



# Aviation Investigation Final Report

<b>Location:</b>	AIKEN, South Carolina	<b>Accident Number:</b>	ATL89FA130
<b>Date &amp; Time:</b>	April 17, 1989, 12:05 Local	<b>Registration:</b>	N118HS
<b>Aircraft:</b>	BELL UH-1E	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	1 Serious
<b>Flight Conducted Under:</b>	Part 133: Rotorcraft ext. load		

## Analysis

THE HELICOPTER WAS BEING OPERD AT APRX 100 FT AGL WITH A HOPPER EXTDD FROM A CABLE. WITNESSES HEARD A LOUD POPPING SOUND. AS THEY LOOKED IN THE DRCTN OF THE HELICOPTER, THEY NOTED THE TAIL ROTOR WAS NOT TURNING & ONE BLADE APPEARED TO BE HANGING. THE PLT RPRTD THERE WAS NO WARNING OF AN IMPENDING ANTI-TORQUE CONTROL PROBLEM WHEN HE LOST CONTROL OF THE HELICOPTER. THE HELICOPTER THEN COLLIDED WITH TREES & CRASHED. INV REVEALED THE PLT HAD RPRTD AN OIL LEAK FM THE 90 DEG GEARBOX ON 4/11/89. THE COMPANY MECHANIC SUBSEQUENTLY REPLACED THE GEARBOX & A FUNCTIONAL TEST FLT WAS COMPLETED. THE ACDNT OCCURRED AFTER APRX ANOTHER 6 HRS OF OPN. AN EXAM OF THE TAIL ROTOR ASSEMBLY REVEALED THAT 1 OF THE 2 RETENTION BOLTS WERE MISSING FM THE TAIL ROTOR PITCH CHANGE CROSSHEAD. THREADED IMPRINTS WERE FND INSIDE THE RESPECTIVE CROSSHEAD RETENTION THRU-BOLT HOLE. THE RETENTION BOLT, NUT, WASHER & COTTER PIN WERE NOT RECOVERED. BOTH TAIL ROTOR BLADES CONTAINED CHORDWISE MARKS WHICH CORRESPONDED TO MARKS ON THE VERTICAL FIN (OPPOSITE OF THE TAIL ROTOR TIP PATH PLANE).

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: IMPROPER INSTALLATION OF A TAIL ROTOR PITCH CHANGE CROSSHEAD RETENTION BOLT BY THE COMPANY MECHANIC, WHICH RESULTED IN LOOSENING OF THE BOLT AND EVENTUAL FAILURE OF THE TAIL ROTOR ASSEMBLY/BLADE AND SUBSEQUENT LOSS OF CONTROL. TREES AT THE CRASH SITE CONTRIBUTED TO HELICOPTER DAMAGE.

## Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION

Phase of Operation: CRUISE

### Findings

1. (C) ROTOR SYSTEM, TAIL ROTOR HUB PITCH CHANGE MECHANISM - NOT SAFETIED
  2. (C) MAINTENANCE, INSTALLATION - IMPROPER - COMPANY MAINTENANCE PERSONNEL
  3. (C) ROTOR SYSTEM, TAIL ROTOR HUB PITCH CHANGE MECHANISM - LOOSE
  4. (C) ROTOR SYSTEM, TAIL ROTOR HUB - FAILURE, TOTAL
  5. ROTOR SYSTEM, TAIL ROTOR BLADE - SEPARATION
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Occurrence #2: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: CRUISE

### Findings

6. DIRECTIONAL CONTROL - NOT POSSIBLE
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Occurrence #3: FORCED LANDING

Phase of Operation: DESCENT - UNCONTROLLED

### Findings

7. AUTOROTATION - ATTEMPTED
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Occurrence #4: IN FLIGHT COLLISION WITH OBJECT

Phase of Operation: DESCENT - UNCONTROLLED

### Findings

8. (F) OBJECT - TREE(S)

## Factual Information

### Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	42, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	
<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 1 Valid Medical--no waivers/lim.	<b>Last FAA Medical Exam:</b>	October 14, 1988
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	4000 hours (Total, this make and model), 39 hours (Last 90 days, all aircraft), 30 hours (Last 24 hours, all aircraft)		

### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	BELL	<b>Registration:</b>	N118HS
<b>Model/Series:</b>	UH-1E UH-1E	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Restricted (Special)	<b>Serial Number:</b>	155341
<b>Landing Gear Type:</b>	Skid	<b>Seats:</b>	7
<b>Date/Type of Last Inspection:</b>	March 7, 1989 100 hour	<b>Certified Max Gross Wt.:</b>	9500 lbs
<b>Time Since Last Inspection:</b>	100 Hrs	<b>Engines:</b>	1 Turbo shaft
<b>Airframe Total Time:</b>	5414 Hrs	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	T-53-L-11D
<b>Registered Owner:</b>	HELICOPTER SYSTEMS	<b>Rated Power:</b>	1100 Horsepower
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	
<b>Operator Does Business As:</b>		<b>Operator Designator Code:</b>	

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>		<b>Distance from Accident Site:</b>	
<b>Observation Time:</b>		<b>Direction from Accident Site:</b>	
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	/	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	0°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>		<b>Temperature/Dew Point:</b>	27°C / -18°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>		<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>		<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	10:00 Local	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>		<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	0 ft msl	<b>Runway Surface Condition:</b>	
<b>Runway Used:</b>	0	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	0 ft / 0 ft	<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious	<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>	1 Serious	<b>Latitude, Longitude:</b>	33.539249,-81.7191(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Powell, Phillip
<b>Additional Participating Persons:</b>	JAMES A MALEK; COLUMBIA , SC
<b>Original Publish Date:</b>	September 5, 1990
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=7887">https://data.nts.gov/Docket?ProjectID=7887</a>

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