Aviation Investigation Final Report

Location:	, Gulf of America	**Accident Number:**	CEN11LA252
Date & Time:	March 24, 2011, 16:55 Local	**Registration:**	N32041
Aircraft:	Bell 206L-3	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	3 Minor
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

After the helicopter was refueled with the engine running, the pilot departed from an offshore oil platform. The pilot and the two passengers reported a loud bang just after the turboshaft-powered helicopter lifted off. The pilot immediately lowered the helicopter's nose and entered an autorotation to the water below; as the helicopter descended, the pilot activated the helicopter's float system. The floats inflated; however, the helicopter impacted the water and rolled inverted. Examination of the helicopter's engine found no preaccident mechanical malfunctions or failures that would have precluded normal operation. A review of data downloaded from the engine's data monitoring system revealed a "spike" in the engine's turbine outlet temperature and torque readings. The oil platform was venting un-ignited methane gas at the time the helicopter departed the platform. It is likely that the helicopter's engine experienced a compressor stall due to ingesting the methane gas, and the pilot immediately reacted by initiating an autorotation.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The loss of engine power due to an engine compressor stall as a result of ingesting methane gas during takeoff.

Findings

Aircraft	Compressor section - Not specified

Factual Information

History of Flight

Takeoff	Loss of engine power (partial) (Defining event)
Autorotation	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On March 24, 2011, about 1655 central daylight time, a Bell 206-L3 helicopter, N32041, impacted water shortly after takeoff from an offshore oil production platform, Main Pass 61A (MP61A), located in the Gulf of Mexico. The commercial pilot and two passengers received minor injuries. The helicopter was substantially damaged. The helicopter was registered to and operated by PHI, Inc., under the provisions of 14 Code of Federal Regulations Part 135 as an air taxi flight. Visual meteorological conditions prevailed for the flight and a company flight plan had been filed.

According to the pilot and passengers, the helicopter lifted from the oil platform and started to depart, when they heard a loud bang. The pilot lowered the nose of the helicopter, initiated an autorotation, and deployed the floats. The helicopter impacted the water and immediately rolled over, coming to rest upside down in the water. The pilot and front seat passenger were able to exit the helicopter unassisted. The pilot then assisted the rear cabin passenger in exiting the helicopter. The pilot stated he tried to deploy the life rafts; however, the raft system did not deploy from the helicopter before a nearby boat assisted him and passengers from the water.

The pilot further stated that they added fuel (hot refuel) to the helicopter prior to the departure from the oil platform. The pilot added that when the bang occurred, he saw the torque gauge read high, and did not notice any other gauges before looking back outside.

The pilot also stated that he departed the platform in a northwest direction and into the wind. The pilot further added that the oil platform had exhaust pipes, but did not know what came out of them, or if they were flaring gas at the time of his departure.

The production foreman on the platform later reported that they were venting methane gas about the time the helicopter departed the platform.

WRECKAGE AND IMPACT INFORMATION

The helicopter was recovered and transported to PHI’s facilities and an examination of engine and airframe conducted.

Examination of one of the main rotor blade revealed that it had fractured just outboard of the doubler, the other rotor blade remained attached to the mast. The blade exhibited spanwise bending along the length, with a chord-wise tear, approximately mid-span. The mast exhibited heavy bending just below the rotating swash plate. During recovery from the water, the helicopter's tailboom was torn from the fuselage just aft of its attachment point. The tailboom was not recovered from the water.

The right side pilot's door was not on the fuselage; the right side "A" pillar was fractured. Both left and right side windscreens and chin bubbles were broken. Prior to transport the main rotor head, main rotor blades and the mast were removed to facilitate transport.
The examination of the engine and airframe did not reveal any abnormalities that would have precluded normal operation of the helicopter, prior to the accident.

TEST AND RESEARCH

The helicopter was equipped with an Intellistart engine data monitoring system which was downloaded and plotted. A review of the data reveals a slight "spike" on the engine torque and TOT (turbine outlet temperature) readings, which likely occurred at the same time the occupants, heard a loud bang. The chart then depicts the torque and TOT to drop sharply, before a rapid recovery. At the time of the spike, the helicopter's main rotor speed has a slight increase, followed by a decrease, and recovery, before a sudden decrease in main rotor speed. The significant decrease in main rotor rpm is believed to be associated with the main rotor blades impacting the water surface.

The helicopter was equipped with the Apical Industries, Inc. float and life-raft system. An alert service bulletin, SB2010-02, dated 01/18/11, was issued by Apical Industries, Inc. that recognized and addressed a problem with the system's float inflation valve. The operator stated that the service bulletin's updated valve was not installed in the accident helicopter, and would normally be incorporated into the helicopter's regular maintenance schedule. The service bulletin allowed operators until May 1, 2011 to comply with the update.

A review of the Height-Velocity diagram contained in the Bell 206L-3 helicopter's Flight Manual, reveals that at 100 feet above ground level, operations with indicated airspeeds below 51 knots should be avoided. Per the Federal Aviation Administration Rotorcraft Flying Handbook, FAA-H-8083-21, the height/velocity (H/V) diagram depicts critical combinations of airspeed and altitude should an engine failure occur. Operations in crosshatched or shaded areas of the H/V diagram may not allow enough time for the critical transition from powered flight to autorotation. The pilot estimated the height of the helicopter's platform was 100 to 120 feet above the water.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	44,Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	May 20, 2010
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	2329 hours (Total, all aircraft), 326 hours (Total, this make and model), 2250 hours (Pilot In Command, all aircraft), 98 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N32041
Model/Series:	206L-3	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	51539
Landing Gear Type:	Skid	**Seats:**	7
Date/Type of Last Inspection:	March 18, 2011 AAIP	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Turbo shaft
Airframe Total Time:	11510 Hrs	**Engine Manufacturer:**	ALLISON
ELT:	C126 installed, not activated	**Engine Model/Series:**	250-C30 SER
Registered Owner:	PHI INC	**Rated Power:**	650 Horsepower
Operator:	PHI INC	**Operating Certificate(s) Held:**	On-demand air taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KMIS	**Distance from Accident Site:**	
Observation Time:	22:11 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	40°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.96 inches Hg	**Temperature/Dew Point:**	22°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Main Pass 61A, GM	**Type of Flight Plan Filed:**	Company VFR
Destination:	Main Pass 61A, GM	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Minor	**Latitude, Longitude:**	30.192229,-88.644977

Administrative Information

Investigator In Charge (IIC):	Hatch, Craig
Additional Participating Persons:	Jason Adame; FAA FDSO; Baton Rouge, LA David Riser; Rolls-Royce; Indianapolis , IN Mark Stuntzner; Bell Helicopter; Fort Worth, TX
Original Publish Date:	August 15, 2012
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=78710