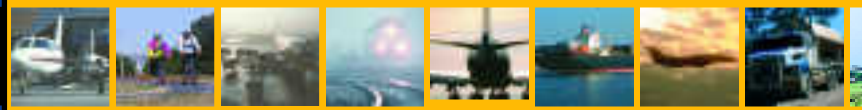
The Australian Ai



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.

In-flight engine fire

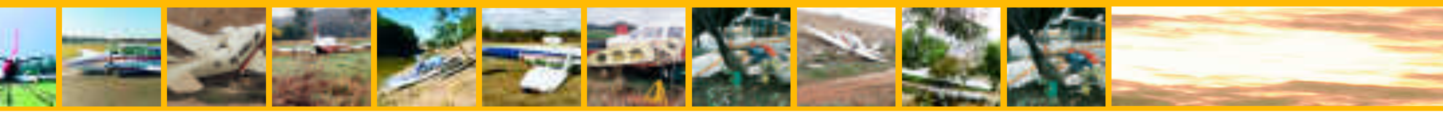
Occurrence 200102710

On 25 June 2001, an Embraer Bandeirante on a charter flight from Sydney to Griffith sustained an in-flight engine fire during cruise. The pilot attempted to extinguish the fire, and believing it to be extinguished, commenced a rapid descent to Young. Fog at Young prevented a landing, and the pilot diverted the aircraft to Cootamundra. Smoke entered the cabin, and the pilot transmitted a MAYDAY. Only the right main landing gear extended when the landing gear was selected down, but the pilot did not get an indication of the landing gear position. Unaware that the right main landing gear had extended, he prepared to make a gear-up landing. The aircraft touched down on the right main wheel and settled onto the left engine nacelle and nose, sustaining abrasion damage as it slid along the runway. The fire in the right engine nacelle was still burning when the aircraft stopped. The occupants egressed uninjured, and bystanders extinguished the fire.

Technical investigation revealed that vibration from the worn armature shaft of the right engine starter generator initiated a fatigue crack in the fuel return line. Fuel leaked from the fractured line during the flight, and was ignited by sparks or frictional heat generated by the failed generator after the armature shaft failed.

The pilot reported that he was unable to select the fuel cut-off position with the right fuel condition lever and feather the right propeller. The pilot did not complete all the items of the engine fire emergency checklist and the firewall shut-off valve remained open. Fuel continued to flow to the fuel control unit and feed the fire. The investigation was unable to determine if the fire extinguisher bottle discharged effectively. The fire continued to burn and heat conducted through the firewall affected components in the wheel well. Smoke from the heat-damaged components entered the aircraft cabin though gaps between the wing root and fuselage.

Checklists carried on the aircraft did not contain appropriate smoke evacuation procedures and the pilot's attempts to evacuate smoke from the cabin were unsuccessful. Consequently, the uncontained fire in the engine nacelle, and smoke in the cabin, created a potentially life threatening situation and influenced the pilot's decision not to delay the landing while attempting to resolve the apparent failure of the landing gear to extend.



Recently completed investigations

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

Published November–December 2002

Occ. no.	Occ. date	Released	Location	Aircraft	Issues
200105173	27-Oct-01	19-Dec-02	Sydney Aero. NSW	de Havilland DHC-8-315	Engine torque signal conditioning unit malfunction
200104983	11-Oct-01	19-Dec-02	46 km ENE Melbourne Aero. Vic.	Fairchild SA227-AC	Turbine nozzle vanes thermal fatigue cracks
200201228	26-Mar-02	19-Dec-02	83km ESE Canberra VOR NSW	S.A.A.B. SF-340A	Incorrect interpretation of radar display
200203641	8-Aug-02	3-Dec-02	APOMA (IFR) NSW	Boeing 737-800	Incorrect level information
200201723	25-Apr-02	15-Nov-02	5.5 km SW Mount Isa Aero. QLD	Robinson R22 ALPHA	Collision with powerline
200105820	8-Dec-01	8-Nov-02	30 km N Launceston Aero. Tas.	Boeing 717-200	Flight Management System failure indication
200102710	25-Jun-01	6-Nov-02	Cootamundra Aero. NSW	Embraer 110P1	In-flight engine fire
200102253	23-May-01	4-Nov-02	Archerfield Aero. QLD	Piper PA-30	Single-engine performance not achieved

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

Turbine nozzle vanes thermal fatigue cracks

Occurrence 200104983

While at 8,000ft on descent for a landing at Melbourne Airport, the crew of the Metroliner heard a loud bang from the left engine together with associated aircraft yaw. The pilot carried out the initial engine failure actions, noting that the left engine torque had dropped to 15%. The flight continued to Melbourne with the engine still operating. The pilot then carried out an uneventful approach and landing, and shutdown the engine.

An examination of the left engine commissioned by the operator, found that the turbine assembly was damaged, with one of the first stage turbine nozzle vanes almost completely burnt away. A blade had also detached from the first-stage turbine rotor assembly. That blade had passed through the subsequent stages of the turbine section, extensively damaging the turbine components. The engine failure was fully contained.

An ATSB technical investigation found that, in addition to the turbine nozzle vane that was completely burnt-through, many of the vanes from the first-stage turbine nozzle assembly had developed thermal fatigue cracking in the leading edges. The investigation concluded that the burnt-through vane had disturbed the downstream airflow through the turbine resulting in vibration of the first stage turbine assembly blades. This vibration contributed to development of fatigue cracking within the root of a single blade from the stage-one turbine, and the blade's subsequent liberation from the turbine rotor. ■

Collision with powerline

Occurrence 200201723

The pilot and passenger of a Robinson R22 helicopter were conducting an aerial inspection and cattle mustering flight.

During the flight some cattle were observed outside the fenced area and the pilot descended to direct the cattle back towards the fence. The passenger reported that the pilot had just commenced to climb higher, at his request, when the helicopter collided with a single-wire powerline. The wire was not severed and the helicopter pitched nose down and the main rotor severed the tail boom. The helicopter collided with the ground. There was no fire.

The pilot, who occupied the right seat, received fatal injuries. The passenger although seriously injured, walked 200 m to a track and waited almost 2 hours until found by a passing motorist.

The powerline was aligned approximately east to west at right angles to the helicopter's flight path. It spanned a distance in excess of 500m from a pole in a saddle on a ridge east of the fence, to another pole set among trees in the timbered paddock. Strike marks on the wire showed the helicopter had struck the powerline at approximately mid-span. There were no markers on the powerline, nor were they required. The height of the wire, at the point of contact, was about 20m above ground level. ■

Loss of separation standards

Occurrence 200200094

A Boeing 747-48HE (OEB) was en-route from Los Angeles, USA to Auckland, New Zealand and was assigned flight level (FL) 330 by Tahiti air traffic control (ATC). A Boeing 747-4H6 (OED) was en route from Auckland to Los Angeles also at FL330. The aircraft were on reciprocal tracks at the same level. The crew of OEB reported that they observed on their traffic alert and collision avoidance system (TCAS), another aircraft that was on a reciprocal track at the same level (OED). The crew of OEB turned their aircraft right 15 degrees and descended to FL325. The crew of OED later reported that they observed on their TCAS an aircraft that was on a reciprocal track at the same level (OEB) and consequently climbed their aircraft to FL333. A third aircraft, a Boeing 747, was en-route from Los Angeles to Auckland at FL340. The crew of OED observed an indication of that aircraft on their TCAS.

The vertical separation standard was 1,000 ft. The vertical distance between OED and OEB reduced to 800 ft, and to 700 ft between OED and the third aircraft. There was an infringement of separation standards.

The crew of OEB had requested climb to FL330 via CPDLC. The CPDLC response provided to the crew of OEB was 'climb to and maintain FL330 due traffic'. The controller was aware that FL330 was not available for OEB and had not intended to authorise climb for that aircraft. ■

Rough running engine

Occurrence 200102289

The Beech C24R aircraft was returning to Hoxton Park following a weekend stay at Trilby Station. On board were three men, including the aircraft's owner. All were qualified pilots experienced on the aircraft type. The pilot in command for the return flight was the youngest of the three onboard.

Witnesses reported that after start and during taxy, the engine sounded as if it was 'running roughly' and 'missing'. During the take-off roll, on the 1,000 m dry gravel airstrip, the aircraft appeared to accelerate slowly with witnesses reporting 'frequent missing' and 'backfires'. None of the witnesses observed the aircraft become airborne. Several seconds later the engine noise ceased followed by the sound of impact. The burning wreckage was located on the western bank of the Darling River. All occupants received fatal injuries.

Prior to impact, the aircraft had struck the tops of several 8-m tall trees that were 108 m beyond the end of the airstrip. Following the impact, fire had destroyed most of the aircraft. The serviceability of the engine ignition and fuel systems could not be confirmed. Damage to the propeller blades indicated that they were not rotating under power at impact. The flap position was assessed at 15 degrees at impact.

The aircraft had incorrect heat range spark plugs fitted in the top positions in all of the engine cylinders. The aircraft and engine manufacturers indicated that the use of these spark plugs can result in detonation and pre-ignition. Engine rough running and backfiring typifies detonation and pre-ignition.

The prevailing wind meant that the aircraft would have taken off with a 5 knots headwind component, and 14 knots right crosswind. Witnesses reported that the aircraft's engine was operating just prior to the crash. ■

Faulty fuel gauge

Occurrence 200200047

The pilot had planned to conduct a charter flight, with three passengers, from Essendon to Latrobe Valley, Vic in a twin engine Beech Duchess aircraft. The pilot reported that he carried out the daily inspection on the aircraft and submitted an Instrument Flight Rules flight notification. He checked the fuel quantity gauge readings, and visually confirmed that there was fuel in the tanks. One gauge indicated a half-full tank while the other gauge indicated slightly less than half full. The pilot's flight plan indicated that 128 litres of fuel, including reserves, would be required for the flight. He estimated that the fuel tanks contained a total of about 200 litres, but did not confirm this, as a fuel tank dipstick was not provided for the aircraft.

During the climb, the right engine RPM reduced to 1,500 and from the manifold pressure indications, the pilot concluded that the engine had partially failed. He carried out engine failure confirmation checks, but found that the propeller pitch lever was very stiff. The pilot was unable to place the propeller pitch lever in the feather position in accordance with the in-flight engine failure checklist. The pilot later reported that, during manipulation of the pitch lever, the aircraft had yawed significantly. Therefore, he decided to reset the right engine controls to a cruise setting because partial power was preferable to no power.

The aircraft was unable to maintain altitude, so the pilot decided to return to Essendon. The aircraft continued to descend until it stabilised in almost level flight at about 1,500 ft. The pilot then tracked direct to Essendon and carried out a visual approach and landing.

Company engineering inspection of the aircraft revealed that the right fuel tank, that was supplying the right engine when it lost power, contained no fuel. The right fuel quantity gauge transmitter unit was found to be corroded and seized in a position that resulted in the right gauge always indicating half-full. Maintenance records indicated that this aircraft had been subject to the decontamination requirement following the AVGAS contamination incident in 2000. That requirement included the flushing of the fuel system with water. ■

Erratic fuel flow indicator

Occurrence 200200885

The pilot of a Cessna 340 departed Bankstown, NSW at 1223 ESuT, for Townsville, Qld via Walgett, St George, Roma, Emerald and Clermont. He climbed the aircraft to 16,000 ft and adopted a long range power setting of about 49% which equated to a true air speed (TAS) of 168 kts and a fuel burn of 141 lbs per hour.

As the pilot approached the 'OLDER' waypoint north of Clermont, he reviewed his fuel situation and, because of a strong tailwind, decided to continue to Cairns.

Some time later, the pilot contacted the approach controller and advised that he had minimum fuel. The controller asked the pilot if he was declaring an emergency, to which he replied affirmative. He was instructed to descend to 6,500 ft and to track direct to Cairns.

As the aircraft descended, the pilot observed that one of the fuel flow gauges was indicating zero, while at the same time, one or both engines began to surge and run roughly. He immediately informed the controller, who asked if he was familiar with a local airstrip, (Greenhill, which is 10NM to the southeast of Cairns airport). The pilot replied that he wasn't. After conducting a number of steep turns, saw a cleared strip in a field and decided that he had to land, but found that he was too high and attempted a 360-degree steep turn onto final to reposition the aircraft. However, the airspeed was rapidly decreasing and there was insufficient height to complete the approach. At 1729 EST, the aircraft impacted the ground short of the strip and slid for about 20 metres.

The ATSB did not conduct an onsite investigation. Witnesses reported that the aircraft's engines were operating just prior to the crash. ■

Confidential Aviation Incident Reporting

THE The CAIR system is an additional means of reporting aviation safety concerns available for people who believe that they cannot express their concerns to colleagues. While protecting a reporter's identity, CAIR can pass de-identified information to agencies that can take appropriate remedial action; this can include referring the information to ATSB for investigation. If you have a safety concern but are unsure of how to proceed, please do not hesitate to discuss the matter on 1800 020505.

John Robbins

Manager CAIR

ATS radar services and visual approaches (CAIR 200204078)

After being cleared to a 5 NM final for runway 11 at Darwin, at night, and inside 30 NM, I was re-cleared to 3,000 ft for a visual approach to the runway. Inside 18 DME, I was not cleared to a lower level consistent with the 5 NM final (1,500 ft is an on-profile height for this length final. The cleared level of 3,000 ft would have required excessive rates of descent preventing me from making an approach.) Initially, I was expecting to be cleared to the lower radar safe altitude inside this 18 DME CTA step, as occurs at primary airports within Australia. At 16 DME when I asked to be cleared lower, the controller just stated that I had been cleared for a visual approach, and a further request was required to get cleared to 1,500 ft in order to continue the cleared arrival.

As I was taxiing in, the controller asked me why I required the lower altitude. I stated, I believe correctly, that under radar control I had to maintain the lowest assigned altitude until established within 5 NM on the centreline, not below the VASI, or establish in the circling area as per ENR 1.1-18, para 9-5.3. The controller went on to state that because I was tracking to a 5 NM final under my own navigation, I was no longer being radar vectored. At no stage was I informed that radar services had been terminated, and have never encountered this interpretation at any other similar airport I have operated into in the last 15 years. My understanding, and that of every other pilot and controller I have spoken to before submitting this report, is that even with direct tracking I am still under radar control. There is always the possibility that I could be later vectored to accommodate other aircraft after the initial clearance.

The controller also stated that after being cleared for a visual approach, I could descend to the LSALT or MSA. This is incorrect, as in my case I had been assigned a radar altitude by ATC and was under radar control.

It was obvious to me and to my crew that the controllers were either not applying the correct visual approach procedures for a night arrival, or did not understand them.

The controller stated that he had never had any problems with jet visual approaches at night on this runway and I don't doubt this. However, many pilots unwittingly would have left 3,000 ft without realising that they are required, by the strict letter of the law, to maintain the last assigned level. This becomes accepted practice until someone tries to fly as per the book which then raises eyebrows. Leaving 3,000 ft in this port is not a safety issue as there is no significant terrain. However, an arrival at Perth onto runway 21 would raise a safety issue given the terrain there; in Perth, aircraft are stepped down by the approach controller after being cleared for a visual approach.

I apologise if this seems to be long-winded. However, I find that there is much confusion affecting both pilots and controllers on occasions on the conduct of visual approaches at night. A possible means of addressing this would be for a controller to delay issuing a clearance for a visual approach until the lowest radar-assigned altitude has been issued.

I would appreciate your advice.

Response from DFS-AD: Unless radar vectoring an aircraft, ATC can authorise a visual approach for an IFR flight (by day or night) that is within 30nm of an aerodrome when the pilot has reported visual and the in-flight visibility is not les than 5km. During the visual approach, the minimum altitude requirements are detailed in AIP ENR 1. 1-18 para 9.5.5, however, the pilot appears to have misinterpreted them. The pilot did not have to maintain 3000ft until on 5nm final, as he was not on a radar vector, although a radar service was being provided. He could have descended to the route LSALT/MSA or the appropriate step of the DME/GPS arrival, or 500ft above the lower limit of CTA (if higher)

Also of note is that this CAIR refers to descent inside the '18 DME CTA step' when Darwin has a 15NM CTA step and neither the DAPS WEST or Jeppesen plates for Darwin have an 18 DME step. If the crew had commenced descent at 18 DME they would have left controlled airspace and this may have caused problems with terrain at a less topographically benign airfield.

There are two points of confusion here:

1. The difference between a radar victor and a radar service, and
2. The descent requirements on a visual approach.

This CAIR bears a remarkable similarity to an incident report submitted by a military crew on arrival to Sydney airport in May 02, thus demonstrating that this type of problem in not isolated to civil crews being controlled by military ATC but may be a more universal, industry-wide issue.

Frequency congestion in MBZ

(CAIR 200204547)

The incident involved a break down in both communication and separation between two aircraft operating in the circuit at Horn Island which necessitated avoidance action being taken while on final approach. A practice GPS/NPA approach onto Runway 08 was being conducted at the time.

On tracking into YHID, we began monitoring *the MBZ frequency about 40 NM and changed over to the Torres MBZ while passing 10,000 ft, about 20 NM from the airport. The appropriate inbound calls were made including advice that we were intending to conduct an instrument approach.*

Several aircraft were at various stages of departing from or arriving into the airport. Additionally, a number of other aircraft were operating within the MBZ at locations other than Horn Island. Some of these aircraft were noted as having Horn Island as their destination.

The MBZ frequency was busy and it was difficult to find clear space to communicate with other aircraft operating on the frequency. From the various calls that were heard, it appeared that there would be no conflicting traffic at our intended arrival time at Horn Island, and so the instrument approach was executed.

Crossing the final approach fix, we made a final inbound call on the MBZ frequency which resulted in a response from another aircraft stating that it was currently on left base for Runway 08. A quick visual check off to the left and a scan of the TCAS was made but the other aircraft could not be located. I then commenced a missed approach breaking right to fly to the dead side of the circuit. During the missed approach, the other aircraft was observed to be in a low short final position. I then rejoined the circuit and landed without any further complications.

A post flight discussion with the crew of the other aircraft revealed that they were conducting low level circuit training at the time and due to the frequency congestion, had missed our initial inbound calls. Additionally, at the time when they responded to our 'finals' call, they were in fact on a low final and not on base as advised.

Operating into the airport on that day, we had considerable difficulty distinguishing from all the calls heard, which aircraft were possible traffic for our arrival. When the area is not your home base, it is difficult to put together a mental picture of the various aircraft departing from an airport into Horn Island and whether they will conflict with your arrival.

From our observation, it would appear that the common MBZ frequency for the Torres Strait area covers far too large an area considering the number of airports and aircraft operating within the MBZ, to permit effective communication between aircraft.

This belief was further substantiated a week later when I operated the same aircraft into Bamaga. Four aircraft (including a helicopter) were operating in and out of Bamaga at the time or our arrival. Thankfully, on that occasion, the volume of traffic working the frequency was light permitting better coordination between the crews.

I believe that urgent consideration should be given to allocating to the Horn Island and Bamaga airports a separate MBZ frequency from the remainder of the Torres Strait area.

Response from Airservices Australia: Reference excessive frequency congestion in MBZs, it is difficult to ascertain the accuracy of the information presented as the MBZ frequencies are not monitored by ATS.

Prior to the implementation of the MBZ, Brisbane ATC and aircraft were frequently unable to make calls on the area frequency due to congestion. The implementation of the MBZ has at a minimum ensured that IFR aircraft are receiving traffic on other IFR aircraft.

The Torres MBZ is of non standard dimensions. Based on Horn Island it extends approximately 40nm North through East to the South reducing to 15nm to the West. It is designed to cover a number of small aerodromes located to the north of Horn Island.

Any division of the MBZ would require aircraft to be calling, in some cases, on two MBZs while taxing because of the track miles associated with these ports:

Horn Is. - Bamaga	24
Horn Is. – Warraber Is.	40
Horn Is. – Mabuiag Is.	39
Horn Is. – Badu Is.	28
Horn Is. – Kubin Village	22

The decision to have the common Torres Strait MBZ frequency was made so that there would be better situational awareness and appropriate, timely advise by using one frequency. This is permitted by AIP. Because of the types of operations being carried out – 'island-hopping type flights' – there exists the possibility of untimely and missed calls that would decrease situational awareness and thus safety. If the number of MBZ frequencies was increased there could be a possibility of congestion on the area frequency as previously stated.

One suggestion that staff feel would enhance the situational awareness is for AIP to mandate an airborne call (AIP 1.1-38). This is particularly valid when shielding can occur (as does occur in the Torres MBZ) and two aircraft on the ground at different aerodromes might not necessarily have heard each other's transmissions. An airborne call would overcome the local topographical shielding and significantly enhance situational awareness. It is only a suggested improvement, which however could be argued, could add to congestion.

I don't believe that evidence to date supports the requirement for separate MBZ frequencies for both Bamaga and Horn Island. As this frequency is not monitored nor recorded by Brisbane Operations, I can not offer more specific advice. Perhaps CASA might have a method of examining the quality and type of transmissions being made in the MBZ and offer more specific advice.

CASA Response on 10 December 2002: CASA has carefully considered the CAIR Report and the suggestion by Airservices Australia.

The proposal to mandate an airborne call would increase the potential for frequency congestion. Therefore, before going down this path, CASA believes that it would be advisable to determine if the CAIR Report reflects a continuing problem or an isolated incident.

However CASA considers that no action be taken pending the outcomes of the National Airspace System proposals in relation to Mandatory Broadcast Zones.

Hazardous trees near runway

(CAIR 200205411)

Trees planted at the end of runway 14 at Cunderdin appear to infringe the obstacle clearance approach plane by a significant height. During practice circling approaches, the aircraft I fly is forced to land longer than normal making the prospect of touch-and-go marginal. The trees need to be trimmed or cut down.

CAIR Note: In discussion, the reporter stated that he suspected that the trees were not on the aerodrome allotment but were on adjoining private land. The reporter flies a light twin-engine aircraft.

Response from aerodrome operator: The trees will be cut back to almost ground level within the next week, which should overcome the problem. ■

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