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ATSB TRANSPORT SAFETY INVESTIGATION REPORT
Aviation Occurrence Investigation No. AO-2008-021
Preliminary

Collision with terrain VH-NUK, Pitts S-2A 7 km NE Camden, NSW

18 March 2008

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Abstract

On 18 March 2008, at approximately 1115[1] Eastern Daylight-saving Time (EDT), a Pitts S-2A aircraft struck two trees before impacting the ground beside the Northern Road, 7 km NE of Camden, NSW, fatally injuring the occupant of the rear cockpit.

The investigation is continuing.

FACTUAL INFORMATION

The information contained in this preliminary report is derived from initial investigation of the occurrence. Readers are cautioned that there is the possibility that new evidence may become available that alters the circumstances as depicted in the report.

History of the flight

On 18 March 2008, a Pitts S-2A aircraft, registered VH-NUK, was being operated for the conduct of a flight review[2]. The aircraft was being operated under the visual flight rules (VFR) and outside controlled airspace. Weather conditions in the area at the time of the accident flight were fine, with light northerly winds.

At approximately 1030, the aircraft departed Bankstown Airport, NSW. On board were the flying instructor conducting the review and the candidate. The instructor was seated in the forward cockpit and the candidate in the rear cockpit.

The instructor recounted that, after departing from Bankstown, the aircraft passed overhead Hoxton Park at 2,500 ft. From overhead Hoxton Park the candidate navigated to the village of Balmoral, at 3,000 ft. On reaching Balmoral, the instructor asked the candidate to make a left turn and track north to The Oaks airstrip to conduct airwork: steep turns (at 60 degrees of bank angle) and recovery of the aircraft from unusual attitudes.

The candidate executed the airwork manoeuvres at the direction of the instructor and, in the instructor's opinion, very competently. Once these manoeuvres had been completed, the candidate tracked to overhead The Oaks airstrip and from there to Camden Airport to fly circuits.

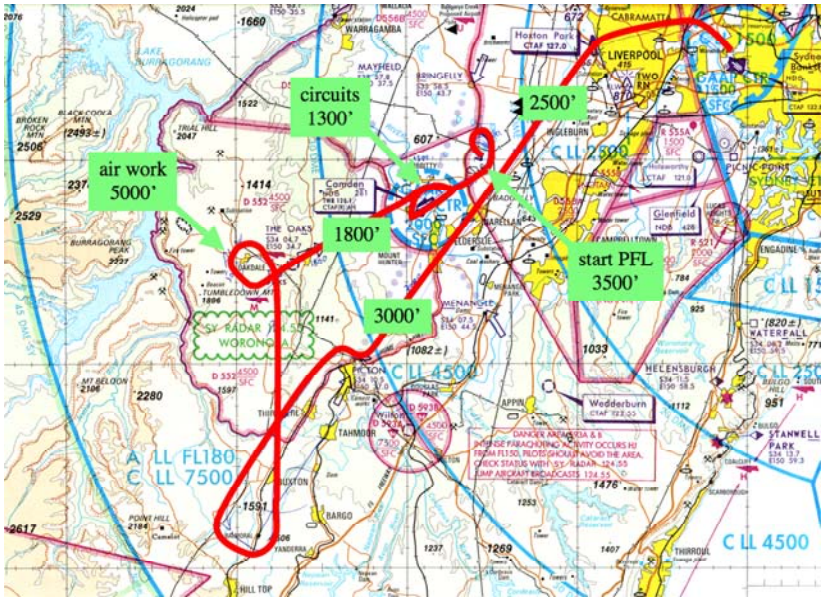
Following two uneventful circuits in light winds, they departed and climbed away to the east-north-east. After passing Oran Park racetrack, the instructor asked the candidate to track for 2RN (the Radio National transmission masts). This would place them on a more northerly track heading towards fields the instructor knew were suitable to conduct Practice Force Landings (PFLs), near an area known to local pilots as the "L-shaped lakes". The instructor's recollection of the flight track was corroborated by a review of available radar data (Figure 1).

Shortly afterwards, at about 3,500 ft, the instructor closed the throttle to simulate an engine failure and said "practice engine failure".

1 The 24-hour clock is used in this report. Eastern Daylight-saving Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.

2 Private Pilot (Aeroplane) Licence holders are required to undergo a flight review every two years. Their competency is assessed to ensure they are maintaining the standard required to exercise the privileges of their licence.

Figure 1: Route taken on the accident flight, as recounted by the instructor

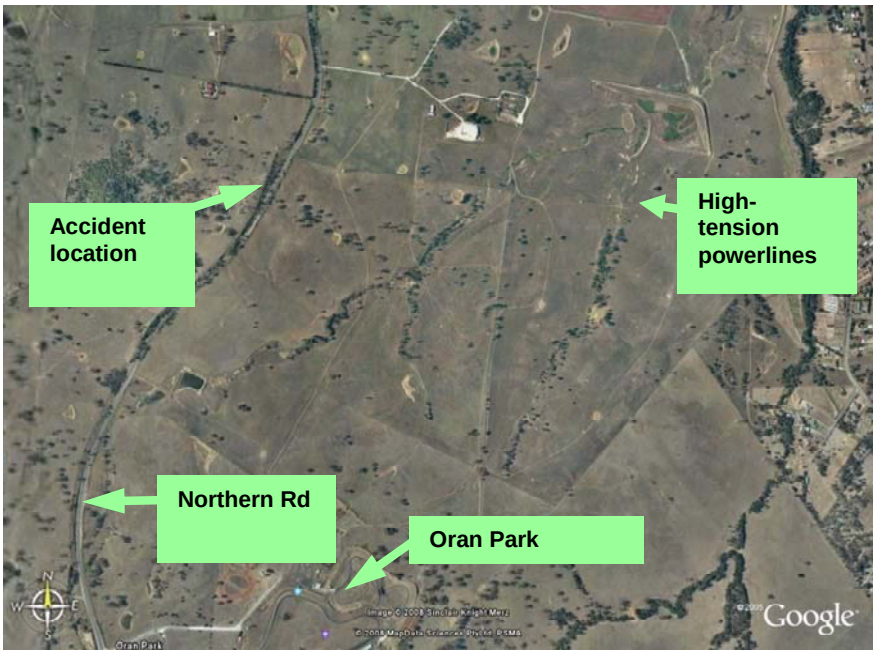


The candidate put the aircraft into a glide[3]. Although the instructor expected to be told promptly which field the candidate had selected as his aiming-point for the PFL, there was no comment from the candidate.

The instructor asked the candidate to state his intentions and he replied that he was aiming for a field off the left wing. (The more suitable fields which the instructor had in mind when he asked the candidate to track towards 2RN were to the aircraft's right.)

Given the aircraft's position at that moment and an intended landing point in a field to its left, the path the aircraft would fly during the PFL lay across a line of high-tension powerlines running approximately south-east/north-west (Figure 2). The instructor asked the candidate if he had seen the powerlines, but there was no reply.

Figure 2: Accident location



3 The design of the Pitts S-2A gives the aircraft a very high rate of descent in a glide: approximately 1,500 ft per minute or one-and-a-half to two times the rate for most light aircraft.

The instructor again asked the candidate to confirm that he had seen the powerlines and the candidate replied that he had seen them. It was apparent to the instructor that the aircraft had sufficient height to clear the powerlines safely.

The candidate's choice of aiming-point required a left turn onto final approach into the selected field once the powerlines had been crossed. While the aircraft was in this turn, the instructor decided the aircraft's flight path would not give it sufficient clearance from some trees (trees which the aircraft later struck) and gave the instruction to 'go around' i.e. apply full engine power and climb. There was no response from the candidate.

The instructor called again for engine power and again there was again no response. The aircraft's speed began to decrease. The instructor quickly applied full power (the propeller was already in full fine pitch) and recalled that he felt the control column begin to move backwards.

To counteract the force which was causing the control column to move backwards, the instructor had to use both hands and was thus unable to press the intercom button on the throttle to speak to the candidate. It required all the instructor's strength to counteract the force which was causing the control column to move backwards. He recalled that there was no resistance to inputs to the control column in roll (i.e. from side to side), only in pitch.

The instructor felt the aircraft begin to stall and applied right rudder to prevent the left wing dropping.

The instructor recalled sensing the aircraft recover from the stall, but that it came too late to avert an impact with trees in the fence line beside the Northern Road. The aircraft struck two trees and impacted the ground between the fence line and the road, coming to rest after turning through almost 180 degrees to face its point of entry to the accident site and with the fuselage twisted anti-clockwise with respect to the wings (Figures 3 and 4).

Immediately after the accident, the instructor pulled himself free of the wreckage. Medical assistance arrived quickly at the scene and it was determined that the candidate was deceased.

Pilot information

The candidate held a Private Pilot (Aeroplane) Licence since April 2006. He had flown on a Student Pilot Licence since August 1995[4]. His Class 2 Medical Certificate was valid until 26 February 2009. He was an accomplished aerobatic pilot and had competed in aerobatics events at the national level. He had accumulated approximately 520 flying hours.

The instructor held a Commercial Pilot (Aeroplane) Licence since 1997. He held a Multi-Engine Command Instrument Rating, a Grade I Instructor Rating, and an approval to conduct aerobatics down to 1,000 feet above ground level. His Class 1 Medical was valid until 23 December 2008. He had accumulated approximately 4,800 flying hours, comprising mainly flight instruction and sport aviation, of which approximately 30 hours were in the Pitts S-2A. His commercial flying had all been conducted as an employee of the operator of VH-NUK, and he was Chief Flying Instructor.

Aircraft information

The aircraft was manufactured in 1976. It was powered by a Lycoming 200 hp engine and fitted with a constant-speed two-bladed propeller. It was first registered in Australia on 23 February 1993 and changed to the current registration holder in November 2005. The aircraft had accumulated an estimated 2,507 flying hours at the time of the accident.

The last periodic maintenance inspection had been completed on 21 September 2007, and the aircraft's Maintenance Release was valid to 22 September 2008. The last recorded maintenance on the aircraft was Airworthiness Directive AD/FSM/31, comprising an inspection of the engine fuel injection servo plug. This was carried out on 14 March 2008 and no defects were found.

It is not known if the pilot had refuelled the aircraft prior to the accident flight. The cap of the main fuel tank had been dislodged during the

4 It is quite common for pilots interested solely in aerobatic flying to operate on a Student Pilot Licence for extended periods, often for many years.

accident and fuel had leaked out as a result. The fuel quantity at the time of the accident could not be determined, although the amount remaining in the tank after the accident would have been sufficient for continued engine operation.

The design of the Pitts S-2A is such that the pilot in the front cockpit has less mechanical advantage on the control column and rudder pedals than the pilot in the rear cockpit.

Wreckage and accident site information

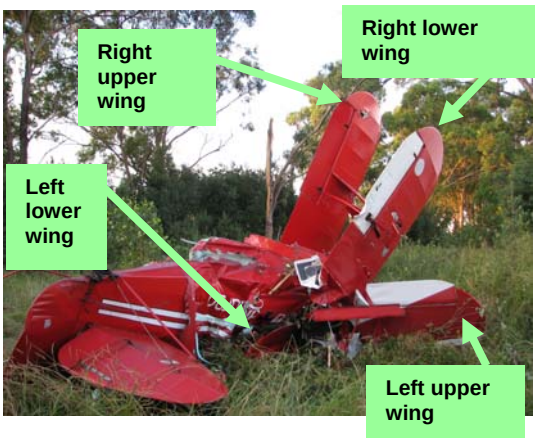
The terrain at the accident site was flat and surrounded by trees (Figures 2 and 3). The aircraft came to rest facing its point of entry to the site with its fuselage partly inverted and the right side of the fuselage facing away from the ground. The rear right side of the fuselage, in the area where the candidate was seated, had been broken open by impact forces.

Figure 3: Crash site and aircraft wreckage

The fuselage had twisted anti-clockwise relative to the wing structure (Figure 4). Both the right upper and right lower wings were substantially intact and pointing upwards. The left upper wing had been bent underneath the fuselage. The left lower wing had been bent backwards beneath the fuselage.

The right tailplane, elevator, and trim tab had mostly detached from the aircraft and were located among broken branches on the ground 5 metres from the nose of the aircraft. The elevator and tailplane were held together by the trim tab rod.

Figure 4: Aircraft wreckage



Continuity of all flight controls, from both front and rear cockpits, was established at the site. The rudder cable on the right side of the fuselage in the vicinity of the rear cockpit had been severed. There was no evidence of cutting or corrosion on the cable, which was severed by impact forces. Although both aileron input rods attached to the cockpit controls were broken, control continuity was established for all ailerons. There was full and free movement of the elevator and trim controls from both cockpits. The left elevator and the remnant of the right elevator control could be moved freely.

Continuity of engine and propeller controls was established from both cockpits, although the controls were stiff and their range of movement was restricted because the engine and the engine mounts had moved rearward as the result of the impact. The throttle was in the maximum power position (fully forwards) in both cockpits.

The propeller and spinner exhibited rotational and impact damage consistent with having struck trees and the ground, and some fallen tree branches showed evidence of damage from the propeller.

The intercom system was tested at the site for operation and continuity of wiring. The intercom and headsets were found to be serviceable. During the radio and intercom checks, the aircraft's battery capacity was tested and found to be 12.8 volts.

The investigation is continuing and will include the following:

- a review of the candidate's medical history
- survivability aspects.