Aviation Investigation Final Report

Location:	Phoenix, Arizona	**Accident Number:**	WPR13LA060
Date & Time:	November 24, 2012, 08:00 Local	**Registration:**	N8747Y
Aircraft:	Piper PA30	**Aircraft Damage:**	Substantial
Defining Event:	Electrical system malf/failure	**Injuries:**	3 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that he had not flown the airplane in over 3 months. He started the right engine on external power, unplugged the external power, and then started the left engine off of the airplane's electrical system, with the ammeter showing a normal charge rate. Immediately after takeoff and while the landing gear was being retracted, the airplane experienced a total electrical failure; all attempts to restore electrical power were unsuccessful. The pilot then performed the emergency landing gear extension procedure, which he said included pulling the landing gear transmission motor release lever and pushing the lever full forward. The pilot subsequently placed the emergency gear extension handle in the left socket because it was in the vertical position, which should have indicated to the pilot that the landing gear had not completely retracted and that the landing gear transmission motor's force was not disengaged. He then most likely secured the handle and rotated it forward to complete the gear extension; however, due to the electrical failure, he had no way of confirming that the landing gear was locked down. After relaying his situation to the departure airport's air traffic control tower, the pilot was cleared to land. Upon landing, the airplane's nose gear slowly collapsed, and then both main landing gear collapsed. The airplane subsequently slid off of the right side of the runway and came to rest in a rock-covered area, which resulted in substantial damage to the airplane. Although the electrical system could have been compromised due to the electrical load required during the landing gear retraction because of insufficient battery power, it could not be determined if this caused the electrical system anomaly. During the emergency landing gear extension procedure, the forward rotation of the landing gear handle in the left socket likely prevented it from reaching its full-forward travel to lock the gear down because the pilot likely failed to fully disengage the landing gear transmission motor's forces from the system.

Probable Cause and Findings

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

The pilot's failure to properly inhibit the landing gear transmission motor consistent with the emergency landing gear extension procedure, which precluded the full extension of the landing gear. Contributing to the accident was the airplane's electrical system anomaly, which rendered the gear position indicator inoperative.

Findings

Personnel issues	Incomplete action - Pilot
Aircraft	Gear position and warning - Inoperative
Aircraft	(general) - Failure
Aircraft	(general) - Incorrect use/operation

Factual Information

History of Flight

Initial climb	Electrical system malf/failure (Defining event)
Landing-landing roll	Landing gear collapse
Landing-landing roll	Collision with terr/obj (non-CFIT)
Landing-landing roll	Runway excursion

On November 24, 2012, about 0800 mountain standard time, a Piper PA-30, N8747Y, sustained substantial damage following a landing gear collapse during landing roll at the Deer Valley Airport (DVT), Phoenix, Arizona. The airplane was registered to and operated by Twin Comanche LLC. The certified airline transport pilot and two passengers were not injured. The local flight was being operated in accordance with 14 Code of Federal Regulations (CFR) Part 91. Visual meteorological conditions prevailed and a flight plan was not filed. The flight departed DVT about 30 minutes prior to the accident.

In a written statement provided to the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), the pilot reported that he had not flown the airplane for almost 3 months prior to the accident. The pilot further reported that he started the right engine on external power, unplugged the external power, and then started the left engine using the airplane's electrical system, with the ammeter showing a normal charge rate at one-quarter scale. The pilot stated that immediately after takeoff the airplane experienced a total electrical failure, at which time he attempted to reset the alternators, voltage regulators, and battery switches; however, he was unable to restore electrical power. The pilot reported that he then called Flight Service to have them relay his situation to the DVT air traffic control tower, in order for them to give him a light signal for clearance to land. Prior to receiving the light signal, the pilot stated that he flew a wide circle to the north and west while performing the emergency landing gear extension procedure. He stated that it did not appear that the [landing] gear had retracted at all, as the emergency extension lever was already vertical when inserted into the left socket. He added that he then pulled the release lever and pushed the lever forward per the [emergency] procedures, but could not verify electrically if the gear was locked. The pilot stated that the viewing mirror on the left engine nacelle indicated that the nose gear "looked good."

The pilot reported that he touched down smoothly on Runway 7L with the main landing gear, but when the nose gear touched down, all 3 landing gear retracted. The airplane subsequently slid off of the right edge of the runway and came to rest in a rock covered area, which resulted in substantial damage to the undercarriage of the airplane.

In a conversation with a Federal Aviation Administration (FAA) airworthiness inspector who conducted a postaccident examination of the airplane, the inspector reported that an examination of the landing gear motor where it attaches to the airframe revealed what looked like a fracture. He stated that the fracture looked clean, it appeared to have failed in overload, and that it was most likely a result of the accident. The inspector further stated that he thought that the most probable explanation of what caused

the loss of electrical power had to do with the Master Switch failure or intermittent operation of the switch. A follow-up examination of the Master Switch by the NTSB IIC revealed that it functioned properly with no anomalies noted.

An examination of the aircraft maintenance records revealed that the most recent annual inspection was performed on July 16, 2012, at which time the airplane's battery would have been checked in accordance with the Piper Aircraft PA-30 Service Manual. No anomalies were noted during the inspection.

According to the Piper Aircraft Corporation Report 1515, FAA Approved Flight Manual for Piper Twin Comanche, Model PA-30, applicable to serial number 30-1717 and 30-1745 and up, date of approval February 5, 1963, the instructions for the Emergency Extension of the Landing Gear state:

• Reduce power/airspeed not to exceed 100 miles per hour.

• Place landing gear selector switch in the "GEAR DOWN LOCKED" position.

• Disengage motor. Raise motor release arm and push forward thru full travel.

• Remove gear extension handle from stowage. If left socket is not in clear position, place handle in right socket. Engage slot and twist clockwise to secure handle. Extend handle and rotate forward until left socket is in clear position. Remove handle and place in left socket and secure. Extend handle. Rotate handle FULL forward to extend landing gear and engage emergency safety lock.

• Handle locked in full forward position indicated landing gear is down and emergency safety lock engaged. Gear "DOWN LOCKED" indicator light should be "ON".

Note: Reducing power and rocking gear extension handle will aid in manually extending the landing gear. DO NOT RETRACT WITH HANDLE IN SOCKET. DO NOT RE-ENGAGE MOTOR IN FLIGHT.

Pilot Information

Certificate:	Airline transport	**Age:**	61
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	July 19, 2012
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 28, 2012
Flight Time:	7500 hours (Total, all aircraft), 300 hours (Total, this make and model), 6500 hours (Pilot In Command, all aircraft), 60 hours (Last 90 days, all aircraft), 31 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N8747Y
Model/Series:	PA30 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1969	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	30-1902
Landing Gear Type:	Retractable - Tricycle	**Seats:**	5
Date/Type of Last Inspection:	July 16, 2012 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	16 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	4410 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-320
Registered Owner:	On file	**Rated Power:**	160 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:	DVT,1478 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	07:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	17°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Phoenix, AZ (DVT)	**Type of Flight Plan Filed:**	None
Destination:	Phoenix, AZ (DVT)	**Type of Clearance:**	None
Departure Time:	07:30 Local	**Type of Airspace:**	

Airport Information

Airport:	Phoenix Deer Valley DVT	**Runway Surface Type:**	Asphalt
Airport Elevation:	1478 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	07L	**IFR Approach:**	None
Runway Length/Width:	4499 ft / 75 ft	**VFR Approach/Landing:**	Precautionary landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 None	**Latitude, Longitude:**	33.688331,-112.082496

Administrative Information

Investigator In Charge (IIC):	Little, Thomas
Additional Participating Persons:	Arthur Steffes; Federal Aviation Administration; Scottsdale, AZ Charles Little; Piper Aircraft, Inc.; Vero Beach, FL
Original Publish Date:	June 11, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=85704