



**NO. 95-007**

**FLETCHER FU24-950**

**ZK-EMB**

**11 KM NORTH-WEST OF TAUPO**

**8 MAY 1995**

**ABSTRACT**

At approximately 0720 hours on 8 May 1995 a Fletcher FU24-950, ZK-EMB, flown by a recently qualified agricultural pilot, squashed onto the ground in a stalled condition at a high rate of descent, in a wings level attitude. The pilot received serious injuries in the accident. The causal factors were a lack of continuity in training records, the pressure the pilot believed he was under to achieve maximum productivity in his flying with a minimum of delay, the pilot's apparent refusal to accept cautions in relation to his ability, and the Fletcher aircraft's performance during the execution of a limit manoeuvre too close to terrain. The safety deficiencies identified include the necessity for an exchange of information about trainee pilots to occur between instructors, and the need for instructors to keep written records regarding a pilot's training.

# TRANSPORT ACCIDENT INVESTIGATION COMMISSION

## AIRCRAFT ACCIDENT REPORT NO. 95-007

<b>Aircraft Type, Serial Number and Registration:</b>	Fletcher FU24-950, 252 ZK-EMB
<b>Number and Type of Engines:</b>	One Lycoming IO-720-A1B
<b>Year of Manufacture:</b>	1978
<b>Date and Time:</b>	8 May 1995, 0720 hours*
<b>Location:</b>	11 km north-west of Taupo. Latitude: 38° 35.5' S Longitude: 176° 02' E
<b>Type of Flight:</b>	Aerial work, agricultural
<b>Persons on Board:</b>	Crew: 1
<b>Injuries:</b>	Crew: 1 Serious
<b>Nature of Damage:</b>	Aircraft destroyed
<b>Pilot-in-Command's Licence:</b>	Commercial Pilot Licence (Aeroplane)
<b>Pilot-in-Command's Age:</b>	21
<b>Pilot-in-Command's Total Flying Experience:</b>	332 hours 44 on type
<b>Information Sources:</b>	Transport Accident Investigation Commission field investigation.
<b>Investigator in Charge:</b>	K A Mathews.

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

## 1. NARRATIVE

- 1.1 At 0600 hours on 8 May 1995 the pilot of ZK-EMB was telephoned by his loader driver to confirm that they would be working that morning. The pilot told the loader driver that the weather was suitable for sowing and that he would meet him at the hangar at Taupo Aerodrome, at 0630 hours. The loader driver reported that the pilot appeared to be his usual self, as did the people with whom he was boarding.
- 1.2 After the pilot arrived at the hangar he went directly to ZK-EMB and completed his pre-flight inspection. The aircraft had been refuelled the previous day at Link Road airstrip from jerry cans, prior to returning to Taupo Aerodrome, and was not refuelled again at Taupo by the pilot. This gave the aircraft an estimated endurance of around 1.3 hours prior to departing from the airstrip. The empty jerry cans were replenished by the pilot at Taupo and loaded back on board ZK-EMB. After about 10 or 15 minutes the pilot informed the loader driver that everything was ready for them to leave, so they boarded the aircraft and departed for Link Road airstrip.
- 1.3 The flight to the airstrip was uneventful and took approximately five minutes to complete. At the airstrip the loader driver prepared the loader truck which had been positioned at the airstrip the previous day, and the pilot removed the refueled jerry cans from the back of the aircraft. It was usual practice for aircraft in the field to refuel from a bowser on the back of the loader truck. In this case however the loader truck was one normally used for turbine powered aircraft and was equipped only with Jet A1 fuel. This required ZK-EMB to be refueled with Avgas from jerry cans.
- 1.4 Arrangements had been made to sow 3.5 tonnes of superphosphate from Link Road airstrip onto a nearby property. The work had commenced the previous day, but due to unsuitable wind conditions developing only one load of 900 kg had been sown. The pilot told the loader driver that he would need three loads to finish sowing this property. The first load was to be 900 kg, followed by 800 kg, and a final load of 900 kg.
- 1.5 The aircraft was loaded and departed about 0710 hours. It returned safely and after being loaded again, with the pre-arranged load of 800 kg, departed normally. The loader driver held a Commercial Pilot Licence (Aeroplane), and at the time had completed about 11 hours of flying toward an agricultural rating. He reported that the aircraft sounded normal and appeared to be functioning correctly. The pilot had not indicated to him to alter the load or that he had experienced any difficulty on the previous run.
- 1.6 The pilot sowed half of his load of 800 kg along one face of a low ridge, which lay approximately in a north-east to south-west direction. He commenced his run along this ridge from the north-east, and then manoeuvred his aircraft to reposition it to sow the second half of the load along the same ridge face, in the opposite direction.
- 1.7 During the turning manoeuvre, and prior to reaching the ridge face, the aircraft struck the ground heavily in a grassy flat paddock. It slid for 44 m, and slewed 90° to the right before coming to rest in an upright attitude. No fire occurred.
- 1.8 There were no eye witnesses to describe the final flight path of ZK-EMB, but a local farmer was aware that the aircraft had been sowing nearby and that it had flown in close proximity to his house, at low level, immediately prior to the accident. He heard the impact as a double thump, and felt his house shake. He looked out of a window of his house and saw what appeared to be dust and the aircraft at rest on the ground. He proceeded directly to the scene and was joined by

another person. The farmer's wife called the emergency services who arrived approximately 10 minutes later.

1.9 The pilot was found in a semi-conscious state. He had been restrained by his full harness and was wearing a safety helmet. The farmer released one shoulder strap that was very tight and left the other in place to hold the pilot upright until the emergency services arrived. Despite being suitably restrained and using a protective helmet, the pilot received serious spinal injury as a result of the high rate of descent at impact, and serious leg, chest, and head injuries. He was transported directly to Waikato Hospital.

1.10 The loader driver reported that the weather conditions that morning were very good for sowing. He said that it was calm and clear with no low cloud or fog present and the sun was bright. The local farmer said that there had been quite a hard frost, and that it was a clear, bright, and sunny morning. He added that the sun appeared brilliant, and noticed it had risen over a hill to the east at about the time of the accident.

1.11 Examination of the wreckage and ground impact marks showed that the aircraft had "squashed" onto the ground, probably in a stalled state, at a high rate of descent and in a wings level attitude. Measurements showed that it was 13° to 15° nose down at the time of ground contact. The aircraft was not spinning, and there was no evidence of it having collided with another object, such as a pole, wire, or tree, before ground contact.

1.12 The topography of the surrounding area was such that it would have presented few problems for the pilot during his sowing, and there were numerous flat paddocks nearby. The sun would have been shining in the pilot's forward field of vision at some point in the turn, but during the final run towards the ridge it would have been approximately 30° to his left. Glare from the sun was, therefore, considered unlikely to have contributed to the accident. In addition, during his training, the adverse effects of sun and shadow had been taught to him.

1.13 It was determined that at the time of the accident the aircraft had around 400 kg of superphosphate in the hopper. The superphosphate was dry and free-flowing. The pilot had not attempted to jettison his load, which is among the first actions a pilot will normally carry out if difficulties are encountered, or if a problem such as a power loss or engine failure develops. The flaps were found in the retracted position.

1.14 The aircraft was destroyed during the impact. The hopper box, nose and main undercarriage were torn from their respective structures at the initial impact, and there was extensive upwards deformation in the cockpit area, which reduced its occupiable space considerably. The firewall was crushed, but the engine and propeller remained fixed to the aircraft, although extensively damaged. The main planes remained attached to the fuselage but were subject to considerable deformation and crushing. The right fuel tank was ruptured and contained no fuel, but the left fuel tank was intact and contained around 60 litres of 100/130 octane Avgas. The fuselage, although intact, was severely distorted and damaged beyond repair. The empennage was found intact attached to the fuselage, and the only major damage was to the right spar of the horizontal stabilizer which had failed in a downwards direction due to overload at impact.

1.15 All of the aircraft's components were accounted for and examination of the flight control systems showed that they had been capable of functioning normally up to the time of the accident. The available evidence at the accident site indicated that the engine had been delivering power at impact, although the master switch and magneto switch had been selected "OFF". None of the personnel who attended the accident recalled having selected these switches to the "OFF" position. It was considered likely however that the pilot had sufficient consciousness and presence of mind to turn them off after the aircraft came to rest, as the local

farmer recalled that the pilot was moving his arms and head around when he first arrived at the scene.

- 1.16 The cylinder head temperature gauge displayed a captured reading of 210° C which was the normal in-flight operating temperature for the engine. There was sufficient fuel on board for the flight and it was not contaminated. The fuel system in the aircraft was of a simple on/off type and in the “ON” position delivered fuel from both fuel tanks simultaneously to the engine. The jerry cans used for refueling were also checked and they were found to be free of contamination and contained 100/130 octane Avgas. Further examination of the aircraft revealed nothing that might have contributed to the accident.
- 1.17 As there were no eye witnesses to the accident and the local farmer could not recall accurately what the engine sounded like prior to the impact, it was decided to bulk strip the engine and propeller for further examination. Two other farmers in the local area subsequently reported that they had heard the aircraft flying around that morning and that it sounded normal to them. The pilot was not able to recall any of the events leading up to the accident, or the accident itself, except an impression that the aircraft’s engine may have lost power during the turn prior to impact.
- 1.18 The engine and propeller were sent to Ardmore to a company experienced in the overhaul of the IO-720-A1B engine and Hartzell HC-C3YR-1 propeller. The bulk strip showed no evidence of any pre-impact failure in the engine or its associated components, or evidence of any other malfunction or contamination that could have contributed to the accident. It did however show signs of a sudden stoppage. The propeller hub was disassembled and examined and showed no evidence of any pre-impact failure. The three pitch change pins were found to have failed due to overload consistent with a sudden stoppage with power applied. There was no evidence to suggest that any of them had failed in flight.
- 1.19 The aircraft’s maintenance records were examined. It was found that ZK-EMB had been maintained correctly and was certified for aerial work and private operations. The last maintenance inspection was a 300 hour check completed on 28 April 1995, and the aircraft had been used regularly up to the accident flight. There was no evidence that it was not airworthy at the time.
- 1.20 ZK-EMB’s pilot had passed a flight test for the issue of a lifetime Commercial Pilot Licence (Aeroplane) on 6 June 1994, and held a valid Class 1 Medical Certificate. The medical certificate had a restriction which stated that the pilot must wear spectacles (distance vision) when flying, and it was usual practice for him to wear contact lenses. He was rated on FU24 series aircraft and had recently qualified for an agricultural rating.
- 1.21 He commenced training for the Agricultural Rating on 29 June 1994, and the person initially responsible for this training was a qualified instructor, well experienced in agricultural flying. The instructor employed the pilot and commenced training him at the instructor’s own expense. This was to give the pilot “a chance” in the industry with a view to retaining him as a pilot for his company at the completion of the training. Consequently the pilot did not have the added pressure of having to fund this training.
- 1.22 The training comprised some 16 hours dual in an Auster and 49 hours in a Cessna 188 Agwagon. All this training was under the direct supervision of the instructor. After approximately 35 hours the instructor said he became concerned that the pilot was not always applying what he had taught him and would do things he specifically had been told not to do. The instructor addressed this with the pilot and warned him that he would consider terminating his training if it continued. A temporary improvement resulted but the instructor had to issue another warning after a further 8 to 10 hours of training. After this warning and during the last 10 hours of the pilot’s training

the instructor noticed that he began carrying out dangerous turning manoeuvres. He would pull the aircraft up into a near vertical attitude, complete essentially a wing-over manoeuvre, and allow the aircraft's nose to drop far too much. The instructor pointed out to the pilot that if he continued to fly this way he would eventually hurt himself, and told him that these manoeuvres were to stop. A short time later the pilot resumed the wing-over manoeuvres, so the instructor terminated the pilot's training and employment. As the instructor had invested a considerable amount of time and expense into the pilot's training, he did not make the decision lightly, but said he felt that it was in the best interests of the pilot. The pilot said that the Cessna 188 was unusable for a period of time due to a component failure, and waiting for a replacement part to arrive. He believed that there was a consequent downturn in the work and that he was dismissed for that reason.

- 1.23 Following this the pilot worked as a loader driver for another topdressing company for two weeks in September 1994, and received some dual Fletcher FU24 ferry flying experience. He was not employed as a pilot by this company and received no agricultural flying training. In October 1994 the pilot approached another company and asked their instructor if he would complete his agricultural rating. It was this company's normal policy to train only their own pilots from the beginning, so his request was denied. However they did agree to complete a Fletcher Rating for the pilot and give him a few hours' agricultural experience. This was completed over a two day period.
- 1.24 In November 1994 the pilot was employed by the company he was working for at the time of the accident. He was employed initially as a loader driver on a trial basis for a period of six weeks. Following the successful completion of this trial period the company agreed to complete his Agricultural Rating as soon as they were able to. His training recommenced in March 1995 in ZK-EMB following a check out in the aircraft and some ferry flying. The pilot said his check out was brief and did not include stalling. He had however covered stalling in the Fletcher with a previous instructor. The instructor flew with the pilot on some topdressing sorties as well as supervising him from the ground. During this supervision a two-way radio was used for communication between the instructor and the pilot. The instructor said he was pleased with the progress of the pilot and felt that he was performing satisfactorily. The pilot appeared to be eager to learn and apply the principles taught. He was pleasant, well groomed, well mannered, and good with the clients. The instructor said he did not notice any dangerous trends or developments in the pilot's flying and he had no cause for concern. From personal observation another company pilot however said he felt that the pilot would not listen to advice and that he was overly confident and enthusiastic. He believed that the pilot should have received more direct supervision because of his attitude, and was surprised that the pilot was permitted to work by himself so soon after qualifying for his Agricultural Rating.
- 1.25 When the pilot first approached the company which employed him at the time of the accident, the company's instructor discussed the pilot's background with him and asked him why his Agricultural Rating had not been completed previously. The pilot said that a personality conflict had developed between him and the previous company's instructor and therefore it was not possible for him to finish the training. Following the successful completion of the pilot's trial period and after having carried out some flying with him the instructor determined that the pilot was a good prospect and accepted his explanation. The instructor therefore saw no reason to contact the pilot's previous instructor. Other than the pilot's log book entries no other documentation, records, or training assessment accompanied the pilot or were available to the new instructor, nor were they required to be. As a result, the concerns the previous instructor had entertained regarding the pilot were not passed on to the new instructor.
- 1.26 As the pilot had acted as a loader driver at times for other more experienced pilots in the company, including the instructor, he would have observed their flying methods. They were experienced agricultural pilots and would therefore fly their aircraft more aggressively than a

junior pilot. The instructor was aware that this could be a problem if the pilot, at his level of experience, tried to follow their example. On several occasions he had talked to him about this, even though he had not seen the pilot try to do the same. He said he had instructed the pilot not to attempt to fly the same way but to work within his own comfort zone and slowly allow his experience level to build. He said he had also reiterated to the pilot during his training that he was to “dump” any load he was carrying immediately, if he had any reason at all to think he should. The pilot claimed however that during his training he believed he was put under pressure by the instructor to achieve maximum productivity in his flying with a minimum of delay and was encouraged to fly in a similar manner to the other experienced pilots. The instructor said that he had never put the pilot under pressure “for productivity” during his training but did “not encourage pilots to waste time or fly around needlessly and to fly well within their ‘comfort zone’”.

- 1.27 The pilot’s training was completed 10 April 1995, and an Agricultural Rating was issued. No further agricultural flying was done by the pilot until 7 May 1995, the day before the accident. The instructor said he had specifically chosen an easy area for him to sow and on 6 May 1995 had briefed the pilot about the work and the properties he wanted him to sow. He said that he had instructed him to “take it easy, take your time, just go easy and do the job safely”. The pilot subsequently advised that he believed he did not receive these instructions as they were contrary to the productivity pressure he believed he was under.
- 1.28 During the morning on the day prior to the accident, the farmer, whose property was being sown, was in the vicinity of the ridge when the pilot completed his one sowing sortie. He was accompanied by his wife and they both observed ZK-EMB flying. At the completion of his first run the pilot flew overhead, deposited some fertilizer on them, and turned back and wagged his wings. The pilot then “stood the aircraft on its tail and pointed the nose straight up vertically”, and completed a turn. He then recommenced sowing along the ridge face. The farmer’s wife said that she was “horrified” as she had never seen a pilot fly that way before and called out to her husband to look. They had both observed agricultural aircraft sowing many times in the past, but this was the first time they had seen one flown in this manner. It did not appear normal to them and they were alarmed at the way the aircraft was being flown. They had used the same company before, but this was the first time they had observed this type of flying.
- 1.29 The loader driver for the pilot said that on the previous day, and on the day of the accident, he noticed the pilot “had begun throwing it (the aircraft) around more than usual”. He had not seen him fly this way previously.
- 1.30 About two weeks before the accident the pilot’s previous instructor had a telephone conversation with him. During this conversation he pointed out to the pilot that a manoeuvre a pilot may complete in an Agwagon may not be as successful in a Fletcher. He also advised him to take it easy and let his experience build with time, and that it would take him at least 500 hours to consolidate his experience, which was the case with most pilots new to the industry.
- 1.31 The pilot had flown ZK-EMB exclusively since 28 February 1995 comprising some 35 flights and 32 hours of flying. He would therefore have been familiar with the aircraft, its handling characteristics and cockpit layout.
- 1.32 Research has shown that a laden Fletcher FU24 can stall easily if the control stick is moved aft too quickly in a pull-up, or during the recovery from a dive, inducing positive “g” loading. If the aircraft is in a wings level balanced condition at the time it will sink rapidly in a flat attitude and may not drop a wing. If this occurs close to the ground there may be insufficient height for recovery. In the past a number of accidents have occurred with the Fletcher as a result of this situation.

- 1.33 It was concluded that during a turning manoeuvre, used to reposition ZK-EMB for a second sowing run along a ridge face, the aircraft stalled as the pilot attempted to pull out of an ensuing dive. It is likely that the pilot was executing a wing-over type manoeuvre at the time, and if at the last moment the pilot realised that the ground was too close to safely complete a pull-up, he may have applied excessive aft stick in an attempt to pull out of the dive, thus inducing excessive positive “g” loading. As the aircraft was close to the ground there was insufficient height for recovery, and it descended onto the ground at a high rate of descent, in a stalled condition and a flat attitude.
- 1.34 The evidence suggests that the pilot had, when not supervised, reverted to an unsafe flying practice adopted during his earlier training. This practice was developed on an aircraft type that was more forgiving during some manoeuvres than ZK-EMB, and this had recently been pointed out to the pilot. A previous instructor’s attempts to correct the pilot’s unsafe flying were unsuccessful and the pilot moved on to complete his training elsewhere. No information regarding the pilot was exchanged between the different instructors, and the pilot did not display any unsafe flying habits to the final instructor during the latter part of his training. As a result the tendency for the pilot to perform unsafe manoeuvres was not apparent to the instructor who issued the pilot with his Agricultural Rating. Had an exchange of information concerning the pilot occurred between the instructors, the final instructor would have been aware of the pilot’s previous unsafe practices and he might have been able to correct them.
- 1.35 The reason the pilot flew the aircraft in an unsafe manner in close proximity to the ground, and did not respond to sound advice given by those qualified to do so, was not determined. The pilot’s behaviour however could have been influenced by his enthusiasm and desire to impress others, along with an over-confidence in his own abilities. The fact that he perceived he was under pressure to achieve maximum productivity in his flying with a minimum of delay, and had observed other experienced agricultural pilots fly in a more aggressive manner than he had been taught, could also have influenced his behaviour. However the pilot had on occasion performed manoeuvres that other experienced agricultural pilots said they would not have attempted under the same circumstances. He had been advised and shown how to fly the aircraft safely at low level when carrying a load, as well as having had opportunities to witness the correct and safe methods adopted by experienced pilots. The fact the pilot did not complete his training with the original instructor but was able to complete it elsewhere, without producing (or being required to produce) any training records other than his log book entries, did not permit an optimum level of consistency in his training. In addition the final instructor’s omission to attempt to contact the pilot’s previous instructor to authenticate and discuss his earlier training prevented him gaining a balanced view of the pilot’s abilities and attitudes.

## **2. FINDINGS**

- 2.1 The aircraft had a valid Maintenance Release and Certificate of Airworthiness.
- 2.2 The aircraft had been maintained correctly and was airworthy.
- 2.3 There was no evidence of any malfunction or defect in the aircraft.
- 2.4 The pilot was appropriately licensed and rated, and had been authorised to conduct the flight.
- 2.5 The pilot had recently been issued with an agricultural rating.
- 2.6 The topography of the area would have presented little difficulty to the pilot and it was an easy area for sowing.



- 2.7 The weather conditions at the time were ideal for sowing.
- 2.8 During a turning manoeuvre at a low height, the aircraft stalled and “squashed” onto the ground in a wings level attitude, at a high rate of descent.
- 2.9 The height of the aircraft above the ground at the time afforded the pilot little opportunity for recovery.
- 2.10 The pilot probably reverted to an unsafe flying practice he had adopted during his earlier training.
- 2.11 The unsafe practice had been recognised by a previous instructor who, when not successful in correcting it, had discontinued the pilot’s training.
- 2.12 The final instructor had no reason to be concerned about the pilot’s flying as he had exhibited no dangerous trends and flew as instructed.
- 2.13 Had the final instructor been aware of a previous trait of the pilot to perform unsafe manoeuvres he might have been able to correct it.
- 2.14 The causal factors in this accident were a lack of continuity in training records, pressure the pilot believed he was under to achieve maximum productivity in his flying with a minimum of delay, the pilot’s apparent refusal to accept cautions in relation to his ability, and the Fletcher aircraft’s performance during the execution of a limit manoeuvre too close to terrain.

### **3. SAFETY RECOMMENDATIONS**

- 3.1 As a result of this investigation it was recommended to the Director of Civil Aviation that he:
- (1) make it mandatory that instructors exchange relevant information about trainee pilots, in addition to log book entries, before they can continue with the training of a pilot from a different company or school. (081/95)
  - (2) require instructors to retain written documentation, regarding the progress of their various students training, for a period of one year beyond the successful completion of that training. (082/95)

17 October 1995

M F Dunphy  
Chief Commissioner

## GLOSSARY OF AVIATION ABBREVIATIONS

AD	Airworthiness Directive
ADF	Automatic direction-finding equipment
agl	Above ground level
AI	Altitude 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	Celsius
CAA	Civil Aviation Authority
CASO	Civil Aviation Safety Order
CFI	Chief Flying Instructor
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	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

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)
lb	Pounds
LF	Low frequency
LLZ	Localiser
Ltd	Limited
m	Metre(s)
M	Mach number (e.g. M1.2)
°M	Magnetic
MAANZ	Microflight 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 <i>or</i> H)	Private Pilot Licence (Aeroplane <i>or</i> 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  
RNZAF  
rpm  
RTF

Royal New Zealand Aero Club  
Royal New Zealand Air Force  
revolutions per minute  
Radio telephone or radio telephony

s

Second(s)

S

South

SAR

Search and Rescue

SSR

Secondary surveillance radar

°T

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