



**Australian Government**

**Australian Transport Safety Bureau**

# Misaligned take-off involving Piper PA-31, VH-XMM

Essendon Fields Airport, Victoria on 21 July 2023



## **ATSB Transport Safety Report**

Aviation Occurrence Investigation (Short)

AO-2023-035

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**Cover photo:** Source: Airport operator

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#### Addendum

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# Executive summary

## What happened

On 21 July 2023 at 0119 local time, an Air Link Piper PA-31 taxied at Essendon Fields Airport, Victoria for a departure to Bankstown, New South Wales. The pilot received an airways clearance and was asked by air traffic control if they could accept a departure from runway 26. After reading back the clearance and accepting the departure runway, the aircraft was taxied and prepared for take-off.

After commencing the take-off run, the pilot heard multiple loud noises, rejected the take-off and exited the runway. Inspection of the aircraft upon return to the apron identified a damaged main landing gear tyre and brake caliper.

## What the ATSB found

The ATSB found that during a period of high workload, the aircraft was misaligned with the runway edge lighting, resulting in minor damage during the take-off run.

## What has been done as a result

Air Link advised the ATSB of the following proactive safety action, involving reviews of the:

- fatigue management of aircrew conducting night operations, including setting mandatory 'out of contact' hours
- night proficiency checks for pilots and how regularly these occur
- airport familiarisation process for pilots conducting night operations, including developing a clear procedure on aspects to be considered when inducting aircrew at new ports
- current simulator set up to determine the potential for simulator training and checks to support practical assessment, including night checks
- fatigue management plan to identify areas of improvement for night flights and variances against Civil Aviation Safety Authority Civil Aviation Order 48.1 regulations.

## Safety message

This investigation highlights the importance of reducing distractions during critical stages of flight. Pilots should consider having a sterile cockpit rule at those times to reduce the chance for distractions to occur. In addition, the conduct of checklists during ground operations should, where possible, be done when the aircraft is stationary.

# 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 21 July 2023, a Piper Aircraft PA-31-350, registered VH-XMM and operated by Air Link, taxied at Essendon Fields Airport, Victoria for a departure to Bankstown, New South Wales. The pilot was the only person on board and was conducting a freight charter flight under the instrument flight rules.

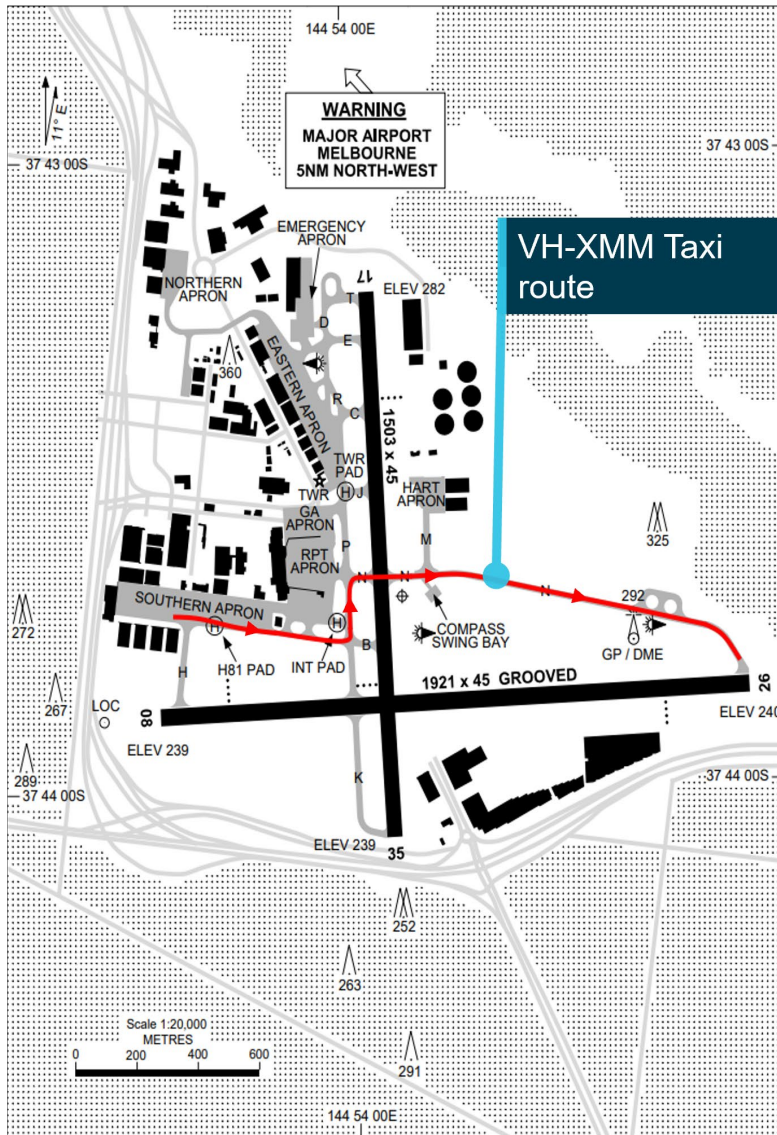
At 0109 local time, VH-XMM taxied from the southern apron where they had been parked, with the airport lighting energised. The pilot contacted Melbourne Centre air traffic control (ATC) and relayed their taxi intentions, to which the controller responded asking if they could accept runway 26<sup>1</sup> for departure. The pilot accepted and over the next 10 minutes taxied the aircraft via taxiway Papa and November, crossing runway 17, (Figure 1). They completed their pre-departure checklists, engine run-up checks<sup>2</sup> and obtained an airways clearance during the taxi. After they arrived at the holding point of runway 26, the pilot reported ready for departure and received departure instructions from the controller.

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<sup>1</sup> Runway number: the number represents the magnetic heading of the runway. The runway identification may include L, R or C as required for left, right or centre.

<sup>2</sup> Run-up checks: a high-power run-up check carried out in a piston-engine aircraft to check the aircraft's ignition and other systems before commencing an initial take-off.

Figure 1: Aircraft taxi route



Source: Aircservices Australia, annotated by the ATSB

As they entered the runway, the pilot completed the departure flight logs, read back the departure instructions to ATC and conducted the line-up checklist. After they commenced the take-off run, they heard multiple loud noises and, in response, rejected the take-off at 77 kt by closing the throttles and applying the brakes. As the aircraft's speed reduced, the pilot felt abnormal braking pressure on the right main landing gear. The aircraft subsequently veered to the left side of the runway and the pilot continued the aircraft-induced left turn to complete a full 360° turn before exiting the runway at taxiway Hotel. The pilot contacted the controller at 0122 and advised that they were vacating the runway and cancelled their departure instructions. The aircraft was returned to the southern apron for further inspection.

On inspection of the aircraft, the pilot determined that the right main landing gear brake caliper was leaking fluid and a cut in the tyre was observed. The pilot sought the advice of a senior base pilot who was on site at the time however, it was not clear at this time exactly how the aircraft came to be damaged. The pilot entered a defect into the aircraft maintenance release and arranged another aircraft to complete the flight.

During a subsequent inspection of the runway, damage to multiple runway lights was detected and foreign object debris was found scattered across the runway.

**Figure 2: Damaged runway lights**



Source: Airport operator, annotated by the ATSB

## Context

### ***Pilot experience***

The pilot attained their commercial pilot licence (aeroplane) in 2018 and completed a satisfactory instrument proficiency check on a multi engine aircraft in January 2023. Both a line check and proficiency check for Air Link were completed on 21 July 2022, where the pilot was assessed as competent for charter and regular public transport flights.

At the time of the incident, the pilot had 1,540 total flight hours and 532 hours on Piper PA-31-350 type aircraft, with approximately 400 hours accrued at night.

### ***Fatigue***

The Melbourne-based pilot routinely flew the night sector between Essendon and Bankstown. They had conducted a similar flight on the previous night where they had encountered a mechanical issue on the aircraft they were flying. A replacement aircraft could not be found and therefore the duty period had ended in Bankstown. A rest period away from base was utilised where the pilot received 6 hours of sleep. The pilot awoke at 0630 the following day and repositioned via a commercial flight to Melbourne. Due to the pilot's late-night roster, their normal wake-up time was around 1000.

After arriving in Melbourne, the pilot was provided with an off-duty period of 12 hours between 1130 and 2330 however, they were discussing weather conditions with the company for the upcoming flight and advised they received 1-hour of sleep during this period.

Initially the pilot advised they did not feel fatigued during the incident flight, however after the pilot reviewed their disrupted sleep pattern and the discussion held during their off-duty period they reported that they considered fatigue was a contributing factor.

### **Aircraft information**

VH-XMM is a Piper Aircraft Corporation PA-31-350 type aircraft fitted with 2 Textron Lycoming TIO-540-J2BD piston engines, each driving a 3-bladed Hartzell propeller. The aircraft was manufactured in the United States in 1979 and issued serial number 31-8052020. VH-XMM was first registered in Australia in 1986 and Air Link became the registered operator in July 2021.

After the occurrence, the aircraft was inspected by engineers. Further damage was found to the main fuselage which was consistent with the aircraft striking the runway lights (Figure 3).

**Figure 3: Damaged sustained by VH-XMM**



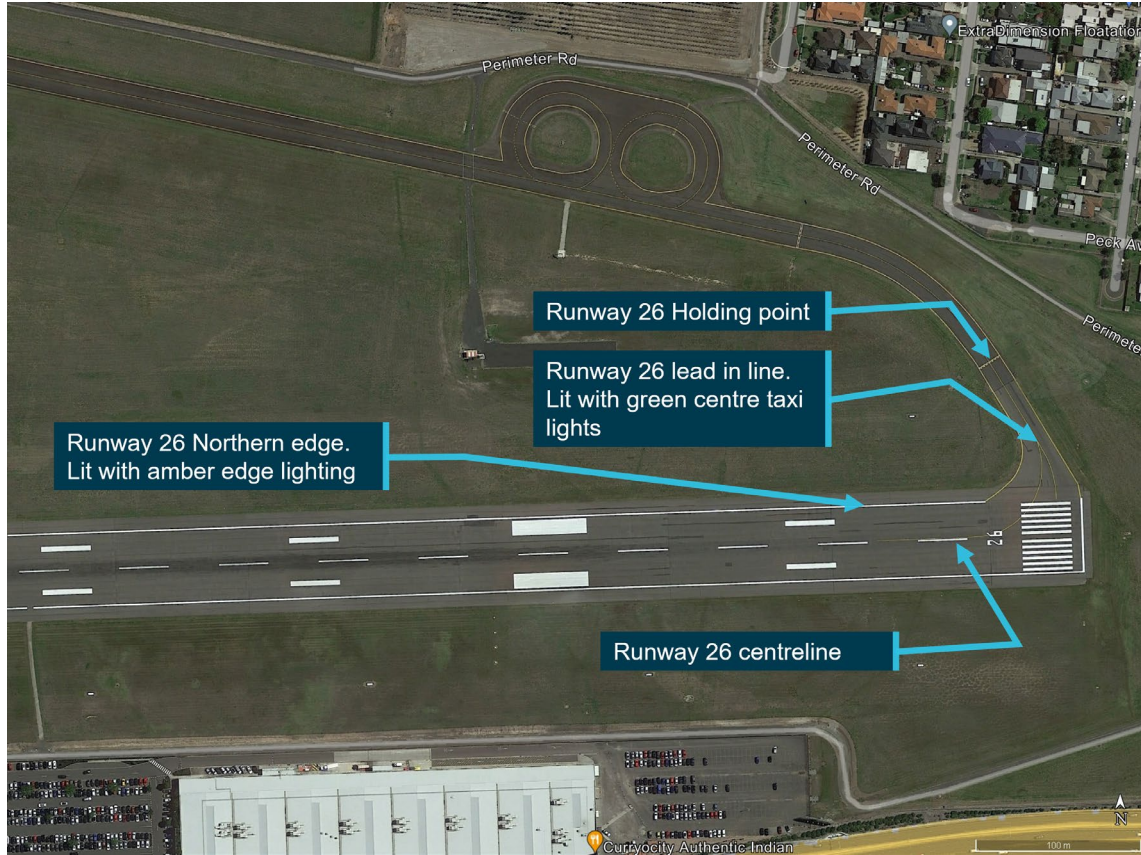
Source: Airport operator

### **Aerodrome information**

The airport lighting was energised without interruption during the course of the aircraft's taxi out, take-off run, aborted take-off and return taxi until after shut-down. The airport lighting de-energised at 0129.

The airport is equipped with green taxiway centreline lighting and runway 26 has a lit lead in taxi line with painted yellow markings. The runway edge lighting provided for runway 26 includes medium and high intensity lighting at 58 metre intervals along the runway edge (Figure 4).

Figure 4: Runway 26 lights and markings



Source: Google earth, annotated by ATSB

The aerodrome inspection carried out on the evening prior to the incident, did not note any defects or damage to the airport lighting system.

The airport operator provided the ATSB with ADS-B movement data which showed the position of the aircraft, and further ADS-B data was obtained from publicly-available, third-party websites (Figure 5).



**Figure 5: VH-XMM take-off path with damaged light positions**

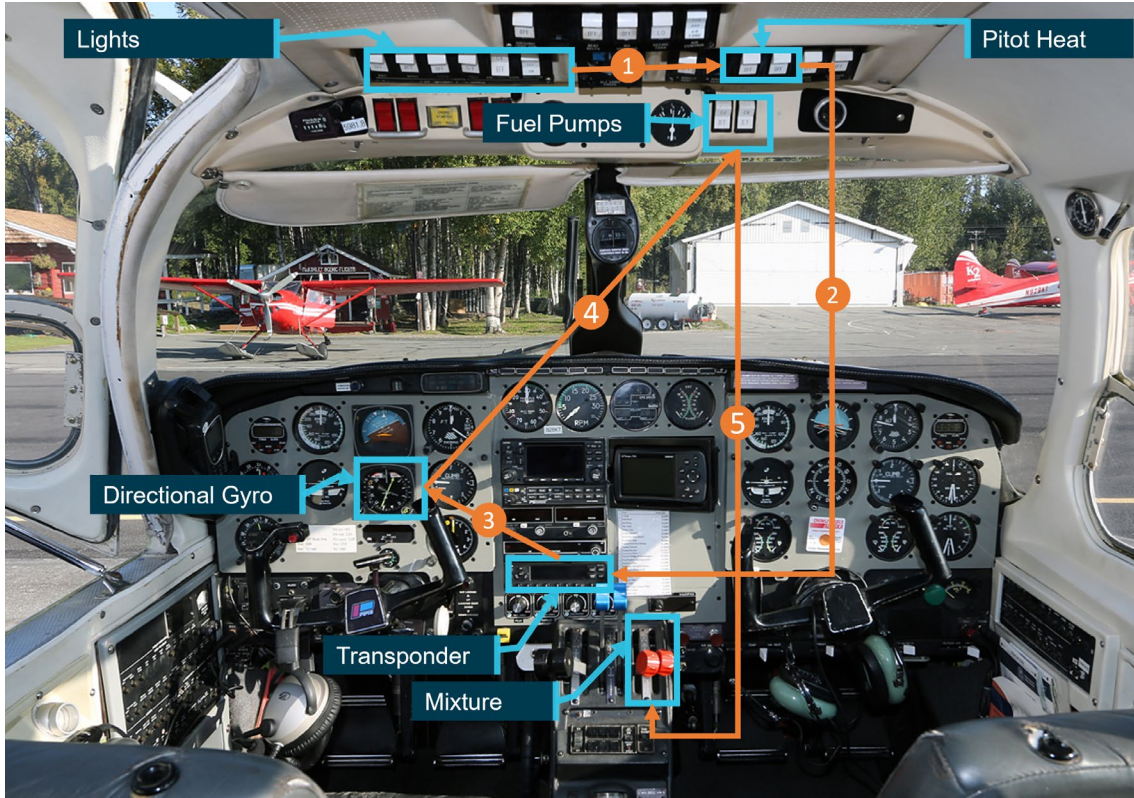


Source: Google earth, annotated by ATSB

***Standard operating procedures***

As the pilot was lining up, they were also completing the line-up checklist. The Air Link standard operating procedure was for pilots to complete the checklist from memory via a flow method and then confirm by referring to a checklist. The line-up checklist required the pilot’s attention to ensure the correct position of multiple items. Figure 6 shows the required checklist flow of an exemplar aircraft, which highlighted the pilot’s attention being drawn from outside the aircraft into the cockpit to identify and confirm specific switches. In addition to the checklist, the pilot also reported checking the extended runway 26 approach for traffic.

Figure 6: Exemplar aircraft showing the line-up checklist flow

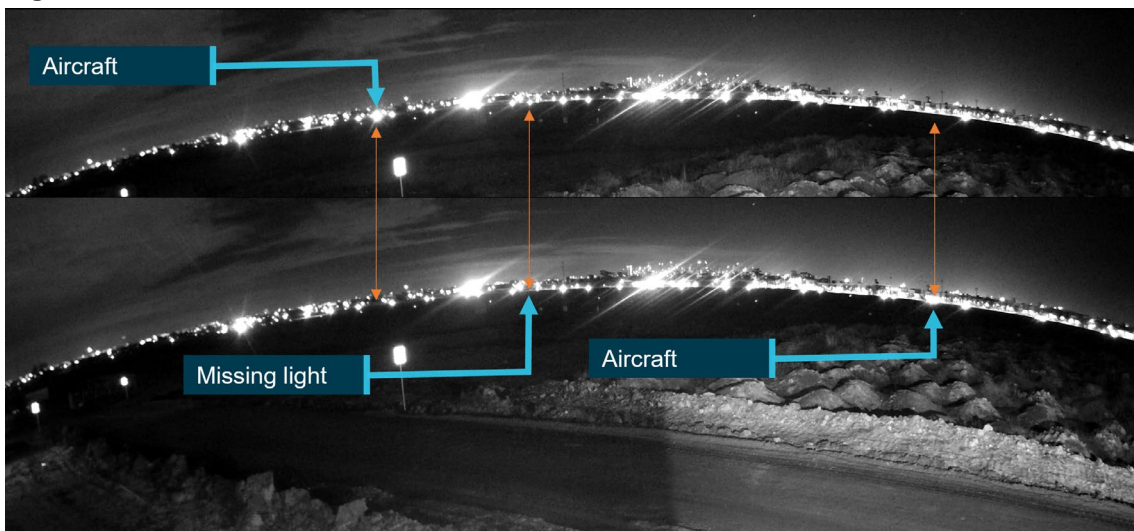


Source: [File:Piper PA-31-350 Navaajo N828KT cockpit \(29890802667\).jpg](https://commons.wikimedia.org/wiki/File:Piper_PA-31-350_Navaajo_N828KT_cockpit_(29890802667).jpg) - Wikimedia Commons, annotated by the ATSB

**CCTV footage**

CCTV footage showing the runway was obtained to confirm if the runway lights were energised during the take-off. From the footage, an aircraft could be seen conducting a take-off run from runway 26 at 0119 and during the take-off, one of the runway lights extinguished as the aircraft passed over it.

Figure 6: CCTV before and after take-off run



Source: Airport operator, annotated by the ATSB

## Safety analysis

The pilot of VH-XMM was conducting a flight from Essendon to Bankstown and taxied to runway 26. Recorded position data from the aircraft confirmed that the aircraft was aligned with the runway edge lighting during the line-up.

CCTV footage confirmed that the aerodrome lights were energised and an aircraft was observed to conduct a take-off run along runway 26 at the time of VH-XMM's departure. As the aircraft moved along the northern runway edge lights were observed to extinguish. In addition, after the aircraft returned to the apron, the damage was detected, which was consistent with striking the runway lights.

During the interview, the pilot confirmed that while entering the runway, they checked the runway approach for traffic, filled out flight departure times and confirmed the line-up checklist was completed by using a physical checklist. These actions diverted the pilot's attention from outside into the cockpit. In addition to the refocusing of attention, the pilot also advised that runway 26 was not a frequently used runway for operations. A combination of the high workload, unfamiliarity with the runway and night operations increased the risk of runway misalignment.

Due to the time of the occurrence and pilot's belief that fatigue was a contributing factor, the ATSB conducted an analysis of the pilot's fatigue level. This analysis showed that, based on the information known in relation to the pilot's previous sleep and work roster, it is unlikely that the pilot was experiencing a level of fatigue known to have an effect on performance at the time of the incident.

## 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 misaligned take-off involving Piper PA-31-350 VH-XMM at Essendon Fields Airport, Victoria on 21 July 2023.

### **Contributing factors**

- The pilot had a high workload during runway line up and subsequently aligned the aircraft with the northern edge lighting, resulting in minor damage during the take-off run.

## Safety action

Air Link advised the ATSB of the following proactive safety action, involving reviews of the:

- fatigue management of aircrew conducting night operations, including setting mandatory 'out of contact' hours
- night proficiency checks for pilots and how regularly these occur
- airport familiarisation process for pilots conducting night operations, including developing a clear procedure on aspects to be considered when inducting aircrew at new ports
- current simulator set up to determine the potential for simulator training and checks to support practical assessment, including night checks
- fatigue management plan to identify areas of improvement for night flights and variances against Civil Aviation Safety Authority Civil Aviation Order 48.1 regulations.

# General details

## Occurrence details

Date and time:	21 July 2023 0119 Eastern Standard Time	
Occurrence class:	Incident	
Occurrence categories:	Runway excursion, Rejected take-off	
Location:	Essendon Fields Airport, Victoria	
	Latitude: 37.7281° S	Longitude: 144.9019° E

## Aircraft details

Manufacturer and model:	PIPER AIRCRAFT CORP PA-31-350	
Registration:	VH-XMM	
Operator:	Air Link Pty. Limited	
Serial number:	31-8052020	
Type of operation:	Part 135 Australian air transport operations - Smaller aeroplanes-Standard Part 135	
Activity:	Commercial air transport-Non-scheduled-Non-scheduled freight only	
Departure:	Essendon Fields Airport, Victoria	
Destination:	Bankstown Airport, New South Wales	
Persons on board:	Crew - 1	Passengers 0
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Minor	

# Sources and submissions

## Sources of information

The sources of information during the investigation included the:

- pilot and operator
- Airservices Australia.
- Essendon Field Airport operator.
- CCTV footage of the incident flight.
- recorded data from the aircraft.
- Air Link Standard Operating Procedures
- PA-31-350 pilot operating handbook

## 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:

- pilot in command
- Air Link
- Civil Aviation Safety Authority

A submission was received from:

- pilot in command

The submission was 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.