National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB ID: CHI03FA259	Aircraft Registration Number: N41128
Occurrence Date: 08/13/2003	Most Critical Injury: Fatal
Occurrence Type: Accident	Investigated By: NTSB

Location/Time

Nearest City/Place	State	Zip Code	Local Time	Time Zone	
E.I. 276	LA		1130	CDT	

Airport Proximity:	Distance From Landing Facility:

Aircraft Information Summary

Aircraft Manufacturer	Model/Series	Type of Aircraft
Bell	206L-3	Helicopter

Revenue Sightseeing Flight: No

Air Medical Transport Flight: No

Narrative

Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:

HISTORY OF FLIGHT

On August 13, 2003, at 1130 central daylight time, a Bell 206L-3 helicopter, N41128, operated by Petroleum Helicopters, Inc. (PHI), received substantial damage during takeoff from Eugene Island 276 helideck, located in the Gulf of Mexico. Visual meteorological conditions prevailed and a company visual flight rules (VFR) flight plan was activated for the Title 14 Code of Federal Regulations (CFR) Part 135 passenger transport flight. The commercial pilot and two passengers were fatally injured, one passenger was seriously injured, and one passenger received minor injuries. The flight was originating at the time of the accident and was en route to Petroleum Helicopters-Intracoastal City Heliport (7LS4), Intracoastal City, Louisiana.

A witness stated that he was about 80 feet away on the 3/4 platform when he first saw the accident helicopter approach. He stated the wind was blowing from the southeast at 10-15 knots with some storms throughout the day. He stated that he believed that the accident helicopter came in from the southeast. The helicopter landed off the helideck center next to the refueling station. The helicopter then moved rearwards to position the tail rotor off the platform to load passengers since there was only one access to the helideck. The helicopter was not shut down after it had been positioned. The helicopter remained on the helideck for about eight minutes during which time it was refueled by one of the passengers and three additional passengers boarded with their baggage. One of the three additional passengers had two bags and the remaining two passengers had at least one bag. The passengers were carrying only clothes in their bags. The bags were described as 4-foot long duffel bags that can carry 40-60 lbs. The witness added that, "everything was normal," and they "were rushing because rain was moving in." He observed the helicopter after everybody boarded and said the 'rpms' came up and heard "nothing strange." The helicopter started coming up to about 3 feet above the helideck. He stated, "The nose went straight up and down onto the right side" and the helicopter rotated to the right. When the nose pitched up, the tail boom hit and snapped. The tail boom was completely severed from the fuselage. He said, "it was so fast and so violent." The nose of the helicopter went up about 35 degrees, and the tail boom snapped.

A second witness located 100 yards away on another platform saw the helicopter approach. He could not provide a compass heading from which the helicopter was approaching, but said that it was from Block "266." The helicopter touched down on the right side of the helideck next to the refueling station. He said that when helicopters need to refuel, they land "close to the fuel tank." The winds were 15-20 mph at the time of landing. The helicopter did not land into the wind. The helicopter remained on the platform for about 15-20 minutes during which time one of the passengers fueled the helicopter. The winds increased to about 45-50 mph with misting rain and were "blowing harder" since the time that the helicopter landed. The flare pipe was moving up and down. The wind was oriented such that it was against the left side of the helicopter. He said that it was not a direct wind into the left side but "just about." He said that the helicopter never lifted off the helideck, but there was an increase in engine sound and then the helicopter rolled to the

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right. The rotor was "running wide open." The nose of the helicopter or the tail rotor never pitched up or down before it rolled over. They had three different duffel bags all of which were 1/2 full and were of such a size that they could all fit into the baggage compartment.

A third witness stated that he was at least 100 yards away from the helicopter at the time of the accident. The helicopter was above him relative to his position. He could not see the skids. The wind was high because there was "bad weather moving in." He observed rain and one bolt of lightening. The rain and wind increased in intensity. It rained for several minutes after the accident. He did not see the helicopter approach and land. He could not tell if the helicopter lifted up because "it happened quick." When the helicopter "idled up" it tilted to the right, and the tail broke off after it hit. He has seen helicopters park close to the refueling station when they needed to refuel.

One of the passengers stated that the helicopter was having trouble taking off. There was plenty of room for two people to walk between the right skid and the fuel platform. The pilot did not say anything during the accident sequence.

PERSONNEL INFORMATION

The pilot was a United States Army helicopter pilot from November 1967 to September 1983. He was issued a commercial pilot certificate with a rotorcraft-helicopter rating on July, 25, 1969. He received an honorable retirement from the Army as Major on December 31, 1985. Following his retirement, he was employed in nonflying positions until he was employed by PHI as a helicopter pilot on January 30, 1988. At the time of his employment application with PHI, the pilot reported a total flight time of 2,252 hours, 1,912 hours as pilot-in-command, and 170 hours offshore experience.

On October 1, 2002, the pilot was issued a second class airman medical certificate with the following limitations, "holder shall possess glasses that correct for near and intermediate vision."

On August 6, 2003, and August 7, 2003, the pilot received 01:15 hours and 02:45 hours of training in a Bell 206 fixed training device (FTD). On August 7, 2003, the pilot received a Title 14 CFR Part 135.293 (Initial and recurrent pilot testing requirements) and Title 14 CFR Part 135.299 (Pilot in command: Line checks: Routes and airports) Airman Competency / Proficiency Check using a Bell 206. All areas included in the check were satisfactory. Unusual altitude recovery, inadvertent IMC, other (M.E.L.) and emergency drills and training were completed in a Bell 206 FTD. Settling with power and dynamic rollover were listed as oral checks. The duration of the check was 35 minutes. The check was administered by a PHI check airman.

At the time of the accident, the pilot had accumulated a total flight time of 10,406 hours, of which 6,858 hours were offshore in Bell 206 helicopters, and 5.35 hours were offshore in Bell 206 helicopters during the 30 days prior to the accident. Federal Aviation Administration (FAA) records indicate that the pilot did not have any prior accidents, incidents or violations.

Flight and Duty Time Log information shows that on August 12, 2003, the pilot reported for duty at ICY at 0550 and ended his duty day at ICY at 1740. A flight time of 01:40 hours in a Bell 206 was recorded. The pilot reported for duty at ICY at 0600 on the day of the accident.

AIRCRAFT INFORMATION

The 1985 Bell 206L-3, serial number 51134, was powered by a Rolls Royce Allison 250-C30P, serial number CAE-890396, turbo-shaft engine. The helicopter was painted yellow and black with white skid landing gear. The helicopter was last inspected during a 150-hour inspection on July 11, 2003, at

Narrative (Continued)

a total airframe time of 12,472 hours. The engine had accumulated a total of 17,865 hours at the time of the accident, and underwent its last 100-hour inspection on August 4, 2003. The helicopter was equipped with a landing skid flotation device.

The certified maximum gross takeoff weight for the Bell 206-L3 is 4,150 lbs (Internal Loading). The longitudinal and lateral center of gravity limits (Internal Loading) are:

Forward: 118 inches up to 2,800 lbs changing linearly to 119.1 inches at 4,150 lbs
Aft: 128.5 inches up to 2,900 lbs changing linearly to 126.85 inches at 4,150 lbs
Left: 4.0 inches
Right: 3.5 inches

The accident helicopter empty weight and balance was listed as 2,666.0 lbs, arm of 128.44 inches, and moment of 342,423 inch-pounds. The lateral axis had an arm of 0.26 inches, and moment of 699.00 inch-lbs.

The pilot's last airman medical certificate indicated that he weighed 228 lbs. The following seating positions and associated passenger weights were reported as follows:

Copilot position (right, front passenger) 200 lbs
Right, aft facing passenger 175 lbs
Right, forward facing passenger 199 lbs
Left, forward facing passenger 175 lbs

The buttock lines for the following positions are listed as follows:

Pilot +14.0 inches
Copilot position (right, front passenger) -11.0 inches
Right, aft facing passenger +12.9 inches
Right, forward facing passenger +15.3 inches
Left, forward facing passenger -15.3 inches

The Cabin and Baggage Compartment Table of Moments lists for the following weights and positions:

Front seat, fuselage station (FS) 65
200 lbs, 13,000 inch lbs
220 lbs, 14,300 inch lbs
230 lbs, 14,950 inch lbs

Mid-passenger (facing aft), FS 91
170 lbs, 15,470 inch lbs
180 lbs, 16,380 inch lbs

Aft-passenger (facing forward), FS 129
170 lbs, 21,930 inch lbs
180 lbs, 23,220 inch lbs
190 lbs, 24,510 inch lbs
200 lbs, 25,800 inch lbs

The PHI flight manifest lists the total weight of baggage as 70 lbs. There was no baggage present in the cabin or baggage compartment of the helicopter during the examination of the wreckage by the National Transportation Safety Board.

The fuel on board at takeoff was reported by PHI as 400 lbs.

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METEOROLOGICAL INFORMATION

The Eugene Island 330 weather reporting station, located about 12 nautical miles northeast of the accident site recorded, at 1153: wind 180 degrees at 23 knots; visibility 2 statute miles; sky condition overcast 500 feet; temperature 26 degrees Celsius; dew point 22 degrees Celsius; altimeter setting 30.04 inches of mercury.

AERODROME INFORMATION

Eugene Island 276, was an offshore oil pumping platform located in the Gulf of Mexico, about 90 nautical miles south of 7LS4. The platform was equipped with a 50-foot by 50-foot helideck approximately 80 feet above the water. The helideck was the northwest helideck and one of two helidecks located on the platform. The accident helideck was equipped with a recessed refueling station within the helideck, which was surrounded by a metal apron.

WRECKAGE AND IMPACT INFORMATION

Examination of the helideck revealed the refueling hose was stowed, and the refueling station cover closed. A series of parallel scrapes in the helideck surface were extended outward from a light fixture next to the refueling station. The bottom of the light fixture possessed a white mark, which was different in color than that of the fixture. The fixture did not posses any deformation, and the glass cover housing the light bulb was not fractured. The fixture was removed from the helideck and sent to Material Analysis Inc. in order to examine the white marking.

The wreckage was recovered near the platform at a depth of about 180 feet and transported to PHI's facilities in Lafayette, Louisiana. The main wreckage consisted of the fuselage, the attached engine and transmission, the attached skids, and the separated tail boom. The tail boom was separated between the aft fuselage and horizontal stabilizer, near fuselage station 250. The inflatable skids were not deployed. There were no remains of tie down straps attached to the wreckage. The right skid contained yellow markings that were different than that of the helicopter color. The right skid was removed and sent to Material Analysis Inc. in order to examine the yellow markings.

The horizontal stabilizer, vertical fin, and tail rotor assembly were attached to the tail boom. The right horizontal stabilizer and upper fin exhibited white markings. The tail skid was intact and not deformed.

The cyclic control stick was moved by hand several times through 360 degrees of rotation while the movement through the lateral cyclic, fore and aft cyclic, and collective hydraulic servo actuators was noted. All of the servo control tube assemblies aft of the actuators were fractured. The link to the collective lever was attached. Both cyclic control tubes leading to the swash plate were separated through a fracture in each control tube assembly. The swash plate assembly was intact. The servo actuators were then removed and bench tested at PHI's maintenance facility.

The hydraulic reservoir was opened and contained about 1/2 ounce of a red fluid consistent with hydraulic fluid. The reservoir screen did not contain metallic debris. The hydraulic pressure and return filter screens did not contain metallic debris. Both hydraulic filter red indicator buttons were not extended. The hydraulic pump was removed, and the pump driveshaft splines were noted to be intact.

Sections of the main rotor blades and main rotor hub assembly were located on the helideck. The main rotor hub was separated from the main rotor shaft through a fracture that exhibited a

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45-degree plane relative to the axis of the shaft. All components relating to the main rotor hub were intact. Both main rotor blades were fractured about 1/4 span from the blade root. The blade with the white spot decal had its fractured blade end collocated with a curvilinear separation through the metal apron that surround the helideck. The pitch horn for the white marked blade was separated at its base. The remaining portion of the pitch horn was attached to the hub. The fracture surface did not exhibit beach marks or striations. The pitch link assembly for the white spot decal blade was attached to its pitch horn and separated from the outer ring of the swash plate assembly through fracture of tube assembly. The fracture surface of the tube assembly exhibited a 45-degree fracture relative to the tube axis. The tube assembly was also bent about 30 degrees laterally.

The upper and lower transmission chip detectors were removed and did not contain metallic debris.

The main drive shaft was separated and exhibited features consistent with overstress about two inches from the outer coupling. The spline teeth of the inner and outer coupling were undamaged.

The tail rotor drive shaft tail and control tube were fractured near fuselage station 250 and exhibited deformation that was radially inward. The tail rotor drive shaft exhibited circumferential scoring of its painted surface several inches inboard from the fracture surface. The tail rotor transmission and tail rotor blades were attached to the tail boom. Both tail rotor blades did not exhibit leading edge damage. The fractured end of the tail rotor drive shaft rotated when the tail rotor blades were rotated by hand. The tail rotor control tube was separated from the tail rotor gearbox through a fracture in the walking beam. The fracture surface did not exhibit evidence of striations or beach marks. The tail rotor gear box chip detector was removed and did not possess metallic debris. The aft short shaft and first tail rotor driveshaft segment were not in place and were not recovered with the wreckage. The left side of the forward most tailboom bearing support bracket for the tail rotor drive shaft was deformed and the screw was displaced outward through a separation of the bracket.

The engine was separated from all of its engine mounts. The upper and lower engine chip detectors were removed and did not contain metallic debris. The engine fuel and oil filter elements were removed and did not contain debris.

MEDICAL AND PATHOLOGICAL INFORMATION

On August 15, 2003, an autopsy was performed on the pilot at the Jefferson Parish Forensic Center, Harvey, Louisiana.

The FAA's Final Forensic Toxicology Fatal Accident Report of the pilot was negative for all substances tested. The FAA's Clinical Report states 1750 mg/dl glucose was detected in urine.

FIRE

There were no reports of a fire on the oil platform, and there was no evidence of smoke or fire aboard the helicopter.

TESTS AND RESEARCH

According to the Material Analysis, Inc.'s examination report of the light fixture and right skid, "...the dark yellow streak on the involved skid and the paint on the light fixture were similar in appearance and elemental composition."

Narrative (Continued)

Bench testing of the servo actuators revealed that they were within the in-service test specifications for pressure, leakage, and breakout force.

A log entry, recorded at 11:19:29.26, in the helicopters Intellistar system, indicated that the engine turbine outlet temperature was 553 C, engine N1 was 63 percent, engine N2 was 60 percent, rotor speed Nr was 60 percent, and the aircraft bus voltage was 28 volts. The recording time was based upon computer time of the computer used to download the data.

The Rotorcraft Flying Handbook, FAA-H-8083-21, Dynamic Rollover, states:

A helicopter is susceptible to a lateral rolling tendency, called dynamic rollover, when lifting off the surface. For dynamic rollover to occur, some factor has to first cause the helicopter to roll or pivot around a skid, or landing gear wheel, until its critical rollover angle is reached. Then, beyond this point, main rotor thrust continues the roll and recovery is impossible. If the critical rollover angle is exceeded, the helicopter rolls on its side regardless of the cyclic corrections made.

Dynamic rollover begins when the helicopter starts to pivot around its skid or wheel. This can occur for a variety of reasons, including the failure to remove a tie down or skid securing device, or if the skid or wheel contacts a fixed object while hovering sideward, or if the gear is stuck in ice, soft asphalt, or mud. Dynamic rollover may also occur if you do not use the proper landing or takeoff technique or while performing slope operations. Whatever the cause, if the gear or skid becomes a pivot point, dynamic rollover is possible if you do not use the proper corrective technique.

Once started, dynamic rollover cannot be stopped by application of opposite cyclic control alone. For example, the right skid contacts an object and becomes the pivot point while the helicopter starts rolling to the right. Even with full left cyclic applied, the main rotor thrust vector and its moment follows the aircraft as it continues rolling to the right. Quickly applying down collective is the most effective way to stop dynamic rollover from developing. Dynamic rollover can occur in both skid and wheel equipped helicopters, and all types of rotor systems.

Critical Conditions increasing possibility for dynamic rollover:

1. Right side skid/wheel down, since translating tendency adds to the rollover force.

2. Right lateral center of gravity.

3. Crosswinds from the left.

4. Left yaw inputs.

ADDITIONAL INFORMATION

The FAA, Rolls Royce, Bell Helicopter, PHI, and UNOCAL were parties to the investigation.

The wreckage was released to the owner's representative on August 18, 2003.

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Landing Facility/Approach Information

Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
E.I. 276		80 Ft. MSL			

Runway Surface Type: Concrete

Runway Surface Condition: Wet

Approach/Arrival Flown: NONE

VFR Approach/Landing: None

Aircraft Information

Aircraft Manufacturer	Model/Series	Serial Number
Bell	206L-3	51134

Airworthiness Certificate(s): Normal

Landing Gear Type: Skid

Amateur Built Acft?	Number of Seats:	Certified Max Gross Wt.	Number of Engines:
No	7	4150 LBS	1

Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:
Turbo Shaft	Allison	250C30P	650 HP

- Aircraft Inspection Information

Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time
AAIP	08/2003	5.35 Hours	12534 Hours

- Emergency Locator Transmitter (ELT) Information

ELT Installed?/Type	ELT Operated?	ELT Aided in Locating Accident Site?

Owner/Operator Information

Registered Aircraft Owner	Street Address	City	State	Zip Code
Petrolium Helicopters Inc.	2001 SE Evangeline Thruway	Lafayette	LA	70508

Operator of Aircraft	Street Address	City	State	Zip Code
Petrolium Helicopters Inc.	2001 SE Evangeline Thruway	Lafayette	LA	70508

Operator Does Business As:

Operator Designator Code: HEEA

- Type of U.S. Certificate(s) Held:

Air Carrier Operating Certificate(s): On-demand Air Taxi

Operating Certificate:

Operator Certificate:

Regulation Flight Conducted Under: Part 135: Air Taxi & Commuter

Type of Flight Operation Conducted: Non-scheduled; Domestic; Passenger Only

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First Pilot Information

Name	City	State	Date of Birth	Age
On File	On File	On File	On File	56

Sex: M | Seat Occupied: Right | Occupational Pilot? Civilian Pilot | Certificate Number: On File

Certificate(s): Commercial

Airplane Rating(s): None

Rotorcraft/Glider/LTA: Helicopter

Instrument Rating(s): None

Instructor Rating(s): None

Current Biennial Flight Review? 08/2003

Medical Cert.: Class 2 | Medical Cert. Status: Valid Medical--w/ waivers/lim. | Date of Last Medical Exam: 10/2002

- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Mult-Engine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Lighter Than Air
Total Time	10414	6866						10414		
Pilot In Command(PIC)	10286	6840						10286		
Instructor										
Instruction Received										
Last 90 Days	57	57								
Last 30 Days	7	7						7		
Last 24 Hours	2	2						2		

Seatbelt Used? Yes | Shoulder Harness Used? Yes | Toxicology Performed? Yes | Second Pilot? No

Flight Plan/Itinerary

Type of Flight Plan Filed: Company VFR

Departure Point	State	Airport Identifier	Departure Time	Time Zone
Same as Accident/Incident Location			1130	CDT

Destination	State	Airport Identifier
Intracoastal Ci	LA	7LSR

Type of Clearance:

Type of Airspace: Class G

Weather Information

Source of Wx Information:

Unknown

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Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
K3B6	1153	CDT	Ft. MSL	12 NM	30 Deg. Mag.

Sky/Lowest Cloud Condition: Clear Ft. AGL

Condition of Light: Day

Lowest Ceiling: Overcast 500 Ft. AGL

Visibility: 2 SM

Altimeter: 30.04 "Hg

Temperature: 26 °C

Dew Point: 22 °C

Weather Conditions at Accident Site: Visual Conditions

Wind Direction: 180

Wind Speed: 23

Wind Gusts:

Visibility (RVR): Ft.

Visibility (RVV) SM

Precip and/or Obscuration:

Accident Information

Aircraft Damage: Substantial

Aircraft Fire: None

Aircraft Explosion None

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot	1				1
Second Pilot					
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers	2	1	1		4
- TOTAL ABOARD -	3	1	1		5
Other Ground					
- GRAND TOTAL -	3	1	1		5

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Administrative Information

Investigator-In-Charge (IIC)

Mitchell F. Gallo

Additional Persons Participating in This Accident/Incident Investigation:

Lemont Williford
Federal Aviaiton Administration
Baton Rouge, LA

Michael A Weber
Rolls Royce Corporation
Indianapolis, IN

Jack H Suttle, Jr.
Bell Helicopter Textron
Fort Worth, TX

Robert P Bouillion
Petroleum Helicopters, Inc.
Lafayette, LA

David D Philips
UNOCAL
Sugarland, TX