



National Transportation Safety Board Aviation Accident Final Report

Location:	Fayetteville, Tennessee	Accident Number:	ERA15LA333
Date & Time:	August 28, 2015, 14:00 Local	Registration:	N891PC
Aircraft:	Beech E 90	Aircraft Damage:	Substantial
Defining Event:	Electrical system malf/failure	Injuries:	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Shortly after takeoff in day visual meteorological conditions, when the airplane was climbing through 3,000 ft mean sea level, a complete electrical failure occurred that affected electrical instrumentation and additional airplane equipment, including the landing gear. The pilot reported that he performed the electrical failure checklists and could not restore power. After additional troubleshooting with no success, he chose to divert to and land at another airport. While in the traffic pattern at his diversion airport, he attempted to lower the landing gear using the emergency landing gear extension procedures but could not confirm the landing gear were down and locked. Without any capability to communicate or confirmation that the landing gear were down, he decided to leave the airport traffic pattern and land on a nearby field to avoid airport traffic; the airplane sustained substantial damage to the fuselage, landing gear doors, engines, and propellers during the off-airport landing. The reason for the loss of electrical power could not be determined.

Examination of the cockpit revealed that the landing gear's emergency engage handle, also known as the "J" handle, was not pulled up and turned, which was one of the steps listed in the airplane flight manual for the manual landing gear extension procedure. The "J" handle engages the clutch and allows for the handle to operate the landing gear chain. Without engaging the "J" handle, the landing gear handle pumping action would not have worked, which resulted in the gear-up landing.

Probable Cause and Findings

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

A total loss of electrical power for reasons that could not be determined and the pilot's subsequent failure to properly follow the manual landing gear extension procedures, which resulted in the landing gear not extending.

Findings

Aircraft	(general) - Failure
Not determined	(general) - Unknown/Not determined
Aircraft	Gear extension and retract sys - Incorrect use/operation
Personnel issues	Incomplete action - Pilot

Factual Information

On August 28, 2015 about 1400 central daylight time, a Beechcraft E-90, N891PC, was substantially damaged during an off-airport landing near Fayetteville, Tennessee. The private pilot was not injured. The airplane was registered to Chopaire LLC and operated under the provisions of 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual flight rules conditions prevailed about the time of the accident, and no flight plan was filed for the flight that departed from Shelbyville Municipal Airport (SYI), Shelbyville, Tennessee, and was destined for Huntsville International Airport (HSV), Huntsville, Alabama.

The pilot reported that the start-up, taxi and takeoff were normal. He had about 270 gallons of fuel on board for the 65-mile flight to HSV. Several minutes after takeoff, while climbing through 3,000 feet in visual meteorological conditions, a total electrical failure occurred. He reported that he performed the generator inoperative emergency checklist but was unable to restore electrical power. He did not see the GEN OUT annunciator light. He further reported that he turned all the switches off to shed any load, then turned on the battery switch followed by the generator switches, but he could not restore power. Without any electrical power and no communication ability, he diverted to Fayetteville Municipal Airport (FYM), Fayetteville, Tennessee, approximately 30 miles south of SYI.

After arriving in the airport traffic pattern at FYM, a public use airport that had a 5,900-ft-long by 100-ft-wide paved and lighted runway that was oriented 02/20, he attempted to lower the landing gear using the emergency gear extension procedures, but reported, "I did not believe that the landing gear was extending. I did not feel any resistance in the manual extension handle." Without electrical power, the green landing gear lights did not function. He discontinued pumping the handle and decided that without any communications capability or confirmation that the gear was down and locked, he would land off-airport to avoid airport traffic. He departed the FYM traffic pattern and found an open field that looked suitable; the airplane touched down in waist-high soybeans and soft ground and came to an abrupt stop within several hundred feet.

According to the pilot and Federal Aviation Administration (FAA) records, the pilot, age 62, held a private pilot certificate with ratings for airplane single-engine land, airplane multi-engine land, and instrument airplane. He reported 1,882 hours of total flight time, with 230 hours of accident airplane make and model. His most recent flight review was conducted on August 8, 2015 in the accident airplane make and model. This was the pilot/owner's second flight in this make/model without an instructor in the right seat. According to a witness, it was highly unusual that the pilot was not flying with a safety pilot, who was usually his instructor.

Postaccident examination of the wreckage revealed substantial damage to the fuselage, landing gear doors, engines, and propellers.

According to FAA records, the airplane was manufactured in 1973. It was an 8-seat, low wing, twin turboprop airplane equipped with Pratt & Whitney PT6-28 engines each rated at 680 horsepower and each engine was equipped with four-blade Hartzell propellers. The left and right engines had 6,255 and 12,471 total hours respectively and the airplane had accumulated 11,283 total airframe hours since its most recent annual inspection on June 4, 2015.

The airplane was equipped with a 24-volt, 45 ampere-hour battery which provided current for starting and electrical loads. At full charge, the battery would last for about 30 minutes. There were two starter generators, and when used as a generator, each one would provide continuous electrical power to the airplane at a capacity of 250 amperes each at 28.25 volts. The pilot reported that he ran the electrical system failure checklist after he lost all electrical power; this included turning off the generator then back on to reset. No additional troubleshooting procedures reported by the pilot could restore electrical power.

The landing gear extension mechanism was electrically driven and mechanically-actuated with a chain-driven motor, and would not extend normally without electrical power. In addition, the three green landing gear lights indicating that the landing gear was down and locked would not function during power loss, so an emergency landing gear extension procedure must be followed.

According to the King Air E-90 Airplane Flight Manual (AFM), the procedure to manually lower the landing gear was to establish 120 knots indicated airspeed, pull the landing gear circuit breaker, place the landing gear handle in the down position, lift the "J" handle and turn it 50° clockwise to engage the clutch, then pump the extension lever up and down until 3 green lights are acquired; which will not occur due to no electrical power to the system. There were no indications in the manual or procedures as to how many pumps of the handle will extend and lock the landing gear.

A postaccident examination of the cockpit, the "J" handle that engaged the landing gear pump was not pulled up or turned; it remained in the stowed position. Pumping the gear extension handle without the "J" handle would not lower the gear and it would not provide any feedback to the operator.

At 1415, the weather recorded at FYM, located 8 miles southeast of the accident site, included scattered clouds at 3,900 ft, wind from 160° at 4 knots, and visibility 10 statute miles. The temperature was 29°C, and the dew point was 15°C. The altimeter setting was 30.09 inches of mercury.

History of Flight

Enroute-climb to cruise	Electrical system malf/failure (Defining event)
Landing	Off-field or emergency landing
Landing-landing roll	Landing gear not configured
Landing-landing roll	Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Private	Age:	62, 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:	No
Medical Certification:	Class 3 Without waivers/limitations	Last FAA Medical Exam:	July 23, 2015
Occupational Pilot:	No	Last Flight Review or Equivalent:	August 8, 2015
Flight Time:	1882 hours (Total, all aircraft), 230 hours (Total, this make and model), 1310 hours (Pilot In Command, all aircraft), 16 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	Registration:	N891PC
Model/Series:	E 90 NO SERIES	Aircraft Category:	Airplane
Year of Manufacture:	1973	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	LW-40
Landing Gear Type:	Retractable - Tricycle	Seats:	8
Date/Type of Last Inspection:	June 4, 2015 Annual	Certified Max Gross Wt.:	10099 lbs
Time Since Last Inspection:	20 Hrs	Engines:	2 Turbo prop
Airframe Total Time:	11283 Hrs as of last inspection	Engine Manufacturer:	P & W
ELT:	C91 installed, not activated	Engine Model/Series:	PT6A-28
Registered Owner:		Rated Power:	680 Horsepower
Operator:		Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	KMDQ,801 ft msl	Distance from Accident Site:	30 Nautical Miles
Observation Time:	14:15 Local	Direction from Accident Site:	170°
Lowest Cloud Condition:	Scattered / 3900 ft AGL	Visibility	10 miles
Lowest Ceiling:		Visibility (RVR):	
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/ None
Wind Direction:	160°	Turbulence Severity Forecast/Actual:	/ Unknown
Altimeter Setting:	30.09 inches Hg	Temperature/Dew Point:	29° C / 15° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	SHELBYVILLE, TN (SYI)	Type of Flight Plan Filed:	None
Destination:	Huntsville, AL (HSV)	Type of Clearance:	None
Departure Time:	13:00 Local	Type of Airspace:	Class G

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None	Latitude, Longitude:	35.139446,-86.68222

Administrative Information

Investigator In Charge (IIC):	Mccarter, Lawrence
Additional Participating Persons:	Rocky Davidson; FAA/FSDO; Nashville, TN
Original Publish Date:	August 10, 2020
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=91888

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).