National Transportation Safety Board
Aviation Accident Data Summary

Location:	Honolulu, HI	**Accident Number:**	WPR16FA072
Date & Time:	02/18/2016, 1020 HST	**Registration:**	N80918
Aircraft:	BELL 206B	**Injuries:**	1 Fatal, 3 Serious, 1 Minor
Flight Conducted Under:	Part 91: General Aviation - Aerial Observation - Sightseeing		

Analysis

The commercial pilot of the helicopter was performing a local air tour around the island with four passengers onboard. During the flight, he noticed a vibration throughout the cabin. The pilot diverted toward the destination airport; however, when the vibration stopped shortly thereafter, he decided to initiate a turn so the passengers could see a nearby landmark. The vibration returned shortly thereafter, and the pilot began to maneuver toward the destination airport a second time. The pilot stated that the vibration developed into a grinding sensation, which was followed by illumination of the main rotor low rpm warning light and an increase in engine rpm to the point where the engine and rotor RPM needles were no longer matched on the power turbine gauge. The pilot initiated an approach to a grassy area near the shoreline; however, due to the presence of people nearby, he turned the helicopter slightly left to land in the water as close to shore as possible. The pilot said that, about 20 ft above the water, it felt like the main rotor stalled, the helicopter lost lift, and it "fell out of the sky." The helicopter descended rapidly into the water and sank about 20 ft from the shoreline.

Three of the passengers were able to egress the helicopter following impact; however, the middle aft seat passenger was trapped inside. A first responder stated that he and another person repeatedly dove underwater to cut the passenger's seatbelt straps and extract him. The first responder reported that the passenger's life preserver appeared to be entangled with the seatbelts. Postaccident examination of the life preserver revealed signatures of inflation and cut waist straps, with no other damage noted. It could not be determined when or how the life preserver was inflated; the first responder could not recall whether it was inflated and the nurse providing CPR said it was not inflated. Review of treatment records for the passenger revealed evidence consistent with drowning, and no traumatic injuries to the head or neck. It could not be determined whether the passenger was unable to extricate himself from the restraint, or if he had a period of unconsciousness resulting from the impact that contributed to his drowning. The helicopter's doors were not installed at the time of the accident and all five seat restraints were found to be in working order and undamaged.

Postaccident examination of the helicopter revealed that the engine-to-transmission drive shaft was separated at the transmission side. Metallurgical examination of the engine-to-transmission drive shaft components revealed that the forward coupling did not appear to be lubricated and that there were multiple indications of exposure to elevated temperature, such as heat tinting and loss of the temperature plates on the forward outer coupling, high-temperature cadmium-induced brittle fracture of two forward attachment bolt heads, and a loss of hardness of the bolt head material due to high-temperature tempering. The external spline teeth on the forward spherical coupling were worn down to the bottom landings, while comparatively minor wear marks were observed on the mating internal spline teeth of the forward outer coupling. The asymmetry in the wear pattern between the spherical coupling and the outer coupling combined with the observations consistent with elevated

temperatures indicate that the assembly likely failed by overheating due to lack of lubrication. This resulted in softening and subsequent failure of the spring that limits and centers the spherical coupling. When the spring failed, the coupling shifted forward, damaging the forward end of the outer coupling, fracturing the forward cover plate, and wearing the external spline teeth down to the bottom landings. Following the failure of the drive shaft, the engine would have continued to operate, but would not have been able to drive the main rotor.

Interviews with the pilot, the owner of the company, and a non-mechanic rated maintenance assistant indicated that maintenance had recently been conducted on the engine-to-transmission drive shaft, even though this was not recorded in the helicopter's maintenance records. In addition, the owner, who was a rated mechanic, was not present the entire time throughout the removal, inspection, and subsequent reinstallation of the engine-to-transmission drive shaft.

It is likely that, when this maintenance was conducted, grease was not applied to the forward coupling as specified in the manufacturer's maintenance manual. Further review of maintenance records revealed no entries pertaining to a current annual inspection or 100-hour inspection. Additionally, a component inspection sheet provided by the operator revealed that several required component inspections were overdue and had not been completed at the time of the accident.

Although the FAA was conducting oversight in accordance with their guidance, increased inspections may have uncovered the inadequate maintenance and documentation, which in turn, may have prevented the accident.

Flight Events

Prior to flight - Aircraft maintenance event
Enroute-cruise - Sys/Comp malf/fail (non-power)
Enroute-cruise - Emergency descent initiated
Enroute-cruise - Collision with terr/obj (non-CFIT)

Probable Cause

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

The in-flight failure of the engine-to-transmission drive shaft due to improper maintenance, which resulted in low main rotor rpm and a subsequent hard landing to water.

Findings

Aircraft-Aircraft propeller/rotor-Main rotor drive-Engine/transmission coupling-Failure - C
Aircraft-Aircraft handling/service-Maintenance/inspections-Scheduled maint checks-Not serviced/maintained
Personnel issues-Task performance-Maintenance-Installation-Maintenance personnel - C
Personnel issues-Experience/knowledge-Experience/qualifications-Qualification/certification-

Maintenance personnel
Personnel issues-Task performance-Maintenance-Scheduled/routine maintenance-Maintenance personnel
Environmental issues-Physical environment-Terrain-Water-Contributed to outcome - C
Organizational issues-Support/oversight/monitoring-Oversight-Oversight of maintenance-Operator - C

Pilot Information

Certificate:	Flight Instructor; Commercial	**Age:**	35
Airplane Rating(s):	None	**Instrument Rating(s):**	Helicopter
Other Aircraft Rating(s):	Helicopter	**Instructor Rating(s):**	Helicopter
Flight Time:	(Estimated) 900 hours (Total, all aircraft), 151 hours (Total, this make and model), 151 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BELL	**Registration:**	N80918
Model/Series:	206B B	**Engines:**	1 Turbo Shaft
Operator:	Genesis Helicopters	**Engine Manufacturer:**	ALLISON
Operating Certificate(s) Held:	None	**Engine Model/Series:**	250-C20B
Flight Conducted Under:	Part 91: General Aviation - Aerial Observation - Sightseeing		

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	PHNL, 7 ft msl	**Weather Information Source:**	Weather Observation Facility
Lowest Ceiling:		**Wind Speed/Gusts, Direction:**	12 knots / 18 knots, 50°
Temperature:	26°C	**Visibility**	10 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Honolulu, HI (HLN)	**Destination:**	Honolulu, HI (HLN)

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal, 2 Serious, 1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Latitude, Longitude:	21.366667, -157.940278		

Administrative Information

Investigator In Charge (IIC):	Joshua Cawthra	**Adopted Date:**	02/22/2018
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=92743		