



Aviation Investigation Final Report

Location:	Burbank, California	Accident Number:	LAX04LA331
Date & Time:	September 25, 2004, 15:49 Local	Registration:	N61413
Aircraft:	Schweizer 269C-1	Aircraft Damage:	Substantial
Defining Event:		Injuries:	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The helicopter encountered ground resonance after landing and sustained substantial damage in the vibratory event. The pilot-undergoing-instruction (PUI) was taking refresher training in the helicopter. The approach was normal; however, the touchdown was harder than normal. With the helicopter on the ground, the certified flight instructor (CFI) began discussing the touchdown with the PUI and the helicopter began to vibrate. The CFI did not have time to react prior to the helicopter self-destructing. Post-accident examination of the components found that in the forward landing gear dampers the pistons were fully extended and they contained fluid in excess of the levels specified in the maintenance instructions. Dampers in this condition will not compress or attenuate airframe motion and vibrations or prevent ground resonance. The last inspection on the helicopter was a 100-hour that was completed 4.5 hours prior to the accident flight.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the failure of maintenance personnel to correctly service the forward landing gear strut dampers in accordance with the manufacturer's maintenance instructions.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: STANDING - ENGINE(S) OPERATING

Findings

1. (C) LANDING GEAR,MAIN GEAR SHOCK ABSORBING STRUT - IMPROPERLY SERVICED
2. (C) MAINTENANCE,INSPECTION - INADEQUATE - COMPANY MAINTENANCE PERSONNEL
3. GROUND RESONANCE - ENCOUNTERED - PILOT IN COMMAND

Factual Information

On September 25, 2004, at 1549 Pacific daylight time, a Schweizer 269C-1 helicopter, N61413, encountered a severe vibratory event after landing at the Bob Hope Airport, Burbank, California. Group 3 Aviation was operating the helicopter under the provisions of 14 CFR Part 91. The certified flight instructor (CFI) and private pilot undergoing instruction (PUI) were not injured; the helicopter sustained substantial damage. Visual meteorological conditions prevailed for the local instructional flight, and no flight plan had been filed. The helicopter departed from the Van Nuys Airport, Van Nuys, California, about 1515.

According to the operator, the PUI was taking refresher training in the helicopter. The PUI performed a normal approach; however, the touchdown was harder than normal. With the helicopter situated on the ground, the CFI began to discuss the touchdown with the PUI, and the helicopter started to vibrate. The CFI said he did not have time to react prior to the helicopter self-destructing.

The three main rotor dampers and four landing gear dampers were examined at the Schweizer Aircraft Corporation on October 12, 2004, in the presence of a Federal Aviation Administration (FAA) inspector from the Rochester, New York, Flight Standards District Office. The results of the examination noted that the damage to all of the dampers was consistent with a ground resonance event. The two aft landing gear dampers tested slightly low but near minimum operating condition. The two forward landing gear dampers contained fluid in excess of the specified levels. When examined, the pistons were in the fully extended condition, and the fluid level was 1.025 inches when measured from the top of the piston to the fluid. The dampers were tested and they were out of compliance with design data, as well as the Schweizer Handbook of Maintenance Instructions (HMI) and production assembly instructions. It was noted in the report that dampers in this condition will not compress or attenuate airframe motion and vibrations or prevent ground resonance.

The last inspection on the helicopter was the 100-hour completed 4.5 hours prior to the accident flight. The total time on the airframe was 6,298.7 hours. The landing gear dampers were serviced on January 12, 2004, at a total airframe time of 5,750.1 hours.

In the Schweizer HMI, Part III, Section 5, the procedures for reassembly, charging, and leakage check on the landing gear damper assembly are discussed. On page 5-2 it noted that the fluid level for the 269A3150-19 dampers (the forward dampers) should reach 0.5-inch below the top of the piston. The fluid level for the 269A3150-21 dampers (the rear dampers) should be 1.40 inches below the top of the piston. When the fluid is added, the piston is to be compressed, not extended. A warning, also on page 5-2, states the following:

"Incorrect fluid levels, improper pressure, or inoperable valving will deteriorate the damping capabilities of the landing gear dampers. These conditions may result in ground resonance

and destruction of the helicopter. Follow all instructions in the HMI carefully, to ensure safe helicopter operation."

According to FAA publication FAA-H-8083-21, "Rotorcraft Flying Handbook:"

"Ground resonance is an aerodynamic phenomenon associated with fully-articulated rotor systems. It develops when rotor blades move out of phase with each other and cause the rotor disc to become unbalanced. This condition can cause a helicopter to self-destruct in a matter of seconds....If the rpm is low, the corrective action to stop ground resonance is to close the throttle immediately and fully lower the collective to place the blades in low pitch. If the rpm is in the normal range, you should fly the helicopter off the ground, and allow the blades to automatically realign themselves. You can then make a normal touchdown...."

Flight instructor Information

Certificate:	Commercial; Flight instructor	Age:	34, Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	
Instrument Rating(s):	Helicopter	Second Pilot Present:	Yes
Instructor Rating(s):	Helicopter	Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical-w/ waivers/lim	Last FAA Medical Exam:	September 21, 2004
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	July 25, 2004
Flight Time:	240 hours (Total, all aircraft), 116 hours (Total, this make and model), 28 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Private	Age:	50, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Valid Medical-w/ waivers/lim	Last FAA Medical Exam:	April 1, 2003
Occupational Pilot:	UNK	Last Flight Review or Equivalent:	August 4, 2004
Flight Time:	80 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Schweizer	Registration:	N61413
Model/Series:	269C-1	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	0027
Landing Gear Type:	Skid	Seats:	2
Date/Type of Last Inspection:	September 24, 2004 100 hour	Certified Max Gross Wt.:	1750 lbs
Time Since Last Inspection:	4.5 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	6298.7 Hrs as of last inspection	Engine Manufacturer:	Lycoming
ELT:	Not installed	Engine Model/Series:	HO-360-C1A
Registered Owner:	Dragonfly Corp	Rated Power:	180 Horsepower
Operator:	Group 3 Aviation	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	BUR,778 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	15:53 Local	Direction from Accident Site:	0°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	180°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.87 inches Hg	Temperature/Dew Point:	31°C / 12°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Van Nuys, CA (VNY)	Type of Flight Plan Filed:	None
Destination:	Burbank, CA (BUR)	Type of Clearance:	VFR
Departure Time:	15:15 Local	Type of Airspace:	Class D

Airport Information

Airport:	Burbank BUR	Runway Surface Type:	
Airport Elevation:	778 ft msl	Runway Surface Condition:	Unknown
Runway Used:		IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	Full stop

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:	34.200832,-118.358612

Administrative Information

Investigator In Charge (IIC):	Dunks, Kristi
Additional Participating Persons:	Carl Allen; Federal Aviation Administration; Van Nuys, CA Steven Gleason; Schweizer Aircraft Corp.; Horseheads, NY
Original Publish Date:	December 20, 2005
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=60211

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