



Report 96-016

Fletcher FU24-950

ZK-EGQ

16 km south-west of Motueka

23 August 1996

Abstract

At about 1522 hours on Friday 23 August 1996 ZK-EGQ, a Fletcher FU24-950, was on a routine sowing run, 16 km south-west of Motueka, when its left wing struck a lone pine tree damaging the left aileron. Control difficulties resulted and the aircraft collided with the face of a steep ridge. The aircraft was destroyed and the pilot lost his life in the accident. No new safety deficiencies were revealed.

Transport Accident Investigation Commission

Aircraft Accident Report 96-016

Aircraft type, serial number and registration:	Fletcher FU24-950, 239, ZK-EGQ
Number and type of engines:	One Lycoming IO-720-A1B
Year of manufacture:	1978
Date and time:	23 August 1996, 1522 hours ¹
Location:	16 km south-west of Motueka Latitude: 41° 11.5' S Longitude: 172° 50.8' E
Type of flight:	Aerial work, agricultural
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:	52
Pilot-in-Command's total flying experience:	14 237 hours Approximately 14 000 hours on type
Investigator in Charge:	K A Mathews

¹ All times in this report are NZST (UTC + 12 hours)

1. Factual Information

- 1.1 At around 0720 hours on Friday 23 August 1996 ZK-EGQ, a Fletcher FU24-950, departed from Nelson Aerodrome for Takaka Aerodrome, located some 66 km to the north-west. On board were the pilot and loader driver.
- 1.2 The pilot had prepared the aircraft for the flight by the time the loader driver reported for duty at Nelson Aerodrome about 0710 hours. The flight to Takaka proceeded uneventfully and took approximately 20 minutes.
- 1.3 Arrangements had been made to sow six tonnes of superphosphate, two tonnes of a special-mix superphosphate product, and 25 tonnes of lime from Takaka onto nearby properties. The work proceeded uneventfully, a spreader being fitted to the aircraft to sow the special-mix superphosphate. Prior to sowing the lime, the last to be sown, the aircraft was shut down, refuelled by the pilot, and the spreader removed. At the completion of the work the pilot and loader driver had lunch together. The aircraft was refuelled and the spreader refitted.
- 1.4 The pilot and loader driver departed from Takaka Aerodrome for an airstrip located some 14 km to the south-west of Motueka. This flight was also uneventful and took about 15 minutes.
- 1.5 From this airstrip, the arrangement was to sow 22 tonnes of a special-mix superphosphate product and 22 tonnes of lime onto a nearby property. Of the 22 tonnes of special mix, 16 tonnes had already been sown by the pilot on Monday 19 August, and six tonnes remained to be sown.
- 1.6 At the airstrip the pilot and loader driver discussed the work, and the loader driver recalled that the pilot appeared to be his usual self and in good spirits. Overnight rain had caused the airstrip's surface to become slightly soft but this was not considered to be a problem. It was decided to complete sowing the special-mix superphosphate product first, using the spreader. The loader driver prepared the loader truck, which had been positioned at the airstrip previously, for the operation. Refuelling of the aircraft was not required at this point.
- 1.7 The weather conditions were described by the loader driver as ideal for sowing with a slight northerly drift and a clear blue sky.
- 1.8 The superphosphate and lime were stored in a covered bin on the airstrip and were dry and free-flowing. Because of the softness of the airstrip's surface and the slight northerly drift the pilot decided to take 900 kg for his first sortie. The aircraft departed normally and returned without incident. The subsequent loads were increased to 950 kg, and the second and third sorties were completed without incident.
- 1.9 The pilot had not indicated to the loader driver that he was experiencing any difficulty, and on the accident flight, the fourth sortie, the aircraft departed normally at about 1520 hours with 950 kg of the special-mix superphosphate on board.
- 1.10 As each previous sortie had taken four or five minutes, the loader driver became concerned when the aircraft had not returned to the airstrip after about ten minutes and began to make enquiries. He had not been able to follow all of the aircraft's flight as he was busy preparing for the next load, but he did not notice anything untoward.
- 1.11 The loader driver subsequently learned there had been an accident and that the Police had been alerted by a witness to the event. The witness had a cellular telephone and was able to contact the Police within a few minutes of the accident.

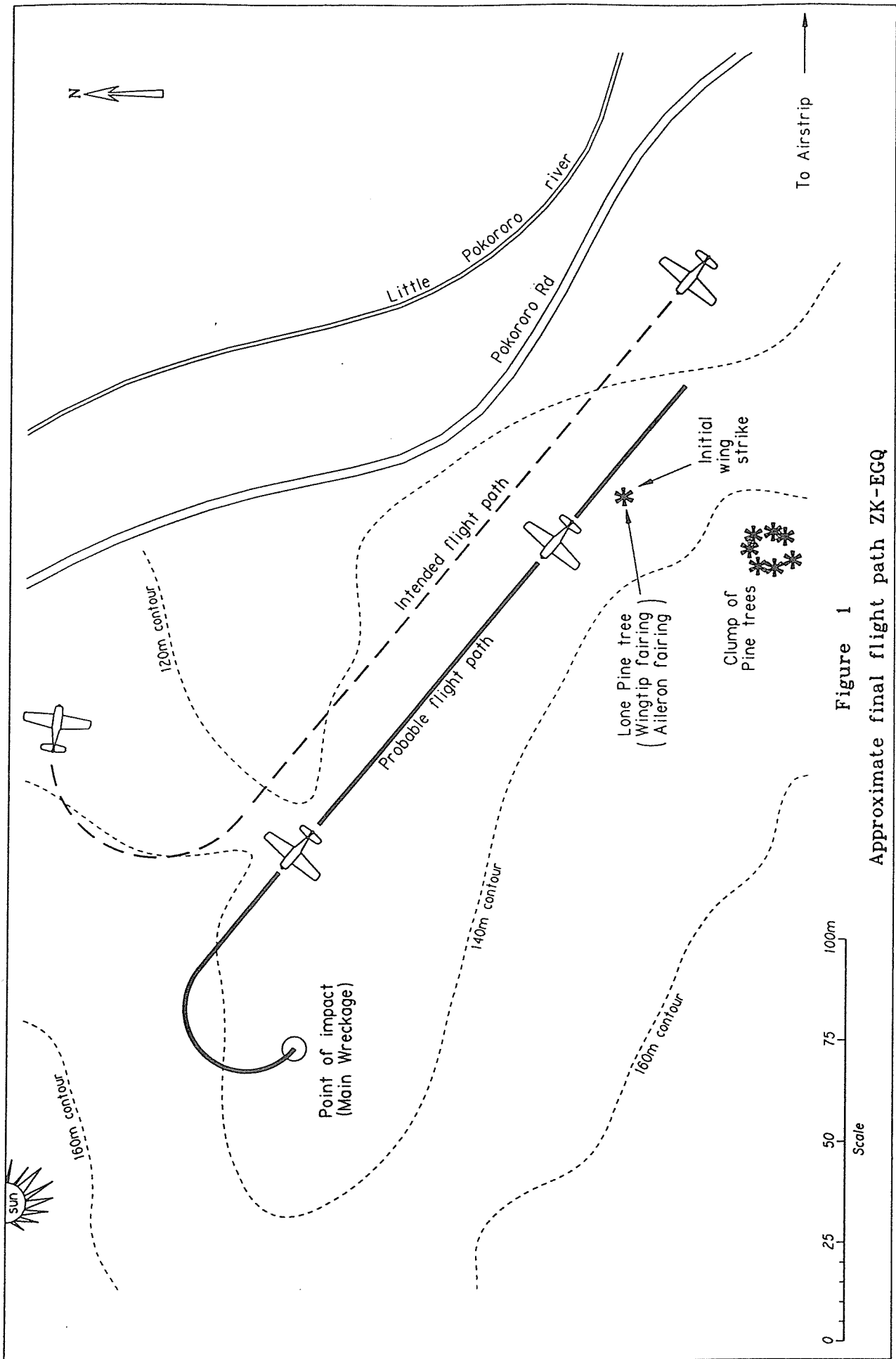


Figure 1
Approximate final flight path ZK-EGQ

- 1.12 The Police were the first on the scene and discovered that the aircraft had collided with the face of a steep ridge on the south side of a valley that ran in an east-west direction. No fire occurred. The pilot died from multiple injuries sustained in the accident. He was suitably restrained by the four-point harness installed in the aircraft but was not wearing a protective helmet.
- 1.13 The witness, a forestry worker, was about one kilometre away at the time on the opposite (northern) side of the valley. He observed the aircraft on its previous runs up the valley and said that everything appeared to be normal. The engine did not make any unusual sounds and he said the pilot seemed to be operating safely. The pilot would fly up the south side of the valley sowing the ridge, from east to west, before making a right turn toward open terrain to the north, toward the witness, and then back out the valley to the east. He described the weather conditions at the time as being perfect for sowing with no wind and open blue skies.
- 1.14 On the accident flight the witness watched the aircraft approach the valley normally at a safe height and commence sowing. He then turned his back to the aircraft but could still hear it operating in the background. A short time later he heard the engine noise reduce suddenly, then almost immediately increase to a loud roar. At this point he turned and observed the aircraft in a steep left bank turning to the south, toward the high terrain. The turn continued and a short time later the aircraft's nose pitched down suddenly and it impacted the steeply sloping ridge. The roar of the engine stopped abruptly at that point.
- 1.15 The farmer, whose property was being sown at the time of the accident, was inside his house "making a cup of tea" at about 1520 hours. He heard the aircraft fly overhead and everything sounded normal to him - the engine was not making any unusual noises. About one minute later he heard a "loud roar" of the engine followed a few seconds later by a distinctive thump. The engine noise ceased abruptly at that point. He ran outside and looked up the valley but could see only a "trail of super dust" left by the aircraft. The dust appeared to arc upwards sharply near a lone pine tree situated further up the valley from his house. The trail of dust led almost directly into the bright afternoon sun which was low on the horizon, and some shadow had formed on the ground near the tree and accident site.
- 1.16 The farmer commented that the previous runs by the pilot had all seemed normal to him and that the pilot had been flying safely. The pilot would fly up the valley from east to west, over his house, and then turn right, to the north, toward open terrain and back out of the valley toward the airstrip located further to the east. He had employed the pilot previously to sow his property, and said that he had always found the pilot to be courteous and professional in the way he conducted his flying.

Wreckage and impact information

- 1.17 The aircraft had collided with the northern face of a ridge situated on the southern side of a valley which ran in an east-west direction. The aircraft had been flying in a westerly direction and sowing along the ridge on the south side of the valley. The collision occurred toward the top of the ridge where the slope was 30°. The aircraft had turned left through 180° prior to the impact and appeared to have stalled, striking the ground nose-first. The ground strike marks showed that the left wing was tilted down parallel with the slope, indicating the aircraft was banked significantly to the left at the time. It was estimated that about half of the load remained on the aircraft at the time of the collision. There was no evidence that the pilot had attempted to jettison this load. The aircraft had struck the face of the ridge heavily, rebounding a short distance, coming to rest upright. The accident was not survivable. See Figure 1 for a diagram of the accident area.

- 1.18 The aircraft had been extensively damaged. All of it was accounted for at the accident site, except for the left wing-tip fairing and left aileron fairing and endplate. These items were located near the base of a lone pine tree on the face of the ridge some 160 m to the east. The lone pine tree was estimated to be about 30 m high, and was separated from a clump of pine trees on the ridge top some 40 m to the south.
- 1.19 The pine tree had freshly broken branches near its top, and some broken branches measuring up to 12 cm in diameter lay on the ground close to the fairings and endplate. Impact marks on the wing-tip fairing and aileron endplate and fairing matched those on the broken branches. The endplate was twisted outwards about 45° from its normal plane, and the aileron fairing to which it was attached had been torn away from the aileron. Likewise, the wing-tip fairing had been torn away from the wing.
- 1.20 The left wing had been badly damaged, particularly on its leading edge due to the ground impact, and the aileron was still attached normally to the wing. Some damage to the outboard section of the wing's leading edge had occurred as a result of striking the tree, as evidenced by pine needles embedded in the wing's leading edge and inside its structure. The aileron was distorted outwards near its outboard end, where the fairing and endplate had been attached. The aileron's trailing edge was bent upwards with some spanwise compression damage evident, and its push-pull control rod had been distorted. The aileron was not jammed by any object but its movement was restricted. The damage to the aileron was not consistent with the ground impact forces, and was likely to have occurred prior to the ground impact.
- 1.21 No evidence was found of any other defect or failure of the control systems or structure which may have been a factor in the accident. Control continuity was established as far as practicable given the disruption that had occurred. The engine was found lying near the empennage, entirely separated from the aircraft. The propeller, which was still attached to the engine, showed signs of having power on at impact. No useful information could be obtained from the cockpit which was demolished. The fuel tanks had been ruptured but a quantity of fuel remained in the left tank. A fuel smell was evident and the remaining superphosphate was soaked with fuel.
- 1.22 The topography of the surrounding area was such that it should have presented few problems for the pilot during his landing. The valley was relatively wide, and had an engine failure or loss of power occurred the valley floor to the north, and some open paddocks to the east, would have been suitable for a forced landing. The elevation of the accident site was approximately 450 feet.
- 1.23 At the time of the accident the sun was approximately 290° M in azimuth and 23° in elevation.

Aircraft information

- 1.24 The aircraft's maintenance records indicated that ZK-EGQ had been maintained in accordance with the operator's approved Inspection Schedule and was certified for aerial work and private operations. The aircraft had been flown regularly up to the time of the accident flight and had accumulated a total of some 9299 airframe hours. The last maintenance inspection was completed on 27 July 1996 and a Maintenance Release was issued, valid till 27 January 1997, or 9349.53 hours whichever occurred first. It had a non-terminating Certificate of Airworthiness.

Personnel information

- 1.25 The pilot held a valid Commercial Pilot Licence (Aeroplane) and Class 1 Medical Certificate with no restrictions. He was rated on the aircraft type and held an Agricultural Rating.

- 1.26 The pilot was in regular flying practice, and apart from the day of the accident had last flown for 4.9 hours on Monday 19 August 1996. He was respected in the community for his professionalism and contribution to aviation safety. He was highly experienced and competent having amassed some 14 000 hours in Fletcher aircraft on agricultural operations, and was familiar with the work he was conducting at the time. His most recent check flight was a Regulation 76 check conducted on 7 December 1995.
- 1.27 There was no evidence of any pilot impairment as the result of medical unfitness, fatigue or environmental factors.
- 1.28 It was the custom of the pilot to wear suitable hearing protection, sunglasses and a peaked cap when he was topdressing. He chose not to wear a protective helmet, but the impact forces were such that a helmet would not have prevented his death.

Additional information

- 1.29 During the recovery of the wreckage the company's manager flew to the accident site in the recovery helicopter, at a similar time of day to the occurrence of the accident. He reported that the sun was low on the horizon, which caused the pine tree to virtually disappear from sight when flying directly toward it and into the sun. He also completed the task of sowing the remainder of the superphosphate onto the property. This was completed one morning, and although the sun was not a factor, he reported that when his aircraft was at about the same height as the pine tree it tended to blend into the background readily.

2. Analysis

- 2.1 The aircraft was on a routine sowing sortie when its left wing struck a lone pine tree, near the top of the tree. As a result the left wing-tip fairing and left aileron fairing and endplate were torn from the aircraft. The left aileron was distorted outwards at its outboard end and bent upwards. Damage to the aileron push-pull control rod was likely to have resulted. The damage to the aileron affected its freedom of movement and therefore the pilot's ability to control the aircraft in roll.
- 2.2 The final flight path of the aircraft suggested that the pilot was not able to turn the aircraft to the right, away from the ridge and towards open terrain, but only to the left toward rising terrain. It is likely the control disruption caused the aircraft to turn to the left, or the wing collision could have yawed/rolled the aircraft left, and the damage prevented the pilot rolling the aircraft back to the right. In an attempt to retrieve the situation, and avoid a collision, the pilot applied full power and probably increased the angle of bank. The aircraft subsequently stalled at a low height from which recovery was not possible.
- 2.3 The pilot was highly experienced and familiar with the operation and area, having sown it previously. It is therefore likely that he was aware of the lone pine tree. He would also have been aware of the danger isolated objects such as trees, poles and wires posed to low flying aircraft, and the difficulty, at times, of detecting them.
- 2.4 Witness observations indicated the aircraft's engine was operating normally until a few seconds before impact with the terrain, when the engine noise reduced suddenly then immediately increased to a loud roar. The time taken for the aircraft to cover the distance from the lone pine tree to the accident site, and turn through 180°, would have been around 20 seconds. A power loss was therefore discounted as having contributed to the accident. In addition, several options were open to the pilot had he experienced a power loss, none of which was taken.

- 2.5 The pilot had not attempted to jettison the aircraft's load, but this could be explained if the pilot needed to use both hands simply to control the aircraft in an attempt to avoid flying into terrain.
- 2.6 No previous control difficulties had been reported by the pilot or observed by others, and examination of the wreckage did not disclose any other defect or failure of the control systems or structure which may have contributed to the accident.
- 2.7 It could not be determined with certainty why the aircraft's wing struck the tree. The pilot was flying toward the sun which was low on the horizon, with accompanying shadow effects, and the tree top was at the same approximate height as the aircraft. The effects of sun and shadow may have obscured the tree, and/or the pilot may have been distracted momentarily as he approached it. In addition the tree was some 40 m removed from a clump of trees which could have deceived the pilot into overlooking the presence of the lone tree, since he was well clear of the clump.
- 2.8 Fatigue was not considered to be a factor in the accident, after reviewing the history of the flight and the pilot's previous activity/rest patterns. There was no evidence of any pilot impairment as the result of medical unfitness or environmental factors.
- 2.9 Given the reported weather conditions it was considered unlikely that a sudden gust of wind caused the aircraft to veer toward the tree.
- 2.10 Tall isolated objects, such as trees, pose a threat to agricultural and other low flying aircraft as these objects can be difficult to detect. Low flying agricultural aircraft are particularly vulnerable as pilots have to constantly exercise a high degree of concentration and judgement to ensure the accuracy of their topdressing swath, as well as be on the lookout for likely hazards in the aircraft's flightpath. The potential to fly into a "hidden" object is therefore high.

3. Findings

- 3.1 The aircraft had a valid Maintenance Release and Certificate of Airworthiness.
- 3.2 The aircraft's records indicated it had been maintained correctly.
- 3.3 The pilot was highly experienced, appropriately licensed and rated.
- 3.4 The pilot had an established reputation for a safe and professional approach to his flying and contribution to aviation safety.
- 3.5 Operating over the topography of the area would have presented little difficulty to the pilot.
- 3.6 The weather conditions at the time were ideal for sowing.
- 3.7 The lone pine tree which the aircraft struck was probably obscured due to the position of the sun and shadow, making it difficult for the pilot to detect.

- 3.8 Damage to the aileron control system resulted from the collision, and prevented the pilot from turning away from the ridge he had been sowing.
- 3.9 Due to the impaired controllability the pilot was unable to recover from a steep left-banked turn, and the aircraft stalled and collided heavily with the face of the ridge in a nose-down attitude.

11 December 1996

M F Dunphy
Chief Commissioner

Glossary of Aviation Abbreviations

AD	Airworthiness Directive
ADF	automatic direction-finding equipment
agl	above ground level
AI	attitude indicator
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
amsl	above mean sea level
AOD	aft of datum
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	degrees Celsius
CAA	Civil Aviation Authority
CASO	Civil Aviation Safety Order
CDI	course deviation indicator
CFI	Chief Flying Instructor
C of A	Certificate of Airworthiness
C of G (or CG)	centre of gravity
CPL (A or H)	Commercial Pilot Licence (Aeroplane or Helicopter)
DME	distance measuring equipment
E	east
ELT	emergency location transmitter
ERC	Enroute Chart
ETA	estimated time of arrival
ETD	estimated time of departure
°F	degrees Fahrenheit
FAA	Federal Aviation Administration (United States)
FL	flight level
ft	foot/feet
g	acceleration due to gravity
GPS	Global Positioning System
h	hour
HF	high frequency
hPa	hectopascals
hrs	hours
HSI	horizontal situation indicator
IAS	indicated airspeed
IFR	Instrument Flight Rules
IGE	in ground effect
ILS	instrument landing system
IMC	instrument meteorological conditions

in	inch(es)
ins Hg	inches of mercury
kg	kilogram(s)
kHz	kilohertz
KIAS	knots indicated airspeed
km	kilometre(s)
kt	knot(s)
LAME	Licensed Aircraft Maintenance Engineer
lb	pound(s)
LF	low frequency
LLZ	localiser
Ltd	Limited
m	metre(s)
M	Mach number (e.g. M1.2)
°M	degrees 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
mm	millimetre(s)
mph	miles per hour
N	north
NDB	non-directional radio beacon
nm	nautical mile
NOTAM	Notice to Airmen
NTSB	National Transportation Safety Board (United States)
NZAACA	New Zealand Amateur Aircraft Constructors Association
NZDT	New Zealand Daylight Time (UTC + 13 hours)
NZGA	New Zealand Gliding Association
NZHGPA	New Zealand Hang Gliding and Paragliding Association
NZMS	New Zealand Mapping Service map series number
NZST	New Zealand Standard Time (UTC + 12 hours)
OGE	out of ground effect
okta	eighths of sky cloud cover (e.g. 4 oktas = 4/8 of cloud cover)
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	second(s)
S	south
SAR	Search and Rescue
SSR	secondary surveillance radar
°T	degrees true
TACAN	Tactical Air Navigation aid
TAF	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