National Transportation Safety Board
Aviation Incident Final Report

Location:	Greenville, SC	**Incident Number:**	ERA09IA315
Date & Time:	06/01/2009, 1500 EDT	**Registration:**	N695CD
Aircraft:	CIRRUS DESIGN CORP SR22	**Aircraft Damage:**	None
Defining Event:	Flight control sys malf/fail	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General Aviation - Other Work Use		

Analysis

The pilot was "returning the airplane to service," following a maintenance inspection. No anomalies were noted during the preflight inspection, engine start, taxi, run-up, and takeoff roll. As the airplane became airborne, the pilot noticed that the elevator control felt "loose," with about 1/2 inch of "play." The pilot proceeded to an area west of the airport, where the he performed in-fight checks uneventfully. As the airplane was returning to the airport, on short final approach, the pilot reduced the throttle to idle power for landing. Subsequently, about 25 feet above the ground, the nose pitched down. The pilot tried to pull back on the control yoke to flare, but the elevator control was stuck in the mid-range position. The airplane touched down on the nose gear and bounced back up into the air. The sudden jolt of the touchdown seemed to free the elevator control and the pilot was able to complete a normal landing. As the pilot taxied from the runway, he was able to duplicate the control jam. The operator noted that the pitch trim cartridge control rod felt "gritty" when actuated by hand. The operator subsequently reported that the anomaly did not reoccur after the pitch trim cartridge was removed and replaced. In addition, the operator did not report any work performed on the pitch trim cartridge during the recent maintenance inspection. Further examination of the airplane's pitch trim cartridge revealed some corrosion and black grease residue present; however, there was no conclusive evidence found to support a flight control jam.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: A pitch control malfunction for undetermined reasons.

Findings

Not determined	Not determined - Unknown/Not determined (Cause)

Factual Information

On June 1, 2009, about 1500 eastern daylight time, a Cirrus Design Corp. SR22, N695CD, registered to and operated by SATSair LLC. as a Title 14 Code of Federal regulations Part 91 maintenance flight, experienced a control malfunction while on approach to Greenville Downtown Airport (GMU), Greenville, South Carolina. The certificated airline transport pilot was not injured and the airplane was not damaged. Visual meteorological conditions prevailed and no flight planned was filed. The flight departed from GMU at 1430.

The pilot reported that he was "returning the airplane to service," following a maintenance inspection. No anomalies were noted during the preflight inspection, engine start, taxi, run-up, and takeoff roll. As the airplane became airborne, the pilot noticed that the elevator control felt "loose," with about 1/2 inch of "play." The pilot proceeded to an area west of GMU, where he performed in-fight checks uneventfully.

As the airplane was returning to GMU, on short final approach, the pilot reduced the throttle to idle power for landing. Subsequently, about 25 feet above ground level, the nose pitched down. The pilot tried to pull back on the yoke to flare, but the elevator control was stuck in the mid-range position. The airplane touched down on the nose gear first and then bounced back up into the air. The sudden jolt of the touchdown seemed to free the elevator control and the pilot was able complete a normal landing. As the pilot taxied from the runway, he was able to duplicate the control jam.

The operator's director of maintenance (DOM) reported that no work was performed on the pitch trim cartridge during the recent maintenance inspection. After the incident, the elevator pitch trim cartridge was removed. When the DOM actuated the cartridge by hand, he felt the spring functioning, but noted that the control rod movement was "gritty." The DOM further stated that the anomaly did not reoccur after the pitch trim cartridge was removed and replaced.

The airplane's pitch trim cartridge was forwarded to the manufacturer's facility for further examination under the supervision of a Federal Aviation Administration (FAA) inspector. The examination revealed some corrosion and black grease residue was present; however, there was no conclusive evidence found to support a flight control jam. Additionally, the manufacturer's representatives were not able to document the suspect cartridge as it was installed, before it was removed and replaced. A manufacturer's representative added that although the elevator control linkage moves through the pitch trim cartridge to the aft elevator bellcrank, an electric elevator trim motor moves the entire pitch trim cartridge and aft elevator bellcrank, which provides system redundancy in the event of a primary elevator control malfunction.

The DOM subsequently reported that the suspect pitch trim cartridge had been the original cartridge installed on the airplane and that the airplane had been operated for 2,562 hours at the time of the event. Although the pitch trim cartridge was required to be inspected, there was no requirement to replace it at a specific time interval.

After the incident, the operator implemented a program to voluntarily remove and replace pitch trim cartridges at 2,000 hours of operation, and forward the used cartridges to the manufacturer for examination.

During the investigation, another operator reported similar issues pertaining to trim cartridge

"sticking," involving five Cirrus airplanes. Those events occurred shortly after the new airplanes left the factory. Subsequent interviews with mechanics and an FAA inspector, along with further information from the second operator, revealed that one airplane had an elevator pitch trim cartridge sticking due to a lack of lubrication. Another airplane had a roll trim cartridge removed and replaced at the customer's request, in an effort to troubleshoot a wing-rocking problem. The other three airplanes were noted to have trim cartridge (roll, yaw, and/or pitch) sticking possibly due to an aileron-rudder interconnect issue, cartridge misalignment, and/or debris particles becoming temporarily stuck in the cartridge.

Review of the National Transportation Safety Board database and FAA service difficulty reports, for a 5-year period preceding the SATSair incident, did not reveal any similar occurrences pertaining to sticking or temporary jamming of any Cirrus pitch trim cartridge.

History of Flight

Approach-VFR pattern final	Flight control sys malf/fail (Defining event)
Landing	Abnormal runway contact

Pilot Information

Certificate:	Airline Transport; Flight Instructor	**Age:**	48, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
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 Without Waivers/Limitations	**Last Medical Exam:**	08/18/2008
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	01/26/2009
Flight Time:	12000 hours (Total, all aircraft), 1000 hours (Total, this make and model), 11650 hours (Pilot In Command, all aircraft), 87 hours (Last 90 days, all aircraft), 22 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	CIRRUS DESIGN CORP	**Registration:**	N695CD
Model/Series:	SR22	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	1372
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	05/31/2009, 100 Hour	**Certified Max Gross Wt.:**	3400 lbs
Time Since Last Inspection:	0 Hours	**Engines:**	1 Reciprocating
Airframe Total Time:	2562 Hours	**Engine Manufacturer:**	Continental Motors
ELT:	Installed, not activated	**Engine Model/Series:**	IO-550-N
Registered Owner:	SATSAIR LLC	**Rated Power:**	310 hp
Operator:	SATSAIR LLC	**Air Carrier Operating Certificate:**	On-demand Air Taxi (135)

Meteorological Information and Flight Plan

Observation Facility, Elevation:	GMU, 1006 ft msl	**Observation Time:**	1453 EDT
Distance from Accident Site:	0 Nautical Miles	**Condition of Light:**	Day
Direction from Accident Site:	0°	**Conditions at Accident Site:**	Visual Conditions
Lowest Cloud Condition:	Clear	**Temperature/Dew Point:**	29°C / 15°C
Lowest Ceiling:	None	**Visibility**	10 Miles
Wind Speed/Gusts, Direction:	5 knots, 350°	**Visibility (RVR):**	
Altimeter Setting:	30.09 inches Hg	**Visibility (RVV):**	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Greenville, SC (GMU)	**Type of Flight Plan Filed:**	None
Destination:	Greenville, SC (GMU)	**Type of Clearance:**	None
Departure Time:	1430 EDT	**Type of Airspace:**	

Airport Information

Airport:	Greenville Downtown Airport (GMU)	**Runway Surface Type:**	Asphalt
Airport Elevation:	1048 ft	**Runway Surface Condition:**	Dry
Runway Used:	10	**IFR Approach:**	None
Runway Length/Width:	3998 ft / 80 ft	**VFR Approach/Landing:**	Full Stop; Straight-in

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	None
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None		

Administrative Information

Investigator In Charge (IIC):	Robert J Gretz	**Adopted Date:**	10/19/2009
Additional Participating Persons:	Bob Switter; FAA/FSDO; West Columbia, SC		
Publish Date:	10/20/2009		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=73944		

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