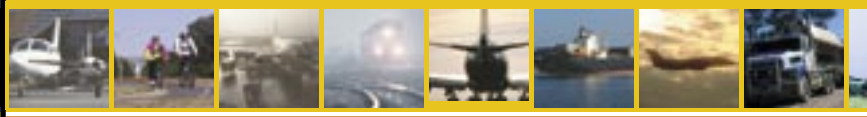
Australian Government
Australian Transport Safety Bureau

The Australian Air



Executive Director's Message

As you may know, the ATSB boosted its aviation research program in late 2003 in accordance with obligations under ICAO Annex 13 (eg paragraph 8.6).

This program provides the Bureau with an opportunity to identify issues and trends that would not be evident from examination of individual accident and incident reports.

The research that was targeted most directly at this requirement re-examined all fatal accidents in general aviation over a ten-year period. The method of classifying the accidents was also reviewed to help illustrate trends. Another research data report looked at a sample of light helicopter accidents.

A survey sent out to 5000 commercial pilots in late 2003 produced two reports, one set a benchmark for the 'safety climate' of commercial aviation as a whole, and the other report assessed the most common errors that pilots themselves considered that they had been exposed to.

A report on runway incursions was updated and expanded to include 2002 and 2003 data as well as further analysis of the prevalence of runway incursions at major airports by aircraft activity.

Material was also released on the hazards posed to aircraft by birds.

A number of reports were initiated from issues that became important during the year:

Airspace changes have raised some interest in the community. The ATSB analysed its databases to identify events that could be used to help assess changes in risk to aviation that may have been brought about by NAS2b airspace changes.

Two reports looked at the effects of cannabis and alcohol respectively on pilot performance: these issues were relevant to a particular accident investigation; however the information is important to everyone involved in aviation.

Another reviewed approximately 40 years of midair collisions in Australia to identify common themes, with the accident rates being compared with the rates in the US.

At least ten more reports are planned for 2004-05.

I encourage you to have a look at the research reports on the ATSB website under 'Aviation Safety Research'.

Kym Bills, Executive Director

Dynamic helicopter rollover

Occurrence 200300982

AT approximately 0830 EST, the pilot of the Bell 47G-4A turbine-powered (Soloy) helicopter, registered VH-MTX, was conducting a lift-off to the hover from a mobile helicopter landing site at Caboolture aerodrome, when the helicopter rolled onto its right side. Weather conditions at the time of the occurrence were reported to be '…little or no wind, warm and humid, some cloud but clearing.' The helicopter was substantially damaged, but there was no post-occurrence fire. The pilot, who occupied the left seat, was fatally injured and the passenger, who occupied the right seat, sustained minor injuries.

The pilot held an Airline Transport Pilot (Helicopter) Licence, a Commercial Pilot (Aeroplane) Licence, a Command Multi Engine Instrument Rating (CMEIR) (Helicopter), a CMEIR (Aeroplane), and a Grade 1 Instructor (Helicopter) Rating. According to his pilot flying logbooks, he had accumulated approximately 8,293 hours total flying experience, of which approximately 7,180 hours was on helicopters, including 14.8 hours on the Bell 47G helicopter type. He had last flown a Bell 47G type helicopter on 19 December 2002, including taking off from and landing back on the mobile platform involved in the occurrence. He had not previously flown a turbine-powered Bell 47G helicopter.

Post-occurrence technical examination of the helicopter did not reveal any evidence of a helicopter or system fault that could have contributed to the accident. In addition, examination of the mobile platform did not reveal any evidence of it having moved throughout the rollover sequence.

The circumstances of the accident are consistent with the phenomenon known as dynamic rollover. It is likely that the pilot's lack of recency in the helicopter type, combined with his not having flown a turbine-powered Bell 47 previously, contributed to his:

- not making sufficient flight control input to correct the right lateral movement during the lift-off to the hover
- not raising the helicopter to a hover height sufficient to prevent contact with the platform. ■

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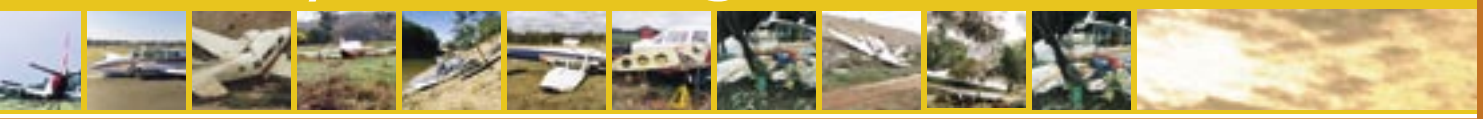
An Aviation Self Reporting Scheme (ASRS) form can be obtained from the ATSB website or by telephoning 1800 020 505.



Moorabbin Airport Fatal Accident

AT approximately 1840 Eastern Standard Time on Monday 29 July 2002, two Cessna Aircraft Company 172Rs, registered VH-CNW and VH-EUH, collided while on short final approach to runway 17 left (17L) at Moorabbin airport, Victoria. The two aircraft became entangled, with CNW on top of EUH. The entangled aircraft impacted the runway and came to rest after sliding a short distance along the runway.

The instructor and student pilot of EUH were conducting night circuit training and the pilot of CNW, the sole occupant, was conducting night circuits. Both aircraft were using runway 17L. The instructor and student pilot of EUH were able to exit their aircraft before fire engulfed both aircraft. The pilot of CNW was fatally injured.

Six aircraft were operating in the Mandatory Broadcast Zone (MBZ) at the time of the accident. All were being flown by pilots who held a commercial pilot licence or some higher qualification.

The mandatory broadcast procedures in an MBZ provide a basic alert to assist pilots to see and avoid other aircraft, and can be supplemented by additional discretionary broadcasts. A mandatory broadcast may contain insufficient information to enable pilots to see-and-avoid other aircraft, or to enable them to make a meaningful assessment of the location of other aircraft. The pilots of CNW and EUH made all the relevant mandatory broadcasts. They also made a discretionary broadcast at about the time they were established on the base leg of the circuit. Those broadcasts did not effectively alert either pilot to the collision potential with the other aircraft.

Even though the two aircraft were of the same type and were operating at similar speeds in the circuit, radar data indicated that the pilots of EUH conducted a wider circuit than the pilot of CNW. Both circuit dimensions were within the range of circuit dimensions that were being conducted by other pilots at the time, and were not considered by the investigation to be contrary to procedures. While the dimensions of the circuits flown by the two accident aircraft were not unusual, the different circuit dimensions, and the consequent difference in the elapsed time, removed the natural spacing that would have typically resulted from the difference in take-off times. In the absence of any other defence or action, the different circuit dimensions led to the two aircraft converging on the final approach leg of the circuit. Neither of the pilots involved in the accident was aware of the impending collision.

An earlier report found that human performance limitations in the visual scanning '…process can reduce the chance that a threat [potentially conflicting] aircraft will be seen and successfully evaded. These human factors are not "errors" nor are they signs of "poor airmanship". They are limitations of the human visual and information processing system which are present to various degrees in all pilots'.

In particular, the practice of routinely re-analysing the information on which decisions are made, especially in airspace where the potential for a traffic confliction is relatively high, might help compensate for those inherent human performance limitations of the human visual and information processing system. ■

What is the Australian Transport Safety Bureau?

The Australian Transport Safety Bureau (ATSB) is an operationally independent multi-modal body that investigates, analyses and reports on transport safety. The ATSB is not part of the Civil Aviation Safety Authority (CASA). The ATSB is Australia's prime agency for the independent investigation of civil aviation accidents, incidents and safety deficiences. To report an Aviation, Marine or Rail accident telephone ATSB (toll-free, 24 hours): **1800 011 034.**

Safety briefs

Loss of tail rotor control

Occurrence 200303804

At approximately 1715 on 29 August 2003, the crew of a Eurocopter AS332L 'Super Puma' helicopter, reported feeling a sudden airframe jolt, followed by a pitch up, roll and a left yawing motion. After assessing the helicopter's performance during a precautionary approach, a safe run-on landing was made at the departure airfield.

The investigation found that the loss of tail rotor control occurred as a result of the tail rotor pitch change servo disconnecting from the control rod. That disconnection was a direct result of the breakdown and partial seizure of the tail rotor pitch change shaft bearing. Analysis of the bearing failure found evidence of the contamination and dilution of the grease lubricant, which led directly to the internal mechanical breakdown of the bearing cage and the partial seizure of the assembly. Testing showed the bearing grease was contaminated by hydraulic fluid released from a leaking tail rotor servo-actuator unit that was identified and replaced twenty-two days before the incident. The bearing was inspected at the time of the leak discovery and found to be satisfactory for further service. At that time, there was no requirement to change the bearing in the event of the leakage of hydraulic fluid into the bearing space.

Following the investigation findings, the French Direction generale de l'aviation civil (DGAC) and Australian Civil Aviation Safety Authority (CASA) released airworthiness directives mandating the frequent inspection of the AS332 tail rotor hub assembly and replacement of the pitch change shaft bearing if any evidence of hydraulic leakage or contamination was found. ■

Left main landing gear collapsed

Occurrence 200401024

On 23 March 2004, shortly after take-off from Katherine, NT, the left main landing gear of the Beech 200 aircraft, registered VH-NTH, did not retract. The flight continued to Darwin with the landing gear extended. During approach to Darwin airport the pilot advised air traffic control that he could not obtain a green `down and locked' indication for the left main landing gear, and declared an emergency prior to landing. During touchdown, the left main landing gear collapsed and the aircraft slewed off the runway. Both occupants evacuated the aircraft with no injuries.

The aircraft operator's maintenance organisation examined the aircraft and found that the left main landing gear drive shaft had severed as a result of fretting against a bleed air duct clamp tail. The bleed air duct clamp (jubilee clamp) had been fitted to the aircraft during an aircraft refurbishment program in September 2003. The jubilee clamp tail had been fastened in close proximity to the landing gear drive shaft. Subsequently, the jubilee clamp tail had come into close contact with the drive shaft, leading to severe wear of the drive shaft section and eventual failure.

As a result of the issues identified with this occurrence, the aircraft operator has conducted a fleet-wide examination of all similar aircraft to ensure adequate clearance exists between bleed air clamps and landing gear drive shafts.

The operator has submitted a major defect report to the Australian Civil Aviation Safety Authority and intends to notify the manufacturer of a number of deficiencies noted in the aircraft maintenance manual. ■

Loss of steering control

Occurrence 200300698

After the Boeing 747-400 aircraft, registered N109UA, landed on runway 27 at Melbourne Airport, the crew vacated the runway via taxiway M at the western threshold. They then entered taxiway E, parallel to runway 27. The crew reported that while taxiing eastward along taxiway E, the aircraft veered left of the taxiway centreline. The co-pilot, who was handling the aircraft, applied right tiller and pedal to correct the veer. When the aircraft began to move right of the centreline, the captain took control because he felt that the co-pilot's correction was not arresting the divergence. The captain applied a left correction and reported that he felt that the aircraft was not responding. When he applied additional left control input, the aircraft responded rapidly and he was unable to stop the aircraft oversteering the centreline. The aircraft failed to respond to the captain's corrective actions and he applied brakes. However, he was unable to stop the aircraft before the nose wheel and the left wing and body gear left the taxiway and became partially bogged in the grassed area beside the taxiway.

The operator reported that a post maintenance inspection of the nosewheel steering system found low cable tensions on the nose gear steering cables. Subsequent removal of the hydraulic nosewheel steering metering valve and laboratory examination by the component manufacturer found some anomalies but the valve was capable of normal steering operation. Although the low tension of the steering cables was considered a possible factor in the development of the occurrence, the reason for the loss of steering control was not positively determined. ■

Aircraft stalled/collision with ground

Occurrence 200204328

At about 1708 Eastern Standard Time on 26 September 2002, the pilot of a Piper PA-32-300 (Cherokee Six) aircraft, registered VH-MAR, reported taxiing for departure from runway 14 at Hamilton Island, Queensland. On board the aircraft were the pilot and five passengers.

Shortly after the aircraft became airborne, the engine was heard 'coughing' and 'misfiring', before 'cutting out' and then 'starting again'. The aircraft was seen to commence a right turn, and the engine was again heard 'spluttering' and 'misfiring'. A number of witnesses reported that, when part way around the turn, the engine again 'cut out', and the aircraft descended and impacted the ground. A severe post-impact fire consumed the majority of the aircraft's fuselage. The six occupants of the aircraft were fatally injured.

The pilot was qualified, appropriately endorsed and authorised for the operation. There was no evidence that fuel contamination, amount of fuel carried, structural failure or meteorological conditions were factors in the occurrence.

The extensive damage caused by the impact forces and post-impact fire prevented functional testing of a significant number of aircraft and engine components. On the available evidence, there was nothing found to suggest what may have degraded the engine performance to the extent reported by the witnesses to the occurrence.

From an aeromedical perspective, the pilot autopsy and toxicological findings were inconclusive. There was insufficient evidence to definitively link the pilot's reported prior intake of alcohol and/or cannabis with the occurrence. However, the adverse effects on pilot performance of post-alcohol impairment, recent cannabis use and fatigue could not be discounted as contributory factors to the occurrence.

Based on witness reports, the investigation concluded that the aircraft engine commenced to operate abnormally shortly after lift off from the runway for reasons that could not be determined. The pilot initiated a steepening right turn, and the aircraft stalled at a height from which the pilot was unable to effect recovery. ■

Loss of engine power

Occurrence 200303599

The Piper PA-31-350 Navajo Chieftain departed Albury with a pilot and six passengers. About 5 minutes into the flight, the pilot reported that the right fuel flow light illuminated and the right engine started surging. About a minute later the left fuel flow light illuminated and the left engine also started surging. Unable to restore power to the engines, the pilot carried out an emergency landing.

On the morning of the occurrence the pilot carried out a preflight check and reported that he found both inboard tanks full, but could not see any fuel in the outboard tanks. The pilot proceeded to warm the engines advising that he preferred to warm the engines up on the fuel from the outboard tanks.

The investigation determined that there were 210 – 211 litres of fuel remaining in the inboard tanks, while their capacity was 212 litres. The right outboard tank contained approximately 25 litres and the left outboard tank approximately 1 litre of fuel.

Examination of the engines found that they were capable of normal operation. Detailed examination of the fuel tanks and the fuel system found no evidence of flow restriction or the presence of any foreign material inside the system. The fuel was of the correct type and grade for the aircraft.

The pilot reported that he had selected inboard tanks for the flight. The investigation was unable to reconcile the pilot's reported recollection of inboard tank selection and the evidence of the remaining fuel quantities in the inboard tanks.

The reason for the right engine losing power and surging first could not be determined. ■

Inappropriate/inadvertent flap/slat selection

Occurrence 200302037

The Boeing 717 aircraft was departing Melbourne for Coolangatta on a regular public transport service. Following a normal take-off, the pilot in command (PIC), the handling pilot, called for the landing gear to be retracted. A short time later, he noticed an amber warning appear on the airspeed scale on the primary flight display screen. The PIC immediately reduced the aircraft pitch attitude in response to that warning. At about the same time, he noticed that the flaps/slats lever was at the `slats retract' position. The PIC immediately called for the flaps to be re-positioned, but the copilot selected the landing gear up. The PIC again called for the flaps to be re-positioned and the copilot then returned the flap selector to the take-off position and the flight continued uneventfully.

The actions of the copilot appear to have been an `action slip', a type of procedural error associated with two actions (landing gear and flaps/slats retraction) that are sequentially linked. As was the case here, there can sometimes be a spill-over that triggers the associated action at an inappropriate time.

Reports were received early in the investigation of other inappropriate/ inadvertent flap/slat selections in B717 aircraft. A survey revealed three other instances of inadvertent flap/slats retraction that all occurred above 3,000 feet altitude during initial `clean-up' flap retraction after take-off and involved the pilot not flying moving the flap/slats lever through the slat gate to the slats zero position. None was associated with landing gear retraction.

The company amended its procedures for flaps/slats retraction approaching the ramp after landing to include a CAUTION note. The purpose of the change was to separate the retraction of the flaps and slats into two distinct actions. ■