



# Aviation Investigation Final Report

<b>Location:</b>	WALTERBORO, South Carolina	<b>Accident Number:</b>	ATL88FA213
<b>Date &amp; Time:</b>	July 12, 1988, 07:30 Local	<b>Registration:</b>	N465JR
<b>Aircraft:</b>	BELL TH-1L	<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 MILITARY SURPLUS HELICOPTER EXPERIENCED A 42 DEGREE GEAR BOX FAILURE WHILE LIFTING A LOAD OF LOGS. THE HELICOPTER SUBSEQUENTLY LANDED HARD AS THE PLT WAS ATTEMPTING TO AUTOROTATE TO A LDG. METALLURGICAL EXAMINATION OF THE GEARBOX REVEALED THAT A GEAR TOOTH ON THE INPUT QUILL PINION HAD FAILED DUE TO FATIGUE. NO EVIDENCE OF PREEXISTING DAMAGE OR IMPROPER OVERHAUL PROCEDURES WAS FOUND. THE GEARBOX TSO WAS ABOUT 440 HRS. THE 42 DEG GEAR BOX MAY BE OVER- HAULED ON CONDITION. INVESTIGATION REVEALED THAT THE HELICOPTER HAD EXPERIENCED IN EXCESS OF 13,000 LIFT CYCLES IN 380 HRS SINCE IT WAS PLACED IN SERVICE IN A LOGGING OPERATION. THE HELICOPTER HAD BEEN FAA-CERTIFICATED IN THE RESTRICTED CATEGORY FOR EXTERNAL LOAD OPERATIONS; HOWEVER, BELL RPTS THAT THE ACFT WAS NOT DESIGNED FOR REPEATED HEAVY LIFTING. THERE HAVE BEEN AT LEAST 2 OTHER SIMILAR FAILURES INVOLVING SURPLUS UH-1/TH-1 HELICOPTERS USED IN LOGGING OPERATIONS. THE LANDING SITE WAS STREWN WITH CUT TIMBER AND SMALL TREES.

## Probable Cause and Findings

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

## Findings

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

Phase of Operation: HOVER

### Findings

1. (C) ROTOR DRIVE SYSTEM, INTERMEDIATE GEARBOX(42 DEG) - FATIGUE
2. (C) ROTOR DRIVE SYSTEM, INTERMEDIATE GEARBOX(42 DEG) - FAILURE, TOTAL
3. (F) ACFT/EQUIP, INADEQUATE DESIGN - MANUFACTURER
4. (F) INADEQUATE CERTIFICATION/APPROVAL, AIRCRAFT - FAA(ORGANIZATION)

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Occurrence #2: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: HOVER

### Findings

5. DIRECTIONAL CONTROL - NOT POSSIBLE

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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - EMERGENCY

### Findings

6. AUTOROTATION - ATTEMPTED
7. (F) OBJECT - TREE(S)

## Factual Information

### Pilot Information

<b>Certificate:</b>	Airline transport; Commercial; Flight instructor	<b>Age:</b>	42, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane; Helicopter	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>		<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 Valid Medical--no waivers/lim.	<b>Last FAA Medical Exam:</b>	April 25, 1988
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	7334 hours (Total, all aircraft), 3900 hours (Total, this make and model), 5500 hours (Pilot In Command, all aircraft), 212 hours (Last 90 days, all aircraft), 82 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	BELL	<b>Registration:</b>	N465JR
<b>Model/Series:</b>	TH-1L TH-1L	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Restricted (Special)	<b>Serial Number:</b>	157828
<b>Landing Gear Type:</b>	Skid	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	May 14, 1988 100 hour	<b>Certified Max Gross Wt.:</b>	9500 lbs
<b>Time Since Last Inspection:</b>	131 Hrs	<b>Engines:</b>	1 Turbo shaft
<b>Airframe Total Time:</b>	7676 Hrs	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	T53-L13BA
<b>Registered Owner:</b>	MOORE, W MARVIN	<b>Rated Power:</b>	1400 Horsepower
<b>Operator:</b>	S. EASTERN HELICOPTER LOGGING	<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>	5 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>	21°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>	00:00 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>	32.899494,-80.669235(est)

## Administrative Information

**Investigator In Charge (IIC):** Strickland, Scott

**Additional Participating Persons:** THOMAS CONWAY; W. COLUMBIA , SC  
CECIL DAVIDSON; W. COLUMBIA , SC

**Original Publish Date:** October 6, 1989

**Last Revision Date:**

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

**Note:**

**Investigation Docket:** <https://data.ntsb.gov/Docket?ProjectID=7616>

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