NO. 94-010

FU24-950M

ZK-DZB

2 NM SOUTH OF NGARUAWAHIA

30 MARCH 1994

ABSTRACT

On the morning of 30 March 1994, ZK-DZB, a Fletcher FU24-950M, stalled in a turn at low level after the pilot apparently aborted a sowing run. The aircraft entered an incipient spin and struck the ground in a steep nose-down attitude. The pilot was fatally injured and the aircraft destroyed

TRANSPORT ACCIDENT INVESTIGATION COMMISSION

AIRCRAFT ACCIDENT REPORT NO 94-010

Aircraft Type, Serial Number and Registration:	Fletcher FU24-950M, 202, ZK-DZB
Number and Type of Engines:	One Lycoming IO-720-A1B
Year of Manufacture:	1975
Date and Time:	30 March 1994, 0820 hours*
Location:	2 nm south of Ngaruawahia Latitude: 37° 42'S Longitude: 175° 08'E
Type of Flight:	Aerial Work, Agricultural
Persons on Board:	Crew: 1
Injuries:	Crew: 1 Fatal
Nature of Damage:	Destroyed
Pilot in Command's Licence:	Commercial Pilot Licence (Aeroplane)
Pilot in Command's Age:	33
Pilot in Command's Total Flying Experience:	338 hours 5 on type
Information Sources:	Transport Accident Investigation Commission field investigation
Investigator in Charge:	Mr A J Buckingham

* All times in this report are NZST (UTC + 12 hours)

1. NARRATIVE

1.1 On the morning of 30 March 1994, ZK-DZB was engaged in sowing lime on a property near Ngaruawahia. The operation had commenced about 0630 hours, after the aircraft had been positioned from its Hamilton base by the pilot, accompanied by a supervising instructor.

1.2 Prior to departure from Hamilton Aerodrome, a routine pre-flight inspection of ZK-DZB was carried out by the pilot. Its fuel tanks were filled to capacity and a water contamination check completed. The endurance with full tanks was about 3.9 hours.

1.3 The pilot was gaining experience towards the issue of an Agricultural Rating, under the supervision of an experienced "E" Category instructor. The property was considered to be relatively easy to topdress, and the pilot began operations with loads of 15 hundredweight (762 kg), increasing in stages to one ton (1015 kg) as the job progressed. (It was the operator's normal practice to gauge the loads in imperial measure.) The lime itself was dry and free-flowing.

1.4 He was under the supervision of the instructor who remained on the ground, but who had direct radio (RTF) communication with ZK-DZB. The instructor also acted as loader driver.

1.5 The plan was for the trainee pilot to start the work and fly for two hours. A break was planned at that point for a rest, to check the fuel state, and to discuss the progress and any problems.

1.6 The work had been progressing well with no problems experienced throughout the morning. The "one-ton" loads were however reduced to 19 hundredweight (965 kg) at the request of the trainee pilot, as he felt a "little uncomfortable" at the heavier weight during the take-off.

1.7 The aircraft would take off from the airstrip on a northerly heading, level out and turn left to the south to commence a sowing run straight along the face of a low ridge. At the completion of the run, a wide left turn onto a northerly heading would place the aircraft in a left-hand downwind position for a landing back to the south. Each sowing run took about five minutes to complete, and the pattern was considered by the instructor to be easy and straightforward, requiring only shallow turns.

1.8 Fifteen minutes before the planned break, and on about the twentieth load, ZK-DZB departed the airstrip normally with 19 hundredweight of lime. The usual wide pattern was flown and the aircraft was positioned for another sowing run to the south along the ridge face, at about 100 feet agl.

1.9 On this occasion ZK-DZB was observed not to drop any lime, but shortly after passing the normal commencement point, the aircraft banked quite steeply to the left away from the ridge and over flat open paddocks.

1.10 The turn appeared to be level, and after having turned through about 120°, the aircraft was seen to pitch sharply nose-down and to impact the ground in a near-vertical nose-down attitude. It bounced over a hedge and came to rest within 10 m of the initial impact point.

1.11 A local sharemilker and his son witnessed the accident and proceeded to the scene by motorcycle. On arrival, the father dispatched his son to alert the local emergency services. The pilot was found to be dead, but still strapped in his seat. His helmet had come off his head and was found, damaged, lying in the vicinity of the cockpit wreckage.

1.12 ZK-DZB was destroyed on impact, but no fire occurred despite the spillage of a considerable quantity of fuel.

1.13 The weather at the time of the accident was reported by the supervising instructor to be fine and calm with excellent visibility. There was no fog or cloud, and he regarded it as a "perfect morning" for lime sowing. Other ground witnesses supported this observation.

1.14 On 27 January 1992 the pilot of ZK-DZB was issued with a Commercial Pilot Licence (Aeroplane), and at the time of the accident held a valid Class 1 Medical Certificate. Later in 1992 he moved to Australia, and obtained an Australian Commercial Pilot (Aeroplane) Licence. In May 1993 he successfully completed an Australian CAA-approved agricultural pilot course comprising 41 hours of flying training.

1.15 He did not obtain work as an agricultural pilot in Australia and subsequently returned to New Zealand. He successfully completed a biennial flight review on 5 February 1994, in a Cessna 150.

1.16 In deciding to pursue a New Zealand Agricultural Rating, he found that he would have to complete a total of 95 hours of agricultural flying training. The 41 hours completed in Australia would be credited toward this total.

1.17 On 28 March 1994 he commenced his training and completed an FU24 Type Rating in ZK-DZB. The aircraft, which had been unused for some months, was leased specifically for this task. Before being flown, it was serviced and inspected for the issue of a new Maintenance Release, the previous one having expired on calendar time.

1.18 On 29 March, the pilot flew two loads of lime in ZK-DZB before returning it to Hamilton for maintenance. The hopper was not opening fully and the engine tachometer was overreading. The hopper was repaired and the engine tachometer replaced. The propeller governor was also adjusted to enable the propeller to reach its maximum rpm during take-off. Full power ground runs showed no abnormality, and the engine was determined to be delivering full power.

1.19 On the morning of the accident, the aeroplane was functioning normally. The supervising instructor did not have any reason to query its performance and the work appeared to be progressing well. The trainee pilot did not indicate to the instructor that he was experiencing any difficulties or handling problems with the aircraft.

1.20 A ground observer did however report that she thought the aircraft was running roughly as it flew overhead. It was subsequently discovered that this witness, living adjacent to the airstrip, heard the power changes that occurred shortly after take-off and immediately prior to landing. The FU24-950 series Fletcher is known to backfire quite loudly with rapid closing of the throttle, especially in the landing sequence. The instructor had spoken to the pilot about this earlier in the morning.

1.21 Other witnesses, including the supervising instructor, stated that the aircraft sounded normal. In particular, an automotive engineer with considerable experience in engine tuning , and who was familiar with the engine and propeller sounds of the FU-24, observed the aircraft on its final run. He stated that the aircraft's engine "didn't miss a beat".

1.22 The reason ZK-DZB was turned quite steeply to the left without sowing any lime could not be determined. There was no evidence to suggest that the hopper had failed to open, the load had "hung up" or that the pilot was experiencing any difficulty with the aircraft. He had available direct RTF communication with the instructor on the ground, but no transmission was heard from the pilot. There was no indication of any attempt to jettison the load.

1.23 The possibility considered most likely was that he judged that he was not in the right position to start the sowing run, and decided to turn back to reposition himself. The nature of the manoeuvre was inconsistent with the pilot's expected action in the event of an emergency or malfunction. Had he, in the worst case, experienced a loss of engine power, the normal course of action would have included pulling up clear of the ridge, jettisoning the load and either returning under reduced power to the airstrip or force-landing on the flat ground to the left of his sowing path. A minor problem such as increasing oil temperature or malfunctioning hopper doors would only necessitate climbing to a safe altitude in order to evaluate the problem, and discussing it with the instructor if necessary.

1.24 In the aborting of the sowing run, ZK-DZB had been turned directly into the sun (22° above the horizon) which may have dazzled the pilot momentarily. A lone bluegum tree, approximately 100 feet tall, was located in the path of the turning aircraft. The wreckage was found adjacent to this tree, but the aircraft had not struck the tree itself. During the course of the morning's work, it had not been necessary for the pilot to pass close to this tree, and he may not have previously noted its presence.

1.25 If the pilot was dazzled by the sun in the turn, he might not have seen the tree at first, but when he did sight it, he may have reacted by banking more steeply to try and turn inside the tree, or by pulling back on the control column sharply in an attempt to "pop" over the top. For whatever reason, the heavily-laden aircraft stalled and entered an incipient spin, at an altitude which allowed no opportunity for recovery.

1.26 As ZK-DZB had moved some distance away from the ridge line during the turn, it was unlikely to have encountered its own wing tip vortices, which in calm conditions can persist and present a significant hazard.

1.27 Medical and pathological investigation showed the impact forces to be unsurvivable. There was no evidence of any medical condition that may have caused the pilot to become incapacitated during the flight.

1.28 The pilot was restrained by a lap belt and full shoulder harness , and was wearing a protective helmet.

These aids to survival had performed satisfactorily even though the helmet had come off his head in the impact.

1.29 The hopper operating lever was found to be in the partly-open position, although impact damage could have accounted for this. The flaps were retracted. Impact damage to the hopper doors precluded functional testing.

The continuity and integrity of the control systems was established, within the limits imposed by the impact damage to the aircraft, and there was no evidence of any in-flight structural failure or power loss. In addition to the spilled fuel, there was still an estimated 100 litres remaining in the aircraft's tanks.

2. FINDINGS

2.1 The pilot held a valid Commercial Pilot Licence (Aeroplane).

2.2 The pilot was gaining experience toward an agricultural rating, and was being supervised appropriately.

2.3 The pilot was inexperienced in flying FU24-950 series aircraft.

2.4 The pilot held an Australian Agricultural Rating.

2.5 ZK-DZB had a valid Maintenance Release and Certificate of Airworthiness.

2.6 The aircraft's operating weight and centre of gravity were within limits.

2.7 The aircraft was performing normally at the time of the accident.

2.8 ZK-DZB was turned steeply directly into the sun and toward a tall tree, at a low altitude.

2.9 The pilot may not have seen the tree at first, owing to the sun's glare.

2.10 The aircraft was operating at a high gross weight at the time.

2.11 The aircraft stalled in the turn and entered an incipient spin, probably as the pilot attempted to avoid the tree.

2.12 The pilot was not able to recover the aircraft from the stall and incipient spin before it impacted the ground.

2.13 The accident was unsurvivable.

24 August 1994

M F Dunphy
Chief Commissioner

ABBREVIATIONS COMMONLY USED IN TAIC REPORTS

AD	Airworthiness Directive
ADF	Automatic direction-finding equipment
agl	Above ground level
AI	Attitude indicator
AIC	Aeronautical Information Circular
AIP	Aeronatical Information Publication
amsl	Above mean sea level
ASI	Airspeed indicator
ATA	Actual time of arrival
ATC	Air Traffic Control
ATD	Actual time of departure
ATPL (A or H)	Airline Transport Pilot Licence (Aeroplane or Helicopter)
AUW	All-up weight
C	Celsius
CAA	Civil Aviation Authority
CASO	Civil Aviation Safety Order
CFI	Chief Flying Instructor
CPL (A or H)	Commercial Pilot Licence (Aeroplane or Helicopter)
DME	Distance measuring equipment
E	East
ELT	Emergency location transmitter
ERC	En route chart
ETA	Estimated time of arrival
ETD	Estimated time of departure
F	Fahrenheit
FAA	Federal Aviation Administration (United States)
FL	Flight level
g	Acceleration due to gravity
GPS	Global Positioning System
HF	High frequency
hPa	Hectopascals
IAS	Indicated airspeed
IGE	In ground effect
IFR	Instrument Flight Rules
ILS	Instrument landing system
IMC	Instrument meteorological conditions
ins Hg	Inches of mercury
kHz	Kilohertz
KIAS	Knots indicated airspeed
kt	Knot(s)
LF	Low frequency
LLZ	Localiser
M	Mach number (e.g. M1.2)
M	Magnetic

MAANZ	Microlight Aircraft Association of New Zealand
MAP	Manifold absolute pressure (measured in inches of mercury)
MAUW	Maximum all-up weight
METAR	Aviation routine weather report (in aeronautical meteorological code)
MF	Medium frequency
MHz	Megahertz
mph	Miles per hour
N	North
NDB	Non-directional radio beacon
NOTAM	Notice to Airmen
nm	Nautical mile
NZAACA	New Zealand Amateur Aircraft Constructors Association
NZGA	New Zealand Gliding Association
NZHGPA	New Zealand Hang Gliding and Paragliding Association
NZMS	New Zealand Mapping Service map series number
NZDT	New Zealand daylight time (UTC + 13 hours)
NZST	New Zealand standard time (UTC + 12 hours)
NTSB	National Transportation Safety Board (United States)
OGE	Out of ground effect
PAR	Precision approach radar
PIC	Pilot in command
PPL (A or H)	Private Pilot Licence (Aeroplane or Helicopter)
psi	Pounds per square inch
QFE	An altimeter subscale setting to obtain height above aerodrome
QNH	An altimeter subscale setting to obtain elevation above mean sea level
RNZAC	Royal New Zealand Aero Club
RNZAF	Royal New Zealand Air Force
rpm	Revolutions per minute
RTF	Radio telephone or radio telephony
S	South
SAR	Search and Rescue
SSR	Secondary surveillance radar
T	True
TACAN	Tactical Air Navigation aid
TAF	Terminal aerodrome forecast
TAS	True airspeed
UHF	Ultra high frequency
UTC	Coordinated Universal Time
VASIS	Visual approach slope indicator system
VFG	Visual Flight Guide
VFR	Visual flight rules
VHF	Very high frequency
VMC	Visual meteorological conditions
VOR	VHF omnidirectional radio range
VORTAC	VOR and TACAN combined
VTC	Visual terminal chart
W	West