

FINAL REPORT

CESSNA 172R, REGISTRATION 9V-FCG

AIRCRAFT VEERING OFF RUNWAY

SELETAR AIRPORT

25 OCTOBER 2011

AIB/AAI/CAS.079

**Air Accident Investigation Bureau of Singapore
Ministry of Transport
Singapore**

30 August 2012

The Air Accident Investigation Bureau of Singapore

The Air Accident Investigation Bureau (AAIB) is the air accidents and incidents investigation authority in Singapore responsible to the Ministry of Transport. Its mission is to promote aviation safety through the conduct of independent and objective investigations into air accidents and incidents.

The AAIB conducts the investigations in accordance with the Singapore Air Navigation (Investigation of Accidents and Incidents) Order 2003 and Annex 13 to the Convention on International Civil Aviation, which governs how member States of the International Civil Aviation Organisation (ICAO) conduct aircraft accident investigations internationally.

In carrying out the investigations, the AAIB will adhere to ICAO's stated objective, which is as follows:

"The sole objective of the investigation of an accident or incident shall be the prevention of accidents and incidents. It is not the purpose of this activity to apportion blame or liability."

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SYNOPSIS

On 25 October 2011 at about 4.42 p.m., a Cessna 172R aircraft veered off the left edge of the paved runway surface onto the grass area during a touch-and-go landing on Runway 21 in Seletar Airport. The aircraft stopped at about 100 m from the runway edge. The pilot, a student of a flying school, was not injured. There was no damage to the aircraft.

The Air Accident Investigation Bureau of Singapore classified this occurrence as an incident. What caused the aircraft to start to veer left after the touchdown could not be determined. After the aircraft had started to veer left, the student pilot did not manage to correct the veering although he tried to apply the recovery techniques.

AIRCRAFT DETAILS

Aircraft type	: Cessna 172R
Operator	: Singapore Flying College
Registration	: 9V-FCG
Number and type of engines	: 1 x Lycoming IO-360-L2A
Type of flight	: Training

1 FACTUAL INFORMATION

All times used in this report are Singapore times. Singapore time is eight hours ahead of UTC (Coordinated Universal Time).

1.1 History of the flight

- 1.1.1 At 4.42 p.m. on 25 October 2011, a Cessna 172R aircraft from a local flying school, piloted by a student pilot, veered off the left edge of the paved runway surface onto the grass area during a touch-and-go landing on Runway 21 in Seletar Airport. The aircraft crossed a helicopter landing lane and stopped about 100 m from the runway edge. The approximate path of the aircraft is shown in **Figure 1**. The aircraft was not damaged.

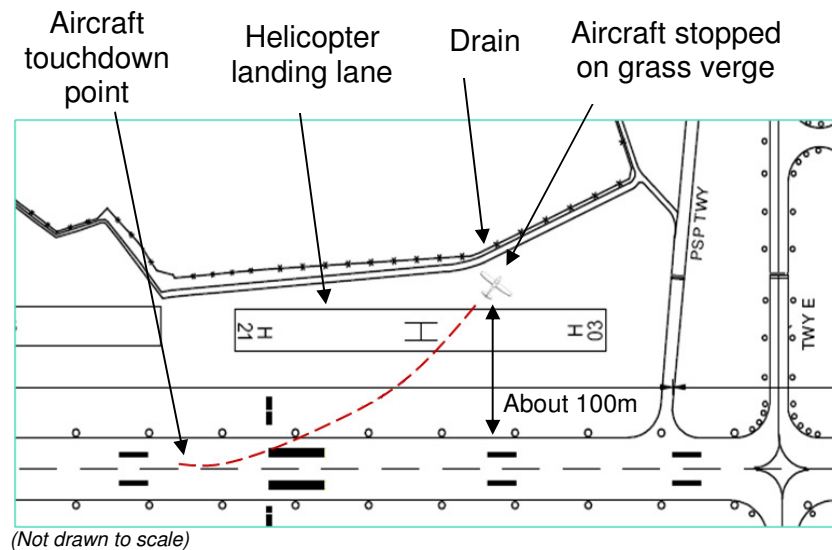


Figure 1: Ground path of the aircraft

- 1.1.2 The student started his day at about 8.30 a.m. performing pre-flight preparations for his dual sortie¹ scheduled at 9.30 a.m. This flight was subsequently cancelled due to a planned airport closure. The student was scheduled for another dual sortie at 12.50 p.m. but this flight was also cancelled due to bad weather.

¹ A dual sortie is one where the student pilot sits in the left seat and operates as pilot-in-command under supervision while an instructor pilot sits in the right seat. The instructor does not instruct but assesses the student's readiness to go for a solo sortie. A satisfactory performance by the student during the dual sortie will enable him to proceed to fly a solo sortie. A dual sortie must be performed immediately before a solo sortie.

- 1.1.3 The student was rescheduled for another dual sortie at 2.30 p.m. The student took off for the dual sortie which lasted 30 minutes. The student's performance was deemed satisfactory by the instructor pilot. Following that flight, the instructor left the aircraft and the student taxied his aircraft for his solo sortie².
- 1.1.4 While the student was waiting at the holding point in the aircraft, another instructor from the same flying school in an airborne aircraft relayed an instruction through the ATC tower for the student to cancel his sortie due to weather. The student cancelled the sortie and taxied back to the parking bay.
- 1.1.5 Since the solo sortie was cancelled, the student had to go through another dual sortie assessment prior to another solo sortie. Another dual sortie was then scheduled for the student. The student assured his instructor that he did not feel tired.
- 1.1.6 At about 4 p.m., the student took off for the dual sortie with his instructor. This flight landed after 30 minutes and the student was sent for his solo sortie. The student performed a normal take-off from Runway 21 for his solo sortie.
- 1.1.7 During the approach for the touch-and-go landing on Runway 21, the ATC informed the student that the wind condition was five knots from 120° (i.e. the wind was from the left of the approach path). The student acknowledged this information. The approach for the touch-and-go landing was normal.
- 1.1.8 Soon after the aircraft touched down, it started to veer left. The student tried to correct the veering by applying right rudder. When the aircraft did not respond to the rudder application and continued to veer left, the student removed his feet from the foot pedals.
- 1.1.9 The aircraft eventually went off the left edge of the paved runway surface and onto the grass area. When the student noticed that the aircraft was heading towards a drain, he applied brakes and the aircraft eventually stopped before the drain after rolling across a helicopter landing lane.

² The student had, according to his training records, already completed two solo sorties at an earlier date.

- 1.2 Injuries to persons
 - 1.2.1 The student was the only person on board the aircraft and he was not injured.
- 1.3 Personnel information
 - 1.3.1 Pilot
 - Age : 25 years
 - Gender : Male
 - Type of licence : Student Pilot's Licence
 - Valid till : 31 December 2015
 - Aircraft rating : Nil
 - Total flying time : 19 hours 25 minutes
 - Total on this type : 19 hours 25 minutes
 - Total last 90 days : 19 hours 25 minutes
 - Total last 30 days : 13 hours 05 minutes
 - Total last 7 days : 3 hours 20 minutes
 - Total last 24 hours : 1 hour 55 minutes
 - Instrument rating : Nil
 - Medical class : Class Two
 - Medical limitation : Nil
- 1.4 Aircraft information
 - 1.4.1 The aircraft had a valid certificate of airworthiness.
 - 1.4.2 No abnormality of the steering and brake systems was observed by the student and instructor prior to the incident.
 - 1.4.3 The aircraft was not damaged in the incident. Post-incident examination of the aircraft did not reveal any defect.
 - 1.4.4 The maximum demonstrated crosswind component for the aircraft type was 15 knots.
- 1.5 Medical and pathological information
 - 1.5.1 The student underwent a medical and toxicological test after the occurrence. The test revealed no abnormality.

1.6 Tests and research

1.6.1 Steering and braking using rudder pedals

1.6.1.1 The rudder pedals of the aircraft are slightly reclined (see **Figure 2**) and they are used to steer the aircraft and to apply brakes.

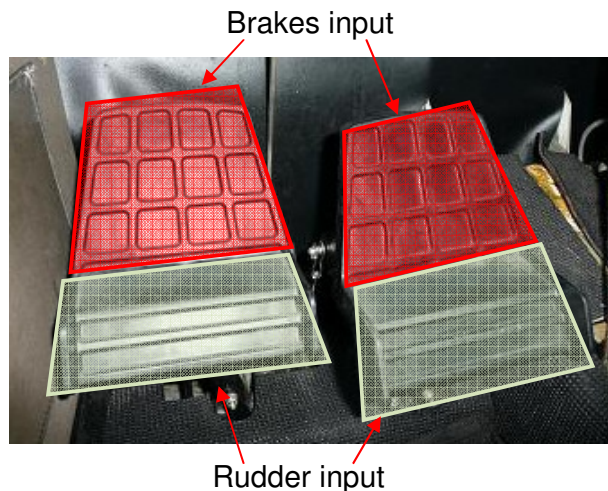


Figure 2: Aircraft foot pedals

1.6.1.2 When steering an aircraft, a pilot would have to keep both his heels on the floor and step on the lower portion of rudder pedals using the balls of his feet (see **Figure 3**). For example, to steer the aircraft to the right, the pilot has to step on the right rudder pedal and push it forward while retracting his left foot to allow the left rudder pedal to move towards him.

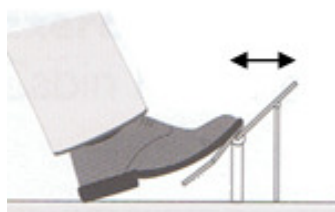


Figure 3: Foot position when steering the aircraft

1.6.1.3 To apply left and right brakes, the pilot has to move his feet upward (i.e. heels off the floor) and step on the top portion of the left and right rudder pedals respectively (see **Figure 4**).



Figure 4: Foot position when applying brakes

- 1.6.1.4 According to the student, when the aircraft started to veer left after touchdown, he tried to steer towards the right by stepping on the right rudder pedal. When the right rudder pedal was being pushed forward, the left rudder pedal was coupled to move rearward correspondingly. This movement of the left rudder pedal caused the student's left foot to slide upwards as, according to the student's recollection, his left foot might have momentarily frozen without his realising it. The student also said he might have inadvertently pressed on the top portion of the left rudder pedal, thus applying left brake.

2 DISCUSSION

2.1 Cause of aircraft's veering

- 2.1.1 During the incident, the wind condition was five knots from 120° (i.e. left of the approach path). This was within the demonstrated crosswind component of the aircraft type, which was 15 knots.

- 2.1.2 There was no evidence to suggest that the wind condition was a factor in this incident. The student had flown before in wind conditions of between 8 and 10 knots from 110° to 130° using Runway 21. He felt that the wind condition in this incident did not affect his handling of the aircraft and that he had executed the approach according to what he was taught.

- 2.1.3 There was no evidence to suggest that fatigue on the part of the student was a factor in the incident.

- 2.1.4 The cause of the aircraft's veering to the left after landing could not be determined.

2.2 Inadvertent application of left brake

- 2.2.1 When the aircraft started to veer left, the student stepped on the right rudder pedal to try to correct the veering. According to the student, his left foot might have frozen momentarily, i.e.

his left foot did not move rearwards. As the left rudder pedal moved rearwards, due to the right rudder application, the student pilot's left foot may have slid up the rudder pedal and inadvertently applied left brake. This inadvertent application of the left brake probably explains why the aircraft continued to veer to the left.

3 **SAFETY ACTION**

3.1 Following the incident, the operator has taken the following safety actions:

- Reminding all the instructors to teach students the landing technique as stipulated in the school's training manual.
- Emphasising to its instructors to remind their students to keep their heels on the floor during landing to prevent inadvertent application of the brakes.

4 **SAFETY RECOMMENDATION**

4.1 In view of the safety actions taken by the flying school, no safety recommendation is proposed.