

Subject Misaligned takeoff from runway 24,
Amsterdam Airport Schiphol

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About this report

On 18 January 2016, an Embraer EMB 120 ER 'Brasilia' with registration EC-JBD was performing a cargo flight from Amsterdam Airport Schiphol to London Stansted Airport. The aircraft, with two pilots on board, took off from runway 24 and then flew to London. Upon arrival, the ground crew discovered holes in the right-hand side of the fuselage. The propeller blades were damaged and in one of the blades a metal wire was embedded in the leading edge. When the Dutch Safety Board made inquiries at Amsterdam Airport Schiphol, it was revealed that during the inspection of runway 24, a bird controller had noted that seven runway edge lights were destroyed. The investigation conducted by the Safety Board into this occurrence revealed that the aircraft had performed a misaligned take-off from runway 24 at Amsterdam Airport Schiphol. The pilots had interpreted the right-hand side runway edge lights as the runway centreline lights. During the take-off, the nose landing gear had hit multiple runway edge lights. These became loose and came into contact with parts of the aircraft, causing damage.

General conclusion on the follow-up to the recommendations

The Dutch Safety Board issued three recommendations, one to the International Civil Aviation Organization (ICAO), one to Amsterdam Airport Schiphol (AAS) and one to Air Traffic Control the Netherlands (LVNL). AAS and LVNL responded jointly to the recommendations addressed to them, on 29 January 2019. An additional response was issued by these parties at the end of 2019. An initial response from ICAO was received on 14 February 2019, followed by an additional response on 23 October 2020.

Recommendations to	Recommendation	Compliance
International Civil Aviation Organization (ICAO)	1. Initiate the process, within Annex 14 Volume 1 'Aerodrome Design and Operations', to develop a standard for runway edge lights that would allow pilots to identify them, specifically, without reference to other lights or other airfield features.	Partially adequate
Amsterdam Airport Schiphol	2. Proactively take measures, in line with the above recommendation to ICAO, which prevent pilots from interpreting the runway edge lights as the runway centre line lights.	Adequate

Subject Misaligned takeoff from runway 24,
Amsterdam Airport Schiphol

Air Traffic Control the Netherlands	3. Outside the uniform daylight period, allow air traffic access to the runway for take-off only when intersections are used that are equipped with centre line lighting.	Inadequate
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Follow-up per recommendation

Recommendation 1

To the International Civil Aviation Organization (ICAO)

Initiate the process, within Annex 14 Volume 1 'Aerodrome Design and Operations', to develop a standard for runway edge lights that would allow pilots to identify them, specifically, without reference to other lights or other airfield features.

Response received from ICAO

ICAO stated that it has passed on the recommendation to the Aerodrome Design and Operations Panel (ADOP) for discussion during its meeting in November 2019. The ADOP concluded that in the absence of a cost-benefit study at global level, changing the characteristics of the runway edge lights might not be the most practical solution. Moreover, it was noted that changes to the provisions for runway edge lights could potentially result in additional hazards and unintended consequences. The ADOP is of the opinion that other solutions should be considered, such as the provisions of runway side stripe marking and the taxiway centreline marking. The panel is working on specifications for Annex 14 relating to the provisions of continuous taxiway centre line marking into the centre line of the runway, following the observation that at some airports, the taxiway centre line marking terminates at the runway edge.

Assessment of the follow-up

Partially adequate.

Explanation of the assessment

The recommendation is partially met. Within ICAO, no process has been initiated for developing standards for runway edge lights. However, specifications for extending the taxiway centre line to the runway centre line are being developed. At the end of 2021, it was found that the latest revision of ICAO Annex 14 Volume I was not amended on the subject taxiway centre line markings. However, the recommendation focusses on adjustments to the standards for runway edge lighting to avoid confusion even at night and in poor visibility. The recommendation calls for starting a process to develop a standard for this; that process was deliberately not started and an alternative interpretation is still being worked on. As such, the recommendation is not adequately addressed.

Subject Misaligned takeoff from runway 24,
Amsterdam Airport Schiphol

Recommendation 2

To Amsterdam Airport Schiphol

Proactively take measures, in line with the above recommendation to ICAO, which prevent pilots from interpreting the runway edge lights as the runway centreline lights.

Response received from AAS and LVNL

AAS and LVNL conducted their own joint investigation into the occurrence and, on the basis of the outcomes of that investigation, extended the taxiway centre line to the centre of runway 24. They noted that as a consequence, guidance has improved and the risk of pilots lining up on the runway edge has been reduced. It was also investigated whether the centre line was also missing at other intersections, but this was not the case.

AAS and LVNL indicated in their initial response that further measures still need to be investigated. They noted that it has emerged that the additional measures they are considering could introduce new risks. AAS and LVNL will assess the risk of the hazard¹ observed by the Dutch Safety Board, using the joint risk matrix adopted in the Integral Safety Management System (ISMS). This should include unintended consequences, compliance with ICAO, uniformity with other airports and clarity for pilots. Within the ISMS, the Top Safety Action Group (TOP SAG) will decide on the risk and the outcome of the analysis into possible additional measures for further reducing the risk of misaligned take-offs.

In December 2019, the sector parties issued additional information verbally about the decision-making on further measures. Based on a study conducted by the Dutch National Aerospace Laboratory (NLR), the risk of a misaligned take-off was estimated as acceptable. As part of the ISMS study, a workshop with experts was organized to identify possible measures. With regard to recommendation 2 from the Dutch Safety Board, the conclusion of the workshop was that, despite possible positive effects on reducing the probability of occurrence of such an incident, the introduction of the recommendation would have a negative effect. This mainly because it would create a situation of non-compliance with ICAO and EASA standards, which could, among other things, result in confusion for the pilots. The workshop participants therefore consider the correct approach for the recommendation to first be through the development of ICAO and EASA standards, so that no Schiphol-specific situation is created. Further measures than continuing the taxiway centre line are therefore not to be taken at this time.

Assessment of the follow-up

Adequate.

¹ The aligning of an aircraft on the runway edge, outside the uniform daylight period, due to pilot error, possibly caused by the infrastructure and use of the airport.

Subject Misaligned takeoff from runway 24,
Amsterdam Airport Schiphol

Explanation of the assessment

With the extension of the taxiway centre line on runway 24, a first step has been taken. Following the written response to the recommendation, the parties involved did indeed explore further measures. Based on the resulting argument that uniformity in runway edge lighting as compared with other airports is important, AAS has decided to only take measures with regard to taxiway centre line extension. Thus, the recommendation has been adequately followed up on and the objective partially achieved. Although the Dutch Safety Board is not aware of any incidents involving runway edge lighting at AAS since the investigation, the objective has not yet fully been realised. Pending international standards, the runway edge lighting remains the same unchanged, as a consequence of which possible misinterpretation is not prevented.

Recommendation 3

To Air Traffic Control the Netherlands (LVNL)

Outside the uniform daylight period, allow air traffic access to the runway for takeoff only when intersections are used that are equipped with centreline lighting.

Response received from AAS and LVNL

Following an initial response from AAS and LVNL to recommendations 2 and 3, the sector parties issued additional information verbally in December 2019 on the decision-making concerning possible further measures. As part of the ISMS study, a workshop with experts was organized to identify possible measures. With regard to recommendation 3, they concluded after the workshop, that despite possible positive effects on reducing the probability of occurrence of such an incident, the implementation of the recommendation would have a negative effect on safety, due to exclusively making use of intersections equipped with centre line lighting. This is then substantiated in particular with arguments regarding capacity (determining an efficient sequence for the aircraft becomes more difficult, possibly resulting in congestion of the taxiway) and potential misalignment by following an incorrect row of lights.

Assessment of the follow-up

Inadequate.

Explanation of the assessment

Recommendation 3 has not been followed up on by LVNL. The recommendation is not followed up on mainly for capacity reasons. The Dutch Safety Board does not find the arguments put forward by LVNL convincing. By failing to follow up on this recommendation, the hazardous will continue to exist, even though the Dutch Safety Board is not aware of any incidents involving runway edge lighting on AAS since the investigation.