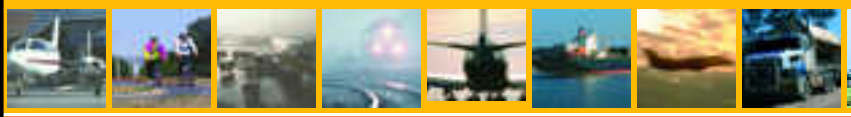
ATSB
Australian Transport Safety Bureau



The ATSB makes a significant contribution to the safety of the Australian aviation industry and travelling public through investigation, analysis and open reporting of civil aviation accidents, incidents and safety deficiencies.

It performs air safety functions in accordance with the provisions of Annex 13 to the Convention on International Civil Aviation (Chicago Convention 1944) as incorporated in Part 2A of the *Air Navigation Act 1920*. Part 2A contains the ATSB's authority to investigate air safety occurrences and safety deficiencies.

The ATSB is an operationally independent bureau within the Federal Department of Transport and Regional Services. ATSB investigations are independent of bodies, including regulators that may need to be investigated in determining causal factors leading to an accident or incident. ATSB is a multi-modal bureau with safety responsibilities in road, rail and sea transport in addition to aviation.

The Australian Air Safety Investigator is a regular six-page feature in *Flight Safety Australia* produced with editorial independence by the ATSB. It aims to keep the industry informed of the latest findings and issues in air safety from the bureau's perspective.

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A Confidential Aviation Incident Reporting (CAIR) form can be obtained from the ATSB website or by telephoning 1800 020 505.

Loss of control

Occurrence 200200377

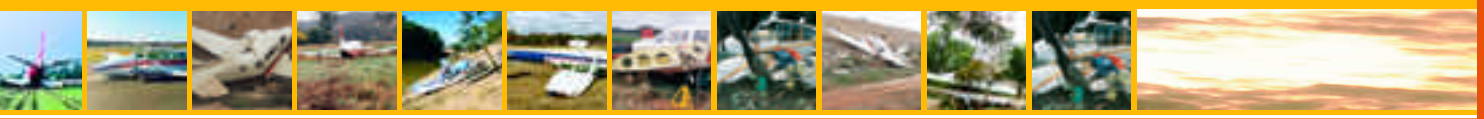
A de Havilland DH82A Tiger Moth aircraft was hired to undertake a pleasure flight. During the take-off, it was observed to strike and destroy two taxiway lights with the right wheel. The pilot continued the take-off and the aircraft departed the Williamstown circuit area at 1428 EST. The aircraft was airborne for about 50 minutes and crashed approximately 2 km from the aerodrome, shortly after joining the circuit. Both occupants were fatally injured. The witnesses reported observing either the left or the right wings fold up and an object separating from the aircraft.

The pilot was appropriately qualified and the accident flight was his first unsupervised flight on the type. The weather was fine with a light north-easterly breeze. The aircraft, manufactured in 1942, was rebuilt in 1988. It was fitted with four wings and propeller of original manufacture, but unknown history. After the rebuild, it was subjected to only limited aerobatic manoeuvres.

The wreckage was contained within a small area at the foot of a tall tree, its distribution consistent with a steep nose-down attitude while rotating to the left. There was no evidence indicating that the right wheel destroying two taxiway lights during take-off damaged any major structural element or in any way contributed to the accident. No evidence was found supporting reported observations of the left or the right wings folding up or an object separating from the aircraft.

The wood was in good condition and free of decay. There was no evidence that a failure of the wood was a factor in the accident. Some laminated wing spar and propeller members failed at the glue line rather than in the wood. It was evident that the Casein adhesive had been subjected to attack by micro-organisms. The attack would occur when the wood and the glue moisture content had risen above 18 per cent. The attack by micro-organisms was least evident in the areas close to the edges of the glued joints. The joints were further secured by nails, bolts and screws, preventing easy detection of the deterioration in the glue. The detection of delaminated propeller members was also hindered by a covering of `Irish linen' on the blades and a thick coat of paint. However, there was no indication that glue failure may have resulted in a catastrophic failure of a major structural element.

Current inspection procedures do not allow detection of delaminated Casein glued joints. ■



Recently completed investigations

As reports into aviation safety occurrences are finalised they are made publicly available through the ATSB website.

Published March–April 2003

Occ. no.	Occ. date	Released	Location	Aircraft	Issues
200102083	27-Apr-01	30-Apr-03	Howard Patch, Swain Reefs QLD	Bell Co 407	Collision with water
200203573	17-Jul-02	20-Mar-03	2 km NW Bankstown, Aero NSW	Piper PA-28-161/Beech 76	Loss of separation standards
200105494	18-Nov-01	18-Mar-03	Tindal NT	Boeing 777-212ER	Failed variable stator vane control lever
200205179	05-Nov-02	13-Mar-03	Canberra, Aero. ACT	Boeing 737-476	Encounter with turbulence
200300526	26-Feb-03	13-Mar-03	28 km NNW Snowy Range, VIC	Centrum PZL M-18A	Collision with trees
200203102	04-Jul-02	13-Mar-03	Sydney, Aero. NSW	Boeing 737	Inadequate pushback procedures
200300316	12-Feb-03	12-Mar-03	4 km NNE Mareeba, Aero QLD	Robinson R44,	Rotor blade skin disbonding
200105777	08-Dec-01	12-Mar-03	Rottnest Island, Aero WA	Piper PA-32-260	Loss of directional control during take-off
200204016	24-Aug-02	06-Mar-03	2kn WSW Los Angles Aero	Boeing 747 and Boeing 757	Loss of separation standards

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

Failed variable stator vane control lever

Occurrence 200105494

After departing Brisbane en-route to Singapore, the crew of the Boeing B777-200 aircraft heard and felt two thumps through the airframe. The crew noted that the right engine was sustaining severe vibration and an increase in exhaust gas temperature. The engine was shut down and the aircraft diverted into Darwin.

An inspection by ground engineers found that one of the right engine, variable stator vane (VSV) control lever's had broken. A boroscope inspection of the engine interior was carried out with a number of compressor blades found damaged.

The ATSB conducted a metallurgic examination of the failed VSV lever. The examination found that, the lever had fractured as a result of stresses induced during manufacture. Additional levers were examined with evidence of cracking found.

On disassembly of the engine, soft body damage was observed on a number of stage-2 intermediate pressure compressor (IPC) blades, which was the result of a previous event. Two of those blades had their tips missing. In the high-pressure compressor, most of the blades displayed hard body damage, with one stage-1 blade found to have failed with 85 percent of the blade missing.

The VSV attached to the failed lever assembly was found to have contacted its adjacent vane. The vane had been operating in a position out of sequence with the remaining vanes, which had induced turbulence that had lead to the release of the tips from the IPC stage-2 blades. The result of that, was the progressive failure of compressor blades throughout the engine, until the final release of the HPC blade. ■

Loss of directional control during take-off

Occurrence 200105777

The pilot of the Piper PA 32-260 was conducting the return sector of a charter flight for five passengers from Rottnest Island to Jandakot, WA. He reported that a strong and gusty southerly wind was blowing almost directly across the runway, favouring a departure from runway 27. He used the indications from the aerodrome's windsock to assess the wind strength and determined that it was within acceptable limits for his aircraft.

The pilot was unable to maintain directional control of the aircraft during the take-off roll. The aircraft diverged to the right of the runway centreline, and departed the runway strip, passing over a sealed taxiway and sandy scrub type terrain. The right main landing gear collided with a tree stump on the edge of a shallow salt-water lake adjacent to the aerodrome. The aircraft briefly became airborne, before coming to rest in the lake. The pilot and passengers were not injured and vacated the aircraft without assistance.

Examination of the aircraft did not reveal any defect that could have affected its normal operation.

The Rottnest Island AWS recorded wind gusts to 38 kts during the 5 minutes prior to the accident. The flight manual approved by the Civil Aviation Safety Authority stipulated a maximum permissible cross-wind component of 20 kts. ■

Loss of separation standards

Occurrence 200202385

A Cessna 172 (Cessna) came within approximately 600 m of a departing Boeing 747-300 (B747) while the B747 was climbing through the level of the Cessna. The pilot of the Cessna was tracking in accordance with, what he believed to be, the visual clearance issued by Cairns air traffic control at 1,000 ft AMSL. The B747 crew was tracking via a standard instrument departure (SID) which specified a left turn after take-off.

The aerodrome controller (ADC) issued the pilot of the Cessna with a clearance to track via the 'southern shores'. The term 'southern shores' was referred to in the Cairns local air traffic control instructions as the 'southern shores of Trinity Inlet'. The ADC understood the clearance referred to the shoreline between the Cairns inlet and False Cape along the southern shore of the Cairns harbour. The pilot of the Cessna was not familiar with the term 'southern shores' and thought the controller meant the shoreline on the southern side of Cairns airport (which was the northern shore of the Cairns harbour). The term 'southern shores' was not specified in any document available to the pilot of the Cessna.

The ADC received a correct read-back of the clearance from the pilot of the Cessna. That correct read-back indicated to the ADC that the pilot of the Cessna could comply with the clearance.

The controller issued a clearance to the pilot of the Cessna that was, to the ADC, a specified route but one that was not known to the pilot of the Cessna. The ADC was not aware that the pilot's understanding of the 'southern shores' differed from his own. The meaning of the clearance was not available to aviators and therefore potential existed for a misunderstanding between the controller and the pilot that resulted in this occurrence. ■

Rotor blade skin disbonding – Collision with powerlines

Occurrence 200300316

The Robinson R44 helicopter departed from Shipwreck Bay, QLD at about 1245 Eastern Standard Time on the final leg of a charter flight to Mareeba aerodrome. At about 1 NM to the south of Mareeba township, at a cruise altitude of 1,000 ft and an indicated airspeed of about 95 kts, the pilot heard an unusual noise associated with the main rotor blades. The pilot reported that the noise sounded as though a potato chip packet had been caught in the blades and a violent vibration occurred in conjunction with the unusual noise.

The violent vibration necessitated a landing. The pilot entered autorotation and selected a paddock for the forced landing. He reported that the helicopter was difficult to control during the descent. In particular, while cyclic inputs altered the attitude of the helicopter left and right it would not turn in the selected direction. The pilot also reported that it was difficult to control main rotor RPM during the autorotative descent and he relied upon the low rotor RPM horn and light as an indication of rotor RPM.

During the descent, the helicopter struck powerlines and was substantially damaged. The pilot reported that he was unable to avoid the powerlines because of the ineffective cyclic inputs. The pilot and passenger, the only occupants, suffered minor injuries.

A report from the accident site indicated significant main rotor blade skin disbonding 60 mm from the tip and extending 1070 mm inboard on one blade and the beginning of skin disbonding on the other blade. The ATSB conducted a preliminary investigation and it was apparent that the problem was a continuing airworthiness matter. ATSB released the main rotor blades to the Civil Aviation Safety Authority (CASA) for further examination as part of an airworthiness investigation.

Inadequate pushback procedures

Occurrence 200203102

On 4 July 2002, VH-VBC, a Boeing 737-7Q8 aircraft, was pushed back from Bay 93 at the Domestic-4 apron at Sydney Airport. After the towbar was disconnected, the aircraft commenced to taxi before the ground interphone had been disconnected. Consequently, the ground engineer who was operating the ground interphone came into close proximity to the right engine of the aircraft as it began to move forward. The crew realised the disconnect procedures were incomplete, and brought the aircraft to a stop.

The operator's procedures specified that when the towbar had been disconnected and the steering bypass pin removed from the aircraft, the dispatch engineers were to stand by for the final command of "Clear to disconnect" from the pilot in command before disconnecting the ground interphone unit. When given that command, the dispatch engineers were to disconnect the interphone, close the interphone panel door, and remove the nose-wheel chock. They were then required to position clear of the aircraft and in view of the flight crew so that the crew could confirm that the disconnect procedures were complete. The crew, however, commenced to taxi the aircraft without assuring themselves that the dispatch engineers were clear of the aircraft, and that the disconnect procedures were therefore complete.

The nose wheel of the aircraft was not chocked at the completion of the pushback, contrary to the operator's prescribed procedures. Had it been, it is unlikely that the aircraft could have moved forward when it did.

It is likely that once the crew incorrectly assumed that the disconnect procedure was complete when they observed the pushback tow motor clearing the aircraft. At that point, the controller requested the crew to tow forward. The crew's response that the disconnect procedure was complete, and that they could taxi as required, reinforces that assumption. However, the crew commenced to taxi without ensuring that the dispatch engineers were positioned clear of the aircraft, thus providing confirmation that the disconnect procedure was complete.

Engine power loss

Occurrence 200202442

The Hughes 369E helicopter, with the pilot the sole occupant, departed Strahan aerodrome at 0815 hours Eastern Standard Time (EST) for charter operations in the Western Tiers area of north-western Tasmania. Multiple flights were required from a base at Lake Mackenzie to a number of dispersed mountain hut locations.

At approximately 1500 hours, the pilot conducted a flight with an external load from Lake Mackenzie to Lake Nameless Hut. He then landed to embark three passengers for transfer to another hut. The pilot reported that, while on the ground, the fuel low-level advisory light had momentarily illuminated, but that he attributed that illumination to the fuel moving in the tank due to the slope of the ground.

At 1515 hours, the helicopter departed Lake Nameless Hut for Tom Whitely's Hut, which was located approximately 5 km to the north-east.

At 1524 hours, as the helicopter descended through about 200 ft above ground level (AGL), and at a speed of 70 kts, the main rotor speed decreased and the engine auto reignition advisory light illuminated. Assessing that the engine had lost power, the pilot reported that he initiated an autorotation to land. The helicopter impacted the ground heavily on the right rear skid landing gear, collapsing that gear and separating the left skid landing gear. The helicopter came to rest about 7 m from the initial impact point, facing back towards the direction of approach. Impact forces destroyed the helicopter. There was no fire. The pilot and three passengers sustained serious injuries.

The investigation found that the helicopter's engine had lost power at a critical stage of flight and that the pilot was unable to conduct a successful autorotation landing.

Confidential Aviation Incident Reporting

THE new secure online means of submitting CAIR reports seems to be working well and an increasing proportion of reports are received by this means. Please note that the online reporting system is an additional system to CAIR. Mail, facsimile, telephone and electronic mail remain available.

Generally, CAIR prefers to receive written reports rather than telephoned reports. In producing a written report, a person can ensure that the report states what he/she wants it to state before it is sent. Telephoned reports are not so 'tight'. However, please do not hesitate to call on 1800 020505 to discuss any concern that you have and CAIR staff will assist you with determining a way ahead. Please remember also that CAIR does not act upon anonymous reports; all reporters must identify themselves and provide contact details to CAIR, even though CAIR protects this information from disclosure and does not retain the information after reports are processed.

John Robbins
Manager CAIR

Perceived risk of mid-air collision (CAIR 200301099)

In light of recent incidents, it has come to our awareness that crossing the Bankstown Lane of Entry presents a potential danger of a midair collision, particularly in the last few hours of daylight. Pilots of aircraft travelling east to west from Long Reef have to cope with severely reduced visibility due to the setting sun. Therefore pilots cannot guarantee to see (and avoid) traffic. In addition, pilots of aircraft coming from the Sydney Harbour Bridge might not hear advisory radio calls from pilots in the lane, because of different frequencies. (Radio calls are not mandatory at this stage).

One possible solution to this problem would be to keep northbound and southbound traffic in the lane at 2000 ft, with crossing traffic required to report at Round Corner at 2500 ft.

It would be appreciated if a solution to this problem can be found and implemented for the safety of pilots flying in the Sydney Basin.

Response from CASA: When weather conditions permit, the flight crew of an aircraft must, regardless of whether an operation is conducted under the Instrument Flight Rules or the Visual Flight Rules, maintain vigilance so as to see, and avoid, other aircraft. If in the process of complying with that regulation, the pilot cannot fly his desired track directly into the setting sun then he or she is required to fly an oblique track or 'tack' in such a manner that he or she can comply – or not fly the route at the problematic time of day.

The correspondent has assumed that traffic has to fly in this Class G airspace at prescribed levels; this is not so. As long as the pilot maintains the required terrain clearance without entering controlled airspace then he or she is free to choose an appropriate level to minimise confliction. The pilot also needs to be aware that traffic in this airspace may operate on other routes apart from the two referred to. Examples of this include traffic flying outbound from Bankstown to Pennant Hills then across to the Coast and tracking northbound or the reverse.

The two major mitigators in Class G airspace are vigilance to see and avoid other traffic and the completely random nature of operations, prescribing fixed routes and levels as mandatory only increases the risk in the joining and crossing areas involved. The nominal light aircraft lane routes are shown for the benefit of pilots not familiar with the area to facilitate their ability to navigate clear of the restricted and controlled airspaces rather than for the separation of such aircraft – ie principally for the safety of large aircraft in controlled airspace.

Submission of SARTIME details by radio (CAIR 200300076)

Significant numbers of pilots are submitting SARTIME details by radio to air traffic controllers causing frequency congestion, and at times distracting controllers from their primary tasks.

Controllers receiving SARTIME details by radio are required to relay this information to flight data personnel who then must transmit a message via AFTN to CENSAR. This can occur up to 200 times per day. Some of the submissions are made by the same pilot for the same aircraft on consecutive flights from aerodromes at which telephones are available.

Persistent offenders are the 'bank runners' and some flying schools in the [location] *area.*

Pilots should be discouraged from submitting SARTIME details via ATC; most do it only to save money.

CAIR Note: In discussion, the reporter stated that the incidence of 200 SARTIME submissions by radio per day was frequent, particularly during weekends when weather conditions were favourable for VFR flying. The reporter quoted an example of one 'bank runner' whose schedule included 8 hours on the ground at one port, and who invariably sent SARTIME details by radio after departure. The port in question was equipped with a telephone and the pilot had plenty of time to call before departure.

Response from Airservices Australia: Details of this CAIR report have been forwarded to the Aviation Safety Promotion Branch within CASA, with a request that the role of AUSFIC in the processing of SARTIMES be highlighted in the Flight Safety Magazine. The hope being that the pilots will desist in nominating SARTIMES to ATC over the radio.

Maintenance practice on foreign-registered aircraft (CAIR 200205655)

The foreign-registered airline aircraft arrived in Sydney after a flight from [foreign port] *with number 2 integrated drive generator (IDG) disconnected due to low oil contents. During the flight, the crew had received a fire warning on both loops on number 3 engine, but had not shut the engine down. (Had the crew done so, only one IDG would have been operating to supply electrical power to the aircraft unless the APU was operating.)*

In accordance with the certification requirements of the country of registration, number 2 IDG was refilled with oil and reconnected despite a serious oil leak, which was ignored. The operator's engineers exhibited an attitude of 'Let's get it to Melbourne to avoid an overnight delay in Sydney'. The aircraft then departed for Melbourne.

The aircraft returned to Sydney the following day. Again, number 2 IDG had been disconnected but the oil leak had been rectified. The operator's engineers reconnected number 2 IDG and test ran the engine. Australian engineers inspected the fire loops on number 3 engine, but their findings are not known.

This was a frustrating experience for the Australian engineers involved as the comment was made that no aircraft in an Australian airline fleet would have been placed into service in this condition.

CAIR Note: In discussion, the reporter stated that the over-riding concern of operator's engineers after the aircraft first arrived in Sydney was to ensure that the aircraft departed for Melbourne before the curfew in Sydney came into effect. Following the aircraft's second arrival in Sydney, eight Australian engineers worked on it.

The reporter added that this occurrence was only one of a string of occurrences involving poor technical condition of some foreign-registered high-capacity RPT aircraft operating in Australian airspace.

Response from CASA: The Authority has noted the matter raised in the CAIR Report. However, currently CASA cannot readily audit the maintenance organisation that relates to a foreign aircraft operation. Whilst the operator has an Australian Certificate of Approval for maintenance, this approval only applies to the maintenance it performs on Australian registered aircraft. Therefore it does not provide an avenue for the audit of issues raised in the CAIR Report.

Notwithstanding, CASA can undertake ramp inspections of the aircraft of foreign operators. Over the next few months, CASA will add an extra ramp inspection in addition to that scheduled and will also bring this matter to the attention of the maintenance organisations foreign regulatory body.

ATS assistance to an aircraft in IMC (CAIR 200300087)

The pilot was operating a planned IFR flight from Bankstown to Camden and return in IMC. The pilot carried out one holding pattern on the Camden NDB followed by an NDB approach and overshoot. The ADF showed a 'sluggishness' and unreliability over and above the usual bearing fluctuations experienced on the Camden NDB.

As the aircraft was returning to Bankstown in IMC, ATC advised the pilot of traffic climbing and converging on the aircraft's track. The pilot carried out a descent to 1800 ft and reported descending, then turned south in a north/south holding pattern, still in IMC. The ADF proved unreliable on both the 2RN and Bankstown NDB frequencies.

The pilot requested a radar vector for Bankstown due to an unreliable ADF in IMC. ATS replied with the advice to 'Intercept the 117 degree bearing to Bankstown NDB' as described on the 'Runway 11C NDB/DME using radar to Bankstown NDB and Sydney DME' approach chart. A further two requests by the pilot brought the same response. The pilot asked a fourth time emphasising the unreliable ADF, and ATS replied with an instruction to change to the Sydney Departures frequency 118.4 MHz. On transfer, the pilot received the required radar vectors until the runway at Bankstown was sighted directly beneath the aircraft.

The pilot's transmission 'Request radar vector to Bankstown Aerodrome because non-visual and unreliable ADF' four times to two different ATS personnel on 124.55 MHz, was clearly ineffective. Should the word 'require' be used? If so, where is the documented reference? Would you please advise the appropriate radio phrase to achieve an immediate response from ATS when an ADF fails during flight in IMC.

Response from Airservices Australia: When an in flight condition exists that results in an aircraft operating in other than normal circumstances and the pilot requires an immediate in-flight response, the appropriate phraseology to alert ATS is by use of the words PAN for an urgency message or MAYDAY for a distress message. Aeronautical Information Publication GEN 3.6 – 7 Phraseology paragraph 6.6 contains standard phraseology for the declaration of abnormal and emergency operations, i.e. PAN and MAYDAY. The events relayed suggest that the pilot never used such phraseology to alert the ATCs to his/her predicament.

Bankstown Aerodrome controllers cannot provide radar vectors and were correct in transferring the pilot to the Sydney Departures frequency who were able to provide assistance.

Straight-in approach at CTAF aerodrome (CAIR 20031106)

Two pilots observed a (non-RPT) twin-engine aircraft carry out a straight-in approach to runway 33 at [location]*, a CTAF aerodrome.*

Weather:	*Wind:*	*Calm*
	Cloud:	*Nil*
	Visibility:	*Good*

CAIR Note: AIP page ENR 1.1 para 61.1 states:

'An aircraft approaching a non-controlled aerodrome for a landing must join on the upwind, crosswind or downwind leg of the circuit unless it is:

a. following an instrument approach procedure in IMC; or
b. conducting a visual circling procedure in IMC after completion of an instrument approach; or
c. conducting a straight-in approach in accordance with para 61.4.2 or para 61.4.1 (as applicable) and para 61.4.3.'

Para 61.4.1 approves straight-in approaches to aerodromes with an associated MBZ subject to conditions detailed in sub-paras a and b. Para 61.4.2 authorises straight-in approaches to aerodromes with an associated CTAF by aircraft on RPT operations, subject to conditions detailed in sub-paras a, b, and c. Para 61.4.3 details the procedures to be followed when carrying out straight-in approaches. ■

ATSB is part of the Commonwealth Department of Transport & Regional Services