



National Transportation Safety Board

Aviation Incident Data Summary

Location:	Truckee, CA	Incident Number:	WPR11IA213
Date & Time:	05/02/2011, 1440 PDT	Registration:	N270CS
Aircraft:	CESSNA 421B	Injuries:	3 None
Flight Conducted Under:	Part 91: General Aviation - Positioning - Air Medical (Medical Emergency)		

Analysis

The airplane entered the downwind leg of the traffic pattern high, and, in an effort to descend, the pilot extended the landing gear and deployed full flaps. About the time the flaps reached their maximum extension, the right flap experienced an instantaneous retraction, and the airplane simultaneously rolled about 80 degrees to the right. The pilot countered with almost full left aileron control input for the remainder of the flight. He began troubleshooting steps, but was unable to extend the right flap or retract the left flap. He diverted to another airport and, for the remaining 35 minutes of flight, employed the assistance of a passenger to help with maintaining left aileron control deflection. The landing was made without further incident.

Postincident examination of the flap control system revealed that the right wing flap extend cable had failed in the area where it made contact with the inboard flap pulley, an area where the cable had experienced multiple bending cycles throughout its life. The failed cable strands exhibited fatigue signatures, and similar frays and failures were observed in the area of the outboard pulley. The corresponding left flap cable also exhibited similar strand failure features in the inboard and outboard pulley contact areas. The cables were installed when the airplane was manufactured, 36 years prior to the incident. Over this period, the airplane had accumulated 4,832.1 total flight hours.

The flap cable was not life limited, and the airplane manufacturer's maintenance manual did not require the removal of flight control cables during inspection. The mechanic who performed the most recent inspection reported that he examined the cables utilizing the methods prescribed in the manufacturer's service manual but did not detect any damage. He further stated that the damage was only obvious once the cables had been removed and subsequently flexed and looped by hand.

A review of Federal Aviation Administration Service Difficulty Reports for the airplane series revealed 33 instances of similar flap cable wear or failure on 25 separate airplanes. About half of the reports indicated flap cable failures occurring during flight; all were during the critical landing approach phase. The failures resulted in asymmetric flap deployment, and some resulted in a violent departure from controlled flight. In a few instances, the damage caused by the cable separation prevented the retraction of the remaining extended flap, and, therefore, the pilot had to maintain very high opposing aileron control inputs in order to control and land the airplane. A common finding noted in the reports was that the cable damage could not be readily observed unless the cables were removed.

A service bulletin is in development by the airplane manufacturer concerning the inspection procedures and replacement criteria for the flap cables in the airplane series.

Flight Events

Approach-VFR pattern downwind - Flight control sys malf/fail

Approach-VFR pattern downwind - Inflight upset

Probable Cause

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

Fatigue failure of the right flap extend cable during the landing approach.

Findings

Aircraft-Aircraft systems-Flight control system-TE flap control system-Fatigue/wear/corrosion - C
Aircraft-Aircraft systems-Flight control system-TE flap control system-Failure - C

Pilot Information

Certificate:	Airline Transport	Age:	27
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane
Flight Time:	3850 hours (Total, all aircraft), 154 hours (Total, this make and model), 3675 hours (Pilot In Command, all aircraft), 61 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	CESSNA	Registration:	N270CS
Model/Series:	421B	Engines:	2 Reciprocating
Operator:	CALIFORNIA SHOCK TRAUMA AIR RESCUE	Engine Manufacturer:	Continental Motors
Air Carrier Operating Certificate:	On-demand Air Taxi (135)	Engine Model/Series:	GTSIO-520H
Flight Conducted Under:	Part 91: General Aviation - Positioning - Air Medical (Medical Emergency)		

Meteorological Information and Flight Plan

Observation Facility, Elevation:	TRK, 5900 ft msl	Weather Information Source:	Weather Observation Facility
Conditions at Accident Site:	Visual Conditions	Lowest Ceiling:	None
Condition of Light:	Day	Wind Speed/Gusts, Direction:	10 knots/ 18 knots, 230°
Temperature:	15° C / -4° C	Visibility	10 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Sacramento, CA (MCC)	Destination:	Truckee, CA (TRK)

Airport Information

Airport:	Truckee-Tahoe (TRK)	Runway Surface Type:	Asphalt
Runway Used:	28	Runway Surface Condition:	Dry
Runway Length/Width:	7000 ft / 100 ft		

Wreckage and Impact Information

Crew Injuries:	3 None	Aircraft Damage:	None
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None

Administrative Information

Investigator In Charge (IIC): Elliott Simpson

Adopted Date: 06/28/2012

Investigation Docket: <http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=78994>

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