



Australian Government

Australian Transport Safety Bureau

Hard landing involving a Bell 206B, VH-XJA

Sunshine Coast Airport, Queensland, 21 February 2014

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Addendum

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Hard landing involving a Bell 206B, VH-XJA

What happened

On 21 February 2014, at about 0850 Eastern Standard Time (EST), a Bell 206B helicopter, registered VH-XJA, took off from Sunshine Coast Airport, Queensland, with an instructor and student pilot on board. The training flight involved conducting a series of simulated emergency procedures in the helicopter training area. A practice autorotation¹ and two simulated engine failures in the hover were completed successfully.

At about 1000, the instructor briefed the student on the next sequence to be flown: a practice autorotation using variations in airspeed to move the aiming point for the touchdown closer or further away, with a power recovery. When at about 1,000 ft above ground level (AGL), in the undershoot for runway 12, the instructor reduced the throttle to idle and directed the student to commence the practice autorotation.

The student lowered the collective² and entered the autorotation. The instructor observed the airspeed reduce to about 60 kt, and then talked the student through reducing the airspeed to about 40 kt to move the aiming point for the touchdown closer.

The instructor reported that, passing 800 ft AGL on descent, he would normally have conducted the descent checks and advanced the throttle, however he was focused on directing the student through decelerating and then accelerating back to 60 kt IAS and inadvertently omitted the checks.

When at about 20 ft AGL, the instructor directed the student to commence levelling the helicopter. At the same time the low rotor revolutions per minute (RRPM) warning horn sounded. The instructor realised that the throttle was still at idle and took control of the helicopter from the student. He controlled the yaw, levelled the helicopter, allowed the helicopter to sink, and completed the autorotation to the ground, however the helicopter landed heavily, resulting in substantial damage (Figure 1).

Damage to VH-XJA

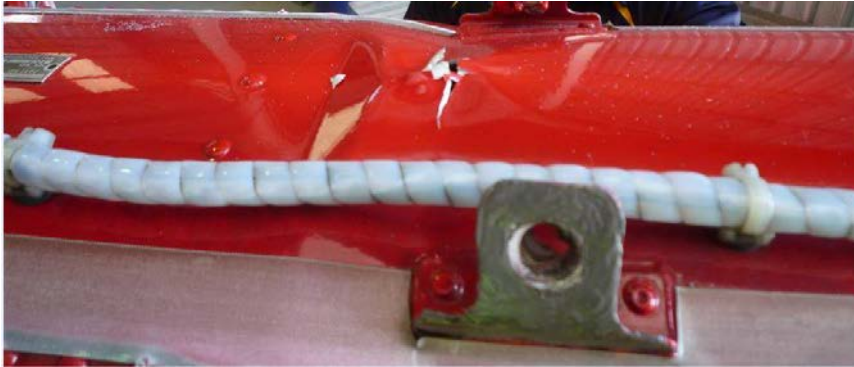


Source: Operator

¹ Autorotation is a condition of descending flight where, following engine failure or deliberate disengagement, the rotor blades are driven solely by aerodynamic forces resulting from rate of descent airflow through the rotor. The rate of descent is determined mainly by airspeed.

² The collective pitch control, or collective, is a primary flight control used to make changes to the pitch angle of the main rotor blades. Collective input is the main control for vertical velocity.

Figure 1: Damage to VH-XJA



Source: Operator

Operator comments

For a power terminated autorotation, the standard procedure was to verbally state “decision – power terminate” prior to 400 ft AGL, and to confirm full throttle prior to passing 200 ft AGL, however these were inadvertently omitted due to the high workload of the instructor.

In future, the sequence is to be commenced from at least 1,500 ft AGL, to provide more time and reduce the task workload for both the instructor and the student.

Instructor comments

The instructor reported that the hard landing may have been avoided if he had realised earlier that the throttle was at idle and he had taken control of the helicopter from the student, prior to terminating the flare.

The instructor reported that he would consider in future whether it was necessary to retard the throttle to conduct practice autorotations. It was possible to complete two separate sequences: one of the entry and maintenance of the autorotation, with the throttle at idle; and another with the throttle advanced, to the hover.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Helicopter operator

As a result of this occurrence, the helicopter operator has advised the ATSB that they are taking the following safety action:

Review of practice autorotations

The company is reviewing the conduct of practice autorotations in conjunction with other organisations.

Communication to instructors

Company flight instructors have been reminded to be familiar with current company policies and procedures. Team discussions will be held prior to conducting autorotations.

Safety message

The United States Federal Aviation Authority (FAA) reported that a high number of accidents were associated with the practice autorotation with a power recovery. However, engine failure and

subsequent autorotation often lead to accidents or serious incidents. The benefits of practice autorotations must be weighed against the risk of incidents during practice autorotations.

This incident highlights the complexity and dynamic nature of autorotation training sequences. Autorotation practice provides pilots with skills to be used in emergency situations, but carries inherent risks. This autorotation sequence involved a high workload for both the student and instructor, given the number of tasks to be completed in a short timeframe. High workload sequences often lead to load shedding and one way to reduce this workload, and the risk of missing something important, may be to commence the autorotation sequence from a higher altitude, allowing more time to complete all the tasks.

The American Aircraft Owners and Pilots Association (AOPA) found that more accidents happen each year from practice autorotations than from actual engine failures. The following links provide information regarding accidents related to practice autorotations:

- www.ainonline.com/aviation-news/hai-convention-news/2012-02-13/instructor-pilots-give-guidance-autorotation-training
- www.ainonline.com/aviation-news/aviation-international-news/2013-05-01/astar-accident-shines-light-autorotation-training
- www.aviationtoday.com/rw/training/specialty/Flight-Training-Tips-Dancing-With-the-Devil_13632.html
- <http://blog.aopa.org/helicopter/?p=725>
- www.robinsonheli.com/srvclib/rhcsn-38.pdf
- www.faa.gov/documentLibrary/media/Advisory_Circular/AC_61-140.pdf
- [www.faasafety.gov/files/gslac/library/documents/2011/Aug/56414/FAA%20P-8740-71%20Planning%20Autorotations%20\[hi-res\]%20branded.pdf](http://www.faasafety.gov/files/gslac/library/documents/2011/Aug/56414/FAA%20P-8740-71%20Planning%20Autorotations%20[hi-res]%20branded.pdf)

General details

Occurrence details

Date and time:	21 February 2014 – 100- EST	
Occurrence category:	Accident	
Primary occurrence type:	Hard landing	
Location:	Sunshine Coast Airport, Queensland	
	Latitude: 26° 36.20' S	Longitude: 153° 05.47' E

Helicopter details

Manufacturer and model:	Bell Helicopter Company 206B	
Registration:	VH-XJA	
Serial number:	3744	
Type of operation:	Flying training - dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in:

independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.