



AIRCRAFT ACCIDENT REPORT
OCCURRENCE NUMBER 99/1
SCHEMPP-HIRTH VENTUS B/16.6
ZK-GTR
MARAMARUA
4 JANUARY 1999

Glossary of abbreviations used in this report:

ATD	Air Transport Division (Ministry of Transport)
CAA	Civil Aviation Authority
E	east
FAI	Fédération Aéronautique Internationale
GP	General Practitioner
GPS	Global Positioning System
hPa	hectopascals
kg	kilogram(s)
km	kilometre(s)
m	metre(s)
MHz	megahertz
NZDT	New Zealand Daylight Time
NZGA	New Zealand Gliding Association
PMO	Principal Medical Officer
UTC	Coordinated Universal Time
VHF	very high frequency

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Aircraft type, serial number and registration:	Schempp-Hirth Ventus B/16.6, 105, ZK-GTR
Number and type of engines:	Not applicable
Year of manufacture:	1982
Date and time:	4 January 1999, 1600 hours* (approx)
Location:	Maramarua, South Auckland Latitude: S 37° 14.4' Longitude: E 175° 14.1'
Type of flight:	Private
Persons on board:	Crew: 1
Injuries:	Crew: Fatal
Nature of damage:	Aircraft destroyed
Pilot-in-command's licence	FAI Gliding Certificate; Gold Badge, with Diamond for Goal
Pilot-in-command's age	59 years
Pilot-in-command's total flying experience:	1150 hours glider, 500 (approx) aeroplane 800 on type
Information sources:	Civil Aviation Authority field investigation
Investigator in Charge:	Mr A J Buckingham

* Times are NZDT (UTC + 13 hours)

Synopsis

The Civil Aviation Authority was notified of the accident at 1629 hours on Monday 4 January 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 cross-country task in company with two other gliders, when he advised that he intended to land at Maramarua. The glider was observed to pitch up and enter a spin from which it did not recover before striking the ground. The first person on the scene found the pilot dead.

1. Factual information

1.1 History of the flight

- 1.1.1 On 4 January 1999, a number of gliders were participating in a cross-country task from the Auckland Gliding Club's base at Drury. The course comprised two laps of a triangular course Drury – Meremere – Kaihere – Bombay with Drury being the finish point at the end of the second lap.
- 1.1.2 ZK-GTR, flown by its owner, was aerotow-launched at 1304 hours, and successfully completed four legs of the course in good thermalling conditions. Conditions deteriorated later in the afternoon after the onset of a sea breeze, and some of the contestants were obliged to land out when they were unable to progress further.
- 1.1.3 About halfway into the second Meremere-Kaihere leg, GTR was in company with two other gliders, GLK and GOC, and all were heading towards an area of anticipated lift to the south of Miranda. They had previously climbed to about 2700 feet in a thermal near Mangatawhiri.
- 1.1.4 Abeam Maramarua at an altitude of between 2000 and 2500 feet, the pilot of GTR called his companions and said that he was going to land near the Red Fox Tavern at Maramarua. Both said that the call was made in a routine manner and no distress was apparent in the pilot's speech. They continued with their flight, and subsequently completed the set course.
- 1.1.5 A witness, a passenger in a car travelling west on State Highway 2, observed the glider flying in a westerly direction about 1 km north of the highway, and pointed it out to her children. As they watched, the glider made a 180° turn to the left, rolled out of the turn, then pitched up noticeably. They lost sight momentarily behind intervening trees, and next sighted the glider "spiralling straight down".
- 1.1.6 Although the witnesses did not see the glider strike the ground, they were certain that it had done so, and stopped at the Red Fox Tavern to call emergency services. A farmer also witnessed part of the final descent, and drove his farm motorcycle to the scene, where he found the pilot dead.

- 1.1.7 The accident occurred in daylight, at approximately 1600 hours NZDT, at Maramarua, at an elevation of 70 feet. Grid reference 260-S12-086380, latitude S 37° 14.4', longitude E 175° 14.1'.

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 held an FAI Gold Badge, with Diamond for Goal. The achievements required for the award of the Gold Badge are a distance flight of at least 300 km, a five-hour endurance flight and a height gain of at least 3000 metres. The Diamond Goal requirement is a flight of at least 300 km over a triangular or out-and-return course.
- 1.5.2 He had previously held a Private Pilot Licence (Aeroplane), but had been medically assessed in 1986 as permanently unfit to hold a flight crew licence. He had accrued some 500 hours aeroplane time while holding this licence.
- 1.5.3 The pilot's total glider time was 1148 hours, of which approximately 800 were on type. His last glider Biennial Flight Review was on 10 December 1997.
- 1.5.4 A cardiac event was the reason for the "permanently unfit" medical assessment in 1986. See 1.13 for more detailed information.
- 1.5.5 The pilot was reported to be in apparent good health and spirits on the day of the accident, although one club member commented that he "didn't look well", particularly in respect of his colour. The co-owner of GTR said that, in his opinion, the pilot appeared normal.

1.6 Aircraft information

- 1.6.1 ZK-GTR was imported and first registered in New Zealand in 1982, and was maintained thereafter in accordance with relevant Civil Aviation and New Zealand Gliding Association requirements.

- 1.6.2 Following an Annual/100 hour and Four Yearly Inspection on 5 November 1998, the aircraft was issued with a non-terminating Airworthiness Certificate, and released to service.
- 1.6.3 Up to 4 January 1999, the aircraft had accrued 1573.5 flight hours.
- 1.6.4 The pilot had performed and signed for a Daily Inspection prior to flight on 4 January 1999. The aircraft was being operated in the “15-metre” configuration, being fitted with winglets in place of the optional tip extensions (which give a span of 16.6 metres).
- 1.6.5 The co-owner of GTR advised that although the glider would spin readily, it would also respond quickly to normal recovery action. He said that he had watched the pilot on several occasions practising incipient spin recovery, and that recovery was usually effected within a quarter of a turn.

1.7 Meteorological information

- 1.7.1 The Auckland area was under the influence of a large, slow-moving anticyclone, giving fine conditions with light winds, good visibility and areas of cumulus and stratocumulus cloud.
- 1.7.2 There was sufficient thermal activity to sustain the planned cross-country task, although the conditions deteriorated with the onset of a sea breeze later in the afternoon.

1.8 Aids to navigation

- 1.8.1 Not applicable

1.9 Communications

- 1.9.1 GTR was equipped with a Dittel 5-channel VHF transceiver, with which the pilot made routine radio calls throughout his flight. The channel selector was found set to Ch 1 (119.1 MHz) when inspected after the accident.
- 1.9.2 A Terra TRT 250 transponder was also fitted, but was not required to be switched on, the flight having taken place outside transponder-mandatory airspace.

1.10 Aerodrome information

- 1.10.1 Not applicable

1.11 Flight recorders

- 1.11.1 The glider was fitted with a Cambridge Aero Instruments GPS navigation system, which incorporated a three-dimensional position recorder. The recorder logged position every four seconds, with the sampling interval reducing to two seconds within a set distance of each turning or destination waypoint.
- 1.11.2 The recorder unit was recovered and downloading of the stored data was attempted by the New Zealand agent for the equipment. However, it was found that an internal battery essential to data retention had been jarred loose from its

mounts, and the data had been lost. The unit was found to be capable of normal operation once the battery was re-inserted. The agent has suggested to the manufacturer that battery mount security be considered in future production.

1.12 Wreckage and impact information

- 1.12.1 The aircraft struck the bank of a small creek, in a steep nose-down attitude while in a left-hand spin. Impact damage included demolition of the cockpit area, spar fractures of both wings, a circumferential fracture of the fuselage just aft of the wing trailing edge and a second similar fracture in line with the fin leading edge.
- 1.12.2 Although the left wing had slid down the creek bank to lie alongside the rear fuselage, ground imprints indicated that the wings were in their correct relative positions at impact. All extremities and control surfaces were accounted for at the site.
- 1.12.3 Limited examination of control runs at the site indicated pre-impact control integrity, and this was confirmed by further examination at a repair facility after retrieval of the wreckage. Comparison of the positions of ancillary controls, established by the presence of witness marks and comparison with an intact identical aircraft, established that at impact:
 - the undercarriage was retracted
 - the dive brakes were closed
 - the flap setting was +1 (first “notch” down)
 - the elevator trim control was set to a position compatible with the flap setting.
- 1.12.4 The altimeter subscale was set to 1015 hPa, although internal damage to the altimeter resulted in an indication of 7000 feet, and the airspeed indicator was stuck on an indication of 21 knots. No other useful instrument indications were present.
- 1.12.5 The accident site was adjacent to a field which would have been suitable for landing, and there were several other suitable fields in the immediate vicinity.

1.13 Medical and pathological information

- 1.13.1 Post mortem examination of the pilot concluded that death was due to multiple injuries consistent with impact.
- 1.13.2 There was clear evidence of severe coronary artery atheroma. The left coronary artery showed severe atheromatous changes with over two thirds reduction in luminal diameter, and the right coronary artery showed a “pin-point” lumen close to its origin. The circumflex coronary artery showed moderate atheroma.
- 1.13.3 Evidence of severe chronic ischaemic heart disease was present, with an area of scarring of the myocardium and posterior left ventricle, and smaller areas elsewhere. Valve scarring was also present.

- 1.13.4 Toxicological tests disclosed no evidence of alcohol, or medicinal or recreational drugs.
- 1.13.5 The effect of the “pin-point” cross section of the right coronary artery was a severely restricted blood flow to that portion of the heart muscle mass normally supplied by that artery.
- 1.13.6 Any further diminution of the blood flow such as by spasm of the artery wall or by the onset of clotting at that point would lead to “heart attack” symptoms, which include severe chest pain, breathlessness, shock, partial or complete loss of consciousness, and death.
- 1.13.7 The pilot’s medical records showed that he had suffered a myocardial infarction (“heart attack”) in January 1986. An angiogram performed in March 1986 found coronary artery disease consistent with that described in 1.13.2, except that the right coronary artery at that time showed 80% narrowing.
- 1.13.8 In December 1986, the pilot’s cardiac specialist corresponded with the ATD¹ Principal Medical Officer (PMO), to ascertain the pilot’s status with respect to renewing his medical certificate. The PMO replied that the “unfit” assessment was permanent, as the pilot was unable to meet the strict criteria prescribed for reinstatement. The same letter also included the sentence: “It has been known for pilots incapacitated by severe chest pain to grasp the controls tightly and so cause the aircraft to stall.”
- 1.13.9 On 9 December 1987, the pilot underwent a medical examination with a doctor who was not his regular GP, to obtain a gliding medical certificate. The certificate included a declaration which stated, in part, “I hereby declare that I do not suffer from any of the following specific conditions: ... (c) High blood pressure, chest pains or angina pectoris or any form of heart disease.”
- 1.13.10 After further medical examinations which included a cardiac assessment, and application to ATD in October 1989, the pilot was again advised by the PMO that he was considered permanently unfit to hold a flight crew licence. During the cardiac specialist examination, the pilot mentioned to the cardiologist that he had a gliding medical certificate. His explanation was that, at the time of making the declaration on the certificate, he was asymptomatic and therefore not actually “suffering” from any of the conditions listed.
- 1.13.11 Although the pilot was hospitalised briefly in October 1996 for suspected angina, subsequent investigation found that the symptoms were gastric in origin. Medication prescribed for angina had no effect on the symptoms, but once the condition was correctly diagnosed, the symptoms responded readily to the correct medication. The pilot’s wife confirmed that he had not experienced any actual cardiac symptoms subsequent to his initial attack in 1986.

¹ The ATD was reconstituted as the CAA in 1992.

1.13.12 Had the pilot been an instructor or rated to carry passengers, he would have been required to renew his medical certificate every 12 months, being over age 50. However, he was not instructor or passenger rated, so his original certificate was effectively non-terminating as long as no change of health occurred.

1.14 Fire

1.14.1 Fire did not occur.

1.15 Survival aspects

1.15.1 The accident was not survivable owing to the high decelerative forces involved. The pilot was restrained by a combination lap and shoulder harness but the cockpit configuration, with the pilot seated in a semi-recumbent position, meant that there was little crushable structure forward of the pilot. Any significant longitudinal impact in this type of aircraft usually results in the destruction of the cockpit area with consequent effects on 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 Using information supplied by the main witness, in particular the position of the glider in relation to a hill in the background, the height of the glider above the area of intended landing was calculated to be between 400 and 500 feet at the time of the witness's first sighting.

1.19 Useful or effective investigation techniques

1.19.1 Nil

2. Analysis

2.1 The pilot was an experienced cross-country glider pilot, as evidenced by his Gold Badge and Diamond for Goal qualifications. Given that his two companions completed the set task from the point where he broke off to land, the completion of the task should have been well within his abilities.

2.2 The pilot gave no reason for his decision to land, nor did he sound distressed in his radio transmissions. The initially observed movements of GTR were consistent with the pilot manoeuvring to land in one of the several suitable fields beneath, as was the setting of the first "notch" of flap.

2.3 The witness observation of the pitch up and spiral descent suggests loss of control, particularly as there was no apparent attempt at recovery.

- 2.4 The possibility of an aircraft control malfunction was eliminated by site and subsequent examination.
- 2.5 The sequence of events, together with post-mortem evidence, indicates a strong probability of in-flight incapacitation, of which the pilot may have had some early warning symptoms. The pin-point arterial flow in his right coronary artery was highly susceptible to further reduction by artery wall spasm or the development of clotting at that point. Any further reduction of the already marginal flow was likely to have caused all or some of the following symptoms: acute chest pain, shock, breathlessness and partial or complete loss of consciousness.
- 2.6 The pilot's decision to land may have been due to the onset of mild symptoms. Had he experienced more severe initial symptoms, it is a reasonable expectation that he would have at least mentioned this to the accompanying pilots, even if distress were not apparent in his voice transmissions.
- 2.7 The observed loss of control is consistent with rapid partial or total incapacitation of the pilot. The initial pitch up is consistent with the PMO's comment in 1.13.8. Spin recovery in this aircraft was reportedly effected rapidly by normal techniques, but in this instance no evidence of any recovery attempt was apparent.
- 2.8 In view of the circumstances in which the glider struck the ground, the pilot's medical history and the post-mortem evidence, it was concluded that the most likely cause was in-flight incapacitation of the pilot.

3. Conclusions

- 3.1 The pilot was appropriately qualified and experienced for the flight.
- 3.2 The aircraft had a valid airworthiness certificate and had been maintained in accordance with relevant requirements.
- 3.3 No pre-accident aircraft defect was found.
- 3.4 The pilot had a history of cardiac problems, and this was substantiated by post-mortem examination.
- 3.5 The pilot had been assessed as permanently unfit to hold a flight crew licence.
- 3.6 The pilot's gliding medical certificate and declaration did not disclose his cardiac history.
- 3.7 The pilot probably suffered in-flight incapacitation, which rendered him incapable of further controlled flight.

(Signed)

Michael G Hunt
Assistant Director Safety Investigation and Analysis
7 April 1999