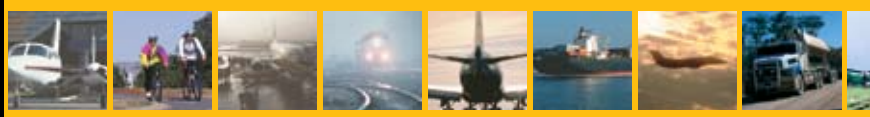
Australian Government
Australian Transport Safety Bureau



Executive Director's Message

Aviation research findings

The ATSB's aviation research efforts in 2004-05 have generated some important and interesting findings, including those in a range of reports issued in June 2004-05.

Weather-related general aviation accidents remain one of the most significant causes for concern in aviation safety. An ATSB study of 491 weather-related occurrences was the first of its type to compare different pilot behaviours in the face of adverse weather. The results suggest that the mid-point of the flight can be a 'psychological turning point' for pilots, irrespective of the absolute flight distance involved. The results also emphasised that a safe pilot is a proactive pilot and that dealing with adverse weather is not a one-off decision but a continually evolving process.

An ATSB study of 63 twin-engine power loss accidents from 1993-2002 found the accident rate associated with power loss in twin-engine aircraft to be almost half the rate for single-engine aircraft, except for fatal accidents, which had similar rates. In 10 of the11 fatal twin-engine power loss accidents, an in-flight loss of control followed the power loss, compared with only three of the 52 non- fatal accidents.

Historically, diabetic pilots have been permanently disqualified from flying duties but some now receive limited flying certification if they are well supervised. The ATSB report on Diabetes Mellitus concluded that an aeromedical policy will be effective if it is based on an appropriate risk management strategy, taking account of all relevant issues.

The ATSB report on risks associated with aerial campaign management is the subject of a separate feature article in this supplement. The other 2004-05 ATSB aviation research reports are available on the ATSB website (www.atsb.gov.au).

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.

TCAS traffic advisory near Hamilton Island

ON 20 June 2005, the ATSB released its final investigation report into a close proximity occurrence involving a Boeing 737 and a 717 near Hamilton Island, Queensland.

On 17 July 2004, at about 1619 EST, a Boeing Company 737-476 (737), registered VH-TJH, was inbound to Hamilton Island from the south-east for a landing on runway 14. The Hamilton Island Aerodrome Controller (ADC) instructed the crew to descend to 4,000 ft due to the pending departure of a Boeing Company 717-200 (717), registered VH-VQB, from runway 14.

The ADC instructed the crew of the 717 to maintain 3,000 ft, to make a right turn to track to Mackay and that they were clear for takeoff. After takeoff, at about 2,000 ft, the crew of the 717 received a TCAS traffic advisory and saw the 737 crossing from left to right on descent. The 717 crew's perception was that the expected track of the aircraft would place them on, or close to, a collision course so they turned left and descended to avoid the 737 by passing behind it.

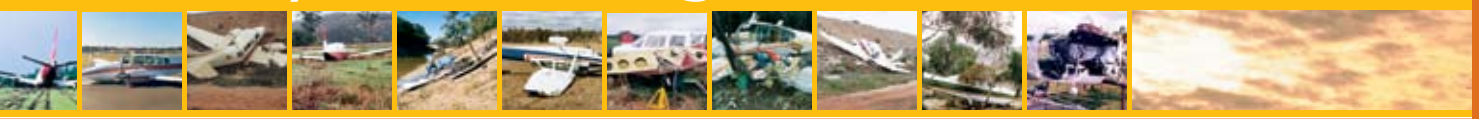
Analysis of air traffic control recorder data and aircraft flight data revealed that at 1619:15 after the 717 had turned left, the lateral and vertical distance between the aircraft was 1,112 m and 700 ft (737 above the 717).

The occurrence highlighted the importance of using unambiguous radiotelephony phraseology to avoid misunderstandings and the need for pilots and controllers to remain vigilant at all times especially when the dynamics of a situation require action to be implemented early to ensure that aircraft safety is not compromised.

Airservices Australia advised several safety actions in place following the incident or planned for implementation. The Group Tower Manager responsible for Hamilton Island has reinforced the need, through the Tower Manager, to ensure that the automatic terminal information system strip matches the actual ATIS broadcast. Also a review of the visual separation requirements in the Manual of Air Traffic Services (MATS) was conducted to assure that all pertinent limitations were referenced and determined that no changes to MATS were required.

A further Airservices safety action will involve a performance check being completed every month for the first 3 months after an air traffic controller gets an initial rating, then at 6 months, and then the checking regime will be in accordance with the requirements in the Civil Air Traffic Services Operations Administration Manual. ■

Safety Investigator



Risks associated with aerial campaign management:

Lesson from a case study of aerial locust control

IN 2004, there were two wirestrike accidents in New South Wales involving helicopters undertaking locust control operations. The first accident occurred in October 2004 near Forbes and resulted in minor injuries to one occupant and extensive damage to the helicopter. The second accident occurred in November 2004 near Dunedoo and resulted in the death of two occupants. A third occupant was seriously injured and there was extensive damage to the helicopter. A third accident, near Mudgee in November 2004, involved a helicopter that was being used for locust control, although the helicopter was not involved in locust control activities at the time of the accident.

PHOTO: Australian Plague Locust

The Australian Transport Safety Bureau (ATSB) began formal investigations into all three accidents and a research investigation into the systems used by Government organisations to manage contracted aerial operators for locust control in order to identify issues that may enhance future aviation safety.

Locust control operations are presented as a case study, but it is intended that organisations managing other aerial operations with similarities to locust control, such as aerial fire control, other pest management operations, and emergency service operations, may also find the concepts presented in this analysis useful. These types of operations, collectively referred to in the report as 'aerial campaigns' are characterised by: a significant and possibly urgent community need requiring the coordination of significant numbers of resources and organisations; a degree of irregularity or unpredictability in the timing and the size of the operation; aerial operations with a relatively high hazard level; and a regularly changing and unpredictable operational environment throughout the course of the campaign.

These characteristics potentially increase risk to the organisation and its staff. Locust control organisations are closely involved in aerial operations and can therefore influence the level of risk of the operations.

Many complex organisations operating in a hazardous environment, such as major public air transport companies, recognise the influence they have on safety. While they may subcontract many safety-critical aspects of their operations, these organisations still maintain an interest in the safety of these operations and proactively manage safety beyond what is required by regulation. Similar methods can be effective for mitigating risk in aerial campaigns.

Locust control organisations and other organisations involved in aerial operations with similar characteristics may benefit from developing some of the characteristics identified in High Reliability Organisations (HROs). HROs work in complex high-hazard environments but with relatively low numbers of accidents and incidents.

These organisations have been identified as having an 'organisational mindfulness' which is defined by: an attitude that recognises failures as symptoms of a problem in a system and as learning opportunities for the organisation; encouraging diverse views and approaches to identify a diverse range of risks and solutions; ensuring there are 'big picture' people within the organisation; a commitment to resilience when facing unexpected dangers through appropriate organising at times of increased risk; and a deference at times of increased risk to expertise rather than traditional management structures.

After the two helicopter accidents associated with locust control in NSW in October and November 2004, the organisation overseeing these operations has advised the ATSB that it has taken considerable steps towards safer operations by developing more comprehensive safety management systems. The organisation has consulted widely with aviation industry bodies, aerial operators and other government departments and has developed risk controls based on a risk management approach to the entire locust control campaign. ■

Safety briefs

R22 clutch shaft failure

Occurrence 200501655 – Preliminary Report

On 13 April 2005, at 0930 EST, the pilot of a Robinson R22 Beta helicopter, VH-HXU, was conducting cattle mustering operations near Mareeba, Qld, when he felt a significant airframe vibration and elected to immediately land the helicopter. Following a safe landing and during engine shut-down, the clutch shaft that transfers drive through to the main rotor gearbox failed. The pilot, the sole occupant of the helicopter, was not injured.

The helicopter maintenance provider reported the failure to CASA, through the Service Difficulty Reporting system. A representative from CASA subsequently notified the ATSB of the failure, because of its apparent similarity to a failure sustained by R22 helicopter VH-UXF on 28 September 2003 that resulted in two fatalities and the destruction of the aircraft.

The failed clutch shaft, yoke, flex-plates and sprag clutch assembly were obtained by the ATSB. Laboratory examination of the clutch assembly confirmed the fracture of the clutch shaft at the connection to the yoke that transferred drive to the main rotor gearbox. The fracture had resulted from the growth of torsional fatigue cracking from an origin within the first bolt hole between the yoke and shaft end. Fracture of the clutch shaft results in the loss of all drive to the helicopter main rotor.

As a result of the September 2003 accident, CASA published airworthiness directive AD/R22/51, requiring the one-off disassembly of yoke-to-shaft connections and the inspection for cracking and bolt hole fretting damage. Maintenance documentation indicated AD/R22/51 was carried out on VH-HXU in August 2004.

The investigation is continuing. ■

Fatal training flight at Bankstown

Occurrence 200304589

On 11 November 2003, at about 1240 EST, a student pilot undertaking multi-engine aircraft training was accompanied by an instructor pilot in a Piper PA-34-200 Seneca, VH-CTT. The flight was to include asymmetric flight training.


Mudgee Guardian

The flight departed and they were turning onto the final approach to runway 11 Right, for a fourth touch and go, when the aerodrome controller (ADC) saw that the aircraft's landing gear was not extended. Witnesses reported that when the aircraft was almost over the threshold to runway 11R it commenced to diverge right while maintaining a low height. They reported that when the aircraft was abeam the mid length of the runway, it's nose lifted and the aircraft banked steeply to the right before impacting the ground in a near vertical nose-down attitude. A fire ignited after the impact. The instructor vacated the aircraft through the right door after the aircraft came to rest. The student was fatally injured. The instructor received severe burns and was treated in hospital for three and a half weeks before succumbing to those injuries.

The investigation found a number of engineering anomalies in the engines, but these were considered to not have affected the circumstances of the occurrence. The investigation found control of the aircraft was lost at a height from which recovery was not possible. The reason for the loss of control could not be determined. ■

Collision with ground

Occurrence 200501656

At 1610 CST, on 18 April 2005, a Cessna Cutlass, VH-LCZ, became airborne at Warooka aircraft landing area (ALA) SA. The pilot retracted the landing gear then heard the stall warning horn. The pilot lowered the nose of the aircraft which started a gradual descent, impacted the ground and came to a stop adjacent to the runway. There were no reported injuries.

The pilot was conducting his second flight from Warooka ALA to Wedge Island ALA. The pilot noted a house and powerlines at the southern end of the airstrip on his previous departure but decided to take off to the south and climb at the best angle of climb airspeed, which is 67 kt indicated airspeed (KIAS). The take-off run was normal and the aircraft became airborne approximately 220 m from the end of the runway at 60 KIAS.

As the aircraft became airborne the pilot retracted the landing gear which swings downward approximately two feet as it starts retracting. The aircraft flight manual stated that the landing gear should not be retracted unless there was insufficient runway remaining to do a wheels down forced landing. The stall warning horn provides a continuous tone through the aircraft speaker 5 to 10 kt above the stall speed. The pilot lowered the nose of the aircraft but there was insufficient height to accelerate the aircraft.

The safety margin between the lift-off speed and the stall speed may have been eroded by the effect of any `swing' in the wind during the retraction of the landing gear, and the potential for any increase in drag associated with the retraction of that gear. There was insufficient height when the stall warning horn activated for the pilot to regain climb speed. ■

Infringement of separation standard

Occurrence 200501482

The occurrence involved a Boeing Company B747-338 (747) aircraft, registered VH-EBW, with a crew of 16 and 346 passengers, which was being operated on a scheduled passenger service between Sydney, Australia, and Auckland, New Zealand on 9 April 2005. The copilot was the handling pilot for the flight.

As the 747 was on approach to runway 23 right (23R) at Auckland, the Auckland Tower and Terminal controllers observed an unidentified aircraft tracking towards its approach path. They instructed the crew of the 747 to discontinue the approach and to turn the aircraft right, on climb to 3,000 ft. The aircraft subsequently entered instrument meteorological conditions (IMC) at an altitude of 3,000 ft. The crew reported that shortly after, and while still in IMC, they received a TERRAIN, PULL-UP warning from the aircraft's enhanced ground proximity warning system (EGPWS). The pilot in command took control of the aircraft and commenced an immediate climb in accordance with the operator's procedures. The crew advised air traffic control that they had received a 'GPWS terrain warning', and that they were climbing the aircraft to 5,000 ft.

At the same time, a New Zealand-registered 747 was making an instrument approach to runway 23R, and had been cleared to descend to an altitude of 4,000 ft. As the Australian-registered 747 was climbing to 5,000 ft, it passed about 1.9 nm behind the New Zealand-registered 747, which was descending through 4,500 ft. The required separation standard of 3 nm laterally or 1,000 ft vertically was infringed. No avoiding action was taken, or was required to be taken, by either crew.

The Transport Accident Investigation Commission of New Zealand is the accident investigation authority conducting the investigation into this occurrence, and will publish the final report on its website at www.taic.org.nz ■

Helicopter crash near Kununurra

Occurrence 200304546

A Bell helicopter Company 206 (B206), registered VH-FHY, and a Robinson Helicopter Company R44, registered VH-YKL, were travelling in company returning to Kununurra WA from a fishing charter to the Cape Dommett area of far north Western Australia.

journey, the pilot of the lead helicopter, the B206, received a broadcast from the pilot of the R44 stating that 'I'm going in hard'. The pilot of the B206 immediately turned his aircraft around in a tight right turn and after assuming a reciprocal heading, observed a mushroom cloud of smoke rising from a nearby ridge. The pilot of the B206 immediately broadcast a mayday to Brisbane Centre and began to orbit the site. Brisbane Centre asked the pilot of the B206 to look for people moving about around the wreckage; none could be seen.

With no signs of life visible, and unable to identify a safe place to land, the pilot of the B206 then continued to Kununurra. The first rescue team into the site confirmed that all four occupants had received fatal injuries. The accident was not considered survivable.

The onsite investigation accounted for all major components of the helicopter at the crash site. The centre of gravity was found to be outside the forward limit, and the operating weight at the time of the occurrence was found to exceed the maximum allowable operating weight for that helicopter type.

The short radio transmission by the pilot of the R44 did not allude to a specific problem. In the absence of witness reports of the occurrence, and the lack of physical evidence due to post-impact fire, the reason(s) for the descent from cruise altitude, and the subsequent impact with terrain could not be established. ■

Seaplane rollover on takeoff

Occurrence 200500216

At 1735 EST on 20 January 2005, a Cessna Aircraft Company A185F floatplane, registered VH-SBH, with one pilot and three passengers on board was taking off on a water departure for a charter flight from Rose Bay aircraft landing area (ALA) to Palm Beach, NSW. Shortly after becoming airborne, the aircraft rolled 45 degrees to the left causing the left wing to strike the water. The aircraft became inverted and was substantially damaged. The four occupants escaped with minor injuries.

The aircraft became airborne at 45 to 50 kt. At approximately 30 ft above the water, the aircraft commenced an uncommanded left roll that the pilot was able to correct with full right aileron input. The aircraft then commenced a second uncommanded left roll that he was unable to correct with control inputs and the aircraft's left wing subsequently struck the water. Given the rapid nature of the event and the need to exit the inverted cabin quickly, the passengers did not retrieve the life jackets which were stowed underneath their seats.

The Pilots Operating Handbook (POH) indicated a stall speed of 55 kt at a mid range centre of gravity. The POH also showed a maximum demonstrated crosswind for takeoff and landing of 13 knots. The investigation found that the crosswind for the accident flight would have been in the vicinity of 19 to 24 knots and that conditions were conducive to wind shear and mechanical turbulence.

The Civil Aviation Safety Authority advised the Australian Transport Safety Bureau that new draft safety regulations require that each occupant of a seaplane or amphibian that is taking off from or landing on water wear a life jacket equipped with a whistle and a survivor locator light.

The operator advised that it was introducing a range of safety measures including, but not limited to, monitoring of weather conditions, wearing of life jackets, and limitations on operations in wind conditions greater than 30 kt. ■