

FINAL REPORT

AIRBUS A380, REGISTRATION 9V-SKT RUNWAY EXCURSION AT SINGAPORE CHANGI AIRPORT ON 14 FEBRUARY 2013

AIB/AAI/CAS.089

**Transport Safety Investigation Bureau
Ministry of Transport
Singapore**

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The Transport Safety Investigation Bureau

The Transport Safety Investigation Bureau (TSIB) is the air and marine accidents and incidents investigation authority in Singapore. Its mission is to promote aviation and maritime safety through the conduct of independent and objective investigations into air and marine accidents and incidents in accordance with international standards and recommended practices.

The TSIB conducts air safety 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 Organization (ICAO) conduct aircraft accident investigations internationally.

In carrying out the investigations, the TSIB 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."

Accordingly, it is inappropriate that TSIB reports should be used to assign fault or blame or to determine liability, since neither the investigation nor the reporting process had been undertaken for those purposes.

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SYNOPSIS

On 14 February 2013 at about 1748 hours local time, an Airbus 380 landed on Runway 02L at Singapore Changi Airport. It veered to the right of the runway during the landing roll after touchdown. The right main landing gear departed the paved runway surface momentarily, resulting in damage to some runway lights and rapid exit taxiway lights. No passengers or crew members were injured.

The occurrence was classified as an incident.

AIRCRAFT DETAILS

Aircraft type	:	Airbus A380
Operator	:	Singapore Airlines
Registration	:	9V-SKT
Number and type of engines	:	4 x Rolls Royce Trent 900
Type of flight	:	Scheduled Passenger Flight
Persons on board	:	378

1 FACTUAL INFORMATION

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

1.1. History of the flight

1.1.1 On 14 February 2013, an Airbus A380 flew from Narita, Japan to Singapore. The flight crew comprised the Pilot-in-command (PIC) and First Officer (FO). The aircraft landed on Runway 02L at Singapore Changi Airport at about 1748 hours. For the landing, the PIC was the pilot flying.

1.1.2 It was raining heavily over the aerodrome at the time of incident. Visibility was 1,400 m. The runway was wet. Surface wind was five knots at 080 degrees. The aircraft's wipers were on high setting. The crew were able to see the runway. According to the meteorological service, there was no windshear detected.

1.1.3 The aircraft drifted to the right when the aircraft flared. The aircraft executed a crab landing and landed. According to the PIC, he had wanted to initiate a go-around when he noticed that the aircraft was drifting to the right when the aircraft flared. However, the aircraft touched down at that moment. As he felt that he was in control of the aircraft, he decided to continue with the landing roll.

1.1.4 Flight data recorder (FDR) data showed that there was a right roll input from the PIC's side stick input when the flare was initiated. The right roll input resulted in the aircraft moving to the right. The aircraft touched down at about 650 m from Runway 02L's threshold and 12 m from the runway centreline. The right main landing gear touched down near the right edge of the runway. The aircraft exited the runway (**Figures 1 and 2**) and rolled on the grass patch and across Taxiway W7 before re-entering the runway.

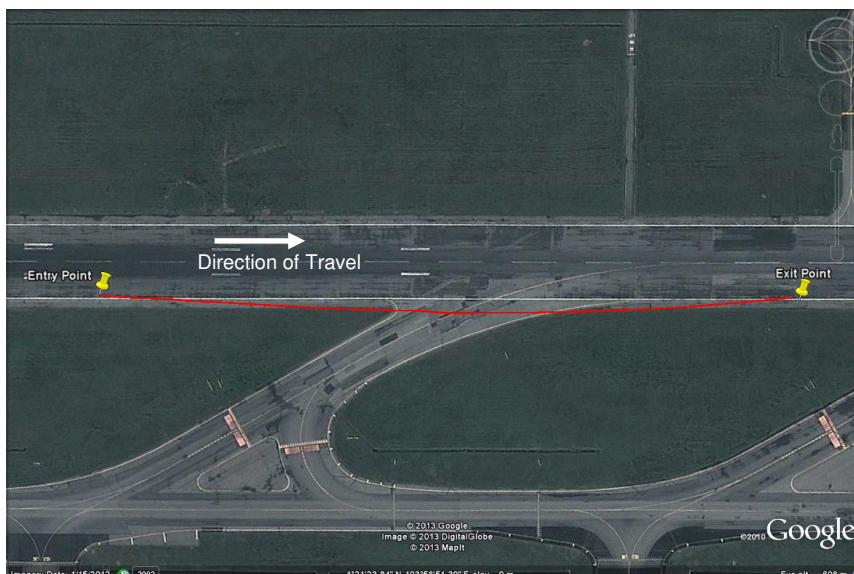




Figure 2: Wheel track of the right main

1.1.5 The PIC applied left rudder and steered the aircraft back to the runway centreline. Not aware that the right main landing gear had departed the runway momentarily, the flight crew vacated the runway via Taxiway W4 and taxied to its designated gate.

1.1.6 After the aircraft arrived at the gate, the flight crew informed the ground engineer that the aircraft might have scrubbed something during the landing. The ground engineer performed a post-flight walk check around the aircraft. He informed the flight crew that mud and grass were found on the right side of the aircraft and right main landing gears as well as in the wheel well area (**Figures 3, 4 and 5**).



Figure 3: Grass ingestion on the forward of the right main landing gear



Figure 4: Grass ingestion on the aft of the right main landing gear



Figure 5: Grass found on the right main landing gear door

1.2. **Injury**

1.2.1. There was no injury in this incident.

1.3. **Damage to aircraft**

1.3.1. The cover plate for the forward hinge fitting of the right body landing gear was broken. The right hand wing landing gear bogie electrical harness was dislodged and its junction box bracket was bent.

1.4. **Other damage**

1.4.1. Five runway edge lights and four rapid exit taxiway edge lights along Runway 02L were damaged (**Figure 6**).



Figure 6: Damaged runway/taxiway lights

1.5. Personnel Information

	PIC	FO
Gender	Male	Male
Age	53	35
Type of Licence	Airline Transport Pilot Licence issued by the Civil Aviation Authority of Singapore	Airline Transport Pilot Licence issued by the Civil Aviation Authority of Singapore
Valid Until	28 February 2014	31 August 2013
Aircraft rating	Piper PA 23-250 Boeing 747 Airbus 310 Boeing 747-400 Airbus A380	Beechcraft Baron 58 Learjet 45 Boeing 777 Airbus A380
Total flying time	22,073 hours	4,769 hours
Total on this type	2,657 hours	2,770 hours
Total last 90 days	224 hours 17 minutes	198 hours 48 minutes
Total last 28 days	80 hours 43 minutes	75 hours 22 minutes
Total last 24 hours	Nil	Nil
Rest period before flight	39 hours 12 mins	26 hours 42 mins
Medical class	Class 1	Class 1
Medical limitations	Holder to wear lenses which correct for near vision	NIL

1.6. Medical Information

1.6.1. The PIC and the FO underwent medical and toxicological tests after the incident. The tests revealed no abnormality.

1.7. Flight Recorders

1.7.1. The Digital Flight Data Recorder (DFDR) and the Cockpit Voice Recorder (CVR) were removed intact by the operator and sent to the AAIB for readout. Both the recorders were downloaded successfully.

1.8. Additional information

1.8.1. Runway friction

1.8.1.1. Following the incident, a runway friction test was conducted. The runway friction coefficient was found to be within limits.

2 DISCUSSION

- 2.1 The right roll input by the PIC when the flare was initiated caused the aircraft to move to the right. The PIC said that he was not aware of the right roll input. It is difficult to understand how this right roll came about. According to the operator, the way the PIC was positioning his elbow and holding the side stick might have resulted in a right roll input that was not perceptible to the PIC.
- 2.2 An investigation conducted by the UK Military in 2014 into a case of A330 violent and sudden pitching movement revealed that an inadvertent input to the Captain's side stick was a result of a physical obstruction (a camera) being caught between the left armrest of the Captain's seat and the side stick unit when the Captain moved his seat forward.
- 2.3 Although the scenarios in both investigations are different, the point to note is that, in a relatively confined environment like a cockpit, any equipment and body movements might interact to produce unexpected movement of the side stick. Therefore, pilots should be mindful of this.

3 SAFETY ACTIONS

During the course of the investigation and through discussions with the investigation team, the following safety action was initiated by the airline operator.

- 3.1 The airline operator shared with its flight crews the safety lessons arising from this incident. The airline operator reminded them of the correct flare technique and the correct positioning of the elbow behind the side stick.

4 SAFETY RECOMMENDATIONS

A safety recommendation is for the purpose of preventive action and shall in no case create a presumption of blame or liability.

- 4.1 In view of the safety action already taken by the airline operator, no further safety recommendations is proposed.