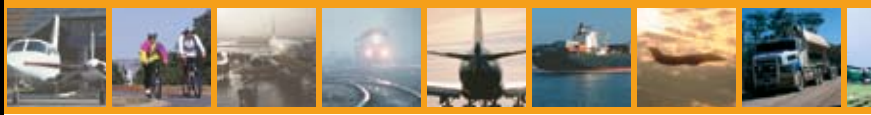
Australian Government
Australian Transport Safety Bureau

The Australian



Executive Director's Message

International activities

March 2006 was for me a month of international meetings and liaison towards the common goal of improving safety. On 1 March I took over from the Chairman of the US NTSB as the 4th chairman of the International Transportation Safety Association (ITSA) which met in Canberra from 15 to 17 March. Of relevance to aviation safety, we discussed investigation methodology and database renewal, investigator training, developments in Europe, use of SMS, LOSA and FOQA type data, possible future changes to ICAO Annex 13 and protection of confidential information, and developments in safety data and research. ITSA members were joined by representatives from Norway's AIBN and Japan's ARAIC.

ICAO hosted a special meeting on aviation safety of the Directors-General of Civil Aviation in Montreal from 20 to 22 March. I represented the ATSB because of the meeting's linkage to major aviation accidents in 2005 and because of the role of the accident investigator in helping to achieve the meeting's aim of improving safety. Of course, there are also many regulatory challenges, especially in the poorer member states. More transparency and sharing of safety information was one theme but it was recognised by many that safety information is unlikely to be willingly provided and shared if it is then available to be used in the legal system to prosecute or financially penalise those who provide it. This poses a difficult dilemma for many countries.

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

Final report into fatal accident near Benalla

On 7 February 2006 the Australian Transport Safety Bureau (ATSB) issued its final report into the July 2004 crash of a Piper Cheyenne PA- 31T aircraft, registered VH-TNP in heavily timbered hilly terrain about 35 km south-east of Benalla aerodrome in Victoria.

The aircraft, which was on a private Instrument Flight Rules flight from Bankstown to Benalla, was destroyed on impact and the pilot and five passengers received fatal injuries. The aircraft did not follow the usual course taken by the pilot, but diverted south along the east coast before tracking directly to Benalla. During that part of the flight, the aircraft diverged between 3.5 and 4 degrees left of track, with the pilot apparently unaware of the tracking error. The aircraft was fitted with a Global Positioning System (GPS) navigation system and the flight was being monitored by Air Traffic Control until it left radar coverage near Benalla.

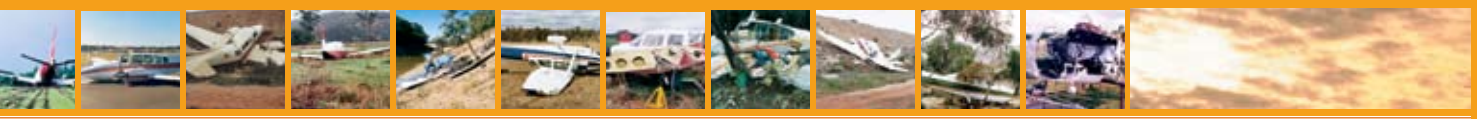
During the flight, the air traffic control system's Route Adherence Monitoring (RAM) system triggered alerts to indicate that the aircraft was deviating from its planned route, but controllers did not question the pilot about the aircraft's position. The investigation found that the instructions to controllers relating to RAM alerts were ambiguous and that the sector controller involved assumed that the pilot was intentionally tracking to the southern waypoint and so did not warn him that he was off-course.

The ATSB final investigation report on the Benalla accident documents substantial safety action by Airservices Australia. Those actions sought to ensure that in future air traffic controllers confirm the intentions of the pilots of aircraft that trigger 'RAM' alerts to avoid a repeat of the fatal Benalla accident. The ATSB has also urged pilots not to rely on a single source of navigation information and to pay careful attention to the use of automated flight systems.

However, the ATSB in its final report was unable to find why the pilot descended the aircraft into terrain when nearly 30km off-course. The amended track did not pass over any ground-based navigation aids, making cross-referencing of the GPS position difficult. The weather was bad and cloud obscured terrain that could have alerted the pilot to the aircraft's erroneous position.

In light of technological advances, the ATSB has recommended that the Civil Aviation Safety Authority review the requirements for the carriage of on-board recorders that could assist future investigators establish the factors associated with significant accidents, improve safety and assist relatives with closure.

In March 2006 the ATSB issued a related recommendation to CASA that it review its current requirements for terrain awareness and warning systems (TAWS) equipment on Australian turbine-powered aircraft and helicopters.



Lockhart River Accident

Interim factual report and subsequent safety recommendations

The Lockhart River aircraft accident in which the two pilots and thirteen passengers died in May 2005 was Australia's worst civil aviation accident since 1968.

On Saturday, 7 May 2005, a twin-engine Fairchild Metroliner aircraft, registered VH-TFU, was being operated on a scheduled passenger service from Bamaga, near the tip of the Cape York Peninsula to Lockhart River, Qld. When 11 km north-west of the Lockhart River aerodrome and descending on the final leg of the instrument approach procedure for runway 12, the aircraft collided with a steep tree covered ridge in the Iron Range National Park.

The aircraft was totally destroyed by massive overload forces as it collided with trees and large boulders during the impact sequence, and the intense fuel-fed fire which followed. The impact was not survivable. There were no witnesses to the accident.

The Australian Transport Safety Bureau (ATSB) published an Interim Factual Investigation Report into the accident in December 2005. The report found that if the ground proximity warning system functioned as designed, the crew should have received a number of warnings as the aircraft descended below the minimum obstacle clearance altitude of 2,060 ft. Because no data on the cockpit voice recorder (CVR) was useable, the functionality of the warnings could not be confirmed. Flight data recorder information from the accident aircraft continues to assist with the investigation.

Although the weather conditions in the Lockhart River area on the day of the accident were worse than originally forecast, the crew was advised by Brisbane air traffic control of the amended forecast details more than two hours prior to commencing the approach to Lockhart River. The weather conditions at the time of the accident were reported as being broken low cloud with squally rain showers and drizzle. The investigation has established that the aircraft was not fitted with an autopilot and the copilot was not qualified to conduct the instrument approach procedure the crew was attempting at the time of the accident.

The ATSB interim report also stated that the crew had not left a load sheet at Bamaga before departure and that the pilot in command had not undertaken crew resource management training that can help mitigate human factor errors.

Recorded air traffic control data indicated that the copilot was making radio broadcasts during the flight, which suggests that the pilot in command was flying the aircraft, but this cannot be confirmed.

Without seeking to pre-judge future investigation findings or imply causality the ATSB has subsequently issued four safety recommendations arising from the Lockhart River accident investigation.

On 24 January 2006, the ATSB issued two recommendations to the Civil Aviation Safety Authority: One recommendation is for CASA to review and clarify legislation and regulations such that in air transport operations requiring a flight crew of two, both crewmembers are appropriately qualified to carry out the instrument approach. The ATSB also recommended that CASA assess the safety benefit that could be achieved from the fitment of a serviceable autopilot to all aircraft on the Australian civil aircraft register engaged on scheduled air transport operations.

On 10 February 2006, another recommendation was issued to CASA to review maintenance requirements for Cockpit Voice Recordings (CVRs) and Flight Data Recorders against international standards, with the aim of improving reliability and availability of data. The ATSB also issued a recommendation to the Department of Transport and Regional Services to review legislation covering copying and disclosure of CVRs to ensure that this can be done for legitimate maintenance purposes.

If additional safety issues arise during the course of the investigation the ATSB will consider further recommendations. ■

Safety briefs

Australian Transport Safety Bureau

Research on fatal accidents and fatalities

The research report examined fatal accidents and fatalities involving civil aviation aircraft in Australian airspace between 1990 and 2005. The purpose of the report was to provide accurate data to industry and the public by identifying key trends and characteristics. Specifically, the objectives of the report were to (1) identify trends for fatal accidents and fatalities from 1990 to 2005, (2) examine the number of fatal accidents from 1990 to 2005 by pilot licence type, type of operation, level of proficiency, and aircraft type, and (3) examine the number of fatalities from 1990 to 2005 by pilot licence type, type of operation, level of proficiency and aircraft type.

The ATSB aviation database was searched to identify all fatal accidents involving civil aviation aircraft operating in Australian airspace from 1 January 1990 to 31 December 2005. It was found that the number of reported fatal accidents and fatalities declined significantly between 1990 and 2005, with the highest number of fatal accidents and fatalities in 1990. The number of fatal accidents and fatalities reported in 2005 was below the annual average calculated for the 16-year period. Fatal accidents associated with both professional and non-professional pilots declined significantly between 1990 and 2005.

In relation to type of operation, the findings show that both commercial and non-commercial operations experienced a significant decrease in the number of fatal accidents between 1990 and 2005. For commercial operations, 2004 was the lowest for the 16-year period for both fatal accidents and fatalities. An elevated fatality rate for 2005 was primarily because of a fatal accident at Lockhart River in Queensland, which involved 15 fatalities. The fatal accident and fatality rates for commercial and non-commercial operations in Australian airspace have been very low. ■

In flight loss of aileron control

Occurrence 200501905

The pilot of a Beech V35A Bonanza experienced a loss of aileron control while cruising at 7,500 ft. He reported turning the aileron control yoke to the left, but the aircraft continued rolling to the right and entered a progressively steeper descent. The pilot arrested the roll by extending the landing gear, adjusting engine power and applying full rudder.

Examination of the aileron control cables found that the right aileron 'up' cable terminal shaft that is screwed into the turnbuckle had failed due to stress corrosion cracking that initiated from surface pits. The terminal was manufactured from SAE-AISI 303 stainless steel.

When the terminal failed, the rudder/aileron interconnect bungee spring forced the left aileron down and the right aileron up.

A study in the USA identified SAE-AISI 303 stainless steel as being susceptible to stress corrosion cracking when used in corrosive conditions such as a chlorine rich coastal environment. Terminals exposed to such environments for approximately 18 to 20 years were apparently likely to have reached their fracture point.

In 2001, the Civil Aviation Safety Authority issued an Airworthiness Bulletin regarding the susceptibility of control cable terminals manufactured from SAE-AISI 303 stainless steel to failure due to stress corrosion. It recommended that aircraft older than 15 years with SAE-AISI 303 stainless steel terminals should have the terminals inspected annually. The Civil Aviation Safety Authority advised that they are considering further action relating to the examination and maintenance of control cables and their terminals.

The aircraft, manufactured in 1969, had accumulated 6,154.8 hours in service and flown approximately 22.9 hours since the last periodic inspection. Within the last 15 years the aileron controls were subjected to routine examination only. ■

Inflight engine shutdown

Occurrence 200502078

At 1110 EST on 12 May 2005, a Eurocopter EC120B helicopter, registered VH-ADC, departed Canberra enroute to Jindabyne, NSW, with the pilot and two passengers on board. The pilot reported that at about 30 minutes after departure, while in cruise flight at 5,000 ft above ground level in smooth flying conditions, the main rotor speed (NR) RPM audio warning sounded.

The pilot reported that a scan of the instrument panel revealed that the NR was exceeding 450 RPM and that he then used the collective pitch lever to reduce the NR. The pilot noted that it took approximately 5 to 7 seconds to arrest the high NR rate, which then silenced the audio warning. The helicopter was flared for landing as it lost altitude and impacted the undulating ground. It then bounced back into the air momentarily, before it impacted the ground once more and slid to a halt. The pilot then applied the rotor brake to stop main rotor rotation and assisted the passengers to exit the helicopter. There were no injuries to the passengers and minor injuries to the pilot.

The nature of the terrain in the vicinity of the accident site was such that potential emergency landing areas were limited and added to the complexity of the task of the pilot in responding to the in-flight emergency. The factors surrounding the in-flight shutdown of the engine could not be determined, as the problem could not be replicated in the engine test cell. No engine shutdown was recorded on the on-board diagnostic equipment.

The rotorcraft flight manual contained no specific information on an event such as that reported. However, the pilot's reaction to the main rotor RPM audio warning appeared inconsistent with the only guidance provided in the rotorcraft flight manual relating to an increase in main rotor RPM. ■

Breakdown in coordination

Occurrence 200500145

On 17 January 2005, at 0633 AEDT, a Saab Aircraft Company AB SF-340B (Saab) departed Albury Airport on a scheduled passenger service to Sydney, NSW. The aircraft was being operated under the IFR. The crew had been authorised by the Albury Tower aerodrome controller to track via Yass on the 043 radial from the Albury VOR and to climb to FL 170. At 0636, a de Havilland Canada DHC-8-102 (Dash 8) aircraft departed Albury Airport on a scheduled passenger service to Sydney, also under the IFR. The crew of the Dash 8 were issued with a clearance by the aerodrome controller to track via the 055 radial from the Albury VOR and to climb to FL200.

The Albury aerodrome controller was required to apply non-radar, or procedural, control, in accordance with published procedures. Procedural control is achieved by the use of information from sources other than radar. The aerodrome controller later reported that he established 12 degrees between the tracks of the two aircraft to facilitate the application of a visual separation standard.

The Albury aerodrome controller was required to establish a procedural separation standard between the two aircraft and to have that standard in place before transferring the responsibility for separation to the Hume controller.

The aerodrome controller's use of visual separation technically complied with the separation provisions stated in the Manual of Air Traffic Services (MATS) for Albury tower procedural separation purposes. However, use of that procedure did not meet the Hume controller's requirements for procedural separation, and would not have ensured that separation continued to exist in the event that the aerodrome controller lost sight of one or both of the aircraft. Furthermore, it did not demonstrate 'the proactive application of separation standards to avoid rather than resolve conflicts' as stated in the MATS. ■

Inadequate lubrication

Occurrence 200503694

On 1 August 2005, at about 1000 EST, a Piper Aircraft Corporation PA-31-350 (Chieftain), registered VH-LMB, departed Adelaide on a scheduled passenger flight to Port Augusta. On arrival in the circuit area at Port Augusta the landing gear appeared to operate normally, but the right main landing gear down-light did not illuminate.

The pilot attempted to engage the right main landing gear down-lock by manoeuvring the aircraft and conducting normal and manual gear extensions, but was unsuccessful.

The pilot reported that, consistent with the operator's procedures, he elected to land with the landing gear retracted. The propellers, underbelly skin and flaps were damaged. The occupants were not injured.

An initial engineering inspection indicated that failure of the right landing gear down-lock to properly engage was the result of inadequate lubrication. The aircraft manufacturer recommended inspection and lubrication of the landing gear down-lock latch and pivot bolts at 50 hour intervals or when the area was washed. The operator's 50-hour maintenance schedule did not specifically require lubrication of the landing gear, and the aircraft's main landing gear down-lock had not been lubricated at the recent 50-hour inspection.

The investigation concluded that incorporation of a specific requirement for down-lock assembly lubrication at 50-hour intervals in Chieftain maintenance schedules would reduce the risk of incomplete down-lock engagement and gear-up landings.

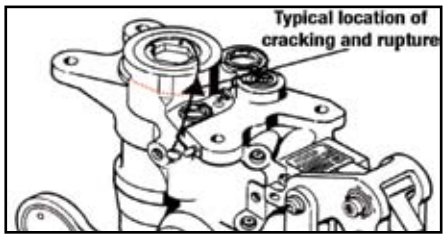
The operator issued a Maintenance Alert requiring each 50-hour inspection to include lubrication of the main and nose landing gear down-lock actuating mechanisms. As a result of this and other related occurrences, the Civil Aviation Safety Authority mailed a letter to operators, issued an Airworthiness Bulletin, and will monitor operators to ensure systems of maintenance include the requirements stated in the letter and bulletin. ■

Actuator failure

Occurrence 200303861

On 6 September 2003, a Bombardier Regional Aircraft DHC-8-102 (Dash-8), on a scheduled passenger service from Brisbane to Roma sustained the in-flight failure of the number-2 hydraulic system. That system provided power to several aircraft systems including the outboard roll spoilers, ground spoilers, nose wheel steering, parking brakes and landing gear extension. Returning to Brisbane, the flight crew extended the landing gear manually and made an uneventful approach and landing.

Loss of the hydraulic system was traced



to the ruptured left outboard roll spoiler actuator, which allowed uncontrolled release of hydraulic fluid and depletion of the system.

The ATSB's examination of the failed actuator and two other similarly unserviceable items from other Dash-8 aircraft found the actuator cylinders were susceptible to the initiation and growth of fatigue cracking. The cracking resulted in perforation and rupture of the cylinder base, with the consequent loss of the affected hydraulic system. Research found records of 15 other related failures in Dash-8 aircraft, all from actuators of the same design and with similar service lives.

Both the aircraft manufacturer and certifying authority reviewed the risks and probabilities of actuator failure. That review concluded that existing emergency procedures adequately addressed the loss of a hydraulic system stemming from actuator rupture and hence did not warrant any direct corrective or safety action. It was not evident however whether the review had considered the aircraft landing performance restrictions imposed by the loss of hydraulics, which could become problematic in areas where runway lengths are limited. From this perspective therefore, the ATSB issued a Safety Advisory Notice highlighting the risks associated with operating aircraft at risk of actuator failure into such areas. ■