Australian Government
Australian Transport Safety Bureau

How safe is Australian aviation?

You may have seen some recent media coverage suggesting that the high number of aviation occurrences reported to the ATSB reflects a low standard of aviation safety in Australia. With a bit of context, you'll see that the opposite is true.

Australia has an extensive mandatory reporting scheme and a healthy reporting culture that sees a broad range of occurrences reported to the ATSB. These include reports from all sectors of aviation, ranging from sport and recreational flying in ultra-lights and gyrocopters, to private flying and commercial passenger operations.

It's important to remember that Australian aviation has many layers of defence to protect safety. If even one of these layers is breached, then the ATSB needs to know about it. We use the information from occurrence reports to determine whether to investigate an incident or accident and to make real practical improvements to the safety system.

The large number of occurrences reported to the ATSB reflects a strong reporting culture. It does not represent a low standard of aviation safety in Australia. In fact, through our investigations and analysis of occurrence data, the ATSB has not seen any overall increase in risk or systemic safety issues in Australian aviation. If we did, we would immediately bring it to the attention of industry and the relevant safety authority.

I encourage the Australian aviation industry to continue the great job of reporting incidents and accidents to the ATSB. Through your reports, we make flying safer.

Martin Dolan
Chief Commissioner

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General aviation: Continuing safety concern

The ATSB has released its latest statistical report – *Aviation Occurrence Statistics 2002 to 2011* – providing the most up-to-date portrait of aviation safety in Australia.

There were 130 accidents, 121 serious incidents, and 6,823 incidents in 2011 involving VH-registered aircraft.

General aviation operations continue to have an accident rate higher than commercial air transport operations—about four times higher for accidents, and nine times higher for fatal accidents in 2011.

Most commercial air transport accidents and serious incidents were related to reduced aircraft separation, and engine issues.

Charter operations accounted for most of the accidents, including two fatal accidents in 2011 within air transport. Air transport incidents were more likely to involve birdstrikes or a failure to comply with air traffic control instructions or published information.

For general aviation aircraft, accidents and serious incidents often involved terrain collisions, aircraft separation issues, or aircraft control problems. General aviation incidents commonly involved airspace incursions, failure to comply with air traffic control, and wildlife strikes.

In most operation types, helicopters had a higher rate of accidents and fatal accidents than aeroplanes, except for in charter operations. Even though the fatal accident rate is generally higher, helicopter accidents are generally associated with fewer fatalities than fixed-wing aircraft.

The figures and insights from the report are helping the ATSB concentrate its efforts on transport safety priorities. The report also reveals that many of the accident types are avoidable (especially for general aviation) and can be prevented through good flight management and preparation.

Aviation Occurrence Statistics 2002 to 2011 is available for free at www.atsb.gov.au ■

If in doubt, don't take-off

ATSB investigation AO-2011-016

A fatal accident involving a Robinson Helicopter Company R44 helicopter is a powerful reminder to stay on the ground if something isn't right with your aircraft.

On 4 February 2011, a Robinson R44 Astro helicopter, registered VH-HFH, crashed after part of the aircraft's flight controls separated from the hydraulic-boost system during circuit operations at Cessnock Aerodrome.

Following a landing as part of a simulated failure of the hydraulic boost system for the helicopter's flight controls, the flight instructor assessed that the hydraulic system had failed and elected to reposition the helicopter on the apron. As the helicopter became airborne, it became uncontrollable, collided with the runway and caught fire. The pilot survived, but the flight instructor and a passenger died in the accident.

What caused the accident

A number of factors—both human and mechanical—contributed to the accident.

The ATSB's investigation found that a flight control fastener had detached, making the aircraft uncontrollable. The ATSB was unable to determine the specific reason for the separation as a number of components could not be located in the wreckage.

Testing conducted by the manufacturer showed that the 'feel' of the flight control fault mimicked a hydraulic system failure. That behaviour, together with the report that the hydraulic system had been leaking and the apparently unsuccessful attempts to re-engage the hydraulic boost system while on the ground, probably resulted in the misdiagnosis of a hydraulic system fault. The fault, however, was with the flight controls, not the hydraulic system and when the helicopter became airborne for repositioning, control was lost.

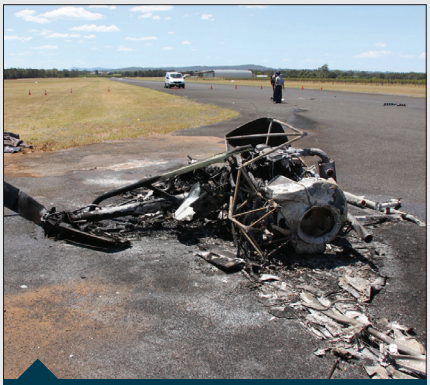
Following the preliminary results of its investigation, in March last year the ATSB issued a Safety Advisory Notice encouraging all operators of R44 hydraulic system-equipped helicopters to inspect and test the security of the flight control attachments on their R44 helicopters, paying particular attention to the connections at the top and bottom of the servos.

The risks of aluminium fuel tanks

The fatal injuries sustained by the instructor and passenger were caused by the post-impact fire. The investigation identified that a large number of R44 helicopters, including VH-HFH, did not have the upgraded bladder-type fuel tanks. These tanks reduce the risk of post-impact fuel leak and subsequent fires.

R44 Service Bulletin 78, issued by Robinson Helicopter Company on 20 December 2010, advised that R44 helicopters with all-aluminium fuel tanks be retrofitted with bladder-type tanks as soon as practical, but no later than 31 December 2014. In February this year the manufacturer revised the date of compliance to 31 December 2013.

Tragically, the post-impact fire from another R44 crash claimed two more lives at Jaspers Brush, NSW in February 2012 (ATSB investigation AO-2012-021).



Aircraft wreckage

What we've learnt from this accident

This accident reinforces the importance of thorough inspections by maintenance personnel and pilots. The investigation identified that self-locking nuts used in many aircraft, including R22, R44 and R66 helicopter models, can become hydrogen-embrittled and fail. The Robinson Helicopter Company and the Civil Aviation Safety Authority (CASA) have published information advising pilots and maintenance personnel that any cracked or corroded nuts be replaced.

The ATSB also urges all operators and owners whose R44 helicopters are fitted with all-aluminium fuel tanks to replace those tanks with bladder-type fuel tanks as soon as possible. Compared to the all-aluminium tanks, the bladder-type tanks provide improved cut and tear resistance and can sustain large deformations without rupture. The safety benefits of incorporating the requirements of manufacturer's service bulletins in their aircraft as soon as possible cannot be underestimated. ■

The success of the system

ATSB investigation AO-2010-035

Often things go wrong in safety because we're all human and prone to error. Inevitably, in any type of operation, some human, somewhere, is eventually going to make a human error. That includes the field of aviation. But it's for that very reason that our systems have so many defences built into them. The success of these defence systems was demonstrated in a 27 May 2010 incident at Singapore's Changi International Airport. Several events on the flight deck of an Airbus A321-231 distracted the crew during the approach. Their situational awareness was lost, decision making was affected and inter-crew communication degraded.

At 6.45 pm, the aircraft, operating as Jetstar flight JQ57 from Darwin Airport, was undertaking a landing. The first officer (FO) was the pilot flying (PF) and the captain was the pilot not flying for the sector. The FO had, on the instructions of Air Traffic Control, descended to 2,500 ft and turned onto the designated heading. The FO disconnected the autopilot.

Immediately, the master warning continuous chime was activated for six seconds. An AUTO FLT A/P OFF message was activated and remained displayed on the monitor. The FO called for action, requesting that the captain set the 'Go Around Altitude'. However, the captain was preoccupied with his mobile phone. The FO set the altitude himself, but the landing gear was left up, and the landing checklist was not initiated.

About two minutes later, as they descended through 750 feet, the undercarriage was still up. The master warning chimed and the 'EGPWS – Too Low Gear' alarm sounded, alerting the crew to the situation. Neither the captain nor the FO communicated their intentions to each other—a problem since the FO perceived that the captain wanted to land, while the captain had always intended to go around.

The go-around was completed successfully, and the aircraft landed safely, but it could not be considered a textbook approach.

'It is not, by any means, an ideal series of events,' said ATSB Chief Commissioner, Martin Dolan. 'However, the defences that exist helped to retrieve the situation, and our investigation did not identify any organisational or systemic issues that might adversely impact the future safety of aviation operations. In addition, the aircraft operator proactively reviewed its procedures and made a number of amendments to its training regime and other enhancements to its operation. Everyone has learned valuable lessons from this.' ■

Proposed changes to reporting requirements

The ATSB is developing new regulations for the mandatory reporting of accidents and incidents, and confidential reporting of safety concerns in Australia.

'This is an important step in the ongoing development of aviation safety in Australia,' said Martin Dolan, Chief Commissioner of the ATSB. 'We have been working with industry for the last couple of years to develop these reforms in the interests of ensuring that reporting makes the greatest possible contribution to future safety.'

There are two changes proposed to the mandatory reporting of accidents and incidents.

'The first is that we are proposing to share with CASA all the mandatory notifications that we receive,' said Mr Dolan. 'It is a standard practice around the world for the regulator to be copied into a notification. In many countries it is the regulator who receives the notification in the first instance. With this change CASA will be better placed to perform its safety regulation functions.'

This change will not place any new burdens or responsibilities on aviation stakeholders.

The second change will involve the revision of the existing list of accidents and incidents that need to be reported as immediately reportable and routine reportable matters.

Mr Dolan says that, 'The new system we are working on will be less prescriptive than it is now. The requirement to report will be based around the severity of the risk that surrounds an occurrence.'

There will also be some changes made to the Voluntary and Confidential Reporting (REPCON) system as a result of the ATSB's increased role in rail from 1 January 2013.

'REPCON will be a multi-modal scheme covering the aviation, maritime and rail transport industries,' explained Mr Dolan. 'However, rest assured that the scheme will continue to give a high level of protection for people who submit reports. The priority of REPCON will always be to provide a secure avenue for people to share their concerns while protecting their identity.'

'The expansion of REPCON will enable all three industries to learn from each other's experiences.'

The next step for the ATSB will be reviewing the comments received from industry, and assessing any suggestions for integration into the amendments.

More information will be published in future editions of *Flight Safety Australia*. ■

Night flying–make sure you're qualified

ATSB investigations AO-2011-043 and AO-2011-087

Two ATSB investigations into fatal accidents highlight the dangers facing pilots who fly at night without the appropriate qualifications.

One accident resulted in the death of a pilot of a Robinson R22 helicopter. The other accident involved a Piper Saratoga PA-32R-301T aircraft, and claimed the lives of the pilot and three passengers and left two other passengers seriously injured.

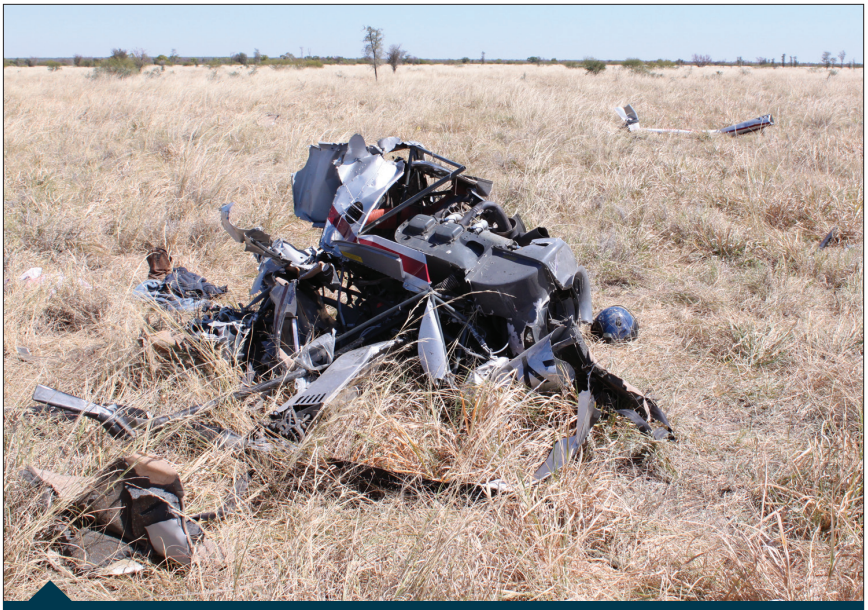
'Flying at night presents unique, and dangerous challenges,' said Julian Walsh, General Manager of Strategic Capability at the ATSB. 'It is troubling that some pilots are ignoring their own lack of qualifications, and putting themselves in these situations.'

The helicopter accident took place on 27 July 2011, 14 kilometres north-west of Fitzroy Crossing in Western Australia. The owner-pilot had departed from the Big Rock Dam stockyards about half an hour after sunset on a moonless evening. As the flight progressed, conditions became very dark and the pilot was probably forced to operate using the helicopter's landing light. The pilot was attempting to return to Brookings Spring homestead at low level in an area without any local ground lighting.

About halfway into the flight, the pilot inadvertently allowed the helicopter to develop a high rate of descent, resulting in a collision with terrain.

The subsequent investigation found that the pilot's licence had not been endorsed for flight under the night Visual Flight Rules (VFR). Also, there was no evidence that the pilot had received any night flying training, although anecdotal reports suggested that this was not the first time the pilot had flown at night. An examination of the helicopter found no evidence of any pre-existing defects or anomalies.

The second aircraft accident happened in March 2011, at Moree in New South Wales. The Piper Saratoga was returning to Moree Airport from Brewarrina Airport with a pilot and five passengers on board.



R22 helicopter wreckage of VH-YOL

The flight had been conducted under the night VFR.

The aircraft flew over the airport at about 8.00pm before the pilot conducted a left circuit for landing. Witnesses observed the aircraft on a low approach path as it flew toward the runway during the final approach leg of the circuit. The aircraft hit trees and collided with level terrain about 550 metres short of the runway threshold.

Although the pilot had a total aeronautical experience of about 1,010 flying hours, he did not satisfy the recency requirements of his night VFR rating. In addition, the aircraft's take-off weight was found to be in excess of the maximum allowable for the aircraft, reinforcing the importance of pilots operating their aircraft within the published flight manual limitations.

'Flying at night adds a level of complexity to every development,' commented Mr Walsh. 'If a safety situation arises, the element of darkness makes it that much more difficult to react effectively.'

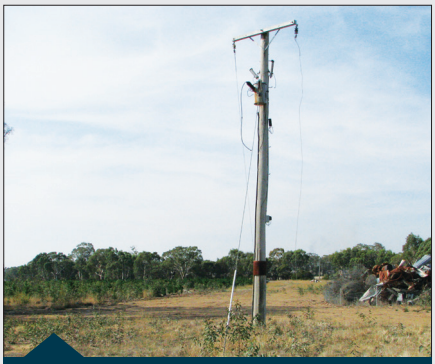
Flying safely at night requires pilots to rely on well-developed skills that address the risks that night flight poses. Night recency requirements, as determined by the Civil Aviation Safety Authority, are a minimum standard that assists pilots to identify and address those risks. Though multiple factors contributed to both accidents, the fact that both pilots were flying in night conditions when they were not properly qualified to do so demonstrates the dangers of such practices.

'If you are going to be flying at night,' said Mr Walsh, 'it is vital that you have received the proper training, and that your qualifications are up to date.' The ATSB takes this issue seriously enough that the topic of flying at night will be a future subject for the *Avoidable Accidents* series.

The reports are available from the ATSB website www.atsb.gov.au ■

Wirestrikes go unreported

A new research investigation has found that more than 40 per cent of aviation wirestrikes that occur in Australia were not reported to the ATSB. This investigation commenced following anecdotal information from stakeholders who were aware of more wirestrikes than had been reported.



Wirestrike

Wirestrikes pose an on-going danger to Australian aviators. They can happen to any low-flying aircraft involved in any operation, such as aerial agricultural, other aerial work, recreational or scenic flights. Intrigued by the possibility that this lack of reporting was common, the ATSB reached out to electricity distribution companies, asking for information. And the electricity companies delivered.

Before this investigation, 166 wirestrikes were reported to the ATSB between July 2003 and June 2011. The new data from the electricity companies, however, revealed another 101 occurrences that had not been reported to the ATSB. At least 40 percent of the wirestrikes in Australia had never been formally tallied.

'And it's possible that the incidence of wirestrikes may actually be even higher,' said Dr Godley, the ATSB's Manager of Research Investigations and Data Analysis. 'There are several reasons for us to believe that. Firstly, a major telecommunications company did not have a single repository of this information to be able to provide the ATSB with information of wirestrikes on its network. In addition, not all wirestrikes result in a broken wire or interrupted power supply, and so are not recorded by electricity distribution companies. And then there's the fact that disused overhead wires are not tracked, so when they are damaged by an aircraft, electricity companies aren't notified. Finally, there are many private power lines out there, and we don't have any figures for them.''

'We're urging pilots, and all aviation stakeholders, to report any wirestrike to the ATSB even if there's no damage to the aircraft and/or no injuries. There may not even be any damage to the wires. But the more we know, the better we can do our job, which is to make flying in Australia safer.'

The report *Underreporting of Aviation Wirestrikes* is available on the ATSB website at www.atsb.gov.au

Notifications of safety related events can be made via the toll free number 1800 011 034 (available 24/7) or via the ATSB website. ■

When wildlife strike

Bats and galahs are among the most common wildlife to be struck by Australian aircraft according to a new ATSB research report.

The report provides the most recent information on wildlife strikes in Australian aviation. In 2011, there were 1,751 birdstrikes reported to the ATSB. Most birdstrikes involved high capacity air transport aircraft. For high capacity aircraft operations, reported birdstrikes have increased from 400 to 980 over the last 10 years of study, and the rate per aircraft movement also increased.

For aeroplanes, takeoff and landing was the most common part of a flight for birdstrikes. Helicopters sustained strikes mostly while parked on the ground, or during cruise and approach to land. Birdstrikes were most common between 7.30 am and 10.30 am with a smaller peak in birdstrikes between 6pm and 8pm, especially for bats.

All major airports, except Hobart and Darwin, had high birdstrike rates per aircraft movement in the past two years compared with the average for the decade. Avalon Airport had a relatively small number of birdstrikes. But, along with Alice Springs, Avalon had the largest strike rates per aircraft movement for all towered aerodromes in the past two years.

In 2010 and 2011, the most common types of wildlife struck by aircraft were bats/flying foxes, galahs, kites and lapwings/plovers. Galahs were more commonly involved in strikes of multiple birds.

Animal strikes were relatively rare. The most common animals involved were hares and rabbits, kangaroos and wallabies, and dogs and foxes. Damaging strikes mostly involved kangaroos, wallabies and livestock.

The report is a reminder to everyone involved in the operation of aircraft and aerodromes to be aware of the hazards posed to aircraft by wildlife. While it is uncommon for a birdstrike to cause any harm to aircraft crew and passengers, many strikes result in damage to aircraft. Some birdstrikes have resulted in forced landings and high speed rejected takeoffs.

Timely and thorough reporting of birdstrikes is vital. The growth of reporting to the ATSB seen over the last 10 years has helped us to understand better the nature of birdstrikes, and where the major safety risks lie. This helps everyone in aviation to manage their safety risks more effectively.

The report Australian aviation wildlife strike statistics: *Bird and animal strikes 2002 to 2011* is available for free on www.atsb.gov.au ■

REPCON BRIEFS

Australia's voluntary confidential aviation reporting scheme

REPCON allows any person who has an aviation safety concern to report it to the ATSB confidentially. All personal information regarding any individual (either the reporter or any person referred to in the report) remains strictly confidential, unless permission is given by the subject of the information.

The goals of the scheme are to increase awareness of safety issues and to encourage safety action by those best placed to respond to safety concerns.

Ambiguous procedures for missed approach

Report narrative:

The reporter raised a safety concern about the ambiguity that lies within the rules surrounding the turn onto any missed approach with the wording 'Track XXX ' and the missed approach point defined by a radio aid. The concern is, should a pilot turn the aircraft so as to make good a track of XXX, or should the pilot intercept the radial XXX outbound from the missed approach point. The rules do not specify one way or the other.

Responses/received:

The following is a version of Airservices Australia's response:

Departure and Approach Procedures (DAP)

Airservices Australia's DAP, page 1-1, paragraph 1-7 states:

'All procedures depict tracks, and pilots should attempt to maintain the track by applying corrections to heading for known or estimated winds.'

Aeronautical Information Publication

In addition, the Australian Aeronautical Information Publication (AIP), paragraph 1.1 0.2 refers to a missed approach conducted from overhead a navigation facility:

In executing a missed approach, pilots must follow the missed approach procedure specified for the instrument approach flown. In the event that a missed approach is initiated prior to arriving at the MAPT [Missed Approach Point], pilots must fly the aircraft to the MAPT and then follow the missed approach procedure.

The MAPT in a procedure may be:

a. the point of intersection of an electronic glide path with the applicable DA; or

b. a navigation facility; or

c. a fix; or

d. a specified distance from the Final Approach Fix (FAF).

Application

Airservices Australia considers there are generally two different scenarios when conducting a missed approach and these are described, in general terms, as text on the DAP plate as follows:

1. Turn Left (or Right), Track xxx°, Climb to xxxxft

Tracking is made without reference to the Navaid and the expectation is that the pilot will use Dead Reckoning (DR) to achieve the nominated track. Allowance for wind must be included to make good this nominated track. A Navaid may be used to supplement track keeping during the missed approach when it is a straight continuation of the final track, however guidance is not mandatory. Most procedures in Australia that have been designed with a navigation facility utilise DR navigation in the missed approach segment. The area of consideration when designing an instrument approach and landing procedure is larger for DR tracks than those assessed when a navigation aid is used.

2. Turn Left (or Right), Intercept xxx° xx NDB (or VOR), Climb to xxxxft

Tracking is made with reference to the Navaid and the expectation is that the pilot will make an interception of the nominated track. Where an intercept is required it will be both stated and shown in diagram on the procedure plate. As an example, refer to the approach chart for Cairns ND8-8 or VOR-8.

The missed approach instruction states, *'At the NDB or VOR, Turn Left to intercept 040° CS VOR or NDB. Climb to 4000ft or as directed by ATC.'* This is displayed diagrammatically on the procedure plate.

The primary reason is to avoid critical terrain located near or within the splay tolerance area. The use of the navigation facility can significantly reduce this area compared to a DR track and also provides situational awareness to pilots and ATC as to where the aircraft will be during that phase of flight. If a pilot does not intercept the radial/bearing, the aircraft may not be contained within the splay protection area and result in the aircraft not clearing an obstacle by the required minimum obstacle clearance.

ATSB comment:

Enquiries conducted by the REPCON Office have revealed a different perspective between ATC and flight crews in respect of how missed approaches should be conducted from overhead an aid (NDB/VOR).

The ATSB provided a number of suggestions to CASA that may assist in removing the ambiguities relating to the missed approach procedure, particularly where the MAPT is overhead an aid.

The following is a version of the response that CASA provided:

> CASA has reviewed this matter internally with subject matter experts and considers that Airservices Australia's comment is accurate in that it reflects the way procedure designers design these types of missed approach procedures. That there seems to be misunderstanding within industry suggests a need to explain this reasoning in the Aeronautical Information Publication. CASA will be generating a Request for Change (RFC) to the AIP. This should ensure that pilots are provided with a greater level of information regarding a missed approach. The AIP change will be coordinated with Airservices.

How can I report to REPCON?
Online:
www.atsb.gov.au/voluntary.aspx