



# Aviation Investigation Final Report

<b>Location:</b>	Shreveport, Louisiana	<b>Accident Number:</b>	CEN14LA048
<b>Date &amp; Time:</b>	November 9, 2013, 12:45 Local	<b>Registration:</b>	N911KB
<b>Aircraft:</b>	EUROCOPTER DEUTSCHLAND GMBH EC135P1	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of control in flight	<b>Injuries:</b>	3 Minor
<b>Flight Conducted Under:</b>	Part 91: General aviation - Flight test		

## Analysis

The helicopter departed on a local maintenance test flight to perform a hover test. The pilot flew the helicopter toward a nearby field to perform the test and then heard a "pop," and the helicopter subsequently began to spin. The pilot attempted to regain control of the helicopter using the antitorque pedals, but they were ineffective. The pilot reduced engine power and performed an autorotation to the field. The helicopter landed hard and rolled on its right side.

Examination of the wreckage found that the antitorque pedals had separated from the antitorque levers. The attachment hardware was not located in the wreckage or the surrounding area. Neither the antitorque pedals nor the lever attachment holes displayed elongation, which is consistent with the hardware bolts not being in place at the time of impact. A review of maintenance logbooks revealed that a mechanic had conducted maintenance on the antitorque pedals 9 days before the accident flight. After the accident, a parts bag containing bolts similar to the bolts needed to secure the antitorque pedals was found in the maintenance facility where the maintenance was performed. Based on the evidence, it is likely that the mechanic reinstalled the antitorque pedals without the required attachment hardware, which allowed the antitorque pedals to separate from the antitorque levers during flight and led to the loss of helicopter control.

## Probable Cause and Findings

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

The mechanic's improper installation of the antitorque pedals, which resulted in an in-flight loss of helicopter control.

## Findings

<b>Personnel issues</b>	Installation - Maintenance personnel
<b>Aircraft</b>	(general) - Incorrect service/maintenance
<b>Aircraft</b>	(general) - Attain/maintain not possible

# Factual Information

## History of Flight

Prior to flight	Aircraft maintenance event
Maneuvering	Loss of control in flight (Defining event)

On November 9, 2013, about 1245 central standard time, a Eurocopter Deutschland GMBH EC135P1 helicopter, N911KB, impacted terrain near Shreveport, Louisiana. The commercial pilot and two company mechanics sustained minor injuries and the helicopter was substantially damaged. The helicopter was registered to and operated by Metro Aviation Inc., under the provisions of 14 Code of Federal Regulations Part 91 as a maintenance test flight. Visual meteorological conditions prevailed for the flight, which operated without a flight plan. The local flight was originating from the company's facility in Shreveport, Louisiana.

The helicopter had recently undergone maintenance inspections at a company maintenance facility. The day prior to the accident several ground runs were performed on the helicopter in order to track and balance the rotor system and to check the parameters of the number 2 engine. The crew for the maintenance flight consisted of one pilot and two aviation mechanics. The pilot preflighted the helicopter and performed several ground runs. The helicopter was refueled, preflighted again, and the pilot completed a hover test in an adjacent field which was separated by a chain link fence. The hover test was completed without incident and the pilot landed the helicopter back at the maintenance facility. After maintenance personnel made adjustments to the rotor system another hover test needed to be accomplished. The pilot once again preflighted the helicopter and the crew began another hover test. The helicopter was brought to a hover and climbed to about 20 feet above ground level and proceed to overfly a chain link fence towards the adjacent field. When the helicopter was abeam to fence the pilot heard a "pop" and the helicopter began a rapid spin. Directional control of the helicopter was lost and the pilot attempted to regain control by using the anti-torque pedals but he found them ineffective. The pilot was not able to regain control of the helicopter and he reduced the engine throttle for an autorotation. The helicopter descended, landed, rolled, and came to rest on its right side.

A security surveillance camera recorded a portion of the accident sequence. The helicopter was observed to lift into a hover, climb and rotate counterclockwise about 90 degrees before heading towards the chain link fence. As the helicopter exited the camera's field of view the helicopter began a rapid counterclockwise turn.

An examination of the helicopter was conducted by the Federal Aviation Administration with assistance from the airframe manufacturer. Crushing damage was observed on the right, lower, and aft sections of the airframe consistent with a nose high/tail low impact. Cyclic and collective control continuity was established from the controls to the main rotor swashplate. Both anti-torque pedals were found near the wreckage, unattached from their respective attachment levers. None of the attachment hardware was found in the wreckage or in the vicinity of the accident. There was no visible elongation of the pedal bolt holes or the holes on the attachment levers. Tail rotor control continuity was established from the anti-torque pedal levers through to the tail rotor pitch change mechanism. No other preimpact anomalies

were detected with the airframe. The engine's Data Collection Unit (DCU) and Engine Electronic Control (EEC) were removed and sent to Pratt & Whitney Canada for data download. Examination of the devices found no fault codes recorded during the accident flight which would indicate an engine malfunction.

A teardown for the right engine found that all the power turbine (PT) blades fractured at the airfoil pocket. The PT shaft showed strong circumferential rubbing. The left engine remained as a training device for hot section inspection until other damage was detected. The left engine was examined and found that all PT blades had fractured in overload. Evidence of significant plastic deformation and secondary cracks, parallel to the fracture, were also visible. Visual examination of the PT shaft showed significant wear consistent with rubbing against an adjacent component. Signatures of frictional heat were also detected. The compressor turbine (CT) disk displayed circumferential rubbing in the inner bore diameter at the same location where the PT shaft had fractured.

The transmission was removed from the helicopter and examined. The examination did not reveal any preimpact anomalies.

A review of the helicopter's log book found an entry dated October 31, 2013, that a mechanic performed the action "disassemble, inspect, and reassemble tail rotor pedals". According to a statement provided by the company's director of maintenance, after the accident a search of the area maintenance area was conducted. Near the area where the helicopter was previously repaired, a small parts bag was found tied to the tail rotor control cable that had been replaced. Inside of the bag were bolts similar to the bolts used to secure the anti-torque pedals.

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	41
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Helicopter	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	September 9, 2013
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	August 24, 2013
<b>Flight Time:</b>	4245 hours (Total, all aircraft), 456 hours (Total, this make and model), 3788 hours (Pilot In Command, all aircraft), 52 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	EUROCOPTER DEUTSCHLAND GMBH	<b>Registration:</b>	N911KB
<b>Model/Series:</b>	EC135P1	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>	1997	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	0013
<b>Landing Gear Type:</b>	N/A; Skid	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	October 28, 2013 AAIP	<b>Certified Max Gross Wt.:</b>	5997 lbs
<b>Time Since Last Inspection:</b>	0 Hrs	<b>Engines:</b>	1 Turbo shaft
<b>Airframe Total Time:</b>	9430 Hrs at time of accident	<b>Engine Manufacturer:</b>	P&W CANADA
<b>ELT:</b>	C126 installed	<b>Engine Model/Series:</b>	PW206B
<b>Registered Owner:</b>	METRO AVIATION INC	<b>Rated Power:</b>	621 Horsepower
<b>Operator:</b>	METRO AVIATION INC	<b>Operating Certificate(s) Held:</b>	On-demand air taxi (135)
<b>Operator Does Business As:</b>	METRO AVIATION INC	<b>Operator Designator Code:</b>	HDNA

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KGGG, 373 ft msl	<b>Distance from Accident Site:</b>	9 Nautical Miles
<b>Observation Time:</b>	12:53 Local	<b>Direction from Accident Site:</b>	165°
<b>Lowest Cloud Condition:</b>	Thin Overcast / 10000 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Overcast / 10000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	5 knots / None	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	160°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.2 inches Hg	<b>Temperature/Dew Point:</b>	15°C / 7°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Shreveport, LA	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Shreveport, LA	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	12:27 Local	<b>Type of Airspace:</b>	

## Wreckage and Impact Information

<b>Crew Injuries:</b>	3 Minor	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	3 Minor	<b>Latitude, Longitude:</b>	32.512866,-93.75749

## Administrative Information

**Investigator In Charge (IIC):** Aguilera, Jason

**Additional Participating Persons:** Keith Kibodeaux; FAA; Baton Rouge, LA

**Original Publish Date:** September 8, 2015

**Last Revision Date:**

**Investigation Class:** [Class](#)

**Note:**

**Investigation Docket:** <https://data.nts.gov/Docket?ProjectID=88414>

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