Aviation Investigation Final Report

Location:	Temple, Texas	**Accident Number:**	CEN14LA269
Date & Time:	May 31, 2014, 10:15 Local	**Registration:**	N902CP
Aircraft:	Schweizer 269C	**Aircraft Damage:**	Substantial
Defining Event:	Ground resonance	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The pilot reported that, during initial taxi, he noticed that the intercom voice operated relay (VOX) volume was set too high, so he landed the helicopter on the asphalt taxiway to adjust the VOX. With the helicopter at flat-pitch operating rpm and just as the pilot reached to adjust the VOX, the helicopter began oscillating due to ground resonance. Within 5 seconds of touchdown, the oscillating became severe. The pilot ensured that the collective was at flat pitch, and he rolled the throttle to flight idle. Within 15 seconds, the main rotor blades impacted the ground, tail boom, and other helicopter components.

During postaccident examination, all four main landing gear dampers failed load stroke tests. The helicopter's maintenance records indicated that the main landing gear dampers were serviced by charging them with nitrogen in accordance with the helicopter's maintenance manual about 1 month before the accident. However, about 14 days before the dampers were serviced, the helicopter manufacturer had issued an alert service bulletin (ASB) that recommended a one-time load stroke inspection of the landing gear dampers to be performed at an overhaul or repair facility to ensure that the dampers were serviced correctly. Concurrently, the helicopter manufacturer had issued a revision to the maintenance manual that added a load stroke inspection procedure to the section of the manual pertaining to repair and charging of the dampers. The company's maintenance manager reported that maintenance personnel were unaware that the ASB and maintenance manual revision had been issued until after the accident. If the load stroke inspection of the dampers called for by the ASB or the maintenance manual revision had been performed, it would have identified the out-of-specification condition of the dampers before reinstallation. Because the dampers were out-of-specification, ground resonance occurred after the pilot landed the helicopter.

Probable Cause and Findings

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

Ground resonance due to maintenance personnel's improper inspection of the landing gear dampers, which resulted in the dampers operating outside of allowable limits.

Findings

Aircraft	Aux gear (tail/rotorcrft skid) - Damaged/degraded
Aircraft	Main gear strut/axle/truck - Incorrect service/maintenance

Factual Information

History of Flight

Landing	Ground resonance (Defining event)

This report was modified on December 11, 2014. Please see the docket for this accident to view the original report.

On May 31, 2014, about 1015 central standard time, a Schweizer 269C, N902CP, sustained substantial damage when it experienced ground resonance at the Draughon-Miller Central Texas Regional Airport (TPL), Temple, Texas. The commercial pilot and one passenger were not injured. The helicopter was registered to and operated by the Kachemak Bay Flying Service Inc. under the provisions of the 14 Code of Federal Regulations as a Part 91 demonstration flight. Visual meteorological conditions prevailed and no flight plan was filed. The helicopter departed TPL at 1010 on a local flight.

The pilot reported that during initial taxi he noticed that the intercom voice operated relay (VOX) volume was set too high, so he landed the helicopter on the asphalt taxiway into the wind to adjust the VOX. With the helicopter at flat pitch operating rpm, just as the pilot reached to adjust the VOX, the helicopter entered ground resonance. Within 5 seconds of touchdown, the oscillating became severe. He ensured that the collective was at flat pitch and he rolled the throttle to flight idle. Within 15 seconds, the main rotor blades impacted the ground, tail boom, and other components. The pilot shut down the engine using the magneto switch, and evacuated the helicopter with the passenger.

The four main landing gear dampers were removed from the helicopter and sent to a facility to conduct a load stroke examination. The examination used a load cell to apply pressure and a computer to record the stroke versus the load required for compression. The computer program was the same as was used to verify proper assembly and operation of new production dampers. A visual examination of the dampers revealed that all four dampers exhibited varying amounts of dried hydraulic fluid on the piston, dust seal, and the inside of the boots. All four dampers failed the load stroke test.

The left forward damper was intact with minor bending to the upper bearing lug. The load stroke test showed that it was within tolerance on the compression stroke at the lower pressure test point, but was slightly high at 3,620 lbs (should be between 2,900 and 3,600 lbs). It was out of limits at the ultimate load range.

The right forward damper was intact. The load stroke test showed that it was within tolerance on the compression stroke at the lower pressure test point. It was out of limits low at 1,787 lbs, at the ultimate load range (should be between 2,900 and 3,600 lbs).

The left rear damper was intact. The load stroke test indicated an out of limits high. It exceeded the maximum load of 3,900 lbs at 3.12 inches of travel. The nominal travel is approximately 3.5/3.6 inches.

The right rear damper was intact. The load stroke test indicated an out of limits slightly high at 3,910 lbs at the ultimate load point (should be 3,200 to 3,900 lbs).

On April 15, 2014, Sikorsky issued 269C helicopter Alert Service Bulletin (ASB) B-304. The ASB concerned a one-time load stroke inspection of the landing gear dampers to be performed at an overhaul or repair facility. The ASB was effective for all 269C models to ensure the landing gear dampers were serviced correctly. The ASB stated that compliance was essential and to be accomplished by January 9, 2015, on all landing gear dampers in service "that have been previously overhauled, serviced, disassembled or otherwise had the charge or fluid level affected." Concurrently, Sikorsky issued a revision to the Handbook of Maintenance Instructions (HMI) for the 269C that added a load stroke inspection procedure to the section of the HMI that pertains to the repair and charging of the landing gear dampers (Appendix C, Part VI).

The maintenance records indicated that the last annual maintenance inspection was conducted on April 21, 2014 with a total aircraft time of 5,204.5 hours. On April 29, 2014, the helicopter's main landing gear dampers were serviced by charging them with nitrogen in accordance with the paragraph 5-4 of the HMI's Appendix C Part VI. After the servicing, the helicopter was returned to service. The maintenance facility did not comply with the ASB B-304 or the load stroke inspection procedure in the concurrent HMI revision

The company's maintenance manager reported that the company was not aware that ASB B-304 and the concurrent HMI revision were issued until after the accident occurred. Once the company became aware of the ASB, they immediately removed the dampers from two other Schweizer 269C helicopters that they operated and had the dampers inspected per the ASB. The inspection revealed that 5 of 8 dampers failed the load test and had to be overhauled. The dampers were returned to service and the helicopters have been in operation without incident.

Pilot Information

Certificate:	Airline transport; Flight instructor	**Age:**	60
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter; Instrument airplane; Instrument helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	December 17, 2013
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	June 25, 2012
Flight Time:	10300 hours (Total, all aircraft), 350 hours (Total, this make and model), 65 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Schweizer	**Registration:**	N902CP
Model/Series:	269C	**Aircraft Category:**	Helicopter
Year of Manufacture:	1995	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	S1715
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	April 21, 2014 Annual	**Certified Max Gross Wt.:**	2050 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	5205 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Not installed	**Engine Model/Series:**	HIO-360-D1A
Registered Owner:	KACHEMAK BAY FLYING SERVICE INC	**Rated Power:**	190 Horsepower
Operator:	KACHEMAK BAY FLYING SERVICE INC	**Operating Certificate(s) Held:**	None
Operator Does Business As:	Kachemak Bay FLying Service	**Operator Designator Code:**	YKBA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TPL,682 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	09:45 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Few	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	340°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.93 inches Hg	**Temperature/Dew Point:**	27°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Temple, TX (TPL)	**Type of Flight Plan Filed:**	None
Destination:	Temple, TX (TPL)	**Type of Clearance:**	None
Departure Time:	10:10 Local	**Type of Airspace:**	

Airport Information

Airport:	Temple Central Texas Regional TPL	**Runway Surface Type:**	Asphalt
Airport Elevation:	682 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	31.151945,-97.407775

Administrative Information

Investigator In Charge (IIC):	Silliman, James
Additional Participating Persons:	Robert O'Keefe; FAA San Antonio FSDO; San Antonio , TX
Original Publish Date:	January 12, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=89331