Aviation Investigation Final Report

Location:	Belgrade, Montana	**Accident Number:**	SEA06LA074
Date & Time:	April 14, 2006, 20:40 Local	**Registration:**	N671
Aircraft:	Central Copters Lancair IV-P	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

While on final for a night visual approach, the quill shaft between the reduction gear box and the power section of the engine decoupled. This resulted in a loss of drive input to the propeller, and ultimately to an off-field forced landing on rough/uneven terrain. Although the initial touchdown was successful, during the rollout the aircraft impacted the terrain, and after it came to a stop a small fire developed near the engine exhaust. Although the occupants tried to put out the fire, they were unable to do so, and the aircraft was eventually consumed by the fire.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The total loss of drive power to the aircraft's propeller while on a visual final approach, due to the decoupling of the quill shaft between the reduction gearbox and the engine power section. Factors include a dark night, no suitable terrain on which to land, and the rough/uneven nature of the terrain upon which the pilot had to execute his forced landing.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF
Phase of Operation: APPROACH

Findings
1. (C) TURBOSHAFT ENGINE,POWER OUTPUT SHAFT - DISCONNECTED

Occurrence #2: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: EMERGENCY LANDING

Findings
2. (F) TERRAIN CONDITION - NONE SUITABLE
3. (F) TERRAIN CONDITION - ROUGH/UNEVEN
4. (F) LIGHT CONDITION - DARK NIGHT

Factual Information

On April 14, 2006, approximately 2040 mountain daylight time, an experimental Central Copters Lancair IV-P, N671, impacted the terrain during an off-field forced landing about one and one-half miles northwest of the approach end of runway 12 at Gallatin Field, Belgrade, Montana. The commercial pilot and his two passengers were not injured, but the aircraft, which was owned and operated by the pilot, was destroyed by the post-crash fire. The 14 CFR Part 91 personal pleasure flight, which departed Spokane International Airport, Spokane, Washington, about 90 minutes prior to the accident, had been on an IFR flight plan, and was on a night visual approach in visual meteorological conditions at the time of the power loss that lead to the forced landing. There was no report of an ELT activation.

According to the pilot, who failed to meet the reporting requirements of Title 49, Part 830.15 (a), when the aircraft was about three miles from the approach end of the runway, the engine suddenly developed a loud howling sound, the torque became very erratic, and the exhaust gas temperature (EGT) exceeded its normal limits. Soon thereafter the engine lost all power, and though there was no suitable nearby terrain on which to land, the pilot turned toward what appeared to be an open area in order to execute a forced landing. Although the touchdown was successful, the aircraft structure came in contact with the rough terrain during the landing roll, and after it came to a stop, a small fire developed near the engine exhaust. Although all occupants exited the aircraft without injury, they were unable to extinguish the fire, which slowly spread, and ultimately consumed the aircraft structure.

During the investigation, it was determined that the experimental aircraft was powered by a Garrett TPE331-6-252M turbo-shaft engine, driving a 280 centimeter diameter five-bladed variable pitch wood/composite MT Propeller (MTV-27). Engine traceability records indicate that the engine was last overhauled by AlliedSignal Aerospace Services, Repair Station ZN3R030M, on 6/19/97. Records also show that Intercontinental Jet Corporation mounted the engine on a test stand in January of 2001, to comply with the operational checks in accordance with the maintenance manual. While on the test stand, all oil was drained from the engine in preparation for shipment to the owner of N671. On October 10, 2005, the owner/builder of N671 annotated in the engine log book that he had installed the engine on Lancair serial number 423 (N671). Discussions with International Jet Corporation determined that they no longer had process records on file for this engine, and the engine records provided by the owner/builder of N671 did not indicate that any of the monthly or biennial engine preservation/depreservation actions prescribed in Chapter 72 of the TPE331-6/10 Maintenance Manual had been performed.

On May 17, 2006, an owner-directed engine teardown inspection was performed by Ag Air Turbines of Caldwell, Idaho. In addition to the owner and his representatives, both the FAA and Honeywell (Product Integrity) had individuals present to observe the teardown. During this

teardown, it was determined that the majority of the structure of the quill shaft forward splines, which showed significant thermal distress, had worn away, resulting in the power section of the engine becoming uncoupled from the reduction gearbox section of the engine. It was also noted that the ball lock coupler and its three locking balls, which ensure the coupling of the quill shaft to the high-speed pinion gear shaft, were found lying in the oil in the bottom of the nose case. The root cause of the disengagement of the coupling assembly was not positively determined.

Pilot Information

Certificate:	Commercial	**Age:**	52,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	April 1, 2005
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	23300 hours (Total, all aircraft), 50 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Central Copters	**Registration:**	N671
Model/Series:	Lancair IV-P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	423
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	June 1, 2004 Condition	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	85 Hrs	**Engines:**	1 Turbo prop
Airframe Total Time:	85 Hrs at time of accident	**Engine Manufacturer:**	Garrett
ELT:	Installed, not activated	**Engine Model/Series:**	TPE331-6-252M
Registered Owner:	Central Copters	**Rated Power:**	808 Horsepower
Operator:	Mark W. Duffy	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	KBZN,4470 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	19:53 Local	**Direction from Accident Site:**	120°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.51 inches Hg	**Temperature/Dew Point:**	11°C / 1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Spokane, WA (KGEG)	**Type of Flight Plan Filed:**	IFR
Destination:	Belgrade, MT (KBZN)	**Type of Clearance:**	VFR
Departure Time:	19:10 Local	**Type of Airspace:**	

Airport Information

Airport:	Gallitin Field KBZN	**Runway Surface Type:**	
Airport Elevation:	4471 ft msl	**Runway Surface Condition:**	Rough
Runway Used:	12	**IFR Approach:**	Visual
Runway Length/Width:	9000 ft / 150 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 None	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 None	**Latitude, Longitude:**	45.800556,-111.189445

Administrative Information

Investigator In Charge (IIC):	Anderson, Orrin
Additional Participating Persons:	Bob Speicher; Helena FSDO
Original Publish Date:	March 26, 2007
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=63515