



DUTCH  
SAFETY BOARD

# Runway incursion Amsterdam Airport Schiphol



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## **Dutch Safety Board**

The aim in the Netherlands is to limit the risk of accidents and incidents as much as possible. If accidents or near accidents nevertheless occur, a thorough investigation into the causes, irrespective of who are to blame, may help to prevent similar problems from occurring in the future. It is important to ensure that the investigation is carried out independently from the parties involved. This is why the Dutch Safety Board itself selects the issues it wishes to investigate, mindful of citizens' position of independence with respect to authorities and businesses. In some cases the Dutch Safety Board is required by law to conduct an investigation.

	<b>Dutch Safety Board</b>		
Chairman:	T.H.J. Joustra E.R. Muller P.L. Meurs		
General Secretary:	M. Visser		
Visiting address:	Anna van Saksenlaan 50 2593 HT The Hague The Netherlands	Postal address:	PO Box 95404 2509 CK The Hague The Netherlands
Telephone:	+31 (0)70 333 7000	Fax:	+31 (0)70 333 7077
Website:	<a href="http://www.safetyboard.nl">www.safetyboard.nl</a>		

NB: This report is published in the Dutch and English languages. If there is a difference in interpretation between the Dutch and English versions, the Dutch text will prevail.

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# GENERAL INFORMATION

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Incident number:	2012040
Classification:	Incident
Date and time <sup>1</sup> of incident:	18 April 2012, 08.44 hours
Location of incident:	Amsterdam Airport Schiphol
Registration:	N815NW
Aircraft model:	Airbus A330
Aircraft type:	Twin-engine passenger aircraft
Flight type:	Passenger flight
Flight phase:	Taxi after landing
Damage to the aircraft:	None
Number of crew members:	Three pilots/nine cabin crew
Number of passengers:	261
Injuries:	None
Other damage:	None
Light conditions:	Daylight

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<sup>1</sup> All times in this report are local times unless stated otherwise.

After landing on runway 18R at Amsterdam Airport Schiphol (Schiphol) the crew of the Airbus A330 taxied to their assigned gate E17 at Schiphol-Centre (see figure 1, blue line). The aircraft was taxiing in a southerly direction on taxi track Zulu, parallel to the west side of runway 18C/36C, when the ground controller instructed the crew to cross at Zulu 2 (hereafter abbreviated as Z2) that is situated south of the beginning of runway 36C.

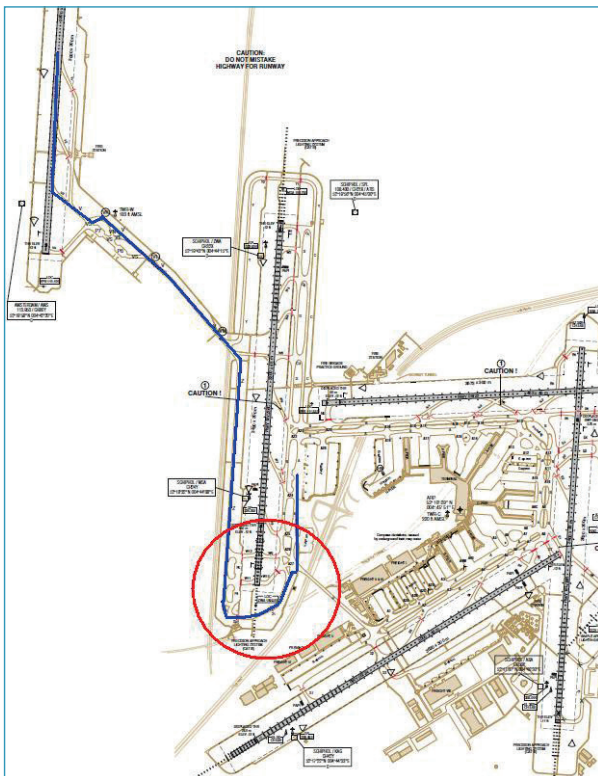


Figure 1: Overview of runways and taxiways at Amsterdam Airport Schiphol, including taxi route from runway 18R, via Zulu to Alpha (blue). (Source: Aeronautical Information Publication Netherlands)

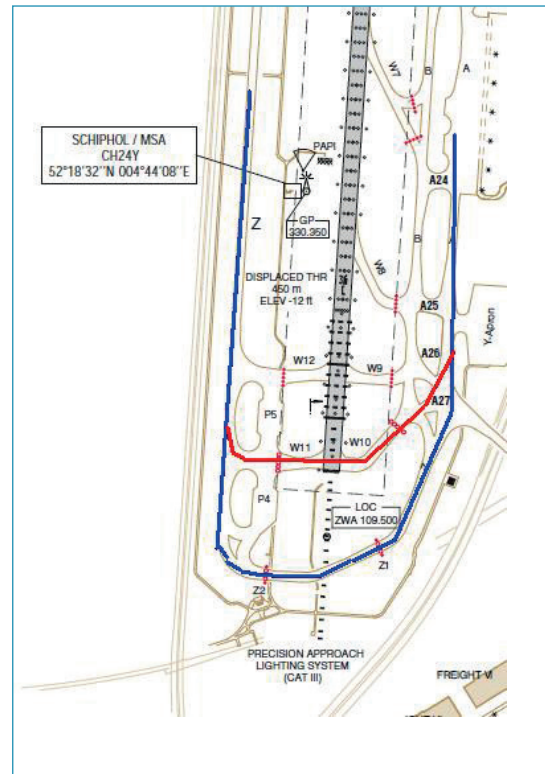


Figure 2: Detailed view of intersections around Zulu (red circle in figure 1) –planned route in blue, actual route in red.

The crew, just prior to reaching intersection W11, understood they were cleared to cross runway 18C, in use for landing. The crew crossed the active landing runway at the southernmost point at W11 (see figure 2, red line), thereby causing a runway incursion.<sup>2</sup> At the moment of the crossing an aircraft approaching the airport for landing was at a distance of approximately 3 nm from the runway threshold in the north.

<sup>2</sup> A runway incursion is defined internationally as: any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and take-off of aircraft.

There was no risk of collision, the approaching aircraft continued its approach and landed on runway 18C uneventfully.

## History of the flight

The Airbus A330 was on a scheduled flight from Detroit Metropolitan Wayne County Airport in the United States of America to Amsterdam Airport Schiphol. The cockpit crew consisted of a captain and two first officers; one sitting in the right hand seat (FO-1), and one sitting in the jumpseat (FO-2). The captain was acting as pilot flying. At 08.35 hours, the Airbus landed on runway 18R. After landing the aircraft vacated runway 18R via intersection V3. FO-1 contacted the ground controller<sup>3</sup> in 'Tower West' at Amsterdam Airport Schiphol, and reported they were taxiing on taxi track Victor. The ground controller instructed the crew to taxi via taxiway Zulu to their assigned gate E17. About four minutes later the ground controller instructed the crew (twice) to switch to 'Ground Controller North'. 'Ground Controller North' is positioned in the control tower at Schiphol Centre.

At that time, the Airbus A330 was approaching intersection W11. The area around intersection W11 and W12 is highlighted as "Hot spot" on both the Jeppesen chart used by the crew as well as in AIP Netherlands. FO-1 checked in on the frequency of 'Ground Controller North' : "Schiphol, DAL 234 is with you on Z". The ground controller instructed the crew to "cross at Z2, taxi Alpha North to gate E17". FO-1 checked his Jeppesen chart to locate Alpha North. FO-2 looked at the chart over the shoulder of FO-1 to assist in finding the location of Alpha North on the chart. A discussion about the location of Alpha North developed between both first officers. In the meantime the captain made a left-hand turn at intersection W11. The stop bar at intersection W11 was not illuminated. At that moment FO-2 noticed that intersection Z2 was situated south of the runway, well clear of it. FO-2 reported this to the captain but the Airbus was already crossing the most southern point of runway 18C/36C at intersection W11. The captain by then had observed the W11 sign and realised that he had taken the incorrect intersection, thereby causing a runway incursion. He observed the aircraft on final for runway 18C. The aircraft was at an estimated distance of approximately 3 nautical miles from the runway. The captain then stated that he was expediting the runway crossing. At the same moment the ground controller requested the crew to expedite the runway crossing due to the approaching aircraft on final. The runway controller informed the aircraft on final about the presence of the Airbus that was mistakenly crossing runway 18C at W11 and not via Z2. The Runway Incursion Alerting System Schiphol (RIASS) was operational, but, because of the distance and estimated time between the two aircraft, did not give an alert for the inadvertent runway crossing. After crossing the runway the Airbus continued to the assigned gate E17 uneventfully.

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<sup>3</sup> The ground controller is responsible for the provision of separation of traffic in that part of the aerodrome that is reserved for taxiing aircraft, with exemption of the aprons.



## Runways/taxi tracks

Runways 18R and 18C were in use for landings at Amsterdam Airport Schiphol, runway 18L was in use for departures. Both reporting points Z1 and Z2 are Runway Holding Positions (RHP)<sup>4</sup> for Runway End Safe Area (RESA)<sup>5</sup> 18C/36C-south. They require clearance from air traffic control before crossing. Among others, runway holding positions Z1 and Z2 are equipped with a stop bar<sup>6</sup> that is operated by the runway controller of runway 18C/36C .

## Meteorological data

According to reports from the Royal Netherlands Meteorological Institute (KNMI) the weather at Amsterdam Airport Schiphol at the time of the incident was as follows:

Wind	On the ground: 170 degrees 13 knots
Temperature	On the ground: 6 °C
Visibility	>10 kilometres
Cloud	Few stratus clouds between 800 and 1500 feet

Table 1: Meteorological data at the time of the incident. (Source: KNMI)

## Similar occurrences at Amsterdam Airport Schiphol

Similar occurrences took place in the vicinity of intersection W11 and W12 before (2011) and after the incident. Apart from one other incident, runway incursions were prevented by timely action from air traffic control.

## Actions taken at Amsterdam Airport Schiphol since the incident

Intersections W11 and W12 were closed by the airport authorities, which was also recommended by Air Traffic Control. Directly after the incident barriers were placed. Furthermore, the taxiway markings leading to intersections W11 and W12 were masked and the relevant part of the taxi lighting was switched off.

The occurrence with the Airbus A330 was discussed in the Runway Safety Team (RST)<sup>7</sup> of Amsterdam Airport Schiphol. As a result of this, and in line with the general policy to bring back the number of hot spots at Schiphol, changes were made to the markings of intersections W11 and W12.

4 A runway holding position is a designated position intended to protect a runway, an obstacle limitation surface, or an ILS/MLS critical/sensitive area at which taxiing aircraft and vehicles shall stop and hold, unless otherwise authorized by the aerodrome control tower.

5 A runway end safe area is an area symmetrical about the extended runway centre line and adjacent to the end of the strip primarily intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway" [ICAO Annex 14].

6 A stop bar is a row of flush-mounted red lights in the entry to a runway that, when illuminated, is not allowed to be crossed.

7 The Runway Safety Team advises the appropriate management on potential runway safety issues and recommends mitigating measures. The RST consists of representatives from the main groups associated with manoeuvring area operations, namely the aerodrome, ground handling associations when appropriate, representatives from the air navigation service provider / and local air traffic controller associations and pilots from aircraft operators / and local pilot associations that operate at the aerodrome and other organisations that operate on the manoeuvring area.

On 14 June 2012<sup>8</sup> the airport authorities reconstructed the markings of the two turns on taxi-track Zulu towards intersections W11 and W12 (see figure 3) and the barriers were removed. Unfortunately these alterations did not prevent aircraft crews from turning to the left at W11, instead of continuing via Z1 and Z2.

Because of the recurring nature of the incidents, the airport authorities reinstalled the barriers near the entrances of intersections W11 and W12 to prevent future turns to the left. As a structural measure, the layout of the entries was reconstructed in such a way that both entries from taxi-track Zulu to intersections W 11 and W12 are closed on a permanent basis. The AIP Netherlands was amended.

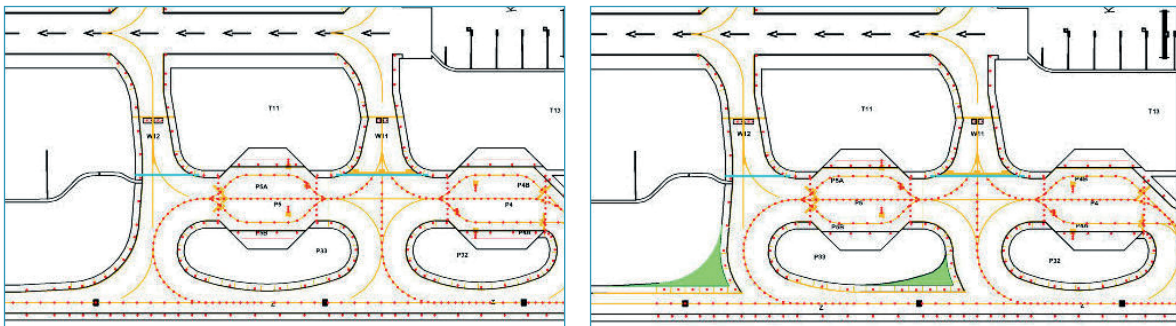


Figure 3: The markings at occurrence date (left) and markings after the April incident from 14 June 2012 (right) near intersections W11 and W12, viewing from west to east. (Source: Amsterdam Airport Schiphol)



Figure 4: Intersection W11 (February 2013) looking from west to east (note the adapted lining and green painted surface as shown in figure 3, bottom drawing, infrastructural changes made by the airport authorities in June 2012).

8 AIRAC date 28 July 2012 published in AIP Netherlands.

## **The occurrence**

The Airbus A330 was instructed to cross at Z2. This routing is via the taxiway south of the runway. Instead, the crew crossed at W11, causing a runway incursion. At the time of the incident runway 18C was in use for landing aircraft.

At the moment the Airbus A330 crossed the end of runway 18C at W11, a passenger aircraft was on final for runway 18C from the north for a full stop landing. The approaching aircraft was approximately 3 NM (5,5 km) before the beginning of runway 18C. Including the length of runway 18C, the total distance between the approaching and the crossing aircraft was about 5 NM (9 km). There was no risk of collision.

At the moment the Ground Controller North instructed the crew to "cross at Z2, taxi Alpha North to gate E17", the Airbus A330 was approaching intersection W11 on taxiway Zulu. FO-1 checked his Jeppesen chart of Schiphol in order to locate the route to Alpha North. FO-2 looked over the shoulder of FO-1 to assist him. Both first officers discussed the possible location of Alpha North and were, as a result, not looking outside.

In the instruction of the ground controller the term "cross" was used. The captain interpreted the instruction as a clearance to cross runway 18C. The Captain made a left turn and crossed 18C at the end. The captain by then had observed the W11 sign and realised that he had taken the incorrect intersection. The captain stated that there were no illuminated stop bars present at or near the intersection. After receiving the perceived crossing clearance he checked the final approach of the runway to scan for incoming aircraft. As he had noticed the aircraft on final, he expedited his crossing at the same moment he was requested to do so by the ground controller. Apparently prompted by the word "cross" as used in the radio transmission, the captain turned left with the intention to cross runway 18C and did no longer follow the Z2 markings.

In the interview with a Safety Board investigator, FO-2 stated that the wordings used by the ground controller to cross via Z2 was misleading because Z2 does not physically cross runway 18C. It crosses the extended centreline of it. The captain stated that he understood to have received clearance to cross the runway and said that it would have been clear if "continue taxi via Z and Z2", would have been used by the ground controller, instead of using the term 'cross'.

The meteorological information shows that the visibility was more than 10 kilometres. The runways and taxi tracks were dry. The markings on the taxi tracks were clearly visible. Weather conditions played no role in this incident.

## **Human factors**

The Airbus A330 landed at Amsterdam Airport Schiphol after a trans-Atlantic flight from the United States of America. The captain stated that he was experiencing the 'normal

fatigue' after a trans-Atlantic flight. For the captain it was his first flight in several years to Amsterdam Airport Schiphol. He recently transitioned to the Airbus A330. Therefore taxiing the aircraft still demanded some additional attention. Checking the final approach area when crossing the runway diverted his attention from taxi track markings and signs. The captain stated that the text on the Jeppesen chart was printed very small and it would require the use of his reading glasses to be able to read it.

For FO-1, it had been six months since his last flight to Schiphol. FO-2 made several flights into Schiphol.

The ground controller was the first one to observe the unintentional crossing. A warning was given to both the crossing Airbus A330 and the aircraft on final for runway 18C, by ground controller north and the runway controller on the respective frequencies.

### **Jeppesen charts**

After landing on runway 18R the captain taxied the aircraft while FO-1 checked the charts, assisted by FO-2. On the relevant Jeppesen chart the area around intersection W11 and W12 is indicated as "Hot spot".<sup>9</sup> Separately, highlighted on the chart, a warning is incorporated not to turn left near W11 or W12 when taxiing on taxi track Zulu coming from the North via holding point Z2. The more detailed Jeppesen chart (10-9A) on which the hotspot area is enlarged was missed by the crew and therefore not used. Though the captain made a remark about the small printed text on the Jeppesen chart he was not the one checking the charts after landing, FO-1 was.

Runway 18R is the most westerly runway at Amsterdam Airport Schiphol and it takes several minutes to taxi from runway 18R to Schiphol Centre. The first taxi clearance by Ground Controller West after landing was issued to the crew at 08.37:17 hours. The next taxi instruction was given at 08.43:24 hours. Thus, apart from flight preparation before and during the flight, the crew had six minutes available after landing to prepare and check the relevant Jeppesen charts of the airport lay-out.

### **Radiotelephony**

In his statement the captain mentions that the phraseology used by the ground controller, the timing of the instruction to cross Z2 and the markings for taxiways and crossings contributed to a discussion on the flight deck. The captain understood that he received a clearance "to cross 18C". It is noticed that both first officers in their statements stated that they also understood to have received clearance to cross runway 18C at Z2.

The initial taxi instruction given to the crew by the Ground Controller West reads: "taxi via Z to E17". In the instruction the word "via" is. Later on, Ground Controller North instructs the crew to "cross at Z2. Taxi Alpha North to gate E17". This instruction did not state the words "via Z" which, in combination with the position of the aircraft when the clearance was given, namely at the end of runway 18C, may have contributed to the confusion on the flight deck.

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<sup>9</sup> Jeppesen Amsterdam, Netherlands; 10-9 and 10-9A, 16 September 2011.

## **Cause**

The crew missed the relevant hotspot on the airport chart. The term “cross” in the taxi instruction “cross at Z2” gave the captain the impression that he had a clearance to cross the runway. He no longer followed the instructed route to Z2 but instead turned left, crossing the runway at the end and thus causing a runway incursion at W11. The stop bar at that intersection was not illuminated. There was no risk of a collision.

**Visiting Address**

Anna van Saksenlaan 50  
2593 HT The Hague  
T +31(0)70 333 70 00  
F +31(0)70 333 70 77

**Postal Address**

PO Box 95404  
2509 CK The Hague

[www.safetyboard.nl](http://www.safetyboard.nl)