

COMMENT RESPONSE DOCUMENT

EASA PAD No. 21-085

[Published on 14 June 2021 and officially closed for comments on 12 July 2021]

Commenter 1: Virgin Atlantic Airways Ltd – Greg Mitchell – 23/06/2021

Comment # 1

I have some comments around PAD 21-085 for the Trent 7000, and specifically the differences between PAD 21-085 and AD 2019-0099R2, which is for the same issue (HPT blade creep) on the Trent 1000. The “Affected Part” is the same for both PAD 21-085 and AD 2019-0099R2 – HPT blade KH64485. This is common on the Trent 7000 and Trent 1000 TEN.

Both PAD 21-085 (Life Limitation, (5)) and AD 2019-0099R2 (Limitations, (4)) limit the life of the blades to 1000FC.

However, AD 2019-0099R2 also contains a further limitation (Limitations (5)) that requires that engines on an aircraft with a combined HPT blade life of 1400FC are de-paired from each other. How this de-pair is achieved (installation of lower life TEN, intermix with Package B/C) is down to operators to manage.

The concern from my side is that for exactly the same blade (albeit in a slightly different engine/airframe), there are different limitations that are having to be managed, and there doesn’t seem to be any strong justification as to why one engine variant would have lighter limitations than the other.

EASA response:

Comment noted. The service experience of the affected part on Trent 7000 engines does not indicate the same level of IFSD risk as on the Trent 1000 engine and for that reason, at this time, no de-pairing requirement is deemed necessary.

No changes have been made to the Final AD in response to this comment.

Commenter 2: Delta Air Lines, Inc. – Alexandra Kidd– 09/07/2021

Comment # 2

References:



- (1) EASA Proposed Airworthiness Directive: PAD No. 21-085, dated 14 June 2021
- (2) Rolls-Royce Alert NMSB Trent 1000 72-AK449 Revision 1, dated 12 December 2019
- (3) Rolls-Royce NMSB Ballot Communication Ref. WW11701-2 for Rolls-Royce Alert NMSB Trent 1000 72-AK449 Revision 2 (To be issued)

SUMMARY: In-service experience has shown that the current High-pressure turbine (HPT) blades with Part Number KH64485 may deteriorate, despite being subject to piece-part level inspection as specified in the current Rolls-Royce Trent 7000 Time Limits Manual (TLM). Rolls-Royce issued (and pending to issued) the NMSB (Ref. 2 and 3) to inspect the affected HPT blades on-wing.

DELTA'S COMMENTS

Delta has reviewed Ref (1) PAD and has the following comments:

A. PAD requirement for borescope inspection, Paragraphs (1), (2) and (3)

The inspection paragraphs (1), (2) and (3) of PAD Ref. (1) require the inspections to be done in accordance with the instructions of Section 3.A of NMSB Ref. (3). However, Section 3.A of NMSB Ref. (3) contains conflicting flexible vs. mandatory language when referring to the AMM steps for accessing the inspection area. Namely, Option A and Option B of Section 3.A.(1) both use the mandatory language “in accordance with” when referring to the AMM in general while using the flexible language “refer to” when referring to specific AMM tasks. This conflicting language in the NMSB only applies to steps for gaining access to the inspection area. These steps do not affect the inspection results in any way. Furthermore, the actual inspection requirement is contained in Section 3.A.(1).(a).

DAL therefore requests EASA to update the language paragraphs (1), (2) and (3) of PAD Ref. (1) ‘Inspection(s):’ to specify the inspections to be done in accordance with the instructions of Section 3.A.(1).(a) of the NMSB, instead of Section 3.A of the NMSB.

B. PAD Corrective Action Paragraph (4) Table 3

Upon reviewing Ref. (3) Section 3.A.(1).(a).(iii), the engine removal limit for crack less than or equal to 4.0 mm (0.16 in.) is within 10 flight cycles or 60 flight hours, whichever occurs first. However, Table 3 in Paragraph (4) of the PAD Ref. (1) only contain the requirement to remove the engine within 10 flight cycles. There is no limit given in flight hours.

DAL request EASA to update Paragraph (4) Table 3 of the PAD Ref. (1) to include both the flight cycles and flight hours requirement (whichever occurs first) as some operators could reach the flight hours limit first depending on the operation.

C. PAD Corrective Action definition of crack indication

The proposed PAD Ref. (1) requires engines to be removed from service if any crack indication is found. However, it does not provide definition of the crack indication. The AMM task for the routine HPT blade BSI, Task 72-00-00-290-842-A allows certain length of radial cracks on the HPT blade. The AMM task also defines different acceptance limits for damage/cracks in other area of the airfoil including the lower half of airfoil leading edge. NMSB Ref. (3) specifically rejects engine with axial cracks in the upper half of the blade and all other observations identified during the inspection are to be sentenced in accordance with the AMM limits.



DAL request EASA to define the applicable crack indication (axial cracks) as well as the applicable area (upper half of blade which include the top 10 row 2 cooling holes) in paragraph (4) of the PAD Ref. (1) final rule.

EASA response:

A. Comment not agreed. The AD requires inspection and the instructions how to do that are in Section 3.A. of the NMSB. Any other information (e.g. those referred to as ‘option’, which are exactly that, optional) or instruction (e.g. photograph and record crack length) provided in that section is therefore at operator’s discretion and not required for compliance with the AD.

It should be noted that, when any service information uses so-called ‘mandatory language’, this does not mean the relevant instructions are ‘mandatory’ (i.e. enforceable, required to be accomplished), unless there is an AD that requires those instructions to be accomplished. See our related [AD FAQ](#).

B. Comment agreed. The Final AD has been amended accordingly.

C. Comment partially agreed. Section 3.A.(1)(a)(ii) of the NMSB is quite clear about which kind of cracking is to be looked for. Where the AD requires to inspect “in accordance with the instructions of Section 3.A of the NMSB”, this implies using that information and instruction. Paragraph (4) of the Final AD has been amended to refer to crack indication “as specified in the NMSB”.

No changes have been made to the Final AD in response to point A of this comment.

