

Date: 31 October 2023
Re: *Follow-up to recommendations Engine failure during initial climb, Boeing 747-412BCF, Meerssen*

Follow-up to recommendations *Engine failure during initial climb, Boeing 747-412BCF, Meerssen*

Publication date of report: 19 April 2023

1. About this report

On 20 February 2021, a Boeing 747-400 took off from Runway 21 at Maastricht Aachen Airport. During the initial climb, the turbine of one of the aircraft's engines failed. As a result, engine debris (parts of the turbine) came down in the village of Meerssen, injuring two people and causing damage to houses and cars. The turbine and engine failure was caused by prolonged elevated gas temperatures in the turbine of the engine, leading to wear and deformation of outer transition duct panels. This resulted in one outer transition duct panel coming loose and one being fractured, which subsequently caused severe damage to the turbine.

The manufacturer of the engine has been aware of the problem with the outer transition ducts coming loose since the 1980s. To help prevent the failure of the outer transition ducts and turbine section, several service bulletins were issued since 1993. Examination of the Boeing 747-400 engine revealed that it was equipped with panels of the new type, but did not have additional cooling features to prevent excessive gas temperatures. The installation of these cooling features, as advised in Service Bulletin 72-462, is not mandatory. In response to this incident, the Dutch Safety Board recommends that the United States Federal Aviation Administration (FAA) reconsiders whether Service Bulletin 72-462 should be made mandatory through an Airworthiness Directive, given the risk to third parties.

During the investigation, it was found that the airline was unable to present documentation for not observing this service bulletin. Having an adequate record keeping of maintenance documentation enables an airline and its maintenance organisation to make sound risk management decisions about the continuing airworthiness of their aircrafts. This is crucial for the safe operation throughout the operating life of, in this case, the engine. The Dutch Safety Board therefore recommends that the airline Longtail Aviation ensures that record keeping related to compliance with service bulletins is always complete and accessible.

Residents around airports are exposed to at least two types of risks: first, parts falling from aircrafts, and second an incident with an aircraft. To date, an assessment for residential areas around Maastricht Aachen Airport of the risks of parts departing the aircraft, such as departing engine debris, has not routinely been done. The Dutch Safety Board made a recommendation to the Ministry of Infrastructure and Water Management to this effect.

This memorandum contains a general conclusion about compliance with the recommendations, followed by a short summary of the responses received to each recommendation and a conclusion about the compliance with that recommendation. All the responses received from the contacted parties are available in full on the website of the Dutch Safety Board.

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2. General conclusion on compliance with the recommendations

The recommendations have, up until now, not been effectively implemented by the parties addressed. This can be explained by the fact that the timeframe between the parties receiving the recommendations and reporting the follow-up was short. However, the FAA and the Ministry of Infrastructure and Water Management have indicated their intentions to implement the recommendation. How this will be followed up will have to be seen in the future. The airline Longtail Aviation has - despite repeated requests - not responded to the recommendation.

To continuously improve aviation safety for air passengers, crew and the people living under flight paths and near airports, it is necessary to learn from previous incidents. Making and following up on recommendations plays an important role in this and is enshrined in international regulations.¹ The Dutch Safety Board therefore regrets Longtail Aviation's attitude.

Overview of compliance with recommendations

In evaluating the extent to which recommendations from aviation reports have been followed up on, the Dutch Safety Board is bound by the assessment criteria of the European classification system, in line with EU Regulation No. 996/2010. The European classifications with the corresponding assessment criteria appear in an appendix to this memorandum.

Recommendations to	Recommendation	Compliance
Longtail Aviation	1. Make and keep the record keeping of the (non-)implementation of service bulletins for leased engines of your fleet of commercial air transport aeroplanes complete and accessible.	Awaiting response
United States Federal Aviation Administration	2. Reconsider whether Service Bulletin 72-462, in light of third party risk, should be made mandatory through an Airworthiness Directive.	Partially adequate
Ministry of Infrastructure and Water Management	3. Perform and publish an assessment for residential areas around Maastricht Aachen Airport of the risks of parts departing the aircraft, such as departing engine debris.	Partially adequate

¹ In accordance with ICAO Annex 13 – Aircraft Accident and Incident Investigation and EU Regulation No. 996/2010 on the investigation and prevention of accidents and incidents in civil aviation.

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3. Follow-up per recommendation

Recommendation 1

To Longtail Aviation:

Make and keep the record keeping of the (non-)implementation of service bulletins for leased engines of your fleet of commercial air transport aeroplanes complete and accessible.

Response Longtail Aviation

The deadline to respond to the recommendation expired on 18 July 2023. At that time, the Dutch Safety Board had not received a response from Longtail Aviation and, by email dated 24 July 2023, asked the company when they expected to respond to the recommendation. To date, the Dutch Safety Board has not received any response from Longtail Aviation.²

Assessment of the follow-up

The Dutch Safety Board regrets Longtail Aviation's attitude. In accordance with the European classification, the follow-up to the recommendation has been classified as awaiting response.

Recommendation 2

To United States Federal Aviation Administration (FAA):

Reconsider whether Service Bulletin 72-462, in light of third party risk, should be made mandatory through an Airworthiness Directive.

Response FAA

By letter dated 3 July 2023, the FAA announced that it is reviewing the Dutch Safety Board's report and current FAA guidance in order to determine an appropriate action plan to address this recommendation. The FAA expects to provide an update on the follow-up to the recommendation by 31 May 2024.

Assessment of the follow-up

In accordance with the European classification, the follow-up to the recommendation has been classified as partially adequate.

² Up to the time of publication of this memorandum.

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Explanation of the assessment

The FAA's response shows an intention to re-evaluate, as recommended by the Dutch Safety Board. How this will be followed up will have to be seen in the future. The FAA will update the Dutch Safety Board on this. The Dutch Safety Board awaits this update.

Recommendation 3

To Ministry of Infrastructure and Water Management:

Perform and publish an assessment for residential areas around Maastricht Aachen Airport of the risks of parts departing the aircraft, such as departing engine debris..

Response Ministry of Infrastructure and Water Management

By letter dated 7 July 2023, the Minister informs that he considers it necessary to gain further insight into already existing studies before deciding whether an additional risk assessment should be carried out. For this purpose, the Minister refers to an earlier study by the European Union Aviation Safety Agency (EASA) on 'parts departing aircraft'. The Ministry will ask the EASA to further explain the scope of this study. In addition, the Ministry asked the Aviation Occurrence Analysis Agency (ABL) to provide data on similar incidents over Dutch territory as well as European and international. Based on the outcome of the consultation between the Ministry and EASA, it will be considered whether additional follow-up steps are needed, the Minister said.

Assessment of the follow-up

In accordance with the European classification, the follow-up to the recommendation has been classified as partially adequate.

Explanation of the assessment

The Minister has taken steps to follow up on the recommendation; where this will lead in concrete terms remains to be seen. For this reason, the Dutch Safety Board classifies the follow-up as partially adequate. It is understandable that the Minister's decision on whether or not to conduct an additional risk assessment will depend on studies that have previously been carried out or are ongoing. However, the incident has shown that the danger of departing engine fragments is real and can lead to personal injury and material damage.