National Transportation Safety Board
Aviation Accident Final Report

Location:	TALLADEGA, AL	**Accident Number:**	ATL93FA127
Date & Time:	07/12/1993, 1455 CDT	**Registration:**	N9116F
Aircraft:	HUGHES 369HS	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

THE HELICOPTER PILOT HAD ATTAINED 9 HOURS OF FLIGHT TIME IN THIS MAKE & MODEL OF AIRCRAFT. HE WAS ATTEMPTING A DOWNWIND LANDING IN A CONFINED AREA OF THE TALLADEGA SUPER SPEEDWAY, ALTHOUGH OPEN & UNCONFINED AREAS WERE LOCATED NEARBY. THE SITE WAS 168 FEET LONG & 105 FEET WIDE, AND WAS SURROUNDED ON ALL SIDES BY TALL FENCES & POWER LINES. WITNESSES STATED THAT JUST BEFORE TOUCHDOWN IN THE CONFINED AREA, THE HELICOPTER BEGAN TO OSCILLATE FROM SIDE TO SIDE. THE HELICOPTER THEN ASCENDED TO A HEIGHT OF ABOUT 25 FEET, THEN IT BEGAN TO SPIN IN A COUNTERCLOCKWISE DIRECTION. THE RIGHT FRONT SEAT PASSENGER RECALLED BRACING HIS HANDS ON THE CONSOLE & DOOR OF THE HELICOPTER DURING THE EVENT; HOWEVER, HE DID NOT RECALL THE POSITION OF HIS FEET DURING THE EVENT. EXAMINATION OF THE AIRCRAFT DID NOT REVEAL ANY PREIMPACT MALFUNCTION OF THE TAIL ROTOR SYSTEM. METALLURGICAL EXAM OF FRACTURES ON THE COLLECTIVE STICK, COLLECTIVE STICK HOUSING, COLLECTIVE PUSH-PULL ROD & ROD END FROM THE ROTOR HEAD REVEALED NO EVIDENCE OF PROGRESSIVE CRACKING (BEFORE IMPACT).

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: THE PILOT'S POOR IN-FLIGHT DECISION TO LAND DOWNWIND IN A CONFINED AREA THAT WAS SURROUNDED BY HIGH OBSTRUCTIONS, AND HIS FAILURE TO PROPERLY COMPENSATE FOR THE TAILWIND CONDITION. A FACTOR RELATED TO THE ACCIDENT WAS: THE PILOT'S LACK OF TOTAL EXPERIENCE IN THE TYPE OF AIRCRAFT.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: HOVER

Findings
1. (C) IN-FLIGHT PLANNING/DECISION - POOR - PILOT IN COMMAND
2. WEATHER CONDITION - TAILWIND
3. (C) COMPENSATION FOR WIND CONDITIONS - IMPROPER - PILOT IN COMMAND
4. (F) LACK OF TOTAL EXPERIENCE IN TYPE OF AIRCRAFT - PILOT IN COMMAND
5. TERRAIN CONDITION - HIGH OBSTRUCTION(S)
6. (C) UNSUITABLE TERRAIN OR TAKEOFF/LANDING/TAXI AREA - SELECTED - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
7. OBJECT - FENCE

Factual Information

HISTORY OF FLIGHT

On July 12, 1993, about 1455 central daylight time, a Hughes 369HS, N9116F, was substantially damaged following a collision with terrain during a landing attempt at the Talladega Super Speedway in Talladega, Alabama. The private pilot was fatally injured, and his passenger received serious injuries in the accident. The aircraft was being operated under 14 CFR Part 91 by the pilot. Visual meteorological conditions existed at the time, and no flight plan had been filed for the personal flight. The flight departed Birmingham, Alabama about 1415.

Witnesses stated the aircraft approached the intended landing area from the south to the north at an altitude of about 50 feet. Once over the landing area, the aircraft began to descend very slowly from a 50 foot hover to approximately one foot above the terrain. At that point, the aircraft began to oscillate from side to side and then climbed to an altitude of approximately 25 feet. After climbing, the aircraft began to rotate in a counter clockwise direction. The aircraft then banked sharply to the left and impacted the terrain and a 10 foot fence adjacent to the original intended landing site.

The right front seat passenger on the aircraft stated that the approach seemed to be normal until about 6 inches to one foot above the ground. He said that at that point the helicopter appeared to turn to the right approximately 30 degrees, and then rapidly ascended to a height above the power line poles. He stated that at that point, the ride became very violent, and he became scared. He recalled bracing his hands on the console and the right door of the aircraft, however he gave no indication of where he braced his feet during the event. He stated that the aircraft impacted the terrain on the left side.(See Record of Interview of Mr. Red Farmer by FAA Inspector Jerry Yates.)

PERSONNEL INFORMATION

The pilot, Mr. David C. Allison, was employed as a race car driver. He held a private pilot's certificate with airplane single engine, multiengine, helicopter, and instrument airplane ratings.

Mr. Allison had accumulated approximately 1073 hours of flight time. He received his helicopter rating in July of 1992, and had accumulated approximately 54 hours of flight time in helicopters. He had flown approximately 9 hours in the Hughes 369HS and the remaining flight time was accumulated during training for his helicopter rating in a Robinson R-22.

Mr. Allison's flight experience in the Hughes 369HS consisted of 2.8 hours of flight instruction. Mr. Allison's flight instructor stated that during the flight training in the 369HS, take-off and landings, autorotations to power recovery, and quick stop procedures were practiced. He stated that at no time during the training, had they practiced down wind landings. He stated that at the completion of the two training sessions, Mr. Allison had stated to him that he intended to fly the helicopter to his(Mr. Allison's) residence and park it until after the race at Talladega. At that time, Mr. Allison, would make an appointment with the flight instructor to complete a thorough check out in the helicopter prior to conducting any flights with passengers.(See Record of Conversation With Mr. John Corley Attached to this Report.)

Insurance companies were contacted on behalf of Mr. Allison, and asked to provide a quotation of premium for coverage on the Hughes 369HS helicopter. One company who offered a

quotation, would have required Mr. Allison to complete 25 hours of flight training in the Hughes 369HS prior to solo flight, and 25 hours of solo flight prior to carriage of passengers.(See Insurance Quotation from Aviation Insurance Managers Attached to this Report.)

Additional pilot information may be obtained in this report on page 3 under Pilot Information.

AIRCRAFT INFORMATION

The Hughes 369HS is a five place utility category helicopter powered by an Allison Model 250-C20 engine.

The last annual inspection of N9116F was completed on August 21, 1992, at a total time of 4159.7 hours of operation. No documentation of aircraft maintenance or flight time after that date was received.

The aircraft records do not indicate that the following Mandatory Service Notices had been complied with.

1. HN-235 Engine air inlet inspection/rework 3/20/93 2. HN-224 Replacement of tail rotor pitch arm nuts 6/15/90 3. HN-213 Replace particle separator door 12/18/87 4. HN-198.1 Corrosion inspection main rotor driveshaft 9/30/87 5. HN-196 Inspect landing gear/struts 10/01/84 6. HN-190 Battery case inspection 10/28/83 7. HN-189.1 Inspect/rework fuel shutoff valve 8/20/84 8. HN-188 Install sleeve on tail rotor output shaft 5/21/83 9. HN-187.1 Install collective support strap 11/23/83

An Aircraft Bill of Sale dated June 21, 1993, showed the aircraft was purchased from Stevens Racing Products by Davey Allison Racing Enterprises, Inc.

Additional aircraft information may be obtained in this report on page 2 under section titled Aircraft Information.

METEOROLOGICAL INFORMATION

Witnesses reported that at the time of the accident, the wind at the Talladega Super Speedway was blowing from south to north.

Additional meteorological information may be obtained in this report on pages 3 and 4 under section titled Weather Information.

AERODROME INFORMATION

The Talladega Super Speedway is not a certificated airport. The Talladega Super Speedway is a large stock car racing complex consisting of several thousand acres of open land. Located on the west side of the racetrack are the stands and race car pit area. In the race car pit area, there are several buildings, and many above ground power lines and tall fences.(See Talladega Super Speedway Diagram for Detail.)

Witnesses stated that the aircraft was attempting a landing in a confined area of the race car pit area called the Media Parking Lot. The Media Parking Lot is an asphalt paved area approximately 168 feet in length and 105 feet in width. The area is bounded on the south, east, and north by a 10 foot high fence. The west end of the area is bounded by a power line approximately 26 feet high.(See Enlarged Section of Talladega Super Speedway Diagram Showing Accident Area for Detail.)

WRECKAGE INFORMATION

The wreckage was located just north of the original intended landing area (Media Parking). A section of a ten foot chain link fence had been damaged. Pieces of the aircraft were found as much as 115 feet from the main wreckage.(See Attached Wreckage Distribution Diagram for Detail.)

There was crushing of the airframe from station (sta.) 50 and water line (wl) 15 below the left pilot door upward across the pilot's door. There was some crushing of the left door and the canopy frame. The forward canopies and cabin overhead canopies were all fractured. The left front door was intact and attached to the airframe, but the Plexiglass was broken and the door was buckled in numerous locations. The right front door was intact, but was detached from the frame, and lying adjacent to the wreckage. The 'A' frame assembly (sta. 78.5 to sta. 124) was intact, and generally undamaged. There were numerous compression buckles in the airframe skin along both sides of the aircraft. Both left skid struts were fractured. The aft left skid tube was fractured just below the step assembly. The front left skid tube was fractured just below the airframe exit point. Both skid tubes were separated from the aircraft, but remained primarily undamaged. The aft cargo or passenger compartment was intact. There was no evidence of shoulder straps available for use by the aircraft occupants.

The main rotor blades all exhibited lead lag bending and spanwise torsional twisting. All four blade roots remained attached to the hub and did not show significant damage at the root end. The green blade was fractured at sta. 140, and there was near total compression of the blade from trailing edge to leading edge. The green rotor blade had aft and up spar bend at sta. 124. The white blade was bent aft at sta. 145, and bent forward and up at sta. 122. The white blade also had a 45 degree upward bend at sta. 134. The blue blade had a uniform 90 degree upward bend beginning at sta. 85 and progressing to sta. 122. The blade tip weights and aft skin of the blue blade outboard of sta. 142 were separated from the blade. The red blade had a uniform up and aft 70 degree bend starting at sta. 104, and progressing to sta. 122. The trailing edge skin, tip cap and weight of the red blade were separated from the blade. There was no evidence of damage to the droop stop striker plates.

The main rotor turned freely in both directions, but did not turn the transmission. The main rotor pitch housing assemblies showed evidence of large lead lag excursions. The green pitch housing was destroyed. The main rotor driveshaft was torsionally fractured just above the spline section in the main transmission.

The main transmission turned freely in both directions when turned with the input shaft. There were no unusual noises or restrictions observed in the transmission, and the magnetic chip plug was clean and free of metal deposits. The engine to transmission driveshaft was intact. The oil cooler drive belt was broken, however there were no signs of belt wrap up or rubbing in the housing. The overrunning (sprag) clutch at the engine output assembly operated properly in both directions. The tail rotor drive shaft was torsionally fractured at sta. 256. The section of tail rotor drive shaft from sta. 256 to sta. 220 was separated from the aircraft and flattened about half the diameter of the shaft. There was also a torsional fracture of the tail rotor drive shaft at sta. 134. The tail rotor transmission was attached to the aft tail boom fitting and turned freely. The output shaft and fork assembly were still attached to the transmission, and the tail rotor hub and fork bolt were still in place and not fractured. The tail rotor gearbox magnetic chip plug did not contain any metal chip particles.

The cyclic controls were in place. The lateral and longitudinal control tubes under the cockpit seats were still in place, attached to the various bellcranks, and operated the mixer assemblies and swashplate normally. The cyclic control system was continuous from the cyclic stick to the rotor head mixer assembly and the stationary swashplate. The lateral and longitudinal trim actuators were both in the centered position.

The tail rotor pedals were found with the left pedal fully depressed. The copilot's tail rotor pedals were in place. The pilot's tail rotor pedal stems were fractured just above the bulkhead torque tube. The bulkhead torque tube was fractured from the mounts on both sides of the airframe. The pedal controls were continuous through the idler bellcrank, sta. 95 bellcrank, and sta. 142 bellcrank. The long control tube through the tailboom was fractured near sta. 220, and near sta. 255 concurrent with the fractures in the tailboom. The tail rotor swashplate and pitch links were attached. The swashplate and red pitch link were both functional. The blue pitch link was damaged by a strand of barbed wire which was wrapped around the link and hub, and the bearing had pulled out of the blade end of the link. The red tail rotor blade was fractured and torn just outboard of the root fitting and a large piece of the blade was located lodged in the top of the chain link fence between the Media Parking area and the main wreckage. The blue tail rotor blade was fractured approximately 4 inches from the tip.

The pilot's collective stick was fractured at the housing mount, and the copilot's collective torque tube housing aft lugs were fractured. The white, blue and red pitch change links were attached and showed minor bending damage. The green pitch change link was bent and fractured just above the swashplate attach point. The stationary and rotating swashplates were intact and attached to the upper mast. The white ,red, and blue main rotor damper assemblies were attached to the pitch housing. The green pitch housing was destroyed, and the damper assembly was fractured.

Witnesses stated that the aircraft engine was running for approximately 20 minutes following the collision. Inspection of the fuel lines did not reveal any vacuum leaks. The pilots throttle on the collective was found in the full open position.

MEDICAL AND PATHOLOGICAL INFORMATION

A verbal request for autopsy and toxicology was denied by the local District Attorney and County Coroner on the basis of family request and that Mr. Allison was an organ donor.

TESTS AND RESEARCH

Metallurgical examination of the fractured main rotor drive shaft showed that the fracture was consistent with a sudden stoppage of the main rotor system.(See Metallurgist's Factual Report Attached to this Report.)

Metallurgical examination of the pilot's fractured tail rotor pedal stems revealed fracture faces typical of overstress fractures with no evidence of progressive preexisting cracking.(See Metallurgist's Factual Report Attached to this Report.)

A test run of the Allison 250-C20 engine revealed that the power levels were slightly below new engine specifications, but exceeded power plant limitations for the 250-C20 installation in the Hughes 369HS, which are 275 horse power (HP) at take off, and 240 HP at normal cruise. There were no deficiencies noted during either stabilized running or power transients. The accelerate time from flight autorotation to takeoff, and decelerate from takeoff to ground idle, were within the power transient specifications of .067 minutes and .100 minutes

respectively.(See Engine Test Log Attached to this Report.)

ADDITIONAL INFORMATION

An investigator representing the pilot's family presented a section of the co-pilot's collective, and a metallurgical report on testing of the part. The part was a section of the co-pilot housing lug which had been fractured. The metallurgical report stated fatigue as the failure method of the part. A request was made of the investigator for the part and the report for further analysis, however, neither have been offered.

The aircraft wreckage was released to Davey Allison Racing Enterprises, Incorporated on August 5, 1993. The aircraft records were released to Mr. David Fair of the Federal Aviation Administration Flight Standards District Office in Birmingham, Alabama on June 13, 1994.

Pilot Information

Certificate:	Private	**Age:**	32, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	Seatbelt
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane Single-engine; None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	02/01/1993
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	1073 hours (Total, all aircraft), 9 hours (Total, this make and model), 963 hours (Pilot In Command, all aircraft), 81 hours (Last 90 days, all aircraft), 31 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	HUGHES	**Registration:**	N9116F
Model/Series:	369HS 369HS	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Utility	**Serial Number:**	0396S
Landing Gear Type:	Skid	**Seats:**	5
Date/Type of Last Inspection:	08/12/1992, Annual	**Certified Max Gross Wt.:**	2550 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo Shaft
Airframe Total Time:		**Engine Manufacturer:**	ALLISON
ELT:	Not installed	**Engine Model/Series:**	250-C20
Registered Owner:	STEVENS RACING PRODUCTS, INC.	**Rated Power:**	278 hp
Operator:	ALLISON, DAVID C.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	ANB, 611 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	1450 CDT	**Direction from Accident Site:**	87°
Lowest Cloud Condition:	Scattered / 4000 ft agl	**Visibility**	6 Miles
Lowest Ceiling:	None / 0 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	130°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	32°C / 22°C
Precipitation and Obscuration:			
Departure Point:	BIRMINGHAM, AL (BHM)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	1415 CDT	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 1 Serious	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	ROFF H SASSER	**Report Date:**	03/21/1995
Additional Participating Persons:	JERRY M YATES; BIRMINGHAM, AL PAUL A WERNER; VANDALIA, OH TOM MILLER; BIRMINGHAM, AL TOM CARMODY; WASHINGTON, DC		
Publish Date:			
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