



AIRCRAFT ACCIDENT REPORT
OCCURRENCE NUMBER 99/1609
KOLB TWINSTAR MARK 2
ZK-FRU
4 KM SOUTH OF FEATHERSTON
11 June 1999

Glossary of abbreviations used in this report:

CAA	Civil Aviation Authority
E	east
kg	kilogram(s)
km	kilometre(s)
m	metre(s)
NZST	New Zealand Standard Time
RAANZ	Recreational Aircraft Association of New Zealand
S	south
UTC	Coordinated Universal Time

AIRCRAFT ACCIDENT REPORT

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Aircraft type, serial number and registration:	Kolb Twinstar Mark 2, Serial number CNB-1, ZK-FRU
Number and type of engines:	One Rotax 503
Year of manufacture:	1988
Date and time:	11 June 1999, 1445 hours* (approx)
Location:	4 km southwest of Featherston, grid reference 260-S27-024051 Latitude: S 41° 8.4' Longitude: E 175° 17.5'
Type of flight:	Private
Persons on board:	Crew: 1
Injuries:	Crew: Fatal
Nature of damage:	Aircraft destroyed
Pilot-in-command's licence	Microlight Novice Certificate
Pilot-in-command's age	44 years
Pilot-in-command's total flying experience:	82 hours, all on type
Information sources:	Civil Aviation Authority field investigation
Investigator in Charge:	Mr S Walker

* Times are NZST (UTC + 12 hours)

Synopsis

The Civil Aviation Authority was notified of the accident at 1550 hours on Friday 11 June 1999. The Transport Accident Investigation Commission was in turn notified shortly thereafter, but declined to investigate. A CAA site investigation was commenced the next day.

The pilot was on the last leg of a flight from Taumaranui to Silverstream, having taken off shortly before from Hood Aerodrome at Masterton. The aircraft was seen to fall from the sky with the left wing detached and falling independently of the main fuselage. The sole occupant was killed in the impact with the ground.

1. Factual information

1.1 History of the flight

- 1.1.1 On Friday 11 June 1999, the owner-pilot of ZK-FRU was conducting a flight from Taumaranui to Silverstream via Paihatua, for ferry purposes.
- 1.1.2 The pilot landed the aircraft at Hood aerodrome at Masterton to refuel and prepare for the last leg of the flight to Silverstream.
- 1.1.3 The president of the Masterton Microlight Club, aware that a microlight from out of town had landed at the aerodrome, went over to meet the pilot and offer local weather information and assistance.
- 1.1.4 The pilot appeared to be meticulous in his pre-flight checks and appeared to the witness to be knowledgeable about his aircraft.
- 1.1.5 When asked about his intended route to Silverstream the pilot indicated that he would be flying through the Rimutaka range overhead the road from Featherston to Upper Hutt.
- 1.1.6 The club president observed that the rotor or wave cloud over the range to the west indicated high winds and turbulence over the range and strongly advised the pilot against flying in those conditions. The pilot responded by saying that he would gain height and fly over the cloud. The club president explained that the cloud tops were at approx 9000 ft. The pilot did not seem to take notice of this and said that he “would give it a go and turn around if it got too bad”. The pilot mentioned that he had been thrown around earlier coming down from Paihatua. The club president advised him that if he really had to fly over the range in these conditions then the safest route would be further south via the Rimutaka Incline.
- 1.1.7 The club president observed that the aircraft was drifting in the wind during take off and that the pilot appeared to be having problems controlling the engine due to the turbulence.
- 1.1.8 Another observer saw the aircraft flying in the vicinity of Carterton and reported how the aircraft was being “tossed about” in the high winds that were evident at the time.

- 1.1.9 In Greytown, a third observer, who is a microlight enthusiast, was watching a video of microlight aviation when he became aware of the sound of a microlight flying over the town. He knew from listening to the marine radio that there were gusts of 40 to 60 knots in Cook Strait and Palliser Bay and that Beacon Hill radio had reported gusts of 30 to 40 knots. The observer knew that these conditions would be extreme for such an aircraft. He went outside to watch the aircraft for several minutes and later described the progress of the microlight as slow.
- 1.1.10 A few people who were working on their house roof in the vicinity of the accident site during the early afternoon reported that they had to cease their activities and return indoors due to the very gusty conditions in the area.
- 1.1.11 Two people travelling by car on the Western Lake Road witnessed the microlight spiralling to the ground. They saw that one wing had separated from the aircraft. One of these witnesses was first on the scene to render first aid but she found that the pilot had died.
- 1.1.12 The accident occurred in daylight at approximately 1445 hours NZST, 4km southwest of Featherston, at an elevation of approximately 50 feet. Latitude S 41° 08.4' Longitude: E 175° 17.5' grid reference 260-S27-024051.

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 destroyed.

1.4 Other damage

- 1.4.1 Nil

1.5 Personnel information

- 1.5.1 The pilot, aged 44, was the holder of an Novice microlight certificate. Under RAANZ procedures this authorises the holder to act, under the supervision of an instructor, as pilot in command of a microlight aircraft for the purpose of:

- (a) Increasing his/her skill in order to qualify for the issue of a certificate of higher qualification, or
- (b) Engaging in flying practice in order to qualify for the issue of a certificate that is no longer valid.

- 1.5.2 The pilots medical certificate had expired on 1 May 1999. A renewal was not evident in his logbook.
- 1.5.3 At the time of the accident, the pilot's total flight time was 82 hours, all on type.
- 1.5.4 The pilot had previously admitted to his instructor that on occasion he would perform aerobatic manoeuvres in the aircraft.

1.6 Aircraft information

- 1.6.1 Kolb Twinstar Mark 2, ZK-FRU, was a high-wing, class 2, three-axis microlight, powered by a Rotax 503 engine and a pusher propeller. It was imported from the USA in kit form, assembled in 1988, and was acquired by the pilot in April 1998. The aircraft logbook showed that its owners had logged 171 hours up to the day of the accident.
- 1.6.2 The aircraft had a valid flight permit.
- 1.6.3 The aircraft structure was of a tubular metal construction covered with a fabric skin. The fabrication of the main airframe components was largely completed by the overseas manufacturer. This left the assembly, construction of the wing aerofoil formers, and application of the fabric covering and installation of the engine by the owner.
- 1.6.4 Both of the wings could be folded alongside the fuselage for ease of transport. This was facilitated by removing a pin from the forward wing attachment point and pivoting the wings around the universal joint type rear attachment point.

1.7 Meteorological information

- 1.7.1 At the time of the accident, there was a strong north-westerly wind blowing over the Rimutaka and Tararua ranges. The weather station report from earlier in the day detailed that the recorded windspeed at Wellington was 40 km/h and Paraparaumu as 30 km/h. Witnesses who were knowledgeable about the local weather conditions reported the presence of a rotor or wave cloud over the ranges to the west of Lake Wairarapa. This indicates that severe mechanical turbulence would be experienced when flying in the lee of the ranges. 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 Not applicable

1.11 Flight recorders

- 1.11.1 Not applicable

1.12 Wreckage and impact information

- 1.12.1 The aircraft impacted vertically nose down in a paddock 200 m to the west of Western Lake road adjacent to Lake Wairarapa, 4 km southwest of Featherston.
- 1.12.2 The main wreckage was contained in one area and exhibited severe structural deformation indicating a high speed impact. The leading edge and strut of the right wing and the landing gear had made impact marks in the ground. The orientation of these marks indicated that the right wing was in its correct position in relation to the fuselage. The right wing exhibited substantial chordwise compression. There were no impact marks where one would expect to see the left wing.
- 1.12.3 The left wing was located 50 m south of the main wreckage. Though the wing showed damage on the inboard trailing edge through to the tubular spar, indicative of propeller strike, the structure was largely intact. There was damage to the wing leading edge, possibly from being blown around on the ground.
- 1.12.4 The forward and rear wing to fuselage attachment assemblies had failed. The wing attachment pin was in the correct position and positively locked. The associated strut had failed mid-way along its length due to bending overload.
- 1.12.5 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 311 kg or that the centre of gravity was outside the normal range.
- 1.12.6 All of the extremities and control surfaces were accounted for at the impact point, and no evidence of any control or engine malfunction was discovered.

1.13 Medical and pathological information

- 1.13.1 Post-mortem examination revealed that the pilot had died of injuries consistent with impact trauma.

1.14 Fire

- 1.14.1 Fire did not occur

1.15 Survival aspects

- 1.15.1 The accident was not survivable.

1.16 Tests and research

- 1.16.1 The left wing attachment assemblies were subjected to metallurgical examination. It was determined that the forward attachment assembly failed in overload bending. This assembly showed marks from impacting the adjacent structure during the in flight break-up.
- 1.16.2. The rear pivoting attachment had failed through overload or low cycle fatigue in tension. It was reported that the weld was of “exceptionally poor quality and the load required to cause failure would be significantly less than one third of that for a good weld”. The rear pivoting attachment is normally subjected to compressive loading in flight.
- 1.16.3 It could not be positively determined from where the rear attachment assembly had originated, though it is probable that it was supplied as part of the manufacturer’s kit.

1.17 Organisational and management information

- 1.17.1 Not applicable

1.18 Additional information

- 1.18.1 The senior microlight instructors nominated for the supervision of the pilot’s training were not aware that the pilot intended to fly on the day of the accident.

1.19 Useful or effective investigation techniques

- 1.19.1 Nil

2. Analysis

- 2.1 It appears that the aircraft was being operated in adverse meteorological conditions. It is possible that the aircraft may have been subjected to high aerodynamic loads that were close to or outside the manufacturer’s ultimate design load limits. These high loads would have contributed to the fatigue of an already structurally compromised left wing rear attachment. The force imparted by a single strong gust is likely to have caused final failure of the rear attachment assembly.
- 2.2 Once the rear attachment had failed, the forces imparted by the airflow would cause the wing to flail violently around its remaining attachment. Subsequent detachment of the wing from the fuselage would have been a rapid process.
- 2.3 The pilot chose to fly in severe mechanical turbulence after an experienced local microlight pilot knowledgeable in the local topographical and climatic conditions had advised him against this.
- 2.4 The most likely cause of the accident was that the pilot did not recognise that severe turbulence presented a significant hazard to his aircraft.
- 2.5 A contributory factor may be the poor quality of a critical aircraft component.

3. Conclusions

- 3.1 The pilot was not appropriately certificated for the flight and may not have held a valid medical certificate.
- 3.2 The aircraft had a valid permit to fly.
- 3.3 The aircraft had been operating normally before the accident.
- 3.4 The aircraft was probably subjected to very high aerodynamic loads due to being operated in severe turbulence throughout most of the flight.
- 3.5 The failed weld of the left wing rear attachment assembly was reported to be of “exceptionally poor quality and was far worse than would normally be acceptable for a critical item”.
- 3.6 The left wing detached from the aircraft in flight.
- 3.7 The ensuing ground impact was not survivable.

4. Recommendations

- 4.1 It is recommended that the Director liaise with the certificated microlight organisations to ensure that adequate information exists to help microlight pilots correctly understand the risk that turbulence presents to safe operation of their aircraft.
- 4.2 It is recommended that the Director assess the feasibility of carrying out continued airworthiness action in respect of the safety of wing attachment assemblies for Kolb aircraft.

Michael G Hunt
Assistant Director Safety Investigation and Analysis
Date