



Aviation Investigation Final Report

Location:	Gulf of Mexico, Gulf of Mexico	Accident Number:	CEN23LA064
Date & Time:	December 15, 2022, 08:15 Local	Registration:	N414RL
Aircraft:	Bell 206-L4	Aircraft Damage:	Substantial
Defining Event:	Dynamic rollover	Injuries:	3 Minor
Flight Conducted Under:	Part 135: Air taxi & commuter - Scheduled		

Analysis

The pilot reported that on approach to the offshore oil platform the wind was gusting from the north. During approach to the helideck, he turned the nose of the helicopter to the northeast, so the disembarking passengers were near the stairway. Later, as he attempted to takeoff, the front skids lifted off the helideck and the wind from the north pushed against the helicopter. The skids became stuck on the helideck and the helicopter rolled over. The pilot was unable to regain control of the helicopter as it continued to roll off the helideck. During the uncontrolled descent, the pilot activated the emergency floats and the helicopter impacted the water. The occupants egressed the helicopter and were rescued from the water.

Photos of the helideck revealed the metal safety skirting was damaged and partially separated.

The operator's chief pilot stated to the Federal Aviation Administration (FAA) inspector that the pilot stated he made his approach from the south and terminated to a hover, rotated the nose right 45° which put the helideck stairs off the right side of the helicopter's nose. During the subsequent takeoff, the aft right skid of helicopter likely contacted the helideck and helideck light, which resulted in dynamic rollover. He also reported that there were no mechanical malfunctions or failures with the helicopter that would have precluded normal operation.

The operator's General Operating Manual (GOM) states that platform takeoffs should always begin from a stabilized hover and as into the wind as much as possible.

Postaccident examination of the helicopter revealed damage and witness marks to the aft right skid and did not reveal any preaccident mechanical malfunctions or failures that would have precluded normal operation.

It is likely that the pilot's improper takeoff technique allowed the helicopter to drift toward the helideck light, then when the skid contacted the light, that acted as a pivot point and resulted in dynamic rollover.

Probable Cause and Findings

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

The pilot's improper takeoff technique that allowed the helicopter skid to drift into a helideck light, resulting in a dynamic rollover.

Findings

Aircraft	Lateral/bank control - Not attained/maintained
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Takeoff	Dynamic rollover (Defining event)
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On December 15, 2022, about 0815 central standard time, a Bell 206-L4 helicopter, N414RL, was substantially damaged when it was involved in an accident in the Gulf of Mexico. The pilot and two passengers sustained minor injuries. The helicopter was operated as a Title 14 Code of Federal Regulations Part 135 on-demand air taxi flight.

The pilot reported that on approach to the offshore oil platform, Ship Shoal 105C, he observed the wind gusting from the north. During approach to the helideck, he turned the nose of the helicopter to the northeast, so the disembarking passengers were near the stairway. Later, as he attempted to takeoff, the front skids lifted off the helideck and the wind from the north pushed against the helicopter. The skids became stuck, the aft right skid made contact with the light, and the helicopter rolled over. The pilot was unable to regain control of the helicopter as it continued to roll off the helideck. During the uncontrolled descent, the pilot activated the emergency floats before the helicopter impacted the water. The occupants egressed the helicopter and were rescued from the water.

The pilot later added that while training in another company helicopter, a Bell 407, his company flight instructor taught him a new takeoff technique. This technique consisted of raising the front skids off the ground first by applying aft cyclic and holding it before lifting to a hover. He used this new technique in the Bell 407 for 2 weeks without issue. The day before the accident he was directed to fly a new contract in the Bell 206, to a platform (Ship Shoal 105C) that he had never been to. During the accident takeoff, he used the aforementioned takeoff technique. He stated that it was possible that the stinger on the rear of the helicopter was lower than it should have been during normal takeoff, and that the stinger might have contacted the helideck lights or safety skirting, which started the initial roll.

The operator's chief pilot stated to the FAA inspector that the pilot stated, in summary, that he made his approach from the south and terminated to a hover, rotated the nose right 45° which put the helideck stairs off the right side of the helicopter's nose. This was done to give passengers access to the stairs without having to go near the tail rotor. Upon lift off, the wind was from the left side of the helicopter in the direction of the stairs, which is where the damage to the skirting occurred. He thought that the helicopter contacted the helideck on the aft right side and that helideck lights might have been contacted, which resulted in the dynamic rollover. He also reported that there were no mechanical malfunctions or failures with the helicopter that would have precluded normal operation.

Photos of the helideck revealed that a blue light and the metal safety skirting were found damaged and partially separated, as seen in Figure 1.



Figure 1. Aerial view of the platform and helideck (courtesy of the helicopter operator). The damaged light and skirting are circled in red at the bottom right side of the helideck near the stairway.

The FAA inspector's postaccident examination of the helicopter revealed several witness marks and damage on the aft right side of the helicopter's skids. The examination did not reveal any preaccident mechanical malfunctions or failures that would have precluded normal operation.

The operator's GOM for platform takeoffs states:

Standard:

- ? Float pin shall be removed for all over water flights.
- ? Departures must always begin from a stabilized hover and be as into the wind as possible.
- ? Apply slight increase in collective, note positive rate and engine performance.

- ? Apply forward cyclic to transition to forward flight.
- ? As the helicopter moves out of ground effect, maintain altitude and accelerate to no less than 60 knots.
- ? Do not lose altitude after clearing the platform.
- ? Once 60 KIAS is achieved, set cruise power and climb to cruise altitude.
- ? The aircraft may be turned toward, but not away from the wind until above 300' AGL.

Description:

- ? Clear the area. Pre-takeoff checks, complete.
- ? Ascend to a 3 to 5 ft hover.
- ? On helidecks 35 ft or larger, reposition aircraft to an upwind corner of platform if obstructions allow.
- ? Go / No-Go checks, complete.
- ? Apply slight increase in collective to begin a vertical climb.
- ? Once positive rate of climb is noted and enough altitude (max 10 ft) is obtained to clear the deck in the event of emergency, depart. Do not assume that a forced landing to helideck will be possible.
- ? Apply forward cyclic, transition to level flight until no less than 60 KIAS is achieved.
- ? Once 60 KIAS is achieved, set cruise power and climb to cruise altitude.
- ? Departure turns are only permissible above 300' AGL.

Special Considerations:

- ? Use caution when performing pedal turns on offshore platforms while repositioning.
- ? Non-normal take-off techniques may be required for obstacle clearance.

The FAA Helicopter Flying Handbook FAA-H-8083-21B states:

A helicopter is susceptible to a lateral rolling tendency, called dynamic rollover, when it is in contact with the surface during takeoffs or landings. For dynamic rollover to occur, some factor must first cause the helicopter to roll or pivot around a skid or landing gear wheel, until its critical rollover angle is reached. The angle at which dynamic rollover occurs will vary based on helicopter type. Then, beyond this point, main rotor thrust continues the roll and recovery is impossible. After this angle is achieved, the cyclic does not have sufficient range of control to eliminate the thrust component and convert it to lift. 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 laterally around its skid or wheel. For dynamic rollover to occur the following three factors must be present:

1. A rolling moment
2. A pivot point other than the helicopter's normal CG
3. Thrust greater than weight

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 use an improper landing or takeoff technique or while performing slope operations. Whatever the cause, dynamic rollover is possible if not using 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 reducing collective pitch is the most effective way to stop dynamic rollover from developing. Dynamic rollover can occur with any type of landing gear and all types of rotor disks. It is important to remember rotor blades have a limited range of movement. If the tilt or roll of the helicopter exceeds that range (5–8°), the controls (cyclic) can no longer command a vertical lift component and the thrust or lift becomes a lateral force that rolls the helicopter over. When limited rotor blade movement is coupled with the fact that most of a helicopter’s weight is high in the airframe, another element of risk is added to an already slightly unstable center of gravity. Pilots must remember that in order to remove thrust, the collective must be lowered as this is the only recovery technique available.

The NTSB Vehicle Recorder Division attempted to extract data from an Appareo Vision 1000 that was installed in the helicopter. The device was subject to damp, corrosive environmental conditions before recovery from the accident site. The device exhibited moisture and corrosion throughout during examination at the NTSB Vehicle Recorders Laboratory. A full dataset was not recovered from the device; therefore, the device did not produce any usable information for the investigation.

Pilot Information

Certificate:	Commercial	Age:	29, Male
Airplane Rating(s):	None	Seat Occupied:	Front
Other Aircraft Rating(s):	Helicopter	Restraint Used:	4-point
Instrument Rating(s):	Helicopter	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	February 15, 2022
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	June 11, 2022
Flight Time:	1437 hours (Total, all aircraft), 252 hours (Total, this make and model), 1437 hours (Pilot In Command, all aircraft), 106 hours (Last 90 days, all aircraft), 39 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	Registration:	N414RL
Model/Series:	206-L4	Aircraft Category:	Helicopter
Year of Manufacture:	1992	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	52006
Landing Gear Type:	Emergency float; High skid	Seats:	7
Date/Type of Last Inspection:	November 20, 2022 AAIP	Certified Max Gross Wt.:	4450 lbs
Time Since Last Inspection:		Engines:	1 Turbo shaft
Airframe Total Time:	19256.8 Hrs as of last inspection	Engine Manufacturer:	ALLISON
ELT:	C126 installed, not activated	Engine Model/Series:	250-C30P
Registered Owner:	ROTORCRAFT LEASING CO LLC	Rated Power:	650 Horsepower
Operator:	ROTORCRAFT LEASING CO LLC	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:		Distance from Accident Site:	
Observation Time:		Direction from Accident Site:	
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	15 knots / 20 knots	Turbulence Type Forecast/Actual:	/
Wind Direction:	360°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	3007 inches Hg	Temperature/Dew Point:	9.4°C / 2.2°C
Precipitation and Obscuration:			
Departure Point:	Abbeville, LA (18LS)	Type of Flight Plan Filed:	Company VFR
Destination:	Ship Shoal 150C, GM	Type of Clearance:	None
Departure Time:	07:37 Local	Type of Airspace:	Class G

Airport Information

Airport:	Ship Shoal 150C	Runway Surface Type:	
Airport Elevation:		Runway Surface Condition:	Dry
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:	2 Minor	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 Minor	Latitude, Longitude:	29.148557,-91.570651

Administrative Information

Investigator In Charge (IIC):	Lindberg, Joshua
Additional Participating Persons:	Harold Aycock; Federal Aviation Administration; Baton Rouge, LA Beverley Harvey; TSB-Canada
Original Publish Date:	April 18, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=106462

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).