



AIRCRAFT ACCIDENT REPORT
OCCURRENCE NUMBER 03/1355
KOLB TWINSTAR MARK II
ZK-JML
FOXPINE AERODROME
10 MAY 2003

Glossary of abbreviations and symbols used in this report:

agl	above ground level
AIP	Aeronautical Information Publication
ATC	air traffic control
ATIS	automatic terminal information service
CAA	Civil Aviation Authority
M	magnetic
m	metre(s)
METAR	aviation routine weather report
NOTAM	Notices to Airmen
NZST	New Zealand Standard Time
NW	north-west
RAANZ	Recreational Aircraft Association of New Zealand
RWY	runway
S	south
SE	south-east
SAC	Sport Aviation Corporation Limited
TAF	Aerodrome forecast
UTC	Coordinated Universal Time
WGS 84	World Geodetic System 1984

AIRCRAFT ACCIDENT REPORT

OCCURRENCE No 03/1355

Aircraft type, serial number and registration:	Kolb Twinstar Mark II, MAANZ/437, ZK-JML
Number and type of engines:	1 Bombardier Rotax 503
Year of manufacture:	1989
Date and time:	10 May 2003, 1540 hours ¹ (approx)
Location:	Foxpine Aerodrome Latitude ² : S 40° 27.4' Longitude: E 175° 16.44'
Type of flight:	Private
Persons on board:	Crew: 1
Injuries:	Crew: 1 fatal
Nature of damage:	Substantial
Pilot-in-command's licence:	Advanced Microlight Certificate
Pilot-in-command's age:	63 years
Pilot-in-command's total flying experience:	1763 hours, 638 on type
Information sources:	Civil Aviation Authority field investigation
Investigator in Charge:	Mr A M Moselen

¹ Times are NZST (UTC + 12 hours)

² WGS 84 co-ordinates

Synopsis

The Civil Aviation Authority was notified of the accident at approximately 1600 hours on 10 May 2003. The Transport Accident Investigation Commission was in turn notified shortly thereafter, but declined to investigate. A CAA site investigation was commenced the following day.

The microlight aircraft was observed during takeoff to go out of sight behind a line of pine trees. Shortly after, a “thump” was heard and subsequently the aircraft was found upside down in a small clearing. The pilot who was the sole occupant of the aircraft died from injuries received in the accident.

1. Factual information

1.1 History of the flight

- 1.1.1 On 10 May 2003 at approximately 1400 hours, the pilot departed Feilding Aerodrome in ZK-JML, on a local return flight that would include visits to Foxpine Aerodrome, and Levin. The first leg of the flight was without incident and after landing at Foxpine, the pilot visited the Director of the Airpark.
- 1.1.2 At approximately 1540 hours, the pilot prepared for the next leg to Levin. He taxied the aircraft out on to Foxpine runway 27 and called on the radio, “Juliet Mike Lima taking off runway 27”.
- 1.1.3 The pilot commenced the take-off from the displaced threshold 175 m from the end of the runway (as depicted on the AIP Foxton aerodrome chart). The Airpark Director stepped out of the clubhouse to watch and caught a glimpse of the tail of the aircraft before it passed out of sight behind a line of pine trees. The Director then returned to the clubhouse but heard a “loud thump” very shortly thereafter, and suspecting the noise came from the aircraft went to investigate.
- 1.1.4 The aircraft was located in a small clearing with the pilot still strapped in the wreckage and seriously injured. The Director called emergency services and on arrival at the scene they moved the wreckage and freed the injured pilot. The pilot later died from injuries received in the accident.
- 1.1.5 The accident occurred in daylight, at approximately 1540 hours NZST, at Foxpine Aerodrome, at an elevation of 36 feet. Grid reference 260-S24-128808, latitude S 40° 27.4', longitude E 175° 16.44'.

1.2 Injuries to persons

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

1.3 Damage to aircraft

1.3.1 The aircraft was substantially damaged.

1.4 Other damage

1.4.1 Minor tree damage.

1.5 Personnel information

1.5.1 The pilot, aged 63, held an Advanced Microlight Certificate, and a RAANZ Medical Certificate and Declaration valid until 25 February 2004. A letter from the pilot's general practitioner dated 8 February 2001 declared that the pilot had been fitted with a pacemaker for the treatment of cardiac arrhythmia and was considered fit for flying microlight aircraft.

1.5.2 The pilot had flown a total of 1763 hours, including 638 hours on the Kolb type. His last biennial flight review and proficiency check were carried out on 3 November 2002.

1.5.3 Friends and colleagues remarked that the pilot was very experienced and flew 250 hours a year on average. His demeanour prior to flying from Feilding and during the stopover at Foxpine was described as outgoing and relaxed.

1.6 Aircraft information

1.6.1 Kolb Twinstar Mark II, serial number MAANZ/437, ZK-JML was a Class 2 microlight aeroplane, kit-built in New Zealand. It was a high-wing monoplane with conventional three-axis controls, and was powered by a Bombardier Rotax 503 engine driving a fixed-pitch wooden pusher propeller. The aircraft was re-registered to the owner-pilot on 28 August 2000 after a rebuild due to a previous owner's accident.

1.6.2 Maintenance is usually carried out by the owner, and for the purpose of maintaining a CAA Flight Permit in perpetuity, independent maintenance checks by CAA approved personnel are required annually in addition to pilot pre-flight inspections.

1.6.3 Up until 10 May 2003, ZK-JML had accrued a total time in service of 641 hours (exclusive of hours prior to rebuild). The most recent maintenance was the

replacement of the left-hand rudder cable on 2 May 2003. An Annual Condition Inspection had been carried out on 22 September 2002.

- 1.6.4 The engine, (serial number M 5323550), had run 141 hours since overhaul. The most recent recorded maintenance was a compression check on 24 April 2003, at 128 hours.
- 1.6.5 The aircraft appeared to have been maintained adequately, particularly the engine. The left main wheel assembly and brake was found to be worn and essentially non-functional for the purpose it was designed for. This defect was considered to have a minor impact on take-off and landing performance but had no bearing on the cause of the accident. There were no other defects with the airframe or engine noted during the investigation that could have affected normal flight.
- 1.6.6 Information supplied by the manufacturer on the performance of the Kolb Twinstar Mark II relevant to the accident investigation, gave the stall speed as 26 knots.
- 1.6.7 Although the all-up weight of the aircraft could not be accurately determined, there was nothing found that would suggest that the centre of gravity was outside the normal range.

1.7 Meteorological information

- 1.7.1 On 10 May 2004 a trough of low pressure accompanied by strong westerly winds was forecast to move over the North Island during the afternoon.
- 1.7.2 The hourly weather observations (METAR) at Ohakea, Palmerston North and Paraparaumu for 1500 and 1600 hours, reported winds from west to north-west at 20 knots, with gusts up to 30 knots. The 2000-foot winds were forecast to be from the north-west at 35 knots. Weather information on the Ohakea ATIS also confirmed the presence of strong winds.
- 1.7.3 There was no evidence found that the pilot received or had in his possession any weather or NOTAM briefing documents as part of his pre-flight activities at Feilding or Foxpine.
- 1.7.4 The Director at Foxpine Airpark remarked that the weather at Foxpine was overcast and windy with strong gusts varying between west and north-west.

1.8 Aids to navigation

- 1.8.1 Not applicable.

1.9 Communications

- 1.9.1 The aircraft was fitted with a VHF radio, and the pilot had contacted Ohakea ATC en route for clearance to transit their zone. In addition, he acknowledged receipt of the current ATIS weather.

1.10 Aerodrome information

- 1.10.1 Foxpine Aerodrome is situated on the north-western outskirts of Foxton approximately four and a half kilometres in from the coast. The single, grass-surfaced runway is 1015 m long and aligned 090/270° M. Extensive microlight aircraft activity is carried out at the airfield.
- 1.10.2 The aerodrome is surrounded by pine trees and there are cautions to observe when taking off and landing there. The AIP aerodrome chart for Foxton lists the following information:
1. **CAUTION:** Moderate to severe turbulence and windshear can be expected in S, SE and NW winds.
 2. Circuit RWY 09 – Left hand
RWY 27 – Right hand.
 3. Trees 85 m east of runway end require angled approach to RWY 27. Take-off RWY 09 – turn left 11° as soon as practicable.

1.11 Flight recorders

- 1.11.1 Not applicable.

1.12 Wreckage and impact information

- 1.12.1 The accident site was adjacent to an access road in a small grassed clearing surrounded by pine trees. The keel and tail assembly was detached and the aircraft moved by emergency services to facilitate access to the injured pilot. This aspect did not impede the investigation.
- 1.12.2 The aircraft had struck the ground inverted on a south-easterly heading. Crush damage to both leading edge upper surfaces and to the nose section indicated the aircraft was at a shallow descent angle at impact.
- 1.12.3 Some engine controls, radio equipment and electrical wiring were disrupted in the impact sequence; however, flight control integrity was positively established. Apart from a small section of the right wing structure and fabric, all extremities and control surfaces were located in the immediate vicinity of the site.
- 1.12.4 Damage to the propeller was consistent with low rpm at impact and the engine throttle was found in the closed (idle) position. The pilot preferred to operate the aircraft using “mogas” (motor gasoline) and while the majority of the fuel tank contents had leaked away in the accident, there was sufficient fuel trapped in the fuel lines, filter and carburettor to determine there had been a supply to the engine. The fuel was also found free from contaminants.
- 1.12.5 Examination of the damaged outboard section of the right wing indicated that the aircraft had collided with trees prior to ground impact. Debris matching the missing right wingtip section was found about six feet from the top of a 30-foot pine tree some 40 metres from the ground impact point. This tree was one of a

stand aligned at 90° to the right of runway 27, about 150 m from the displaced threshold.

- 1.12.6 Cut branches and general scarring showed where the aircraft struck the tree in an inverted attitude, on a heading of approximately 040° M. The aircraft then had deflected in a clockwise rotation dissipating much of its energy before finally striking the ground.

1.13 Medical and pathological information

- 1.13.1 Post-mortem examination found that the pilot died of head injuries.
- 1.13.2 The pilot was fitted with a pacemaker for the treatment of cardiac arrhythmia. However, there was nothing in the pathologist's report that would indicate any existing health problem and therefore possible incapacitation of the pilot.
- 1.13.3 Routine toxicological tests revealed nothing of significance.

1.14 Fire

- 1.14.1 Fire did not occur.

1.15 Survival aspects

- 1.15.1 The pilot was restrained by a lap and shoulder harness, but the inverted attitude at impact gave the pilot no protection whatsoever, as he was not wearing a rigid helmet and the Perspex canopy was of light construction.
- 1.15.2 In respect to appropriate safety equipment and safety procedures, the Aircraft Flight Manual for another microlight type, the Bantam, contains the following caution:

“Using a rigid helmet is considered absolutely essential when flying the Bantam, because of the limited frontal protection in the event of an accident”.

The Kolb type microlight aircraft is similarly disposed in that there is little forward protection, and the engine and propeller are behind the pilot.

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 Anecdotal and documented evidence indicated that the pilot was prepared to fly in strong wind conditions. The pilot's logbook recorded flying activity virtually everyday over a fifteen month period, and two entries commented; “wind too strong - returned” and “local flight strong wind”. During the stopover at Foxton

the pilot did not comment on any adverse conditions during the flight from Feilding, or what the flight conditions were like during approach.

- 1.18.2 In respect to microlight aircraft operations, the RAANZ Policy and Procedures Manual; Authorised Operations – General Rules state:

“No Microlight Aircraft shall be operated when the surface wind speed is in excess of 75 percent of the Aircraft's stall speed.”

The wind strength forecast on the day of the accident would have exceeded 75 percent of the 26-knot stall speed.

- 1.18.3 The pine trees alongside runway 27 would provide some degree of shelter from north-west winds during take-off ground roll. Taking into account the witness's observation of the very short time lapse between last sighting the aircraft and hearing a “thump”, indicates that immediately after take-off the pilot entered a gap between the trees at low level probably to try and remain in the lee of the wind. Instead, the pilot was likely to have encountered severe mechanical turbulence and a downwind component as the aircraft turned further towards the south-east. It is recommended in the SAC Flight Training Manual to allow at least three times the height of trees to be clear of turbulence. Normally, aircraft would be flown on runway heading until obstacle clearance is assured (usually 500 feet agl).

1.19 Useful or effective investigation techniques

- 1.19.1 Nil.

2. Analysis

- 2.1 The investigation discounted mechanical failure or pilot incapacitation. However, a significant factor was the pilot's decision to fly in strong wind conditions at an aerodrome known for mechanical turbulence.
- 2.2 During the flight from Feilding to Foxton, the pilot would have gained an appreciation of the weather conditions. He acknowledged the Ohakea weather, yet elected to continue the flight. There are three possibilities:
- the wind speed did not register;
 - the significance of the wind was not fully understood;
 - the wind strength was ignored or minimised in the pilot's mind, as he had experienced strong wind flying many times previously and therefore was not overly concerned. In terms of human factors, the pilot may have developed a “mindset” about weather.
- 2.3 Under the circumstances, the third option is more likely and is possibly why there was no mention of weather factors during the stopover at Foxton.
- 2.4 The witness's observation of the weather at Foxton was consistent with the METAR reports at three other aerodromes in the area. The Foxpine aerodrome

chart contains a caution to the effect that moderate to severe turbulence and windshear can be expected in north-westerly winds. It is virtually certain that the aircraft encountered such conditions as it took off, but the reason why the pilot commenced a turn at low level into the lee of a line of trees is unknown.

- 2.5 If this manoeuvre was intended to shelter the aircraft from the effects of the wind, it was a major mistake. The aircraft would have been exposed to severe downdraughts and local rotor effects, which could make controllability very difficult. Roll rates generated in turbulence could exceed the counteracting roll rate of the aircraft, particularly at low speed. Additionally, turning away from a strong headwind at low level will cause a reduction in climb angle, and introduce a groundspeed/airspeed illusion, i.e. the pilot perceives the aircraft speed as being higher than it actually is. This can lead to involuntary stalling when the pilot attempts to reduce airspeed in response to the illusion of high speed.
- 2.6 In this instance, a prudent course of action would have been for the pilot to remain on the runway extended centreline until a safe height (say 500 feet) before commencing any turns. This is standard practice in general aviation, and until the revocation of the Civil Aviation Regulations 1953, was a regulatory requirement from which microlight aeroplane pilots, incidentally, were not exempt.
- 2.7 A more prudent course of action, however, would have been to avoid flying in these conditions in the first place. The pilot's having flown in strong wind conditions in the past did not guarantee a safe outcome to this particular flight.
- 2.8 In this accident, it is not known whether the lack of a protective helmet contributed to the severity of the pilot's injuries, but in general, the use of any protective equipment will enhance a pilot's chances of survival.
- 2.9 A safety recommendation was made to the SAC and RAANZ organisations to include, in an appropriate format for their members, information pertaining to the use of protective headwear.

3. Conclusions

- 3.1 The pilot had been declared medically fit and was appropriately qualified for the flight.
- 3.2 The aircraft appeared to be airworthy prior to the accident.
- 3.3 There was no evidence of pilot in-flight incapacitation.
- 3.4 The pilot operated in weather conditions that were probably outside of the acceptable limits for microlight aircraft operations.
- 3.5 The pilot turned away from runway heading towards obstacles with insufficient height.
- 3.6 Severe turbulence would have been present in the prevailing conditions.

- 3.7 The pilot lost control in conditions that were probably beyond his capabilities and those of the aircraft.

4. Safety recommendations

- 4.1 Both SAC and RAANZ accepted a CAA recommendation to include in their respective training manuals, information on the advantages of wearing protective headwear. The information will also include reference to the following CAA *Vector* articles:

Vector March/April 2001 – “*Are Helmets a Good Investment? You bet they are!*”
Vector January/February 2001 – “*Microlight Accidents and Injuries*”.
Vector 1997 Issue 4 – “*Do Helmets Really Save Lives?*”
Vector 1998 Issue 6 – “*Crash Survival*”.

In addition, both organisations will incorporate questions on protective safety equipment into their pilot examination syllabus.

5. Safety actions

- 5.1 Both SAC and RAANZ are continuing the safety education of their members, and this includes awareness of the availability of relevant accident reports on the CAA website.

Report written by:

Authorised by:

(Signed)

(Signed)

Alan Moselen
Safety Investigator
6 January 2005

Richard White
Manager Safety Investigation

Civil Aviation Authority of New Zealand
Aviation House 10 Hutt Road Petone
P O Box 31 441 Lower Hutt New Zealand
Tel: +64-4-560 9400 Fax: +64-4-569 2024

www.caa.govt.nz