Aviation Investigation Final Report

Location:	Hopewell, New Jersey	**Accident Number:**	NYC01LA144
Date & Time:	June 14, 2001, 01:00 Local	**Registration:**	N555LH
Aircraft:	Eurocopter France AS-350-BA	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	7 Minor
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

The pilot departed in a helicopter with seven passengers, on a night VFR cross-country flight under FAR 135, into known deteriorating weather conditions. About 35 minutes after departure, while maneuvering in IMC conditions, the helicopter struck trees, and came to rest about 735 feet from initial tree contact. The flight had been one of two helicopters that had carried passengers to the departure airport. The pilot of the other helicopter made three contacts with flight service for weather briefings, and relayed his finding to the accident pilot. The briefings included VFR flight not recommended, and deteriorating weather. The company operations manual called for a minimum weather of a 500 foot ceiling and 1 mile visibility, and that to operate VFR, the pilot had to have visual surface reference. The pilot reported that he entered IMC conditions and was attempting to perform a precautionary landing when the tail rotor struck a tree. The pilot also reported that after the accident, he estimated the ceiling was about 100 feet high and the visibility was about 1 mile at the accident site. Radar data tracked the flight as the pilot maneuvered between 300 feet MSL, and 1,300 feet MSL, and then descended toward a nearby airport. However, due to terrain, there was no radar of the last portion of the flight. A pilot rated passenger seated in the front row, reported the pilot entered into IMC conditions, and maneuvered in IMC conditions for several minutes. He also said the helicopter was in IMC conditions, in cruise flight when it struck trees. The departure weight exceeded the maximum allowable takeoff weight by about 115 pounds and also exceeded the forward CG limit. Additionally, the passengers reported no pre-departure passenger briefing had been conducted.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's improper decision to continue flight in instrument meteorological conditions, and which resulted in an in-flight collision with trees. Factors were the fog, and dark night conditions.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: CRUISE

Findings
1. (F) LIGHT CONDITION - DARK NIGHT
2. PROCEDURES/DIRECTIVES - NOT FOLLOWED - PILOT IN COMMAND
3. (F) WEATHER CONDITION - FOG
4. (C) FLIGHT INTO KNOWN ADVERSE WEATHER - CONTINUED - PILOT IN COMMAND
5. OBJECT - TREE(S)

Factual Information

On June 14, 2001, about 0100 eastern daylight time, a Eurocopter AS-350-BA, N555LH, operated by Liberty Helicopters, was substantially damaged when it struck trees in Hopewell, New Jersey. The certificated commercial pilot and six passengers received minor injuries. Night instrument meteorological conditions prevailed at the accident site. The flight was operated on a company flight plan under 14 CFR Part 135.

The accident helicopter was one of two helicopters operated by the same company that had carried passengers from the New York City area, to Philadelphia International Airport (PHL), Philadelphia, Pennsylvania, and arrived about 1830. The pilot of the other helicopter reported that he started checking weather about 2100, and continued through 2300. Each time, he would relay the weather observations received to the pilot of the accident helicopter. The pilot who had checked the weather told the Safety Board that the forecast called for the visibility to reduce to less than a mile after 0300.

According to transcripts of the weather briefings, the pilot of the other helicopter contacted the Williamsport automated flight service station (AFSS) at 2114, 2259, and 2347.

At the 2114 contact he was given:

"...airmet still for occasional i f r conditions up around the new york city area...its tending toward i f r conditions in the new york city area, um mainly poor visibilities less than three miles, elsewhere its generally marginal with the visibilities running four to six in haze...northeast philadelphia, ahh their forecast says their looking for until two a m, fifteen hundred overcast with four and haze and ahh, newark's forecast ahh they're generally looking for ahh eight hundred overcast with two and mist, occasionally down to five hundred over and one...[McGuire AFB] they're looking for five hundred broken and a visibility of eight hundred meters in fog...."

At the 2259 contact he was given:

"...there's an airmet out for i f r conditions up through there...north philly is clear below one two thousand with six and haze...three and haze at south jersey regional, right about 4 miles in fog both at trenton, and the sommerville or summerset, ah actually they put a special out at thirty seven past the hour they're now at two and fog...mcguire is one and half in fog...morristown's at two miles in fog...teterboro's new one, they're ceilings below one two thousand with four and fog...la guardia's at thirteen hundred few with three and fog....it'll probably just continue to get worse here as the night goes on and those temperatures and dewpoints come closer together...newark ahh till two in the morning they're saying eight hundred overcast with two and fog, occasionally five hundred overcast with a mile in fog...it just keeps getting worse...v f r

flight not recommended....north philly till midnight ahh twenty five thousand scattered with six and haze, midnight till three a m fifteen hundred overcast with four and haze, and after three a m eight hundred overcast with two and fog, that's the same trenton uses ahh north philly's forecast...."

At the 2347 contact he was given:

"...[Newark]...a special at fifteen past this hour, wind two hundred at four, visibility three in mist, ceiling eight hundred broken, temperature twenty one, dewpoint nineteen [no specials for northeast philadelphia or trenton]...allair, lets see last observation automated observation here at thirty five past the hour so fourteen minutes ago, one mile and with the automated observation they don't indicate what it is but i'm sure its fog mist and ceiling one hundred overcast...la guardia...they dropped to two miles mist, fifteen hundred broken...."

The pilot of the other helicopter reported that he briefed the pilot of the accident helicopter on the weather he had received. He also reported that he briefed his passengers on the possibility that the flight could not be completed due to en route weather, and they elected to return to New York via automobile.

The pilot of the accident helicopter reported that he received a weather briefing from the other pilot, briefed his passengers on the weather, and they elected to make the return flight. The passengers boarded the accident helicopter and the flight departed. The pilot of the other helicopter reported that he was about a mile behind the accident helicopter, and he was able to maintain visual contact with it until they neared Bordentown, New Jersey, when he started slowing down due to reduced visibility. The pilot of the other helicopter also reported that both he and the pilot of the accident helicopter agreed a few minutes later to divert to TTN. The pilot of the other helicopter reported that his course to TTN was about 280 to 285 degrees magnetic.

The pilot of the accident helicopter reported that as he passed Northeast Philadelphia Airport (PNE), the ceiling lowered and the visibility reduced. As he passed abeam of TTN, the ceiling had lowered to 300 feet AGL, and the visibility had reduced to 1 mile. He reported that he also made the decision to divert to Trenton as he passed abeam of it.

Radar data tracked both helicopters flying northeast from Philadelphia International Airport. As the helicopters departed the Philadelphia Airport airspace, their transponder codes were changed from discrete codes to code 1200. Two code 1200 targets were picked up where the discrete codes stopped. The 1200 codes continued until 0042:30, when they were about 4.6 nautical miles (NM) miles southeast of TTN, after which they disappeared.

The radar tracks begin again about 2.2 east southeast of TTN at 0046:18. The target was tracked as it continued north, at an altitude of 300 to 400 feet mean sea level (MSL). At 0050:13, when the target was about 6.1 NM northeast of TTN, it turned to the west, and climbed to 1,100 feet. The target continued on this heading until it was 7.1 NM north of TTN,

when it began a turn to the right at 0052:48. For the next several minutes, the target continued in a right turn, moved to the southeast, back north, and then back to the south. Altitudes varied from 1,300 feet to 800 feet. Radar contact with the target continued to be intermittent. The last radar contact occurred at 0057:44, with a recorded altitude of 800 feet MSL, on a track of 206 degrees magnetic.

The accident site was located 1.11 NM from the last radar hit, on a track of 184 degrees magnetic. The track and distance from the accident site to TTN was 202 degrees magnetic, and 5.8 NM.

In a written statement, the pilot reported:

:...Without warning, I encountered IMC several miles from Trenton at an altitude of approximately 600 feet. I began flying by instrument reference, turned to a heading of South and proceeded in the direction of Trenton and what I expected to be clearer weather."

"After proceeding a period of time as described above, I spotted two tree lines and a field. Rather than continuing into uncertain and unforecast conditions, I elected to make a precautionary landing in the field. While confident that the field was of more than sufficient size to land safely, the tail rotor nonetheless struck a tree that I did not see just prior to landing. Upon losing rotor authority, the helicopter started to spin. I secured the engine and continued with the landing. When the helicopter came to rest, I exited along with each of the passengers. "

The pilot reported that after the accident, he estimated the visibility was about 1 mile and the ceiling was about 100 feet. At 0053, the weather at TTN was recorded as clear with mist, and visibility of 3 miles.

A passenger seated in the right front seat, held a private pilot certificate with airplane and instrument ratings. He was also a student pilot in rotorcraft. He reported that initially after departure, the helicopter flew at 500 feet with good visibility. Later, the ceiling started to lower, and the helicopter flew lower. The passenger reported further:

"...the bottoms of the fog were less than 100' above us...you could see the ceilings were even lower in front of us...we begin a climb into IMC. We climbed with our altitude varying between 500 and 700' indicated altitude and our airspeed increased to between 100 and 110 knots. At this time, we were completely in IMC with neither ground lights, horizon, nor any visual indications to the side or above the helicopter visible...We then began a climb, leveling out at 1200' indicated altitude. We leveled off here shortly, and then climbed a further 200' to 1400'. We flew at these altitudes, with only small altitude fluctuations for the next few minutes...We then began a descent to 1000' feet indicated altitude. We were in IMC this entire time. As we descended to 1000' feet, I saw a flashing red light at approximately our 3:00 position and below us. I couldn't tell if it was a flashing light or flashing through breaks in the fog...The pilot was keeping the aircraft in control, and appeared to be navigating via a portable gps, which

was hanging on a strap attached to the left side of the aircraft. At no point did he consult his Jeppesen binder or remove any approach plates. We then began a series of descents which culminated in us leveling off at 600' indicated altitude. We flew at this altitude for several minutes, during which time I noticed more flashing lights to the right and below us...He was continually checking his portable GPS, and we continued to fly between 600' and 700'. After several minutes of flying at these altitudes, during which time we were still in IMC, we began to descend. I noticed the altimeter at 400' heading towards 300' and the airspeed at approximately 90 knots indicated airspeed, and we were still in IMC. Immediately thereafter, a tree materialized in the windshield, and we crashed into it.. As the windshield shattered...I felt the aircraft pitch down, and roll to the right. The next conscious thought I had was of my friends above me telling me to wake-up and not go to sleep. I felt myself being pulled to my feet and moving away from the helicopter into the middle of the field. From the time we entered IMC until the time we crashed, I would estimate we flew for between 10 and 20 minutes. From the time we entered IMC until the time we hit the tree, we were continually in IMC with only occasionally flashes of lights visible.

Other passengers reported that the helicopter was not slowing for a landing when it struck the tree, and the helicopter was at cruise or near cruise speed when the accident occurred. In addition, they also reported that there was no passenger briefing prior to departure.

The pilot and some of the passengers reported that the helicopter spun several times after it struck the trees.

Personnel from the New Jersey Department of Transportation, Division of Aeronautics, reported that they observed a tree with broken branches 92 feet above the ground. The helicopter came to rest 737 feet from the tree with the broken branches, on a heading of 189 degrees magnetic. Debris from the helicopter, including the tail rotor blades and 90-degree gearbox were found between the initial tree strike and where the helicopter came to rest.

According to the Liberty Helicopter Operations Manual, the weather minimums for night time operations were a 500 foot ceiling and one mile visibility.

The company flight operations manual did not contain, nor was it required to contain a section on encountering inadvertent IMC conditions.

According to the pilot, he had not completed a load manifest as required by the company operations manual prior to departure. A reconstructed weight and balance for the flight revealed the takeoff gross weight was 4,745 pounds, and the center of gravity position was 124.89 inches. The maximum allowable takeoff weight was 4,630 pounds (2,100 kg), with a maximum forward limit at that weight of 125.3 inches.

The pilot of the other helicopter reported that he made an uneventful landing a TTN.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	40,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine; Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	January 8, 2001
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	October 10, 2000
Flight Time:	2519 hours (Total, all aircraft), 1063 hours (Total, this make and model), 2401 hours (Pilot In Command, all aircraft), 199 hours (Last 90 days, all aircraft), 76 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Eurocopter France	**Registration:**	N555LH
Model/Series:	AS-350-BA	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3018
Landing Gear Type:	Skid	**Seats:**	7
Date/Type of Last Inspection:	May 30, 2001 AAIP	**Certified Max Gross Wt.:**	4630 lbs
Time Since Last Inspection:	37.2 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	4804.3 Hrs at time of accident	**Engine Manufacturer:**	Turbomeca
ELT:	Installed, not activated	**Engine Model/Series:**	Arriel 1B
Registered Owner:	Liberty Helicopters	**Rated Power:**	650 Horsepower
Operator:		**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:		**Operator Designator Code:**	MHIA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	TTN,213 ft msl	**Distance from Accident Site:**	6 Nautical Miles
Observation Time:	01:03 Local	**Direction from Accident Site:**	201°
Lowest Cloud Condition:	Scattered / 400 ft AGL	**Visibility**	2.5 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	60°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.01 inches Hg	**Temperature/Dew Point:**	21°C / 21°C
Precipitation and Obscuration:	N/A - None - Fog		
Departure Point:	Philadelphia, PA (PHL)	**Type of Flight Plan Filed:**	Company VFR
Destination:	New York, NY (JRA)	**Type of Clearance:**	None
Departure Time:	00:25 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Trenton-Mercer TTN	**Runway Surface Type:**	
Airport Elevation:	213 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	6 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	7 Minor	**Latitude, Longitude:**	40.369445,-74.793334

Administrative Information

Investigator In Charge (IIC):	Hancock, Robert
Additional Participating Persons:	James Sheppard; Federal Aviation Administration; Philadelphia, PA
Original Publish Date:	September 20, 2002
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=52480

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