



AIRCRAFT ACCIDENT REPORT

OCCURRENCE NUMBER 01/4194

NZ AEROSPACE FU24-950

ZK-MAT

PAIAKA, NORTHLAND

23 DECEMBER 2001

Glossary of abbreviations used in this report:

CAA	Civil Aviation Authority
E	east
ELT	emergency locator transmitter
ft	foot or feet
kg	kilogram(s)
km	kilometre(s)
m	metre(s)
NW	north-west
NZDT	New Zealand Daylight Time
S	south
UTC	Coordinated Universal Time

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Aircraft type, serial number and registration:	NZ Aerospace FU24-950 (Fletcher), 236, ZK-MAT
Number and type of engines:	1 Lycoming IO-720-A1B
Year of manufacture:	1977
Date and time:	23 December 2001, 1430 hours ¹ (approx)
Location:	Paiaka (31 km NW of Whangarei Aerodrome) Latitude ² : S 35° 33.2' Longitude: E 174° 08.3'
Type of flight:	Agricultural - topdressing
Persons on board:	Crew: 1
Injuries:	Crew: 1 fatal
Nature of damage:	Aircraft destroyed
Pilot-in-command's licence	Commercial Pilot Licence (Aeroplane)
Pilot-in-command's age	39 years
Pilot-in-command's total flying experience:	1516 hours, 1262 on type
Information sources:	Civil Aviation Authority field investigation
Investigator in Charge:	Mr J A Daley

¹ Times are NZDT (UTC + 13 hours)

² NZ Geodetic Datum 1949

Synopsis

The Civil Aviation Authority was notified of the accident at about 1440 hours on 23 December 2001. 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 aeroplane was engaged in topdressing operations from a farm property near Piaka. Shortly after it had taken off the loader driver heard the aircraft under full power as it entered a valley system; he then heard an explosion and saw smoke on the skyline. On investigation, rescuers found the burning wreckage of the aircraft. The pilot did not survive the accident.

1. Factual information

1.1 History of the flight

- 1.1.1 On the morning of Sunday 23 December 2001, the pilot was engaged in spreading superphosphate on a property near Otonga. When this job was completed the operation moved to a property to the east of Whangarei where urea was sown on a maize crop. This job finished at about 1130 hours when the pilot and loader driver decided to have a cup of tea and determine which job they would do next.
- 1.1.2 There were two options available; it was found that the wind was unsuitable for operations from one airstrip, so it was decided to complete the job at Paiaka, which involved spreading some 112 tonnes of lime. This particular job was to have commenced on 13 December 2001 but was delayed because of wind.
- 1.1.3 The loader driver arrived at Paiaka at about 1300 hours to find that the pilot had already landed and was removing the cover from the fertiliser bin that held the lime. The loader driver noticed that water had come under the edges of the cover making the lime damp around the walls of the bin. The truck driver who had delivered lime earlier in the week had also noted the presence of moisture in the lime around the edges of the bin.
- 1.1.4 The work commenced at about 1320 hours and the loader driver expected the pilot to stop for fuel between 1445 and 1500 hours. After approximately 13 loads the loader driver was using the lime that had been affected by moisture. As a result he took bucket loads from the sides of the bin and mixed it with the lime in the middle of the bin in an effort to make the lime flow more freely.
- 1.1.5 At approximately 1425 the pilot gave the signal to the loader driver for a refuel on the next landing. As this was earlier than the expected refuel time the loader driver assumed this was also to check if any lime was building up around the bottom of the hopper. During the 10 weeks that they had been operating the aircraft they had to clean fertiliser away from the hopper door area. This had happened several times, especially if the fertiliser was damp, and on one occasion they had to clean out part of a previous fertiliser load that had “hung up” inside the hopper.

- 1.1.6 As the loader driver was preparing for the refuel he could hear the aeroplane operating under what sounded like full power, and saw the pilot manoeuvre the aircraft in an apparent attempt to dislodge the load. He saw a small “puff” of lime discharge from the aircraft as it was “bunted”. The aircraft then disappeared behind intervening terrain into a valley, some 1500 m from the sowing area. The loader driver did not see the aeroplane again, but heard a muffled explosion and saw smoke on the skyline. He then phoned for emergency assistance.
- 1.1.7 The accident occurred in daylight, at approximately 1430 hours NZDT, at Paiaka, at an elevation of 720 feet. Grid reference 260-Q06-142267, latitude S 35° 33 2', longitude E 174° 08.3'.

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 male pilot, aged 39, held a New Zealand Commercial Pilot Licence (Aeroplane) endorsed with Flight Radio Telephone Operator and Agricultural ratings.
- 1.5.2 He had flown a total of 1516 hours at the time of the accident and had completed 1240 hours in agricultural operations.

1.6 Aircraft information

- 1.6.1 New Zealand Aerospace FU24-950 (Fletcher), serial number 236, was manufactured in 1977 and registered as ZK-MAT. At the time of the accident, the aircraft had accrued 9445.28 hours in service.
- 1.6.2 The Lycoming IO-720-A1B engine, serial number L-850-54A, was installed in the airframe on 15 August 1997 and at the time of the accident had run 1934.80 hours since overhaul.
- 1.6.3 Hartzell HC-C3YR-1RF propeller, hub serial number DY3240A had run 1894.85 hours since overhaul.

1.6.4 The most recent scheduled maintenance was a 100-hourly check performed on 15 November 2001 at 9399.50 hours in service. An annual review of airworthiness was also carried out at this time.

1.6.5 The aircraft was fitted with a standard 43 cubic foot hopper and an Easton box.

1.7 Meteorological information

1.7.1 On 23 December 2001, the Northland area was under the influence of a weakening ridge of high pressure, with light westerly winds, and generally fine weather.

1.7.2 Heavy rainfall was recorded in the Whangarei area on 16, 17 and 18 December 2001.

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 struck a tree with the right wing, about 30 feet above ground level, losing the outer 1.5 m of wing and aileron at this point. It then struck rising ground some 12 m beyond the tree on a track of approximately 120° M. After impact an intense fire consumed much of the fuselage and engine sections of the aeroplane, the propeller also sustained impact damage.

1.12.2 All extremities of the aircraft were accounted for at the site. Although all control surfaces were present, pre impact integrity of their respective control runs could not be verified because of fire damage to the cockpit controls.

1.12.3 A large amount of lime was found at the accident site. This was dug away and the hopper box was found to be in the open position.

1.12.4 The engine sustained extensive fire damage and together with the propeller and hopper box was removed from the site for later examination.

1.13 Medical and pathological information

1.13.1 Post-mortem examination found that the pilot died of multiple injuries sustained on impact.

- 1.13.2 There was no evidence of any pre-existing condition that could have resulted in incapacitation or affected the pilot's ability to fly the aircraft.
- 1.13.3 Toxicological tests on the pilot revealed no trace of alcohol, or medical or recreational drugs. Tests disclosed a blood carbon monoxide level of 9%, which the pathologist did not consider to be significant.

1.14 Fire

- 1.14.1 An intense fire erupted after impact and consumed most of the fuselage and engine area. Virtually all of the non-ferrous materials in these areas were melted or reduced to ash.
- 1.14.2 At the time of the accident there was approximately 60 litres of fuel on board. It is likely that one or more fuel lines ruptured during ground impact and while the ignition source could not be established, there was enough disruption to the electrical system to have caused arcing at some point in the impact sequence.

1.15 Survival aspects

- 1.15.1 Although the pilot was restrained by a full harness, impact forces and the loss of occupiable space combined to render the accident unsurvivable.
- 1.15.2 The aircraft was equipped with a Pointer 3000 ELT, but no ELT signal relating to this accident was reported as received. The ELT was not found in the wreckage and was presumed to have been destroyed by fire.

1.16 Tests and research

- 1.16.1 Following on-site inspection, the engine, propeller and hopper box were transported to an aircraft engineering facility for further examination. The engine was bulk stripped and apart from fire damage to the sump, fuel control unit and both magnetos, no abnormalities were found.
- 1.16.2 The Easton hopper box was also examined and no abnormalities were found.
- 1.16.3 The propeller and propeller hub were subjected to metallurgical examination. It was determined that the failure of the pitch change knobs occurred as a result of overload during the impact sequence.

1.17 Organisational and management information

- 1.17.1 Not applicable.

1.18 Additional information

- 1.18.1 The topdressing flights originated from an airstrip about 1.5 km to the east of the property being treated. The strip was located on the north-east face of a ridge aligned generally north-west to south-east; take-offs were downhill to the north-east and landings were made uphill in the reciprocal direction. Elevation of the mid-point of the strip was approximately 650 feet.

- 1.18.2 After take-off, the pilot would make a wide left turn, cross the ridge and continue the turn to approach the property from the north. The property itself contained two major hills, of 820 and 920-foot elevation, with the lowest portion of the property being a valley on the western boundary, the valley floor elevation being approximately 300 feet.
- 1.18.3 A reconstruction of the final flight path was undertaken with an aircraft of the same type. The load consisted of the pilot and passenger, nominal fuel, but no fertiliser. It was found that in the valley where the accident occurred, full power was required to clear the ridge at the end of the valley.

1.19 Useful or effective investigation techniques

- 1.19.1 Nil.

2. Analysis

- 2.1 On-site and subsequent examination of the wreckage disclosed no pre-impact defect or condition in either the engine or propeller that could have led to the accident. Similarly there was no indication of any pre accident condition affecting the pilot.
- 2.2 The aircraft had previously had fertilizer build up around the hopper box, requiring removal on several occasions. On one recent occasion the loader driver and pilot had to clean out part of a previous load that had “hung up” in the hopper.
- 2.3 After about 13 loads the loader driver started encountering lime that had been affected by moisture, and in an effort to make it flow, the loader bucket was used to mix the dry product with the damp product.
- 2.4 It is evident that on the final flight, the lime did not discharge from the hopper, and the loader driver saw the pilot manoeuvring his aircraft (bunting) in an effort to dislodge the load. He saw one small “puff” of lime discharge from the aircraft before it disappeared from view. At this point, the engine sounded as if it were producing full power.
- 2.5 A large quantity of lime was found at the accident site and when this was dug away the hopper doors were found to be in the open position. It is possible that a portion of the previous lime load may have still been in the hopper when the new load was added.
- 2.6 Having crossed the subject property from north to south, the pilot would have found himself in a “cul-de-sac” situation, with a (probably) fully-laden aeroplane, no room to complete a reversal turn, and insufficient climb performance to clear the terrain ahead. The bunting manoeuvre(s) may have also resulted in a height loss, thereby exacerbating the situation.

3. Conclusions

- 3.1 The pilot was appropriately licensed, rated and fit for the flights undertaken.
- 3.2 The aircraft had a valid Airworthiness Certificate and had been maintained in accordance with current requirements.
- 3.3 The possibility of a pre-existing defect with the aircraft or engine that could have contributed to the accident was eliminated as far as practicable by the investigation.
- 3.4 The pilot was aware that water had affected the lime that he was using.
- 3.5 The pilot encountered a “hung load” of lime, probably resulting from the damp product bridging over the hopper doors, and despite bunting manoeuvres, he was unable to discharge the hopper contents.
- 3.6 The aircraft entered a valley system from which there was no means of escape, either by climbing or by carrying out a reversal turn.

4. Safety recommendations

- 4.1 Nil

5. Safety actions

- 5.1 Nil

Report written by:

Authorised by:

(Signed)

(Signed)

J Alan Daley
Safety Investigator
4 June 2003

Richard White
Manager Safety Investigation