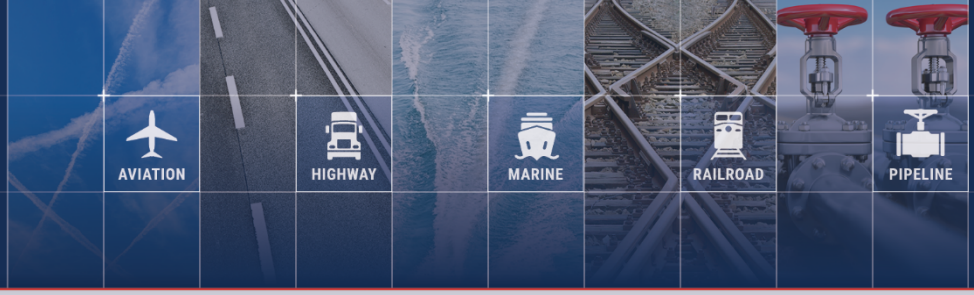

Aviation Investigation Final Report

Location:	Concord, California	**Accident Number:**	LAX02LA228
Date & Time:	July 15, 2002, 14:57 Local	**Registration:**	N20256
Aircraft:	Schweizer 269C-1	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The helicopter sustained an in-flight fracture and separation of the center aft mast support tube. While en route to the practice area, a slight vibration was felt through the airframe. Moments later, the vibration level became severe. The certified flight instructor (CFI) entered an autorotation, and during the descent, he looked back and found the tail rotor was disabled. The autorotation was completed to a field. Post accident metallurgical examination revealed a fracture surface consistent with fatigue.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The main rotor mast support tube failure as a result of fatigue.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE - NORMAL

Findings
1. (C) ROTOR DRIVE SYSTEM,MAIN ROTOR MAST(DRIVE SHAFT) - CORRODED
2. (C) ROTOR DRIVE SYSTEM,MAIN ROTOR MAST(DRIVE SHAFT) - FATIGUE

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
3. AUTOROTATION - PERFORMED - PILOT IN COMMAND(CFI)

Factual Information

On July 15, 2002, at 1457 Pacific daylight time, a Schweizer 269C-1, N20256, sustained an in-flight fracture and separation of the center aft mast support tube about 10 miles east of Concord, California. The certified flight instructor (CFI) and the dual primary student were not injured; the helicopter sustained substantial damage. The helicopter was owned and operated by Helicopter Adventures, Inc., for a local area dual instructional flight under the provisions of 14 CFR Part 91. Visual meteorological conditions prevailed and no flight plan had been filed.

In a written statement, the flight instructor reported that they were in level cruise flight en route to the practice area when a slight but unusual vibration was felt through the airframe. As he was reaching for the controls, the vibration level suddenly became severe. The left door departed the helicopter and the flight instructor entered an autorotation. During the descent, he looked back and found the tail rotor was disabled. The autorotation was completed to a field.

A Federal Aviation Administration (FAA) airworthiness inspector examined the helicopter. He observed that the aft center mast support tube (p/n 269A2172-5) had fractured. He noted that a dark corrosion like appearance was present over a large part of the center of the fracture face. The part was painted with an epoxy coating and the inspector opined that this would have hindered visual detection of any crack in the underlying metal. He also reported that the tail rotor drive shaft had separated just aft of the oil cooler, and stated his belief that this was a secondary event to the vibration.

The main rotor mast support tube was sent to the National Transportation Safety Board Materials Laboratory Division, Washington, D.C., for examination. The complete metallurgical examination report is in the docket for this accident. The examination revealed a fracture surface, relatively smooth and flat, in a plane perpendicular to the longitudinal axis. A region of the fracture had a reddish brown corrosion layer with smooth curving boundaries; a feature consistent with fatigue. Closer examination using scanning electron microscopy (SEM) of the fracture surface origin area, revealed three crack arrest lines and further corrosion. Scratches were also observed on the left side of the aft support tube in the paint at the lower edge and near the origin of the fracture surface.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	23,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	March 15, 2002
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	March 16, 2002
Flight Time:	470 hours (Total, all aircraft), 420 hours (Total, this make and model), 407 hours (Pilot In Command, all aircraft), 200 hours (Last 90 days, all aircraft), 50 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	None	**Age:**	Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None None	**Last FAA Medical Exam:**	
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	19 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Schweizer	**Registration:**	N20256
Model/Series:	269C-1	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	0099
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	June 19, 2002 100 hour	**Certified Max Gross Wt.:**	1750 lbs
Time Since Last Inspection:	19.9 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1609.6 Hrs as of last inspection	**Engine Manufacturer:**	Textron Lycoming
ELT:	Not installed	**Engine Model/Series:**	HO-360-CIA
Registered Owner:	Helicopter Adventures, Inc.	**Rated Power:**	180 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	CCR,26 ft msl	**Distance from Accident Site:**	10 Nautical Miles
Observation Time:	14:53 Local	**Direction from Accident Site:**	250°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	15 knots / 0 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	24°C / 0°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Concord, CA (CCR)	**Type of Flight Plan Filed:**	None
Destination:	Concord, CA (CCR)	**Type of Clearance:**	None
Departure Time:	14:30 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	37.989723,-122.056945

Administrative Information

Investigator In Charge (IIC):	Rich, Jeff
Additional Participating Persons:	Harry Carnahan; Federal Aviation Administration; Oakland, CA Kai Barkhald; Helicopter Adventures, Inc.; Concord, CA Steven Gleason; Schweizer Aircraft Corp.; Horseheads, NY
Original Publish Date:	March 2, 2004
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=55217