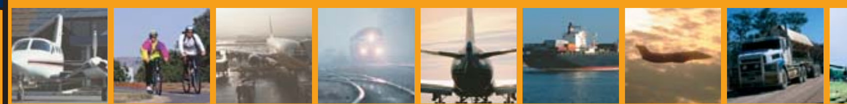
Australian Government

Australian Transport Safety Bureau

The Australian



Executive Director's Message

Implementation of the ATSB Safety Investigation Information Management System (SIIMS)

In the May 2004 budget the Australian Government provided $6.3 million of funding over four years for replacement of the ATSB's early 1990s vintage 'OASIS' aviation investigation database. The development and effective operation of a suitable Safety Investigation Information Management System was seen as essential for the ATSB to be able to provide accurate and timely information for investigations, research, and to key stakeholders such as the Minister, the Parliament, industry and the public.

Improvements sought by the delivery of SIIMS include more efficient data capture and analysis through simplifying the occurrence data model while ensuring compatibility and comparability with external data models (eg ICAO). SIIMS also aimed to improve management of investigation resources through the application of formal project and risk management approaches to safety investigations and improved document and evidence management processes. SIIMS further sought the adoption of more formal processes for the objective analysis of evidence and the establishment of a more automated information transfer with internal and external partners. These objectives required a significant increase in functionality compared with the current system and a significant cultural shift within the ATSB.

I am pleased to report that the project has been delivered on time and within budget due to a solid governance framework, a cooperative relationship between key project partners, and the ongoing efforts by many talented individuals both internal and external to the ATSB, in contributing to the intellectual rigour and technical robustness and usability of SIIMS.

Sound management of this project has allowed the ATSB to 'value add' within the funding available to include the incorporation of the marine and rail databases into an additional phase of the SIIMS project.

Kym Bills, Executive Director

Fixed-wing and rotary-wing aircraft accidents involving private operations

Private flying operations in Australia cover a potentially diverse range of flying activities for personal use, including for travel, or as a business tool to support a variety of tasks including aerial mustering or aerial survey. At present, there are about 16,000 private pilot licence holders with a current medical certificate in Australia.

Approximately 90 per cent of private flying involves fixed-wing aircraft. However, over the last decade rotary-wing operations have become more common and now account for a larger proportion of flying activity than was the case just a few years earlier.

The purpose of this report was to examine accident and fatal accident rates for fixed-wing and rotary-wing aircraft engaged in private operations between 2001 and 2005. Accident and fatal accident rates for private operations are among the highest for any general aviation activity. Rotary-wing aircraft generally have a higher accident rate than fixed-wing aircraft for general aviation, but this difference is less apparent when looking solely at private operations. The year 2005 was an exception, with rotary-wing accident rates for private operations increasing to more than three times the accident rate for fixed-wing aircraft.

The study investigated accidents by phase of flight and accident type to determine similarities and differences between both aircraft types. Because the number of accidents involving rotary-wing aircraft is low ($n = 42$) compared with fixed-wing aircraft ($n = 282$), some limits apply to the conclusions that might be drawn from the data. Nevertheless, sufficient data exists to provide some early indication of patterns.

The analysis of accidents by phase of flight suggests some differences between fixed-wing and rotary-wing aircraft. Fixed-wing accidents in private operations are dominated by landing accidents. Just over half of all recorded accidents (50.4 per cent) occurred in this phase, although none of these were fatal accidents. Other phases of flight each accounted for 10 per cent or less of fixed-wing accidents, and initial climb, cruise, manoeuvring, and approach phases were noteworthy as they also included fatal accidents. By contrast, accidents involving rotary-wing aircraft were more evenly spread among four phases of flight: take-off, cruise, manoeuvring, and landing. Together, accidents in these phases accounted for 76 per cent of rotary-wing accidents. Fatal rotary-wing accidents were recorded only against the cruise and manoeuvring phases.

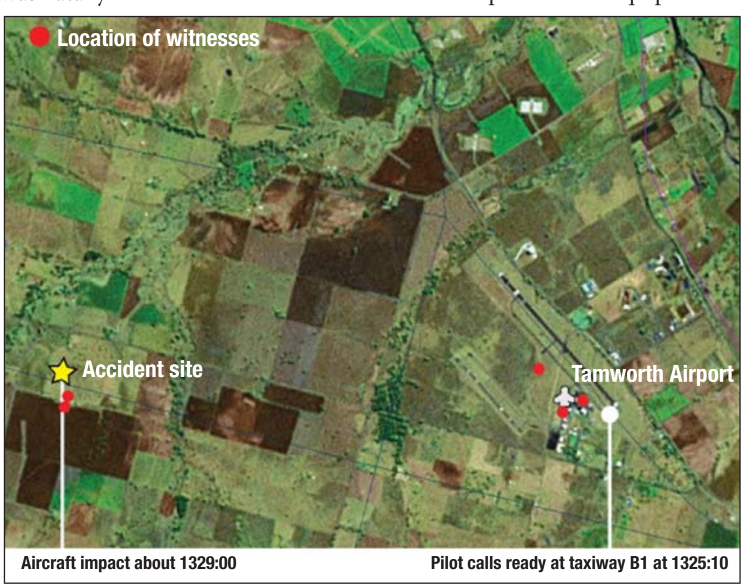
While differences between the two aircraft types were apparent when analysed by phase of flight, the pattern was more similar when accidents were examined according to the type of accident. Around two-thirds of all accidents involved operational factors, with the remaining third associated with mechanical factors. The most common accident types for fixed-wing and rotary-wing aircraft were associated with collisions, loss of aircraft control, airframe, and powerplants. Collision accidents and those involving a loss of aircraft control were also more commonly associated with fatal accidents for both aircraft types. ■

Loss of control 7km WSW of Tamworth Airport

At about 1326 on 7 March 2005, the pilot of a Cessna Aircraft Company 310R, registered VH-FIN, took off from runway 30 Right (30R) at Tamworth Airport, for Scone, NSW. Approximately 1 minute after becoming airborne, the pilot reported flight control difficulties. At about 1329, the aircraft impacted the ground in a cleared paddock about 7 km west-south-west of the airport, in a nearly wings-level attitude at high speed and at a nose-down angle of between 35 and 40 degrees. The pilot was fatally injured and the aircraft was destroyed by the impact forces and post-impact fire.

Examination of the aircraft's mechanical flight control systems, autopilot and electric trim system did not reveal any evidence of pre-impact malfunction. Those results, however, were inconclusive due to the extensive impact and fire damage. Metallurgical analysis of a bent hand tool found in the wreckage indicated that it was not implicated in the development of the accident. A periodic maintenance inspection carried out in the days before the flight resulted in the rudder trim tab being set at the full right position and possibly aileron and elevator trim tabs being set at non-neutral positions prior to the flight.

The investigation found that the pilot probably overlooked the rudder and aileron trim tab settings during the pre-takeoff phase of the flight due to significant time pressure and the relatively obscure location of the rudder and aileron trim tab indicators. Before taxi, the rudder trim tab was in the full right position (nose left tendency) and the aileron trim tab was probably at, or close to the 12 degrees down position (left roll tendency). The pilot experienced flight control difficulties shortly after takeoff from runway 30R at Tamworth Airport and was not able to identify the source of the problem. He subsequently lost control of the aircraft at a position corresponding to an early left downwind for runway 30R, probably as a result of heavy control loads produced by a combination of abnormal trim tab position and increasing airspeed. The aircraft flight path reported by witnesses was found to be consistent with the effect of abnormal rudder and/or aileron trim tab settings.



The investigation also found that aircraft operating checklists produced by aircraft operators did not always include the autopilot and electric trim procedures located in the supplements of aircraft operating handbooks/flight manuals. At the time of the accident, the training and guidance generally provided to pilots did not emphasise the management of flight control difficulties, including autopilot and electric trim related difficulties.

The aircraft's maintenance schedule and the maintenance provider's procedures did not include return of the aircraft's configuration to normal, including a trim neutrals check at the completion of maintenance, nor was there any regulatory requirement or formal guidance to do so. The maintenance provider did not have a system to track the location of tools and equipment during aircraft maintenance, nor was there any regulatory requirement or formal guidance to do so.

Following the accident, the aircraft operator advised that it had incorporated the emergency procedures relating to autopilot and electric trim from their flight manual supplements into their aircraft-specific operating procedures. The maintenance provider advised that they had reviewed and amended some procedures. The Civil Aviation Safety Authority advised that a Civil Aviation Advisory Publication titled Multi-engine Aeroplane Operations and Training will be issued by July 2007. In addition, issues relating to tool and equipment control, aircraft configuration after maintenance and operator's aircraft operating procedures and checklists have have been forwarded to the Safety Promotion Branch for consideration/action. ■

Safety briefs

Engine failure

Occurrence 200506834

On 23 December 2005 at about 1745 South Australian Summer Time, a British Aerospace Plc, J32, Jetstream aircraft was being operated on a scheduled passenger service from Mt Gambier to Adelaide in South Australia. The crew reported that during cruise flight at flight level (FL) 120 and in a shallow right turn, about 93 km east of Adelaide, the right engine briefly surged twice and then stopped.

After landing at Adelaide, the TPE331-12UHR-702H engine, serial number P66397C, was removed from the aircraft and forwarded to the manufacturer in the US for failure examination. The report of that engine examination indicated that the P/N 3103589-1 gear had a separated section of one gear tooth and several other damaged teeth. A metallurgical examination of the damaged components and the metal fragments found in the gearbox showed that there had been significant heavy wear of the mating surfaces of the spur gear teeth of both gears. The report further stated that experience had shown that the mating of a new or different gear, and a worn gear can accelerate tooth wear and lead to tooth fatigue cracking. In this instance the smearing of the separated surfaces and the damage sustained by the components precluded an assessment of whether the failure was due to fatigue. The report also indicated that, in the absence of an identified fatigue origin, there is also the possibility that a foreign object may have entered the gear mesh and overloaded a tooth.

The engine manufacturer advised that they have submitted a Publication Change Request (PCR 029601) to the Inspection and Repair Manual 72-IR-15 specifically requiring an inspection for wear of the P/N 3103590-2 gear. That change is expected to be issued in late 2007. ■

VFR into IMC

Occurrence 200505107

On 11 October 2005 at about 1815 Eastern Standard Time, a Kawasaki Heavy Industries BK 117 B-2 helicopter, registered VH-BKS, became airborne at Brisbane's Princess Alexandra Hospital on a night Visual Flight Rules (VFR) flight to Maroochydore, Qld. On board the helicopter were the pilot, a paramedic and a crewman. The pilot had earlier departed Hervey Bay on a day VFR medical flight, arriving at the hospital at 1748 that afternoon. The incident flight was to reposition the helicopter at the operator's Maroochydore base location.

At about 1823, the pilot was advised by the Brisbane Approach North controller that the weather at Maroochydore included broken cloud, with a cloud base of 1,000 ft above ground level (AGL). In addition, the pilot reported that he observed a solid layer of cloud beneath and in front of the helicopter along the intended route.

The pilot's decision to continue the flight to Maroochydore committed the pilot to a night VFR flight above more than scattered cloud. The pilot could not assure himself of maintaining Visual Meteorological Conditions (VMC) during the remainder of the flight, with the result that night VFR flight was not possible.

On arrival at Maroochydore, the cloud base was such that the pilot was restricted to a recovery to land via an instrument approach, in conditions in which he was not qualified to operate, and for which the helicopter was not single-pilot instrument flight rules-equipped.

The report also details extensive safety action undertaken by the operator, the Queensland Department of Emergency Services, Airservices Australia and the Civil Aviation Safety Authority. ■

Ditching

Occurrence 200603333

At 1323 Coordinated Universal Time (UTC) (0623 US Pacific Daylight Saving Time), on 9 June 2006, a Piper PA-44-180 Seminole aircraft, registered VH-CZE, departed Santa Barbara, California, USA, for Hilo, Hawaii. The aircraft was one of two Seminoles that were being ferried in-company to Australia under the instrument flight rules. At about 2050 UTC, the pilot in command advised US Air Traffic Services that the left engine had failed and that the aircraft would have to be ditched as the aircraft was 7 hrs from Hilo but only had 5 hrs of fuel endurance remaining. At about 0145 UTC, the aircraft ditched 980 km north-east of Hilo. The pilot and co-pilot exited the aircraft uninjured and were rescued by a nearby ship. The aircraft sank and was not recovered.

The pilot reported that more fuel was being drawn from the ferry fuel tank than was expected. In addition, a 5 cm x 1 cm scorch mark could be seen just above the landing gear observation mirror on the left inboard engine cowl. Following discussions with the pilot of the accompanying Seminole, the pilot decided to shut down the left engine. Prior to ditching, the pilot restarted the left engine to prevent an asymmetric situation on touchdown.

As a result of this occurrence, the aircraft operator has advised the Australian Transport Safety Bureau that:

- In conjunction with their US maintenance provider, they were continuing inquiries with respect to the interaction of the ferry fuel tank system and the fuel selector positions fitted to the aircraft and system management.
- They intended to change the ferry flight procedures to use more fuel from the aircraft wing fuel tanks and then periodically top-up those tanks from the ferry fuel tank, using the aircraft fuel contents gauges as a guide. ■

Turbulence event

Occurrence 200700035

At approximately 0955 Central Daylight-saving Time on 8 Jan 2007, the flight crew commenced the take-off roll on runway 23 in a Boeing Company 737-838 aircraft.The aircraft (VH-VXG) was on a scheduled passenger service from Adelaide, SA to Alice Springs NT.

At a speed of approximately 140 kts, the crew reported an abrupt, uncommanded yaw. Corrective action was applied, engine parameters checked, and the takeoff was continued without further incident. The crew advised Air Traffic Control of the uncommanded yaw and contacted the operator's maintenance watch for advice. The crew subsequently returned the aircraft to Adelaide Airport. The wind at the time was reported to be light (approximately 3 kts) from the east.

Data from the aircraft's Flight Data Recorder was recovered and downloaded by the Australian Transport Safety Bureau (ATSB) for review. That review indicated that the input to the aircraft rudder was not uncommanded and that the rudder pedals moved proportionally to the rudder surface deflection at all times. An engineering examination of the aircraft did not identify any reason for the uncommanded yaw and the aircraft was released back to service.

The aircraft operator sought advice from the aircraft manufacturer for a similar event at Adelaide Airport on 15 Dec 2006 (ATSB occurrence 200607627). The aircraft manufacturer reviewed the data from the Flight Data Recorder and concluded that the recorded event was not a result of an uncommanded aircraft rudder input, asymmetric thrust, nose-wheel steering or asymmetric brake application.

While the nature of the uncommanded yaw could not be positively identified, it is likely that the event was related to an atmospheric disturbance during the take-off run.

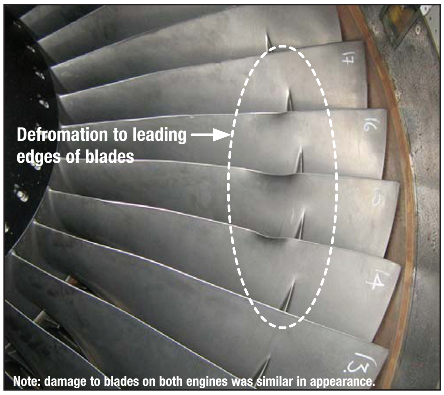
The ATSB continues to monitor such reported uncommanded yaw events and has reported similar events in the past (see occurrence reports 200607627, 200500994 and 199703237 available on the ATSB website: www.atsb.gov.au). ■

Birdstrike

Occurrence 200605807

At 1837 Eastern Standard Time on 3 October 2006, a Boeing Co 767-338 aircraft, registered VH-OGJ, with a crew of 11 and 125 passengers, commenced the takeoff roll on runway 27 at Melbourne Airport, Vic, on a scheduled passenger service to Sydney, NSW. The sun had set at 1826.

During rotation of the aircraft, the crew noticed a large flock of birds (estimated between 20 and 50 birds) converging with the aircraft's flight path. With no evasive manoeuvre available to the crew at this stage of flight, the aircraft encountered the flock and sustained multiple strikes on many parts of the aircraft. Immediately following the strikes, the crew checked the engine instruments and noticed that the left engine vibration indicator had risen to about 4.5 units. The crew reduced power on the left engine and that reduced the vibration levels. The crew reported that, based on the stable EGT and the vibration level on the left engine being below the limit provided by maintenance watch, they elected to continue the flight to Sydney rather than return to Melbourne.



Note: damage to blades on both engines was similar in appearance.

The investigation found that the decision to continue the flight did not fully take into account the potential effect of the birdstrike on the durability of the left engine, nor did it account for the performance of the aircraft if the right engine ceased operating during the flight.

Following the occurrence, the operator implemented a policy for their twin engine fleet that if a birdstrike to an engine is known to have occurred and there is obvious sign of engine damage, then a landing at the nearest suitable airport should be made. ■

Breakdown of coordination

Occurrence 200505536

On 3 November 2005, the aerodrome controller (ADC) at Gold Coast Airport, Qld issued the crew of a Boeing 717 (717) aircraft a take-off clearance following closely behind an Airbus A320 (A320) aircraft. The ADC was responsible for the initial visual separation between the two aircraft and also for providing a suitable separation standard for the Brisbane approach controller who was responsible for the overlying airspace. While the ADC was able to continue to visually separate the two aircraft after departure, he was not able to communicate this or arrange another standard, with the approach controller. The two aircraft entered the approach controllers airspace with less than the required radar separation standard and the approach controller took action by initiating a significant change in heading for the 717. There was a breakdown of co-ordination.

The pilot in command of the 717 later reported that the crew had considered the distance behind the A320 to be safe for their departure, and that the crew maintained visual contact with the A320 throughout the takeoff, departure and subsequent tracking.

Documentation available to both controllers provided guidance relating to coordination phraseology and separation responsibilities. The attempted coordination exchange did not adhere to the requirements of these documents and was continuously interrupted as a result of the workload of both controllers. The incident highlighted the need for controllers to use clear unambiguous words and phrases to ensure complete understanding of all communications, including coordination exchanges. It also highlighted the importance of tactical separation assurance which places emphasis on traffic planning and conflict avoidance, rather than conflict resolution.

As both the ADC and the crew of the 717 had continuous visual contact with the two aircraft it was unlikely that the situation would have resulted in the aircraft coming into such close proximity as to have presented any significant safety risk. ■