



National Transportation Safety Board Aviation Accident Final Report

Location:	RIVIERA, TX	Accident Number:	FTW98LA084
Date & Time:	01/02/1998, 0830 CST	Registration:	N1091Y
Aircraft:	Hughes 269C	Aircraft Damage:	Substantial
Defining Event:		Injuries:	2 None

Flight Conducted Under: Part 91: General Aviation - Other Work Use

Analysis

Following a total loss of engine power, during a cattle herding flight, the pilot executed an autorotation to an area confined by trees. Engine examination revealed a broken crankshaft & camshaft. The camshaft exhibited deformation consistent with overload. All four cylinder mounting flanges were fretted & all piston rings showed 'excessive' wear. The #1 & #4 cylinder top compression rings were broken. Main bearing saddle faces of the crankcase showed heavy fretting. The engine manufacturer Materials Laboratory reported the mode of fracture of the crankshaft was fatigue. The fatigue originated from the oil hole (between #3 main & #3 crankpin journals) in the cheek and near the rear fillet radius of the #3 main bearing journal. The cause of the fatigue was not determined. During the overhaul, the crankshaft received a magnaflux inspection & re-nitriding by an inspection facility. The engine was reassembled & returned to service by company maintenance personnel. The engine had 1150.6 hours since overhaul.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The total loss of engine power due to a fatigue failure of the crankshaft for undetermined reason. A factor was the lack of suitable terrain for the forced landing.

Findings

Occurrence #1: LOSS OF ENGINE POWER

Phase of Operation: MANEUVERING

Findings

1. (C) ENGINE ASSEMBLY, CRANKSHAFT - FATIGUE
2. (C) REASON FOR OCCURRENCE UNDETERMINED

Occurrence #2: FORCED LANDING

Phase of Operation: EMERGENCY DESCENT/LANDING

Findings

3. (F) TERRAIN CONDITION - NONE SUITABLE
4. OBJECT - TREE(S)

Factual Information

On January 2, 1998, at 0830 central standard time, a Hughes 269C helicopter, N1091Y, owned and operated by Smith Helicopters, Inc., under Title 14 CFR Part 91, sustained substantial damage during an autorotation following a loss of engine power while maneuvering near Riviera, Texas. The commercial pilot and the passenger were not injured. Visual meteorological conditions prevailed for the local cattle herding flight and a flight plan was not filed. The flight originated from the King Ranch at 0745.

During telephone interviews, conducted by the investigator-in-charge (IIC), and on the Pilot/Operator Aircraft Accident Report (NTSB Form 6120.1/2), the pilot and the operator reported that the pilot was maneuvering the helicopter at 75 feet agl herding cattle on the King Ranch when the engine "started missing briefly then quit." The pilot executed an autorotation to a dirt road confined by mesquite trees 15 to 20 feet in height. During the landing, the main rotor struck the tailboom. The tailboom, vertical and horizontal stabilizer, main rotor blades, and the tail rotor driveshaft received structural damage.

A review of the engine maintenance records, by the FAA inspector and the IIC, revealed that the Lycoming HIO-360-D1A engine, S/N L-25772-51A, was manufactured in 1991. The engine was overhauled in January 1995. During the engine overhaul, the crankshaft received a magnaflux inspection and re-nitriding. The crankshaft was certified and approved for return to service by Aircraft Engine & Accessory Co., Inc., Dallas, Texas. The engine was reassembled by a mechanic and installed in N1091Y. The engine was returned to service by company maintenance personnel on February 21, 1995. At the time of the accident, the engine time since overhaul was 1,150.6 hours. The last 100 hour inspection was performed on October 7, 1997, and the airplane had accumulated 69 hours since the inspection.

On March 10, 1998, at Laredo, Texas, the FAA inspector examined the helicopter and the engine. Structural damage to the airframe was confirmed. The inspector reported that the engine crankshaft would not rotate. When cylinders #1 and #3 were removed from the engine, the FAA inspector found that a portion of the crankshaft appeared to be separated in the area of the #3 main bearing. A piece of metal was found in the oil screen sump. The engine was shipped to Textron Lycoming, Williamsport, Pennsylvania, for further examination.

On September 16, 1998, in Williamsport, Pennsylvania, under the surveillance of an FAA inspector, a teardown of the engine revealed a broken crankshaft and camshaft. The camshaft exhibited deformation consistent with overload. All four cylinder mounting flanges were fretted and all piston rings showed "excessive" wear. The #1 and the #4 cylinder top compression rings were broken. The engine and aircraft logs provided no indications as to what service bulletins or FAA Airworthiness Directives had been complied with from overhaul to the time of the accident. The #1, #2, and the #3 center main bearing saddle faces of the crankcase showed heavy fretting. Fresh fretting was seen on the #4 main saddle surface. The oil holes and galleys were normal. See the enclosed reports for additional details.

The crankshaft was examined by the Textron Lycoming Materials Laboratory. The mode of fracture of the crankshaft was fatigue. The fatigue originated from the oil hole (between #3 main and #3 crankpin journals) in the cheek and near the rear fillet radius of the #3 main bearing journal. The cause of the fatigue was not determined.

The helicopter was released to the owner's representative.

Pilot Information

Certificate:	Commercial	Age:	28, Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	Seatbelt
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	04/15/1997
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	567 hours (Total, all aircraft), 567 hours (Total, this make and model), 527 hours (Pilot In Command, all aircraft), 254 hours (Last 90 days, all aircraft), 61 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Hughes	Registration:	N1091Y
Model/Series:	269C 269C	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	411050
Landing Gear Type:	Skid	Seats:	2
Date/Type of Last Inspection:	10/07/1997, 100 Hour	Certified Max Gross Wt.:	1700 lbs
Time Since Last Inspection:	69 Hours	Engines:	1 Reciprocating
Airframe Total Time:	6631 Hours	Engine Manufacturer:	Lycoming
ELT:		Engine Model/Series:	HIO-360-D1A
Registered Owner:	SMITH HELICOPTERS, INC.	Rated Power:	190 hp
Operator:	SMITH HELICOPTERS, INC.	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	, 0 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	0000	Direction from Accident Site:	0°
Lowest Cloud Condition:	Clear / 0 ft agl	Visibility	20 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	5 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	135°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:		Temperature/Dew Point:	20° C
Precipitation and Obscuration:			
Departure Point:		Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	VFR
Departure Time:	0745 CDT	Type of Airspace:	

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:	

Administrative Information

Investigator In Charge (IIC):	JOYCE ROACH	Report Date:	02/16/2001
Additional Participating Persons:	JIM AGUILAR; SAN ANTONIO, TX JOE GREEN; NEW CUMBERLAND, PA BOB OHNMEISS; WILLIAMSPORT, PA		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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](#).