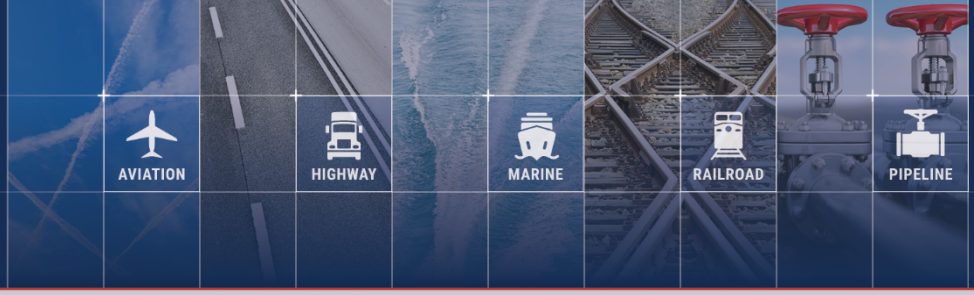

Aviation Investigation Final Report

Location:	Kekaha, Hawaii	**Accident Number:**	ANC24LA017
Date & Time:	February 27, 2024, 13:40 Local	**Registration:**	N633JH
Aircraft:	MD Helicopter 369E/500E	**Aircraft Damage:**	Substantial
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	1 Serious, 4 Minor
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled - Sightseeing		

Analysis

The pilot reported that, while conducting a doors-off helicopter sightseeing flight near the northern shoreline on the island of Kauai, he smelled smoke and immediately began flying toward a beach for a precautionary landing. Very shortly thereafter he heard a loud “pop,” followed by the engine out aural warning tone. The pilot immediately lowered the collective control and entered an autorotation to land at a nearby smaller, remote sand-covered beach. As the helicopter touched down, it rocked forward and nosed down into the sand. The helicopter then rolled to the right and came to rest on its side, resulting in substantial damage to the tail boom, fuselage, and main rotor system.

An initial examination revealed that the overrunning clutch and engine-to-transmission driveshaft were fractured. The overrunning clutch was found to have failed at its output (forward) end, with significant thermal damage to the clutch inner race and output bearing. The overrunning clutch assembly, Kaflex driveshaft, and the grease sample from the engine power output pad were collected and sent to the NTSB Materials Laboratory. Further examination of the overrunning clutch found the thermal damage was consistent with frictional heating of the output bearing, leading to the output bearing’s failure, causing the clutch inner race to become very hot and degrade its material strength.

The mechanics who maintained and inspected the accident helicopter during its last 100-hour and 300-hour inspections had not removed the output bearing from the overrunning clutch when repacking the bearing with new grease during the inspections. The removal of the output bearing from the overrunning clutch during the regreasing procedure was required by the maintenance manual to allow visual confirmation that the old grease had been pushed out of the bearing during the repacking process.

By neglecting to remove the output bearing from the overrunning clutch during the regreasing procedure, the mechanics could not confirm that the old grease had been completely displaced from the output bearing. A significant quantity of old grease likely remained within the output bearing due to the bearing not being removed during the regreasing procedure. Over time, and with continued use, this residual grease likely degraded further, ultimately leading to the failure of the output bearing.

Probable Cause and Findings

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

Maintenance personnel's noncompliance with maintenance manual procedures that required the removal of the overrunning clutch output bearing during the regreasing procedure, which resulted in inadequate regreasing of the bearing and the subsequent failure of the overrunning clutch assembly.

Findings

Aircraft	Engine/transmission coupling - Incorrect service/maintenance
Aircraft	Engine/transmission coupling - Fatigue/wear/corrosion
Personnel issues	Scheduled/routine maintenance - Maintenance personnel
Aircraft	Engine/transmission coupling - Failure

Factual Information

History of Flight

Enroute-cruise	Powerplant sys/comp malf/fail (Defining event)

On February 27, 2024, about 1340 Hawaii-Aleutian standard time, an MD Helicopter 369E/500E, N633JH, was substantially damaged when it was involved in an accident on a remote beach about 14 miles north of Kekaha, Hawaii, on the island of Kauai. The pilot and three passengers sustained minor injuries, and one passenger sustained serious injuries. The helicopter was operated as a Title *14 Code of Federal Regulations* Part 135 sightseeing flight.

According to the pilot, while conducting a doors-off, helicopter sightseeing flight near the northern shoreline on the island of Kauai, he smelled smoke and immediately began flying to an area known as Kalalau Beach, which is one of the operator's predetermined helicopter emergency landing zones along the NaPali Coast. Very shortly thereafter he heard a loud "pop," followed by the engine out aural warning tone. The pilot immediately lowered the collective control and entered an autorotation to land at a nearby smaller, remote beach known as Honopu Beach, as an emergency landing site. As the helicopter touched down on the sand-covered beach, it rocked forward and nosed down into the sand. The helicopter then rolled to the right and came to rest on its side, which resulted in substantial damage to the tail boom, fuselage, and main rotor system.

Postaccident examination revealed that the overrunning clutch and engine-to-transmission driveshaft were fractured. The main rotor blades were partially attached to the main rotor hub. The main gearbox remained installed on the airframe and its attaching hardware remained intact with no evidence of looseness. The main gearbox could not be manually rotated due to damage to the main rotor head. The main gearbox input flange remained installed and the drive belt for the oil cooler blower was intact.

The Kaflex driveshaft had fractured and separated at both ends of its flex plates. The Kaflex driveshaft tube was continuous and did not exhibit torsional deformation or fractures. The forward flex plate assembly had fractured at its aft plate. The aft flex plate assembly had fractured at its forward plate. All fasteners for the Kaflex driveshaft installation remained installed and their torque stripes were present with no evidence of torque stripe misalignment. The forward splined flange, attaching to the main gearbox input pinion, and the aft splined flange, attaching to the splined output shaft of the overrunning clutch, did not exhibit cracks, fractures, or deformation.

The majority of the overrunning clutch subassembly and the clutch housing remained installed on the engine gearbox housing, but the clutch inner race splined shaft had fractured aft of the splines, with the fracture exhibiting a spiral and partially melted appearance (figure 1).

Figure 1. The fractured and thermally deformed clutch inner race.

The forward portion of the fractured clutch inner race splined shaft remained attached to the aft splined flange that was attached to the aft end of the Kaflex driveshaft.

An overrunning clutch permits the output, or driven member, of the clutch to freewheel whenever the input, or driving member, is stopped or is rotating at a slower speed. In a helicopter, overrunning clutches are designed to disengage the engine from the rotor drivetrain to allow the rotors to turn freely without drag from the engine, such as during an autorotation.

The overrunning clutch subassembly on the accident helicopter is primarily comprised of the outer race, inner race, sprag assembly, forward and aft sprag bearings, and the output bearing. Adding the clutch housing and retaining ring to the clutch subassembly creates the overrunning clutch assembly.

A portion of the clutch output bearing, normally installed immediately adjacent to the clutch inner race's splines, was found in its normally installed location but had separated from the clutch. However, the clutch output bearing found was composed only of the bearing outer race with three roller (ball) elements adhered to the outer race and exhibited thermal damage

(figure 2). A circular metal piece, which exhibited thermal damage and deformation, was found with the output bearing.

Figure 2. The clutch output bearing outer race with the three roller elements adhered.

After the engine was removed from the airframe, the overrunning clutch was observed to be installed normally on its engine gearbox mounting studs. The overrunning clutch assembly was removed from the engine gearbox, revealing the clutch outer race splines, which did not exhibit anomalous wear.

Dark brown material, similar in consistency to grease mixed with oil, was present on the forward face of the clutch mounting pad of the engine gearbox. The dark brown material had metallic-colored specks within the mixture. The composition of the metal flakes within this mixture consisted of low alloy steel and stainless steel. Functionality of the clutch's sprags was confirmed upon manual rotation of the clutch's input splines: in the drive direction, the sprags engaged, and in the freewheeling direction, the sprags disengaged; rotation of the clutch shaft was difficult due to its damaged state.

The overrunning clutch assembly, Kaflex driveshaft, and the grease sample from the engine power output pad were examined by the NTSB Materials Laboratory. Examination of the fracture surfaces on the flex plates of the Kaflex driveshaft showed signatures consistent with overload; no evidence of fatigue was observed on these fracture surfaces. Examination of the damage to the components at the forward end of the overrunning clutch assembly showed

heat tinting, oxidation, and deformation consistent with high heat exposure. The output bearing outer race contained remnant balls (roller elements) and cage pieces that had melted and resolidified to the outer race.

The accident helicopter's Aircraft Maintenance Manual (AMM) includes a grease repack task as part of the 300-hr checklist. This task required disassembly of the overrunning clutch assembly to inspect the condition of the clutch inner race, clutch outer race, and sprag assembly at 300-hour intervals. During this inspection, as required by the maintenance manual, the output bearing was to be removed and repacked with new grease.

NTSB investigators interviewed two mechanics employed at the operator who had previously worked on checklist tasks for the 100-hour and 300-hour inspections, including the [output] ball bearing grease repack task. Both mechanics had experience performing the 100-hour and the 300-hour inspections on various helicopters at the operation; however, they could not recall, with certainty, which portions of the previous 100-hour and 300-hour inspections on the accident helicopter they had personally performed. Review of the logbooks reveal the clutch was inspected at both the most recent 100-hour inspection in February, 2024, and the most recent 300-hour inspection in January, 2024. Both mechanics stated that they had not removed the output bearing for the grease repack task during previous inspections. It was found that, at the time of the accident, removing the output bearing during the grease repack task was not a common practice for maintenance personnel at the operation.

Additionally, one mechanic specified that, after the accident involving N633JH, he recently began to remove the bearing for the grease repack task. One mechanic believed the accident overrunning clutch had a riveted cage ball bearing. The other mechanic recalled that he had never seen the output bearing grease dried out or melted, and that the "old" grease typically looked like "normal" grease.

Pilot Information

Certificate:	Commercial	**Age:**	35,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter; Instrument helicopter	**Toxicology Performed:**	
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	July 14, 2023
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 15, 2024
Flight Time:	10998 hours (Total, all aircraft), 5975 hours (Total, this make and model), 10923 hours (Pilot In Command, all aircraft), 167 hours (Last 90 days, all aircraft), 71 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Passenger Information

Certificate:		**Age:**	Male
Airplane Rating(s):		**Seat Occupied:**	Left
Other Aircraft Rating(s):		**Restraint Used:**	3-point
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:			

Passenger Information

Certificate:		**Age:**	Female
Airplane Rating(s):		**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	4-point
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:			

Passenger Information

Certificate:	**Age:**	Male
Airplane Rating(s):	**Seat Occupied:**	Right
Other Aircraft Rating(s):	**Restraint Used:**	3-point
Instrument Rating(s):	**Second Pilot Present:**	No
Instructor Rating(s):	**Toxicology Performed:**	
Medical Certification:	**Last FAA Medical Exam:**	
Occupational Pilot:	**Last Flight Review or Equivalent:**	
Flight Time:		

Passenger Information

Certificate:	**Age:**	Female
Airplane Rating(s):	**Seat Occupied:**	Center
Other Aircraft Rating(s):	**Restraint Used:**	3-point
Instrument Rating(s):	**Second Pilot Present:**	No
Instructor Rating(s):	**Toxicology Performed:**	
Medical Certification:	**Last FAA Medical Exam:**	
Occupational Pilot:	**Last Flight Review or Equivalent:**	
Flight Time:		

Aircraft and Owner/Operator Information

Aircraft Make:	MD Helicopter	**Registration:**	N633JH
Model/Series:	369E/500E	**Aircraft Category:**	Helicopter
Year of Manufacture:	1987	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	0230E
Landing Gear Type:	High skid	**Seats:**	5
Date/Type of Last Inspection:	February 21, 2024 100 hour	**Certified Max Gross Wt.:**	3000 lbs
Time Since Last Inspection:	125.4 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	25086.8 Hrs at time of accident	**Engine Manufacturer:**	Rolls-Royce
ELT:	C126 installed, activated, aided in locating accident	**Engine Model/Series:**	M250-C20B
Registered Owner:	JACK HARTER HELICOPTERS INC	**Rated Power:**	420 Horsepower
Operator:	JACK HARTER HELICOPTERS INC	**Operating Certificate(s) Held:**	Rotorcraft external load (133), On-demand air taxi (135), Commercial air tour (136)
Operator Does Business As:		**Operator Designator Code:**	DCGA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HBK,12 ft msl	**Distance from Accident Site:**	10 Nautical Miles
Observation Time:	12:51 Local	**Direction from Accident Site:**	218°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots / None	**Turbulence Type Forecast/Actual:**	Unknown / Terrain-Induced
Wind Direction:	290°	**Turbulence Severity Forecast/Actual:**	Unknown / Unknown
Altimeter Setting:	30.15 inches Hg	**Temperature/Dew Point:**	27°C / 15°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lihue, HI (LIH)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Lihue, HI (LIH)	**Type of Clearance:**	VFR
Departure Time:	13:10 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious, 3 Minor	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 4 Minor	**Latitude, Longitude:**	22.166005,-159.67246(est)

Administrative Information

Investigator In Charge (IIC):	Rasmussen, Mitchell
Additional Participating Persons:	Andrew Rasmussen ; FAA - FSDO; Honolulu, HI Patrick Lusch; Federal Aviation Administration - AVP 110; Washington DC, DC Christopher (Casey) Riemer; Jack Harter Helicopter; Lihue, HI Lawrence (Mac) Johnson; MD Helicopters; Mesa, AZ David Riser; Rolls-Royce Corporation ; Indianapolis, IN Jeffrey Chang; FAA - West Certification Branch; Lakewood, CA Chris Hoesel; Jack Harter Helicopters; Lihue, HI
Original Publish Date:	June 25, 2026
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=193859