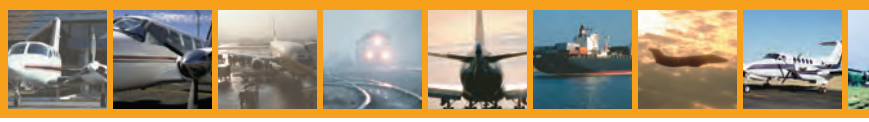
Australian Government
Australian Transport Safety Bureau

The Australian



Executive Director's Message

More than 200 safety experts, including delegates from 75 Contracting States and 12 international organisations, met at the headquarters of the International Civil Aviation Organization (ICAO) in Montreal from 13 to 18 October for the eighth ICAO Accident Investigation and Prevention (AIG) Divisional Meeting.

I had the honour of leading the Australian delegation which consisted of representatives from the ATSB, CASA and Australia's representative on the ICAO Air Navigation Commission. This meeting was the first of its kind in 10 years. Attention centred on Annex 13 - *Aircraft Accident and Incident Investigation* to the Chicago Convention on Civil Aviation which establishes international Standards and Recommended Practices (SARPS) for aircraft accident and incident investigation.

In his comments to meeting participants, the President of the ICAO Air Navigation Commission, Mr. Omari Rashin Nundu, emphasized that continued safety improvement required a pre-emptive approach which could only be achieved through an 'unimpeded flow of safety information from sources such as accident and incident investigations, which is not possible when such information is used for other than safety-related purposes'.

Overall, Australia had a major influence on the outcomes of the meeting due to the preparation and quality of submitted papers, pre-meeting preparation, Australia's perceived lack of bias, and the skill and substance of interventions during debate regarding various agenda issues.

A number of important recommendations were agreed aimed at improving accident and incident investigation for the enhancement of safety worldwide. Notable recommendations included focussing on those accidents and serious incidents where safety lessons are expected to be learned and improving regional cooperation in accident and incident investigations to assist those States lacking the necessary means. It has also been proposed that a working group be established to review the current regime of protections for sensitive safety information within Annex 13. It is likely that the ATSB will be an active participant in this working group.

The AIG Divisional Meeting provided an important opportunity for members of accident investigation authorities and other aviation community stakeholders to network and exchange ideas. It also served as a forum for the facilitation of cooperation between States.

Kym Bills, Executive Director

An Overview of Human Factors in Aviation Maintenance

This Aviation Research report provides an overview of the human factors issues facing aviation maintenance personnel. Written by Dr Alan Hobbs, a leading autority on maintenance human factors, this educational report will provide maintenance engineers, managers, and trainers with valuable information on human limitations, how maintenance errors can be minimised, and how errors that are made can be captured before they lead to incidents and accidents.

Maintenance is essential to aviation safety, yet improper maintenance contributes to a significant proportion of aviation accidents and incidents. This is because a small percentage of maintenance tasks are performed incorrectly or are omitted due to human error. Examples include parts installed incorrectly, missing parts, and the omission of necessary checks. While precise statistics are unavailable, it is likely that the great majority of maintenance errors are inconsequential, however a small proportion present significant safety threats. In comparison to many other threats to aviation safety, the mistakes of maintenance personnel can be more difficult to detect, and have the potential to remain latent, affecting the safe operation of aircraft for longer periods of time.

While acknowledging that maintenance personnel are responsible for their actions, it must also be recognised that, in many cases, the errors of maintenance technicians are the visible manifestation of problems with roots deep in the organisation. A careful examination of each error, combined with a preparedness to inquire into why the error occurred, can help to identify underlying organisational problems. Effective countermeasures to maintenance error require a systemic approach, not only towards issues at the level of the technician and their work environment, but also to organisational factors such as procedures, task scheduling and training. Some countermeasures to the threat of maintenance error are directed at reducing the probability of error through improvements to training, equipment, the work environment and other conditions. A second, complementary, approach is to acknowledge that despite the best efforts, it is not possible to eliminate all maintenance errors, and countermeasures must be put in place to make systems more resilient to those residual maintenance errors that are not prevented.

Aviation organisations are increasingly introducing safety management systems (SMS) that go beyond legal compliance with rules and regulations, and instead emphasise continual improvement through the identification of hazards and the management of risk. The activities involved in managing the risk of maintenance error can be appropriately included within the SMS approach. Key activities include internal incident reporting and investigation systems, human factors awareness for maintenance personnel, and the continual identification and treatment of uncontrolled risks. ■

ATSB Research and Analysis Report AR-2008-055

Aviation Safety Investigator

Wirestrike

On 10 November 2007 at approximately 0830 CST, a Cessna Aircraft Company 172N, registered VH-WLQ, with two pilots and a passenger on board, departed Katherine, NT on a private, visual flight rules flight to Tennant Creek. At about 1030, the aircraft struck a powerline that spanned the Stuart Highway 20 km north of Elliott and was 15 m above the surface of the road.

The aircraft's tail section contacted the powerline, breaking the tail rearwards from the aft fuselage and rendering the aircraft uncontrollable. The aircraft impacted the highway in a steep nose-down attitude and came to rest inverted on the verge beside the highway. The three occupants were fatally injured. The aircraft was destroyed.

In accordance with the extant Australian Standards affecting the marking of powerlines and their supporting structures, there was no requirement for the powerlines to be fitted with high-visibility markers.

The engine was recovered for disassembly and inspection at an engine overhaul facility under the supervision of the ATSB. That disassembly and inspection did not reveal any pre-impact mechanical problem with the engine. However, due to extensive impact damage to the carburettor, magneto assemblies and fuel pump, the serviceability of those items could not be established.

Weight and balance calculations for the aircraft were carried out by the ATSB, using the actual weights of the occupants, the weight of the luggage and equipment that was removed from the wreckage, and the reported fuel quantity on departure from Katherine. Those calculations indicated that the aircraft was being operated about 79 kg above its maximum take-off weight (MTOW) at that time. The aircraft's average fuel burn for the journey from Jandakot to Katherine was applied to the 2-hour flight from Katherine. This suggested that, at the time of the accident, the aircraft was about 36 kg above its MTOW. The aircraft's centre of gravity was estimated to be within the aircraft manufacturer's limits at takeoff, and at the time of the accident.

There was no evidence of an aircraft or operational reason for the flight below 500 ft above ground level. Based on a lack of evidence to the contrary, the investigation concluded that the descent to, and flight at low level was probably as a result of a conscious decision by the pilot. The fine weather at the time of the wirestrike, and the lack of any physiological or other medical condition that may have contributed to the accident, suggested two possible scenarios to explain the operation of the aircraft at low level. In the first instance, an emergency of some kind may have required an immediate attempt to land by the pilot. Alternately, the pilot may have intentionally engaged in low-level flight. Video and still images taken during a previous leg of the party's aerial tour showed an acceptance by the pilot of the risk of unnecessary and unauthorised exposure to the hazards associated with such flight.

In either case, the operation of the aircraft above its MTOW, and the effect on the manoeuvrability of the aircraft, could not be conclusively established. However, it may have negatively affected any manoeuvre to avoid the powerline in the event that such avoidance action was attempted by the pilot.

In September 2006, the ATSB reissued its aviation research paper *Wire-strike Accidents in General Aviation: Data Analysis 1994 to 2004*. The paper found that 119 wirestrike accidents were reported to the ATSB between 1994 and 2004. That accident rate highlighted the dangers associated with low-level operations, especially for pilots who have not received specialised training in that environment.

The report and the research paper are both available on the ATSB website. ■

ATSB Investigation Report 200706832

Investigation briefs

Fumes event

Occurrence 200707207

On 23 November 2007, a Boeing Company 767-338, registered VH-OGG, departed Sydney, NSW at 1426 Eastern Daylight-saving Time for Melbourne, Vic. The flight was a scheduled passenger service and on board were two flight crew, seven cabin crew and 255 passengers.

At about 1455, a passenger reported to a flight attendant that he could smell fumes coming from a gasper air vent above his seat. The passenger later reported that the fumes smelled like jet exhaust. The passenger became unconscious, and was administered oxygen and regained consciousness within a few seconds. A second passenger in the area also reported feeling nauseous at the time. The flight crew declared a state of urgency to air traffic control and began performing the 'Smoke or Fumes – Air Conditioning' checklist. The aircraft landed at Melbourne Airport at 1529.

No other passengers or crew reported any adverse effects from the event. The two affected passengers had travelled extensively by air with no previous adverse reactions and the investigation could not determine whether the passengers' symptoms were as a result of fumes in the aircraft cabin, or some other unidentified medical conditions.

The investigation identified a non-contributory safety issue related to the adherence to curing times following application of corrosion inhibiting compounds in the aircraft's cargo bays on 22 November. The operator's procedures for the application of the compound did not completely and unambiguously specify the curing time required to prevent fumes. In addition, the maintenance records for the application of the compound did not show any requirement for a curing time to be met. As a result, there was no assurance that sufficient time would be allowed.

The operator reported that it will revise maintenance manuals covering the application of corrosion inhibiting compounds to clarify the corrosion-inhibiting compounds curing times. ■

Collision with Terrain

Occurrence 200703266

On 26 May 2007, at about 1644 WST, a Piper Aircraft Corp PA-28RT-201 aircraft, registered VH-FTT, departed Jandakot Airport for Esperance, WA. On board the private, visual flight rules (VFR) flight were the non-instrument-rated owner-pilot, and two passengers. At 1836, one of the passengers telephoned his wife by mobile phone and advised that the flight was proceeding well.

The following morning, a check of the airport confirmed that the aircraft had failed to arrive. A rescue helicopter located aircraft wreckage about 2 km west of the aerodrome.

The flight had arrived about 1 hour and 40 minutes after last light, in marginal weather conditions. The aircraft impacted the ground on what appeared to be a right base for runway 11. There were no survivors.

There was no evidence of any technical defect or other failure of the aeroplane, or of its associated systems, prior to impact with terrain. That, and the normal operation of the approach and landing aids, and apparent activation of the aerodrome lighting, suggested that the most likely factors that contributed to the occurrence related to the operation of the aircraft.

The investigation was unable to conclusively establish the reason for the impact with terrain. The investigation could not exclude the possibility of a sudden incapacitation of the pilot due to a cardiac condition.

The reported previous flights by the pilot with a descent in IMC may have acted to normalise that behaviour, lessening any possible stress.

However, the weather conditions were such that the pilot's decision to attempt the flight indicated a low appreciation, or an acceptance, of the associated risks. The attempted landing under those conditions represented a significant level of risk for any flight attempted under the night VFR. ■

Engine Failure and Ditching

Occurrence 200703214

At about 1030 Eastern Standard Time on 23 May 2007, a Piper Aircraft Inc. PA-32-260 aircraft, registered VH-PYD, departed Horn Island, Queensland, for a visual flight rules charter flight to Warraber Island, Queensland, with the pilot and three passengers onboard.

Shortly after commencing the descent into Warraber Island, the pilot noticed that the engine speed had increased beyond the normal range. Several unsuccessful attempts were made to reduce the engine speed, and within a short time the engine stopped producing power. The aircraft was not able to maintain altitude and, given the aircraft's distance from land, was forced to ditch into the water.

Having received only minor injuries, the occupants exited the aircraft. One passenger later reported that he had unfastened his seat belt and that of the child beside him, prior to ditching, in the belief that it would aid their ability to exit quickly and avoid becoming trapped in the sinking aircraft.

After the aircraft sank, the pilot assembled the passengers together and floated towards a nearby islet. After a short time they were located by an aircraft and its pilot directed rescue helicopters to them. After nearly an hour in the water, a rescue helicopter winched the survivors to safety.

Because the aircraft was not recovered, the factors that resulted in the powerplant failure could not be determined; however, it was probable that they were related to a problem with the forward most crankshaft bearing.

The pilot's recently acquired knowledge from the company's emergency procedures training likely contributed to the successful ditching. ■

Operational Event

Occurrence 200708026

On 31 December 2007, at about 1600 Eastern Daylight-saving Time, an Airbus Industrie A320-200 aircraft, registered VH-VQT, was being prepared at Bay C8 at Melbourne Airport, Vic. for a scheduled flight to Newcastle, NSW. The flight crew was in the cockpit preparing the aircraft for the flight, the passengers were boarding the aircraft and the ground handlers were loading and unloading baggage and other items.

The pallet loader operator reported that, after a period of normal operation, an electrical burning smell was detected in the area of the loader's engine compartment. The supervising leading hand noticed a fire in that compartment and alerted the operator to dismount the pallet loader. The pallet loader operator detached the fire extinguisher from the loader and extinguished the fire.

The ignition source for the fire was most probably intense electrical arcing within the pallet loader engine's starter motor solenoid.

As a result of this incident, the Aerodrome Emergency Planning Advisory Group undertook both to modify its Aerodrome Emergency Plan format to include relevant on-apron emergencies, and to examine the leadership aspects of turn-around operations as they might affect on-apron emergency planning. In addition, the ground vehicle maintenance provider issued a Service Bulletin requiring the immediate inspection of the condition and routing of the starter motor wiring loom in all similar pallet loaders.

As a result of this, and a second fire in a similar pallet loader that occurred at Adelaide Airport on 27 May 2008, the operator retrofitted all of its affected pallet loaders with a replacement starter motor that significantly reduced the risk of electrical arcing. ■

Warning Device Event

Occurrence 200601076

On 28 February 2006, a Boeing Company 717-200 aircraft, registered VH-NXH, was being operated on a scheduled passenger service from Paraburdoo to Perth, WA. The flight was being conducted under the instrument flight rules (IFR). Onboard the aircraft were two flight crew, four cabin crew and 66 passengers. The aircraft departed Paraburdoo at about 0837 Western Standard Time and was in instrument meteorological conditions (IMC) during the climb.

The stick shaker stall warning system activated soon after the aircraft reached top of climb at Flight Level (FL) 340 and while the aircraft was accelerating to cruise speed. The flight crew did not receive any 'STALL' annunciation on their respective primary flight displays, nor any 'STALL STALL' aural warning or klaxon alert.

The flight crew initiated an immediate on-track descent and advised air traffic services of their requirement to change level. There was an infringement of the relevant procedural separation standards as the aircraft descended through the cruise level of an opposite-direction aircraft.

An analysis of the flight recorder data indicated that the activation of the stick shaker was as a consequence of the angle-of-attack sensors becoming static during the climb. The investigation concluded that the immobilisation of the angle-of-attack sensors was consistent with ice restricting the movement of the 'slinger' on which the sensor vane is mounted.

The investigation assessed that the aircraft was not near a stalled condition of flight when the stick shaker warning activated. However, because the angle-of-attack sensors provided input to the aircraft's stall warning system, the immobilisation of those sensors adversely affected the reliability of the aircraft's stall warning system and could have rendered the automatic stall recovery system inoperative.

As a result of this incident, the aircraft and angle-of-attack sensor manufacturers initiated a detailed design review of the angle-of-attack sensor. ■

Collision with Terrain

Occurrence 200801245

On 1 March 2008, at about 1300 Eastern Daylight-saving Time, the pilot of a Bell Helicopter 206B Jetranger III was flying over a property on a private flight with four passengers. Witnesses reported that the helicopter was making low-level passes, at about 100 ft above ground level over the property. At the completion of one low-flying pass, the helicopter was observed by witnesses on the ground to bank steeply to the left, roll out, and descend into surrounding trees. The helicopter impacted the trees and was destroyed. One of the occupants was discovered outside the helicopter's cockpit/cabin area. All of the five occupants sustained serious injuries.

The weather was fine and not considered a factor in the accident. Examination of the wreckage did not indicate any mechanical defects of the helicopter, rotor system or engine that would have resulted in loss of controlled flight. The examination also confirmed significant rotational RPM of the main rotor blades at the time of impact.

The investigation found that the pilot's action to conduct low flying did not comply with Civil Aviation Safety Authority regulations. In addition, the helicopter was operated at a gross weight in excess of the helicopter manufacturer's maximum take-off weight, which also did not comply with the regulations. The operation of the helicopter in this configuration limited the controllability of the helicopter during the flight. Had the helicopter been operated within the manufacturer's weight limitations and at 500 ft or more above ground level, the pilot would have had more time to assess and react to the situation. The operation of the helicopter outside of those parameters exposed both the helicopter's occupants and observers on the ground to a hazardous situation. ■

REPCON briefs

Australia's voluntary confidential aviation reporting scheme

REPCON is established under the *Air Navigation (Confidential Reporting) Regulations 2007* and 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, the personal information will not be disclosed. Only de-identified information will be used for safety action.

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

- matters showing a serious and imminent threat to a person's health or life
- terrorist acts
- industrial relations matters
- 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.

In this issue of REPCON briefs is a pullout REPCON notification form. If you wish to submit a report you can fill in the form and post, fax or e-mail it to REPCON. Please check the ATSB website at <www.atsb.gov.au> for the online notification form and additional forms that can be down loaded.

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

Close proximity of two aircraft

R200800036

Report narrative:

While travelling as a passenger on a flight between Brisbane and Melbourne, the reporter expressed concerns that while the aircraft was in cruise, another aircraft appeared to fly very close. The reporter claimed that the other aircraft was on an approaching crossing track on the right side and slightly below by approximately 100 and 300 meters respectively. While the reporter was observing the other aircraft, it appeared to suddenly increase altitude and flew directly beneath the reporter's aircraft.

REPCON comment:

REPCON contacted the Operator and supplied them with the de-identified report. The Operator responded that the aircraft involved would have been in controlled airspace. The aircraft and the in Air Traffic Control (ATC) unit have equipment designed to give a warning when two aircraft are predicted to infringe a predetermined envelope around the aircraft, i.e. the warning systems in the aircraft and the ATC unit activate well before a collision is likely to occur and direction is given to avoid each other. If this had occurred it is a mandatory reportable event to the ATSB for all agencies involved. The operator reported that they had no such reports nor were any reported from ATC. ATC separate aircraft vertically by 1,000 ft (approx 300 metres). The operator commented that it is not uncommon for passengers (and even some pilots) to underestimate vertical distances between aircraft, especially when presented with visual exposures of short duration.

REPCON contacted CASA and supplied them with the de-identified report and a version of the operator's response and they advised that since neither the aircraft nor the air traffic control warning systems were activated, it would appear that a common optical illusion of vertical distance was experienced by some of the passengers. Where above 29,000 ft Reduced Vertical Separation Minimum (RVSM) airspace applies, the vertical separation under RVSM is 1,000 ft. With RVSM, there is stringent equipment accuracy, reliability and maintenance requirements. The aircraft is operating in controlled airspace and has a Traffic Alert and Collision Avoidance System fitted. Another aircraft 1,000 ft above or below does look close, but in terms of separation is operating safely and within the rules. CASA advised that they did not propose to take any further action on this report. ■

REPCON reports received	
Total 2007#	117
First quarter 2008	27
Second quarter 2008	31
Third quarter 2008	30
What happens to my report?	
For your Information issued	
Total 2007#	58
First quarter 2008	16
Second quarter 2008	31
Third quarter 2008	21
Alert Bulletins issued	
Total 2007	1
First quarter 2008	4
Second quarter 2008	7
Third quarter 2008	0
Who is reporting to REPCON?	
Aircraft maintenance personnel	34%
Air Traffic controller	4%
Cabin crew	3%
Facilities maintenance personnel /ground crew	0%
Flight crew	25%
Passengers	6%
Others*	28%

\# REPCON commenced on 29 January 2007

* examples include residents, property owners, general public

How can I report to REPCON?

On line: ATSB website at <www.atsb.gov.au>
Telephone: 1800 020 505
by email: repcon@atsb.gov.au
by facsimile: 02 6274 6461
by mail: Freepost 600,
PO Box 600, Civic Square ACT 2608
For further information on REPCON, please visit our website <www.atsb.gov.au> or call REPCON on: 1800 020 505.

REPCON – Aviation Confidential Reporting Scheme

Note: REPCON is established under the *Air Navigation (Confidential Reporting) Regulations 2006* and allows any person who has an aviation safety concern to report it to the Australian Transport Safety Bureau (ATSB) confidentially. Protection of the reporter's identity is a primary element of the scheme. Any matter may be reported if it endangers, or could endanger the safety of an aircraft. REPCON is not an alternative to the reporting requirements detailed in Regulations 2.3 and 2.4 of the *Transport Safety Investigation Regulations 2003*, as published on the ATSB website: **www.atsb.gov.au**

REPCON cannot be used for reports concerning;

(a) acts of unlawful interference with an aircraft;

(b) reports of conduct that represents a serious and imminent threat to a person's health or life;

(c) industrial relations issues; or

(d) conduct that constitutes an offence punishable by a penalty of life or more than 2 years imprisonment.

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

To be completed by all reporters: Mandatory fields

Your name | Contact phone (eg 09 9999 9999) | Contact instructions (eg best times to call)

Postal address

State Code

Today's date | Facsimile | Email

Your position (e.g. Pilot, LAME, ATS etc) | If pilot – total flying hours | Non-pilot experience (years)

If your report concerns one or more aircraft, complete Section A and B. If your report is in concern about a procedure, published information, service, rule i.e, does not concern a specific aircraft, complete Section B only.

SECTION A

This report is about: ☐ my aircraft ☐ another aircraft

Aircraft registration (eg VH-ABC) | Flight number | Aircraft manufacturer and model

Aircraft operator (eg company name) | Aircraft owner

Type of operation:

☐ Air transport – passenger
☐ Air transport – freight
☐ Flying training – solo
☐ Flying training – dual
☐ Sports aviation
☐ Gliding
☐ Military
*☐ Charter
*☐ Agricultural
*☐ EMS/SAR
*☐ Private/Business
*☐ Aerial work
*☐ Other

For operations marked with * please complete 'Purpose of flight' in box provided below.

Purpose of flight

Date of occurence | Local time | Location – *direction and distance from a geographic feature or latitude and longitude.*

Number of persons on board: ☐ Crew ☐ Passengers

Flight rules: ☐ VFR ☐ IFR

Flight conditions: ☐ VMC ☐ IMC

Light conditions: ☐ Day ☐ Night

Weather conditions:

Wind (direction/speed) | Visibility km / m | Cloud (type/oktas) | Altitude / FL at time of event

Significant met – *e.g. heavy rain, thunderstorm, fog, icing etc.* | Airspace type and/or class

Departure | Destination | Landing (if different to destination)

Indicate the phase of flight in which the safety event happened:

☐ Aircraft standing ☐ Taxiing ☐ Takeoff ☐ Climb ☐ Manoeuvring/airwork ☐ Cruise ☐ Descent ☐ Approach ☐ Landing ☐ Unknown

Complete section B on the reverse side.

When complete, post to: Reply Paid 600, PO Box 600, Civic Square, ACT 2608. No postage stamp required.

Or fax to 02 6274 6461

Please fully describe the safety concern. If insufficient space, continue on additional sheets.
All relevant documentation should be forwarded to REPCON, including your suggestions on how to address similar safety concerns.

SECTION B

Please enclose additional page/s as necessary

The Australian Transport Safety Bureau (ATSB) is an operationally independent body within the Australian Government Department of Transport and Regional Services.

When complete, post to: Reply Paid 600, PO Box 600, Civic Square, ACT 2608. No postage stamp required.
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