CIVIL AVIATION AUTHORITY
OF NEW ZEALAND

AIRCRAFT ACCIDENT REPORT

CAA OCCURRENCE NUMBER 08/1193

AIRBORNE OUTBACK

ZK-WYN

RIVERSDALE, SOUTHLAND

20 MARCH 2008

FOREWORD

Aviation safety investigations are conducted in New Zealand pursuant to New Zealand's international obligations under the Convention on International Civil Aviation 1944 – also known as the Chicago Convention. Pursuant to Articles 26 and 37 of the Chicago Convention, the International Civil Aviation Organisation ("ICAO") has issued Annex 13 to the Convention setting out International Standards and Recommended Practices in respect of the investigation of aircraft accidents and incidents. Paragraph 3.1 of Annex 13 describes the sole objective for the investigation of such accidents as follows:

> *3.1 The sole objective of the investigation of an accident or incident shall be the **prevention** of accidents and incidents. It is **not** the purpose of this activity to **apportion blame or liability**.*

This philosophy of prevention for the future promotion of aviation safety is reflected in the New Zealand domestic law by virtue of the provisions of the Civil Aviation Act and Part 12 of the Civil Aviation Rules. CAA accident investigations operate under this philosophy.

CAA accident investigations are conducted in accordance with ICAO guidelines. The sole objective of such investigations is the prevention of accidents by determining the contributing factors or causes and then implementing appropriate preventive measures - in other words restoring safety margins to provide an acceptable level of risk.

The focus of CAA safety investigations are to establish the causes of the accident on the balance of probability. Accident investigations do not always identify one dominant or 'proximate' cause. Often, an aviation accident is the last event in a chain of several events or factors, each of which may contribute to a greater or lesser degree, to the final outcome.

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Glossary of abbreviations used in this report:

agl	above ground level
amsl	above mean sea level
CAA	Civil Aviation Authority
E	east
ft	foot or feet
m	metre(s)
mm	millimetres
NZDT	New Zealand Daylight Time
N	north
RAANZ	Recreational Aircraft Association of NZ
S	south
s/n	serial number
UTC	Coordinated Universal Time

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AIRCRAFT ACCIDENT REPORT

OCCURRENCE No. 08/1193

Aircraft type, serial number and registration:	Airborne Outback, 861, ZK-WYN
Number and type of engines:	1 Bombardier Rotax 582
Year of manufacture:	2003
Date and time:	20 March 2008, 1450 hours[1] (approximately)
Location:	Riversdale, Southland Latitude[2]: S 45° 55.5' Longitude: E 168° 46.9' 375ft amsl
Type of flight:	Private
Persons on board:	Crew: 1
Injuries:	Crew: 1 fatal
Nature of damage:	Aircraft destroyed
Pilot-in-command's licence	Microlight Pilot Certificate, Weight Shift
Pilot-in-command's age	50 years
Pilot-in-command's total flying experience:	433 hours
Information sources:	Civil Aviation Authority field investigation Police witness statements
Investigator in Charge:	A J Hansen

[1] Times are NZDT (UTC + 13 hours)

[2] WGS 84 co-ordinates

Synopsis

Witnesses reported a microlight aircraft was seen to pitch up steeply, enter a tailslide, followed by a tumble and spin. The microlight failed to recover and struck the ground. The pilot sustained severe injuries and died soon after.

The Civil Aviation Authority was notified of the accident on Tuesday 25 March 2008. The Transport Accident Investigation Commission (TAIC) was in turn notified shortly thereafter, but declined to investigate. A CAA site investigation was commenced 1400 hours on 26 March 2008.

1. Factual information

1.1 History of the flight

1.1.1 The pilot was attending a microlight fly-in with other microlight pilots at a property near Riversdale. He had flown previously that day as an instructor in ZK-WYN with its owner . The owner stated they had carried out a two and a half hour navigation exercise, landing at four airstrips, and that there had been no indications of any problems.

1.1.2 On the flight that resulted in the accident, the pilot was on a paper chase exercise overhead the location of the fly-in. This exercise involved dropping a toilet paper roll from 1600 feet agl, and then attempting to intercept and cut the paper stream during the descent. On this flight the paper was cut twice and the aircraft was completing a turn for the third intercept when the aircraft was observed to pitch up steeply, enter a tailslide, and then tumble forward. After two rotations in the tumble, the wing was observed to fail upward on the left outboard side. The aircraft completed a further tumble rotation, and then entered a flat spin to the left. At this point the right wing was seen to fold upwards at approxamitly two thirds the wing span. The aircraft did not recover, descending rapidly in a flat attitude until it impacted with the ground.

1.1.3 The accident was observed from the ground by other pilots attending the fly-in, five of whom gave statements to the New Zealand Police.

1.1.4 The witnesses were viewing the exercise from outside a farmhouse at the fly-in site, and estimate the pitch up occurred when the microlight was at approxamitly 500-700 feet agl slightly north-north-east of their position. The microlight impacted the ground at a position approximately 400 metres north of the farmhouse. The first person on the scene found the pilot conscious, but distressed and disoriented.

1.1.5 Two witnesses stated that the engine appeared to be running at low power until the point of impact.

1.1.6 The accident occurred in daylight, at approximately 1450 hours NZDT, at Riversdale, Southland, at an elevation of 375 feet. Grid reference latitude S 45° 55.5', longitude E 168° 46.9'.

1.2 Injuries to persons

Injuries	*Crew*	*Passengers*	*Other*
Fatal	1	0	0
Serious	0	0	0
Minor/None	0	0	

Table 1 - Injuries to Persons

1.3 Damage to aircraft

1.3.1 The microlight was destroyed.

1.4 Other damage

1.4.1 Not applicable.

1.5 Personnel information

1.5.1 The pilot, aged 50 years, held a current Microlight Pilot Certificate (weight shift). He also held Instructor, Test Pilot, and Tow Pilot ratings.

1.5.2 Up to 19 March 2008, the pilot had flown 433 hours in weight-shift microlights, with 5.2 hours within the previous 90 days.

1.5.3 The pilot's last annual flight test was conducted on 29 April 2007.

1.6 Aircraft information

1.6.1 The microlight, an Airborne Outback s/n 861, Wizard Wing, was manufactured in Australia in 2003, and had accrued 244.4 hours total time in service.

1.6.2 It was first registered in New Zealand on 5 August 2003 as ZK-DUG. The registration was changed to ZK-WYN on 10 February 2006 as part of a change of ownership.

1.6.3 The Bombardier Rotax 582 engine s/n 5589454, was fitted new at the time of aircraft manufacture, and had accrued the same time in service as the airframe.

1.6.4 The last annual condition inspection of the microlight, and engine, had been carried out on 2 November 2007 at 235.6 hours total time in service.

1.7 Meteorological information

1.7.1 The weather at the site was fine with no cloud and light winds.

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 Not applicable.

1.11 Flight recorders

1.11.1 Not applicable.

1.12 Wreckage and impact information

1.12.1 After receiving advice that TAIC and CAA would not be investigating the accident, the attending Police Constable had the wreckage recovered to the garage of the local transport contractor. Subsequently a CAA Inspector was tasked with investigating the accident when CAA were notified of the fatality.

1.12.2 Accident information was deduced from witness reports, inspection of the accident site, and viewing the aircraft wreckage at the storage site.

1.12.3 The aircraft impacted in a flat attitude, with no significant horizontal travel. Wreckage was contained within a three metre radius of the impact point.

1.12.4 There were no signs of any pre-impact loss of integrity with the microlight's flying wires or 'A' frame. The wing's left leading edge tube had failed outboard of the cross tube and the wing's fabric was torn and frayed in that area, indicating in-flight damage. The wing's right leading edge tube had failed outboard of the cross tube, but the fabric was not damaged. The right cross tube and 'A' frame were damaged consistent with failure at impact.

1.12.5 The base frame was severely damaged, but all indications were that the ground impact had caused this. The seat harness was intact.

1.12.6 The fuel tank had ruptured and damage to the Lucerne crop at the impact site indicated a significant amount of fuel spillage. A check of remaining fuel found no water or sediment.

1.12.7 The carburettor float bowls were found to contain fuel. No water or sediment contamination was observed in the float bowls. The carburettor air slides and throttle cables functioned satisfactorily. The fuel selector was found to be in the 'on' position.

1.12.8 The engine was examined and considered to have been capable of running at the time of the accident. No determination could be made of the selection of the ignition switches which had been destroyed in the impact.

1.12.9 The propeller left no discernable strike marks in the ground. One blade had spanwise compression failure about 100 mm from the tip, considered to be damage consistent with ground impact.

1.13 Medical and pathological information

1.13.1 Post-mortem examination showed that the pilot died of injuries to his chest and head.

1.13.2 The pilot's medical records indicated a history of tachycardia episodes (abnormally rapid heart rate).

1.13.3 A Police witness report states the pilot had talked of three episodes of his heart speeding up in the previous two weeks.

1.13.4 Toxicological tests showed no indications of any other pre-existing condition likely to affect the pilot's ability to fly the aircraft.

1.14 Fire

1.14.1 Nil.

1.15 Survival aspects

1.15.1 There is no requirement for the aircraft to be fitted with or the pilot to utilise a parachute in an emergency, and although the pilot was secured by a harness, there was little chance that someone could survive this type of accident.

1.16 Tests and research

1.16.1 Nil.

1.17 Organisational and management information

1.17.1 Nil.

1.18 Additional information

1.18.1 Nil.

1.19 Useful or effective investigation techniques

1.19.1 Nil.

2. Analysis

2.1 The accident witnesses observed the aircraft manoeuvre to chase the paper streamer. The turn for the third intercept led to a sudden pitch up, followed by a tailslide, then a forward tumble followed by a structural failure of the left part of the wing. The aircraft then stabilised in a spin to the left which was not recovered from prior to impact.

2.2 The execution of the paper-chase flight would have required the pilot to make vigorous control inputs. There was however no evidence suggesting that the pilot had exceeded the aircraft limitations prior to the excessive pitch up that resulted in the accident.

2.3 The loss of control followed as a result of a sudden pitch up of the microlight. The reason for this sudden action could not be positively identified, but is possible that the pilot may have suffered an incapacitation associated with his known medical condition.

2.4 It is considered that the probable cause of the accident was loss of control of the aircraft by the pilot for some reason releasing the 'A' frame, allowing the increased airspeed coming out of the descending turn to cause an excessive pitch up, resulting in a tailslide. The aircraft then tumbled, which caused structural failure of the wing and subsequent impact.

2.5 A tailslide followed by a 'tumble' is a known characteristic of weight-shift microlights when they are operated outside of their flight limitations[3].

2.6 The pilot was aware of the hazards associated with a tailslide-tumble situation involving weight-shift aircraft. He had recently emailed a warning to other fellow microlight pilots emphasising the consequences of entering this situation.

3. Conclusions

3.1 The pilot was appropriately licensed and experienced to carry out the flight.

3.2 The aircraft was registered, had a valid Flight Permit, and appropriate maintenance actions had been carried out. There were no indications of pre-accident structural or system failure of the microlight.

3.3 Weather was not a factor in this accident.

3.4 The loss of control by the pilot followed as a result of a sudden pitch up of the microlight. The reason for this could not be positively identified, but is possible that the pilot may have suffered an incapacitation associated with his known medical condition.

4. Safety actions

4.1 To further raise awareness about the hazards associated with tailslide-tumbles in weight-shift microlights, the CAA has requested that the two New Zealand microlight organisations - Recreational Aircraft Association of NZ, and Sport Aircraft Corp., inform their members as soon as possible about this hazardous flight condition. (CAA Safety Action number 10A1811 refers).

[3] Refer to Gratton, G. and Newman, S. (2006) Towards the tumble resistant microlight. *Cockpit*, January - June

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