



Australian Government

Australian Transport Safety Bureau

Landing accident involving Van's RV-6A, VH-ANU

William Creek ALA, South Australia, on 28 July 2019

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Addendum

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Safety summary

What happened

On 28 July 2019, the pilot of a Van's RV-6A aircraft, registered VH-ANU, conducted a private flight from Coober Pedy to William Creek aircraft landing area, South Australia. After touching down with the main gear first, the nose gear touched the runway momentarily. The pilot noted that although the nose gear lifted off after touchdown, the main gear stayed on the runway.

When the nose wheel made contact with the runway surface for the second time, the nose gear bent under the aircraft. The propeller struck the runway and the aircraft skidded on its nose, then flipped over and came to rest inverted.

The pilot sustained serious injuries and the passenger minor injuries. The aircraft was substantially damaged.

What the ATSB found

The ATSB found that during the landing sequence, the ground clearance of the nose gear fork or strut was reduced sufficiently to allow them to contact the runway surface. This initiated the damage to the nose gear and resulted in the aircraft becoming inverted.

Safety message

A reduction in the nose gear ground clearance during landing can result in the nose gear strut or fork impacting the runway and affect the structural integrity of the nose gear. In the tricycle variants of Van's aircraft, the factors that can affect nose gear ground clearance include the dynamics of the landing, tyre pressure, weight over the nose gear, and runway condition and characteristics.

After-market devices fitted to this aircraft aimed at reducing the risk of a nose-gear collapse and aircraft inversion, did not prevent the accident.

The occurrence

What happened

On 28 July 2019, the pilot of a Van's RV-6A aircraft, registered VH-ANU, conducted a private flight from Coober Pedy to William Creek aircraft landing area, South Australia. Due to the prevailing northerly winds of around 20 knots, the pilot elected to land on runway 03. That runway was unsealed, with a sand and gravel surface and was dry and in good condition on the day, with no significant imperfections.

At 1525 Central Standard Time (CST), the aircraft commenced its final approach. Based on the recorded data, the aircraft crossed the threshold at the recommended approach speed of 70 knots indicated airspeed (IAS) and slowed to 60¹ knots just before touching down with a rate of descent of about 140 feet per minute. This was consistent with the pilot's recollection of the event.

The pilot reported and the recorded data confirmed, that the main gear touched down first. Shortly afterwards, the nose gear touched the runway momentarily. The pilot noted that although the nose gear lifted off the runway, the main gear stayed down.

When the nose gear made contact with the runway surface for the second time, it bent under the aircraft. The propeller struck the runway and the aircraft skidded on its nose, then flipped over and came to rest inverted (Figure 1).

The pilot sustained serious injuries and the passenger minor injuries. The aircraft was substantially damaged.

During the accident sequence, no fractures were sustained by the nose gear strut or the fork. The principal deformation was the bending in the aft direction at the top of the strut, near the engine mount (Figure 2).

Figure 1: Accident site of VH-ANU



Source: South Australia Police

¹ The stall speed of the aircraft with flaps extended was 42 knots.

Figure 2: Damage sustained by the nose gear



Source: South Australia Police

Nose gear information

On 12 August 2005 in Alaska USA, a Van's RV-9A aircraft nosed over during the landing roll and sustained substantial damage. In response, the US National Transportation Safety Board (NTSB) conducted an examination of the nose gear strut and fork from the Van's Aircraft series RV-6A, -7A, -8A and -9A. The study examined data from 18 previous accidents and one incident, in which Van's aircraft became inverted during landing. Several involved hard landings such as hard touchdowns, bounced landings (six), or landing in a slip. Several others involved off-field landings in rough terrain, hitting a ditch, or going down an embankment.

The study examined the strength of the nose gear and the possible effects of tyre pressure, engine weight, runway condition and some dynamic considerations that could affect nose gear clearance. The conclusions of the study were:

- The nose gear strut had sufficient strength to perform its intended function.
- In all cases examined, the landing gear struts and forks made contact with the runway surface, initiating the damage sequence.
- Tyre pressure, engine weight over the nose gear, runway condition and the dynamics of the landing (including washboarding²) can affect the ground clearance and therefore the likelihood of the strut or fork contacting the runway surface.

In 2007, prior to the release of the NTSB Study, Van's issued a mandatory Service Bulletin with a redesigned nose gear that provided greater ground clearance. VH-ANU was compliant with the Van's Service Bulletin.

VH-ANU was also fitted with two after-market devices to the nose gear. One device was intended to increase the rigidity of the strut and transfer landing forces to the top of the strut near the engine mount. The second was a device intended to minimise the chances of the gear digging into the runway surface in the event that the strut came in contact with the runway.

² Washboarding or corrugation is the formation of periodic, transverse ripples in the surface of gravel and dirt roads.

Previous Australian Occurrences

A review of the ATSB occurrence database identified 49 nose gear collapses in Australian-registered, single-engine, piston-powered, fixed-wing aircraft between 2009 and 2018. Four of these occurrences involved Van's Aircraft. Of the four, one resulted in serious injuries and was investigated by the ATSB ([AO-2017-001](#)). Due to the date range used, the current occurrence was not included.

Safety analysis

The ATSB reviewed the damage to the aircraft and found that the nose gear did not sustain a fracture through any of the major structural components (i.e. the nose gear strut or fork), but had deformed rearwards, under the aircraft. For this to have occurred, the ground clearance must have been sufficiently reduced so that the nose gear strut or fork made contact with the runway, imparting significant forces on the gear assembly and initiating the damage sequence.

The factors that affect the ground clearance during landing include the tyre pressure, engine weight, runway condition and dynamics of the landing. In this accident, the exact mechanism by which the gear made contact with the runway was not determined.

Findings

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

- During the landing sequence the nose gear fork or strut made contact with the runway surface and bent underneath the aircraft, causing it to become inverted.

General details

Occurrence details

Date and time:	28 July 2019 1526 CST	
Occurrence category:	Accident	
Primary occurrence type:	Landing gear/indication	
Location:	William Creek (ALA), South Australia	
	Latitude 28° 54.4200' S	Longitude:136° 20.4720' E

Aircraft details

Manufacturer and model:	Amateur Built Aircraft Vans RV-6	
Year of manufacture	1998	
Registration:	VH-ANU	
Serial number:	Q203	
Type of operation:	Private	
Departure:	Coober Pedy, SA	
Destination:	William Creek, SA	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – 1 (serious)	Passengers – 1 (minor)
Aircraft damage:	Substantial	

About the ATSB

The 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; 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 the ATSB's 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 operations involving the travelling public.

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 identify and reduce safety-related risk. ATSB investigations determine and communicate the 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.