



**Australian Government**

**Australian Transport Safety Bureau**

# Propeller strike due to foreign object debris involving Beech 1900D, VH-NYA

Fortnum Aerodrome, Western Australia on 17 November 2022

**ATSB Transport Safety Report**

Aviation Occurrence Investigation (Short)

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#### Addendum

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# Executive summary

## What happened

On 17 November 2022, the flight crew of a Beech 1900D aircraft, registered VH-NYA, refuelled then boarded passengers at Fortnum Aerodrome for a flight to Perth, Western Australia. On the gravel-surface apron, there were pieces of conveyor-belt matting fixed to the ground to allow engines to be operated with minimal propeller damage.

The crew started both engines and taxied the aircraft to an adjacent parking area to allow another aircraft to access the refuelling truck. The crew positioned the aircraft propellers over the matting to complete pre-flight checklists. On completion of the checklists, the crew applied engine power to taxi to the runway.

Immediately there was a loud bang and severe vibration. The captain observed that the left propeller was damaged and shutdown the engines. The passengers were disembarked and escorted of the apron. There were no injuries.

## What the ATSB found

As the flight crew was conducting pre-take-off checks, the end of conveyer belt matting under the left propeller was drawn into the propeller arc, resulting in a sheared propeller blade and vibration damage to the aircraft.

The conveyer belt matting installed on the aerodrome apron was a non-standard method to prevent propeller damage and was not subject to any installation specifications or inspection requirements.

## What has been done as a result

The aircraft operator requested that the aerodrome operator remove the conveyor belt strips from the aerodrome apron, which was carried out.

## Safety message

As this occurrence demonstrates, the consequences of a propeller strike can be serious and operators of aircraft and aerodromes are advised to review the use of any non-standard surfaces for aircraft movement areas.

## The investigation

Decisions regarding the scope of an investigation are based on many factors, including the level of safety benefit likely to be obtained from an investigation and the associated resources required. For this occurrence, a limited-scope investigation was conducted in order to produce a short investigation report, and allow for greater industry awareness of findings that affect safety and potential learning opportunities.

### The occurrence

On 17 November 2022, Penjet was operating 2 Beech 1900 aircraft on mine personnel transfer flights from Perth, Western Australia to Fortnum Aerodrome and return.

Fortnum Aerodrome has a gravel runway, taxiways, and parking area. In the parking area, there were designated parking areas with pieces of conveyor-belt matting fixed to the ground to allow engines to be operated with minimal propeller damage from loose gravel.

VH-NYA was the first to arrive at Fortnum and the flight crew parked the aircraft near the fuel truck to allow refuelling. After refuelling and boarding the passengers, the crew started both engines and taxied the aircraft to one of the designated parking areas to allow a following aircraft to access the fuel truck.

The crew positioned the aircraft propellers over the matting to complete pre-flight checklists. This was in accordance with operator instructions to prevent stone damage to the propeller blades. On completion of the checklists, the crew applied engine power to taxi to the runway.

Immediately there was a loud bang and severe vibration. The captain observed that the left propeller was damaged and shutdown the engines. The passengers were disembarked and escorted off the apron. There were no injuries.

The aerodrome manager, who witnessed the event, advised that the propeller picked up a corner of the matting and one propeller blade was ejected about 50-100 m in the air. The blade landed on the apron about 10 m in front of the other aircraft parked near the fuel truck.

**Figure 1: Damaged aircraft and dislodged matting**



Source: Westgold Resources Ltd (cropped by the ATSB)

**Figure 2: Dislodged inner matting**

Source: Penjet (cropped by the ATSB)

## Context

### ***Aerodrome information***

Fortnum Aerodrome was operated by Westgold Resources Limited in support of their nearby gold mining operation. The aerodrome had been renovated in 2019 under the supervision of an aerodrome consultant. Although the aerodrome was uncertified, the operator had processes for daily and weekly aerodrome inspections by trained aerodrome reporting officers (AROs).

On the morning of 17 November 2022, the ARO conducted a daily inspection of the aerodrome and completed the associated checklist form. All of the apron (parking and movement area) items were annotated as meeting the standard.

The daily apron assessment items included, 'no loose material or debris on apron or flanks' but did not include reference to the mats. There was also no reference to the mats in the weekly inspection checklist.

The mats had been installed by the aerodrome operator about 3 years previously in response to a request from the aircraft operator. There was no record of any technical consideration of mat security. The matting involved in this occurrence was in 3 sections and held down by large nails between 200–250 mm length. The outer belt was newer than the inner belt and its end was nailed down at the corners and the middle (Figure 2). The end of the inner belt had been nailed only at the corners. A white line had been applied to the centre of the matting, which was used by the crew to position to the aircraft.

According to the aerodrome operator, there was no record of any communication between the aircraft operator and the aerodrome operator about the condition of the mats. The aerodrome manager recalled that on one occasion a mat was dislodged by twisting associated with aircraft wheel movement. The captain of VH-NYA advised that previously mats had been reported coming loose and these had been resecured.



The aerodrome operator engaged the aerodrome consultant to conduct annual aerodrome audits. In the audit prior to the occurrence, on 11 February 2022, the consultant found that the aerodrome was in a safe and serviceable condition, and the apron was in good condition. There was no reference to the presence of the mats or their condition.

The consultant advised that conveyer belts had been used in a similar way on the movement areas of other aerodromes of comparative size to Fortnum Aerodrome and some certified aerodromes where larger aircraft had been operated. Although the consultant had heard that incidents had occurred, no record of a similar occurrence was found and the mat coming loose to strike the propeller was a surprise.

In the Fortnum aerodrome risk assessment compiled by the aerodrome operator, foreign object damage was identified as a hazard that was controlled through the daily/weekly inspections, restricted airside access, and monitoring during aircraft movements.

For reference, the regulatory guidance for inspection of certified aerodromes (*AC 139.C-03v1.0*) specified that serviceability inspection of the apron should check the surfaces, including the aircraft parking positions for surface break up and foreign object debris (FOD).

### **Aircraft damage**

In addition to the detached propeller blade (Figure 3), other damage included:

- another propeller blade snapped approximately 250 mm from the blade tip
- left engine propeller governor control arm fracture, with associated damage to top forward cowling
- buckling to the left engine firewall
- cracking to the nacelle structure adjacent to the left engine mount.

**Figure 3: Propeller hub and detached propeller**



Source: Westgold Group

### ***Aircraft operator information***

The aircraft operator advised they had been operating 6 weekly flights into Fortnum Aerodrome for about 3 years and pilots had been instructed to park with the propellers over the matting to prevent foreign object damage to the propellers. There was no record provided of any communications between the aircraft operator and the aerodrome operator related to the condition of the matting. The apron matting had not been identified as a risk in the operator’s safety management system.

### ***Other occurrences***

A search of the ATSB database was conducted for events between 2012 and 2022 involving mats or conveyor belt used on aircraft movement areas. This identified 3 other occurrences involving a helicopter that resulted in contact between matting and the main rotor blades and 2 aeroplanes that resulted in propeller strikes.

### **Safety analysis**

The operator had been conducting flights into Fortnum aerodrome for about 3 years without any adverse consequences related to the conveyer belt matting on the apron. The flight crew of VH-NYA were following the operator’s guidance to park over the matting to reduce stone damage to the propellers.

By aligning the centreline of the aircraft with the central white line, the aircraft was positioned with the left propeller disc located above the intersection of two conveyor belts. It is evident that the airflow produced at the propeller tips produced a lifting force on the matting and the corner nails of the inner belt were not sufficiently secured to hold it. As a result, the corner of the belt was drawn into the propeller arc and one propeller blade was sheared off near the hub and another blade was damaged. With one blade detached the propeller was severely unbalanced and generated significant engine vibration that damaged the aircraft.

Although it is not possible to establish the condition of the inner belt before the accident, the aerodrome reporting officer and flight crews did not notice anything amiss. If other crews were also using the central white line to position aircraft over this matting, on those occasions one propeller would generally be placed over the intersection of the belts and there might have been progressive degradation of mat security. The crew did not have the opportunity to look at the matting as they might have done before an engine start in the same position.

Additionally, the aerodrome operator’s risk assessment did not identify the matting as a potential propeller strike hazard, nor did the previous audit by the aerodrome consultant. This was probably related to the absence of specifications and specific inspection requirements for the non-standard apron surface. It is also possible that the matting security had deteriorated since the risk assessment and audit were carried out.

As this occurrence demonstrates, the consequences of a propeller strike can be serious and operators of aircraft and aerodromes are advised to review the use of any non-standard surfaces for aircraft movement areas.

### **Findings**

ATSB investigation report findings focus on safety factors (that is, events and conditions that increase risk). Safety factors include ‘contributing factors’ and ‘other factors that increased risk’ (that is, factors that did not meet the definition of a contributing factor for this occurrence but were still considered important to include in the report for the purpose of increasing awareness

and enhancing safety). In addition 'other findings' may be included to provide important information about topics other than safety factors.

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

From the evidence available, the following findings are made with respect to the foreign object damage involving Beech 1900D, VH-NYA on 17 November 2022.

### ***Contributing factors***

- As the flight crew was conducting pre-take-off checks, the end of conveyer belt matting under the left propeller was drawn into the propeller arc, resulting in a sheared propeller blade and vibration damage to the aircraft.

### ***Other factors that increased risk***

- The conveyer belt matting installed on the aerodrome apron was a non-standard method to prevent propeller damage and was not subject to any material specifications, installation instructions, or maintenance requirements.

## **Safety actions**

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. All of the directly involved parties are invited to provide submissions to this draft report. As part of that process, each organisation is asked to communicate what safety actions, if any, they have carried out to reduce the risk associated with this type of occurrences in the future. The ATSB has so far been advised of the following proactive safety action in response to this occurrence.

### ***Safety action by Penjet***

Penjet requested that the aerodrome operator remove the conveyor belt strips from the aerodrome apron.

### ***Safety action by Westgold Resources Limited***

Westgold Resources Limited advised that the conveyer belt strips and fixing nails were removed from the Fortnum Aerodrome apron.



# General details

## Occurrence details

Date and time:	17 November 2022 – 1540 Western Standard Time	
Occurrence class:	Accident	
Occurrence categories:	Foreign Object Damage / Debris, Propeller strike	
Location:	Fortnum Aerodrome, Western Australia	
	Latitude: 25° 20.248' S	Longitude: 118° 23.043' E

## Aircraft details

Manufacturer and model:	Beech 1900D	
Registration:	VH-NYA	
Operator:	Penjet Pty Ltd	
Serial number:	UE4	
Type of operation:	Part 121 Australian air transport operations - Larger aeroplanes-Standard Part 121	
Activity:	Commercial air transport-Non-scheduled-Passenger transport charters	
Departure:	Fortnum Aerodrome, Western Australia	
Destination:	Perth Airport, Western Australia	
Persons on board:	Crew – 2	Passengers – 15
Injuries:	Crew – nil	Passengers – nil
Aircraft damage:	Substantial	

# Sources and submissions

## Sources of information

The sources of information during the investigation included the:

- aircraft captain
- Fortnum Aerodrome manager
- aerodrome operator – Westgold Resources Ltd
- aircraft operator – Penjet Pty Ltd
- aerodrome consultant

## Submissions

Under section 26 of the *Transport Safety Investigation Act 2003*, the ATSB may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. That section allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the following directly involved parties:

- aircraft captain
- Westgold Resources Ltd
- Penjet Pty Ltd
- aerodrome consultant

Submissions were received from:

- aircraft captain
- aerodrome consultant

The submissions were reviewed and, where considered appropriate, the text of the report was amended accordingly.

# Australian Transport Safety Bureau

## About the ATSB

The ATSB is an independent Commonwealth Government statutory agency. It is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers.

The ATSB's purpose is to improve the safety of, and public confidence in, aviation, rail and marine transport through:

- 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, as well as participating in overseas investigations involving Australian-registered aircraft and ships. It prioritises investigations that have the potential to deliver the greatest public benefit through improvements to transport safety.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, international agreements.

## Purpose of safety investigations

The objective of a safety investigation is to enhance transport safety. This is done through:

- identifying safety issues and facilitating safety action to address those issues
- providing information about occurrences and their associated safety factors to facilitate learning within the transport industry.

It is not a function of the ATSB to apportion blame or provide a means for determining 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. The ATSB does not investigate for the purpose of taking administrative, regulatory or criminal action.

## Terminology

An explanation of terminology used in ATSB investigation reports is available on the ATSB website. This includes terms such as occurrence, contributing factor, other factor that increased risk, and safety issue.