Aviation Investigation Final Report

Location:	Casper, Wyoming	**Accident Number:**	WPR19LA029
Date & Time:	November 19, 2018, 14:50 Local	**Registration:**	N59BK
Aircraft:	BKF Backcountry Supercub	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Flight test		

Analysis

The commercial pilot was flight testing the airplane to evaluate an experimental diesel engine reduction gearbox. During the takeoff, as the airplane climbed above 500 ft above ground level, the pilot increased engine power, but a total loss of engine power occurred shortly afterward. The pilot initiated a left descending turn to return to the runway. During the landing sequence, the airplane had a high descent rate. The airplane touched down hard, resulting in the separation of the left main landing gear axle and substantial damage to the left wing lift strut.

Postaccident examination of the engine reduction gearbox found that two propeller shaft bearings inside the reduction gearbox seized, causing the total loss of engine power.

Probable Cause and Findings

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

The seizure of two bearings in the reduction gearbox, resulting in the total loss of engine power. Contributing to the accident was a high descent rate which resulted in a hard landing.

Findings

Aircraft	(general) - Failure
Personnel issues	Aircraft control - Pilot
Aircraft	Descent rate - Not attained/maintained

Factual Information

History of Flight

Initial climb	Loss of engine power (total) (Defining event)
Landing-flare/touchdown	Loss of control in flight
Landing	Hard landing

On November 19, 2018, about 1450 mountain standard time, an experimental amateur-built BKF Backcountry Super Cub airplane, N59BK, was substantially damaged when it was involved in an accident near Casper, Wyoming. The commercial pilot and pilot-rated passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 test flight.

The airplane was part of an experimental program using a diesel engine and reduction gearbox to transfer power from the engine to the propeller. The pilot reported that when landing during the previous flight, the airplane lacked pitch authority to flare with the engine at idle. The airplane's elevator was re-rigged to correct the lack of pitch authority.

According to the pilot, he initiated the takeoff for the accident flight from runway 21 using full power. After the airplane became airborne, the pilot reduced power slightly. As the airplane climbed above 500 ft above ground level, the pilot increased engine power, but a total loss of engine power occurred shortly afterward. The pilot initiated a left descending turn to return to the runway. During the turn, the pilot realized that he would not be able to completely align with the runway, so he leveled the wings to land on the runway and roll off the runway edge into the grass. The pilot stated, that, during the descent, the airplane's indicated airspeed was 50 knots, and the airplane had a high descent rate. Subsequently, the airplane landed hard on the right side of runway 21, and the left main landing gear axle separated. The left wing lift strut was substantially damaged.

Pilot Information

Certificate:	Commercial	**Age:**	73,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	September 28, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	April 20, 2017
Flight Time:	20322 hours (Total, all aircraft), 1 hours (Total, this make and model), 28 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Passenger Information

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

Aircraft and Owner/Operator Information

Aircraft Make:	BKF	**Registration:**	N59BK
Model/Series:	Backcountry Supercub	**Aircraft Category:**	Airplane
Year of Manufacture:	2018	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	BC21115R006
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	2600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	0.5 Hrs at time of accident	**Engine Manufacturer:**	CKT
ELT:	Not installed	**Engine Model/Series:**	TD240
Registered Owner:		**Rated Power:**	240 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KCPR,5344 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	22:53 Local	**Direction from Accident Site:**	10°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	220°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.17 inches Hg	**Temperature/Dew Point:**	2°C / -6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Casper, WY (CPR)	**Type of Flight Plan Filed:**	None
Destination:	Casper, WY (CPR)	**Type of Clearance:**	VFR
Departure Time:	14:50 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	CASPER/NATRONA COUNTY INTL CPR	**Runway Surface Type:**	Asphalt
Airport Elevation:	5344 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	21	**IFR Approach:**	None
Runway Length/Width:	10165 ft / 150 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	42.905834,-106.459999(est)

The reduction gearbox was examined at Bent Wing Aviation in Casper, and a Federal Aviation Administration representative from the Casper flight standards field office oversaw the examination. The examination report stated, "both forward and reverse thrust bearings on the main propeller shaft

were fused or seized." Additional information regarding the reduction gearbox examination is available in the public docket for this accident.

Additional Information

The owner of Backcountry Cub kit airplanes stated that the inability to bring up the nose during an engine-out landing was "not a characteristic of the airplane."

The pilot stated that the airplane's stall speed should have been in the mid-30-knot range. He also stated that, other than a high descent rate, he had no indication that the airplane was near a stall.

Administrative Information

Investigator In Charge (IIC):	Salazar, Fabian		
Additional Participating Persons:	Bruce Hanson; Casper FSFO; Casper, WY Travis Peters; Bent Wing Aviation; Casper, WY		
Original Publish Date:	September 16, 2021	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98667		