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DATE: Jul.14/06

V2500 A1/A5 SERIES PROPULSION SYSTEM NON-MODIFICATION SERVICE BULLETIN

This document transmits Revision 1 to Service Bulletin EV2500-72-0500 and Revision 1 to the Supplement

Document History

Service Bulletin Revision Status		Supplement Revision Status	
Initial Issue	Jul.25/05	Initial Issue	Jul.25/05

Bulletin Revision 1

Remove	Incorporate	Reason for change
All pages of the Service Bulletin	Pages 1 to 12 of the Service Bulletin	To revise the Accomplishment Instruction.

Supplement Revision 1

Remove	Incorporate	Reason for change
All pages	Page 1	To revise the Accomplishment Instruction.

V2500-ENG-72-0500

CHECK THAT ALL PREVIOUS TRANSMITTALS HAVE BEEN INCORPORATED
If any have not been received please advise Customer Data Services, Rolls-Royce plc, Derby, England

LIST OF EFFECTIVE PAGES

The effective pages to this Service Bulletin following incorporation of Revision 1 to the Bulletin and Revision 1 to the Supplement are as follows:

	Page	Revision Number	Revision Date
	Bulletin		
R	1	1	Jul.14/06
R	2	1	Jul.14/06
R	3	1	Jul.14/06
R	4	1	Jul.14/06
R	5	1	Jul.14/06
R	6	1	Jul.14/06
R	7	1	Jul.14/06
R	8	1	Jul.14/06
R	9	1	Jul.14/06
R	10	1	Jul.14/06
R	11	1	Jul.14/06
R	12	1	Jul.14/06
	Supplement		
R	1	1	Jul.14/06

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SERVICE BULLETIN

NON-MODIFICATION SERVICE BULLETIN - N2 VIBRATION MONITORING FOR THE HIGH PRESSURE TURBINE (HPT) STAGE 2 AIR SEAL

1. Planning Information

A. Effectivity Data

(1) (For Airbus A319)

Engine Models Applicable

V2522-A5, V2524-A5, V2527M-A5

Engine Serial No. - All engines

(2) (For Airbus A320)

Engine Models Applicable

V2500-A1

Engine Serial No. - All engines

V2527-A5, V2527E-A5

Engine Serial No. - All engines

(3) (For Airbus A321)

Engine Models Applicable

V2530-A5, V2533-A5

Engine Serial No. - All engines

B. Concurrent Requirements

There are no concurrent requirements.

C. Reason

(1) Problem: There have been occurrences of cracks in the High Pressure Turbine (HPT) Stage 2 Air Seal. The crack can propagate and result in the fracture of a piece of the HPT Stage 2 Air Seal, which could result in significant damage to the HPT and LPT.

(2) Evidence: When the crack develops in the HPT Stage 2 Air Seal front fillet radius, an increasing trend in N2 vibration occurs. AOW 1069 provided a procedure to monitor steady state cruise N2 vibration for increasing trends.

(3) Objective: This NMSB supersedes the interim fleet management actions
R provided in AOW 1069 and the original NMSB. This NMSB provides instructions to monitor N2 vibration which may be an indication of a cracked HPT Stage 2 Air Seal.

(4) Substantiation: The N2 vibration trend monitoring limits used to identify engines which may have a cracked HPT Stage 2 Air Seal are based on engineering analysis of data from operational engines including those which have been found with cracks in the HPT Stage 2 Air Seal.

(5) Effects of Bulletin on:

Removal/Installation: None.

Disassembly/Assembly: None.

Cleaning: None.

Inspection/Check: None.

Repair: None.

Testing: None.

(6) Supplemental Information

None.

D. Description

This Service Bulletin provides procedures for repetitive monitoring of steady state cruise N2 vibration to identify engines which are suspect of having a cracked HPT Stage 2 Seal.

E. Compliance

Category 3

Monitoring of N2 vibration on all V2500-A1/A5 engines should begin as follows:

(1) For engines that operate at 30K and 33K, or if they have ever run at those ratings in revenue service, monitoring should begin once the HPT Stage 2 Air Seal has accumulated 4000 cycles or more.

NOTE: After trend monitoring begins, N2 vibration data gathering and monitoring needs to continue. It is recommended that data be reviewed for N2 vibration trend at repetitive intervals not to
R exceed 150 cycles.

(2) For all other ratings or models, monitoring should begin when the HPT Stage 2 Air Seal has accumulated 6000 cycles or more.

NOTE: After trend monitoring begins, N2 vibration data gathering and monitoring needs to continue. It is recommended that data be reviewed for N2 vibration trend at repetitive intervals not to
R exceed 150 cycles.

F. Approval Data

The part number changes and/or part modifications specified in the Accomplishment Instructions and Material Information sections of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the engine model(s) given.

The compliance statement and the procedures described in this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the Engine Model listed.

G. Manpower

(1) In Service

Not applicable.

(2) At Overhaul

Not applicable.

H. Weight and Balance

(1) Weight Change

None.

(2) Moment Arm

No Effect.

(3) Datum

Engine Front Mount Centerline (Power Plant Station (PPS) 100)

I. Electrical Load Data

This Service Bulletin has no effect on the aircraft electrical load.

J. Software Accomplishment Summary

Not applicable.

K. References

1. IAE V2500 All Operators Wire 1069 (HPT2 Air Seal Cracking).
2. V2500 Engine Manual (E-V2500-1IA), Chapter/Section 72-40-00.
3. AMM manual 72-00-00.
4. Airbus OIT SE 999.0009/05/JS.

R 5. Internal Reference No. - 05VC133 and 05VC133A.

6. ATA Locator - 72-40-00.

L. Other Publications Affected

None.

M. Interchangeability of Parts

Not applicable.

N. Information in the Appendix

Alternate Accomplishment Instructions (No)

Progression Charts (No)

Added Data (No)

Revision to Table of Limits (No)

Inspection Procedures (No)

2. Material Information

A. Industry Support Program

Not applicable.

B. Tooling - Price and Availability

Special tools are not required to accomplish this Service Bulletin.

C. Reidentified Parts

Not applicable.

D. Other Material Information Data

Not applicable.

3. Accomplishment Instructions

Gather and monitor steady state cruise N2 vibration data (in Aircraft Display
R Units).

Operators who are unable to comply with this NMSB should contact IAE technical support for assistance.

The requirement will remain in place, and operators should continue to monitor N2 vibration, until otherwise notified by IAE.

R A. Procedure for Monitoring N2 Vibration.

R NOTE: Operators should ensure that the engine vibration monitoring system is
R operating properly. Any problems with the vibration monitoring system
R should be corrected as soon as possible but not to exceed 50 cycles from
R when the problem is identified.

R (1) Gather steady state cruise N2 vibration data from each engine routinely.
R It is recommended that data be gathered once per day or a minimum of once
R every 8 flight cycles (see step B. below for procedures on how to gather
R this data).

R (2) Monitor N2 vibration trend of each engine for every 100 to 150 cycles of
R engine operation. If an increasing trend is identified prepare a plot of
R N2 vibration. The plot should have N2 vibration amplitude on the Y-axis
R versus date on the X-axis. The plot must meet the following requirements:

R (a) Y-axis range should be 0 to 2.0 Aircraft Display Units (if vibration
R amplitude is greater than 2.0 units, range can be 0 to 3.0 Aircraft
R Display Units).

R (b) X-axis should cover approximately 12 to 18 months (this range should
R be used even if data is not available for the entire time period).

R (c) Individual vibration data points should be plotted and they should not
R be connected with lines.

R (d) Do not use smoothed vibration data.

R (e) Do not use averaged vibration data.

R (3) The data must be plotted and reviewed for a vibration trend slope soon
R after it is obtained. No more than 175 cycles should accumulate on the
R engine from the beginning of the plot data and the time the plot is
R reviewed.

R NOTE: This means that if you gather data every 100 cycles, you must
R review the plot within 75 cycles of the last data point. If you
R gather data every 150 cycles, you must review the plot within 25
R cycles of the last data point.

R (4) If there is an increase in vibration of 0.1 units or more, then the slope
R must be calculated. Since there is scatter in the data, this increase is
R based on the 'average vibration level' which is the mid-point of the
R vibration scatter. If the increase is less than 0.1 units engine vibration
R monitoring should continue per the above steps. The units of the slope are
R Aircraft Display Units/Engine Cycles (abbreviated Units/cycle). Calculate
R slope as follows:

R (a) Determine 'average vibration level' at the first point of the line.

R (b) Determine 'average vibration level' at the end point of the line.

R (c) Using engine or Aircraft records, determine engine cycles
R corresponding to the first and last points of the line. Calculate
R slope:

R Slope = Change in 'average vibration level' / Change in engine cycles.

R NOTE: Figure 1 shows a typical vibration plot, the 'average vibration
R level' and how to calculate the slope.

R (5) Take action as follows:

R (a) Slope less than .001 Units/Cycle:

R (i) The HPT Stage 2 Airseal is not suspect of being cracked - the
R engine can remain in service and vibration monitoring should
R continue.

R (b) Slope is .001 Units/Cycle or greater and less than .003 Units/Cycle:

R (i) The HPT Stage 2 Airseal is suspect of being cracked and the
R engine needs to be removed within 250 total cycles from when
R the slope began to increase.

R WARNING: FAILURE TO REMOVE THE SEAL WITHIN 10 CYCLES IF THE SLOPE
R IS GREATER THAN .003 UNITS/CYCLE COULD RESULT IN SEAL
R FRACTURE DURING ENGINE OPERATION.

R (c) Slope .003 Units/Cycle or greater:

R (i) The HPT Stage 2 Airseal is suspect of being cracked and the
R engine needs to be removed within 10 cycles of when the slope
R was calculated (Figure 2 shows the plot of an engine which
R needs to be removed within 10 cycles).

R NOTE: Step changes in vibration are not an indication that the
R HPT Stage 2 Airseal has developed a crack but if observed
R the engine should continue to be monitored. Figure 3 shows
R a sample of what is considered a step change in vibration.

B. Information regarding data collection and monitoring systems

(1) Data recording

The majority of aircraft fitted with V2500 engines are equipped with onboard data recording capability. These systems provide the steady state cruise data that is required to monitor the engines. It is desirable to continue to use this automatic data recording capability. In the event this capability is not available it is equally acceptable to use data recorded by other means. Operators must ensure that AVMH indicated vibration levels are included in the set of parameters that are recorded.

Aircraft fitted with Teledyne FDIMU P/N 2234320-01-01 and with software P/N D01SAIA01C00000 or D02SAIA02C00000 FDIM do not allow for monitoring of the N2 vibrations on engine 2 using Display Management Unit (DMU) reports 1, 2 or 4. This is due to the fact that engine 2 incorrectly receives N2 vibration data from engine 1.

There is an interim software update available by No Technical Objection (NTO) or Statement of Technical Concurrence on request to Airbus. Once this software update has been incorporated, only DMU reports 1 or 4 or trend monitoring software should be utilized, as DMU reports 2 is not corrected in the update. Additional details are available in Airbus OIT SE 999.0009/05/JS. Please contact Airbus Customer Service for additional details regarding this issue.

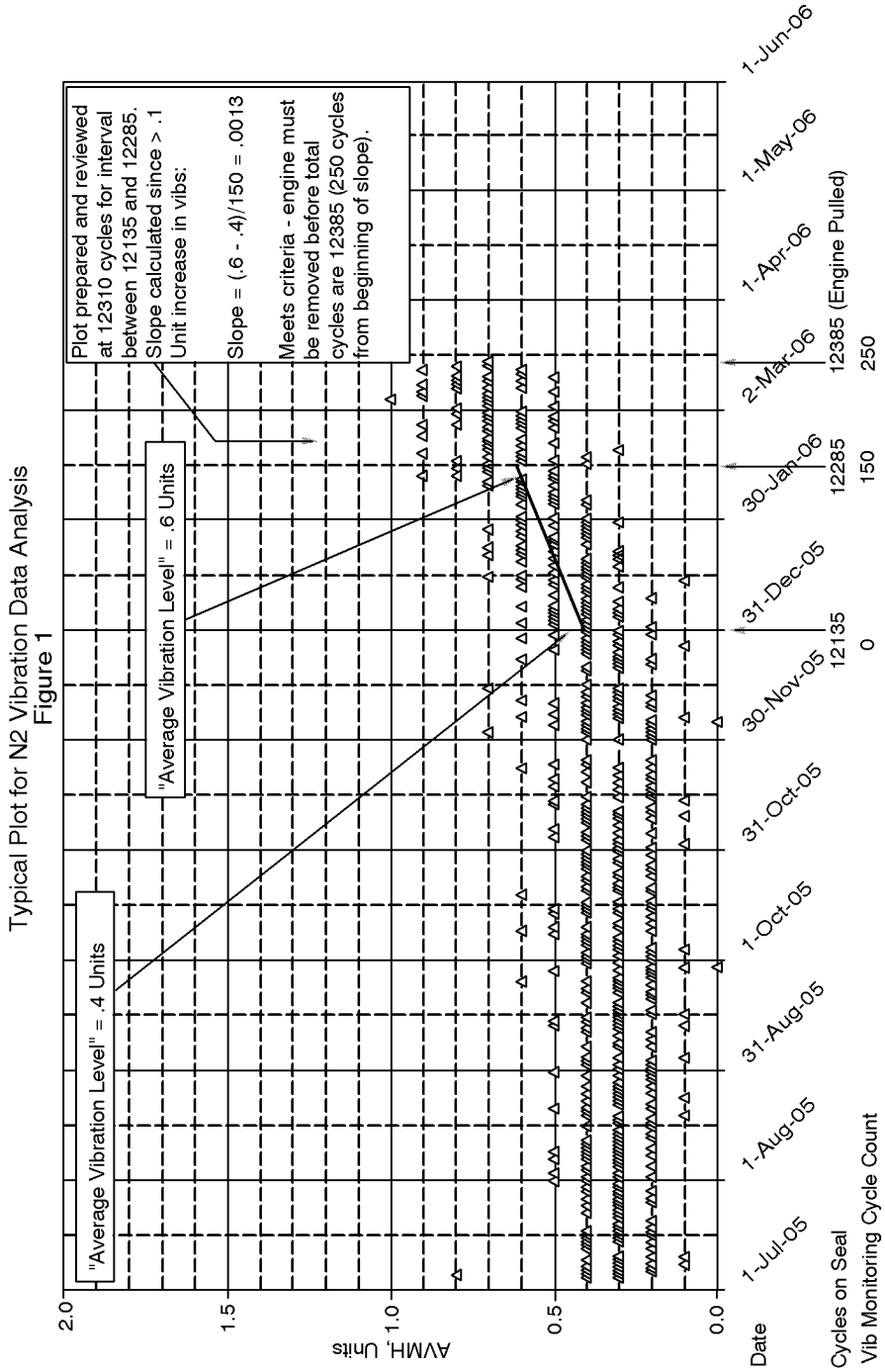
(2) Data quality

The automatic data recording systems on aircraft fitted with V2500 engines record low-rotor and high-rotor vibration levels to the nearest one-tenth (0.1) units. V2500 operators who record steady state cruise data by other means should assure that AVMH values are recorded to the nearest one-tenth (0.1) units and they should utilize this data for steady state cruise N2 vibration trend monitoring.

(3) Data analysis

All operators are to establish a process for monitoring AVMH levels focused on identifying an increasing AVMH trend described in Figure 1.
R Only observed N2 vibration values should be used for plotting purposes.

R It is anticipated that most operators will use one of the engine health monitoring programs and/or services provided by either Pratt and Whitney or Rolls Royce. It is equally acceptable for the operator to use software developed by themselves, others, or the monitoring services of another company to perform this task.



R

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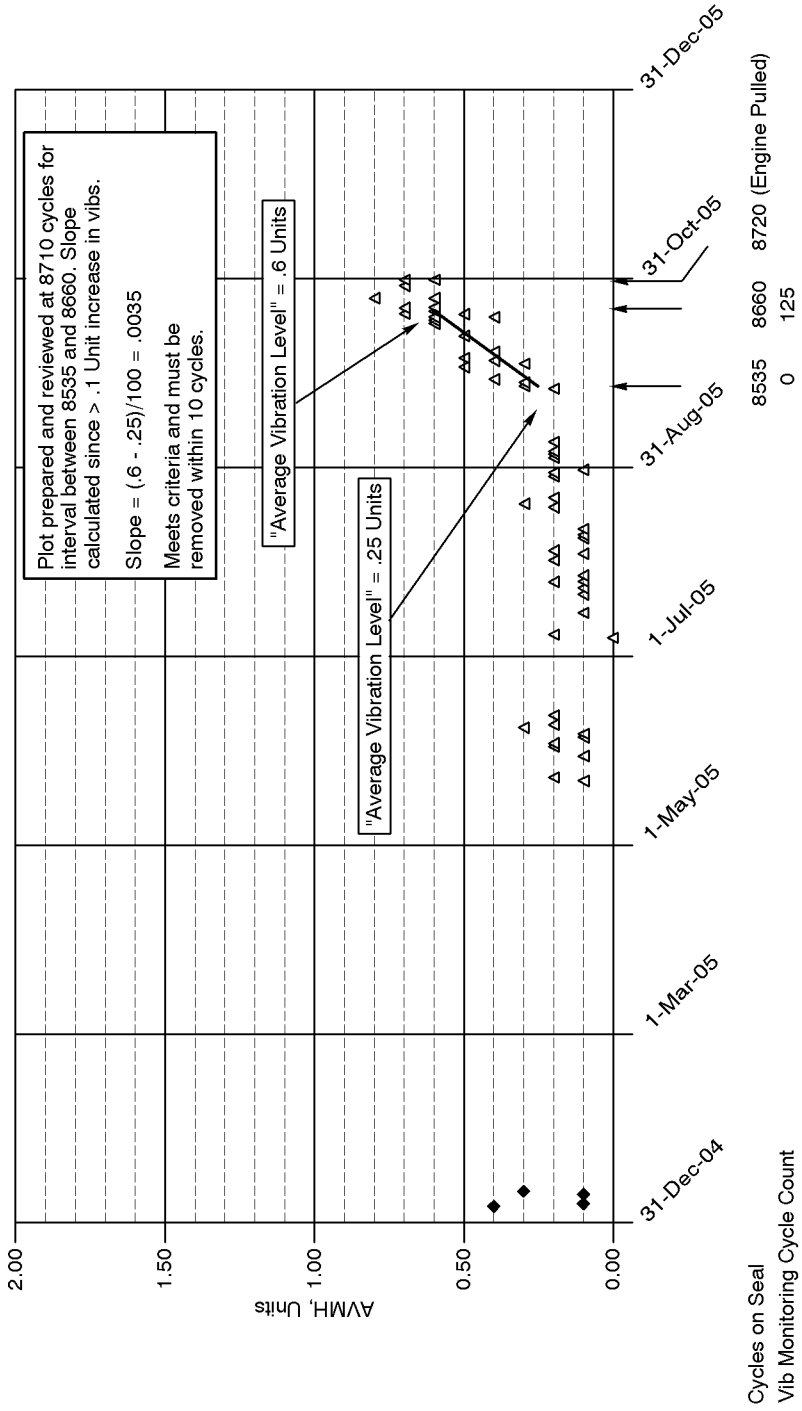
R Typical Plot for N2 Vibration Data Analysis
R Figure 1

R

N2 Vibration Data
Figure 2



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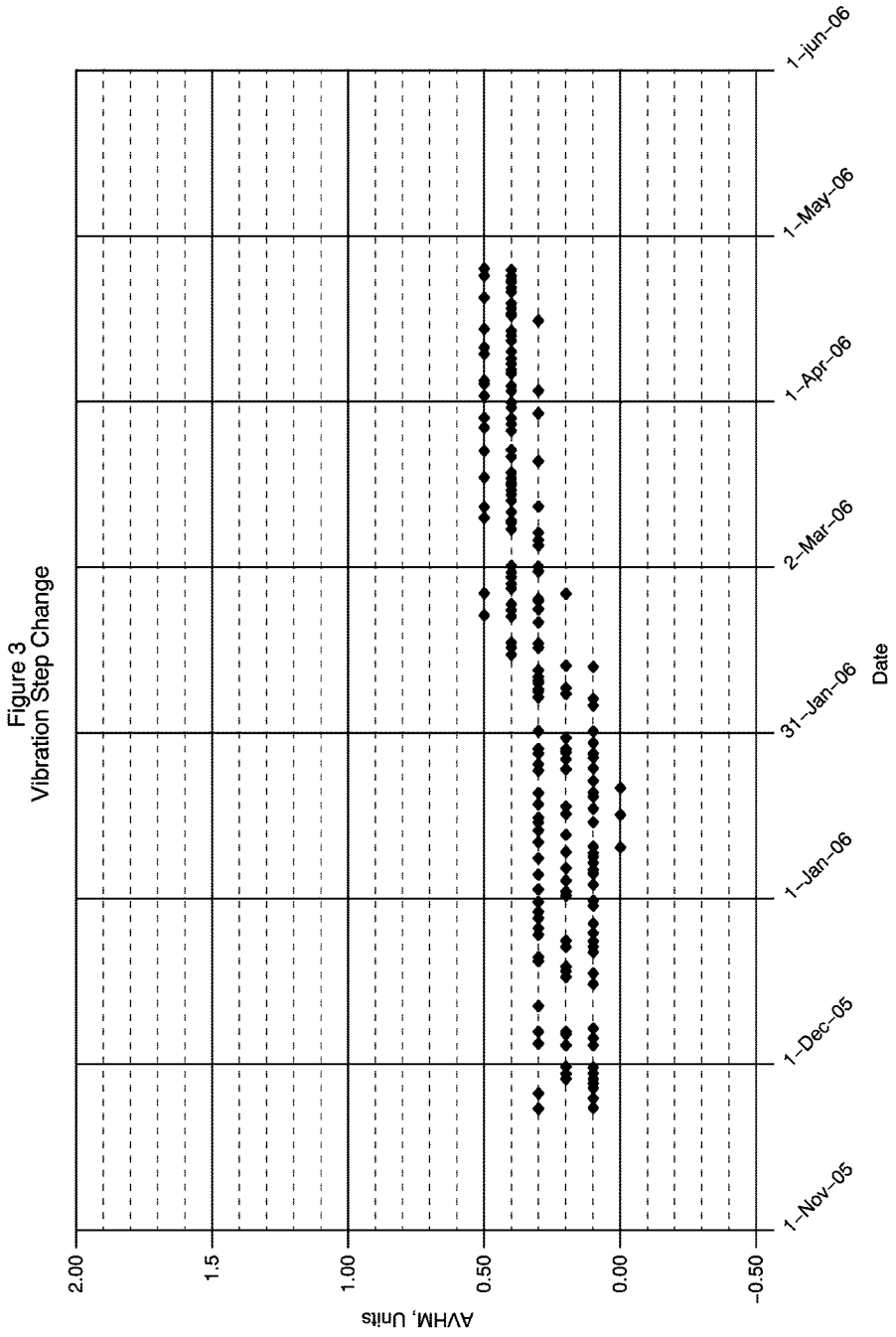
R N2 Vibration Data
R Figure 2

R



R R Vibration Step Change
Figure 3

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SUPPLEMENT - PRICES AND AVAILABILITY

V2500-A1/A5

1. Modification Kit:

   A. There is no kit provided to do this Service Bulletin.

2. Material Cost

   Not applicable.

3. New Production Parts:

   Not applicable.