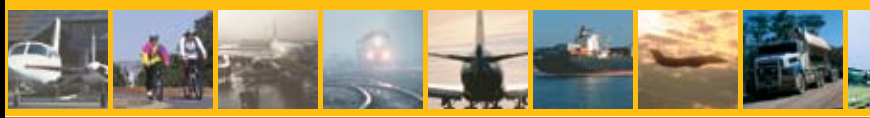
Australian Government
Australian Transport Safety Bureau

The Australian



Executive Director's Message

In late 2005 the media carried reports that the commercial aviation fatal accident rate in Australia was increasing and may now be the worst ever. It was suggested that the number of aviation fatalities involving professional pilots in Australia over the last three years was very high compared with the years since 1990 and possibly represented the world's worst record. This was surprising and I commissioned a research paper to review and test these claims.

The ATSB reported on 22 December that the number of fatal accidents and fatalities declined significantly in the period from 1990 to 2005. The largest number of fatal accidents (30) and fatalities (64) was recorded in 1990. The lowest number of fatal accidents (10 and 11) and fatalities (24 and 23) occurred in 2002 and 2004. In 2005 there was an increase in the number of fatal accidents and fatalities to 13 and 34 (Lockhart River spike) respectively compared with 2004 but 2005 remained below the annual average (20 and 40 respectively) for the 16-year period.

Using a broad definition of 'professional pilot' to include all ATPL and CPL holders, the data from 1990 to 2005 was examined to see if fatal accidents and fatalities had increased in recent years. The data show no significant trend in fatalities involving professional pilots from 1990 to 2005 but a significant decline in the fatal accident trend.

Between 1990 and 2004 (the last year for which activity data is available) commercial operations recorded an average of 0.6 fatal accidents per 100,000 hours flown compared with an average of 2.4 fatal accidents per 100,000 hours flown for non-commercial.

Of course, these data provide no excuse for complacency and the ATSB is undertaking further analysis and benchmarking.

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.

Aviation research on Mandatory Broadcast Zone occurrence

The purpose of this report was to examine occurrences associated with Mandatory Broadcast Zones (MBZ) in Australia using the ATSB aviation occurrence database. Specifically, the objectives of the report were to (i) examine the number of occurrences involving General Aviation (GA) aircraft in addition to occurrences involving Regular Public Transport (RPT) aircraft that occurred in MBZ airspace from 2001 to 2004, and (ii) examine the number of occurrences involving GA aircraft and RPT aircraft that were associated with intentional and unintentional non-compliance with MBZ procedures from 2001 to 2004.

In total, 257 airspace-related occurrences in MBZ airspace involving GA aircraft and RPT aircraft for 2001–2004 were identified. Of these, 145 involved intentional non-compliance with MBZ procedures and 25 involved unintentional non-compliance with MBZ procedures.

Examination of the data revealed that the number of airspace-related occurrences declined from 3.9 in 2001 to 3.1 per 100,000 hours flown by GA and RPT aircraft in 2002 and remained at 3.1 for 2003 and 2004. Furthermore, the number of intentional non-compliance occurrences decreased from 2.6 per 100,000 hours flown by GA and RPT aircraft in 2001 to 1.4 in 2004.

Overall, the findings suggest that the number of MBZ airspace-related occurrences in Australia between 2001 and 2004, including those specifically relating to non-compliance with MBZ procedures, was relatively low. Importantly though, due to recent changes and potential inconsistencies in the reporting and recording of occurrences, the findings on which these conclusions are based need to be interpreted with caution. ■

EMPLOYMENT OPPORTUNITIES

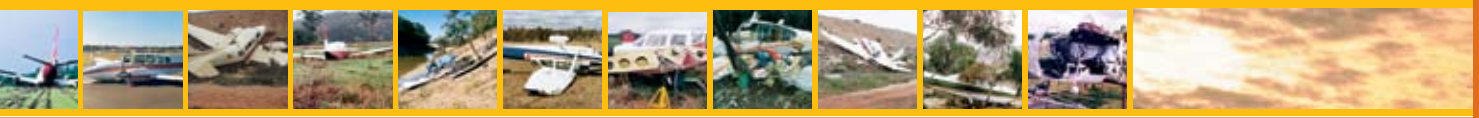
Aviation Safety Occurrence Coders

The ATSB is seeking a team of highly motivated people with an aviation and human factors background to work as Aviation Safety Occurrence Coders. Applicants must have a knowledge of the aviation environment in Australia, preferably with experience as a pilot, air traffic controller, or licensed aircraft maintenance engineer.

The Canberra based positions are non-ongoing for up to 12 months, and are at the APS level 5 with a salary range of $51,866–$54,99 pa.

Applications for the initial team selection close on 9 February 2006. However, you may lodge an expression of interest after that date if you would like to be contacted if vacancies arise.

For further details, please see the Employment Opportunities section of the ATSB website, www.atsb.gov.au or contact Richard Batt by phone 02 6274 6404 or email richard.batt@atsb.gov.au



Final report on fatal helicopter accident near Roma

At 1725 EST on 8 September 2004, Robinson Helicopter Company R44 Raven II helicopter, registered VH-JWX, departed Eurella Station homestead, located approximately 54 km west of Roma, Qld, for a local flight. On board were the pilot and one passenger. The helicopter was seen operating about 7 kilometres north of the homestead before departing to the south at about 1830. Later, a person at Eurella homestead saw the lights of the helicopter apparently heading towards the homestead. When the helicopter did not arrive, search action was initiated. The wreckage was located the following morning 1.8 km west of the homestead. The helicopter had impacted the ground in a steep nose-down attitude. The impact was not survivable.

Data from a handheld GPS receiver found in the wreckage showed that the helicopter operated about 6 km north of the homestead until after civil twilight. It was later established that the helicopter had been engaged in moving a number of cattle from one paddock to another. At 1827, the helicopter departed that area and tracked initially towards the homestead but then in a south-westerly direction west of the homestead. On four occasions, the track swung towards the homestead only to turn away each time. The accident occurred on the fifth occasion the helicopter was tracking towards the homestead. There was no altitude information available from the GPS receiver memory card.

The pilot had more than 10,000 hours fixed wing flying experience, including regular public transport and corporate jet experience in Australia and overseas. He had logged about 1,400 hours night and 700 hours fixed wing instrument flight. The pilot had 582 hours helicopter experience, and held a night VFR (helicopter) rating. He had logged about 11 hours helicopter night flight, but that was in areas and conditions where there were lights from broad urban areas. The pilot had received no specific training in remote area, dark night operations where there was little or no ambient lighting.

On the night of the accident, there was no moon. The only lights in the area were at the homestead and effectively formed a point source. There was a high probability of rain/showers in the area, and most likely greater than 5 oktas of cloud cover. These conditions meant that a natural horizon was probably not discernable and visual reference to surface features was unlikely. It is possible that rain and/or cloud thwarted the pilot's attempts to fly towards the homestead and, in association with the dark conditions, ultimately contributed to him becoming disorientated and losing control of the helicopter.

The only abnormality found during the wreckage examination was that the clutch warning light globe filament was stretched. It is possible that clutch was activated during the impact sequence. It is also possible that activation occurred during normal flight in which case the warning light may have distracted the pilot and adversely affected his workload.

The helicopter manufacturer issued safety notices (SN) and included those in the aircraft flight manual. Two of the notices related to night flight–SN-18 Loss of Visibility Can Be Fatal, and SN-26 Night Flight Plus Bad Weather Can Be Deadly. The circumstances of the accident highlight the risk of spatial disorientation during night VFR operations and reinforce the significance of the cautions included in those safety notices. ■

Safety briefs

Breakdown of separation

Occurrence 200501628

At 0543 eastern standard time on 14 April 2005, an Aero Commander 500-S (Aero Commander) aircraft became airborne off runway 32 at Brisbane airport, QLD, on a non-scheduled flight to Maryborough, Qld. At 0544, a Boeing Company 737 (737) aircraft on a scheduled passenger service from Darwin, NT, was established on the final approach path to land on runway 19 at Brisbane airport.

The Brisbane aerodrome controller (ADC) accepted responsibility for separating the 737 with the Aero Commander once the 737 was established on the final approach path for a landing on runway 19. In consultation with the ADC, the approach controller assigned the pilot of the Aero Commander a heading of 090 degrees to comply with noise abatement procedures.

The ADC reported that he had a mental model that the Aero Commander was going to turn right onto a heading of 360 degrees, once airborne, even though he had assigned a heading of 090 degrees to the pilot of the Aero Commander. The ADC later reported that, if he had realised that he was assigning a heading of 090 degrees to the pilot of the Aero Commander, he would not have accepted responsibility for separation because he could not visually separate the Aero Commander with the inbound 737 on that heading.

A review of the recorded TAAATS data showed that separation reduced to a minimum of .95 NM horizontally, at which time vertical separation had reduced to 500 ft. The minimum radar separation standard was 3 NM, and the minimum vertical separation standard was 1,000 ft. There was an infringement of separation standards.

The investigation was unable to determine why the ADC had a mental model that he was assigning a heading of 360 degrees to the pilot of the Aero Commander. ■

Powerplant bull gear failure

Occurrence 200401353

The British Aerospace Plc, J32, Jetstream aircraft was on descent, during a scheduled passenger flight from Melbourne, Victoria to Mount Gambier South Australia. Approximately 37 NM from its destination as the aircraft passed through FL140, the crew reported hearing a bang from the right engine, with simultaneous aircraft yawing and a loud bang on the fuselage. A check of the aircraft's instrumentation confirmed a problem with the right engine and the crew shut down the engine and feathered the right propeller in accordance with the operator's quick reference handbook drills. The crew conducted a single engine landing at Mount Gambier Airport.

An examination of the TPE 331 engine, supervised by the ATSB, found that a section of gear teeth from the outer perimeter of the reduction gearbox bull gear, had detached during engine operation. An ATSB Technical Analysis report on the failure found that there had been progressive propagation of a high cycle fatigue crack within the bull gear web and rim transition region. That failure mechanism was known to the engine manufacturer.

The engine manufacturer had produced several service bulletins (SB) introducing changes to the engine components in an attempt to prevent the bull gear failures. Those measures had not been entirely successful, as there had been a further three failures that had occurred in post-SB compliant engines.

The engine manufacturer has now produced a further SB introducing a set of redesigned gears with helical tooth form for installation into the engines. That SB has been mandated by CASA.

The aircraft operator has introduced a seating allocation limitation in the affected aircraft until the service bulletin has been carried out. ■

Collision with ground

Occurrence 200502116

On 15 May 2005, at 1535 Central Standard Time, an American Champion Corporation Citabria 7GCAA aircraft registered VH-TUF, with a pilot and passenger, took off from Stonefield private airstrip in South Australia for a local private flight. Shortly after becoming airborne, the aircraft crashed. Both occupants were fatally injured. The aircraft was destroyed by impact forces and a post impact fire.

After start up, the pilot performed a turn on the ground of more than 360 degrees before taxying on the north-east strip. The aircraft engine was heard powering up on the strip into the north-east and shortly after became airborne. After becoming airborne, the aircraft was observed to remain approximately 10 ft above the strip, and remained at that height to the end of the strip. At about this point, the aircraft was observed to enter a near vertical climb. At an estimated height of 500ft above ground level, the aircraft stalled in the vertical position, before entering a right hand spin. The aircraft completed one and a half turns in the spin before it appeared to recover. At the point where the aircraft appeared to have recovered from the spin, it impacted the ground.

The investigation determined that the aircraft on the accident flight was 20 kg over maximum all up weight (MAUW). The increased weight would have the effect of increasing the stall speed of the aircraft, thereby reducing its performance. It was also determined that the pilot took off north-east with a quartering downwind component, and attempted a vertical climb with a wind gradient of approximately 30 kt at 500 ft from the south, above ground level. This wind gradient would have significant impact on the aerodynamic performance of the aircraft, and the pilot may not have achieved the height he intended before it stalled. ■

Dynamic rollover

Occurrence 200402820

The pilot landed the helicopter on the Brisbane River Helipad to disembark a passenger. As the pilot prepared to lift off, the right main wheel penetrated the pontoon deck, causing the helicopter to capsize. The circumstances were consistent with dynamic rollover. The pilot did not lower the collective pitch control (the recommended response to dynamic rollover) when the helicopter began to roll.

The helipad consisted of a plywood deck

mounted on a framework that formed a floating pontoon moored to the river bank. Prior to the flight the pilot had not checked the load bearing capability of the deck, but assumed that the helipad was capable of accepting the Agusta 109 helicopter. Examination revealed that the point load imposed by the main wheels of the helicopter was close to the tested strength of the plywood pontoon decking material. The additional dynamic load effects due to helicopter movement, and wind and water action, were likely to have increased the loads on the deck surface, causing failure of the plywood.

Documentation relating to the management and maintenance of the helipad revealed that the actual load bearing capability had never been established. Potential users of the helipad had been advised of a load limit of 2,000 kg, although the origin of that figure was unknown. The pilot claimed that he was not aware of that limit.

The engineering drawings for the deck called for plywood sheets that extended the full width of the deck. However, smaller sheets were used when the deck surface was last replaced. That had the effect of introducing weaker areas where sheet ends butted together but were unsupported. The deck failure occurred at one of the sheet ends. ■

Clutch shaft failure

Occurrence 200501655

On 13 April 2005 at approximately 1130 Eastern Standard Time, the pilot of a Robinson Helicopter Company model R22 Beta, registered VH-HXU, was conducting cattle mustering operations near Mareeba, Qld, when he felt a significant airframe vibration and elected to conduct and immediate precautionary landing. Upon inspection with the engine still running, the pilot observed the clutch assembly shaking excessively, followed by the sudden fracture of the clutch shaft at the connection to the main rotor gearbox. The pilot was the only occupant of the helicopter and was not injured. There was no other damage to the helicopter.

The ATSB investigation found the clutch shaft had failed from torsional fatigue cracking, initiated from within the forward yoke connection. Propagating under main rotor drive loads, the cracking had originated from an inner through-bolt hole and grown along a spiral path to a point where the remaining section was insufficient to carry the normal operating loads and final overload failure resulted.

The investigation identified movement and fretting within the yoke – shaft connection as the primary factor contributing to crack development. The investigation also found that during the last assembly of the connection, the paint had not been removed from the yoke surfaces where the joint clamping blocks were located. Compression and extrusion of the paint from between the surfaces subsequently allowed for the loss of clamping bolt tension and the development of looseness and insecurity within the joint. Specific instructions relating to the removal of surface paint coatings from the block seating locations were provided by both the helicopter maintenance manual and a recent airworthiness directive (AD/R22/51 Amdt 1) that required the inspection of the shaft – yoke connection for evidence of fretting and cracking. The investigation was not able to determine why those instructions were not followed during the last assembly of the connection. ■

Breakdown of separation

Occurrence 200502116

On 6 April 2005, a de Havilland Canada DHC–8–102 (Dash 8) aircraft departed Mackay for Townsville climbing to flight level (FL) 160. A Boeing Company 737–800 (737) aircraft departed Proserpine for Brisbane climbing to FL410.

The airspace in the area was classified non-controlled airspace from ground level to 4,500 ft and controlled airspace from 4,500 ft to FL180.

When the controller issued the crew of the 737 a clearance to enter control area (CTA) on climb to 5,000 ft the crew reported they were approaching 6,000 ft. The minimum vertical distance between the two aircraft reduced to 430 ft and there was an infringement of separation standards.

The radar that provided coverage in the area had been removed from service and a notice to airmen had been issued. The crew of the 737 had obtained pre-flight briefing material, however first became aware of the radar outage on the inbound descent to Proserpine. They believed that the base of CTA had changed to 9,000 ft and on departure set 8,000 ft as an initial level for climb outside CTA.

The Manual of Air Traffic Services (MATS) specified that clearances issued by air traffic controllers shall enable the pilot to comply with civil aviation regulations relating to terrain clearance and that level assignment shall take into account terrain clearance.

In issuing the crew of the 737 a clearance to climb to 5,000 ft, a level below the published lowest safe altitude of 5,500 ft on the departure track of the 737, the air traffic controller did not comply with the MATS and the potential existed for the 737 crew to not meet their responsibilities for minimum terrain clearance. ■

A detailed story covering the interim factual report on the fatal accident of a Fairchild Metroliner SA227-DC, registered VH-TFU, at Lockhart River on May 7, 2005 will be published in the ATSB supplement in the March-April issue of *Flight Safety Australia*.