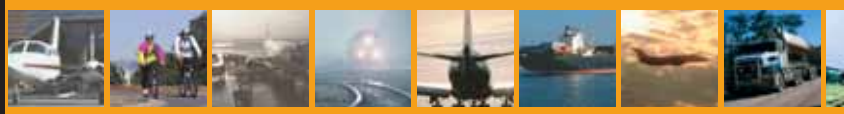
Australian Government
Australian Transport Safety Bureau

The Australian



Executive Director's Message

On 29 January 2008 the ATSB marked the first anniversary of the commencement of Australia's confidential aviation safety reporting scheme - REPCON. The ATSB is very pleased with the industry response to date and considers that REPCON is largely working the way that it was intended. In the first year of operation both reports and ATSB responses have progressively matured, as expected. Processes are continually being reviewed and refined to ensure that the scheme best meets its objective of facilitating safety awareness and safety action by other persons and organisations.

The REPCON scheme was introduced after extensive industry consultation and represents model international legislation in meeting the principles of an independently-administered, confidential, voluntary and non-punitive scheme. The January-February issue of Flight Safety Australia *featured a new submission from the ATSB: several briefs describing confidential reports made to REPCON. This sharing of safety information from REPCON briefs will be an ongoing feature of* Flight Safety Australia *and, beginning with this issue, will make up a double-page spread.*

A decision of the Federal Court of Australia in Elbe Shipping v Giant Marine Shipping SA [2007] upheld the validity of legislative protections for safety information obtained by the ATSB in an investigation. Under the Transport Safety Investigation Act 2003*, directly-involved parties in an ATSB investigation such as flight crew, aircraft owners and operators, can be assured that the ATSB cannot be compelled to disclose safety information to a court for use in blame or liability proceedings. The Elbe Shipping case confirms that safety investigations and blame and liability proceedings are necessarily separate processes so as to ensure the continued free flow of safety information. Recent High Court decisions have reinforced the ATSB's legislation further and an appeal against the ATSB in Elbe was discontinued in mid February 2008.*

Kym Bills, Executive Director

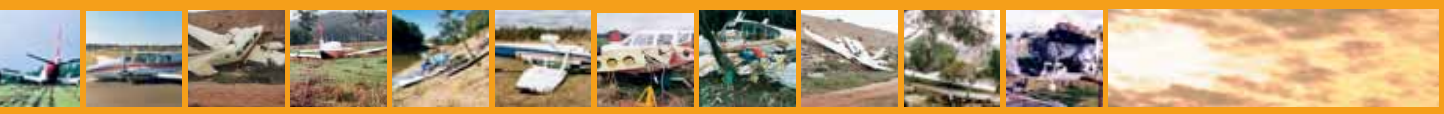
What's next for aviation safety research?

No doubt, many of you may read the research reports published by the ATSB each year on its website. The ATSB's aviation research program produces a variety of reports that examine current and emerging safety issues. The ideas for these reports often arise from issues identified in ATSB investigations, concerns raised by the industry, and topics currently of interest in both the domestic and international aviation communities. The ATSB's current research program covers a range of interesting topic areas and we would like to take this opportunity to elaborate on a few of the projects that will be published in 2008.

Last year there were a number of major aircraft accidents that received widespread media attention. Most notable were the Garuda airlines Boeing 737 in Indonesia and the TAM Airlines Airbus A320 in Brazil, both of which ran off the end of the runway. These accidents resulted in a substantial number of fatalities and raised concerns regarding the adequacy of runway overrun areas at airports. The ATSB will be taking a closer look at these types of accidents from both an Australian and international perspective, and will examine the factors that contribute to these accidents. Another area of interest that attracts considerable public interest is the risk of transmission of infectious diseases among passengers during flight. The severe acute respiratory syndrome (SARS) outbreak in 2002-2003 and the sporadic avian influenza deaths in Asia have heightened interest in this topic. The ATSB will review the current literature on the potential for infectious disease transmission within an aircraft cabin to better explain the risks for the travelling public.

Each year the ATSB receives over 12,500 accident and incident reports from the industry. These reports allow the ATSB to conduct investigations and monitor the safety of the industry by analysing trends. The type of reports to be provided to the ATSB are listed in the ATSB's legislation, the *Transport Safety Investigations Act and Regulations 2003* and are referred to as immediately reportable matters (IRMs) and routine reportable matters (RRMs). The ATSB recently published a research report that looked at IRMs involving regular public transport operations. The ATSB will take this one step further and look at charter operations. One reportable matter that will be examined separately from the charter report is birdstrikes, which remain a perennial problem for aircraft owners and airport operators. This report will look at birdstrike data in the ATSB's aviation safety database between 2002 and 2006 and will provide some insight into the tools available for managing bird hazards.

The ATSB encourages all members of the aviation community to take advantage of the Bureau's research program to understand more about the factors influencing safety aviation today. ■



Final ATSB investigation report on Boeing 737-476 in-flight engine malfunction

On 25 August 2005, while on a scheduled flight from Brisbane, Qld, to Sydney, NSW, a Boeing 737-476 aircraft, registration VH-TJX, experienced an in-flight engine malfunction approximately 6 km SSE of Sydney Airport.

While on approach to runway 34R with the landing gear extended, the flight crew heard unusual 'popping' noises from the left side of the aircraft. The crew initially suspected a defect with the landing gear and commenced a missed approach.

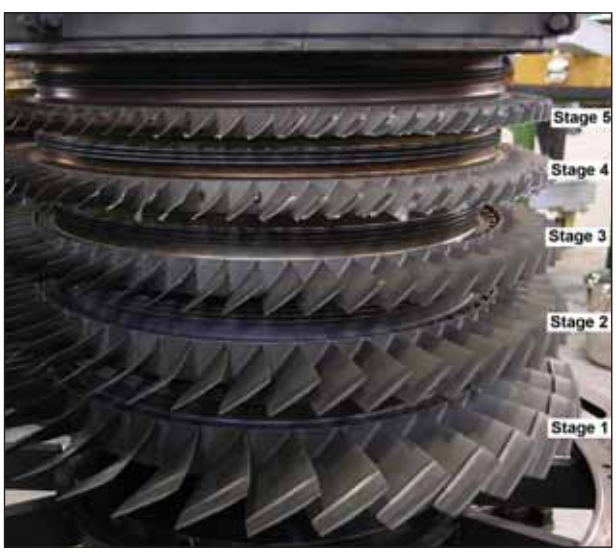
When both engine power levers were advanced, the left engine did not respond. The pilot-in-command (PIC) then reduced the left engine power to idle, retracted the landing gear and climbed the aircraft to approximately 2,000 ft. The crew advised air traffic control of a possible engine problem.

The PIC advised the copilot to leave the left engine at idle and that a single engine landing would be conducted. The appropriate one-engine inoperative checklists were referenced and the aircraft was prepared for landing. At 07:37 EST a single-engine approach and landing on Sydney runway 34R was completed.

Upon landing, Aviation Rescue and Fire Fighting (ARFF) personnel performed an external visual inspection of the left engine area and advised the crew that there were no signs of a fire. The aircraft taxied to the gate without further incident. There were no injuries.

An inspection of the left engine by the operator's engineering personnel revealed damage within the high pressure compressor (HPC). The left engine, a General Electric CFM56-3C1, was subsequently removed and disassembled at the operator's maintenance facility. The teardown revealed that a single dowel pin had come loose from its installed position within stage-three of the HPC and was ingested by the downstream rotating hardware, resulting in damage to the HPC rotor and stator components.

Further examination of the HPC stator components revealed that the dowel pin had come loose due to excessive clearance and recession of the stage-three stator shroud anti-rotation pins.



As a result of this occurrence, the engine manufacturer, General Electric, initiated a number of safety actions that included a redesign of the HPC anti-rotation pin. The manufacturer also released an alert Service Bulletin CFM56-3 S/B 72-1091 to all operators and maintainers of CFM56-3 engines that recommended the introduction of the new pin design into existing engines.

Safety issue

The manufacturer's engine shop manual contained no guidance or instruction to engine maintenance personnel of CFM56-3 engines to dimensionally inspect stator shroud anti-rotation pins from new or during reinstallation of the pins from overhaul.

Action taken by General Electric

As a result of this occurrence, the engine manufacturer, General Electric, advised that they had taken a number of safety actions. In regard to the CFM56-3C1 engine fitted to the Boeing 737 fleet, the manufacturer:

- consulted with the supplier of the CFM56-3 stator shrouds to determine whether a quality problem existed during the stator shroud manufacturing process
- added an inspection requirement to the current CFM56-3 engine shop manual to verify the stator shroud anti-rotation pin height during piece part inspection
- modified the engine shop manual to include a stator shroud anti-rotation pin height check whenever a new pin was reinstalled into a stator shroud that was being returned to service from overhaul
- redesigned the anti-rotation pin and field released the new part into the CFM56-3 fleet in July 2007
- released a service bulletin (CFM56-3 S/B 72-1091) in December 2007 to all operators and maintenance personnel of CFM56-3 engines to alert that the stator shroud anti-rotation pin design had changed, and recommended that the old design pins be replaced with the redesigned part into existing engines. ■

Investigation briefs

Wirestrike

Occurrence 200607801

On 24 December 2006, an Auster J1/A1 aircraft, registered VH-ALO, departed from a private airstrip at Nelson Victoria with the owner-pilot being the sole occupant on board.

During the initial climb out, the aircraft was observed making a low-level right turn towards two hangars where three people were standing to watch the departure and bid the pilot farewell. The aircraft struck a powerline above the observers, shattering its wooden propeller, before aerodynamically stalling and impacting the ground at a steep angle. The pilot was fatally injured.

The witnesses stated that the aircraft appeared to pull up just prior to striking the powerline, indicating that the pilot had either just sighted the powerline prior to striking it, or it was a part of his manoeuvre to avoid the trees which were approximately thirty metres in front of the aircraft.

The pilot's comment about the powerlines on a previous occasion, and the need to pass underneath the lines when taxiing to and from the hangar area, indicated that the pilot was aware of the location of the powerlines. An ATSB research paper indicated, however, that awareness of powerline locations does not always prevent wirestrike accidents.

There were indicators in this accident that the pilot had his attention diverted from the primary task of flying by the close proximity of the aircraft to the witnesses and the hangers and the trees directly in front of the aircraft flight path. It is at least possible and, on balance, likely that the pilot became focussed on the execution of the low-level flight over the witnesses and, anticipating a pull-up to avoid the trees behind the hangars, forgot about the powerline location. Alternatively, he may not have noticed the powerlines or the adjacent power pole until it was too late to avoid them. ■

Crew Incapacitation

Occurrence 200701910

On 31 March 2007, a Boeing Company B767-338, registered VH-OGN, was being operated on a scheduled passenger service between Jakarta, Indonesia, and Sydney, Australia. Approximately 1 hour after departing from Jakarta, the pilot in command (PIC) began to feel unwell. Over the following 4 hours, the medical condition of the PIC continued to deteriorate and the copilot was alerted to this. The PIC vacated the pilot control position and handed over responsibilities for command decisions and flying duties to the copilot.

The evening before the flight, both flight crew and five cabin crew attended a restaurant for dinner. All of the crew ate from a selection of eight separate meals. The PIC did not experience any symptoms except for an unusual lack of interest in exercising at the gym the next day. None of the remaining crew experienced any symptoms prior to, or during the flight. However, four others of those who attended the dinner at Jakarta experienced similar symptoms to the PIC after arriving at Sydney. A gastrointestinal parasite was possibly ingested by mouth or by touching contaminated material at the restaurant at Jakarta the evening before the flight.

An ATSB review of medical conditions affecting Australian pilots has stated that 'The majority (22%) of in-flight medical and incapacitation events in Australian civil pilots for the study period were due to acute gastrointestinal illness (usually food poisoning), a finding consistent with other published studies and 29.9 per cent occurred in airline operations.'

As a result of this occurrence, the aircraft operator has advised the Australian Transport Safety Bureau that procedures relating to the monitoring of flight crew, following pilot incapacitation, have been reviewed and additional guidance material will be inserted into the operators' pilot documentation. ■

Oxygen Mask Complications

Occurrence 200603438

On 15 June 2006 at approximately 1630 Eastern Daylight-saving Time, during a scheduled flight from Hervey Bay, Qld, to Brisbane, Qld, the crew of the Fairchild Industries SA227-AC (Metro III) aircraft, registered VH-SEF, noticed that the cabin temperature was colder than desired. After adjustment to the auto- and manual-cabin temperature controls, the cabin temperature increased to a higher than expected range and could not be reduced. Shortly after, smoke was seen coming from the right side cockpit air vents. The crew isolated the right bleed air system and diverted the aircraft to Maroochydore, Qld.

After examination of the aircraft's airconditioning system, the right hot air mixing valve was replaced and the aircraft returned to service without further problem.

During the incident, the crew found that the single straps on their emergency oxygen masks no longer had sufficient tension to hold the masks in place and provide an adequate seal against their faces. As a result, the crew were required to hold the masks in place with one hand. Crew oxygen masks were 'on demand' flow type, and so a positive seal against the user's face was essential to ensure oxygen flow.

In addition, the passenger address system was ineffective in alerting the passengers to the emergency, including the instruction to don oxygen masks.

As a result of this incident the Australian Civil Aviation Safety Authority issued an Airworthiness Bulletin (AWB) to address maintenance aspects of flight crew oxygen masks. The AWB recommended that oxygen mask head harnesses should be inspected at an appropriate interval to ensure correct functioning. The AWB also recommended that maintenance schedules be corrected to include oxygen masks and any other aircraft equipment not currently covered by the schedule. ■

Loss of Control

Occurrence 200701033

On 23 February 2007, the owner-pilot of a Van's Aircraft Inc RV-4 aircraft, registered VH-ZGH, was observed conducting aerobatic manoeuvres in the designated Moorabbin aerobatic area over Clyde North. VH-ZGH was an amateur-built aircraft constructed in Australia in December 1994 and had accumulated an estimated 474.6 flying hours at the time of the accident.

At approximately 1740 Eastern Daylight-saving Time, witnesses observed the aircraft descending in a spin after completing a stall turn. The aircraft then appeared to enter an unstable spiral dive and, at approximately 500 m above the ground, pieces were observed separating from the aircraft. The aircraft was seen to impact the ground almost vertically and was destroyed by impact forces and a post-impact fire. Both occupants were fatally injured.

Both right and left tailplanes, the fin and rudder were recovered in trees approximately 117 metres from the main aircraft impact point. There have been no previous reported occurrences of this type recorded whereby the tailplanes, fin, and rudder separated during flight from a Van's RV-4.

An examination of the engine and propeller showed that the engine was developing significant power at the time of impact. When an aircraft enters a fast, tight spiral with engine power applied, the aerodynamic and inertial forces acting on the airframe increase significantly. If unchecked, these high structural stresses can rapidly overload the aircraft's aerodynamic surfaces, leading to eventual failure.

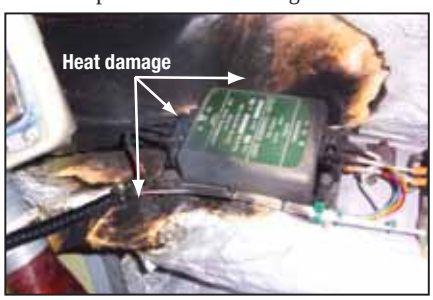
The investigation found that the pilot probably lost control of the aircraft while performing an aerobatic manoeuvre, and entered a spin from which he was unable to recover. The investigation also found that the pilot performed manoeuvres in an aircraft that was loaded above the maximum weight limit for aerobatic flight, and with the centre of gravity outside the rear limit. ■

Smoke Event

Occurrence 200605039

At 1745 Western Standard Time on 29 August 2006, a BAE SYSTEMS BAe 146-100 (BAe 146) aircraft, registered VH-NJE, departed Ravensthorpe Aerodrome, WA for Perth.

The flight crew recalled noticing a smell on the flight deck as the aircraft climbed through about FL130, but commented that it was different from the oil-like smell historically associated with the operation of the BAe 146, and to the normal smells associated with the operation of the aircraft's galley. The pilot in command recalled that, shortly after, there were a number of 'popping noises' accompanied by a series of bright yellow flashes and some glowing behind the escape rope panel on the copilot's side of the flight deck.



The flight crew donned their emergency oxygen equipment and returned to the departure aerodrome. The crew stated that the aircraft's emergency oxygen equipment adversely affected their communication during the remainder of the flight. The flight crew depressurised the aircraft descending through 6,000 ft and landed at Ravensthorpe.

The investigation determined that the aircraft's 'A' windscreen electrostatic filter had failed. That failure was consistent with an electrical arcing event.

In response to this and a number of other similar failures in the UK and in Europe, the aircraft manufacturer undertook a number of safety actions, including issuing a Service Information Letter advising operators to check the correct positioning of the insulation blankets in the vicinity of their aircraft electrostatic filters at the next available opportunity. The Australian Transport Safety Bureau has issued two safety recommendations that seek to reduce the likelihood of electrical arcing events in 'A' windscreen filters in BAe 146 aircraft. ■

Engine Power Loss

Occurrence 200606510

On 31 October, at approximately 1152 Eastern Daylight-saving Time, the pilot of a Bell 206 B3 helicopter, registered VH-KTR, was undertaking aerial feral animal culling operations with a trained shooter of feral animals onboard.

At approximately 1050, the helicopter departed from a property north of Coolah, and commenced aerial shooting operations. The pilot reported that he was preparing to return to refuel when the shooter spotted some feral animals nearby.

The pilot was lining the helicopter up for the shooter, when the engine power suddenly reduced to near idle. The shooter was able to throw his rifle out of the helicopter and brace for impact, in accordance with the Feral Animal Aerial Shooting Training (FAAST) procedures.

The helicopter descended into trees on the side of a steep hill and the rotors severed several large branches, before the helicopter came to rest supported by trees. The occupants reported that the engine was still running after the helicopter came to rest, however, only at about idle power. The pilot then shut the engine down via the throttle and both occupants exited the helicopter. The pilot received facial and eye injuries during the impact while the shooter had minor injuries.

While only 23 L of fuel was physically recovered from the helicopter's fuel tank, the assessment of the fuel remaining by the investigation determined there would have been sufficient fuel in the helicopter for continued flight at the time of the accident. Examination and testing of the engine and components, and the fuel system was unable to determine what led to the sudden loss of power.

By following FAAST procedures, it is likely that the shooter reduced the danger to the pilot and to himself. ■

Repcon briefs

Australia's voluntary confidential aviation reporting scheme

REPCON is a voluntary confidential reporting scheme for aviation. REPCON allows any person who has an aviation safety concern to report it to the ATSB confidentially while protecting the reporter's identity. This could include a self-report about something the reporter was directly involved in. 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. A good example of this type of report which was submitted through the UK confidential reporting scheme has been included in this article. The account provided in this example reinforces the message that we must remain vigilant to ensure the ongoing safety of ourselves and others. REPCON will also accept third-party reports where the reporter has a safety concern about, for example, training, cabin safety, crew scheduling or maintenance practices of an operator. One such report has been included in this article (R200700099).

Is REPCON an anonymous scheme?

As a general rule, REPCON is not an anonymous scheme and will not normally accept anonymous reports. This is because REPCON staff cannot contact an anonymous reporter to verify the report or to seek additional information. Further, REPCON staff must be satisfied that the reporter's motivation for reporting is aviation safety promotion, and that the reporter is not attempting to damage a rival or pursue an industrial agenda. ■

Photographic flight

R200700119

Report narrative:

The reporter noticed the aircraft registered as [aircraft registration] flying over a built up residential area (town of Bulli, NSW) at an estimated altitude of below 500 ft AGL on the [date]. The aircraft registration could be clearly seen under the wing.

REPCON comment:

The registered owner and operator of the aircraft was contacted and supplied with the de-identified report. The operator informed REPCON that they believed the report concerned a photographic flight. A professional photographer was on board the aircraft. The pilot reported to the operator that no operations were conducted below 1,000 ft AGL over built up areas. The underwing registration of this aircraft is over 40 cm tall and is easily visible from 1,000 ft AGL. ■

Expired maintenance release

R200700099

Report narrative:

It has been reported that many B737's have been found with expired Maintenance Releases. Management have seen this as a failure of the Licensed Aircraft Maintenance Engineers to calculate the dates and hours correctly.

Reporter comment:

It is interesting that the checks and balances with the company maintenance release system have failed.

REPCON comment:

REPCON contacted the aircraft operator and supplied them with the de-identified report. The operator responded that they had identified a process issue at the time of calculating the Maintenance Release date. The operator also reported that the check to carry out the inspection was not sufficiently robust. Following the operators investigation a complete audit of all aircraft was conducted to ensure that all maintenance releases were correctly dated. ■

Close call

R200700114

Report narrative:

A civilian aircraft registration [aircraft registration] with civilian crew and a military call sign were given clearance to take off at a Nowra military base (operating IFR in IMC conditions), when two military helicopters were conducting VFR operations on a grassed area south of the upwind end of the runway used by the departing IFR aircraft. The civilian aircraft had to take low level evasive action to avoid a potential collision.

Reporter comment:

It has been reported that there has been a lot of pressure on staff due to low and decreasing staff numbers coupled with increased uncertainty over changes to the ATC system in regards to employment with little consultation and little information supplied about the new ATC system (proposed changes have been ongoing for the last year).

REPCON comment:

The department of Defence Aviation and Air Force Safety were contacted and supplied with the de-identified report. They informed REPCON that they were conducting an investigation into the occurrence and would inform REPCON of the results when the investigation was complete. ■

Fuel-related event

R200700078

Report narrative:

A Boeing aircraft was reported as having flown from Perth to Sydney without any fuel being used from the centre fuel tank.

On landing at Sydney, the aircraft had 120 kg of fuel in the left wing tank, 60 kg of fuel in the right wing tank and about 3,000 kg of fuel in the centre tank. It is also alleged that the crew realised the error on landing and after shut down at the terminal, asked engineers to redistribute the centre tank fuel to the wing tanks to 'make it look normal'. The reporter expressed the concern that had the crew been required to conduct a missed approach, both engines would have flamed out.

REPCON comment:

When REPCON was alerted to this possible occurrence, the ATSB database was searched to determine if the ATSB had already been notified as the occurrence was a reportable matter under Australia's mandatory reporting scheme. It was ascertained that there had been no report from the operator or the crew. The reporter indicated that they had not been directly involved in the occurrence but had been made aware of it from a reliable source. It is understood the reporter subsequently advised the operator but also sought for their identity to remain confidential. Upon learning of the occurrence, the operator immediately contacted the ATSB. The ATSB was also issued a REPCON Alert Bulletin containing the report's de-identified text and subsequently commenced an investigation into this occurrence (200705093). Preliminary inquiries from the ATSB investigation indicate that the flight crew noticed their error approximately one hour out from landing at Sydney when a master caution light illuminated (confirmed through FDR data reviewed by the ATSB). The crew immediately switched from the main tanks to the centre tank. At that time, there was approximately 4,700 kg of fuel in the centre tank. On landing at Sydney, with fuel still being drawn from the centre tank, there was approximately 2,750 kg remaining, more than sufficient for the aircraft to be able to conduct a missed approach if that had been necessary. The ATSB investigation is continuing. The Preliminary report is available on the ATSB website http://www.atsb.gov.au/publications/investigation_reports/2007/AAIR/aair200705093.aspx. ■

UK confidential reporting scheme

The United Kingdom has a similar confidential reporting system to REPCON, called CHIRP (Confidential Human Factors Incident Reporting Programme) which has been in operation since 1982. Important information gained through CHIRP reports, after being de-identified, is published in their FEEDBACK publications, with the aim of improving safety standards. The following article was published in the Autumn 2007 CHIRP General Aviation Safety Newsletter <www.chirp.co.uk>. ■

Fixation

Report Text:

Upon vacating the runway after landing, my attention was drawn to the loose surface state of the taxiway, which suggested the presence of potholes.

Taxiing slowly (thank goodness), I was so engrossed in examining the surface to avoid possible propeller damage that I allowed the aircraft's left wingtip to collide with one of a number of a wooden posts supporting a barbed-wire fence.

The collision turned the aircraft towards the fence and forward motion was arrested when the outer leading edge came up against a second post.

The aircraft came to rest with all wheels still on the taxiway.

Damage:

Broken port navigation light, chipped wingtip fairing and a vertical dent approx 1cm-deep in the wing leading edge

Lessons:

1. Do not allow yourself to fixate on a single task to the exclusion of all else.
2. Be aware that passage on a taxiway does not automatically imply full obstacle clearance. If in any doubt — stop the aircraft until you are happy to proceed.

CHIRP Comment:

This report is a good example of how easy it is to allow yourself to focus on one potential threat and, as a result, not remain aware of other 'gotchas'. As the reporter notes, if you have doubts about the surface, stop and/or seek assistance, such as requesting a marshaller.

One further point, if your aircraft suffers apparent superficial damage, always have the damage inspected by a qualified engineer before flying again to ensure that no unseen structural damage has been incurred that could affect the aircraft's structural integrity. ■

REPCON reports received	
January 08	9
Total 2007#	117
What happens to my report?	
For Your Information issued	
Total 2007#	58
January 08	4
Alert Bulletins issued	
Total 2007#	1
January 08	0
Who is reporting to REPCON?	
Aircraft maintenance personnel	24.5%
Air Traffic controller	4.0%
Cabin crew	1.6%
Facilities maintenance personnel /ground crew	0%
Flight crew	23.8%
Passengers	5.6%
Others*	40.5%

Repcon commenced on 29 Jan 2007

* examples include residents, property owners, general public

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.