Australian Government
Australian Transport Safety Bureau

# Collision with terrain – Schweizer 269C-1 VH-LTO

Redcliffe Aerodrome, Qld – 18 June 2012

**ATSB Transport Safety Report**
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AO-2012-082
Final

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**Postal address:** PO Box 967, Civic Square ACT 2608
**Office:** 62 Northbourne Avenue Canberra, Australian Capital Territory 2601
**Telephone:** 1800 020 616, from overseas +61 2 6257 4150
Accident and incident notification: 1800 011 034 (24 hours)
**Facsimile:** 02 6247 3117, from overseas +61 2 6247 3117
**Email:** atsbinfo@atsb.gov.au
**Internet:** www.atsb.gov.au

# Collision with terrain – Schweizer 269C-1, VH-LTO

AO-2012-084

## What happened

On 18 June 2012, an instructor and student were conducting emergency procedures training in the circuit at Redcliffe aerodrome, Queensland in a Schweizer 269C-1 helicopter, registered VH-LTO. The purpose of the flight was a bi-annual flight review for a company line pilot. The flight was to include low-level autorotations[1] to simulate an engine failure on approach.

**VH-LTO**

Source: Operator

At about 1120 Eastern Standard Time[2], when the helicopter was at about 250 ft above ground level (AGL) and 55 kts airspeed, the instructor called for a practice engine failure. The exercise was to be conducted to a power termination[3] at the threshold of runway 25. The student initiated the practice engine failure by closing the throttle and lowering the collective[4] to enter autorotation. Power was restored shortly after, by opening the throttle in anticipation of a power termination. The student flared[5] the helicopter, however the helicopter did not decelerate as expected. The instructor increased the flare in an attempt to arrest the rate of descent and decrease the groundspeed.

The tail rotor struck the ground and the helicopter pitched forward. The skids then contacted the ground before the helicopter became airborne again and immediately entered a rapid rotation to the right. The crew closed the throttle in an attempt to recover from the uncommanded right yaw, however the helicopter impacted the ground before the rotation could be arrested and the helicopter rolled over. The helicopter was seriously damaged. Both instructor and student reported soft tissue injuries and some minor cuts and bruises.

### *Weather*

The instructor reported that the meteorological condition at the time of the occurrence included:

- A light and variable wind predominately from the south to south-west at less than 10 kts
- Nil cloud
- Visibility greater than 10 kilometers

### *Pilot experience*

**Instructor**

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[1] Descent with power off, air flowing in reverse direction upwards through lifting rotor(s) causing it to continue to rotate at approximately cruise RPM. The pilot preserves usual control functions through pedals, cyclic and collective, but cannot alter steep 'glide path'. The rate of descent is reduced just before ground impact by an increase in collective pitch; this increases lift trading stored kinetic energy for increased aerodynamic reaction of the blades, and should result in a gentle touchdown.

[2] Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 Hours

[3] Used during training to terminate an autorotation at a height above ground level, by restoring full engine power, and resulting in the helicopter coming to a hover above the ground.

[4] A primary helicopter flight control that simultaneously affects the pitch of all blades of a lifting rotor. Collective input is the main control for vertical velocity.

[5] Final nose up pitch, to reduce rate of descent and airspeed prior to touchdown.

The instructor held an Airline Transport Pilot Licence (ATPL) - Helicopter and Grade 1 Instructor rating. The instructor had 3,370 hours total time, including 2,155 hours instructing and 503 hours on type.

**Student**

The student held a Commercial Pilot Licence (CPL) – Helicopter and Grade 2 Instructor rating. The student had about 5,000 hours total time with about 810 hours on type.

**Figure 1: Redcliffe aerodrome**


Source: *Google Earth*

## *Pilot Comments*

### *Instructor*

The instructor commented that the flare did not have the same effect as previous autorotations. In addition, the instructor noted that if the student had not been an experienced company pilot he may not have conducted a practice low level autorotation in those wind conditions.

### *Student*

The student commented that he initiated a flare which did not have the same effect as previous autorotations conducted earlier that morning. The student stated that he had decided not to flare to the hover due to the unexpected high rate of descent. Instead he intended to perform a power termination with a high groundspeed. The student noted that he did not communicate his intention to the instructor.

## ATSB comment

The reason for the accident could not be conclusively established. While there may be a number of factors that can influence the successful outcome of an autorotation, the following three conditions are known to adversely affect an autorotation: low rotor RPM, wind shear and low forward airspeed.

- **Rotor RPM**. It was considered that rotor RPM would have been high at the time of the flare as power had been reintroduced in anticipation of a power termination.
- **Forward airspeed**. The airspeed at the time of the flare could not be conclusively determined.
- **Wind shear**. Both instructor and student reported the wind as being light and variable both instructor and student commented that the wind may have shifted at the time of the flare.The student also added that it is common to get mechanical turbulence off the hangars at the threshold of runway 25 where the practice autorotation was to be conducted.

It is likely that the helicopter encountered low level wind shear during the flare resulting in a tail rotor strike and subsequent loss of control.

## 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 investigating a change to the company operations manual to require a minimum 10 kts of wind in the runway direction for the performance of practice low-level autorotations.

## Safety message

ATSB research indicates that for helicopters the greatest risk of an accident occurs during practice autorotations. Page 27 of the Australian Transport Safety Bureau research report, *Australian Helicopter Accidents 1969-1988*, published in 1989, includes information that out of a total of 42 helicopter accidents analysed, 18 involved hard landings after a practice autorotation. A copy of the report can be accessed at:

www.atsb.gov.au/publications/1989/aust-helicopter-accidents.aspx

When performing autorotations, there are a number of factors that must be considered in planning and execution to achieve a successful outcome. The following publications provide useful information on practice autorotations:

*Planning Autorotations*- Federal Aviation Administration-

www.faasafety.gov

Robinson Safety Notice SN-38

www.robinsonheli.com/srvclib/rhcsn-38.pdf

Although specific to Robinson Helicopters the concepts are applicable to all autorotations.

## VH-LTO

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|---|---|
| Manufacturer and model: | Schweizer 269C-1 |
| Registration: | VH-LTO |
| Type of operation: | Training |
| Location: | Redcliffe Aerodrome |
| Occurrence type: | Collision with terrain |

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|---|---|---|
| Persons on board: | Crew – 2 | Passengers – 0 |
| Injuries: | Crew – 2 (minor) | Passengers – 0 |
| Damage: | Serious | |

## About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau 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.