



Aviation Investigation Final Report

Location:	Grass Valley, California	Accident Number:	WPR19LA117
Date & Time:	April 19, 2019, 13:40 Local	Registration:	N621JM
Aircraft:	Nanchang CJ 6	Aircraft Damage:	Substantial
Defining Event:	Runway excursion	Injuries:	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During the landing roll, the pilot applied left rudder and lightly depressed the brake handle to exit the runway. About 30° into the left turn, the brakes failed, and the airplane exited the asphalt taxiway surface. Due to obstructions ahead and the downsloping terrain, the pilot applied right rudder and engine power to realign the airplane with the runway. Shortly thereafter, the airplane overran the departure end of the runway and traveled downslope while airborne. The airplane then touched down and impacted a dirt berm before it collided with a fence, nosed over, and came to rest inverted, sustaining substantial damage to the fuselage and both wings. Examination of the airplane revealed that the brake control cable was fractured near the cable thimble and was separated from the brake control handle. The fracture surfaces of the separated cable were consistent with a fatigue fracture. Six of the seven strands of wires exhibited relatively flat fracture surfaces normally oriented to the wire axis, consistent with a progressive fracture mechanism, such as a fatigue fracture. Only one strand and a few of the remaining individual wires showed evidence of minor elongation at the fracture location. It is likely that the cable completely failed during the landing roll when the pilot depressed the brake handle.

Probable Cause and Findings

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

A loss of brake control due to fatigue fracture of the brake control cable, which resulted in the separation of the cable from the brake handle.

Findings

Aircraft

Brake - Failure

Personnel issues

Aircraft control - Pilot

Factual Information

History of Flight

Landing-landing roll	Loss of control on ground
Landing-landing roll	Runway excursion (Defining event)
Landing-landing roll	Collision with terr/obj (non-CFIT)
Landing-landing roll	Nose over/nose down

On April 19, 2019, about 1340 Pacific daylight time, a Nanchang CJ-6 airplane, N621JM, was substantially damaged when it was involved in an accident near Grass Valley, California. The pilot and passenger sustained minor injuries. The airplane was operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that, following an uneventful landing on runway 25, a 4,657 ft long and 75 ft wide asphalt runway, he extended his landing roll due to traffic on one of the taxiways. As the airplane neared the pilot's intended taxiway, he applied left rudder and lightly depressed the brake handle. About 30° into the left turn, the brakes failed, and the airplane exited the asphalt taxiway surface. Due to obstructions ahead and the down sloping terrain, the pilot applied right rudder and engine power to realign the airplane with the runway. Shortly after, the airplane overran the departure end of the runway and traveled downslope while airborne. The airplane then touched down and struck a dirt berm before it collided with a fence, nosed over, and came to rest inverted, resulting in substantial damage to the fuselage and both wings. The wreckage was recovered to a secure location for further examination.

Postaccident examination revealed that the brake cable was separated from the brake handle. The cable thimble, clevis pin, and cotter pin remained attached to the brake control handle. The separated portions of the cable were removed and sent to the NTSB Materials Laboratory for further examination.

Examination of the brake cable revealed that it was constructed of seven strands of seven metal wires (7x7). When comparing the thimble with the cable contour between two fracture locations, the fit was consistent with a thimble-eye termination created by a hand-tucked splice joint, as seen in figure 1.

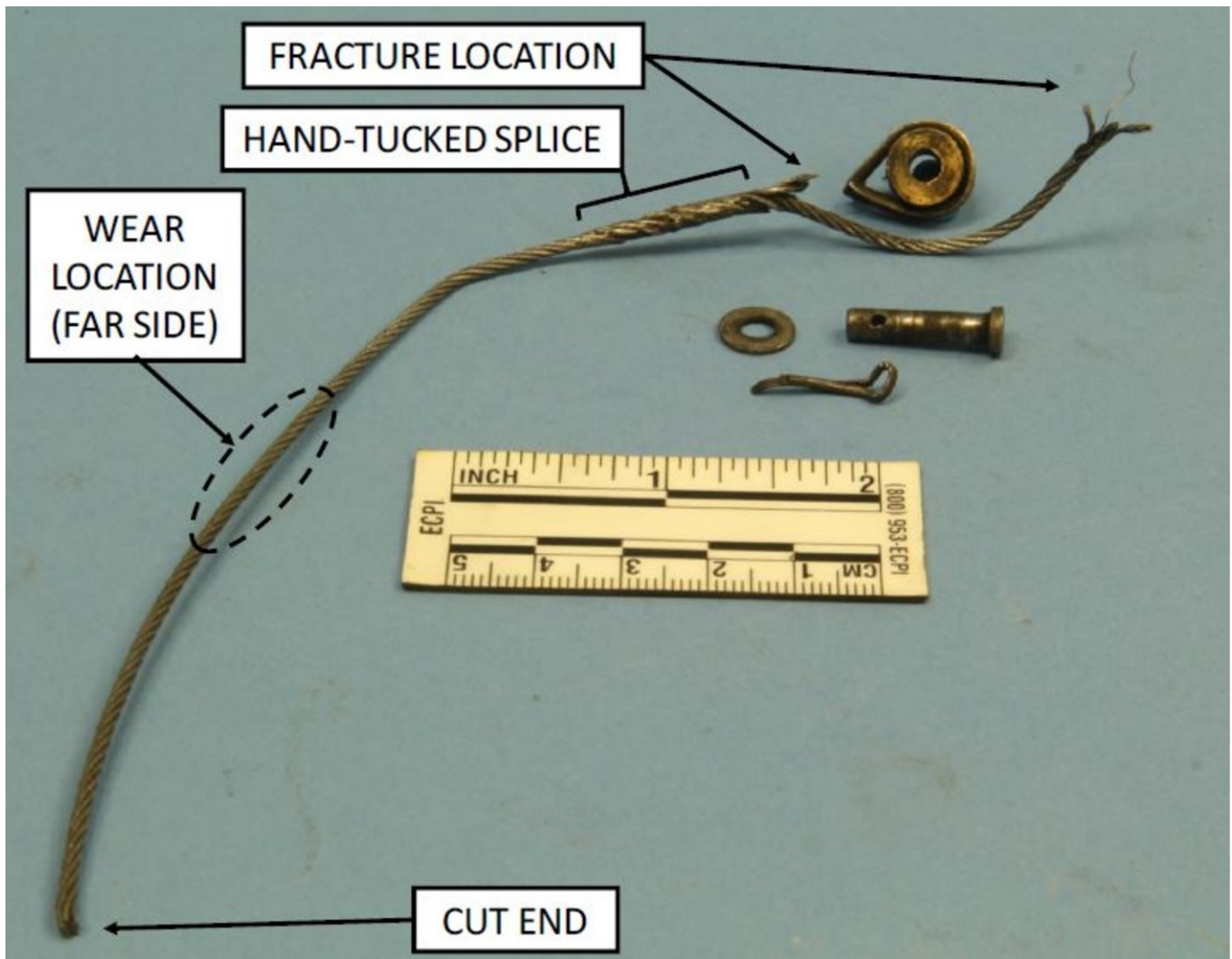


Figure 1: View of the brake cable components submitted to the NTSB Materials Laboratory.

The fracture surface of the cleaned cable was examined using a scanning electron microscope. Six of the seven strands of wires exhibited relatively flat fracture surfaces normally oriented to the wire axis, consistent with a progressive fracture mechanism, such as a fatigue fracture. Only one strand and a few of the remaining individual wires showed evidence of minor elongation at the fracture location. For further information, see the Materials Laboratory Factual Report within the public docket for this accident.

No specific entries pertaining to the brake cable were found within the airframe logbook.

Pilot Information

Certificate:	Private	Age:	72,Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Front
Other Aircraft Rating(s):	None	Restraint Used:	5-point
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Without waivers/limitations	Last FAA Medical Exam:	August 17, 2017
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	1594 hours (Total, all aircraft), 368 hours (Total, this make and model), 1509 hours (Pilot In Command, all aircraft), 5 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Nanchang	Registration:	N621JM
Model/Series:	CJ 6 A	Aircraft Category:	Airplane
Year of Manufacture:	1989	Amateur Built:	
Airworthiness Certificate:	Experimental (Special)	Serial Number:	4632023
Landing Gear Type:	Retractable - Tricycle	Seats:	2
Date/Type of Last Inspection:	April 5, 2018 Annual	Certified Max Gross Wt.:	3087 lbs
Time Since Last Inspection:	36.2 Hrs	Engines:	Reciprocating
Airframe Total Time:	2760.2 Hrs at time of accident	Engine Manufacturer:	Huosai
ELT:	C91 installed, not activated	Engine Model/Series:	6JIA
Registered Owner:		Rated Power:	285 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:	KGOO,3153 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	13:55 Local	Direction from Accident Site:	89°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	6 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	240°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.98 inches Hg	Temperature/Dew Point:	3°C / 6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Auburn, CA (AUN)	Type of Flight Plan Filed:	None
Destination:	Grass Valley, CA (GOO)	Type of Clearance:	None
Departure Time:	13:00 Local	Type of Airspace:	Class G

Airport Information

Airport:	Nevada County GOO	Runway Surface Type:	Asphalt
Airport Elevation:	3157 ft msl	Runway Surface Condition:	Dry
Runway Used:	25	IFR Approach:	None
Runway Length/Width:	4657 ft / 75 ft	VFR Approach/Landing:	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	1 Minor	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Minor	Latitude, Longitude:	39.223888,-121.013336(est)

Administrative Information

Investigator In Charge (IIC):	Cawthra, Joshua		
Additional Participating Persons:	Dennis DeGolia; Federal Aviation Administration; Sacramento, CA		
Original Publish Date:	March 23, 2022	Investigation Class:	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=99293		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).