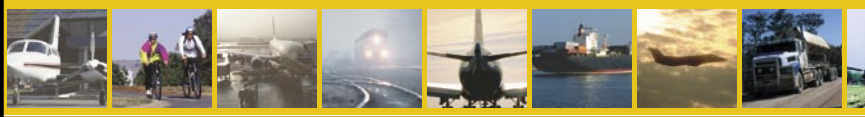
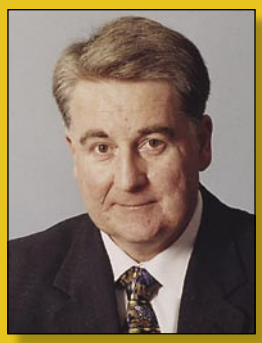
Australian Government
Australian Transport Safety Bureau

The Australian Air



Executive Director's Message

ICAO Audit of the ATSB's aviation activities



The October 2004 International Civil Aviation Organization (ICAO) report on their audit of the ATSB expressed a high satisfaction with Australia's legislative, organisational and training framework for aircraft safety investigation and the professional and efficient conduct of the ATSB investigations reviewed in detail. The ATSB sought this ICAO audit to ensure that we met international best practice for aviation accident and incident safety investigation and could take early action on areas where we could improve ahead of the unannounced international ICAO safety audit program from May 2005 that will include Annex 13.

ICAO 'commended' the ATSB's 'very comprehensive training policy and programme' and, based on the two complex accident investigations audited, found: 'despite multiple difficult circumstances in each of the investigations reviewed, the investigators appeared to have managed the investigation tasks in a professional and efficient manner, consistent with the established standards and practices of the ATSB. Furthermore... safety issues were properly addressed and the processing of reports of the investigations was generally accomplished in a timely manner'.

As expected, the audit team made recommendations for improvement including regarding documentation, memoranda of understanding, post-accident medical testing, budgeting and number of investigations, investigator training, and occurrence reporting, against which the ATSB has submitted a corrective action plan which ICAO has accepted.

These recommendations are being progressed with the Government and internally. In the interests of transparency, the full ICAO audit has been made available on the ATSB's website. The ATSB is taking the ICAO results very seriously as a basis for improvement.

Kym Bills, Executive Director

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An Aviation Self Reporting Scheme (ASRS) form can be obtained from the ATSB website or by telephoning 1800 020 505.

Winning research grants

The ATSB's highly successful Aviation Safety Research grant scheme funded by the Australian Government is now into its second year. Through the scheme, a number of researchers are working today on a wide range of projects that are looking at issues as diverse as the fire safety of new advanced materials being used in today's modern aircraft, how pilots interpret weather radar displays, and the modelling of bird strike risks at airports.

This innovative approach to encouraging new research has aroused wide interest. Applications have come from universities, airlines, engineering companies, social research organisations, and even individuals with a burning desire to look at a particular issue.

Pilots and flight crew are the focus of several of the projects that are running. The effectiveness of error management training for flight crews is being investigated by the University of South Australia, and the performance of general aviation pilots is under the spotlight at the University of Western Sydney.

Fatigue is a relentless element in aviation operations. The Sleep/Wake Research Centre at Massey University in New Zealand is investigating how aviation organisations are managing fatigue in their flying operations.

In the quest for answers to managing human error in the cockpit, the Line Operations Safety Audit (LOSA) has become a key strategy for the major airlines. With the assistance of an ATSB grant, Regional Express will be the first Australian regional airline to investigate LOSA as a tool for developing countermeasures to human error on its flight decks.

Several projects have an international scope. One of these, being conducted by Perth company AVISE P/L, is surveying major airlines in Australia and the Asia Pacific region to assess and compare safety management practices and strategies for keeping ahead of potential mishaps.

Cranfield University in the UK is working with a major Australian airline on practical research into different ways of managing the evacuation of an airliner in an emergency.

On the cabin safety front, Perth-based Market Equity P/L is surveying the travelling public in a bid to help airlines improve cabin safety briefings for passengers, and Sydney-based Human Impact Engineering is testing various options for safely restraining infants in aircraft.

In the light of the scheme's success so far, the ATSB has opened another call for grant applications. The details can be found on the Bureau's website at www.atsb.gov.au/aviation/research/grants.cfm The period for lodging applications closes on 25 February 2006 If you have any questions about the scheme, call Joy Sutton on (02) 6274 7133. □

Drive shaft failure Robinson R22

The ATSB final investigation report into the crash that killed the two occupants of a Robinson R22 helicopter at Yakka Munga Station in Western Australia on 28 September 2003 found that a drive shaft to the main rotor gearbox failed.

Examination of the shaft revealed that it had failed as a result of a fatigue crack that initiated at a bolt hole in the shaft. Inappropriate procedures, including use of an unapproved sealant, were used when the shaft was last assembled.

The clutch shaft had fractured at the point of connection to the main rotor gearbox flex-plate yoke. The fracture surface indicated pre-existing torsional fatigue cracking, which followed a spiral path from within the yoke connection, and extended around the shaft for approximately 340 degrees over an axial length of about 25 mm. Those crack propagation features were consistent with the initiation and progressive growth of the crack during multiple shaft load cycles prior to the accident flight.

The clutch shaft was installed in the helicopter on 30 October 2002, and had 886.2 hours time-in-service since new. Maintenance records showed that it had been installed in accordance with the Robinson Helicopter Company R22 maintenance and overhaul manual.

Examination found that when the clutch shaft was assembled to the flex-plate yoke, paint was left on the surface beneath the bearing blocks. That resulted in the applied bolt tension reducing over time. The examination also found that an unapproved jointing compound had been used when the shaft and yoke were last assembled.

On 6 November 2003 the ATSB issued recommendation R20030211 to the Civil Aviation Safety Authority (CASA). As a result of that recommendation, CASA issued airworthiness directive AD/R22/51, which mandated inspections of the A166 shaft to A907 yoke on all R22 helicopters operating in Australia. CASA issued AD/R44/019 on 28 November 2003, mandating the same inspection on those R44 helicopters that had had the C166 shaft to C907 yoke disassembled since installation at the factory.

Following the issue of the airworthiness directives, information from CASA and the industry indicated that the use of non-approved mating compounds on the shaft–to-yoke mating surfaces was apparently widespread.

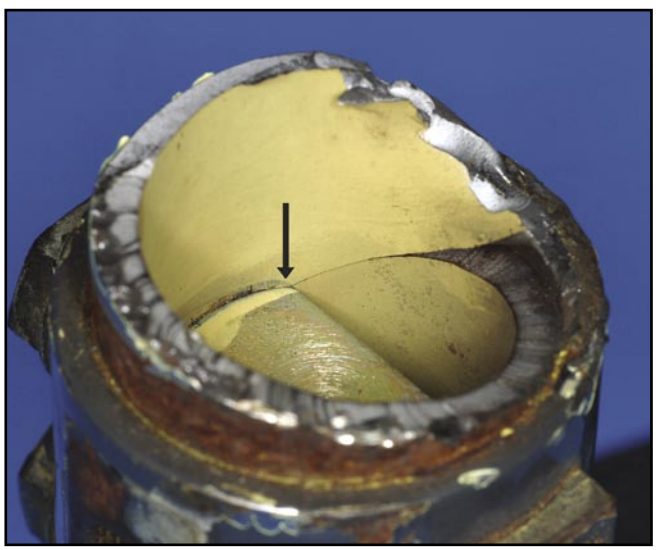
The ATSB also issued recommendation R20030212 to the operator involved in this occurrence on 6 November 2003. The recommendation stated that the operator should carry out an inspection of its fleet to determine the extent of the A166 shaft to A907 yoke joint problems outlined in R20030211. Subsequent to receiving recommendation R20030212, the operator advised that it had suspended operations and had recalled its fleet of helicopters to the main operating base for inspection. The operator also advised that it had carried out inspections of their R44 helicopters during that time.

The Robinson Helicopter Company subsequently advised that it would be revising the maintenance manuals and maintenance training courses for the R22 and R44 model helicopters to ensure that the instructions for the assembly of the shaft to yoke joint were clarified.

The investigation also found that the survivability of the two occupants may have been adversely affected by the reduced capacity of the seat structures to deform as designed. That was due to the stowage of an excessive amount of baggage and equipment in the underseat baggage compartments.

The full investigation report (200304074) is available from the ATSB website or from the Bureau on request.

The picture shows the fatigue crack with the initiation point arrowed. □



Safety briefs

Runway incursion

Occurrence 200303726

On 24 August 2003, at about 0935 Eastern Standard Time, a motor vehicle involved in catering duties on the international apron area at Sydney airport entered runway 34 left (34L) at taxiway Golf without the driver having first received a clearance from air traffic control to enter the runway. At that time, an Airbus Industries A330-341 aircraft (Airbus) had just become airborne from runway 34L. The aircraft passed directly over the vehicle while the catering vehicle was on the runway. The runway incursion by the vehicle resulted in an infringement of runway separation standards.

The driver of the vehicle was authorised to only drive on the perimeter roads, airside roads and apron areas. The driver was not aware that she had entered the runway and was not authorised, or trained, to drive on taxiways or runways. The driver eventually realised that she had entered an area of the airport with which she was not familiar. She attempted to return to the apron and was subsequently escorted from the movement area by an airport operations officer.

The investigation identified a significant risk to the safety of operations at Sydney Airport.

Since the occurrence both Airservices Australia and the Sydney Airport Corporation have implemented a number of safety actions to try and reduce the risk of another similar runway incursion. □

Collision with fence

Occurrence 200401661

The pilot in command reported that the elevator trim was set to the rear of the neutral position before takeoff, in accordance with the Aircraft Operating Manual. One stage of flap was selected. The takeoff was normal and rotation was initiated at about 80 knots. The aircraft became airborne, but remained in ground effect, and veered to the left of the runway centreline. The pilot lowered the nose slightly in an attempt to increase aircraft control, but the aircraft veered right beyond the edge of the runway towards the aerodrome boundary fence. The pilot then retracted the landing gear. However, the aircraft settled onto its belly and collided with the boundary fence.

The aircraft was approximately 67 kg above maximum takeoff weight at the time of the occurrence.

On the day before the accident, the pilot in command completed three circuits in the aircraft. At the owner's suggestion, the pilot in command set the elevator trim close to the full forward position before takeoff.

The aircraft operating manual stated that for a normal takeoff, the elevator trim should be set slightly rearward of neutral, and that the aircraft should be accelerated to 74 to 80 knots, depending on its weight, before rotating the aircraft to the climb attitude. From the information provided, it is likely that a combination of the different trim setting, the rear centre of gravity position, and the higher aircraft weight for the accident takeoff compared to the flight the previous day resulted in the aircraft assuming an excessive nose attitude after becoming airborne. The resultant drag lead to the control difficulties reported by the pilot and prevented the aircraft accelerating to the normal climb speed. □

Engine Failure

Occurrence 200402060

The pilot of a Cessna 210 aircraft, registered VH-TFI, who was the sole occupant of the aircraft, was conducting a freight charter flight to several locations in the Northern Territory.

At Baikal airstrip the pilot added 100 L of fuel to the aircraft's left fuel tank from drum stock stored at the airstrip.

Shortly after takeoff, the pilot selected the left fuel tank. The engine then began to surge and run roughly. After seeking advice from the company maintenance staff, he attempted, unsuccessfully, to identify the problem before landing at Utopia station.

The pilot again sought advice from the company maintenance staff before departing Utopia station. Soon after departure, engine oil sprayed onto the windscreen and the engine caught fire and lost power. The pilot intended to return to Utopia station, but almost immediately, the engine failed completely. During the forced landing in an area of low scrub and scattered trees, the pilot sustained facial injuries and the loss of some teeth, but after regaining consciousness was able to vacate the aircraft unassisted. The aircraft was substantially damaged.

Examination of the aircraft by a company engineer revealed that the engine had failed after sustaining catastrophic damage due to contamination of the aircraft's fuel by Jet A-1 fuel. The operator reported that when refuelling the aircraft at Baikal, the pilot inadvertently used a drum of Jet A-1 fuel.

The operator advised the ATSB that they have amended their refuelling procedures to preclude a recurrence of this accident. □

Burning smell on flight deck

Occurrence 200300029

On 16 January 2003, while conducting pre-flight checks during passenger boarding, the flight crew of a Boeing 737-700 aircraft, registered VH-VBS, detected a pungent burning smell. The pilot in command contacted the company by radio and requested that an aircraft engineer attend the aircraft.

The first officer reported feeling faint and the pilot in command felt dizzy and weak at the knees as he stood to leave the flight deck. The pilot in command also reported experiencing shaking hands, watering eyes and tingling fingers. He opened the windows in the flight deck for ventilation and contacted air traffic control to request paramedic assistance. The cabin supervisor administered oxygen to the pilot in command and the first officer, but when the pilot in command attempted to stand, his legs collapsed from under him.

Airport Rescue and Fire Fighting services attended the aircraft to assist the pilot in command and requested an ambulance. The pilot in command was transported to hospital for observation and was advised by medical personnel that he showed signs similar to mild carbon dioxide poisoning.

A subsequent engineering examination of the aircraft found a burned diode on the master dim and test module circuit board on the P6 panel, located behind the first officer's seat. The plastic cased diode was the only component damaged on the circuit board. Electrical tests conducted by the aircraft manufacturer determined that the mode of failure of the diode was due to excessive heating while under electrical load. □

Airprox event

Occurrence 200401273

On 7 April 2004, a Boeing 737-7BX (737) aircraft, operating under the instrument flight rules, was en route from Townsville and descending for a landing at Brisbane. A Neico Lancair IV-P aircraft, operating under the visual flight rules, was en route from Maroochydore to St George, on climb to flight level (FL) 165. Both aircraft were operating in radar Class E airspace at the time of the occurrence.

In accordance with published National Airspace System procedures, the Air Traffic Services controller was not providing traffic separation to either aircraft. The controller provided traffic information about the Lancair to the 737 crew on three occasions, and also provided the Lancair pilot with traffic information about the 737 on two occasions. Following the second advice to him, the Lancair pilot advised the controller that he had the 737 in sight.

At 15,420 ft the 737 crew received a TCAS resolution advisory aural warning instructing them to climb, in response to the proximity of the Lancair. They subsequently climbed the 737 to FL166 and turned to about 15 degrees right of track. The Lancair altered track 8 degrees to the right away from the 737, just before passing behind and below it. The minimum distance between the two aircraft was about 600 ft vertically at about 0.3 NM laterally.

In the circumstances of this occurrence, there were no separation standards applicable in Class E airspace. Consequently, there was no infringement of separation standards. Information obtained from the crews of both aircraft, the ATS controller, recorded flight data from the 737, ATS audio recordings and radar data, was consistent and indicated that the crews of both aircraft and the ATS controller complied with the published procedures for Class E airspace under the NAS. The incident was classified as an airprox event. □

Collision with water

Occurrence 200400242

The TedSmith Aerostar 601 aircraft, registered VH-WRF, departed Coolangatta at 1301 ESuT with a flight instructor and a commercial pilot on board. The aircraft was being operated on a dual training flight in the Byron Bay area, approximately 55 km south-south-east of Coolangatta.

The purpose of the flight was to introduce the commercial pilot, who was undertaking initial multi-engine training, to asymmetric flight. At approximately 1445, the operator advised Australian Search and Rescue that the aircraft had not returned to Coolangatta, and that it was overdue. Recorded radar data indicated that contact with the aircraft was lost at approximately 1331 ESuT. A small amount of debris from the aircraft was recovered from the surface of the ocean.

The accident flight was the commercial pilot's fourth in the Aerostar aircraft, and was the third flying exercise sequence in the operator's multi-engine training syllabus. The objectives of the exercise included controlling the aircraft after the failure of an engine, recovering from a stall in the takeoff configuration, and entering and recovering from a minimum control speed (Vmca) situation. (Vmca is the minimum control speed in flight with one engine inoperative.)

Without the aircraft wreckage or more detailed information regarding the behaviour of the aircraft in the final stages of the flight, there was insufficient information available to allow any conclusion to be drawn about the development of the accident. □