Aviation Investigation Final Report

Location:	Cameron, Louisiana	**Accident Number:**	GAA16CA039
Date & Time:	October 30, 2015, 12:20 Local	**Registration:**	N420PH
Aircraft:	Bell 407	**Aircraft Damage:**	Substantial
Defining Event:	Part(s) separation from AC	**Injuries:**	1 None
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

The operator reported that the pilot landed and shutdown the helicopter on an offshore platform. He secured the main rotor system by attaching a tiedown to the forward left main rotor blade and he then attached this tiedown to the left front skid cross tube. Several hours later, the pilot entered the right front seat to begin the engine start sequence. The operator reported that the pilot proceeded to start the engine and noted a few seconds after initiating the engine start that the helicopter made an "unusual noise" and began to shake. The pilot then shut down the helicopter without further incident. A postflight inspection revealed substantial damage to the blue main rotor blade.

The operator reported there were no pre-impact mechanical failures or malfunctions with the airframe or engine that would have precluded normal operation.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to remove a main rotor blade tiedown, which resulted in substantial damage to a main rotor blade when the engine was started.

Findings

Personnel issues	Preflight inspection - Pilot
Personnel issues	Forgotten action/omission - Pilot
Personnel issues	Use of checklist - Pilot

Factual Information

History of Flight

Prior to flight	Preflight or dispatch event
Standing-engine(s) start-up	Aircraft structural failure
Standing-engine(s) start-up	Part(s) separation from AC (Defining event)

Pilot Information

Certificate:	Airline transport; Flight instructor	**Age:**	49,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	September 10, 2015
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	June 21, 2015
Flight Time:	3104 hours (Total, all aircraft), 313 hours (Total, this make and model), 1918 hours (Pilot In Command, all aircraft), 150 hours (Last 90 days, all aircraft), 36 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N420PH
Model/Series:	407 NO SERIES	**Aircraft Category:**	Helicopter
Year of Manufacture:	2007	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	53747
Landing Gear Type:	N/A; Emergency float; High skid	**Seats:**	7
Date/Type of Last Inspection:	December 17, 2014 AAIP	**Certified Max Gross Wt.:**	5250 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo shaft
Airframe Total Time:	9015.86 Hrs at time of accident	**Engine Manufacturer:**	Rolls-Royce
ELT:	C126 installed, not activated	**Engine Model/Series:**	250-C47B
Registered Owner:	PHI INC.	**Rated Power:**	630 Horsepower
Operator:	PHI INC.	**Operating Certificate(s) Held:**	Rotorcraft external load (133), On-demand air taxi (135), Agricultural aircraft (137)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KVBS,735 ft msl	**Distance from Accident Site:**	11 Nautical Miles
Observation Time:	17:15 Local	**Direction from Accident Site:**	300°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	13 knots / 20 knots	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	29.92 inches Hg	**Temperature/Dew Point:**	24°C / 23°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Cameron, LA (149)	**Type of Flight Plan Filed:**	None
Destination:	Cameron, LA (167)	**Type of Clearance:**	None
Departure Time:	08:41 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	West Cameron 167 167	**Runway Surface Type:**	Metal/wood
Airport Elevation:	0 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	29.390556,-93.446113(est)

Preventing Similar Accidents

Flight Control Locks (SA-048)

The Problem

Accidents have occurred after pilots omitted seemingly obvious procedures, such as removing flight control locks and performing flight control checks before takeoff. Errors of omission are frequently associated with interruptions, distractions, time pressures, divided attention, and complacency about standard operating procedures (SOPs).

What can you do?

- Pilots of all experience levels should follow SOPs and use checklists, which serve as a memory aid to help counteract human performance vulnerabilities. Do not rely on memory alone.
- Recognize that procedural omissions are also common in many other types of accidents, including those involving gear-up landings, fuel starvation, incorrect fuel pump settings, and flap misconfigurations.
- Be prepared to abort the takeoff if something does not seem right. When a pilot is confronted with a sudden, abnormal event, responses are more likely to be delayed or inappropriate. Having a plan will help reduce reaction time and can result in a safer response.
- When flying alone, read the checklist aloud and touch the applicable switch or control. Research has shown that touching an object while verbally communicating enhances the probability that an activity has been accomplished.
- Avoid using improvised control lock devices that may be inconspicuous and easily overlooked during preflight checks.

See https://www.ntsb.gov/Advocacy/safety-alerts/Documents/SA-048.pdf for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

Administrative Information

Investigator In Charge (IIC):	Hodges, Michael
Additional Participating Persons:	Keith J Kibodeaux; FAA Baton Rouge FSDO; Baton Rouge , LA
Original Publish Date:	February 8, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	This accident report documents the factual circumstances of this accident as described to the NTSB.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=92283