

**Aviation Safety Investigation Report
198801381**

Pitts S1E

Pitts S2A

16 January 1988

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NOTE: All air safety occurrences reported to the ATSB are categorised and recorded. For a detailed explanation on Category definitions please refer to the ATSB website at www.atsb.gov.au.

Occurrence Number: 198801381 **Occurrence Type:** Accident
Location: Approx 500 metres north of Portsea Pier VIC
Date: 16 January 1988 **Time:** 1015
Highest Injury Level: Fatal
Injuries:

	Fatal	Serious	Minor	None
Crew	1	0	0	0
Ground	0	0	0	-
Passenger	0	0	0	0
Total	1	0	1	0

Aircraft Details:	Pitts S1E	Pitts S2A
Registration:	VH-WIZ	VH-AVM
Serial Number:	V45	2241
Operation Type:	Private	Private
Damage Level:	Destroyed	Destroyed
Departure Point:	Moorabbin VIC	Moorabbin VIC
Departure Time:	0932	
Destination:	Moorabbin VIC	Moorabbin VIC

Approved for Release: April 4th 1989

Circumstances:

Arrangements had been made for the aerobatic team to perform an air display over the water at Portsea, prior to the start of a large Regatta. These arrangements included advice to the organisers of the area in which the display would be made. The team carried out a successful practice session the night before. On the morning of the Regatta they proceeded to Portsea where change over was made to a discrete VHF radio frequency so that necessary radio communications could be made between team members and the display was commenced. The display sequences were completed as planned until after about 10 minutes the final sequence was commenced from a vee formation with the leader in front and numbers two and three positioned on each side of him. For this manoeuvre the aircraft were to pull up in turn, on a count of three, from level flight at about 500 feet to complete five eighths of a loop, followed by a 180 degree roll to upright and then dive to level off at 500 feet in line astern and depart the area. The first to pull up was to be number two, followed in turn by numbers one and three. For a significant proportion of the manoeuvre, pilots of the following aircraft are unable to see the aircraft ahead. Successful conduct of the manoeuvre required that all team members perform compact loops of similar diameter. As planned and on the call of the leader the number two pilot commenced his pull up, followed by number one on a count of three and then by number three, also on a count of three. About three quarters of the way up the loop the leader realised something was wrong as he could see number two too early and called for number two to speed up. There was no response, but this was not considered unusual. As he pulled over the top of his loop the leader again lost sight of number two. The leader descended initially as planned but then levelled off, concerned about the location of number two and realising he would have to move sideways, to the left away from the shore crowds. He looked right and left and was suddenly hit from behind and above by number two aircraft. The aircraft collided at a height of about 750 feet. The number two aircraft was very badly damaged in the collision and descended steeply into the water, contacting the sail of a yacht as it fell. The leader's aircraft was significantly damaged by the collision but he was able to maintain partial

control and was forced to limit engine power due the control difficulties. As a result of the damage, the aircraft was unable to maintain height. A ditching was made in a clear area adjacent to some yachts. The pilot escaped from his sinking aircraft and was assisted by a person from a nearby yacht. He was subsequently taken on board a rescue vessel. The weather was fine with good visibility, the temperature was 18 degrees and there was a light westerly wind. The leader's aircraft was not recovered, but he reported there were no operating problems with it prior to the collision. About 70 percent of the number two aircraft was recovered. Examination of this did not reveal evidence of any pre-existing defects which might have contributed to the accident. The aircraft used for the display were all of the the same general type but had different performance capabilities. This was primarily because of different engines and aircraft weights. As was normal procedure, the leader flew the aircraft with the least performance, the aim of which was to allow a performance margin for the other two aircraft which in most team manoeuvres, had to be positioned with respect to the leader. A disadvantage in this type of manoeuvre is that it is necessary for the other two pilots to limit the engine power and ensure that they fly the same path. In his predisplay briefing the leader made a point of drawing attention to this aspect. An amateur video was taken of the accident flight and this indicated that the total time from the start of the pull-up by the number two pilot, until the collision, was about 15 seconds. The video showed that on the pull-up, number two aircraft climbed much higher than normal and that during descent it completed some two and three quarter rolls to the left prior to the collision with the number one aircraft. Because of the relative positions of the two aircraft from the top of their respective climbs it would have been very difficult for either pilot to have seen the other in time to avoid the collision. Opinions were obtained from experienced aerobatic pilots concerning the rolling manoeuvres of the number two aircraft. In the main these opinions indicated that the manoeuvres were controlled and that the aircraft maintained the required line during descent. Earlier in the display sequence, a team manoeuvre with some similarity to that on which the accident happened took place. On this occasion, however, the number three pulled up first, followed by the number one, both of which then completed a manoeuvre similar to that during which the accident happened. Number two pulled up last and because he has to delay before his next sequence, he sometimes executed a large diameter pull-up followed by a diving manoeuvre which included one and a half rolls. A possible explanation for what happened on the accident sequence was that the pilot inadvertently employed a procedure generally similar to that he sometimes used earlier in the display. The accident manoeuvre had only recently been added to the sequence, being completed three times previously, including once at an air display two weeks earlier and twice during practice sessions. In aerobatic terms the accident manoeuvre was not difficult. All pilots in the team were experienced aerobatic pilots with approvals to conduct aerobatics down to a height of 500 feet above ground level. The pilots in numbers one and three aircraft had been in the team from its formation some ten years earlier. The pilot in the number two aircraft had joined as a part-time member in 1982 and had been a full-time member since 1985. Air displays of this type require that the performing aircraft not track or manoeuvre towards spectators within a horizontal distance of 500 metres or pass within 200 metres horizontally from spectators. There were many official, spectator and competition boats in the area. The leader indicated that there were also large clear areas of water. He reported he conducted the display with the aim of remaining over the clear areas. At times there were water craft moving into the display area and he altered the path of the runs to avoid these.

Significant Factors:

The following factors were considered relevant to the development of the accident

1. The flight path for the number two aircraft was significantly different to the path needed to correctly perform the manoeuvre. The reasons for this could not be determined.

2. The final flight paths of the two aircraft were such that it was unlikely that either pilot could see the other.