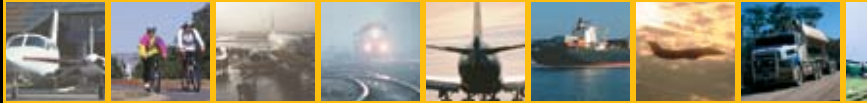




Australian Government

Australian Transport Safety Bureau

# The Australian



## Executive Director's Message

This November I was privileged to attend the 2005 Flight Safety Foundation annual seminar in Moscow, the major world aviation safety forum.

Highlights includes James Burin's FSF overview of world aviation safety in 2005 and noting that while disturbing, the recent spate of high capacity passenger jet fatal accidents was within statistical trend bounds, especially given the very good 2004 result. The overall trend remained downwards and Australia had a zero hull loss rate. Burin emphasised the need to both learn from past accidents and to integrate data types (eg FOQA and LOSA) to make further safety gains – what another presenter termed a 'risk-based prognostic approach'. He forecast that the next trend in GA accidents may involve very light jets.



Boeing's head of safety, Marlene Davis, presented on the continuing data-driven safety priorities of the CAST project. She suggested that the quality of English used in ATC read-back may be an additional priority around the world.

Analysis of 400 landing overrun accidents from 1970 to 2004 by Gerard van Es of the Netherlands NLR, cited the world rate of 0.5 per million landings with an Australian rate of 0.25 and North America 0.15. He commended the use of soft arrestor beds that had prevented overrun accidents from being potentially fatal in New York.

The US ALPA's manager of air safety and operations, Charlie Bergman, presented a paper on promising training to reduce runway incursions. He said accurate moving map displays via ADSB was part of a solution. There is an interactive one hour web-based training program accessible at [www.alpa.org](http://www.alpa.org) and a DVD soon to be released. The ATSB has registered an interest to work with Bergin and the FAA on this issue, given the incursion issue remains a concern in Australia.

Honeywell's Yasuo Ishihara presented a paper on helicopter CFIT accidents and noted the rise in such accidents in the US over the past five years, especially involving emergency medical flights. Honeywell had therefore developed a new EGPWS unit.

*Kym Bills, Executive Director*

## Aviation Safety Research

The Australian Transport Safety Bureau's highly successful Aviation Safety Research Grants Program is now into its third year. The program is all about encouraging quality research into aviation safety issues. It also aims to foster the growth of research expertise throughout industry and the community.

The program has promoted interest in aviation safety from a wide range of researchers. Applications have come from universities, airlines, engineering companies, social research organisations, and individuals with a passionate desire to look at a particular safety issue.

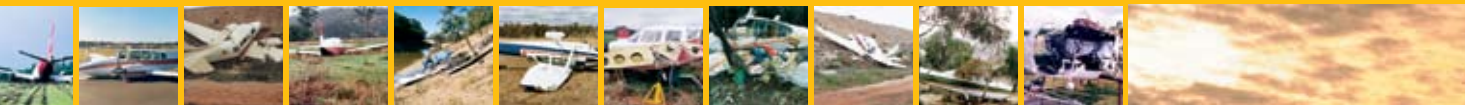


Grants of up to \$25,000 are made available through the program for projects of up to 12 months duration. Proposals are assessed for their merit against the objectives of the program and specific project criteria. Applications for the 2006–07 round of grants are being called for now and will be accepted up to 17 February 2006.

Some examples of recent and current grant projects are:

- A study of child restraint systems in aircraft which has contributed valuable insights into the safe restraint of infants and young children in aircraft.
- A better understanding of visual cues selected by pilots for timing and control of the flare with the aim of reducing pilot error in this critical phase of flight.
- Fire safety characteristics of advanced materials used in aircraft construction to enhance our understanding of flammability and impacts on otherwise survivable aircraft accidents.
- Pilot error is a common focus for a number of the grants. Best practice in training to identify and manage error in the cockpit is one of these. Another is an evaluation of the operational error-rates of general aviation pilots in a range of in-flight situations.
- Factors that lead to the misinterpretation of weather radar data by flight crew the results of which should assist with improvements in presentation of the data on cockpit displays.
- Discovering what impacts night transcontinental flights from the west coast to the east coast of Australia may have on sleep, behaviour and performance in flight crew.
- Feasibility and design of 'auditory icons' or meaningful everyday sounds as warning signals in the cockpit that alert the crew to immediate threats to the safety of the flight.
- Airline safety health and accident resilience leading to identification of best practice in the management of flight safety.

Reports from completed grant projects, more information about the program, and grant application kits are available from the ATSB's website at [www.atsb.gov.au](http://www.atsb.gov.au)



## Final report on fatal helicopter accident near Camden

**O**n 20 June 2003, a Robinson R22 helicopter registration VH-OHA crashed near Camden NSW during a training flight from Bankstown airport. The instructor and student pilot onboard were both fatally injured. Examination of the accident site and helicopter wreckage confirmed that one main rotor blade had failed in-flight. Examination of the helicopter and its systems did not reveal any other abnormality that would have contributed to the loss of the main rotor blade.



An examination of the main rotor blade in the ATSB laboratories revealed that it had failed as a result of fatigue crack growth in the blade root fitting at rotor station 10.35. The fatigue crack initiated as a result of localised pitting corrosion in the counterbore of the inboard bolthole. The examination also revealed that while the fatigue failure was in a similar position to two previous main rotor blade failure accidents in Australia, in OHA's case, there was an area of adhesive disbonding between the main rotor blade skin and blade root fitting. The investigation found no evidence to support suggestions that the fatigue crack was the result of under-recording of time in service.

The material failure analysis found that the disbonding present on the failed main rotor blade was also present in a number of other main rotor blades that were examined. As a result, the ATSB issued

a safety recommendation to the United States Federal Aviation Administration (FAA) and to the Robinson Helicopter Company, seeking that they conduct further testing on main rotor blade root fittings to evaluate the extent of adhesive disbonding in the blade root fitting. This examination was conducted on a total of 51 main rotor blades that had between zero and 2,200 hours time in service. Results of the examination revealed that adhesive disbonding between the spar and root fitting was present in all blades and that the extent of the disbonding was variable.

The manufacturer has issued a safety letter and a service bulletin relating to revised retirement lives for main rotor blades, and has introduced a redesigned main rotor blade into service. The manufacturer indicated that it intends to publish safety alerts and notices on

its Internet website as an additional means of bringing safety related information to the notice of owners, operators and maintenance organisations.

The R22 maintenance manual has also been amended by the manufacturer as a result of this investigation. The main rotor blade tracking and balancing section now contains information, which alerts maintenance personnel to the fact that a main rotor blade vibration may be the result of a developing crack.

Safety action taken by the CASA as a result of this accident was to amend an existing airworthiness directive to take into account the findings from the examination of the blade and to introduce additional amendments to the directive, when updated information became available from the manufacturer. They also introduced a discussion paper on the installation of mandatory time in service recorders for helicopters. As at October 2005, CASA was still evaluating the public comments on the discussion paper.

In addition, CASA has drafted a Notice of Proposed Rulemaking (NPRM 0503CS) in which it is proposed to require the retirement of similar main rotor blades by 1 March 2006 on Australian registered Robinson R22 helicopters.

The European Aviation Safety Agency, issued an airworthiness directive on 5 July 2005 mandating compliance with the Robinson service bulletin. ■

# Safety **briefs**

## Fuel crossflow valve problem

Occurrence 200403209

At 1810 Eastern Standard Time on 30 August 2004, a Fairchild Industries Inc. SA226-T Merlin III aircraft, registered VH-SSL, departed Bankstown, NSW on a charter flight to Glen Innes, NSW with the pilot and seven passengers.

The pilot reported that he manually flew the aircraft in instrument meteorological conditions during the climb to flight level (FL)160. On levelling off at the cruise level, he noticed that the aircraft was flying in a slightly right-wing low attitude. The pilot said that he applied left rudder trim to level the wings and engaged the autopilot. About 2½ minutes later, the autopilot suddenly disengaged without warning. The aircraft then rolled rapidly to the right and entered a steep spiral descent. After the pilot regained control of the aircraft, he reported that he noticed that the right fuel tank gauge reading was 350 kg (437.5 L) greater than the left fuel tank gauge reading.

The right-wing low condition at the commencement of the cruise suggested that the crossflow valve was open at the time, and that it had allowed the transfer of fuel from the left fuel tank to the right fuel tank to create that condition. The use of rudder trim to level the aircraft wings would have resulted in the aircraft being in a skid to the right. That would have further assisted the transfer of fuel from the left fuel tank to the right fuel tank. Consequently, the autopilot disengaged without warning when it could no longer trim against the increasing fuel load in the right wing.

The asymmetric fuel load could only have resulted from the crossflow valve having been in the open position during the flight. ■

## Loss of control after takeoff

Occurrence 200403202

On 30 August 2004, shortly before 1200 Western Standard Time, the owner-pilot of a twin-engine Cessna Aircraft Company 421C Golden Eagle, registered HB-LRW, commenced his takeoff from runway 32 at El Questro Aircraft Landing Area. The private flight was to Broome, where the pilot intended resuming the aircraft delivery flight from Switzerland to Perth.

Witnesses to the takeoff stated that, shortly after lift-off from the runway, the aircraft commenced a slight left bank and drift before striking the trees to the side of the runway and impacting the ground. The aircraft was destroyed by the impact forces and post-impact fire. The pilot and passenger were fatally injured.

The main wreckage came to rest upright, with the nose of the aircraft facing south-east. A severe post-impact fire consumed the majority of the aircraft's fuselage, wings, tail section, cockpit and cabin, and damaged the left engine. The right engine received minor fire damage.

There was no documentary, physical or witness evidence identified during the investigation that indicated that an anomaly or failure in the aircraft or its systems contributed to the development of the occurrence. In addition, there was no evidence to indicate that the reported slight left bank after lift-off from the runway was the result of a lateral imbalance of the aircraft, an aerodynamic effect or an intentional control input by the pilot. However, the investigation was unable to determine whether the pilot might have been distracted during the takeoff by an unidentified event to the extent that he did not notice, or was unable to react to any unintentional left bank and drift in sufficient time to prevent the aircraft impacting the trees to the left of the runway. ■

## Engine failure

Occurrence 200500925

On 3 March 2005, at about 0700 Western Standard Time, the crew of a Fokker BV F27 Mark 50 (F50) aircraft, registered VH-FNB, was being operated on a scheduled passenger service from Perth to Esperance, WA with four crew and 31 passengers. About 1 minute after takeoff the right engine failed. The crew reported that the failure was accompanied by a triple chime alert, and the illumination of the right engine-out light on the flight-deck centre main instrument panel. At the same time they observed that the right engine torque had exceeded 120 per cent. The crew carried out engine failure procedures, broadcast a distress call and returned the aircraft to Perth.

The aircraft was fitted with propeller auto feathering systems designed to automatically feather a propeller during takeoff when engine torque falls below 25 per cent. An electronic inhibit prevented the propeller on the other engine from moving to feather when one propeller was feathered. The light in the right engine fuel shutoff lever remained illuminated after the flight, indicating that the auto feathering system was still armed. Maintenance engineers completed fault isolation action and replaced the right engine auto feathering control unit (AFCU).

The manufacturer of the AFCU examined the removed unit. The manufacturer's report indicated that internal circuit board failures within the AFCU could initiate an auto-feather in flight. The damage within the unit suggests that the unit sustained a power spike or lightning strike. However, the operator had no record of such an event. There was no defect within the AFCU that would cause an indication of a torque sensor failure. The manufacturer recommended that the AFCU be scrapped given its use on an aircraft involved in regular public transport operations. The operator has subsequently scrapped the unit. ■

## Ice on airframe

Occurrence 200402415

The pilot in command (PIC) of a Saab 340 registered VH-KEQ, had levelled the aircraft at 12,000 feet (FL120) with IAS and half bank selected on the autopilot. The aircraft engine, propeller and airframe anti-ice and de-ice was activated.



The PIC reported that the outside air temperature was minus 10 degrees while the indicated airspeed (IAS) was 145-150 knots. As the PIC increased the propeller RPM to aid with ice shedding, the IAS rapidly decreased to 137 knots. The PIC disconnected the autopilot and initiated a descent to 10,000 feet. During the autopilot disconnection, the stick shaker activated for about 1 to 2 seconds. Ice was still present on the aircraft radome after landing.

The recorded data indicates that from the time the autopilot levelled the aircraft at FL120 the autopilot was maintaining the flight level by providing nose-up elevator movement and automatically re-trimming. At the same time, the IAS was decreasing and the angle of attack was increasing.

About one minute later, with an IAS of 134 knots, the angle of attack reached the level required for stick shaker activation.

A company investigation indicated that the probable reason for the rapid decrease in IAS was most likely caused by the altitude capture mode at the time of the incident.

A manufacturer investigation reported that the wing partially stalled, probably due to a combination of significant ice accumulation on the airframe, and run-back ice accretion on the propeller blades.

The company decided that the current Crew Simulator programme, containing elements of unusual attitude recovery and flight in severe icing conditions, would be extended until the new flight proficiency simulator programme had been trialed and approved. During a visit, the manufacturer informed Australian operators about winter operations in icing conditions. ■

## Collision with powerlines

Occurrence 200402669

On 19 July 2004, the owner-operator pilot of Bell Helicopter Company 47G-3B-1 Soloy helicopter, registered VH-RTK, was contracted to spray herbicide on a property near Wodonga, Victoria.

Early in the day, the pilot and the company operations manager met with the property owner to discuss the proposed work. The discussion included the identification of known powerlines, other hazards, and sensitive areas likely to affect the operation.

The preparations also included an aerial survey, in the company of the property manager, of the areas to be sprayed. During that flight, the property manager indicated to the pilot the areas that were free from powerlines, including a valley that he considered a safe transit zone between the replenishment truck and the proposed spray area.

The pilot commenced spraying operations on the occurrence property at about 1458 Eastern Summer Time. During the approach to land on the first return flight to the replenishment point the helicopter collided with powerlines. The helicopter impacted terrain about 860m to the south-west of the replenishment point and was destroyed by impact forces. The pilot who was the sole occupant, was fatally injured. There was no fire.

The powerlines were located on the north-eastern side of a ridgeline, strung across the direct track from the last treatment area to the replenishment point. The powerlines were not depicted on the relevant aeronautical or topographical charts. No high visibility devices were attached to the powerlines, and nor were they required to be.

Had the pilot followed the pre-planned safe transit route, or included the direct route from the treatment area to the replenishment point in his risk assessment, he may not have collided with the powerlines.

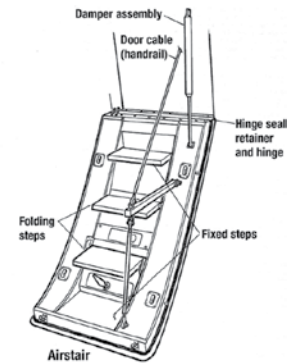
As a result of previous wirestrike occurrence BO/200404285, various safety actions have been implemented by the Civil Aviation Safety Authority and the Aerial Agricultural Association of Australia. The ATSB has also initiated two research projects on wirestrikes. ■

## Cabin door separation

Occurrence 200403333

On 7 September 2004, at about 0710 Eastern Standard Time, while passing FL175, during a gradual descent from flight level (FL) 220, the pilot of the Raytheon B300 aircraft, registered VH-KJD, heard a loud muffled thud and then air noise. The pilot saw that the cabin door had separated from the aircraft fuselage.

During the occurrence, the cabin door



warning light illuminated. The pilots completed emergency checks and actions before diverting the aircraft to Thangool, Queensland.

The investigation found that the aft door latch hook sense switch terminal screw and the sense switch adjustment nut were located in very close proximity.

A circuit test of the three sense switches, located within the door (two switches for the two latch hooks and the other for the door handle position) determined that it was possible for the aft latch hook sense switch to produce an earth point through the sense switch earth loop wiring, resulting in the door handle position sense switch no longer providing an electrical signal for its position. Consequently, one of the systems to alert a pilot to a potential cabin door unsafe condition was not available.

As a result of the investigation, the ATSB issued the following recommendations.

R20040074

The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority advise operators of Beechcraft King Air and Raytheon King Air aircraft of the potential safety deficiency of the cabin door warning system becoming prematurely earthed, resulting in a sense switch or switches no longer providing an electrical signal for its or their position.

R20040075

The recommendation was simultaneously issued as R20040075 to the US Federal Aviation Administration. ■