

EASA	COMMENT RESPONSE DOCUMENT
	EASA PAD No. 12-120 [Published on 17 September 2012 and officially closed for comments on 01 October 2012]

Commenter 1: FAA – Alan Strom – 17/9/2012

Comment # 1

1) Ref paragraph (1) of the required actions: When writing our FAA AD, I plan to just say, 'each time N1 vibration limits are exceeded...', rather than referring to the EHM system, and leave it up to the operator as to how to determine that condition. I believe this to be more flexible and it does not mandate use of a specific method to determine that an exceedance has occurred. I also plan to make the referenced TV primary and the AMM reference secondary. Using the TV will avoid mandating a specific version of the AMM that may become difficult to track over time.

2) Ref paragraph (2) of the required actions: In order to accurately represent EASA's intent when writing our corresponding FAA AD, I would prefer a more specific definition of 'LP turbine overhaul.' While 'LP turbine overhaul' is better than RR's 'level 1 serviceability' terminology as used in their ASB, it is still somewhat vague. Could the definition of LP turbine overhaul be clarified, to something like, 'when the LP turbine module is removed from the engine or when any part of the LP turbine casing is removed from the LP turbine module?'

EASA response:

Comment #1(1), part 1: EASA disagrees. Currently it is not practically feasible for Trent 900 operators to reliably determine if N1 vibration limits have actually been exceeded without EHM data processing performed by Rolls-Royce. The AD describes the only process currently available and practical to perform that determination. The operator may however perform trouble shooting to discard vibration indication fault as described in paragraph (1.1) of the RACT of the Final AD.

Comment #1(1), part 2: EASA disagrees. The AD requires the use of the referenced TV, or alternatively the relevant AMM Chapter when the instructions of the TV will be incorporated. This is deemed accurate and robust enough to avoid possible misinterpretation. No changes have been made to the Final AD in response to this comment.

Comment #1(2): EASA partially agrees. The definition of level of overhaul has been clarified and improved, but not as proposed by the commenter.

In paragraph (2) of the Final AD, '...each time the engine is in a shop visit for LP turbine overhaul,....' has been replaced with '....each time the engine is subject to a "Engine Check and Repair Shop Visit" or "Engine Refurbishment Shop Visit" in accordance with Trent 900 Generic Engine Management Programme (EMP) paragraph 5.3.1 Engine Rework Definitions.....'.

Commenter 2: N3 Engine Overhaul Services GmbH & Co. KG – Sacha Haak – 25/9/2012

Comment # 2

Section “Required Action(s) and Compliance Time(s):”

“(2) From the effective date of this AD, each time the engine is in a shop visit for LP turbine **overhaul**,....”

Clarification [is] required due to the definition of shop visit (hospital shop visit and Level1, Level2, Level3 and Level4) or all shop visits and the term “overhaul” is not clear enough. Overhaul= Level1, Level2, Level3, Level4, hospital shop visit?

Example: Level3 and Level4 i.a.w. Rolls-Royce EMP - Is piece part level and therefore the part can be inspected.

Level1 and Level2 as well as hospital engines - Not all engines will be disassembled to the piece part level. Therefore the affected part cannot be visually inspected.

For these cases the part can only be boroscope inspected i.a.w. RB.211-72-AH054. The RB.211-72-AH054 only lists Level 1. What about Level2?

Therefore the term should be changed in order to ensure that all engines are covered by this AD once they will have the next shop visit.

EASA response: EASA agrees. See EASA response to comment #1(2) of this CRD. In addition, it is expected that Rolls-Royce will revise NMSB RB.211-72-AH054 in the near future to bring the definitions of shop visits in line with the Final AD.

Commenter 3: Deutsche Lufthansa AG – Burkhard Culemann – 28/9/2012

Comment # 3

Comment (1): [Section] Required Action(s) and Compliance Time(s): In Paragraph (1) the underlined sections should be added

From the effective date of this AD, within 10 flight cycles (see Note 3) following each Engine Health Monitoring (EHM) notification for N1 vibration levels exceeding the alert limits during flight (see Note 1), accomplish the following action:

Perform trouble shooting in accordance with Airbus Trouble shooting Manual (TSM), Task 77-00-00-810-803.

If according to 3.A Fault Isolation (Subtask 77-00-00-810-010-A) an indication problem is identified no further on Wing Inspection according to this AD is required.

Upon confirmation that N1 vibration levels are genuine and alert limits have been exceeded, inspect the LPT disc seal fins and interstage seals in accordance with the instructions of Rolls-Royce Technical Variance (TV) 125060, or in accordance with the instructions of the relevant Aircraft Maintenance Manual (AMM) Chapter (see Note 2).

Note 1: Rolls-Royce Operational Service Desk (OSD) automatically receive, monitor and analyse EHM data and will send one of the notifications in Appendix 1 of this AD to the Operator through a local Rolls-Royce Representative within max. 2 flight cycles after the vibration event.

Note 2: The instructions contained in TV125060 are expected to be incorporated in an upcoming Revision of the Airbus A380 AMM.

Note 3: Either " Flight Cycle Counting starts with the next flight cycle after the vibration event. " or " Flight Cycle Counting starts when the Operator has received the EHM notification from the Rolls-Royce Representative. "

Comment (2): [Section] Required Action(s) and Compliance Time(s): According to the existing Paragraph (2), the Shop Inspection would only be performed if the LP turbine is at overhaul. Based on the discussions we had with Rolls-Royce this is not the intent of NMSB RB.211-72-AH054. We suggest to replace the existing paragraph (2) with the following underlined wording:

§(2)

From the effective date of this AD, each time an engine is undergoing a shop visit*, and the LPT Rotor and Stator group are not planned for separation (i.e. not EMP Level 4), perform a borescope inspect in accordance with the instructions of Rolls-Royce Alert Non-Modification Service Bulletin (NMSB) RB.211-72-AH054. If, during this inspection, any crack or material loss from the disc seal fin is found, replace the affected parts with serviceable part before engine/module release to service.

*as defined in the Engine Management Programme (EMP) issue 14 or later issues. Hospital Shop Visit is also considered as a Shop Visit.

NMSB RB.211-72-AH054, D. Compliance should use the same wording as AD paragraph (2).

Comment (3): The TV's should be attached to the AD because TV's are available on Aeromanager only for a very limited time period (i.e 14 days).

Comment (4): EMP issue 14 should be added to the AD Ref. Publications section if Comment two should be incorporated.

EASA response:

Comment #3 (1): EASA partially agrees. The AD has been modified to clarify the compliance time as starting from the receipt of the EHM notification: See paragraph (1.1) of the Final AD. See also EASA response to comment #1(1) of this CRD.

Comment #3 (2): EASA partially agrees. The AD has been modified, but not as proposed by the commenter. See EASA response to comment #1(2) of this CRD.

Comment #3 (3): EASA disagrees. It is not standard practice to include detailed technical instructions in the AD. If any difficulty is encountered to obtain these instructions, the TC Holder should be contacted as specified in point 3 of the Remarks section of the AD. No changes have been made to the Final AD in response to this comment.

Comment #3 (4): EASA agrees. References to the Engine Management Plan (EMP) have been added in paragraph (2), and in the Ref. Publications section of the Final AD.

Commenter 4: Singapore Airlines – Tze Xian Lee – 1/10/2012**Comment # 4**

- i. Administrative - Administering/tracking/ ensuring compliance.
- ii. Technical - Separating a genuine event from other known N1 vibration causes.
- iii. Operations - How to manage the inspection within our [on] ground time.

i. Administrative

1. It is difficult to formalise the AD Inspection requirements that is ad-hoc. It is either an AD & to carry out an inspection at a fixed interval or there is none at all. The reactive nature to the inspection requirements should be made as an Alert SB instead.
2. The trigger to an AD Inspection is dependent on an external organisation (EHM) & is therefore dependent on people to monitor for such notifications. This increases the possibilities of an over-run if someone overlooked the matter, especially so over an extended holiday period. This could result in non-compliance.
3. There would be an issue with the tracking of remaining cycles to drop date as it is not readily apparent which flight did the Alert trigger on. The Alert is issued based on EMU data which is only available on landing.

ii. Technical

1. There are known mechanical causes that could have caused high N1 vibrations. Is the inspection still required if we found out that these maintenance actions had

been carried out? If yes, do we still need to carry it out within 10FC? If the causes are known, we would ideally prefer a longer interval to plan for an inspection, like in 50FC time.

- a. DFL of Fan Blades
- b. Birdstrikes/ FOD ingestion/ panel liberations with damage to blades
- c. Icing (no experience on Trent 900s yet but taking a que from the Trent 500s)
- d. Other known maintenance activities on the Fan Blades.
 - * Imbalance Spinner/ Spinner Ring (PW4000 experience)
 - * Fan Blade change. Ground Vibe Survey does not run the N1 system to its full flight operating speeds & may not be sufficient to check for vibrations at high speeds.
 - * Annulus Filler change

Indication issues are taken care of by TSM quoted in the AD.

iii. Operations

1. This AD is extremely disruptive to the schedules as all inspections would be "unplanned" despite the 10FC relief. A fixed schedule AD allows aircraft to be planned around it's drop date but an ad-hoc AD will subject the operations/ schedules to the random nature of an event. This goes against the nature of operations, which are meant to be stable & predictable.

EASA response:

Comment #4 (i.): EASA partially agrees. See EASA response to comments #1(1) and #3(1) of this CRD. It is also to be noted that the case of an Operator not using the RR EHM service has been addressed in the Final AD, requiring periodic inspections in accordance with paragraph (1.2) of the Final AD.

Comment #4 (ii.): EASA partially agrees. The operator may perform trouble shooting to discard vibration indication fault as described in paragraph (1.1) of the Final AD. See also EASA response to comment #3(1) of this CRD.

Comment #4 (iii.): The disruption of operations is noted but EASA disagrees. The review of the occurrence detailed in paragraph Reason of the AD and the associated risk assessment have resulted in defining the most appropriate corrective actions to maintain airworthiness. All operators using the Rolls-Royce EHM service need to comply with paragraph (1.1) of the Final AD. No changes have been made to the Final AD in response to this comment.

See also EASA response to comment #4 (i.) of this CRD in case an Operator is not using RR EHM service.

Commenter 5: Qantas Airways Ltd – Ben Nicholls – 2/10/2012

Comment # 5

I have feedback on the PAD. Due to a public holiday in Sydney, Australia, I missed the opportunity to send this prior to the PAD closure date, which was only a few hours ago. I hope you are able to include these comments into the final AD.

1. Required action(s) states, "Required as indicated, unless accomplished previously:" Usually, the statement, 'unless accomplished previously' is used for one-off type ADs. I believe this statement contradicts with required action (1) since it applies each time an EHM notification is received and with required action (2), "...each time the engine is in a shop visit..."
2. Required action (1) states, "Upon confirmation that N1 vibration levels are genuine and alert limits have been exceeded..." I don't think it is very clear what

constitutes genuine or non-genuine vibration when working through the TSM. I think EASA should make it clearer when the TV125060 is required if a defect is found in the TSM 77-00-00-810-803.

For example, the TSM steps 3.A to 3.D allow for the aircraft to return to service after replacing electrical harnesses or the EMU, even though it may take subsequent flights to determine whether vibration indications have been rectified, by which time the AD mandated 10 cycles may have been over flown. If there is a finding in steps 3.A. to 3.D, does this constitute non-genuine vibration and the AD only then applies if a new EHM alert has been sent to operators?

The addition of '...and alert limits have been exceeded...' adds confusion because from an operator's perspective, if OSH has sent notification, it will be because vibration levels have been exceeded. This argument is further supported by the wording of required action (1), "...notification for N1 vibration levels exceeding the alert limits during flight..." and the wording of the notifications in Appendix 1 of the AD, "...Vibration levels have exceeded the alert limits...".

Overall, the AD is not clear enough on what action needs to be taken and when. It needs to be clear what steps in the TSM are deemed non-genuine vibration and when the TV is required to be accomplished.

3. Required action (1), Note 1 states that the OSD, "...will send one of the notifications in Appendix 1 of this AD to the Operator through a local Rolls-Royce Representative" and Appendix 1 notifications state, "Please contact your local Rolls-Royce Representative, who in turn will contact the Rolls-Royce OSD, for additional recommendations and reaction time".

These requirements are confusing. First the AD says that the operator will receive the notification from their local rep. This isn't always true as the OSD sends operators notification directly with the Rolls-Royce rep copied in. Second, the notification says that the required action is to contact the local rep whom will contact the OSD. This seems a redundant step since the OSD contacted the Rolls-Royce rep in the first place. Third, this notification wording may allow an interpretation that the required action will be determined by the local rep. This is in contradiction to the AD requirements, which are specified in required action (1). If the Rolls-Royce representative advises the operator on what action to take, this may not be directly in line with the intent of the AD and will create confusion as to what actions are mandatory. Also, valuable time may be wasted with this confusion.

I think that the process needs to be more clearly defined. E.g. OSD sends notification to the operator. The operator then has 10 cycles to carry out the TSM. It should also be made clear when the 10 cycles exactly starts from. If the notification is sent while the aircraft is mid-flight, does the 10 cycles start counting from when the aircraft lands?

In order to reduce confusion, the OSD notifications themselves should be reworded. Rather than "Please contact your local Rolls-Royce Representative...", it should clearly state that EASA AD 2012-XXXX applies and it is mandatory to carry out the actions of the AD within 10 cycles from xxx (see above point). Or something to that effect.

4. Required action (2) only requires accomplishment at LP turbine overhaul shop visits. This is not consistent with the NMSB RB211-72-AH054 compliance requirement of, "engines at overhaul where the 08 module has a minimum of a Level 1 serviceability work scope". There are a number of areas that require clarification in the AD and NMSB, as follows:

A. What is intent of the AD wording of 'LP turbine overhaul'?

B. What is the intent of the NMSB wording of 'engines at overhaul'?

C. When an 08 module undergoes a EMP Level 3 Refurbishment or EMP Level 4 Overhaul, why is it necessary to perform the borescope inspection, since the interstage seals will be exposed for closer inspection? It should therefore only be necessary to complete the NMSB inspections if the 08 module is not refurbished or overhauled.

I believe EASA needs to be clearer when the NMSB is and isn't required to be completed when an engine is off-wing. We may have an engine removed for repair of attrition liners (for example) and it may be performed by the line maintenance personnel or personnel in a hospital shop, not a repair and overhaul shop. In this case, I do not believe the AD should apply because we are carrying out repairs to an engine that has been removed only for convenience and to prevent operational delays.

EASA response:

Comment #5(1): EASA disagrees. 'Required as indicated, unless accomplished previously' is a standard opening statement in RACT of an AD to give credit for actions performed prior to the effective date of an AD. It does not alleviate repetitive actions required by the AD. No changes have been made to the Final AD in response to this comment.

Comment #5(2): EASA partially agrees. See EASA responses to comments #1(1), #3(1), #4(i.) and #4(ii.) of this CRD.

Comment #5(3): EASA partially agrees. See EASA responses to comments #1(1), #3(1), #4(i.) and #4(ii.) of this CRD.

Comment #5(4): EASA agrees. See EASA response to comment #1(2) of this CRD. In addition, it is expected that Rolls-Royce will revise NMSB RB.211-72-AH054 in the near future to bring the definitions of shop visits in line with the Final AD.