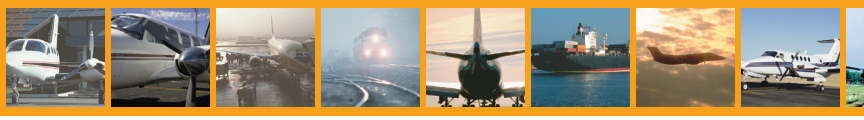
Australian Government
Australian Transport Safety Bureau

The Australian



Chief Commissioner's message

The ATSB has now completed its inaugural year as an independent agency. Thanks to a great deal of work from a great many people, we are now firmly established in our independent role. We are also well-positioned to meet international expectations about what we investigate, while still making sure that we are focused on doing things that will make a difference to future safety.

Over the next few months, you will see the ATSB place a greater emphasis (including here) on communicating what we have learned from our investigations and what we have learned from research and from analysis of incident data.

Getting to this point in addition to the continuing business of conducting transport safety investigations, some of which were complex and high profile, made this a challenging, though satisfying, year for the ATSB.

Over the year, we received notification of 14,721 aviation accidents and incidents – and that does not include the notifications that were multiple reports of the same occurrence. ATSB staff members reviewed every one of those notifications, and assessed 8,545 as transport safety matters. From those matters, we initiated 103 aviation investigations. In addition, ATSB investigators also successfully completed 68 aviation investigations. It has been a busy first year, and there is every sign that the next year will be even busier. I have confidence, however, that it is a challenge the ATSB will rise to and meet.

I would like to take this opportunity to thank everyone who has done so much to help us begin a new chapter in the ATSB's story. Not only have they helped to establish a government agency, which is no small feat, but their efforts have helped to make aviation in Australia safer.

If you have any ideas or feedback on the ATSB's performance that you would like to share, I urge you to contact us, so that we can make the next year as satisfying and productive as this past one has been.

Martin Dolan
Chief Commissioner

Ground safety occurrences

The aviation industry has been slow to acknowledge the risks associated with ground operations. While most occurrences on airport aprons and taxiways do not have consequences in terms of loss of life, they are often associated with aircraft damage, delays to passengers and avoidable financial costs to industry.

The focus of this recent ATSB research report was to examine safety occurrences involving high capacity aircraft, specifically dealing with ground operations and foreign object debris (FOD). The report explored contributing factors associated with each type of occurrence to create a picture of ground occurrences which begins when an aircraft is being prepared for takeoff and ends when passengers and crew have disembarked from the aircraft. The key to preventing ground occurrences appears to revolve around ensuring effective communication between pilots, ground crews and air traffic services through a process of checks and balances.

There were 398 ground occurrences reported to the ATSB involving high capacity aircraft operations between 1 January 1998 and 31 December 2008. About 70 per cent related to ground operations and 30 per cent related to FOD. Six different types of occurrences accounted for about 75 per cent of all ground operations occurrences, with failure to comply with a clearance being the most frequently reported occurrence type. Other common types of occurrences were ground equipment/obstacle clearance, near collision with vehicle, tug connection and breakage, door access and opening, and collision or contact with aircraft by a vehicle. About a quarter of the reported ground operations occurrences involved aircraft damage. The vast majority of damaging occurrences related to a ground crew vehicle collision with a stationary aircraft, and about two per cent of occurrences related to flight crew colliding with an object on the ground.

Foreign objects debris (FOD) has the potential to damage aircraft, particularly in the case of jet-powered aircraft, where objects can be ingested into an engine. The most common FOD reported to the ATSB was aircraft components, and this was followed by tools and equipment. In one case, the pilot of a Boeing 767 noted a series of loud bangs shortly after takeoff, and returned to the aerodrome. Subsequent engine teardown found a Phillips-head screwdriver bit in the core of the engine. This probably fell into the engine through the variable bleed valves which are open when the aircraft is not operating.

Airports are complex interfaces between the air and the ground, where many vehicle, people and aircraft movements occur. The occurrences in this report serve as a timely reminder of how ground occurrences take place, and to some degree why they occur. ■

Aviation Safety Investigator

Tourists swim for it after helicopter joyride goes wrong

On 25 September 2008, a Bell 407 helicopter, registered VH-NSH, with a pilot and six passengers on board, lifted off from the helideck of a cruise ship, *True North*, anchored in Talbot Bay, Western Australia, to begin a 45-minute tourist flight.

As the pilot moved the helicopter clear of the right of the ship, and at a height of about 10 m above the surface of the sea, a loud bang was heard, followed by a total loss of engine power. The helicopter rapidly descended to the water, impacting in a nose low, right side-down attitude. The cockpit and cabin quickly filled with water and the helicopter rolled onto its side initially before rolling completely inverted.

The helicopter was fitted with emergency flotation equipment, however the pilot indicated that the rapidity of the descent into the water gave him insufficient time to deploy the floats. He had considered re-entering the cockpit to activate the floats once he was free of the helicopter but had been discouraged from doing so.

The rapid response to the emergency by the ship's crew ensured that all of the helicopter's occupants survived the accident. Two of the occupants, one of whom was unconscious, required assistance to exit the partially-submerged helicopter. Sometime later, the helicopter sank.

The investigation found that there had been a 'burst' failure of the Rolls Royce Corp model 250-C47B engine's outer combustion case as a result of pre-existing, high cycle, fatigue cracking in the case's 'armpit' area. That cracking grew slowly and undetected, over a considerable period of time and was a consequence of the cumulative effect of normal engine pressure cycles.

The engine manufacturer had previously strengthened the 'armpit' areas of the outer combustion cases on the Worldwide fleet of RR250 engines in the early 1970's by the addition of brazed wire mesh patches following a number of in-service failures. Subsequently, in 1984, that strengthening was extended to the later series of RR250 engines, such as was installed in the occurrence helicopter. The cracks in this occurrence had developed adjacent to those brazed wire mesh patches and had propagated through them.

The investigation found that the regular crack inspections that were required by the engine manufacturer to be carried out on the outer combustion case had been done. However, the approved dye-penetrant detection methods used had been ineffective in discovering the cracks prior to failure.

As a result of this occurrence, the engine manufacturer conducted a computerised analysis of the design of the combustion case in an effort to address the relevant areas of high stress more effectively. That analysis resulted in an on-going re-design of the brazed wire mesh patch to more effectively cover the areas of concern. The engine manufacturer is also re-evaluating the method of inspection used for detecting outer combustion case cracks during maintenance.

In response to this, and a similar failure in another helicopter two weeks earlier, the Civil Aviation Safety Authority released an Airworthiness Bulletin highlighting the circumstances of the occurrence to Australian helicopter operators. That bulletin resulted in another outer combustion case crack being found on an in-service Sikorsky S76 helicopter.

The operator of the helicopter has also advised its intention to change a number of the operational procedures employed during shipborne helicopter operations to better ensure passenger safety. The operator is also installing Helicopter Emergency Air Breathing System bottles in the helicopter's cabin area for the use of crews in a similar emergency. ■

ATSB investigation report AO-2008-067

Investigation briefs

A worrying lack of comms

ATSB Investigation AO-2009-001

On 26 December 2008, a Bombardier Inc DHC-8-315 (DHC8), registered VH-TQL, was conducting a regular public transport flight from Moree to Sydney Aerodrome, New South Wales. While on final approach, and after capturing the glideslope for the runway 34 Left (34L) instrument landing system approach, the autopilot commanded the aircraft to descend. This prompted the crew to make a number of configuration changes in an effort to continue the approach. Those changes destabilised the aircraft and diminished its performance, which lead to the activation of the aircraft's stickshaker. Shortly after, a missed approach was commenced by the flight crew.

In this occurrence, the crew continued the approach despite becoming aware of the unstable aircraft state. Positive action to avoid a stickshaker event could have been taken if the crew communicated to each other the inappropriate aircraft configuration as it progressed along the approach.

This incident reinforces the importance of adhering to company SOP's. Poorly managed stick shaker recovery techniques and go-around procedures increase the likelihood of inducing aerodynamic stall and stick pusher activation.

As a result of this occurrence, the operator has proactively implemented changes to its DHC-8 training syllabus. It has also highlighted to its crews the destabilising effects of changes to an aircraft's configuration during an approach, the importance of forward planning; and the monitoring and prioritisation of tasks when conducting approaches. Finally, the operator has emphasised to crews the importance of good communication in a multi-crew environment. ■

Engine Cooling Fan Fracture

ATSB Investigation AO-2009-019

On 3 May 2009 at approximately 0620 EST, a Bell Helicopter 47G-2A–1 departed Rolleston landing area, Queensland, on a private flight. During the climbout, approximately 200 ft above ground level, the pilot heard a very loud bang and felt a jolt through the airframe. The helicopter started descending and the forward/aft cyclic control was unresponsive. The helicopter landed heavily, resulting in the main rotor blades severing the tail boom and causing some structural damage to the airframe. The pilot suffered a minor back injury.

Examination of the helicopter revealed that two blades had separated from the engine cooling fan as a result of fatigue fracture. The fan cowling had fractured and separated from the engine and there was impact damage to the flight control linkages located adjacent to the fan assembly. The ATSB examination determined that the fan unit had not been correctly assembled, and that this probably had an effect on the vibration and resonance characteristics of the fan, which in turn may have increased the susceptibility of the fan to fatigue failure.

As a result of this occurrence, the CASA released Airworthiness Bulletin AWB 63-007, reminding operators and maintainers of the importance of adhering to all current manufacturer's approved data for sheet metal cooling fans and their drive assemblies, and detailing some potential contributing factors to structural fatigue fan failure. ■

Collision with terain

ATSB Investigation AO-2008-062

On 14 September 2008, a Robinson Helicopter R44 Raven, registered VH-RIO, was being operated on a series of scenic flights in the Purnululu National Park, WA. At about 1230 WST, the helicopter departed with the pilot and three passengers. When it did not return, a search located the burnt wreckage of the helicopter. Their were no survivors.

The pilot had deviated from the regular flight track, speed and profile to operate out of ground effect (OGE) in close proximity to the terrain at a low airspeed or at the hover. The helicopter's estimated OGE hover performance was marginal. It is likely that the high level of engine power required to sustain a hover was not available, or not fully utilised by the pilot, resulting in an uncommanded descent, overpitching of the main rotor as a result of the pilot's attempts to arrest that descent, and a main rotor RPM decay that significantly increased the rate of descent.

Two minor safety issues were identified:

- There was no Australian requirement for endorsement and recurrent training conducted on Robinson R22/R44 helicopters to specifically address the preconditions for, recognition of, or recovery from, low main rotor RPM.
- There was a lack of assurance that informal operator supervisory and experience-based policy, procedures and practices minimised the risk of pilots operating outside the individual pilot's level of competence.

The aircraft operator has since formalised the operating parameters applicable to pilots conducting scenic flights. In addition, CASA will be reviewing the training requirements affecting R22/44 helicopters. The ATSB has issued a Safety Advisory Notice to encourage operators to address the risk of their pilots operating outside the individual pilot's level of competence. ■

Airframe Vibration

ATSB Investigation AO-2008-039

On the morning of 11 June 2008, a Bell 412 helicopter, registered VH-UAH, was conducting training operations from Wollongong Aerodrome, NSW. Shortly after landing, the helicopter developed severe vertical airframe vibrations, resulting in reduced pilot control. In response to the increasing vertical airframe vibrations, and suspecting that they were related to ground resonance, the pilot raised the helicopter into the hover, however, the vibrations continued to increase. The pilot lowered the collective to set the helicopter back down onto the runway. The resulting heavy landing caused serious damage to the helicopter, but the crew were not injured.

Examination of the helicopter's flight control system revealed an anomaly with the collective hydraulic actuator. Excessive free play had developed between the collective actuator's pivot bolt and the pilot input linkage. It was probable that the free play within the helicopter's flight control system brought about the onset of divergent vibrations and allowed subsequent controllability issues to develop. It is likely that free play at the bolted joint was introduced when the collective actuator was last overhauled.

As a result of this occurrence, the collective actuator manufacturer revised the tensioning procedures and requirements for the pivot bolt assembly during the overhaul process. In addition, the helicopter operator changed its inspection regime of the collective servo-hydraulic actuator units in its fleet of Bell 412 helicopters and issued a 'flight staff instruction' to provide guidance to pilots on what actions to take if they experienced unusual or excessive vibrations during flight. ■

Hard landing

ATSB Investigation AO-2008-007

On 7 February 2008, a Boeing 717-200 aircraft, registered VH-NXE, was being operated on a scheduled passenger service from Cairns, Queensland via Nhulunbuy (Gove) to Darwin, Northern Territory with six crew and 88 passengers.

The flight crew were cleared by air traffic control to fly a visual approach to runway 29 at Darwin Airport and elected to follow the instrument landing system to the runway. The aircraft was above the glideslope for the majority of its approach and temporarily exceeded the operator's stabilised approach criteria shortly before landing. The aircraft sustained a hard landing resulting in structural damage. The damage included several creases to the fuselage skin above the wing area and to the underside of the fuselage behind the wing.

Several longerons in the rear cargo area were also damaged. The left main landing gear was removed and inspected in response to minor damage to the upper wing above the landing gear assembly. The outer left main landing gear tyre was also damaged. The flight crew completed the landing roll and taxied the aircraft to the terminal without further incident.

There were no reported injuries; however, the extent of the damage to the aircraft led the ATSB to classify the occurrence as an accident. The investigation identified a number of relevant safety factors, including the flight crew's actions and control inputs, the aircraft operator's stabilised approach criteria and operational documentation, and the visual cues associated with runway 11/29 at Darwin Airport.

As a result of this occurrence, the aircraft operator implemented a number of safety actions in relation to enhancing their stabilised approach criteria and pilot training, the monitoring of third party training providers, and the amendment of relevant operational documentation. In addition, the CASA undertook to prioritise the completion of proposed legislation in relation to third party training providers. ■

Collision with terrain

ATSB Investigation AO-2008-069

At about 1440 EST on 29 September 2008, the pilot of a Piper Aircraft PA36-375 Pawnee Brave, registered VH FXE, was conducting aerial baiting operations in the Pilton Valley, Queensland when the aircraft collided with terrain. The aircraft was seriously damaged by impact forces and a post–impact, fuel and magnesium-fed fire. The pilot was killed.

The pilot had flown the aircraft for about 3 hours that day, conducting operations at a number of properties. He had extensive experience on a variety of large jet and air transport category aircraft types. In contrast, his agricultural flying experience was relatively limited, although he had carried out regular, recent agricultural operations.

Examination of the engine indicated that it was producing significant power at the time of impact. There were no other technical anomalies of the aircraft or its systems identified that would have contributed to the accident.

Witnesses reported wind consistent with a weather front moving through the area generating gusts of up to 30 kts. Those observations reinforced the Bureau of Meteorology observation that mountain and breaking waves might have occurred in the area.

The investigation found that the topography of the area in which the pilot was operating, and the strong, gusty, wind conditions at the time, probably resulted in turbulence that increased the hazardous nature of the low-level application task.

It is likely that the pilot lost control of the aircraft as a result of that turbulence, at a height from which recovery was not possible before the aircraft struck the ground. ■

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. Unless permission is provided by the person that personal information is about (either the reporter or any person referred to in the report) that information will remain confidential.

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

Before submitting a REPCON report take a little time to, consider whether you have other available and potentially suitable options to report your safety concern. In some cases, your own organisation may have a confidential reporting system that can assist you with assessing your safety concern and taking relevant timely safety action. You may also wish to consider reporting directly to the Civil Aviation Safety Authority (CASA) if you are concerned about deliberate breaches of the safety regulations, particularly those that have the potential to pose a serious and imminent risk to life or health. REPCON staff may be able to assist you in making these decisions, so please don't hesitate to contact our staff to discuss your options.

REPCON would like to hear from you if you have experienced a 'close call' and think others may benefit from the lessons you have learnt. These reports can serve as a powerful reminder that, despite the best of intentions, well-trained and well-meaning people are still capable of making mistakes. The stories arising from these reports may serve to reinforce the message that we must remain vigilant to ensure the ongoing safety of ourselves and others.

If you wish to obtain advice or further information, please contact REPCON on 1800 020 505.

HF radio communications

R200900079

Report narrative:

The reporter expressed safety concerns that the operator's aircraft had requested that the reporter's aircraft relay their position as they were having trouble with their HF communication. After a 1 hour transit on the return flight, the same aircraft was flying the same route and required the reporter's aircraft to relay their position again due to HF communications problems. The reporter noted that their aircraft had no HF communication problems. The reporter believed that for high capacity aircraft on commercial operations, two-way communications is required and repair before further flight is a requirement.

Action taken by REPCON:

REPCON supplied the operator with the de-identified report and the operator advised that their aircraft always carry the necessary radios to meet the regulatory and operational requirements of the planned routes. They are all fitted with two HF radio systems, whereas only one is required for international operations. There may have been some unserviceability or propagation issues that caused the events described in the REPCON, but without specific details of the flight number, date and route it is impossible to investigate further and provide additional feedback.

REPCON supplied CASA with the de-identified report and a version of the operator's response. CASA provided the following response:

> The Airservices Australia Aeronautical Information Package (AIP) General (GEN) 1.5 Paragraph 1.1 states that aircraft must be equipped with radio communications systems capable of continuous communication according to the flight classification and airspace category.
>
> AIP GEN 1.5 Paragraph 1.4 states that at least one item of the required radio equipment must be capable of maintaining continuous communication with Air Traffic Services at 'all stages of flight'. The term 'all stages of flight' includes ground operations at the aerodromes of departure and arrival, and cruising levels that could be required for any emergency and/or abnormal operation en route.
>
> [The operator's] response to the REPCON report indicates the radio equipment they carry. Without more specific information that indicates the aircraft registration number and flight number, CASA is unable to action the matter further.

Note: In order for REPCON to protect the personal information of the reporter and those mentioned in the report, REPCON was not able to provide more detailed information to the operator or CASA.

Control of component extensions to overhaul times

R200900081

Report narrative:

The reporter expressed safety concerns that there are numerous instances of the operator allowing components to run to their maximum overrun for overhaul or time expired.

One such incident is a brake hydraulic fuse that was granted an extension to continue in service for a further 1,000 hours beyond the manufacturer's requirements. The hydraulic fuse failed at 972 hours beyond the manufactures' requirements for overhaul.

Another incident reported involved hydraulic fuses exceeding their extension. When the error was discovered, the fuses were replaced before further flight.

The reporter believes that the company still needs to improve in the area of safety mindfulness and the use of extensive extensions on component overhauls is one area that the operator has not made any recent improvements.

Action taken by REPCON:

REPCON supplied CASA with the de-identified report. CASA provided the following response:

Operators can either apply to CASA for extensions to maintenance requirements, or in [this case], extensions can be internally approved as [the operator] are authorised CASA persons. This can be up to 10% of the original interval on some components. This is not normally done unless some form of extenuating circumstance exists.

In the case of the overrun for overhauled components, when an anomaly with serial numbers of fuses was discovered by [the operator] the aircraft in question was grounded until a one-off permission was issued to enable the aircraft to proceed to [location] where the part was replaced. The part had not exceeded the concession time of 2,500 hours, but had exceeded the 25,000 hour limit by 1,500 hours. In this case, however, a concession had not been issued.

[The operator] has examined the issues raised by the reporter and the total process of managing the staggering of times for components was reviewed. Data on the issue has been supplied to [the operator] and changes have been put in place to prevent this type of event happening again.

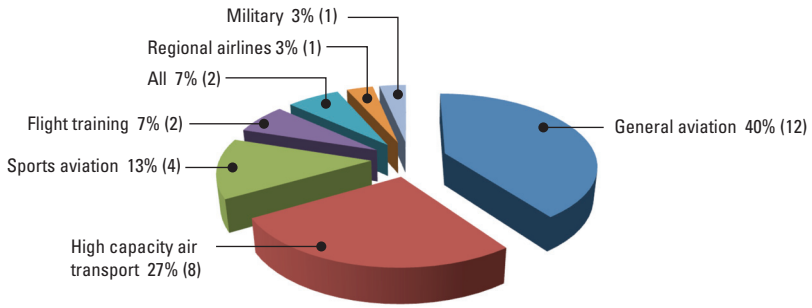
In the other case reported, where a fuse which was operating under a concession failed, a search of [the operators] technical logs was made and no other such failure was found. [The operator] was consulted, but no trends were evident.

[The operator] has acted as CASA would expect; identified the problem, investigated it, put in place procedures to prevent re-occurrence and are monitoring the outcome. CASA does not intend to take further action on this issue.

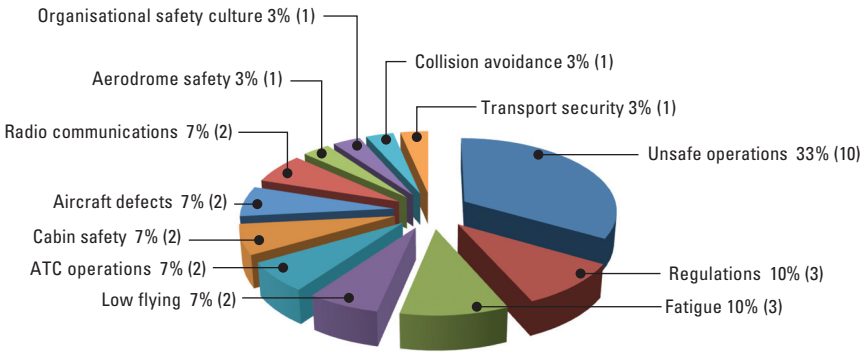
REPCON reports received	
Total 2007	117
Total 2008	121
Total 2009	118
Total 2010[a]	80

a. as of 30 June 2010

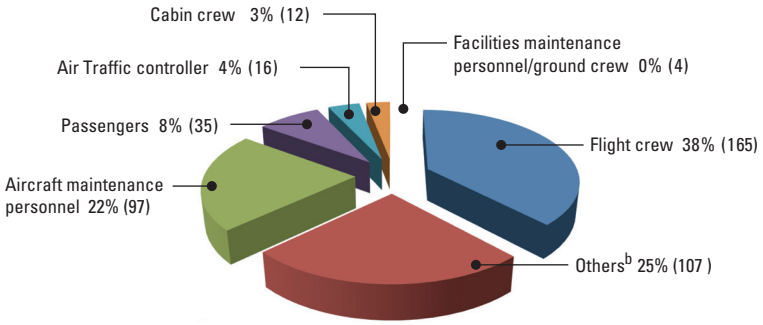
REPCON Operation types Second quarter 2010



Reported issues Second quarter 2010



Who is reporting to REPCON? [a]



a. from 29 January 2007 to 30 June 2010
b. examples include residents, property owners, general public.

What is not a reportable safety concern?

To avoid doubt, the following matters are not reportable safety concerns and are not guaranteed confidentiality:

(a) matters showing a serious and imminent threat to a person's health or life;
(b) acts of unlawful interference with an aircraft;
(c) industrial relations matters;
(d) conduct that may constitute a serious crime.

Note 1: REPCON is not an alternative to complying with reporting obligations under the Transport Safety Investigation Regulations 2003 (see <www.atsb.gov.au>).

Note 2: Submission of a report known by the reporter to be false or misleading is an offence under section 137.1 of the Criminal Code.

How can I report to REPCON?

Reporters can submit a REPCON report online via the ATSB website.
Reporters can also submit via a dedicated REPCON telephone
number: 1800 020 505
by email: repcon@atsb.gov.au
by facsimile: 02 6274 6461
or by mail: Freepost 600, PO Box 600, Civic Square ACT 2608

How do I get further information on REPCON?

If you wish to obtain advice or further information on REPCON, please visit the ATSB website at <www.atsb.gov.au> or call REPCON on 1800 020 505.