Aviation Safety Investigation Report 199003056

Beech 95-55 Baron

32976

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Occurrence Number: 199003056 **Occurrence Type:** Accident
Location: Brisbane, Queensland
Date: 32976 **Time:**
Highest Injury Level: Serious
Injuries:

	Fatal	Serious	Minor	None
Crew	0	1	0	0
Ground	0	0	0	-
Passenger	0	3	0	0
Total	**0**	**4**	**0**	**0**

Aircraft Details: Beech 95-55 Baron
Registration: VH-TSM
Serial Number:
Operation Type:
Damage Level:
Departure Point:
Departure Time:
Destination:

Approved for Release: 15th January 1991

Circumstances:

At 1040 hours EST on 13 April 1990, Beech 95-B55 Baron registered VH-TSM crashed at Brisbane Airport. The pilot was conducting a landing approach when the aircraft struck a light pole near the southern end of a section of Runway 04 of the decommissioned Brisbane Airport and then impacted the runway surface. The pilot and three passengers received serious injuries. 1. FACTUAL INFORMATION 1.1 History of Flight 1.1.1 Beech 95-B55 VH-TSM was being operated by an Albury, NSW based charter organization. The aircraft had been privately hired for a flight from Albury to Brisbane via Tamworth. 1.1.2 This was the pilot's first flight into Brisbane. 1.1.3 The aircraft departed Albury at 0610 hours and arrived at Tamworth at 0820 hours. After refuelling, the flight departed for Brisbane at about 0910 hours. 1.1.4 The flight proceeded normally and the aircraft descended to 2500 feet on the 183 degree Brisbane VOR (Very High Frequency Omni Range) radial for an approach to Runway 01. At about 10 miles from the destination, the pilot switched on the aircraft Instrument Landing System (ILS) receiver as he was unable to locate visually the aerodrome. He noticed that the Course Deviation Indicator (CDI) for the ILS was indicating that the aircraft was right of the Runway 01 centreline and asked the Approach Controller for confirmation of this. When the Approach Controller advised that the aircraft was one mile right of the centreline, the pilot adjusted the aircraft's heading 20-30 degrees left. A short time later, after being advised that the aircraft was now on centreline, the pilot sighted what he thought was the runway directly ahead of the aircraft and proceeded to fly towards it. The aircraft was then transferred to Brisbane Tower frequency. 1.1.5 While initially satisfied that he was tracking for the correct runway, the closer in the pilot flew, the more concerned he became that it might not be the correct runway because it appeared much shorter than 3500 metres which he recalled was the length of Runway 01 and because he could not see the Domestic Terminal to the left of the runway. He questioned whether the Tower Controller had his aircraft sighted and was advised that he could not be seen from the Tower. The pilot then noticed that the CDI was indicating the aircraft to be well left of centreline. He commenced a gentle right turn and was

increasing engine power to go around from the approach when the aircraft struck the light pole. 1.1.6 The pilot reported that the aircraft landing light was not selected on for the approach. 1.1.7 In the days preceding the flight, the pilot had studied closely the Instrument Approach to Land Procedure (IAL) Charts for Brisbane Aerodrome because he planned to conduct the flight under the Instrument Flight Rules (IFR). He stated that he was aware of the aerodrome runway layout, the position of the Domestic Terminal and General Aviation parking area but that he did not study in any great detail the International Apron Chart as it did not appear relevant to his operation. Further, he did not study the Brisbane Visual Terminal Chart as he was conducting an IFR flight and considered the Instrument Approach Charts adequate for this purpose. The pilot stated that he did not study the Aerodrome Diagrams Chart for Brisbane as his experience indicated that these charts offered no information additional to that contained in the IAL Charts; nor did he consult the En Route Supplement as he felt that his reading of this publication in relation to other aerodromes had not been particularly helpful. 1.2 Injuries to Persons Injuries Crew Passengers Other Fatal - - - Serious 1 3 - Minor - - - Total 1 3 - 1.3 Damage to Aircraft. The aircraft was substantially damaged from impact with the light pole and the runway surface. 1.4 Other Damage. The street light pole was destroyed during the accident sequence. 1.5 Personnel Information. 1.5.1 Pilot. The pilot in command was aged 58 years. He held a current Commercial Pilot Licence and a Command Instrument Rating for multi-engined aircraft. His licence was appropriately endorsed to allow him to fly in command of Beech Baron aircraft. 1.5.2 At the time of the accident, the pilot had a total flying experience of 673 hours of which seven were on Beech Baron aircraft. His most recent proficiency check was on 15 March 1990 when he completed an endorsement on Beech Baron aircraft. The pilot had previously held an ILS Rating for multi-engined aircraft. However, the rating was not current at the time of the accident. 1.6 Aircraft information 1.6.1 The aircraft was manufactured by Beech Aircraft Corporation in 1977. It was a low wing, six seat, twin piston engined aircraft with a maximum takeoff weight of 2313 kilograms. At the time of the accident, the aircraft was fitted with four seats, two in the front and two in the centre row. It was predominantly white in colour. 1.6.2 Loading The weight and centre of gravity of the aircraft were within specified limits, and there was adequate fuel on board the aircraft for the completion of the flight. 1.6.3 Maintenance and Serviceability The aircraft had a current Certificate of Airworthiness and a valid Maintenance Release. No maintenance was outstanding at the time of the accident. Examination of the wreckage did not reveal any defect that might have contributed to the accident. 1.7 Meteorological Information 1.7.1 At the time of the accident, the surface wind at Brisbane Airport was north-easterly at 4 knots. Visibility was measured at 25 km at 1030 hours and 30 km at 1100 hours. There were 2 oktas of cumulus cloud at 2500 feet and 5 oktas of stratocumulus cloud at 5000 feet. There were showers in the area, particularly to the south-east of the airport and a weather observation at 1045 hours EST noted a recent shower at the aerodrome. 1.8 Aids to Navigation 1.8.1 All navigational aids at Brisbane Airport, including the VOR, Distance Measuring Equipment (DME), and ILS were operational at the time of the accident. 1.9 Communications 1.9.1 All Brisbane Air Traffic Services, including Brisbane Approach and Tower frequencies were operating normally at the time of the accident. 1.10 Air Traffic Control Procedures 1.10.1. The procedures applied by Brisbane Approach and Tower Control to VH-TSM during its approach into Brisbane were standard and no abnormalities were noted. In brief, the aircraft's approach was being radar monitored under the control of Brisbane Area Approach Control until the pilot reported the runway in sight at which time he was directed to transfer to Brisbane Tower frequency. 1.10.2 The Brisbane Runway 01 Approach Lights were on at the time of the accident. 1.10.3 The Tower Controllers followed the normal practice of attempting to sight the aircraft on approach to Runway 01 both with and without the aid of binoculars. When it could not be seen in this area, they began checking the approach to the decommissioned runway but did not sight the aircraft until after it had crashed. 1.11 Brisbane Airport 1.11.1 Brisbane Airport is owned by the Australian Government and operated by the Federal Airports Corporation (FAC) and is situated 27`23'09"S 153`06'59"E. The main runway, Runway 01/19, is 3500 metres long and 45 metres wide and constructed of asphalt. 1.11.2 Four kilometres south-west of Brisbane Airport

lies the decommissioned Brisbane aerodrome. The northern 1150 metres of Runway 04 of the old airport fell within the Brisbane Airport boundary. The remaining southern section of the runway had been dug up. 1.11.3 The decommissioned Runway 04 formed part of the taxiway system from the present International Terminal area to the taxiway system for the new airport. It was also used on occasions for aircraft parking. A road crossed the runway 50 metres from its southern end. On the northern side of the road was the Brisbane Airport boundary fence while a series of floodlights bordered the southern side of the road. The pole for one of these light was positioned some two metres right of the decommissioned runway centreline. Both the light pole and the boundary fence were difficult to see from the air against the runway surface background. 1.11.4 There were visible for the first 240 metres on the old Runway 04 surface four white runway centreline markings, each of the standard 30 metres length. The centreline markings for the next 450 metres had been painted over but were still discernible from the air. The remaining northern section of the runway contained a continuous white centreline taxiway marking. There were no runway threshold markings or numbers at the southern end of the runway section. A line of six white cone markers painted with a 0.25 metre wide horizontal red band was positioned some 200 metres from the southern end of the runway section. There were no white unserviceability crosses on the runway. 1.11.5 The Brisbane Airport Control Tower is situated adjacent to the airport new terminal complex. The distance from the Tower to the threshold of Runway 01 is some 1650 metres while the distance to the southern end of the section of Runway 04 is 4000 metres. The Approach Radar Transmitter site is positioned approximately 1100 metres west of the southern end of the section of Runway 04. 1.12 Approach Radar Display 1.12.1 The radar display for the Approach Controller in the Brisbane Area Approach Control Centre allows a fairly accurate assessment of aircraft range to within about one kilometre of the runway threshold. However, accuracy with respect to aircraft position in azimuth is limited at close ranges and precludes the accurate determination of an aircraft's position with respect to the centreline of Runway 01. 1.13 Recorded Radar Information 1.13.1 The recorded primary radar information of the track flown by VH-TSM during the final stages of the flight was examined. It indicated that the aircraft was tracking about 360 degrees until nine miles from Runway 01. The track then diverged left to about 335 degrees crossing the Runway 01 centreline at six miles (10 kilometres) final. At about five miles (eight kilometres) final the track gradually gradually veered right to line up on Runway 04. 1.13 Flight Recorders 1.13.1 The aircraft was not equipped with a flight data recorder, nor was there any requirement for it to be so equipped. 1.14 Wreckage and Impact Information. 1.14.1 The right wing root of VH-TSM struck the light pole one metre below the light/reflector housing at the top of the pole and 15 metres above ground level. The seven metre upper section of the pole became embedded in the wing root and remained attached until the aircraft came to rest. The light/reflector housing contacted the right side of the windscreen and the right front side window, breaking both sections of perspex. The housing also contacted the right propeller, causing the right engine to stop. 1.14.2 The aircraft impacted the runway surface right wingtip first 54 metres beyond the light pole and two metres right of the centreline. The aircraft attitude at impact was approximately 45 degrees nose down, 15 degrees right bank and 15 degrees right yaw. The nosewheel and left main wheel were torn off and the mounts for both engines broken by the impact. There was also substantial crushing damage to the lower forward fuselage. This extended to wrinkling of the wing carry-through spar, indicating the extent of energy absorbed by the fuselage structure. The aircraft came to rest after skidding 52 metres along the runway surface. 1.15 Medical Information 1.15.1 The pilot was in good health at the time of the accident. He had recently had his visual acuity checked and had new spectacles prescribed which he was wearing at the time of the accident. 1.16 Survival Aspects 1.16.1 Seating and Seat Restraint. The front seat occupants were restrained by lap/sash harnesses while the centre row seat occupants wore lap belts only. There were no seat belt failures during the impact sequence but all seats and/or seat mounts were damaged. The front left (pilot) seat remained anchored but the seat back failed at the rotation bar position. The front right seat was similarly damaged and also had moved forward with the left foot forced off the seat rail. On the left centre row seat, the two feet were forced off the rails,

allowing the seat to pivot about the front attachments. The right centre row seat remained attached to the seat rails but the rails had been torn from the floor at the rear and centre attachment points. The centre row seats were found to be fitted with sash type shoulder harnesses but these had not been used because they were underneath seat covers. 1.16.2 Injuries The pilot and front right seat passenger both sustained facial/head injuries as a result of being thrown forward and to the right when the aircraft impacted the runway. The passenger in the left centre row seat suffered a fractured ankle as the seat rotated forward. The passenger in the centre row right seat suffered no serious injuries other than bruising. 1.16.3 Although the results could not be quantified precisely, calculations indicated the aircraft experienced a deceleration level of approximately 17 Gs over a period of about 0.1 seconds at the time of the major impact on the runway surface. The extent of injuries to the occupants supports these figures. 1.17 Maps and Charts 1.17.1 The pictorial layout of Brisbane Aerodrome (including all runways and taxiways) was depicted in a number of Civil Aviation Authority publications current at the time of the accident. These included Aerodrome Diagrams (ADDGM), the Brisbane/Maroochydore Visual Terminal Chart, and Departure and Approach Procedures. On two places on the Visual Terminal Chart there was a "CAUTION ABANDONED RUNWAYS" notice directing attention to the location of the decommissioned airport. In the Enroute Supplement Australia, under Brisbane, Special Procedures, was advice of a decommissioned aerodrome four kilometres SW of the airport. 2. ANALYSIS 2.1 Preflight Preparation 2.1.1 The pilot did not study all available information appropriate to the intended operation. It is perhaps ironic that of the two publications he did not study, the Brisbane VTC contained a caution notice indicating abandoned runways at the site of the decommissioned aerodrome, while the En Route Supplement Australia, under Brisbane, in the Aerodrome and Facility Directory, contains a Special Procedure notice referring to "Decommissioned aerodrome 4 km SW of airport". 2.2 The Approach into Brisbane - Pilot Aspects 2.2.1 The pilot's account of the approach indicated that he initially was using the CDI as an aid in locating Runway 01. However, as the aircraft came closer to the aerodrome, his attention seems to have been diverted almost exclusively outside the cockpit towards locating the runway. There could be a number of reasons for this. The weather conditions, in particular visibility, around the time of the accident were good and more than adequate for a visual approach to be authorised. However, the pilot's comment to Brisbane Approach that in-flight visibility was reduced might have been caused by one of the rain showers observed in the area around the time of the accident. Also, because the pilot was not familiar with the area, he did not know what ground features to look for to locate the runway. These influences may have led to some anxiety on the part of the pilot. At the same time, the two requests by Approach to report the runway in sight might have been perceived by the pilot as additional pressure and further channelled his attention outside the cockpit. While his attention was outside the cockpit, he denied himself the information from the CDI as to the aircraft's position in relation to the runway centreline. In fact, in the visual meteorological conditions prevailing, and even though he did not hold a current ILS Rating, the pilot could have conducted a practice ILS approach and thus flown down the Runway 01 extended centreline until he located the runway visually. 2.2.2 What appeared to have been of significance in the pilot locating the decommissioned runway was the heading change left he made when advised by ATC that the aircraft was about one mile right of centreline. The net result of this was, in effect, to position Runway 01 about 40 degrees right of the nose of the aircraft. When the pilot reported the runway in sight, he was looking directly ahead of the aircraft (i.e. towards the decommissioned runway) instead of the 1.30 o'clock position towards Runway 01. 2.2.3 A number of reasons can be advanced for the pilot continuing the approach to the late stage that he did before commencing an overshoot. Firstly, there was the appearance of the decommissioned runway, including its orientation close to that of Runway 01, visible centreline markings, and absence of white unserviceability crosses. Secondly, while the pilot was in some doubt as to whether he was approaching the correct runway, this doubt was not confirmed until very late in the approach when he noticed the CDI indicating the aircraft to be well left of centreline. Finally, there were no obstructions apparent to the pilot in the undershoot area or runway vicinity which would have prompted him to go around from the approach.

Notwithstanding these aspects, there were also many visual features which could have made the pilot realise earlier that he was approaching the wrong runway. That these were not seen or acted upon by him is indicative of his attention being channellised towards the runway and not its environs. This is considered a normal mode of pilot behaviour during the final stages of an approach. 2.3 The Approach into Brisbane - ATC Aspects 2.3.1 The pilot reported the runway in sight when the aircraft was about 3.5 miles (6.5 kilometres) from the threshold of Runway 01 or two miles (3.5 kilometres) from the threshold of the decommissioned runway. The aircraft was then transferred to Brisbane Tower frequency from which point there was no further requirement for it to be monitored by the Approach Control. In any case, the Approach Radar Display was not capable of providing a meaningful indication of the aircraft's position at this close range with respect to the Runway 01 extended centreline. 2.3.2 Tower was advised by Approach Control that the pilot did not report sighting the runway until about 3.5 miles from the threshold of Runway 01 as part of the handover of control of the aircraft to Tower. Tower had no reason to expect other than for the aircraft to have been on the normal line of approach for Runway 01. It was reasonable for some time to elapse while attempts were made to sight the aircraft in this area. When no sighting was made, the approach to the decommissioned runway was checked. In the event, the aircraft was not seen in this area until just after it had crashed. However, there were reasons for this. 2.3.4 Looking from the Tower at the last 1.5 miles (2.8 kilometres) of approach to Runway 01 the change in azimuth was from 181` M to 157`M. For the decommissioned runway, the change was from 208`M to 202`M. At one mile from the threshold for Runway 01, the aircraft was about 3.5 kilometres from the Control Tower. At one mile from the threshold of the decommissioned runway, the aircraft was almost six kilometres from the Control Tower. Thus, in attempting to sight the aircraft on approach to the decommissioned runway, the Tower Controllers were confronted by a target with small lateral movement at a substantial distance. The problem of visual acquisition was compounded by the light colour of the aircraft against an urban background, its small size, and the fact that its landing light was not on during the approach. 2.4 Runway 04 Markings 2.4.1 Aeronautical Information Publication Australia (AIP), Aerodromes and Ground Aids (AGA) details the requirements for aerodrome markings. AGA-5-3-2 refers to Unserviceable Areas and states that the limits of unserviceable areas are delineated by white cone markers painted with a 0.25 metre wide horizontal red band. It also states that, except in the case of total (aerodrome) unserviceability or restricted operations, unserviceable areas on the movement area are marked by the display of unserviceability cross markers on the affected area. Such a marker consists of a white cross with arms at least 6 metres long and 0.9 metres wide. 2.4.2 The six white with horizontal red band cone markers across the runway 210 metres from the southern end marked the northern limit of an unserviceable area adjacent to the road and boundary fence. This area should have been marked with white unserviceability crosses. Had it been so marked, the pilot might have seen the crosses and become aware earlier that he was approaching the wrong runway. 3. CONCLUSIONS 3.1 Findings 1. The pilot was medically fit, correctly licenced, and qualified to undertake the flight. 2. No evidence was found that the aircraft was not capable of normal operation at the time of the accident. 3. The pilot did not, before the beginning of the flight, study all available information appropriate to the intended operation. 4. Weather conditions were suitable for the aircraft to conduct a visual approach. 5. The procedures followed by Brisbane Approach Control and Brisbane Tower during the lead up to the accident were reasonable and in accordance with approved procedures. 6. The pilot misidentified the decommissioned Runway 04 at the old Brisbane Airport for Runway 01 of the current airport. 7. The characteristics of the Brisbane Approach Control radar display precluded an accurate assessment of the aircraft's position in azimuth during the latter stages of the approach. 8. Brisbane Tower was unable to visually locate the aircraft during its final approach. 9. There were no white unserviceability crosses on the southern end of the remaining section of the decommissioned Runway 04. 10. The pilot did not see the light pole against the runway surface background. 11. The pilot elected late in the approach to Runway 04 to discontinue the approach and go around.

Significant Factors:

1. The pilot was unfamiliar with Brisbane Airport and its environs.

2. The pilot's preflight preparation was inadequate in that he did not, before the beginning of the flight, study all available information appropriate to the intended operation.

3. Probably because of concern or apprehension on his part, the pilot's attention was channelised outside the cockpit towards sighting the runway. He was thus denied cockpit information via the CDI indicator as to the aircraft's position in relation to the Runway 01 centreline.

4. The southern end of the remaining decommissioned section of Runway 04 was not marked with white unserviceability crosses.

5. The pilot did not see the light pole.