NO. 94-014

CESSNA A150L

ZK-DJP

REWA, NEAR HUNTERVILLE

11 JUNE 1994

ABSTRACT

On 11 June 1994 the student pilot was authorised for a period of practice aerobatics. He decided to fly over a friend's house and lost control during a steep turn at low level and the aircraft collided with the ground.

TRANSPORT ACCIDENT INVESTIGATION COMMISSION

AIRCRAFT REPORT NO. 94-014

Aircraft Type, Serial Number and Registration:	Cessna A150L, A1500388 ZK-DJP
Number and Type of Engines:	One Rolls Royce Continental O-200
Year of Manufacture:	1973
Date and Time:	11 June 1994, 1415 hours*
Location:	Rewa Latitude: 39°57.5'S Longitude: 175°39'E
Type of Flight:	Flying School, Training
Persons on Board:	Crew: 1 Passengers: Nil
Injuries:	Crew: 1 Fatal Passengers: Nil
Nature of Damage:	Destroyed
Pilot in Command's Licence:	Student Pilot Licence (Aeroplane)
Pilot in Command's Age:	23
Pilot in Command's Total Flying Experience:	57 hours, including 36 dual instruction
Information Sources:	Transport Accident Investigation Commission field investigation
Investigator in Charge:	R Chippindale

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

1. NARRATIVE

1.1 On the morning of 11 June 1994 the pilot telephoned the CFI and obtained approval for a solo aerobatics flight in ZK-DJP. The CFI arranged to meet him at Feilding, where the aircraft was based, and discussed the flight that he was to undertake.

1.2 As it was to be the student's first aerobatic solo flight the CFI told him to restrict his exercise to loops and barrel rolls.

1.3 The CFI had just returned, from a sortie with another student, from the area between Ashhurst and Aokautere and told the student to confine his exercise to that area. He also briefed him on the weather there as being a cloud base of 5000 feet, no turbulence and a light northerly wind.

1.4 The need to keep clear of the Ohakea TMA was discussed as was the requirement to have the aircraft back by 1430 hours for another student.

1.5 The CFI expected that the aircraft would need refuelling on its return and waited at the fuel pump, from about 1415 hours, to assist with this chore.

1.6 When the aircraft had not returned by 1500 hours he flew another aircraft to 1000 feet to listen for an ELT transmission and called Palmerston North Tower who confirmed they had not heard from the student pilot.

1.7 When the CFI returned he was advised that ZK-DJP had been involved in an accident and the wreckage located. The ELT had been switched off by one of the rescue personnel.

1.8 The CFI recalled that the area in which the accident occurred had been flown over in the course of a dual map reading exercise during which the student had pointed out that he used to work in the vicinity and still had a friend living there.

1.9 The student had prearranged a visit to his friend and proceeded to the farm in the vicinity of Rewa, 17 nm north of Feilding, instead of flying to the area authorised by the CFI, which was 7 nm south-east of Feilding. He had not advised any intention to land at the property.

1.10 On arrival over the farm he had circled the area below tree top height and made a dummy approach to a farm strip.

1.11 On the last circuit about the student's friend's house the aircraft entered a steep left turn with 20° of flap lowered. After turning through some 90° the aircraft was seen to flick and dive into the ground.

1.12 The witnesses were divided as to which direction the aircraft rolled out of the steep turn when it flicked.

1.13 The aircraft impacted the steep bank of a gully. The combined flight path and slope angle resulted in an impact angle of approximately 115°, ie. 25° over the vertical.

1.14 The pilot was restrained by a shoulder harness and lap strap. The two shoulder straps were attached to the cockpit's rear bulkhead which moved forward relative to the pilot's seat when the aircraft jackknifed during the impact sequence. The engine and nose undercarriage were driven rearward reducing the occupiable area particularly around the pilot's feet.

1.15 One of the spectators was a nurse and she administered first aid to the pilot immediately. The pilot was airlifted to hospital from the accident site but he succumbed to his injuries three days after the accident.

1.16 The CFI, who had been the student's principal instructor, had been employed as a Flying Instructor since 21 June 1990 and attained a B Category rating on 31 January 1991. He had a total flying

time of 2500 hours with 1568 hours of instructing of which 117 hours was devoted to teaching aerobatics.

1.17 The student went solo after 10.25 hours and had completed 6.65 hours dual instruction in spinning and aerobatics. He had also undergone 3.2 hours dual instruction in low flying. His performance was assessed as above average by the CFI.

1.18 The CFI had flown the aircraft on the flight prior to that on which the accident occurred. The aircraft had performed normally and had sufficient fuel for the student's flight without a refuel.

1.19 A witness believed that he heard the aircraft's engine cut prior to the aircraft flicking out of the steep turn. The engine was therefore subjected to a strip examination by an approved overhaul company. No defects were found that might have led to the symptom described or to any other significant loss of power.

1.20 The fuel system of the aircraft was supplied by two tanks which fed to the engine simultaneously. The supply of fuel was controlled by a single on/off selector which was lockwired in the "ON" position. There was a significant quantity of fuel in each tank after the accident although the left tank had been punctured in the accident sequence. Both fuel caps were in place after the impact.

1.21 No fire occurred.

1.22 The student had been taught to use flap during his dual low flying exercises. Although this flying was in a different aircraft type the amount of flap used was similar. The use of 20° in ZK-DJP during the low level display to his friend was appropriate.

1.23 The Cessna 150 Owner's Manual included a table that gave the "power off" stalling speed with 60° of bank and 20° flap lowered as 70 mph (61 knots).

1.24 The aircraft's impact heading was 345° which was some 180° from its flight path prior to entering the steep turn.

1.25 No fault was found which might have interfered with the pre-impact operation of the aircraft's control systems.

1.26 The sequence of events suggested that the pilot entered a steep turn, the first portion of which involved flying cross-wind. In the light northerly conditions this would have caused an apparent slipping out of the turn if he was using the ground as a reference, or subconsciously noted the background while watching the spectators on the ground. In such an event he may have introduced bottom rudder in an attempt to "balance" the turn and thus initiated the stall and flick observed prior to the aircraft's collision with the terrain. It was also possible that a ridge of hills, some 200 to 300 feet above the level of the accident site and some 500 metres away, created a false horizon. If so the pilot may have raised the aircraft's nose in compensation and consequently reduced the aircraft's margin of speed above the stall.

2. FINDINGS

2.1 The CFI was suitably qualified and had sufficient knowledge of the student's ability to authorise the solo aerobatic flight.

2.2 The student had sufficient training and skill to complete the solo aerobatic flight as briefed.

2.3 The student departed from the CFI's authorization both in the type of flying in which he engaged and the area in which it was flown.

2.4 The student had received instruction in low flying but was not authorised for solo low flying. He lost control of the aircraft during a steep turn at low level.

2.5 The aircraft was airworthy prior to the accident.

2.6 The aircraft was properly loaded and fuelled for the flight.

2.7 The weather conditions were suitable for the flight as briefed.

2.8 The student may have been misled by an illusion that the aircraft was slipping out of the turn and made an inappropriate application of rudder which initiated a loss of control of the aircraft.

2.9 A nearby ridge of hills may have created a false horizon.

2.10 The student had been shown and had practised recovery from spins.

2.11 The height at which the aircraft flicked out of the turn precluded any realistic chance of recovery.

2.12 The chances of the student's survival would have been enhanced if his shoulder harness had been fixed to a section of the aircraft less likely to move forward on impact.

2.13 The bystanders and emergency services acted promptly and efficiently in response to the accident.

3. OBSERVATION

3.1 This is not the first occasion on which the Commission has been required to investigate an accident which resulted from a student engaging in a low flying display near the home of a friend or relative after departing from the instructor's specific instructions for the flight.

3.2 Low flying is a skill which requires specific training and regular practice even by experienced pilots. A number of factors resulting from the proximity to the ground create a significant potential for loss of control of the aircraft or for flying into obstructions. There is little time for recovery from a loss of control and such recovery itself depends upon training, and experience.

3.3 An article published in the CAA magazine "Flight Safety" six weeks prior to this accident commenced:

> "It is not long since we featured an item on beat-ups. Nevertheless another instance has recently been brought to our attention, and we fear that there are other occurrences that we have not heard about.
>
> It seems there are still pilots who believe they are immortal—despite the fact that the New Zealand accident records offer many examples of like-thinking pilots who have come to grief.
>
> ...These accidents also show that the beat-up mentality is not confined to any particular stereotype—increased flying experience and age do not necessarily coincide with increased wisdom.

You may get away with it once or twice, and this tends to engender false confidence. Any low flying has inherent dangers. Unnecessary low flying, with little or no margin for error and lack of time and space to cope with the unexpected, is not worth the risk. Don't join the (New Zealand list of low flying accident victims)."

3.4 There followed brief descriptions of 13 accidents resulting from low flying displays.

3.5 The pilot was on the distribution list for "Flight Safety."

12 October 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
ATIS	Automatic terminal information service
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
cm	Centimetres
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
km	Kilometres
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
mm	Millimetres
mph	Miles per hour
N	North
NDB	Non-directional radio beacon
NOTAM	Notice to Airmen
nm	Nautical mile
NZ	New Zealand
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)
octa	Eighths of sky cloud cover (eg: 5 octas = 5/8 of cloud cover)
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
TIS	Time-in-service
UHF	Ultra high frequency

US	United States
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