AIRCRAFT ACCIDENT REPORT No 2/2010

This report was published on 19 May 2010 and is available on the AAIB Website www.aaib.gov.uk

REPORT ON THE ACCIDENT TO BEECH 200C SUPER KING AIR, VQ-TIU AT 1 NM SOUTH-EAST OF NORTH CAICOS AIRPORT TURKS AND CAICOS ISLANDS, BRITISH WEST INDIES ON 6 FEBRUARY 2007

Registered Owner and Operator:	Air Turks and Caicos (2003) Limited
Aircraft Type:	Beech 200C Super King Air
Serial number:	BL-131
Nationality:	Turks and Caicos Islands
Registration:	VQ-TIU
Location of Accident:	1 nm south-east of North Caicos Airport, Turks and Caicos Islands, British West Indies (N21º 54.7′ W071º 55.0′)
Date and Time:	6 February 2007 at 1842 hours All times in this report are local (UTC-5)

Synopsis

The accident was reported to the Turks and Caicos Islands (TCI) Civil Aviation Department (CAD) on the evening of 6 February 2007. The same evening, a request for assistance was made to the United Kingdom Air Accidents Investigation Branch (AAIB), under the terms of a pre-existing Memorandum of Understanding; AAIB Inspectors arrived in the TCI on 8 February 2007. The TCI CAD appointed a TCI national as Investigator-in-Charge, tasked with conducting an investigation in accordance with the provisions of Annex 13 to the International Civil Aviation Organisation (ICAO) Convention. The investigation was conducted by: Mr P Forbes (Investigator-in-Charge), Mr K Fairbank (AAIB Operations), Mr P Thomas (Operations), Mr A Robinson (AAIB Engineering) and Mr K Malcolm (Engineering). The manufacturers of the aircraft, the engines and the propellers assisted during the later stages of the investigation.

VQ-TIU crashed soon after takeoff from North Caicos Airport, at the start of a flight bound for Grand Turk, TCI. On board were one pilot and five passengers. The pilot received fatal injuries in the accident; the passengers mostly suffered serious injuries, but all survived the accident. Weather conditions at the time were good, but it was after nightfall; the moon had not risen and there was little cultural lighting in the area.

The aircraft crashed into a shallow lagoon approximately one nautical mile south-east of North Caicos Airport. Wreckage was spread along a trail that extended in excess of 370 m along a track of 220°(M). The aircraft's fuselage had come to rest comparatively intact, although lying in an inverted attitude. Evidence from the accident site indicated that the aircraft had struck the water in a nominally upright attitude, with only a moderate rate of descent but at relatively high forward speed.

From a detailed examination of the wreckage and the circumstances of the accident, it was concluded that the aircraft was structurally intact and probably under control when it struck the surface. The evidence indicated that each engine was producing power throughout the short flight and at the time of impact. Although anomalies were found which suggested that a possible power asymmetry may have existed, this should not have been sufficient to cause the pilot serious control difficulties.

None of the passengers described an obvious problem with the aircraft during the flight, and most remained unaware of the impending crash. The circumstances of the accident suggested that the pilot became spatially disorientated, to the extent that the aircraft diverged from its intended flight path and reached an irrecoverable situation. The environmental conditions were conducive to a disorientation event, and a postmortem toxicological examination showed that the pilot had a level of blood alcohol which, although below the prescribed limit, was significant in terms of piloting an aircraft and would have made him more prone to disorientation.

The evidence indicated that the pilot had probably started a recovery to normal flight, but too late to prevent the accident. However, his actions had the effect of reducing the descent rate and placing the aircraft in a nearly level attitude at impact. This lessened the impact damage and helped preserve the fuselage structure relatively intact, increasing the passengers' chance of survival.

The investigation identified the following causal factors:

1. The aircraft adopted an excessive degree of right bank soon after takeoff. This led to a descending, turning flight path which persisted until the aircraft was too low to make a safe recovery.

2. The pilot probably became spatially disorientated and was unable to recognise or correct the situation in time to prevent the accident.

The investigation identified the following contributory factors:

1. The environmental conditions were conducive to a spatial disorientation event.

2. The pilot had probably consumed alcohol prior to the flight, which made him more prone to becoming disorientated.

3. The flight was operated single-pilot when two pilots were required under applicable regulations. The presence of a second pilot would have provided a significant measure of protection against the effects of the flying pilot becoming disorientated.

No Safety Recommendations are made.

Discussion

The available evidence, which shows that a significant change in aircraft attitude occurred late in the accident sequence, strongly suggests that the pilot was in control of the aircraft when it struck the surface, and was taking appropriate recovery action. Some conclusions may be drawn from this: the aircraft was controllable; the pilot was physically able to control it and was so doing; and he probably had sufficient information from the flight instruments, alone, to make correct control inputs.

The event which caused the actual and intended flight paths to diverge was not catastrophic. There were no unusual engine or other noises in the cabin, no particularly unusual forces were experienced by the aircraft occupants and there were probably no warning lights or sounds in the cockpit. Together with the lack of obvious concern on the part of the pilot as the flight path diverged, this indicates a subtle event or situation which developed unchecked until recognised by the pilot at a late stage, and even then possibly not fully.

It was not possible to rule out a subtle technical malfunction as a contributory factor, but the weight of evidence indicated that the pilot retained sufficient reliable information from his flight instruments to prevent or correct the attitude deviation which ultimately led to the accident. Similarly, it was not possible to rule out a subtle but transient medical condition which may have interfered with the pilot's normal functioning, although there was only circumstantial evidence to support the possibility.

The circumstances of the accident strongly suggest that the pilot became spatially disorientated. It was immediately after takeoff, it was dark with no reliable outside references and the pilot was operating as single crew. He had completed the after takeoff checks shortly before, which may have been an initiating distraction. It was probable that he had consumed alcohol at some time before the flight and his blood alcohol level, although not excessive, would have made him more prone to becoming disorientated. Although very experienced, the pilot had a potential weakness in his instrument scan technique. This and the turbulence the aircraft apparently encountered could also have contributed to any disorientation.

Spatial disorientation accidents are frequently fatal, as the pilot does not recognise the danger or is unable to effect a recovery. In this case the pilot did start a recovery and appears to have been taking appropriate recovery actions when the aircraft struck the surface. This had the effect of reducing the descent rate and placing the aircraft in an almost level attitude at impact. The pilot's actions, although initiated too late to avoid the accident, lessened the impact damage and helped preserve the fuselage structure relatively intact, which probably prevented greater loss of life.

Findings

1. The pilot was correctly licensed and qualified for the flight in accordance with existing regulations.

2. Aircraft maintenance records indicated that it was correctly equipped and maintained and that all required maintenance had been carried out.

3. The aircraft was within the applicable mass and balance limitations and carried sufficient fuel for the intended flight.

4. Weather conditions were generally favourable. Some turbulence was reported but this is unlikely to have been severe.

5. It was night, with little natural or cultural lighting. The pilot would not have had external visual references immediately after takeoff and would have been flying with reference to flight instruments.

6. Shortly after takeoff the aircraft rolled to the right, achieving an excessive bank angle. It descended in a banked attitude at an approximately constant descent angle, turning as it did so.

7. Passengers did not recall unusual noises, vibrations, accelerations or other significant events after takeoff, although some motions attributed to turbulence were reported.

8. The aircraft struck the surface with only a small amount of right bank and an approximately level pitch attitude, indicating that the pilot was probably attempting to recover from the situation.

9. The aircraft was intact at impact, with landing gear and wing flaps retracted.

10. There was no evidence of a pre-impact engine failure that would have prevented either engine from producing power.

11. A defect within the right engine FCU raised the possibility of a small power asymmetry, but would be unlikely to cause the pilot handling difficulties.

12. The propellers were operating in their governed range at impact. Damage to the propellers suggested that approximately symmetrical power was applied.

13. There was no evidence of a failure affecting the flying control systems.

14. The pilot was probably being presented with correct attitude information on his main attitude indicator.

15. The aircraft was probably under the control of the pilot at impact and was capable of controlled flight.

16. Impact was at a relatively high speed and there was no indication that the aircraft had stalled.

17. There was no pathological evidence to indicate that the pilot had become incapacitated in flight.

18. Conditions were conducive to spatial disorientation.

19. The pilot was operating as single crew, and there was some potential for distraction in the cockpit.

20. The pilot had probably consumed alcohol at some stage before the flight; the measured alcohol level in his system was below the applicable limit, but is likely to have increased his susceptibility to spatial disorientation.

21. The pilot's training records showed that he had demonstrated a satisfactory standard in handling in-flight emergencies such as engine failures, but a possible weakness in his instrument scan pattern had been identified.

22. Although the passengers had not paid for their seats, the flight should have been operated as a public transport flight.

23. The flight did not meet the regulatory requirements for public transport flights in respect of minimum flight crew and airport operating restrictions.

24. The presence of a second pilot on the flight deck would probably have lessened the chance of the accident occurring.

Safety Recommendations

No Safety Recommendations are made as a result of this investigation.