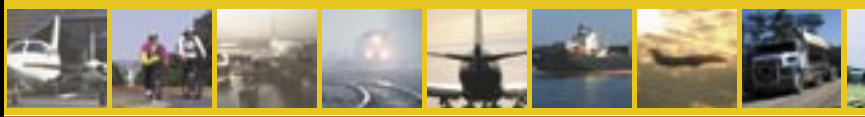
Australian Government
Australian Transport Safety Bureau

The Australian Air



Executive Director's Message

Reflecting on the ATSB's outputs in 2003-04

In addition to ATSB work in road, rail and marine safety, the Bureau had a busy and productive year in 2003-04 in its aviation activities.

During the year, the ATSB released 6863 aviation investigation and technical reports including important reports on fatal accidents at Hamilton Island, Bankstown, Moorabbin and Toowoomba and on a Saab 340 serious icing incident near Bathurst. The Bureau also issued its investigation report into the fatal crash of an Ilyushin IL76 aircraft near Baucau in a joint investigation on behalf of East Timor with the Australian Defence Force and in cooperation with Russian investigators. In total the ATSB received 4556 notifications of accidents and incidents, commenced 7275 new occurrence investigations and finished the financial year with 75 76 ongoing occurrence and technical investigations on hand.

During 2003-04 the ATSB generated two safety advisory notices and 46 air safety recommendations including those arising from the Hamilton Island investigation, on Robinson R22 helicopter blades, and concerning the National Airspace System following a close proximity serious incident near Launceston on 24 December 2003.

The ATSB also released 10 aviation safety research reports including on alcohol and cannabis use in aviation, general aviation accidents, and the aviation safety climate survey. The ATSB's alcohol and cannabis work underpin the joint DOTARS/CASA inquiry on alcohol and cannabis in aviation.

Since 1 July 2003, the Transport Safety Investigation Act 2003 (TSI Act) and Regulations have applied to all new ATSB investigations in aviation, marine and interstate rail modes. Gratifyingly, there have been no major problems encountered with the new legislation.

With additional funding for investigations from 2004-05 we will be even busier in working with stakeholders to enhance future safety.

Kym Bills, Executive Director

Circuit airprox

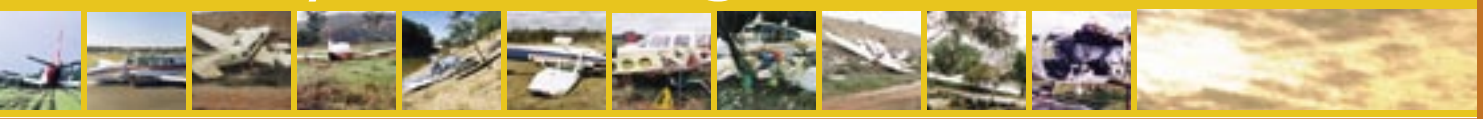
ON 27 May 2003, at about 1650 Western Standard Time, the pilot of a Cessna 172P (C172) aircraft, registered VH-AUC, was conducting circuits on runway 06 right (06R) at Jandakot. An instructor and student pilot of a Piper PA-38-112 (Tomahawk) aircraft, registered VH-FIG, were also conducting circuits on runway 06R.

While on downwind for runway 06R, the pilot of the C172 requested a landing on runway 06 left (06L). The aerodrome controller responsible for runway 06R (ADC1) acknowledged that request and instructed the pilot of the C172 to follow the Tomahawk, which was also on downwind for runway 06R. After coordinating with the aerodrome controller responsible for runway 06L (ADC2), the ADC1 cleared the pilot of the C172 to make an approach to runway 06L and instructed the pilot to transfer to the ADC2 frequency. The C172 subsequently passed in close proximity to the Tomahawk while the Tomahawk was on final for runway 06R and the C172 was on right base leg for runway 06L.

Radar data indicated that the crew of the Tomahawk had extended downwind for sequencing with a preceding aircraft and did not turn base for runway 06R until close to the control zone boundary. Radar data also indicated that the pilot of the C172 had turned right base for runway 06L from a late downwind position and had flown an oblique base leg to join final for runway 06L. Sun glare may have contributed to the C172 pilot losing sight of the Tomahawk ahead after it had turned onto the base leg.

The Tomahawk was at about 500 ft above ground level and descending on long final approach to runway 06R when the instructor observed the C172 tracking towards them. The instructor in the Tomahawk attempted to contact the pilot of the C172, but used the callsign of another aircraft believed to be operating in the circuit at the time and received no response. Regardless, the pilot of the C172 would not have heard any transmissions from the instructor, as the pilot was operating on a different frequency, as instructed by ADC1.

Following this incident, Airservices Australia issued instructions to Jandakot aerodrome controllers to delay, where practicable, the transfer of aircraft onto another frequency when facilitating a change in landing runway.



Toowoomba accident claims four lives

AT about 0836 Eastern Standard Time on 27 November 2001, a Raytheon Beech C90 King Air aircraft, registered VH-LQH, with a pilot and three passengers on-board, took off from runway 29 at Toowoomba aerodrome for an Instrument Flight Rules charter flight to Goondiwindi. As the aircraft became airborne, it lost power on the left engine. Following take-off, the landing gear was not retracted. Control of the aircraft was lost and it struck powerlines before impacting the ground inverted, in a steep nose-down attitude. An intense fuel-fed fire erupted upon initial impact with the ground and all four occupants were fatally injured. At impact the left propeller was not feathered and the right engine was developing significant power.

There was no evidence that fuel contamination, a birdstrike, airframe structural failure, incorrect aircraft loading or meteorological conditions were factors in the occurrence.

Examination of the left engine showed internal damage consistent with the fracture and release of one or more compressor turbine blades, resulting in a significant reduction in power from the engine. Engine Condition Trend Monitoring (ECTM) Program data from the left engine indicated that a potentially safety-critical problem existed in that engine for several weeks prior to the accident. For a variety of reasons that evidence was not detected. The pattern of evidence suggests that temperature-related damage to the left engine's compressor turbine blades, probably due to a problem with the efficiency of the cold section of the engine, resulted in the failure of one of the blades.

As part of maintenance arrangements prior to the accident, the operator had been sending the ECTM data to the engine manufacturer's field representative for analysis, but it was not being recorded or submitted for analysis as frequently as required by the engine manufacturer, or CASA's Airworthiness Directive AD/ENG/5 and there were deficiencies in the operator's maintenance scheduling processes. AD/ENG/5 enabled time between overhaul extensions under less restrictive circumstances compared with those required by the manufacturer, but CASA's surveillance system was not sufficiently rigorous to ensure that the mitigators introduced were effective. The investigation also found that the CASA system for approving maintenance organisations and maintenance controllers did not appropriately consider the maintenance organisation's resource requirements.

The engine failure occurred during a critical phase of flight, just prior to, or at about, the time of take–off. Takeoff speed when the aircraft became airborne was probably close to minimum control speed (Vmca) of 90 kts, not sufficient to allow the aircraft to accelerate to the best one-engine inoperative rate of climb speed (Vyse) of 107 kts with an engine failure. With an engine failure or malfunction near Vmca, the safest course of action would be to reject the takeoff. This means that the aircraft may overrun the runway and perhaps sustain substantial damage, but the consequences associated with such an accident will generally be less serious than a loss of control after becoming airborne.

The operator's procedures did not provide appropriate guidance for pilots regarding decision speeds or decision points for use for an engine failure during takeoff. Aircraft manufacturers have provided such material, but CASA has not published formal guidance material. Further, the level of training available for emergencies in this category of aircraft during critical phases of flight and at high aircraft weights is less than desirable.

The runway length, and the visual appearance of the runway and buildings beyond the runway at the time of the engine failure may also have influenced the pilot's decision to continue with the takeoff. Toowoomba aerodrome was licensed and met the relevant CASA standards. However, runway 29 did not meet the ICAO standards in relation to the runway end safety area (RESA). ■

Details of the report and CASA's responses can be found at http://www.atsb.gov.au/aviation/occurs/occurs_detail.cfm?ID=315 and www.atsb.gov.au/aviation/rec/rec_detail.cfm?ID=444, 445 and 469-472

Safety briefs

Collision on final approach

Occurrence 200201846

At about 1525:34 Eastern Standard Time (EST) on 5 May 2002, a Piper PA-28-161 aircraft, registered VH-IBK, and a Socata TB-9 aircraft, registered VH-JTV, collided on final approach to Bankstown airport. General Aviation Airport Procedures (GAAP) were in operation at the time, and aircraft were using simultaneous contra-rotating circuits onto parallel runways in the 29 direction. Under GAAP, pilots were responsible for separation when airborne in the circuit, and air traffic controllers were responsible for runway separation and the provision of sequencing and traffic information to pilots.

The primary mitigator in place at Bankstown to prevent this type of collision was the provision by controllers of traffic information to pilots of aircraft operating to parallel runways spaced less than 210 m apart. The investigation concluded that this procedure reduced collision risk, but due to limitations with its general nature and its implementation, the extent of the mitigator's influence on collision risk could not be determined. The investigation also concluded that there were insufficient visual cues available for a pilot in one circuit to reliably assess the collision potential of an aircraft in the opposing circuit. In such situations there were also insufficient cues available for the controllers to detect a potential collision in time to provide one or both pilots with information to initiate effective avoidance action.

Collision with power line

Occurrence 200401181

On 31 March 2004, at 0600 Eastern Standard Time, the Robinson R22 helicopter with one pilot on board departed on a ferry flight to commence mustering operation from a property approximately 15 minutes flying time to the north-north-east. The pilot reported that he landed at the property and picked up a passenger who was going to show him the paddocks, fences and laneways.

At about 1000, after mustering cattle into a small paddock, the pilot made an approach to land beside a fence. The pilot indicated that the weather was fine with good visibility. The wind was from an easterly direction at 5 kts and the temperature was 25 degrees C. He reported that he saw a powerline and aimed to land adjacent to a point where the powerline changed direction. However, he did not see a third wire, which the helicopter struck at a height of about 30 ft. The helicopter spun into the ground and landed on a barbed wire fence. The helicopter sustained substantial damage to the tail boom, lower vertical fin and tail rotor blades. The two occupants escaped with minor injuries.

Loss of separation standards

Occurrence 200205540

A de Havilland DHC-8-315 (Dash 8) was southbound to Mackay from Townsville and a Boeing 717-200 (717) was northbound to Mackay from Brisbane. Both aircraft were scheduled services and were conducting regular public transport operations. They were being radar monitored by Brisbane Centre air traffic control and the crews had been cleared to descend their IFR aircraft to 6,000 ft.

The Dash 8 was in cloud and was cleared by the aerodrome controller (ADC) at 1506:17 to descend to 4,700 ft. Separation between the Dash 8 and 717 was no longer assured and there was a technical breakdown of separation. The breakdown occurred because the aircraft were no longer under radar control and no procedural separation standard had been established. The breakdown of separation was not recognised by the ADC.

At 1507:53, the crew of the 717 reported visual at 7 NM and advised that they were able to track for left base. The ADC told the crew to maintain 3,000 ft and to track for left downwind. The crew of the Dash 8 reported visual and were subsequently cleared to make a visual approach straight in to runway 14 at 1508:38. At 1508:51, the crew of the 717 was cleared for a visual approach. The 717 crew responded by reading back the clearance. The ADC then said 'and maintain downwind heading, the Dash 8's currently at 9 miles'. The 717 crew neither heard nor responded to this subsequent transmission by reading back of the requirement.

Approximately 90 seconds later, the ADC observed the 717 turning left base into conflict with the Dash 8 on final approach. This was a second, and more critical, breakdown of separation between the two aircraft.

Compressor stall after takeoff

Occurrence 200300040

The crew of a SAAB 340B, VH-EKN, on a scheduled flight from Orange to Sydney, NSW, reported that shortly after takeoff, as they were setting climb power, they heard a 'bang' similar to the sound of a compressor stall. The left engine gauges indicated zero torque and excessive inter-turbine temperature (ITT). The left over temperature and ignition lights illuminated followed by a master warning annunciation. The crew carried out the engine failure procedure and, having shut down the left engine, returned to Orange and landed.

Eight days later, the crew of another SAAB 340B, VH-OLM, operated by the same company, reported that shortly after takeoff from Orange, the right engine displayed characteristics consistent with a compressor stall (ATSB Occurrence 200300078). On that occasion, after the crew carried out the appropriate checklist procedures, normal engine operation and indications were restored and the flight continued to Sydney without further incident.

The affected engines from both aircraft were removed for examination at the manufacturer's overhaul facility. The engine manufacturer, after reviewing the recorded engine data, identified a number of similar conditions had existed during both flights that may have affected the engines. Both events had occurred on the first flight of the day. On both occasions a significant temperature inversion existed at approximately 1,000 ft above ground level, and the compressor stalls occurred when the crews were adjusting the power setting to climb power. The engine manufacturer's assessment concluded that a combination of environmental conditions and engine operating procedures had led to both events and made several recommendations to the operator. Those recommendations were actioned by the operator and there have been no further instances of compressor stalls in the climb after takeoff. ■

Loss of torque

Occurrence 200205705

An abnormal noise coming from the left engine of an Aerospatiale AS.332L Super Puma helicopter, registered VH-BHY, was reported by several operating crews over the course of successive charter flights. This noise and vibration was evident at approximately 26,000 rpm during acceleration and deceleration phases, and could be induced by rapid movement of the speed select lever.

Although the engine was operating within the manufacturer's vibration limit, maintenance personnel continued to investigate the cause of the vibration. It was discovered that the six attachment bolts at the engine end of the Bendix driveshaft had worn through approximately 50 per cent of their thickness. There was evidence of fretting of the mating surfaces of the Bendix and engine coupling plates. The engine attachment plate for the Bendix also incurred severe elongation of the bolt holes. The Bendix shaft had completed approximately 380 hours in service since installation.

New Bendix attachment bolts, along with several of the damaged bolts were forwarded to the ATSB for laboratory analysis. The examination found no evidence of material deficiencies or other anomalous features of the bolt construction that would have rendered the items susceptible to the type of damage observed. The ATSB concluded that the damage sustained by the Bendix attachment bolts supplied was consistent with the effects of inadequate bolt tightness. The engine was shipped to the manufacturer in France for further testing. The damage to the engine, observed by the manufacturer and the BEA, in their opinion was consistent with the findings of the ATSB. ■

One-engine inoperative landing

Occurrence 200203655

The Saab 340B aircraft was on descent for a landing at Sydney Airport. During the descent the aircraft suddenly yawed to the left and the left propeller feathered. The crew reported illumination of master warning and caution lights consistent with a left engine failure. The aircraft's auto-coarsen system was selected to ON and the ignition switches were in NORM throughout the incident. The auto-ignition system did not operate. The crew declared a PAN to air traffic control and an uneventful one-engine inoperative landing was conducted.

The operator examined the aircraft and replaced the left engine's hydromechanical unit (HMU) and the digital electronic control unit (DECU). Those components were returned to the repair vendor for examination. The component repair vendor found no problems with the HMU and DECU and both components were returned to the operator.

The DECU was then fitted to another aircraft in the operator's fleet and was subsequently removed following engine torque fluctuation problems on that aircraft. A subsequent examination of the DECU by the repair vendor following that incident, revealed an internal fault. The engine manufacturer indicated that DECU torque fluctuation problems had caused uncommanded auto-coarsen events in other aircraft.

No flight data recorder information was available for the original incident due to a data recorder problem. The lack of flight data recorder information did not allow a detailed examination of all of the issues surrounding the incident.

The reason for the apparent engine failure was not able to be fully determined. The ATSB found that some of the circumstances were consistent with an inadvertent auto-coarsen event.

Two local safety actions were identified during the investigation. One relating to the engine manufacturer's testing procedures for the DECU in the event of torque fluctuation problems, and another relating to the operator's Operations Manual procedures. ■