

GENERAL INFORMATION

Identification number:	2005142
Classification:	Serious incident
Date, time ¹ of occurrence:	23 September 2005, 11.24 hours
Location of occurrence:	Amsterdam Schiphol Airport
Aircraft registration:	PH-KCG
Aircraft model:	Boeing MD-11
Type of aircraft:	Passenger aircraft
Type of flight:	Commercial air transport
Phase of operation:	Take-off
Damage to aircraft:	None
Cockpit crew:	Unknown
Passengers:	Unknown
Injuries:	None
Other damage:	None
Light conditions:	Daylight

SUMMARY

A MD-11 aircraft received take-off clearance for runway 24. During the take-off run a bird control vehicle got a clearance and crossed runway 24. Both the MD-11 and the vehicle continued their path uneventfully.

FACTUAL INFORMATION

History of the event

A MD-11 aircraft was planned to be flown from Amsterdam Schiphol Airport (EHAM) to Bonaire, Netherlands Antilles (TNCB). The ground controller² instructed the flight crew to taxi to runway 24 for departure. The crew complied with the instructions, taxied to runway 24 and held short of the runway at the S7 entry (see figure 1). After reporting that they were ready for departure, the runway controller³ cleared the aircraft to line up on runway 24 at 11.24:34 hours. The controller cleared the aircraft for take-off 26 seconds later. The flight crew acknowledged this instruction.

¹ All times in this report are local times unless otherwise specified.

² The ground controller is responsible for controlling the traffic in the maneuvering area except for runways available for take-off and landing.

³ The runway controller is responsible for controlling local traffic (departing and landing) except traffic under the control of the ground controller.

The bird controller (call sign 'Kievit 1') reported that he had driven from Post Rijk along the perimeter track, Zuidelijk Randweg 06, towards S2 with the intention to cross runway 06/24. During this timeframe the runway controller had cleared the MD-11 for take-off. Kievit 1 stopped his vehicle about three meters from the end of the perimeter track on the taxiway at S2 (south). At this position, he described the vehicle as being between the stop bar and the runway. This position is indicated as 'B' in figure 1.

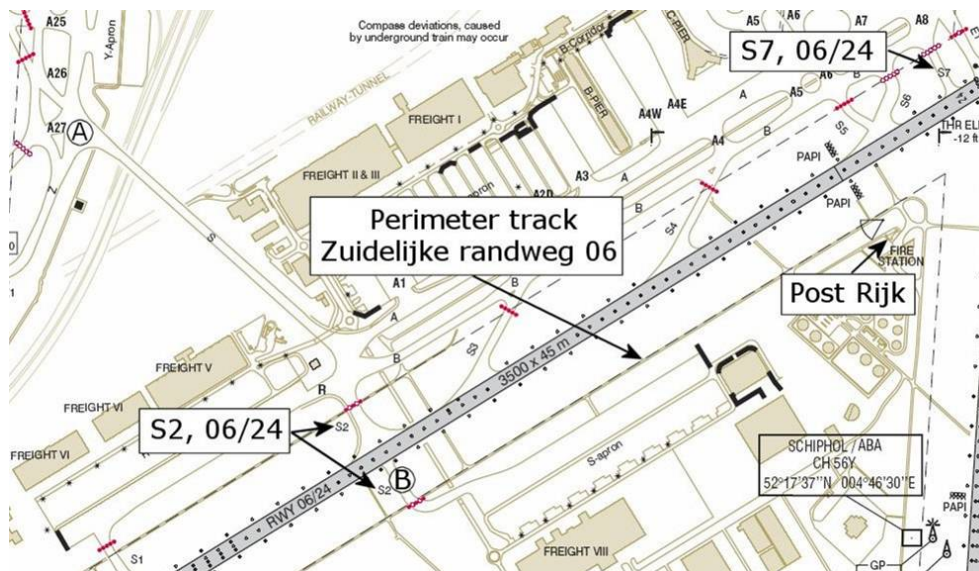


Figure 1: ground movement chart for EHAM as published in the Netherlands AIP

At 11:25:13 hours Kievit 1 requested clearance to cross runway 06/24 after a departing aircraft on runway 24, which just had passed in front of him. He gave his position as taxiway Sierra south. The tower assistant 2⁴ asked who was calling for Sierra south. When the bird controller identified himself, the assistant 2 replied with the clearance 'Kievit 1, Sierra south approved'.

The assistant 2 did not observe the Kievit 1 at position B as he checked the northern end of taxiway Sierra (towards position A) because in his view he expected to see Kievit 1 there. As taxiway Sierra was clear of traffic he approved the request of Kievit 1, which in his conviction was to drive along taxiway Sierra in a southerly direction.

After having crossed the runway the bird controller, now at the north-west side of the runway, noted that the MD-11 had commenced its take-off roll. Immediately on seeing this, the bird controller reported that he had vacated the runway. He was however right away aware that something had gone wrong as he heard the flight crew of the MD-11 discussing the incident with air traffic control. At the same time when reporting his position he heard a transmission from air traffic control questioning who was at S2. The bird controller responded that he was there. Shortly after this, he telephoned air traffic control to discuss the event.

Aerodrome lay-out

During this event runway 24 was in use for departing traffic. Runway 06/24 has various exits and entry taxiways; only at the Sierra 2 position the runway can be crossed by other traffic either

⁴ The tower assistant 2 has a general assisting role in the tower which amongst other things includes supporting the runway controller, guiding of vehicles in the maneuvering area under responsibility of the ground controller and crossing of runways by towing traffic under responsibility of the runway controller.

aircraft or vehicles. The use of the other take-off and landing runways at Amsterdam Schiphol Airport at the time of the incident had no bearing on this event and are therefore left out of the report.

INVESTIGATION AND ANALYSIS

The Dutch Safety Board conducted its investigation using the material provided by Amsterdam Airport Schiphol (AAS) and Air Traffic Control the Netherlands (LNVL), supported by data gathered during interviews with investigators from these parties. The Board used the Tripod Beta method.⁵

Weather

The visibility at the moment of the incident was good in daylight conditions. The weather conditions had no influence on the incident.

Flight crew

After take-off, the crew of the MD-11 contacted the tower to report that they had observed a vehicle crossing the active runway during their take-off roll. In the brief exchange between the flight crew and the controller, no estimation of the separation between the aircraft and the vehicle was provided; nor was such requested.

Bird controller

On the day of the incident the bird controller did not drive the vehicle he usually does; he drove in the 'Airport one' vehicle. This vehicle is equipped with various radios which monitor multiple frequencies. When the bird controller contacted the tower assistant 2 for the first time the quality of the transmission was very poor. When using a hand walkie-talkie the quality was much better. The bird controller also indicated that some of the multiple radio channels he had to monitor sometimes blocked out each other or were of such a poor quality that this may have had a negative effect on his monitoring performance. He also stated that he brought this subject to the attention of his supervisors several times in the past.

The bird controller recalled that the request to cross runway 24 was 'not very smoothly' as he was distracted by the voices on other channels that were being received at that moment. He estimated that the MD-11 was abeam S5 when he vacated the runway; thus, he concluded, that no-one had been in danger.

Air traffic control

At the time of the incident, the tower staff consisted of a runway controller, a ground controller, a tower assistant 1⁶, a tower assistant 2 and a start-up controller.⁷ At the moment of the incident no supervisor was present in the tower. He entered the tower shortly after the incident had occurred.

Investigation revealed that the function of supervisor in daily operation is often combined with (runway) controller duties. The tower supervisor is an on duty air traffic controller with additional

⁵ Tripod Beta is a systematic and structured process of incident investigation and analysis.

⁶ The tower assistant 1 is among other things responsible for determining the revised estimate times of departure in consultation with the start-up controller in such a way that the amount of departing traffic is balanced in a safe and efficient manner.

⁷ The start-up controller provides among other things start-up clearances and transfers flights to the ground controller.

authority to supervise. Generally, he is an experienced controller. It is not a requirement for him to be present in the tower control room at all times. LVNL indicates the supervisor manages the operational process and it is not the task of the supervisor to act as a safety net in the first place.

One of the recommendations in the Delta investigation report⁸ states that 'a tower supervisor should not have additional duties' as it was concluded that insufficient supervision had been a causal factor in the Delta-incident. As follow-up (re)action LVNL reported to the Dutch aviation authority at that time that 'this recommendation has been complied with'. According to the Board it suggested that the safety net had improved.

The Board asked LVNL additional questions about supervision and how it related to a safety net. In its response LVNL did not clarify why it stated in 2001 to the Dutch aviation authority it had complied with the recommendation from the Delta report, and by that improved the safety net, whilst investigation now reveals that supervision is not primarily meant to create a safety net.

The runway controller handled the departing traffic from runway 24. He did not observe the Kievit 1 crossing the runway at Sierra 2.

The assistant 2 stated he had no doubt regarding the request from Kievit 1. In his opinion Kievit 1 had requested to use the Sierra taxi way in a southerly direction. The assistant 2 stated that sometimes it is not possible to positively identify the actual position of a vehicle because at some locations the view from the control tower might be partially obscured by buildings.

Other relevant air traffic control procedures

Radio telephony procedures for communication between air traffic control and vehicles in the maneuvering area are laid down in the 'Regulation: Access to maneuvering area' of Amsterdam Airport Schiphol (AAS). These procedures are also laid down in Regulations Department Traffic Control 2 (VDV2).⁹

In VDV2 procedures regarding compulsory visual verification of the position of a vehicle and/or with the use of a ground radar are only established for runway crossings and not for any other position in the maneuvering area (e.g. taxiways).

The call-sign for a bird control vehicle, according to VDV2 is 'checker'. The call-sign 'kievit' is not used in VDV2.

Radio communication

Communication between the tower and aircraft and the tower and vehicles in the terrain is generally conducted on different frequencies. Flight crews are not able to follow the communication between the tower and operational vehicles. The bird control vehicle is equipped with various receivers and is able to follow radio communication between the tower and aircraft.

Appendix A contains the transcript of the radio communication during the event.

⁸ Final report 98-85/S-14. Dutch Transport Safety Board; N193DN, Boeing 767, 10 December 1998 Amsterdam Airport Schiphol.

⁹ Voorschriften Dienst Verkeersleiding 2.

Amsterdam Airport Schiphol (AAS)

AAS procedures - bird control

The bird controllers, or checkers, operate across the whole aerodrome, more or less continuously. In the context of this investigation, only the activities of bird controllers with regard to the inspection of runways were reviewed.

The procedures for bird control measures to be taken by AAS that are published in their operations manual include a procedure for the inspection of a runway that is available but has not been used for at least 20 minutes. The procedure requires an inspection of the full length of such a runway before it may be used. The procedure makes no mention of which direction the vehicle shall be driven along the runway.

Stop bars

When the driver of the vehicle crossed the runway the stop bar at Sierra 2 was illuminating.

The followed route by the driver of the vehicle was such that it did not encounter a stop bar before crossing the runway (the route takes him behind the stop bar).¹⁰

Other investigations and findings

LVNL and AAS investigated the incident separately. Both parties issued internal investigation reports. LVNL concluded that the incident was in severity category A¹¹ and was the result of an operational error and vehicle/passenger deviation.

LVNL made a number of recommendations that are summarized as follows:

- It is recommended that all traffic that does not necessarily has to cross a runway should be guided around the runways via the inspection tracks or, in case of the 06/24, via the tunnel underneath the runway. The purpose hereof is to minimize the number of runway crossings.
- It is recommended to make sure that all vehicles that are operated in the landing area should be equipped with sound radio equipment. In case of poor or interfering radio connections these vehicles should be removed from the landing area. The purpose hereof is to maintain an optimal radio communication.
- It is recommended that vehicle call signs correspondent with the labels that are presented on the aerodrome surface detection equipment in the tower.
- It is recommended to investigate the necessity that some vehicles have to monitor various frequencies at the same time. The purpose hereof is to prevent overloading personnel ('human factors').
- It is recommended to investigate if it would be helpful to rename taxi way Sierra. The purpose hereof is to prevent confusion between crossings and intersections of runway 06/24 and the southerly taxi way (this recommendation has been implemented and the taxi way is now renamed to Quebec).
- It is recommended that as long as only stop bars are used to prevent runway incursions, every road and track that provides runway access should be guarded by appropriate means (such as stop bars, traffic lights or signs) in order to prevent unauthorized runway entries or crossings.

¹⁰ The perimeter track along runway 06/24 already existed at the time the stop bars were realized at intersection S2. The stop bars are constructed as such that they do not affect the operation of the instrument landing system of the runway. For that reason they are located outside the perimeter track structure.

¹¹ Category A: Separation decreases and participants take extreme action to narrowly avoid a collision.

There were no recommendations directed at their own organization. It was noted however that radio conversation was given extra attention through:

- a publication in their safety bulletin.
- the appointment of assessors who look at the quality of their colleagues.
- a survey regarding this subject in the first quarter of 2006.

AAS made a number of recommendations that are summarized as follows:

- Restrict vehicles crossing runway 06/24 to an absolute minimum, so that a runway crossing is only required whenever operationally necessary.
- Introduce the above restrictions into work instructions.
- Investigate the difference in perception between management and users of the runway channel with regard to the technical problems that exist.
- Perform research into complaints about over-modulation and sudden interruptions on the runway channel with a view to resolving these problems.
- Investigate the need to have operational requirements and technical specifications for portable radios. If not required, remove these requirements from the standard 'Access to maneuvering area'.
- Limit the activities of the bird control officer to his primary duties (i.e. bird control) and do not permit his secondary tasks such as cleaning or fuelling vehicles.
- Include the risks associated with a runway crossing in the airside authorization 'U'¹² and add that runways should only be crossed when operationally necessary.
- Perform an annual proficiency check for holders of an airside authorization 'U'.
- Investigate whether there is an increased risk when clearances to cross runway 22 and 24 are made at, or near, the same time. If there is an increased risk, investigate what can be done to reduce it.
- Investigate whether or not crossing on the perimeter track at S1, S2, W1, W2, W3 and taxiways Y & Z need to be protected by stop bars, thus creating an additional defense when crossing active runways.
- Investigate which radio channels are necessary for the bird controller's work and ensure that This information is included in his work instructions.

In addition, AAS tasked LVNL to examine the different levels of volume that the transmissions on the runway channel are received at.

¹² 'U' stands for extensive area competence.

CONCLUSION

Based on Tripod Beta it is concluded that unwanted events occur when barriers or safety measures fail (i.e., failed barrier) or are not in place (i.e., missing barrier). The descriptions of the situations or failed active barriers have been identified and listed below:

- The option by the driver of the vehicle to follow a route without runway crossings did not work. It is unclear what precondition was or might have been in effect.
- The positive identification and unambiguous clearance by the assistant 2 did not work. The identified (possible) unfavorable preconditions were the workload of the assistant 2 and his perception of the possibility that the vehicle might be behind buildings feeding its assumed position. Other preconditions might be the assistant's expanded range of duties and repetitive checks and clearances during duty affecting his attention. Also no specific procedures for positive identification for vehicles in the maneuvering area are laid down in the VDV2.
- The read back and clearance check by the driver of the vehicle did not work. Radio load and quality, names of taxiways and positions, routine violations and expected clearances have been identified as (possible) preconditions.
- The checks of runway 24 and supervision for crossing failed.
- The stop bar functionality failed. The followed route by the driver of the vehicle was such that it will not encounter a stop bar before crossing the runway.
- The check of the runway by the flight crew failed. Unfavorable preconditions might have been that at the moment the take-off clearance was issued the vehicle was not on the runway and during the take-off roll the crew was not aware that a vehicle was going to cross the runway.

Note: This report has been published in English and Dutch language. If there are differences in interpretation the Dutch text prevails.

APPENDIX A

Radio communication transcript

The texts below are reproduced from a transcript made by LVNL. The following abbreviations are used to identify the parties speaking:

- TWR Runway controller
- AS2 Assistant controller in contact with vehicles
- KL Flight crew KLM741
- K1 Driver, Kievit 1
- KC Driver, Tug KC

Local time	Between	Content
11.24:31	KLM741 – Tower	Goedendag KLM741, S7 and we are ready.
11.24:34	Tower - KLM741	741 line up 24.
11.24:37	KLM741 – Tower	Line up 24 KLM741.
11.24:50	Kievit1 – Assistent2	Toren, Kievit 1 (Tower, Kievit 1).
11.25:00	Tower - KLM741	KLM741 cleared for take-off 24.
11.25:02	KLM741 – Tower	Cleared take-off 24, KLM 741, goedendag.
11.25:03	Tower - KLM741	Dag.
11.25:04	Tug KC – Assistent2	G2 west baan 04/22 kruisen toegestaan (G2 west runway 04/22 crossing approved).
11.25:05	Assistent2 – KC	KC, die Cessna die u net zag landen, kunt u daar nog voorrang aan geven, vrij van de baan op G2, want die gaat naar hangaar 1 aan het begin. (KC, that Cessna that you just saw land, can you give way to him they're, clear of the runway at G2, as he is going to hangar 1, at the beginning).
11.25:10	Tug KC – Assistent2	Ja, dat is geen enkel probleem hoor (Yes, that is not problem at all).
11.25:11	Assistent2 - KC	Dank u wel (That you very much).
11.25:13	Kievit1 – Assistent2	Toren, Kievit 1... Sierra... eh... taxiway Sierra... eh... zuid graag... eh... kruisen... op... de 06/24 (Tower, Kievit 1... Sierra... eh... taxiway Sierra ..eh.. south please... eh... cross... on... the 06/24).
11.25:24	Assistent2 – Kievit1	Eh, wie riep dat voor Sierra zuid? (Eh, who called for Sierra south?).
11.25:26	Kievit1 – Assistent2	Kievit 1, toren (Kievit 1, tower).
11.25:27	Assistent2 – Kievit1	Kievit 1, Sierra zuid toegestaan meneer (Kievit 1, Sierra south approved sir).
11.25:30	Kievit1 – Assistent2	Sierra zuid toegestaan voor de Kievit 1 (Sierra south approved for Kievit 1).
11.25:33	Tug KC – Assistent2	KC is vrij van de 04/22 en we wachten even op dat kleine vliegtuigje. (KC is clear of the 04/22 and we are waiting for that little aircraft).
11.25:38	Assistent2 - Tug KC	KC vrij van de 04/22 bij G2, en dank u wel meneer (KC clear 04/22 at G2, and thank you sir).
11.25:43	Kievit1 – Assistent2	En toren Kievit 1 is vrij van baan 06/24 (And Tower Kievit 1 has vacated runway 06/24).
11.25:47	Assistent2 – Kievit1	Kievit 1 is vrij van... (pause) 't Sierra is begrepen meneer ehm... we hebben een jetstart 22 meteen (Kievit 1 is clear

		of... (pause) Sierra is understood sir urm... we have a jet start 22 now).
11.26:28	KLM741 – Tower	Eh, KLM 741 dat was mooi gezicht wel die auto die voor ons overstak (that was nice view; the car that just crossed in front of us).
11.26:34	Tower - KLM741	De auto die? (The car that what?).
11.26:36	KLM741 – Tower	Die overstak tijdens onze take-off roll (That crossed during our take-off roll).
11.26:38	Tower - KLM741	Ja? Waar dan? (Yes? Where then?).
11.26:40	KLM741 – Tower	Vrachtplatform (Freight apron).
11.26:43	Tower - KLM741	Ah, dat meent u niet! (Oh, you mean that!).
11.26:45	KLM741 – Tower	Reed echt over de baan (Really, drove across the runway).
11.26:48	Tower - KLM741	Zo dan (Well well).