Australian Government
Australian Transport Safety Bureau

Left main landing gear collapse involving a Raytheon B200, VH-ZCO

Darwin Airport, Northern Territory, 27 March 2013

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Addendum

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Left main landing gear collapse involving a Raytheon B200, VH-ZCO

What happened

On 27 March 2013, a Raytheon B200 aircraft, registered VH-ZCO (ZCO), was being operated on an aero-medical flight from Darwin to Port Keats, Northern Territory. On board the aircraft were the pilot and two flight nurses.

In preparation for landing at Port Keats, the pilot selected the landing gear down. The left and right main landing gear down indication lights did not illuminate, while the nose landing gear down (green) indication light illuminated. The unsafe landing gear (red) warning light was illuminated. The pilot cycled the landing gear and the landing gear control circuit breaker tripped. The circuit breaker was reset in accordance with the quick reference handbook and the circuit breaker tripped again. At about 1458 Central Standard Time,[1] the pilot elected to return to Darwin and advised air traffic control. Air traffic control declared an alert phase and notified the Darwin tower. During the return flight to Darwin, the pilot completed the unsafe gear checklist including using the emergency gear extension system. The unsafe gear red warning light remained illuminated.

In the Darwin circuit area, the pilot reported that the tower and a company pilot observed the landing gear and indicated that the gear appeared to be down.

The pilot reported that on landing, the right main landing gear wheel touched down first and when the left landing gear wheel touched down the pilot felt the left side of the aircraft start to sink. The pilot arrested the sink, transferred the weight to the right landing gear, shut down the left engine and feathered the left propeller. The pilot then shut down the right engine and feathered the right propeller. The left wing then contacted the runway and the aircraft skidded to a stop. The pilot and flight nurses evacuated the aircraft via the overwing exit. The aircraft sustained substantial damage, while the pilot and flight nurses were not injured (Figure1).

Figure 1: VH-ZCO on runway 29 at Darwin

Source: Aircraft operator

[1] Central Standard Time (CST) was coordinated Universal Time (UCT) + 9.5 hours.

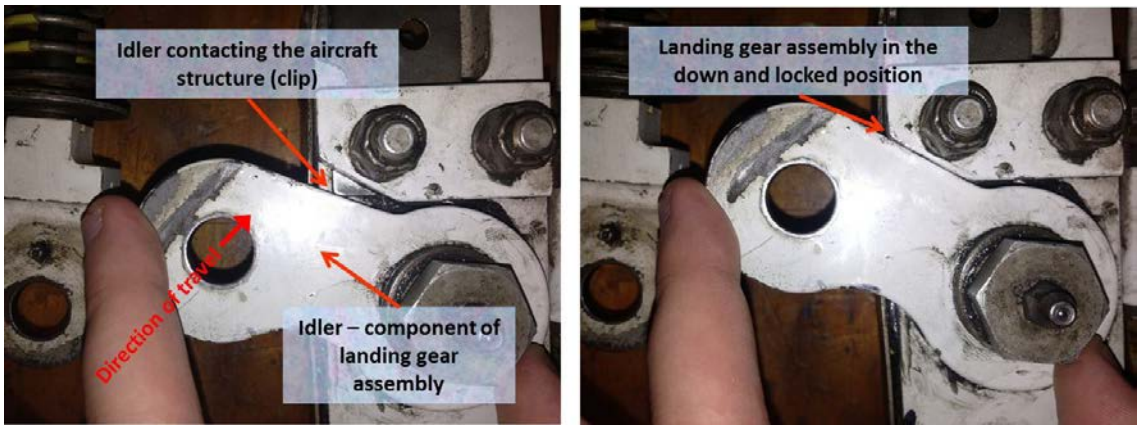
Operator investigation

On 22 March 2013, the left main landing gear was installed on ZCO. At the time of installation, this landing gear had conducted a total of 1,830 landings, since it was last overhauled. The accident flight was the first flight after the landing gear installation.

The operator determined that during the last overhaul of the left main landing gear, a washer had not been installed. The operator believed this resulted in the landing gear contacting the aircraft structure preventing the landing gear from locking in the down and locked position (Figure 2). The operator inspected their other B200 aircraft and found another aircraft where the main landing gear was incorrectly assembled.

Figure 2: VH-ZCO main landing gear assembly

Position found at the accident site *Normal position*



Source: Aircraft operator

Civil Aviation Safety Authority investigation

The Civil Aviation Safety Authority (CASA) conducted an investigation into the accident and found that there was no conclusive way to determine when the washer installation error occurred. They were also unable to determine why the landing gear did not contact the aircraft structure when it was installed on another aircraft. CASA also established that this issue was an isolated event. A search of both the CASA and US Federal Aviation Administration (FAA) service difficulty report databases identified landing gear issues for the aircraft type, but none of the reports identified the missing washer as a contributing factor.

Aircraft manufacturer comments

The manufacturer was informed of the accident and determined that the missing washer would not have led to the failure of the landing gear to lock down. They believed that it was more likely that the drag brace[2] was not installed or rigged correctly when installed on ZCO or that another landing gear assembly or maintenance error occurred, causing the circuit breaker to trip, resulting in the accident.

The manufacturer reviewed the aircraft component maintenance manual and illustrated parts catalogue; it found that both documents referenced the installation of two washers, although there was an inconsistency in the item numbering. The component maintenance manual and the maintenance manual required a check that the idler fully engaged to the idler stops. In addition, the manufacturer found that the link assembly extension would allow the lock hook to fully engage the lock pin, thereby locking the landing gear down, even with the idler contacting the corner of the clip.

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[2] A brace that supports an aircraft landing gear against loads trying to force the landing gear backward, locking the landing gear in the down position.

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:

Relocate medical bag

A medical bag that was located near the overwing emergency exit was relocated.

B200 fleet inspection

All B200 aircraft were inspected. The main landing gear on one aircraft was found not to be correctly assembled and this was rectified before further flight.

Safety Bulletin

A safety bulletin was issued to all staff to inform them of the accident.

Pilot training

The training and checking department were to review the part within the proficiency check about this type of landing and ensure it is reiterated at the next base check.

Aircraft manufacturer

As a result of this occurrence, the aircraft manufacturer has advised the ATSB that the component maintenance manual will be revised to remove the inconsistent numbering.

General details

Occurrence details

Date and time:	27 March 2013 – 1551 CST	
Occurrence category:	Accident	
Primary occurrence type:	Left main landing gear collapse	
Location:	Darwin Airport, Northern Territory	
	Latitude: 12° 24.88' S	Longitude: 130° 52.60' E

Aircraft details

Manufacturer and model:	Raytheon Aircraft Company B200	
Registration:	VH-ZCO	
Type of operation:	Aerial work	
Persons on board:	Crew – 3	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 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.