Aviation Safety Investigation Report 199500424

Beech Aircraft Corp
Travel Air

17 February 1995

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Aviation Safety Investigation Report

199500424

Occurrence Number: 199500424 **Occurrence Type:** Accident
Location: 1 km W Diamond Head
State: NSW **Inv Category:** 3
Date: Friday 17 February 1995
Time: 1137 hours **Time Zone** ESuT
Highest Injury Level: Fatal
Injuries:

	Fatal	Serious	Minor	None	Total
Crew	1	0	0	0	1
Ground	0	0	0	0	0
Passenger	1	2	0	0	3
Total	**2**	**2**	**0**	**0**	**4**

Aircraft Manufacturer: Beech Aircraft Corp
Aircraft Model: 95-B55
Aircraft Registration: N9124S **Serial Number:** TC-1940
Type of Operation: Non-commercial Pleasure/Travel
Damage to Aircraft: Destroyed
Departure Point: Port Macquarie NSW
Departure Time: 1130 ESuT
Destination: Launceston TAS

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	Private	840.0	2348

Approved for Release: Wednesday, August 7, 1996

Factual Information

History of the flight

The purpose of the flight was to attend air races near Launceston. The flight had been planned for some weeks and had been the subject of discussion between the pilot, his wife, professional colleagues and local aero club members. Aspects discussed included the route and altitude to be flown. It was the understanding of those involved in the discussions that the pilot intended to conduct the flight under the instrument flight rules (IFR).

On the day of the flight, the weather at Port Macquarie was reported by witnesses to have been overcast with a cloud base about 400 ft above ground level (AGL) and intermittent rain.

A male passenger, who held a restricted private pilot licence and had limited flying experience, assisted the pilot in loading the aircraft. The pilot told him that he intended flying in accordance with the visual flight rules (VFR) coastal to Nowra and, if there were any delays in obtaining clearance through the Nowra restricted area, he would proceed IFR inland. However, the pilot stated that he had been told that the weather improved further south.

The pilot invited the male passenger to occupy the front right seat. The female passenger occupied the left rear seat, and the pilot's wife, who also had limited flying experience gained some years previously, the right rear seat. The male passenger secured his sash harness and noticed that the pilot fastened his lap harness only.

The male passenger reported that as soon as the pilot had retracted the landing gear after takeoff, he motioned for the male passenger to take control and fly the aircraft. The passenger placed his hands on the control yoke and the pilot then told him to turn towards the coast and to remain below the cloud. The passenger recalled the aircraft reaching the coast at Lake Cathie (about 13 km south of Port Macquarie Airport) and noticed that the altimeter was reading about 300 ft. He then turned the aircraft right to track south along the coast. The cloud was unbroken overcast and the aircraft was just below the cloud base.

A few kilometres further south, the aircraft overflew a built-up area near the coast and the pilot's wife commented that the aircraft was too low. The pilot then placed his hands on the control yoke and the male passenger removed his hands, assuming the pilot was taking control of the aircraft, even though nothing was said. A short time later, the female passenger saw the pilot's wife release her seat harness and lean across, in a semi-standing position, to again say to the pilot that the aircraft was too low. The male passenger recalled at this time, that the aircraft was heading for Diamond Head, and that the top of the hill was shrouded in cloud. He could see the ocean to the left of the aircraft and expected the pilot to turn in that direction. However, the pilot continued straight ahead and did not appear in any way concerned as to the progress of the flight. The male passenger indicated that he was tempted to try to take control of the aircraft but was convinced not to do so by the pilot's demeanour and his knowledge of the pilot's flying experience. The last clear recollection the male passenger had of the flight was seeing trees 10 m or so below the aircraft. Sometime later, he regained consciousness and extricated himself from the wreckage. The female passenger was trapped in the wreckage and later released by rescue services.

The aircraft had struck the slope of a 60 m high hill, bounced, and come to rest about 100 m from the initial impact point in an area of thick trees at the top of the hill.

Pilot information

The pilot held a valid private pilot licence and command multi-engine instrument rating.

The pilot's logbook showed that he began flying in 1978, although he may have had some experience prior to this. Of the total flying time of 2,348 hours recorded, 840 were in Beech Baron type aircraft. Some 10 flying hours were recorded as having been flown in the past 90 days, and 2 hours in the past 30 days.

Aircraft information

The aircraft was purchased by the pilot in the USA and brought to Australia in mid to late 1989 carrying US registration N9124S. It retained this registration at the time of the accident.

The most recent entries in the airframe and engine logbooks for the aircraft were for an annual inspection dated 26 October 1990, carried out in Australia. Some records of maintenance work carried out on the aircraft since then were located. This work did not conform to any maintenance schedule for the aircraft but was directed on an ad hoc basis by the owner. There was no record found of regular maintenance, such as 100-hourly inspections having been conducted nor was there any record of maintenance conducted in accordance with the US Federal Aviation Administration (FAA) system. The pilot's logbook indicated that since October 1990 he had flown in excess of 500 hours in N9124S.

No record was found of the following US FAA airworthiness directives having been complied with on the aircraft:

1. AD 90-08-14 requires the inspection of the wing forward spar carry-through web structure every 500 flight hours. The most recent record of this inspection being performed was in October 1990.

2. AD 91-17-01, issued on 25 October 1991, was to prevent loss of control of the aircraft because of interchanging the right and left elevator trim tab actuators. There was no record of this inspection having been complied with.

There was also no record of any flight or navigation instrument having been calibrated after 26 October 1990.

Meteorological information

The Bureau of Meteorology advised that at 1000 on 17 February 1995, a cold front extended north through the Tasman Sea from a deep low pressure system south of Tasmania. The front had progressed along the coastal regions of NSW and was in the vicinity of Yamba at 1037. A deep, moist, southerly airstream was flowing on to the coastal regions causing low cloud and rain showers.

The estimated conditions in the area of the accident were as follows: wind 140/08 kts, showers and rain throughout the area, overcast stratus/cumulus base 200 ft above sea level, visibility 10 km reducing to 1,500 m in showers and rain, temperature 27 degrees C, barometric pressure 1011 hPa.

The Area 20 (including from Port Macquarie to Sydney) amended forecast, issued at 0934 and covering the period of the flight, was for scattered showers and drizzle about the sea, coast and ranges with areas of low cloud east of the ranges and in precipitation. The Area 21 (including Sydney south to Moruya) amended forecast issued at 0926, and covering the period of the flight, was for low cloud with showers persisting coastal and east of the ranges.

There was no record of the pilot having accessed the Aviation Meteorological and NOTAM Facsimile Service (AVFAX) in the period 14-17 February 1995. It was not determined whether the pilot accessed the Automatic Meteorological Telephone Briefing Service (DECTALK) prior to the flight.

Witnesses at a campsite at the base of the hill struck by the aircraft reported that the top of the hill was obscured by cloud at the time of the accident.

Communications

An examination of the Air Traffic Services automatic voice recording of air-ground communications covering the period of the flight did not reveal any radio transmissions from N9124S.

An AVDATA logging recorder is located at Port Macquarie Airport to record aircraft transmissions made on the local mandatory traffic advisory frequency (MTAF) for the purpose of levying charges on aircraft operating to or from the airport. The recording covering the period of the flight of N9124S was examined. However, no transmissions that could be identified as originating from N9124S were detected.

Wreckage and impact information

The aircraft struck the western slope of a ridge 2.2 km west of Diamond Head at a height of about 50 m above mean sea level (AMSL) while heading in a south-easterly direction and in a very shallow descent. The impact position was some 13 m below the top of the hill. The aircraft bounced from the initial impact position and contacted the ground again 45 m further on, before sliding 60 m into an area of dense scrub. The aircraft remained upright throughout the sequence.

Wreckage examination revealed that the outboard wing sections had failed and that both engines were torn from their mounts. The remainder of the aircraft was relatively intact. The landing gear was in the retracted position. The flaps were extended approximately 16 degrees although the position selector was in the 'up' position and the position indicator showed fully up. The cabin floor was partially disrupted, but all seats remained attached to the seat rails. There were no seat belt failures.

The airspeed indicator, encoding altimeter, vertical speed indicator, auto-pilot turn co-ordinator, instrument air gauge, attitude gyro, pictorial navigation indicator, remote slaved directional gyro, course select indicator, radio magnetic indicator, both vacuum pumps and their associated filters and regulators, were removed from the aircraft and tested. All components met test specifications except the following.

1. Pictorial navigation indicator. This instrument was damaged in the accident and tested inoperative because of a missing cable connector pin in connector P1 on the rear of the instrument. There was evidence that some attempt had been made in the past to repair the pin. Impact damage had caused the drive gears on the heading bug to be disconnected. The operational status of the instrument before impact was not determined.

2. Remote slaved directional gyro. This instrument showed evidence of moisture ingress. The rotor housing gymbal assembly was out of position and all rotor bearings were unserviceable at the time of the inspection. The operational status of the instrument before impact was not determined.

3. VOR/localiser indicator/converter. This instrument was visually undamaged. However, bench tests revealed that the unit was out of tolerance on most radials, with errors of up to 6 degrees (the tolerance is 2 degrees for aircraft certified for instrument flight). These errors were probably present before impact.

The encoding altimeter was indicating 160 ft in the aircraft wreckage, with the subscale set at 1011 hPa.

At the initial impact position, there were a number of distinct propeller blade tip marks on the ground. The distance between the marks for both the left and right propellers was one metre. At an engine cruise RPM of 2,200, this distance between blade marks equates to an aircraft speed of 143 kts.

The aircraft was fitted with a Narco ELT 10 Locator Beacon which was recovered from the wreckage undamaged, with the switch in the armed position. The beacon had not activated during the impact sequence. The battery change date written on the unit was 28 September 1992. Examination of the beacon revealed that the g-switch had been activated and that the battery voltage was at the required level. The beacon was functionally tested and performed normally.

Medical information

There was no evidence that the pilot had any medical condition which might have contributed to the accident.

Survival aspects

The pilot died from head injuries received when his upper body was thrown forward against the instrument panel, probably at the initial impact. The pilot's wife was ejected from the aircraft during the impact sequence and died of multiple injuries.

The male passenger occupying the front right seat had his lap/sash harness secured during the flight. He received serious back injuries from the impact but was able to extricate himself from the wreckage unaided. The surviving female passenger had her lap belt secured for the flight. She received serious back injuries and was removed from the wreckage by rescue personnel.

Pilot's instrument flying history

The pilot had recorded a total instrument flying time of 242 hours. However, there was no record of instrument flying (other than instrument rating renewals, and practice for these renewals) after November 1992. The recorded yearly total, and instrument, flying hours since November 1992 were as follows:

Period	Total Flying Hours	Instrument Flying Hours
1992	125	5.8

1993	117	1.0
1994	44	5.6
1995 (January)	1.7	1.7

Pilot's flying history - other aspects

On 1 January 1990, at 2120, the pilot was the subject of an air safety incident report concerning a flight from Maitland to Bankstown in N9124S. The aircraft penetrated controlled airspace between 9 and 15 NM north of Sydney Airport and was involved in a breakdown in separation with a regular public transport aircraft on approach to Sydney. The pilot had departed Maitland without having obtained weather forecasts, and attempted to fly the route visually at night. Weather conditions were poor with Bankstown Airport closed to all operations. Flight service had no information on the aircraft and the pilot's first radio communications with any unit was when he contacted Bankstown Tower. The aircraft subsequently landed at Bankstown.

There was some anecdotal evidence obtained during the investigation concerning the pilot's flying habits which was relevant to the circumstances of this accident:

1. It was reported that the pilot had flown into Bankstown visually on a number of occasions when the weather was not suitable for visual flight.

2. It was reported that N9124S, when flown by this pilot, was one of a group of aircraft which flew from Bankstown to Lord Howe Island and return. The pilot conducted the flights visually at 2000 ft, while all other aircraft in the group flew in accordance with IFR procedures at 8,000 to 10,000 ft.

Flight planning

The Civil Aviation Authority held no flight plan information on the aircraft. The male passenger indicated that he did not see any flight planning information, such as a pilot flight plan or map or chart held or consulted by the pilot at any stage during the flight.

Several maps and charts were found in and around the wreckage. These included departures and approach procedures charts, visual terminal charts (VTC) for Sydney/Newcastle and Hobart/Launceston, Enroute Charts Low L3 and L4, a terminal area chart folded at Launceston, and some blank flight plan forms. The Hobart/Launceston VTC was open at Launceston and some prominent features on the chart were circled. On the back of another chart were handwritten altitude minima and frequencies for the Launceston navigation aids.

Aircraft registration history

In September 1991, the pilot, as owner of the aircraft, wrote to the FAA requesting that the aircraft be removed from the US register (this was a pre-requisite for Australian registration). Included in this letter was advice that legal action against the vendor had been initiated for, amongst other things, a bill of sale to be issued. In response, the FAA advised that ownership issues had to be resolved before registration could be cancelled. A representative of the pilot advised, after the accident, that the legal action was concluded in late 1994 in favour of the pilot.

Visual flight rules (VFR)

The Aeronautical Information Publication Australia (AIP), RAC - 23, lists the visual flight rules (VFR). It states that VFR flight may only be conducted in visual meteorological conditions (VMC). VMC - takeoff, en route, and landing, in non-controlled airspace, for aeroplanes - is described at AIP RAC - 25 as follows:

1. For an aircraft flying at or below 3,000 ft AMSL or 1,000 ft above terrain, whichever is the higher,

2. Visibility - 5,000 m, and

3. Clear of cloud.

No evidence was found that the pilot had received a low-flying endorsement or any low flying training.

Analysis

The actual weather at Port Macquarie and the weather forecasts indicated that the weather was not suitable for flight under the VFR. The official weather information did not indicate that the weather improved to the south, as the pilot was reported to have indicated to the male passenger. While it was established that the pilot had not accessed the AVFAX system for a weather forecast, he may have obtained weather infomation by telephone (DECTALK or some other source). While the DECTALK information would have been the same as that from AVFAX, another source could have provided different information which encouraged the pilot to undertake the flight.

The fact that the weather conditions did not meet the criteria for flight under the VFR was not, in itself, a factor in the accident. However, it is self evident that the lower the cloud base, the higher the skill level required to fly and navigate an aircraft safely below the cloud. Information from the male passenger and ground witnesses confirmed that the aircraft was flying very low just below the cloud base throughout the flight. It appears likely that the cloud base became progressively lower as the flight continued, being around 300 ft when the aircraft first crossed the coast, and decreasing to about 160 ft where the accident occurred. There was evidence that the pilot had operated in marginal weather conditions previously and reached his destination. This may have given him confidence that he could successfully undertake the accident flight.

No explanation was found as to why the pilot, on the one hand, maintained an instrument rating and indicated his intention to conduct the flight under the IFR, while in the event attempted to conduct the flight visually. The fact that the pilot did not submit a flight plan for the flight indicated that he did not intend to conduct the flight under the IFR.

A safe option available at any stage during the flight was for the pilot to place the aircraft in a climb towards the east (over the ocean), and request assistance from flight service or air traffic control. There was no evidence that the pilot attempted this course of action.

The impact attitude and angle of the aircraft indicates that no attempt was made to avoid the rising ground. It could not be established whether the pilot was aware of the rising ground ahead of the aircraft.

Both the pilot and his wife received injuries directly attributable to their manner of restraint within the aircraft cabin. In view of the extent of the injuries to the surviving passengers, it is likely that the pilot and his wife would have survived the accident had the pilot's shoulder harness, and his wife's lap harness, been secured.

There was no indication that the aircraft was not capable of normal flight under visual conditions at the time of the accident. Although some abnormalities were identified with respect to the aircraft registration, maintenance history, and instruments, these are not considered relevant to the circumstances of the accident. There was no indication that any aircraft abnormality influenced the pilot's decision to attempt the flight in visual conditions below cloud.

The position of the flaps in the aircraft wreckage indicated that the pilot was operating the aircraft with the flaps in the approach position. This would have allowed the pilot to operate the aircraft in the speed range 122-153 kts while maintaining good manoeuvrability. The calculated aircraft speed at impact of 143 kts, based on cruise engine RPM of 2,200 and the measured distance between the propeller blades' marks on the ground, fell within the approach flap speed range.

Findings

1. The pilot held a valid pilot licence and was endorsed on the aircraft type.

2. The pilot held a valid command multi-engine instrument rating.

3. The aircraft was purchased by the pilot in mid-1989 and entered Australia carrying US registration N9124S which it retained at the time of the accident.

4. There was no record of the aircraft being maintained in accordance with either the US or Australian requirements after an annual maintenance inspection conducted in Australia on 26 October 1990.

5. The coastal weather at, and to the south of, the departure airport consisted of low cloud and showers.

6. It could not be determined whether the pilot obtained any actual or forecast weather information prior to the flight.

7. No record was found of the pilot making any radio transmissions before or during the flight.

8. When the aircraft departed Port Macquarie, it tracked to the coast and thence south, remaining below the cloud base.

9. The aircraft struck the western slope of a ridge 2.2 km west of Diamond Head at a height of about 50 m above mean sea level while heading in a south-easterly direction and in a very shallow, wings-level descent.

10. At impact, the aircraft landing gear was retracted and the flaps extended approximately 16 degrees.

11. Aircraft speed at impact was in the range of 122-153 kt.

12. The pilot did not have his shoulder harness secured at impact.

13. The pilot's wife did not have her seat belt secured at impact.

14. The accident was survivable.

Significant factors

1. The weather along the intended route was not suitable for visual flight.

2. The pilot attempted to conduct the flight visually below cloud.

3. The pilot did not maintain separation from rising terrain.

Safety Action

As a result of the investigation, the Bureau of Air Safety Investigation made the following interim recommendation.

IR950205

The Bureau of Air Safety Investigation recommends that the Civil Aviation Safety Authority:

(i) require importers of foreign-registered aircraft to obtain Australian registration for such aircraft within a finite period of the aircraft arriving in Australia; and

(ii) require airworthiness surveillance of privately operated foreign-registered aircraft to ensure compliance with minimum maintenance inspection requirements.

The Civil Aviation Safety Authority response to the interim recommendation is reprinted below.

I refer to your interim recommendation number IR 950205 concerning the accident involving Beech 95-B55, N9124S on 17 February 1995.

Summary

The recommendation is not accepted insofar as it would not prevent a similar act of non-compliance. There is little to be gained by placing a limit on the period that a foreign registered aircraft may be operated privately in Australia. The real question is the extent of surveillance and enforcement action that CASA should devote to private operations. At present, private operations are not addressed in Part 5 of the Policy Manual which specifies the Director's 1995/96 National Surveillance Priorities.

Response classification: Open