



# National Transportation Safety Board Aviation Accident Final Report

<b>Location:</b>	HICKORY, NC	<b>Accident Number:</b>	ATL99LA086
<b>Date &amp; Time:</b>	05/14/1999, 0003 EDT	<b>Registration:</b>	N924RM
<b>Aircraft:</b>	Beech BE-100	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	4 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Business		

## Analysis

While on approach, the pilot placed the landing-gear handle in the down position but the right main gear did not extend. All attempts to extend the right main gear failed. The pilot landed on the left main gear and the nose wheel. The right wing settled to the runway and the airplane veered off the right side of the runway and collided with a ditch. A post-accident inspection of the landing gear system by the FAA revealed that the right main gear drive shaft had been sheared, disabling the actuator. Examination of the actuator parts revealed that the ring gear was missing one tooth and the pinion gear, which meshes with the ring gear, had missing and damaged teeth. Examination of the upper and lower thrust bearings revealed that the lower thrust bearing had been installed in reverse. The type of damage the ring and pinion gears exhibited indicated that the gears were not meshing properly. A thrust bearing installed in reverse could create an interference condition between the gears.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the landing gear actuator due to the improper installation of the lower thrust bearing by maintenance personnel.

## Findings

Occurrence #1: WHEELS UP LANDING  
Phase of Operation: LANDING - FLARE/TOUCHDOWN

### Findings

1. (C) LANDING GEAR,NORMAL RETRACTION/EXTENSION ASSEMBLY - FAILURE
2. (C) MAINTENANCE,INSTALLATION - IMPROPER - OTHER MAINTENANCE PERSONNEL

## Factual Information

On May 14, 1999, at 0003 eastern daylight time, a Beech BE-100, N924RM, landed on runway 6 with the right main gear up, veered off the runway, and collided with a ditch at the Hickory Regional Airport in Hickory, North Carolina. The business flight was operated by the pilot under the provisions of Title 14 CFR Part 91 with an instrument flight plan filed. Visual weather conditions prevailed at the time of the accident. The air transport pilot, the right seat passenger/pilot, and the two passengers were not injured. The airplane sustained substantial damage. The flight departed Richmond, Virginia, at 2150.

As the flight approached Hickory, the pilot was issued a visual approach clearance. Upon entering the traffic pattern for a full stop landing, the pilot completed the before-landing checklist, which included lowering the landing gear. When the landing-gear handle was placed in the down position, the right main landing gear did not extend. The pilot and the right seat passenger/pilot attempted several times to lower the right main gear but failed. The pilot decided to land with all gear in the up position; however, the left main gear and the nose wheel did not retract when the gear handle was placed in the up position. The airplane landed on the left main landing gear and the nose wheel. As the speed of the airplane slowed, the right wing settled to the runway and the airplane veered off the right side of the runway. The airplane came to rest after colliding with a five-foot deep ditch.

A post-accident inspection of the landing gear system by the FAA revealed that the right main gear drive shaft had been sheared. The right main landing gear actuator was removed and disassembled under the supervision of the FAA. Prior to disassembling the actuator gearbox, it was observed that the input shaft could be freely rotated and the output shaft did not move. The actuator parts were sent to Engineering Systems Inc. for examination. Examination of the ring gear and pinion gear revealed that the ring gear was missing one tooth and the pinion gear, which meshes with the ring gear, had missing and damaged teeth. Examination of the lower thrust bearing and the upper thrust bearing revealed that each was heavily packed with grease on one side. The heavily greased side of the bearings would have been facing the ring and pinion gears in the gearbox. The side of the bearing marked "Thrust" should be installed facing away from the ring and pinion gears. The lower thrust bearing was heavily greased on the side marked "Thrust" and there were small chips of metal embedded in the grease. The upper thrust bearing was greased on the side not marked "Thrust." The last inspection/maintenance done on the main landing gear actuators was performed on November 22, 1996 at 9508.6 hours aircraft total time and 9,279 landings.

## Pilot Information

<b>Certificate:</b>	Airline Transport	<b>Age:</b>	65, Male
<b>Airplane Rating(s):</b>	Multi-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 2 Valid Medical--w/ waivers/lim.	<b>Last Medical Exam:</b>	03/31/1999
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	25400 hours (Total, all aircraft), 1200 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

<b>Aircraft Manufacturer:</b>	Beech	<b>Registration:</b>	N924RM
<b>Model/Series:</b>	BE-100 BE-100	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	BE-063
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	10
<b>Date/Type of Last Inspection:</b>	05/21/1998, AAIP	<b>Certified Max Gross Wt.:</b>	11800 lbs
<b>Time Since Last Inspection:</b>	72 Hours	<b>Engines:</b>	2 Turbo Prop
<b>Airframe Total Time:</b>	9872 Hours	<b>Engine Manufacturer:</b>	Garrett
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	TPE-331-6-202
<b>Registered Owner:</b>	B-100 KINGAIR, LLC	<b>Rated Power:</b>	750 hp
<b>Operator:</b>	CARROLL G. SMITH	<b>Air Carrier Operating Certificate:</b>	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	HKY, 1180 ft msl	Observation Time:	0002 EDT
Distance from Accident Site:	360 Nautical Miles	Direction from Accident Site:	1°
Lowest Cloud Condition:	Scattered / 5500 ft agl	Temperature/Dew Point:	16°C / 16°C
Lowest Ceiling:	Overcast / 10000 ft agl	Visibility	10 Miles
Wind Speed/Gusts, Direction:	6 knots, 20°	Visibility (RVR):	0 ft
Altimeter Setting:		Visibility (RVV):	0 Miles
Precipitation and Obscuration:			
Departure Point:	RICHMOND, VA (RIC)	Type of Flight Plan Filed:	IFR
Destination:	(HKY)	Type of Clearance:	None
Departure Time:	2150 EDT	Type of Airspace:	Class B

## Airport Information

Airport:	HICKORY REGIONAL AIRPORT (HKY)	Runway Surface Type:	Asphalt
Airport Elevation:	1189 ft	Runway Surface Condition:	Dry
Runway Used:	6	IFR Approach:	None
Runway Length/Width:	6400 ft / 150 ft	VFR Approach/Landing:	Full Stop

## Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	2 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	4 None	Latitude, Longitude:	

## Administrative Information

Investigator In Charge (IIC):	PHILLIP POWELL	Adopted Date:	06/22/2000
Additional Participating Persons:	JAN E MCDUGALD; CHARLOTTE, NC		
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 <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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