



AIRCRAFT ACCIDENT REPORT
OCCURRENCE NUMBER 99/590
MICRO AVIATION BANTAM B22
ZK-FNO
3 KM NORTH-WEST OF STRATFORD
14 MARCH 1999

Glossary of abbreviations used in this report:

CAA	Civil Aviation Authority
CFI	Chief Flying Instructor
E	east
g	acceleration due to gravity
kg	kilogram(s)
km	kilometre(s)
kV	kilovolt(s)
m	metre(s)
mm	millimetre(s)
NZDT	New Zealand Daylight Time
RNZAF	Royal New Zealand Air Force
S	south
UTC	Coordinated Universal Time

AIRCRAFT ACCIDENT REPORT

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Aircraft type, serial number and registration:	Micro Aviation Bantam B22, 0056, ZK-FNO
Number and type of engines:	One Rotax 503
Year of manufacture:	1987
Date and time:	14 March 1999, 1200 hours* (approx)
Location:	3 km north-west of Stratford Latitude: S 39° 20.1' Longitude: E 174° 14.9'
Type of flight:	Private
Persons on board:	Crew: 1 Passengers 1
Injuries:	Crew: Fatal Passenger: Fatal
Nature of damage:	Aircraft destroyed
Pilot-in-command's licence	Microlight Advanced Certificate
Pilot-in-command's age	73 years
Pilot-in-command's total flying experience:	355 hours, (229 microlight) 215 on type
Information sources:	Civil Aviation Authority field investigation
Investigator in Charge:	Mr H R Ritchie/Mr A J Buckingham

* Times are NZDT (UTC + 13 hours)

Synopsis

The Civil Aviation Authority was notified of the accident at approximately 1300 hours on Sunday 14 March 1999. The Transport Accident Investigation Commission was in turn notified shortly thereafter, but declined to investigate. A CAA site investigation was commenced later the same day.

The pilot was on a local flight with one passenger, having taken off from Stratford Aerodrome. The aircraft was seen to enter a dive shortly after flying over a high-tension power line, then disappear from sight shedding pieces as it went. A search by witnesses located the wreckage, which had impacted on the bank of a small creek. Both occupants had been killed in the accident.

1. Factual information

1.1 History of the flight

- 1.1.1 On Sunday 14 March 1999, the owner-pilot of ZK-FNO was participating in a recreational “fly-in” at Stratford Aerodrome, hosted by the Stratford Aero Club. He had flown from his home base at Te Kowhai, near Hamilton, on the preceding Friday, arriving at Stratford late in the afternoon.
- 1.1.2 During the weekend, the pilot had met up with an old friend, with whom he had served in the RNZAF circa 1945. His friend accompanied him to the aerodrome on Sunday morning, and the pilot took him for a flight in the programmed bombing and spot-landing competition. The competition flying had been postponed from the previous day, when weather conditions were unsuitable.
- 1.1.3 After the competition flight, the pilot mentioned to the Aero Club CFI that he was going to give his friend “a bit of hands-on flying time”. The CFI advised the pilot not to allow his friend to fly, as the pilot was not an instructor.
- 1.1.4 At about 1155 hours, the pilot took off from runway 16, turned right and headed west from the aerodrome. About five minutes later, a witness cutting firewood on a farm some three kilometres west of the town heard and saw a microlight aeroplane. It was coming towards him from the north, crossing over a high-tension power line which ran through the property.
- 1.1.5 This witness perceived that: the engine power reduced to idle, the aircraft continued in level flight for a short time, then entered a dive at an angle of about 45°. He saw large pieces of fabric come off the right wing, and he could hear the remaining fabric flapping during the dive, which continued to the ground.
- 1.1.6 Other witnesses also saw the aircraft dive, shedding objects as it went. Two witnesses were sure that the aircraft had “spiralled” while in the dive. Another, who was cutting firewood with a companion, heard a “flapping noise ... like ... a tarpaulin on the back of a trailer ... going really fast”. He looked up in time to see the tail of the aircraft disappear, but did not hear any sound of impact.

- 1.1.7 He and his companion drove their vehicle to the area where they believed the aircraft had gone down. They located the wreckage, which was in a nose-down attitude against the bank of a small creek. They checked both of the aircraft occupants for signs of life but found none.
- 1.1.8 The accident occurred in daylight, at approximately 1200 hours NZDT, 3 km north-west of Stratford, at an elevation of 1187 feet. Grid reference 260-Q20-175072, latitude S 39° 20.1', longitude E 174° 14.9'.

1.2 Injuries to persons

<i>Injuries</i>	<i>Crew</i>	<i>Passengers</i>	<i>Other</i>
Fatal	1	1	0
Serious	0	0	0
Minor/None	0	0	

1.3 Damage to aircraft

- 1.3.1 The aircraft was destroyed.

1.4 Other damage

- 1.4.1 Nil

1.5 Personnel information

- 1.5.1 The pilot, aged 73, was the holder of an Advanced Microlight Certificate with passenger rating. He had undergone a biennial flight review on his own aircraft on 12 June 1998. His associated medical certificate and declaration were valid until 25 April 2000.
- 1.5.2 The pilot had originally trained as a pilot with the RNZAF in 1945, gaining his pilot brevet (“Wings”) in August of that year. He did a small amount of aero club flying in 1947, but did not fly seriously again until 1990, when he took up microlight flying.
- 1.5.3 At the time of the accident, his total flight time was 355 hours, with 229 of that total on microlight aeroplanes. Flight time on the Bantam type was 215 hours.

1.6 Aircraft information

- 1.6.1 Bantam B22 ZK-FNO was constructed in 1987, and was acquired by the pilot in December 1990. Up to the time the aeroplane arrived in Stratford on 12 March 1999, the hour meter on the aircraft had recorded 458 total hours.
- 1.6.2 A landing accident had resulted in the aircraft being substantially rebuilt early in 1998 by the manufacturer. Included in this rebuild was a complete recovering of the wings and tail section with new fabric.

1.6.3 While not in use, the aircraft had been stored under cover at Te Kowhai, thus any opportunity for weather-related deterioration of the fabric would have been negligible.

1.6.4 The covering on the Bantam wings is fabricated as a “bag” which fits over the metal wing structure. It is not stitched or otherwise attached to the wing ribs in the manner found on conventional frame and fabric aeroplanes. The fabric itself is a Dacron sailcloth, which, although inherently strong, does not incorporate any “rip-stop” properties.

1.7 Meteorological information

1.7.1 At the time of the accident, there was a light southerly wind blowing, and the cloud cover was broken cumulus and stratocumulus, at an estimated height of about 2500 feet above ground level in the Stratford area. There was no impediment to visibility below cloud level.

1.8 Aids to navigation

1.8.1 Not applicable

1.9 Communications

1.9.1. Not applicable

1.10 Aerodrome information

1.10.1 The elevation of Stratford Aerodrome is 946 feet; that of the area that ZK-FNO flew over immediately before the accident is between 1100 and 1200 feet.

1.11 Flight recorders

1.11.1 Not applicable

1.12 Wreckage and impact information

1.12.1 The aircraft impacted nose-first on the south bank of a small waterway, facing south, at a steep angle of descent. The impact point was located approximately 250 m south of where the Stratford-Ihai 110 kV power line crosses Pembroke Road.

1.12.2 A wreckage trail began some 22 m north of the road, adjacent to the power line, and continued southward for about 160 m, with a gap between the last item found and the main wreckage. Most of the items on the trail were sections of fabric which were found to have come from the upper surface of the right wing. Some of these pieces were as large as 900 by 600 mm.

1.12.3 Located at the start of the trail was a cap belonging to one of the aircraft occupants, and at about 90 m from the start, a spectacle case was found. Normal practice was to stow items of this nature in a cockpit receptacle in the aircraft.

1.12.4 All extremities and control surfaces were accounted for at the impact point, and no evidence of any control malfunction was discovered. It could not be

determined what power, if any, that the engine was developing at the time of impact. Destruction of the cockpit area precluded obtaining any useful instrument indications.

1.12.5 The left wing structure and surfaces were determined to have been intact at impact, but it was clearly evident that most of the right wing upper surface had been lost prior to impact. The wing structure itself, however, showed evidence of having been intact when it struck the ground, with a trailing edge spar failure attributed to the aircraft rolling rapidly to the right at that time.

1.12.6 Although the all-up weight of the aircraft prior to the accident was not calculated, there was nothing found which would suggest that it had been laden beyond its permitted maximum of 375 kg or that the centre of gravity was outside the normal range.

1.13 Medical and pathological information

1.13.1 Post-mortem examination revealed that both occupants had died of injuries consistent with impact trauma. No evidence was found to suggest that the pilot had suffered any incapacitation in flight.

1.14 Fire

1.14.1 Fire did not occur

1.15 Survival aspects

1.15.1 The impact was not survivable, despite both occupants wearing motorcycle-type crash helmets and being restrained by lap and shoulder harnesses.

1.16 Tests and research

1.16.1 Nil

1.17 Organisational and management information

1.17.1 Not applicable

1.18 Additional information

1.18.1 One witness account suggested that the aircraft was flying “higher than the pylon”, but no more accurate estimate was available. Another witness’s description placed the aircraft about 120 feet above the ground when he first sighted it. The pylon mentioned was the one closest to Pembroke Road, on the northern side, and the height of which is 85.5 feet.

1.19 Useful or effective investigation techniques

1.19.1 Nil

2. Analysis

- 2.1 Although the wreckage trail commenced in the vicinity of the power line, it was established early in the investigation that no actual contact with the power line had occurred. It was apparent, however, that the sequence of events that led to the destruction of the upper surface of the right wing probably initiated in this area.
- 2.2 Had the pilot been flying at only a little above the power line height, and not sighting the power line until almost upon it, a natural reaction would be to pull hard back on the control column in order to clear the line. Having done that, the next action to regain level flight would be to lower the nose of the aircraft by pushing the control column forward.
- 2.3 If the initial pull-up were so severe as to place the aircraft in an extreme nose-up attitude, the subsequent reaction to the attitude would be to push the stick hard forward. The presence on the ground of a cap normally carried in a cockpit receptacle tends to suggest that such a pushover with attendant negative 'g' occurred at this point.
- 2.4 A sudden pull-up would cause the wings to flex upward under positive loading, and a sudden push forward would cause them to flex downward. If the two manoeuvres were performed one immediately after the other, the degree of wing flexing could place abnormal loads on the upper wing skins. A tear initiated by such a snap loading could easily be exacerbated by the airflow, resulting in sections of the wing surface tearing away.
- 2.5 Once the top surface is compromised in this manner, most of the lifting effectiveness of that wing is lost, and if only one wing suffers damage, the aircraft will roll about the damaged wing. If the damage is severe enough, the roll will be uncontrollable.
- 2.6 The impact damage to the right wing suggested that the actual wing structure was not compromised in flight, but that most of the top surface had been lost beforehand. The left wing appeared to have been totally sound before impact.
- 2.7 A possible reason for the pilot being at low level in the Pembroke Road area is that he may have set his altimeter to read zero at Stratford Aerodrome, this causing his altimeter to read height above aerodrome level, which is itself 946 feet above sea level. The terrain rises deceptively steeply to the west of Stratford, and had the pilot then been flying at an indicated 400 feet, that would place him only about 120 feet above ground level where he crossed the power line.
- 2.8 At that height, the sudden appearance ahead of an 85-foot pylon would be likely to precipitate a vigorous reaction from the pilot, particularly if he had sighted it only when he was almost upon it.
- 2.9 Although the sequence of events described thus far is partly hypothetical, in that no witness noticed a pull-up and push-over manoeuvre, it does provide a likely explanation for the accident. No other pre-impact fault was found with the aircraft, and there was no evidence to suggest that the pilot had suffered sudden in-flight incapacitation.

3. Conclusions

- 3.1 The pilot was appropriately certificated and experienced for the intended flight.
- 3.2 In-flight incapacitation of the pilot was unlikely to have occurred.
- 3.3 Damage to the upper surface of the right wing appeared to have occurred about the time the aircraft flew over a major power line.
- 3.4 The damage progressed to a stage where the aircraft became uncontrollable.
- 3.5 The ensuing ground impact was not survivable.
- 3.6 The wing damage may have been associated with pilot control input on sighting of the power line.

4. Safety recommendations

- 4.1 Nil.

(Signed)

Michael G Hunt
Assistant Director Safety Investigation and Analysis
20 December 1999