



# AIRCRAFT ACCIDENT REPORT

**No. 92-015**

**Cessna 150M**

**ZK-EHK**

**3 km north-west of Glenbrook**

**27 July 1992**

**Transport Accident Investigation Commission  
Wellington - New Zealand**

TRANSPORT ACCIDENT INVESTIGATION COMMISSION

AIRCRAFT ACCIDENT REPORT No. 92-015

**Aircraft Type, Serial Number and Registration:** Cessna 150M; 15079385  
ZK-EHK

**Number and Type of Engines:** One Continental O-200A

**Year of Manufacture:** 1977

**Date and Time:** 1524 hours NZST, 27 July 1992

**Location:** 3 km north-west of Glenbrook  
Latitude: 37°11'S  
Longitude: 174°44'E

**Type of Flight:** Flying School

**Persons on Board:** Crew: 1  
Passenger: 1

**Injuries:** Crew: 1 Fatal  
Passenger: 1 Serious

**Nature of Damage:** Destroyed

**Pilot in Command's Licence:** Commercial Pilot Licence  
(Aeroplane)

**Pilot in Command's Age:** 25

**Pilot in Command's Total Flying Experience:** 333 hours  
146 hours on type

**Information Sources:** Transport Accident Investigation  
Commission field investigation

**Investigator in Charge:** Mr J J Goddard

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



## 1. NARRATIVE

1.1 The pilot, who had done much of his training at the Flying School, arranged to hire the aircraft for a local flight. He was accompanied by a colleague from work, where both were aircraft maintenance engineers.

1.2 Their intention was to fly around the Glenbrook Beach Road area, some 28 km south-west of Ardmore Aerodrome, where the passenger lived. As the flight was local only, a weather briefing was not obtained. The flight was duly authorised by a Flying School instructor.

1.3 After normal pre-flight procedures, the pilot obtained taxi clearance from Ardmore Tower at 1451 hours. He advised by RTF that the aircraft would be vacating towards Waiuku, clear of controlled airspace, for about one to one and a half hours.

1.4 The aircraft departed normally from Runway 21 at 1457 hours, and the pilot terminated his abbreviated flight plan at 1500 hours. No further RTF message from ZK-EHK was heard, but two unidentified carrier-only transmissions were recorded on the Ardmore Tower tape at 1521 and 1523 hours.

1.5 A number of witnesses saw the aircraft in the Glenbrook Beach Road area over a period of some minutes. It was generally described as flying at a moderately low height and circling around. It particularly attracted the attention of some witnesses when they heard its engine sound change. This was described as the engine being throttled back, or stopping, briefly then the sound increasing again. Some reported it spluttering or missing as the engine sound picked up.

1.6 While these engine sounds were occurring, the aircraft was seen to turn left from a southerly heading towards the north-east. It then went suddenly into a very steep dive, while turning or "twisting" to the left. It appeared to make two or three turns, then those witnesses who could still see it saw a recovery to level flight at a low height, on a northerly heading.

1.7 Almost immediately after levelling, it collided with a tree, then cartwheeled to the ground.

1.8 Emergency services were alerted promptly, and rescuers arrived at the scene within minutes. The occupants were extricated from the wreckage, and the seriously injured passenger was evacuated by rescue helicopter. The pilot was killed in the impact.

1.9 Examination of the site showed that the left wing of the aircraft had struck a large willow tree at about 45 feet agl, causing major damage to the aircraft. The right wing tip had then struck the ground 47 m north of the tree. Ground marks indicated that it had cartwheeled before coming to rest alongside a hedge.

1.10 The left wing was separated, probably by the tree impact. The engine and fuselage forward of the wing struts was broken off, as was the tail cone behind the cockpit. The remaining cockpit structure had essentially collapsed, leaving little occupiable space.

1.11 The pre-impact integrity of flight and engine controls, except for the ailerons, was established. Aileron systems damage was consistent with the impact sequence, however. The aircraft was complete and showed no evidence of a birdstrike. The flaps were retracted, and elevator trim and engine controls were in normal positions. The propeller damage did not give an indication of power at impact. No fuel remained in the damaged fuel system, but ground evidence of an appreciable spill was apparent.

1.12 The engine was stripped and examined at an approved facility. No evidence of a malfunction was found. The carburettor, magnetos, ignition switch, wiring and ignition harness were tested. The only defect found was in one spark plug lead, which had cracked insulation. This would have had a minor effect on engine performance.

1.13 The acoustic reed type stall warning horn was found separated from its plumbing installation. It functioned normally when tested.

1.14 As the aircraft was equipped with a radar transponder, a search of Auckland Radar recordings was made. A record was found which fitted the circumstances of this flight, even though ZK-EHK was not receiving a radar service. This showed that the aircraft had arrived in the area at 1512 hours and had flown up and down the road, with a number of circles, before the end of the record over the accident site, at 1524.40 hours. The mode C return showed that the aircraft was between 700 and 800 feet ansl throughout the flight, or between 650 and 750 feet agl in the area.

1.15 An aftercast of the weather reported a strong south-west flow over North Island, between an anticyclone in the Tasman Sea and a small depression off East Cape. The weather was generally clear at the time with scattered cumulus cloud at 2000 to 2500 feet. Surface winds were south-west, 16 to 19 knots at Auckland Airport and 10 to 18 knots at Ardmore.

1.16 Moderate turbulence at low levels was likely in the accident area because it was in the lee of coastal sand hills some 8 km away. These rose to over 700 feet ansl. Some gustiness and wind shear was reported by other pilots in the Ardmore Training Area at the time.

1.17 The witnesses' description of the aircraft's steep dive, with two or three turns as it descended, confirmed that a spin had occurred. The observed recovery indicated positive action by the pilot to regain control, which might have been successful had the collision with the tree not occurred so shortly afterwards. The pilot's ability to see and avoid the tree would have been reduced in the few seconds after spin recovery. Residual disorientation would have made it difficult to perceive a collision risk and, even if the risk had been perceived, the necessary manoeuvring to avoid the tree might have been beyond his ability in the time available.

1.18 In order for a spin to occur the aircraft's wing had to be stalled while yawing, turning or rolling. While the speed at which the aircraft was being flown was not determined, it is likely that a reduced speed was adopted in order to facilitate survey of the area. A typical speed for a Cessna 150 might be 65 knots for this purpose. This would, however, have required vigilance and careful handling by the pilot because of the reduced margin above stall speed. A flap setting of 10° to 15° is normal practice for reduced speed operation, and would increase the margins above the stall speed by 3 to 4 knots. ZK-EHK was being flown with the flaps retracted.



1.19 The onset of the spin did occur as, or shortly after, the aircraft was turned through crosswind to a downwind heading. In this situation, the perceived effect of wind drift in a slow aeroplane at a moderately low height *agl* would be an illusion that the aircraft was slipping into the turn. If the pilot was not aware of this illusion, a likely response would be to apply rudder in the direction of the turn, thereby yawing the aircraft and making it likely to spin if stalled. Another illusory effect of a crosswind/downwind turn is the perceived acceleration across the ground even though the airspeed is unchanged. This illusion is known to cause pilots to reduce speed unwittingly as it occurs.

1.20 An alternative cause of the aeroplane entering the spin was the low level turbulence likely to be encountered in the area at the time. While not severe, it may have been sufficient to cause an aeroplane in slow speed flight to drop a wing, which some momentary mishandling could have allowed to develop into a spin.

1.21 It was likely that a combination of illusory effects and turbulence was involved in the onset of the spin.

1.22 The pilot had been trained for his Commercial Pilot Licence in the Cessna 152. His training had included advanced stalling with wing drops, and in turns, but had not included spinning as this was not required by the syllabus. Had he been trained in spinning and recovery, it is unlikely that he would have been better able to recover from the spin because of the low height at which it occurred. Spin training, however, might have produced greater awareness of the symptoms of spin onset, and thus have enabled him to regain control before the spin developed.

1.23 His low flying training, which would normally include the illusory problems caused by wind drift during ground reference manoeuvres, had been carried out in low flying areas located predominantly over the sea. The illusory problems are associated with the aircraft's perceived flight over static terrain features, and are less prominent over a featureless or moving water surface. It was probable that his exposure to these illusions had been limited as a result.

1.24 The pilot had flown some 28 hours on the Cessna 150, mostly on ZK-EHK, and some 118 hours on the Cessna 152, which is essentially the same type. His training and practice of handling exercises such as advanced stalls had been on the Cessna 152, while his Cessna 150 flying had been mostly local or cross-country flying. The stalling characteristics do differ in that the Cessna 150 is more likely to drop a wing at the stall than the Cessna 152. The stall warning systems also differ; the Cessna 152 has a vane operated electric horn which is loud and unequivocal, while the Cessna 150 has an acoustic reed horn which produces tentative notes of varying pitch. While each gives similar warning time, the latter may be difficult to hear by a pilot wearing a noise-attenuating headset.

1.25 Post mortem and toxicological investigation revealed no abnormalities which might have affected the pilot's ability to conduct the flight.

1.26 The aircraft was probably close to the maximum authorised weight, but the centre of gravity was within prescribed limits. No adverse stalling or spinning characteristics should have occurred as a result of the aircraft's loading.

1.27 The reported sounds of the engine spluttering or missing may have resulted from the defective ignition lead which could have caused some misfiring during throttle handling. It was unlikely to cause a serious loss of power, but could have been a source of distraction for the pilot. There was no evidence that an engine failure had occurred and even if it had, a stall and spin was an unlikely consequence.

1.28 The dry- and wet-bulb temperatures recorded at Auckland Airport at 1500 hours indicated a serious probability of carburettor icing at descent power; moderate at cruise power. No evidence existed to show that carburettor icing had or had not occurred. Carburettor icing, if allowed to develop, could have produced symptoms of engine malfunction of any severity up to engine failure.

1.29 Proper use of the carburettor heat control would obviate any such problem in the conditions of the flight. The pilot was recently trained for his Commercial Pilot Licence, principally flying this type of aircraft in this area; he was also an aircraft engineer. It was considered likely that he was able to use the carburettor heat control as required on this flight.

## 2. FINDINGS

2.1 The pilot was suitably qualified for the flight undertaken.

2.2 The aircraft had a valid Certificate of Airworthiness and Maintenance Release.

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

2.4 The aircraft was being flown in normal turning manoeuvres at a moderately low height and probably at a slow cruising speed when control was lost and it entered a spin.

2.5 The pilot recovered from the spin, but at a very low height, and was unable to avoid a collision with a tree.

2.6 Wind drift, perceptual effects and low level turbulence may have promoted the onset of the spin.

2.7 A minor engine defect should not have affected the loss of control which occurred.

15 April 1993

M F DUNPHY  
Chief Commissioner

