

**Aviation Safety Investigation Report
199500444**

**North American Aviation Inc
Trojan**

20 February 1995

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199500444

Occurrence Number: 199500444 **Occurrence Type:** Accident
Location: 1km N Launceston
State: TAS **Inv Category:** 3
Date: Monday 20 February 1995
Time: 1059 hours **Time Zone** ESuT
Highest Injury Level: Fatal
Injuries:

	Fatal	Serious	Minor	None	Total
Crew	2	0	0	0	2
Ground	0	0	0	0	0
Passenger	0	0	0	0	0
Total	2	0	0	0	2

Aircraft Manufacturer: North American Aviation Inc
Aircraft Model: T-28D
Aircraft Registration: VH-LAO **Serial Number:** 55-138320
Type of Operation: Non-commercial Pleasure/Travel
Damage to Aircraft: Destroyed
Departure Point: Launceston Tas
Departure Time: 1059 ESuT
Destination: Point Cook Vic

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	ATPL	11.0	3350

Approved for Release: Thursday, December 12, 1996

FACTUAL INFORMATION

History of the flight

Pylon racing was conducted at Valley Field, south of Launceston, from 14-19 February, 1995. Following completion of the races five T-28 aircraft were to be flown back to the mainland from Launceston. The plan was for the T-28s and a PA-31 to return to the mainland in loose formation. The role of the PA 31 was to provide search-and-rescue support in the event of a T-28 ditching. On the morning of the accident the formation leader briefed the pilots involved. Takeoff was to be in formation pairs, spaced a short time interval apart. The first two pairs were to be T-28 aircraft. The pilot of VH-LAO asked to be in the last pair which meant flying in formation with the accompanying PA-31 aircraft. The flight was briefed as a normal departure, no mention was made of the performance of any aerobatic manoeuvres, nor did the pilot of VH-LAO discuss this possibility with any of the other formation members.

The formation takeoff on runway 32 proceeded as planned with the pairs taking off at 15-20 second intervals. Due to the performance of the PA-31 being lower than the T-28, the climb speed of the last pair was limited to about 120 knots. Observers reported that the third pair made a normal takeoff and initial climb, with the T-28 to the left of the PA-31. At a height of about 500-600 feet the nose of VH-LAO was seen to rise and the aircraft started rolling to the left. The left roll continued with altitude remaining about the same until the aircraft had rolled inverted. At about that stage of the roll, the nose started to drop. After about 270 degrees of roll, the aircraft's attitude was very nose-low and the rate of roll had decreased. Observers indicated the pilot appeared to be trying to recover from the dive, but there was insufficient altitude to regain level flight before the aircraft, still 10-15 degrees nose-down, struck the ground. Some witnesses thought the engine continued to operate at about the same power as at the start of the manoeuvre, but one person indicated the power was cut while on the final descent.

Damage to aircraft

The aircraft was severely damaged by impact forces and a post-impact fire.

Wreckage trail/wreckage examination

The aircraft struck the ground approximately 100 metres to the left of the extended runway centreline. The wreckage trail, which extended for about 140 metres, was towards the north-east (about 90 degrees to the right of the take-off path). The landing gear and flaps were in the retracted position. Examination of the wreckage did not identify any evidence of a pre-impact defect that could have affected the safe operation of the aircraft. Also, nothing was found that could have caused an uncommanded roll to the left.

Weight and balance

At the time of takeoff the aircraft was loaded to approximately the maximum permissible take-off weight. Balance was within limits.

Passenger background

The passenger did not have any pilot qualifications.

Pilot history

During 1986 the pilot had completed part of an RAAF pilot course. He was suspended from this course following unapproved low flying manoeuvres. Subsequently he took up civilian flying. At the time of the crash he held a Grade One fixed wing instructor rating. In October 1989 he had received an endorsement to conduct basic aerobatic manoeuvres. At about the same time he also received an endorsement authorising him to teach basic aerobatic manoeuvres, including loops, aileron rolls, slow rolls and barrel rolls.

After obtaining his aerobatic approvals, his logbook showed he had done only a moderate amount of basic aerobatic flying and aerobatic instruction. Most of this was in simple general aviation type aircraft such as the Cessna 150. These types are small and light and have a very moderate performance compared to the much heavier, higher powered and faster T-28. The pilot did not hold an approval to conduct aerobatic manoeuvres below 3,000 feet.

Reports indicated that during his time as an instructor he had occasionally been involved in abnormal flight activities. These included continuing flight into poor weather conditions and making multiple very low passes over a country airstrip. On two separate occasions with student pilots he had taken the controls and conducted a 360-degree roll manoeuvre. The aircraft type on which these manoeuvres were flown was not approved to perform aerobatic manoeuvres. For approximately the last two years the pilot had been employed as a co-pilot on regular public transport operations but he still maintained an active interest in private flying.

The pilot obtained a T-28 endorsement on 2 April 1994. During the endorsement he carried out two or three horizontal roll manoeuvres. These were executed from an entry speed of 180 knots, the normal speed for entering such rolls. A few days later a flight included horizontal roll manoeuvres, using entry speeds of about 190 knots. The pilot did not fly the T-28 again until 12 February 1995, when he did a short flight with the owner of another T-28. On 15 February he was permitted to fly this T-28 to Launceston with the owner-pilot on board.

At Valley Field the pilot received a low-level check required by the organisers for participants in pylon races. This check was only for pylon racing and did not include any aerobatic manoeuvres. While at Valley Field, he was trained to fly the pace plane used to start aircraft in the T-28 pylon races. The pilot did not fly in pylon race events but did fly the pace plane on four or five occasions. The pace plane leads the competitors to the start line and then pulls up out of the way.

The pylon races were conducted at a minimum height of 200 feet, but competitors were permitted to descend to 100 feet on the straight leg. The races ended on the straight, at which stage the aircraft were at relatively high speeds. At the end of the race a pull up/climb manoeuvre was required, to a height of 2,000 feet. While doing this pull up/climb, some competitors executed a 360-degree roll manoeuvre.

On one occasion at Valley Field the pilot, while flying a T-28, was observed to carry out a barrel roll aerobatic manoeuvre at a height of about 1,500 feet. On the day prior to the accident he flew as a passenger-observer in a T-28 flown by a well known American air-show pilot, who conducted an impressive low-level aerobatic display.

Medical information

The pilot passed his last pilot licence medical examination on 18 April 1994. Following the accident a post-mortem examination was performed on both the pilot and the passenger. No evidence was found to indicate that either the pilot or the passenger had any medical condition that might have contributed to the accident.

Meteorological information

Information from the Bureau of Meteorology indicated that at about the time of the accident the weather was fine. The temperature was about 19 degrees, the surface wind was from 270 degrees at three knots and there were five octas of cumulus cloud with a base of 3,500 feet. There was no significant turbulence.

Wake turbulence

The only possibility of wake turbulence would have been from the preceding T-28 aircraft, but this could not have caused the manoeuvre flown.

Survival aspects

The accident was not survivable.

Tests

The normal entry speed for roll manoeuvres in the T-28 was about 180 knots. The speed at the time of the roll that preceded the accident was probably about 120 knots. Information was sought on the roll capability at the slower speed, and limited testing was done by an experienced competition aerobatic pilot who also owned a T-28. The aircraft was loaded to a similar weight. Tests showed that an aileron roll could be completed without losing significant altitude.

Barrel rolls to the left were attempted but in every case the recovery occurred with a 60-70 degree deviation to the right. The testing pilot used different methods of entry for these manoeuvres. Significant altitude losses could not be avoided and were approximately 600-800 feet. On one of the rolls the throttle was closed about two-thirds of the way through the roll. This resulted in an additional altitude loss of about 200 feet.

ANALYSIS

The weather conditions were good. The only wake turbulence that could possibly have been encountered was from preceding aircraft, which were of the same type. This could not have caused an upset of this magnitude. No evidence was found to suggest any abnormality existed with the aircraft. There was no evidence to suggest that anyone, apart from the pilot, had any idea that an aerobatic manoeuvre might be conducted after takeoff.

Evidence indicated that on occasions the pilot had carried out unapproved flying activities. The information indicated a strong probability that on the accident flight the pilot had attempted to carry out a low-altitude roll manoeuvre. He was not approved to do low-level aerobatics and his background training did not prepare him for such manoeuvres. He had little experience on the T-28 which is a large, heavy, high powered, single engine aircraft type. From the evidence, it appears that the pilot was attempting a roll manoeuvre and mishandled the aircraft. The high degree of hazard associated with attempting such a manoeuvre at such a low height was significantly increased by the relatively low airspeed at which it was started.

CONCLUSIONS

Findings

1. The pilot was correctly licensed and endorsed to fly the T-28.
2. The pilot held an aerobatic endorsement but did not hold an approval to conduct aerobatic manoeuvres below 3,000 feet.
3. The pilot had a moderate level of basic aerobatic experience and had little aerobatic experience on the T-28.
4. The weather conditions were good and did not contribute to the accident.
5. There was no evidence of any defect in the aircraft.
6. There was no evidence to show that anyone apart from the pilot had any idea that an aerobatic manoeuvre would be performed after takeoff.
7. The evidence indicated that the manoeuvre carried out was intentionally initiated by the pilot.
8. The relatively low airspeed at the start of the manoeuvre was well below that recommended for the conduct of horizontal rolls.

Significant Factors

1. The pilot had limited experience on the aircraft type and had never been trained for, or approved to do, low-level aerobatic flight on any type.
2. The pilot probably attempted to carry out an aerobatic manoeuvre at an unsafe height.