



Australian Government

Australian Transport Safety Bureau

Wheels up landing involving Cessna 210, VH-UPN

Broome Airport, Western Australia, 10 October 2016

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Addendum

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Wheels up landing involving Cessna 210, VH-UPN

What happened

At 1433 Western Standard Time (WST), on 10 October 2016, a Cessna 210N aircraft, registered VH-UPN (UPN), departed Fitzroy Crossing, Western Australia (WA), for a passenger charter flight to Broome Airport, WA. On board were a pilot and three passengers.

At about 80 NM from Broome, the pilot began a descent from the cruising altitude of 8,500 ft. At 1540, as the aircraft approached 15 NM from Broome, Broome air traffic control (ATC) cleared UPN to conduct a straight-in approach to runway 28. The pilot manoeuvred the aircraft to join a 10 NM final approach to runway 28.

At 1545, passing 5 NM from Broome Airport, the pilot reported they levelled the aircraft at 1,000 ft and conducted the pre-landing checklist in accordance with operator procedures. The pre-landing checklist included selecting the landing gear down and confirming that the landing gear was extended. At about 1547, an individual located under the approach path to runway 28, about 800 m from the runway 28 threshold, observed a Cessna 210 on approach with the landing gear retracted. The individual contacted a member of Broome Airport operations to notify them of the sighting, however, the notification was not received until after the incident.

At 1548, the aircraft touched down on runway 28 with the undercarriage retracted (Figure 1). The aircraft slid along the runway on the underside of the fuselage before stopping. After the aircraft stopped, the pilot contacted ATC to request assistance. The pilot then raised the flaps to provide a clear evacuation path for the passengers. After raising the flaps, the pilot shut the aircraft down, selected fuel off and assisted the passengers with exiting the aircraft.

No persons were injured in the incident and the aircraft sustained minor damage.

Figure 1: UPN after the wheels-up landing



Source: Aircraft operator

Pilot comments

The pilot of UPN provided the following comments:

- The pilot's roster required them to operate both the fixed landing gear Cessna 206 and the retractable landing gear Cessna 210. They found this difficult and felt that this may have contributed to the landing gear not being selected down prior to landing.
- Prior to departure, the pilot operated a flight from Broome to Fitzroy Crossing. The pilot initially planned to spend 30 minutes at Fitzroy Crossing, however late passengers delayed departure by about 50 minutes. The temperature at Fitzroy Crossing during this time was 41 degrees. The pilot was able to spend about 10 minutes of this time in an air-conditioned caravan, but the rest of the time was spent outside in the heat. A full bottle of water was consumed during this time, however, at the time of departure the pilot reported feeling agitated and slightly dehydrated.
- Prior to landing, as the aircraft passed over the runway threshold, at a height of about 50-100 ft, the pilot reduced engine power to idle. The pilot reported that they did not hear the landing gear unsafe warning horn prior to the landing.
- The pilot may have only completed the pre-landing checklist mentally without actually performing the required actions.
- The pilot felt that ATC personnel should have checked to confirm that the aircraft's landing gear was extended prior to the aircraft landing.
- While shutting down and securing the aircraft after the incident, the pilot may have selected the landing gear down.
- After exiting the aircraft, the pilot observed the landing gear to be slightly extended and resting on the runway surface.

Operator report

The operator provided a report with the following comments:

- An engineering inspection conducted after the incident found no fault with the landing gear system or landing gear unsafe warning system.
- The damage to the underside of the fuselage and absence of damage to the landing gear indicated the landing gear was fully retracted during the landing.
- After the landing, the propeller pitch control was found approximately 5 cm from the high-RPM position, the fuel selected off, the flaps retracted and the landing gear selector in the down position.
- During straight in approaches, pilots are trained to select landing gear down at 5 NM from the destination airport and to complete the pre-landing checks at 3 NM if not already complete. Once established on final approach, pilots are trained to conduct a final check. This final check includes selecting the propeller pitch control to high-RPM, confirming the undercarriage is selected down and selecting full flaps. The final check is not included in the company operating procedures or aircraft checklists.
- The pilot was wearing a noise cancelling type headset, which may have prevented them from hearing the landing gear unsafe warning horn.
- Broome Airport ATC personnel did not detect that the landing gear had not been extended.

Landing gear warning system

The Cessna 210 is fitted with a landing gear warning system. This system is designed to help prevent a pilot landing with the landing gear retracted. The system will activate when engine power is reduced below about 12 inches of manifold pressure and the landing gear is not down and locked. When activated, the system emits an intermittent tone through the cabin speaker.

Air traffic control procedures

The provider of air traffic services within Australia, Airservices Australia, procedures require a controller to confirm the undercarriage is extended for a civil aircraft when:

- Doubt exists as to whether the aircraft’s landing gear is fully extended.
- Issuing a landing clearance to a general aviation aircraft with retractable undercarriage that has experienced abnormal operation.

The controller on duty at the time of the incident acted in accordance with ATC procedures. The controller also reported that they checked the aircraft while it was on final approach and did not detect anything unusual.

Airservices Australia advised that if anything unusual is detected by a controller, the pilot in command will be notified.

Safety analysis

The aircraft was observed on final approach with the landing gear retracted. The pilot commented that after exiting the aircraft the landing gear was found sagging against the runway surface. However, the absence of damage to the nose landing gear doors and the main landing gear legs and tyres indicated that the landing gear was fully retracted when the aircraft landed.

The propeller control was found positioned about 5 cm from the high RPM position required by the final approach check. This was a position consistent with a cruise and approach setting. Therefore, the pre-landing checklist and final approach check were likely not completed resulting in the aircraft landing with the landing gear selected up.

The operator did not have a documented distance from the airport by which the pre-landing checklist should be completed and the final approach check had also not been documented. Such measures increase the chance a pilot will detect incomplete pre-landing checks.

The pilot reported that they did not hear the landing gear warning system prior to the landing. The pilot reduced engine power to idle at a height of about 50-100 ft and glided to the landing. The system should have activated to alert the pilot to the retracted landing gear. The pilot’s noise-cancelling headset may have prevented the landing gear warning tone from being heard.

Findings

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

- The pilot did not complete the pre-landing checklist and the final approach checks resulting in the aircraft landing with the landing gear retracted.
- The operator’s procedures did not define a distance where the pre-landing checks should be completed and the final approach checklist was not documented.
- The landing gear warning system did not alert the pilot to the retracted landing gear, probably as the pilot was wearing a noise-cancelling headset.

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.

Aircraft Operator

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

Change to operating procedures

The final approach check has been added to the company operating procedures and aircraft checklists and a distance has been added to the pre-landing checklist to specify when the pre-landing checks should be completed.

Pilot training

Company pilots have been reminded to confirm the position of the landing gear during the pre-landing and final approach checks on all company aircraft, regardless landing gear type. This assists in building well established routines for operating aircraft with retractable landing gear.

Safety message

This incident provides a good example of the importance of checklist vigilance. Checklists are designed to ensure that flight crew properly configure the aircraft for any given phase of flight. Regular routine flying can lead to checklists, which are regularly completed, being conducted mentally without the required actions being completed. Vigilance is required to ensure that each checklist is completed correctly and in full.

Pilots should also familiarise themselves with the expected performance of an aircraft for a given power setting, configuration and loading. Extending the landing gear creates an increase in drag which must be balanced by an increase in engine power to maintain a given flight path. When aircraft performance deviates from expectations this may be an indication that aircraft configuration is not correct, such as landing gear remaining retracted when the phase of flight requires it to be extended. This should act as a trigger for the pilot to confirm the configuration of the aircraft.

The Flight Safety Australia article [Those who won't: avoiding gear-up landings](#) includes the following information to assist pilots in avoiding gear up landings:

Most retractable landing gear aeroplanes have landing gear warning systems, but there are normal flight situations where warning systems won't help.

For instance, most gear warning horns are rigged to sound when the throttle is brought to idle if the gear is not down. But if you use power to touchdown, which many pilots do in windy conditions, or to cushion even a normal landing, the gear warning horn will not sound. In some aeroplanes the gear warning also sounds if the flaps are fully down when the gear is not. This warning only works, however, if you select full flaps. Some pilots don't use full flaps for every landing, especially in windy conditions, and in these cases the warning will not sound.

In some aeroplanes the gear warning also flashes an annunciator on the instrument panel. Pilots generally focus their attention outside the aeroplane on final approach, however, and may not see a cockpit warning. Conditions that prevent the gear warning horn from sounding will also inhibit the annunciator light.

If you make full-stall landings you get used to hearing the stall warning horn on touchdown. You may not notice the difference between a steady stall warning and the intermittent gear advisory.

Lastly, modern noise-cancelling headsets often prevent the pilot from hearing a warning horn, unless the aeroplane has been modified to pipe the warning through the intercom.

General details

Occurrence details

Date and time:	10 October 2016 – 1548 WST	
Occurrence category:	Serious incident	
Primary occurrence type:	Wheels up landing	
Location:	Broome Airport, Western Australia	
	Latitude: 17° 56.98' S	Longitude: 122° 13.67' E

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 210	
Registration:	VH-UPN	
Serial number:	21064125	
Type of operation:	Charter - Passenger	
Persons on board:	Crew – 1	Passengers – 3
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Minor	

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 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.

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.