

Australian Government

Australian Transport Safety Bureau

ATSB TRANSPORT SAFETY INVESTIGATION REPORT

Aviation Safety Occurrence Report – 200701033 Preliminary

Loss of Control Clyde North, Victoria 23 February 2007 Van's Aircraft Inc. RV-4, VH-ZGH



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Abstract

On 23 February 2007, at approximately 1710 Eastern Daylight-saving Time, a Van's Aircraft Inc. RV-4 aircraft, registered VH-ZGH, took off from Essendon Airport, Victoria, with the ownerpilot and one passenger on board. The flight was to the designated Moorabbin aerobatic area over Clyde North.

At approximately 1740, witnesses reported observing the aircraft descending in a spin after completing an aerobatic manoeuvre. The aircraft engine was heard to gain power during the spin and the aircraft speed rapidly increased. The aircraft was then seen to enter into, what appeared to be, an unstable spiral dive.

At approximately 1,500 ft above the ground, witnesses reported that the engine noise was very high-pitched and loud, and objects were seen to separate from the aircraft. The rapid spiral descent continued and the aircraft was observed to impact the ground almost vertically. The aircraft was destroyed by impact forces and a post-impact fire. The pilot and passenger were fatally injured.

The investigation is continuing.

THE AUSTRALIAN TRANSPORT SAFETY BUREAU

The Australian Transport Safety Bureau (ATSB) is an operationally independent multi-modal Bureau within the Australian Government Department of Transport and Regional Services. ATSB investigations are independent of regulatory, operator or other external bodies.

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.

Purpose of safety investigations

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

It is not the object of an investigation to determine blame or liability. However, 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.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to proactively initiate safety action rather than release formal recommendations. However, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation, a recommendation may be issued either during or at the end of an investigation.

The ATSB has decided that when safety recommendations are issued, they will focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on the method of corrective action. As with equivalent overseas organisations, the ATSB has no power to implement its recommendations. It is a matter for the body to which an ATSB recommendation is directed (for example the relevant regulator in consultation with industry) to assess the costs and benefits of any particular means of addressing a safety issue.

About ATSB investigation reports: How investigation reports are organised and definitions of terms used in ATSB reports, such as safety factor, contributing safety factor and safety issue, are provided on the ATSB web site <u>www.atsb.gov.au</u>.

FACTUAL INFORMATION

History of the flight

On 23 February 2007, at approximately 1710 Eastern Daylight-saving Time¹, a Van's Aircraft Inc. RV-4 aircraft, registered VH-ZGH, took off from Essendon Airport, Victoria, with the owner-pilot and one passenger on board. The flight was to the designated Moorabbin aerobatic area over Clyde North (figure 1).

At approximately 1740, witnesses reported observing the aircraft descending in a spin after completing a stall-turn². The aircraft engine was heard to gain power during the spin and the aircraft speed rapidly increased. The aircraft was then seen to enter into what appeared to be an unstable spiral dive.

Witnesses reported that when the aircraft was approximately 1,500 ft above the ground, the engine noise was very high-pitched and loud and objects were seen to separate from the aircraft. The rapid spiral descent continued and the aircraft was observed to impact the ground almost vertically. The aircraft was destroyed by impact forces and a post-impact fire. The pilot and passenger were fatally injured.



Figure 1: Moorabbin aerobatic area in red box. The accident site is indicated by the red arrow.

¹ The 24 hour clock is used in this report to describe the local time of day, Eastern Daylight-saving Time, as particular events occurred. Eastern Daylight-saving Time was Coordinate Universal Time (UTC) + 11 hours.

² Flight manoeuvre in which an aircraft is pulled up into a very steep climb, usually with the engine cut well back, until, on the point of stall, full rudder is applied to cause rapid rotation to the left or right, then once the rotation is stopped the aeroplane is pointed down vertically.

Accident site

The terrain at the accident site was flat and open. Examination of the site revealed that the aircraft had impacted the ground in a very steep nose-down attitude at high speed. Both right and left tailplanes, the fin and rudder were recovered in trees approximately 117 metres from the main aircraft impact point. The left and right elevator balance weights were recovered either side of the burnt area of the accident site.

The force of the impact and the subsequent fire resulted in disintegration of the aircraft structure (figure 2). No instrumentation was recovered from the wreckage. Examination of the engine and propeller showed that the engine was developing significant power at the time of impact.



Figure 2: View of wreckage

An examination of the ground witness marks and twisting of the tailplane rear spar indicated that the aircraft had been rotating in a clockwise direction at the time of impact.

Examination of the separated tail structures indicated twisting and tearing of the attachments fittings.

Aircraft information

The aircraft was an amateur-built aircraft constructed in Australia in 1994 and had been owned by the pilot since 28 August 2006. It had accumulated a total of 474.6 flying hours at the time of the accident.

An experimental certificate was issued for the aircraft 2 March 2005. A maintenance release had been issued for the aircraft on 21 February 2007 and was valid until 18 February 2008 or at 570 aircraft hours.

A periodic inspection and additional maintenance was also completed on 21 February 2007.

Aircraft weight and balance

The aircraft maximum take-off weight for normal flight operations was 680 kg and 625 kg for aerobatic manoeuvres. Weight and balance limitations and cautions were contained in the Pilot's Operating Handbook. The cautions stated that the aerobatic gross weight is set by structural limits and that aerobatic flight should not be conducted at weights greater than 625 kg or at centre of gravity locations outside the aerobatics centre of gravity limit. The limitations defined the gross weights and design centre of gravity range and limit.

The combined weight of the pilot and passenger for the final flight was estimated to be 195 kg. The fuel tanks had been filled prior to the flight at Essendon Airport, bringing the fuel load to 116 litres or 83 kg. Baggage weight was estimated to be 16 kg.

With an aircraft empty weight of 476 kg, preliminary weight and balance calculations indicated that the take-off weight of the aircraft at the time of the final flight was 770 kg. This exceeded the maximum allowable weight by 90 kg. The centre of gravity was calculated to be within the range for normal flight operations.

The weight and balance calculations indicated that the take-off weight of the aircraft at the time of the final flight exceeded the maximum allowable weight for aerobatic operations by 145 kg. The centre of gravity was calculated to be outside the range permitted for aerobatic flight.

The pilot

The pilot held a valid private pilot (aeroplane) licence since 23 October 2006 and held a valid Class 1 medical certificate with the endorsement 'renew by CASA'. At the time of the accident, the pilot had accrued approximately 279 hours total flying time in powered aircraft, including approximately 22.7 hours in VH-ZGH.

The pilot had also undergone flying training for a commercial pilot (aeroplane) licence since 24 February 2006.

The pilot held endorsements for single-engine aircraft less than 5700 kg, including a limited aerobatic endorsement received on 18 February 2007, for which he had 4 hours flight training.

Weather conditions

At the time of the accident, a south to south-westerly wind was blowing over the eastern seaboard of Port Phillip, with wind speed ranging from 5 to 15 kts. Witnesses located near the accident location reported that the skies were clear.

The investigation is continuing and will include:

- a review of the pilot's training and experience
- a review of the pilot's post-mortem results.