substantial damage to the wings and fuselage. The separated section of rudder pedal torque tube was retained and forwarded to the National Transportation Safety Board Materials Laboratory for further examination. Metallurgical examination revealed that the vertical torque tube for the right rudder pedal fractured at a fillet welded intersection where it attached to a horizontal torque tube. The fracture surface exhibited a small thumbnail like fatigue region followed by an overstress region.

The single-seat, high-wing, tailwheel-equipped airplane, serial number C9406-0031, was assembled from a kit by the pilot in 2000 and issued an FAA experimental airworthiness certificate. Its most recent condition inspection was completed on August 8, 2016. At that time, the airframe had accumulated 547.4 total hours of operation. It had flown an additional 3.3 hours from the time of the last inspection, until the accident.

The FAA inspector that examined the wreckage further stated that although assembly of the accident airplane was completed in 2000, the kit was actually a 1994 model. On August 22, 1995, the kit manufacturer released Service Letter No. 47 (SL-47), applicable to the accident airplane model, which advised owners that the company had recently noticed signs of fatigue in rudder pedal torque tubes. The SL instructed owners to inspect the areas for fatigue and offered a reinforcement kit (P/N 35015.000) for $59.95. Further, in 2000, the kit manufacturer redesigned the rudder pedal torque tubes for subsequent models, to include a reinforcement similar to what had previously been offered in the reinforcement kit. The inspector added that the accident airplane was not equipped with the newer rudder torque tube design, nor was it equipped with the reinforcement kit offered in SL-47.

Pilot Information

Certificate:	Private	**Age:**	75,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Sport pilot	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	April 22, 2015
Flight Time:	1667 hours (Total, all aircraft), 600 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	MANTELL ALLAN T	**Registration:**	N51TM
Model/Series:	KITFOX 4 1200 IV	**Aircraft Category:**	Airplane
Year of Manufacture:	2000	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	C9406-0031
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	August 8, 2016 Condition	**Certified Max Gross Wt.:**	1200 lbs
Time Since Last Inspection:	3 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	551 Hrs at time of accident	**Engine Manufacturer:**	Jabiru
ELT:	C91A installed, not activated	**Engine Model/Series:**	2200
Registered Owner:	On file	**Rated Power:**	80 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PEO,988 ft msl	**Distance from Accident Site:**	15 Nautical Miles
Observation Time:	09:53 Local	**Direction from Accident Site:**	160°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	190°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	26°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Weedsport, NY (B16)	**Type of Flight Plan Filed:**	None
Destination:	Canandaigua, NY (D38)	**Type of Clearance:**	None
Departure Time:	09:20 Local	**Type of Airspace:**	

Airport Information

Airport:	Canandaigua D38	**Runway Surface Type:**	Grass/turf
Airport Elevation:	814 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	31	**IFR Approach:**	None
Runway Length/Width:	950 ft / 25 ft	**VFR Approach/Landing:**	Full stop;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	42.908889,-77.325279(est)

Administrative Information

Investigator In Charge (IIC):	Gretz, Robert
Additional Participating Persons:	Robert` Lacourse; FAA/FSDO; Rochester, NY
Original Publish Date:	October 17, 2017
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=93872