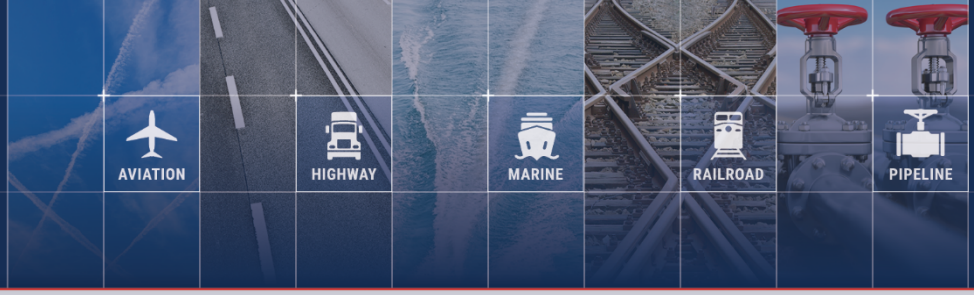

Aviation Investigation Final Report

Location:	Waterville, Maine	**Accident Number:**	ERA21LA021
Date & Time:	October 14, 2020, 08:20 Local	**Registration:**	N499CZ
Aircraft:	Beech 99	**Aircraft Damage:**	Substantial
Defining Event:	Landing gear collapse	**Injuries:**	1 None
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

While taxiing to the ramp, the airplane's right main landing gear collapsed, resulting in substantial damage to the right wing. Examination of the right main landing gear drag leg support fitting and angle bracket revealed several areas of fatigue cracking with multiple origins. The attach angle bracket fracture exhibited features consistent with fatigue. The reason for the crack initiation could not be determined.

A review of the maintenance procedures performed on the right main landing gear 8 days prior to the accident found that they instructed the mechanic to add grease to the drag leg fitting. The procedures did not specify to examine the landing gear for fatigue cracking or anomalies; therefore, it is unlikely that the mechanic would have looked in the area of the cracked main landing gear drag leg support fitting and angle bracket. Furthermore, there was no nondestructive testing procedures for examining the main landing gear drag brace, so it's unlikely an inspection would have detected the multiple areas of fatigue cracking.

Probable Cause and Findings

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

A failure of the right main landing gear drag leg support fitting and angle bracket as a result of multiple areas of fatigue cracking.

Findings

Aircraft	Main landing gear attach sec - Fatigue/wear/corrosion

Factual Information

History of Flight

Taxi-from runway	Landing gear collapse (Defining event)

On October 14, 2020, about 0820 eastern daylight time, a Beechcraft 99, N499CZ, was substantially damaged when it was involved in an accident at Waterville Robert LaFleur Airport (WVL), Waterville, Maine. The commercial pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 135 cargo flight.

According to the pilot, the landing at WVL was not "firm or hard" and during the landing roll, he used reverse thrust and minimal braking to slow the airplane to a "standard taxi speed." As he initiated a right turn to exit the runway onto the taxiway, the airplane's right main landing gear collapsed, resulting in substantial damage to the right wing.

An examination of the airplane by the Federal Aviation Administration (FAA) inspector who responded to the site revealed the drag leg of the right main landing gear was fractured.

According to FAA airworthiness records, the airplane was manufactured in 1969. It was maintained with an approved aircraft inspection program. The airplane's most recent inspection was completed on October 6, 2020, at an airframe time of 39,544.45 hours. At that time, the right main landing gear was lubricated in accordance with the operator's approved aircraft inspection program. The guidance instructed the mechanic to add grease to the drag leg fitting. It did not instruct the mechanic to examine the landing gear for fatigue cracking or anomalies. An overhaul of the right main landing gear drag brace was performed every 7,500 flight cycles or 120 months. The most recent overhaul was performed on March 23, 2017, at an airframe total time of 38,485.5 hours. There were no nondestructive testing inspection procedures for the main landing gear drag braces prior to the accident.

The National Transportation Safety Board Materials Laboratory examined the right drag leg support fitting and right main landing gear attach angle bracket. Examination of the right drag leg support fitting revealed the presence of several areas of pre-existing progressive fractures originating at the outer surface of the part with radial marks emanating inward, visible curved crack arrest marks, and microscopic striations consistent with fatigue. The largest fatigue crack originated at an external radius feature where parallel gouges and periodic depressions were observed on the adjacent surface. The smaller fatigue cracks originated at internal radii and features resembling ratchet marks were observed at each location, consistent with multiple initiation sites. The attach angle bracket fracture exhibited features consistent with fatigue emanating from the nut plate side and the opposite drag leg support fitting interface side.

Pilot Information

Certificate:	Commercial	**Age:**	28,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	June 18, 2020
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	September 18, 2020
Flight Time:	1656 hours (Total, all aircraft), 577 hours (Total, this make and model), 1081 hours (Pilot In Command, all aircraft), 144 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N499CZ
Model/Series:	99 A	**Aircraft Category:**	Airplane
Year of Manufacture:	1969	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	U-81
Landing Gear Type:	Retractable - Tricycle	**Seats:**	2
Date/Type of Last Inspection:	October 6, 2020 AAIP	**Certified Max Gross Wt.:**	10900 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo prop
Airframe Total Time:	39544.45 Hrs as of last inspection	**Engine Manufacturer:**	Pratt & Whitney Canada
ELT:	C126 installed, not activated	**Engine Model/Series:**	PT6A-28
Registered Owner:	N499CZ LLC	**Rated Power:**	680 Horsepower
Operator:	Freight Runners	**Operating Certificate(s) Held:**	Commuter air carrier (135)
Operator Does Business As:		**Operator Designator Code:**	KCQA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KWVL,310 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	07:56 Local	**Direction from Accident Site:**	78°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	330°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.72 inches Hg	**Temperature/Dew Point:**	10°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Manchester, NH (MHT)	**Type of Flight Plan Filed:**	IFR
Destination:	Waterville, ME	**Type of Clearance:**	IFR
Departure Time:	07:06 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Waterville Robert LaFleur Airport WVL	**Runway Surface Type:**	Asphalt
Airport Elevation:	332 ft msl	**Runway Surface Condition:**	Wet
Runway Used:	23	**IFR Approach:**	Visual
Runway Length/Width:	5500 ft / 100 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	44.531471,-69.676932(est)

Administrative Information

Investigator In Charge (IIC):	Kemner, Heidi
Additional Participating Persons:	David Roakes; FAA/FSDO; Portland Andrew Hall; Textron Aviation; Wichita, KS
Original Publish Date:	October 13, 2022
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=102152