

**Aviation Safety Investigation Report  
200002648**

**Beech Aircraft Corp 70**

**24 June 2000**

Readers are advised that the Australian Transport Safety Bureau investigates for the sole purpose of enhancing transport safety. Consequently, Bureau reports are confined to matters of safety significance and may be misleading if used for any other purposes.

Investigations commenced on or before 30 June 2003, including the publication of reports as a result of those investigations, are authorised by the CEO of the Bureau in accordance with Part 2A of the Air Navigation Act 1920.

Investigations commenced after 1 July 2003, including the publication of reports as a result of those investigations, are authorised by the CEO of the Bureau in accordance with the Transport Safety Investigation Act 2003 (TSI Act). Reports released under the TSI Act are not admissible as evidence in any civil or criminal proceedings.

**NOTE: All air safety occurrences reported to the ATSB are categorised and recorded. For a detailed explanation on Category definitions please refer to the ATSB website at [www.atsb.gov.au](http://www.atsb.gov.au).**

**Occurrence Number:** 200002648  
**Location:** 2km NW Leonora, Aerodrome  
**Date:** 24 June 2000  
**Highest Injury Level:** Serious  
**Injuries:**

**Occurrence Type:** Accident  
**Time:** 1740 WST

	Fatal	Serious	Minor	None
Crew	0	1	0	0
Ground	0	0	0	-
Passenger	0	5	0	0
<b>Total</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>

**Aircraft Details:** Beech Aircraft Corp 70  
**Registration:** VH-MWJ  
**Serial Number:** LB-29  
**Operation Type:** Non-commercial Business  
**Damage Level:** Destroyed  
**Departure Point:** Leonora WA  
**Departure Time:** 1740  
**Destination:** Laverton WA

**Approved for Release: 22 December 2000**

#### FACTUAL INFORMATION

The Beechcraft Queen Air and Rockwell Aero Commander were being used by a company to conduct private category passenger-carrying flights to transport its workers from Leonora to Laverton in Western Australia. The Aero Commander had departed and was established in the Leonora circuit area when the Queen Air took off. The pilot and one of the passengers of the Queen Air reported the take-off roll appeared normal until the aircraft crossed the runway intersection, when they felt a bump in the aircraft. The pilot reported hearing a loud bang and noticed that the inboard cowl of the right engine had opened. He also reported that he believed he had insufficient runway remaining to stop safely, so he continued the takeoff. The cowl separated from the aircraft at the time, or just after the pilot rotated the aircraft to the take-off attitude. He reported that although the aircraft had left the ground after the rotation, it then would not climb. The aircraft remained at almost treetop level until the pilot and front-seat passenger noticed the side of a tailings dump immediately in front of the aircraft. The pilot said that he pulled the control column fully back. The aircraft hit the hillside parallel to the slope of the embankment, with little forward speed. The impact destroyed the aircraft. Although the occupants sustained serious injuries, they evacuated the aircraft without external assistance. There was no post-impact fire. The aircraft-mounted emergency locator transmitter (ELT) did not activate.

The Aero Commander pilot reported the accident to Perth Flight Service at 1746. Flight Service advised the local police of the accident at about 1750, however, the police were unable to locate the occupants until about 1848 because the details of the aircraft's whereabouts provided by the Aero-commander pilot were inaccurate.

#### Sequence of events

Three days before the accident flight, the Queen Air was privately hired from its owner and used to transport ten workers from Manjimup to Leonora. During the return flight to Manjimup, the pilot discovered that the left engine

had developed a fuel leak and the right engine's oil pressure indication was low. The pilot returned the aircraft to Leonora and landed without further incident. He then returned to Manjimup using a commercial air service.

On the day of the accident, the original Queen Air pilot (pilot A) returned to Leonora in the Aero Commander. He was accompanied by a Licensed Aircraft Maintenance Engineer (LAME), another passenger and another pilot (pilot B). Pilot B was to fly the Queen Air to Manjimup.

By about 1330, the LAME had repaired the left engine. Pilot A then conducted a test flight and after landing, the aircraft was shutdown and checked. He then conducted a .6 hour refamiliarisation flight with pilot B. Both pilots reported that the flight included upper air work and three circuits. The aircraft landed at about 1600.

After the refamiliarisation flight, the aircraft was again shutdown and further maintenance was conducted on the left engine. The LAME reported that while he conducted maintenance on the left engine, both pilots were standing next to the right engine with the inboard cowl of the engine open. He reported that the pilots had found a set of pliers in the engine bay. Once he had ascertained that the pliers were not his, the LAME said that he went back to work on the left engine. He reported that he did not do any subsequent maintenance on the right engine and therefore did not check the security of the cowl of the right engine before the aircraft flew again. Pilot B said that he was assisting the LAME at the left engine and that pilot A had found the pliers in the right engine bay. A witness reported that pilot A had opened the right engine cowl and retrieved the pliers however, pilot A reported that pilot B had unfastened the cowls on the right engine to check for a small oil leak.

The pilots' original intentions were that once the Queen Air was repaired, the two aircraft would return the passengers to Manjimup. However, after the test and refamiliarisation flying had been completed, and during the planning for the flight to Manjimup, the pilots decided that the weather at Manjimup was unsuitable for VFR flight. They decided to conduct the flight the following day. Consequently the pilots, LAME and passengers went to Leonora Township to find accommodation for the night and at about 1700 they met in a local hotel. Because there was insufficient accommodation available in Leonora, the group decided to fly to Kalgoorlie that afternoon. The pilots then became concerned about the wet weather approaching Kalgoorlie and Leonora, so they decided to fly both aircraft and all the passengers to Laverton for the night. Laverton was located about 15 to 20 minutes flying time north of Leonora.

Pilot A, who was flying the Aero Commander, reported that he had conducted the takeoff in daylight conditions at about 1710. Pilot B, flying the Queen Air, reported that he had started the engines at the same time as pilot A had started the Aero Commander's engines but the time was about 1720. He reported that he had conducted the takeoff in daylight conditions soon after. Documentary evidence indicated that the Aero Commander had been refuelled at about 1726. A witness reported that when he was leaving the airfield, he saw the passengers about a kilometre from the airfield and walking towards it at about 1710. Another witness reported seeing the passengers still walking towards the airfield at 1720 and that the aircraft were both on the tarmac without the engines running. One of the passengers of the Queen Air recalled seeing the Aero Commander depart at about 1730.

One of the passengers in the Aero Commander reported that it was getting dark with the sun just above the horizon when he embarked in the aircraft while pilot A conducted post-refuel checks. He also reported that the Aero Commander taxied about 10 minutes after refuelling and that the Queen Air had not started at the time they taxied.

One of the witnesses also reported hearing the aircraft start at about 1735 and seeing one of the aircraft takeoff soon after and circle the airfield. He also reported hearing the police sirens at about 1755. The police running sheet shows the police responded to the accident at 1755.

Pilot B reported that he had conducted the run-up checks on the apron before taxiing to the runway and backtracking to the threshold of Runway 30. He reported that during the takeoff roll he felt a "substantial impact" when the aircraft crossed the runway intersection. The passenger occupying the front passenger seat reported feeling a "fair bump" as the aircraft crossed the intersection. Pilot B said that it was after the bump that he heard a, "loud metallic bang". He reported that the noise caused him to look across the cockpit and out the right side window. He noticed the inboard cowl of the right engine opening in the propeller slipstream. The front seat passenger recalled seeing the cowl open when the aircraft experienced the bump. He said that the cowl fully opened as the aircraft left the ground and soon after, fell away. Another passenger recalled seeing the cowl open and come off before the aircraft took off.

Pilot B recalled having set a power of 45 inches of manifold air pressure (maximum continuous power) on the engines. He also recalled rotating the aircraft to lift off at 85 kts when he saw the engine cowl fall away. He said that he maintained the power setting because he, "was being very careful to avoid an overboost (engine) condition" and that the aircraft would not climb, remaining just above treetop level. He then saw the tailings dump embankment. He said that at about that time, the front seat passenger was telling him to pull up. He pulled back on the control column and the aircraft pancaked onto the embankment.

A passenger located in the Aero Commander, reported seeing the Queen Air "wallowing at low speed" just after it took off. He said that he saw the aircraft's landing lights illuminate the tailing dump before the aircraft pitched-up and bank to the right before hitting the hill. Pilot A reported the accident to Perth Flight Service but the details initially passed indicated that the aircraft had hit the ground on the airfield. The tailings dump was about 1 km beyond the airfield boundary.

#### Weather information

Last light for Leonora on the day of the accident was at 1732. There was mid- to high-level cloud with the lowest base being about 16,000 ft over the Leonora area. The wind was a light north-westerly.

#### Airfield information

Runway 12/30 was the only useable runway at Leonora airfield at the time of the accident because extensive works were being conducted on the main runway. Runway 12/30 was not lit and was therefore, unsuitable for use at night.

#### Pilot Information

Pilot B had extensive experience flying single engine aircraft but had last flown a twin-engine aircraft at night 3 years prior to the familiarisation flight. He had not flown a Queen Air for 7 years. He had advised the owner of the Queen Air that he had 300 hours flying experience in the Queen Air aircraft type. However, his pilot's logbook revealed that he had accumulated a total of just 30 hours flying experience in the type of which about 6 hours were as pilot in command. He subsequently reported that he had gained many more, "unofficial", hours in the Queen Air.

His licence was not endorsed with a night visual flight rules (NVFR) rating and his single engine instrument rating had expired 10 months prior to the day of the accident. His multi-engine command instrument rating had expired 6

years previously. The pilot's interpretation of the regulations and orders was such that he claimed that he did not require a NVFR rating because he previously held an instrument rating. The Civil Aviation Safety Authority reported that the pilot's interpretation of the requirements was incorrect.

The pilot who conducted the refamiliarisation flying reported that the accident pilot handled the aircraft well during the short refamiliarisation flight.

### Wreckage Examination

The aircraft hit half way up the embankment of a tailing dump about 1.7 kms from the runway and slightly left of the extended centreline. The embankment was about 30 ft high, with a 38-degree slope. The trees between the runway and the embankment were about 3 to 5 m tall. The fuselage had failed at the rear window line and twisted to the left. The cabin door was torn off and the right cabin windows were broken. The rear left seat had separated from the seat rails and the forward cabin ceiling lining had collapsed onto the seats. A small aluminium ladder was on the rear right seat. Several small hand tools and three protective helmets were in the rear of the cabin. All the cargo was unrestrained although a cargo tie-down net lay loosely in the rear of the cabin. The remote ELT control switch was in the armed position but the ELT had not activated. The ELT was undamaged and mounted correctly behind the rear cabin bulkhead. A subsequent inspection of the ELT found no fault with the unit.

The inboard cowling of the right engine was missing from the wreckage. It was found resting to the right side of the runway, about 850 m from the threshold of runway 30. An engineering inspection of the engine bay and cowl found that all its latches and locking mechanisms were serviceable. The two top hinges had failed in overload. The cowl was otherwise in good condition.

The left propeller and reduction gearbox, both main gears and the lower nose gear had all separated during the accident. Damage to the blades of both propellers was consistent with both engines delivering power at impact. A considerable quantity of Avgas was drained from both wing tanks during the recovery operation. Evidence indicated that both engines were capable of normal operation at the time of the accident.

The aircraft was not fitted, nor was it required to be, with a flight data or voice recorder.

The aircraft's maintenance release had not been completed during the 8 days prior to the accident including the maintenance conducted on the day.

### ANALYSIS

The examination of the Queen Air wreckage found no mechanical fault that may have contributed to the accident sequence other than the inboard cowl of the right engine detaching during the takeoff. The cowl latching mechanisms appeared to have been capable of operating normally. The two top hinges failing in overload associated with the lack of cowl latch damage suggested that the cowl was probably improperly secured before takeoff. The cowl appeared to have subsequently opened when it experienced the jolt when the aircraft crossed the runway intersection. The lack of any further cowl damage indicated that it detached cleanly and consequently its dislodgment should not have adversely affected the flying qualities of the aircraft.

After the refamiliarisation flight there were several decisions made about the aircraft crews and passengers either remaining at Leonora or transiting to another airfield. These decisions culminated during the 1700 meeting at the

local hotel where the pilots decided to depart Leonora for Laverton. However, there was only about 30 minutes of daylight remaining in which the departure could legally be made due to the lack of runway lighting at Leonora.

Because only a short period of daylight remained, the flight to Laverton was to be a night transit although pilot B's instrument ratings had lapsed and he was not rated to fly at night. Due to pilot B's lack of experience and currency in the Queen Air, it was unlikely that the refamiliarisation flight was adequate to ensure that he was fully able to conduct a night flight in the aircraft.

Despite the pilots' reports of takeoff time, the evidence suggested that the Queen Air took off from the Leonora airfield after last light. The ambient light conditions were dark or nearly dark although the horizon was probably visible in the direction the aircraft was facing when it took off. The discrepancy between pilot B's report of his time of takeoff and the evidence could not be resolved.

Without the availability of flight data or voice recorder information, the exact circumstances surrounding the accident sequence could not be established. Other than the loss of the engine cowl, there was no evidence of a pre-existing mechanical fault that may have contributed to the failure of aircraft to continue the climb on the reported power setting. The aircraft subsequently remained at a low height and low speed until the pilot and front-seat passenger saw the tailings dump embankment. When the pilot pulled back on the control column, the aircraft pitched nose up but did not appear to gain any height. The failure of the aircraft to gain appreciable height following the pitch up, associated with the aircraft hitting the wall at very low forward speed at or near a 38 degrees nose-up attitude appear consistent with the aircraft flying at low airspeed or, being in or near a stalled condition, before the pitch-up manoeuvre was attempted.

Despite pilot B recognising that the aircraft was not performing as expected, he did not attempt to use full power. The investigation could not determine whether the use of full power would have resulted in a different outcome. Pilot B's apparent overriding concern, however, about over-boosting the engines while the aircraft remained at tree top height after takeoff appeared to indicate that he was not applying the appropriate priorities in operating the aircraft. This may have been a consequence of the distraction he experienced when the cowling opened as well as his lack of experience and currency in the Queen Air, particularly at night.

The aircraft's low speed and high nose attitude resulted in the aircraft impacting parallel to the embankment with nearly all the impact forces acting perpendicular to the aircraft's attitude. The impact parameters and the unsecured equipment remaining in-situ contributed to the occupants of the aircraft surviving the accident.

The Civil Aviation Safety Authority is conducting a separate investigation into the regulatory aspects of the circumstances associated with the accident.