P U B L I C A T I O N T R A N S M I T T A L

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DATE: May.15/03

V2500-D5 SERIES PROPULSION SYSTEM NON-MODIFICATION SERVICE BULLETIN

This document transmits the Initial Issue of Service Bulletin EV2500-72-0457

Bulletin Initial Issue

Remove	Incorporate	Reason for change
	Pages 1 to 14 of the Service Bulletin	Initial issue

V2500-ENG-72-0457

CHECK THAT ALL PREVIOUS TRANSMITTALS HAVE BEEN INCORPORATED
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LIST OF EFFECTIVE PAGES

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ENGINE - LP COMPRESSOR FAN BLADES - DOVETAIL ROOT FLANK INSPECTION AND APPLICATION OF DRY FILM LUBRICANT - NON-MODIFICATION SERVICE BULLETIN

1. Planning Information

A. Effectivity

(1) Boeing DPD MD90

V2500-D5 Engines Serial Nos. V20129, V20130, V20150, V20151, V20154, V20155, V20164, V20165, V20167, V20168, V20169, V20170, V20171, V20174, V20175, V20176, V20180, V20181, V20184, V20185, V20188, V20189, V20190, V20191, V20194, V20195, V20196, V20197, V20198, V20199, V20200, V20201, V20206, V20207, V20208, V20211, V20212, V20218, V20228, V20232, V20233, V20236, V20237, V20238, V20239, V20242, V20243, V20244, V20245, V20246, V20248, V20249, V20250, V20251, V20252, V20256, V20257, V20262, V20263, V20264, V20265, V20266, V20270, V20271, V20272, V20273, V20274, V20275, V20276, V20278, V20280

B. Concurrent Requirements

None.

C. Reason

Latest fan blade dovetail inspections have revealed the need for early action to make sure fan blade dovetail deterioration is minimised. The intent of this NMSB is:

(1) Ongoing inspections of V2500-D5 fan blades have identified a further two sets with root cracks, bringing the total number of cracked V2500-D5 sets to three. These cracks were found during overhaul by binocular inspection.

(2) The cracked sets have all been found at one operator. This NMSB is issued to instruct specific fleet management action for those engines at the affected operator.

(3) Across the remaining V2500-D5 fleet the existing inspections (NMSB 72-0409 and NMSB 72-0424) are adequate to maintain an acceptable level of risk. Therefore V2500-D5 operators with engine numbers that are not included in the above list are not required to comply with the instructions of this NMSB.

D. Compliance

Category Code 3

(1) If the fan blade set has accumulated less than 2000 cycles since last inspection (ultrasonic, fluorescent penetrant or binocular):

(a) Remove the fan blades from the fan disc and inspect before the fan set life reaches 3000 cycles. Refer to Fig.1 and AMM, 72-31-11, Removal/Installation.

(b) Repeat at C Check intervals.

(2) If the fan blade set has accumulated more than 2000 cycles since last inspection (ultrasonic, fluorescent penetrant or binocular):

(a) Remove the fan blades from the fan disc and inspect within 1000 cycles or the next C Check, whichever is the sooner.. Refer to Fig.1 and AMM, 72-31-11, Removal/Installation.

(b) Repeat at C Check intervals.

E. Approval

The compliance of statement 1.D. and the procedures outlined in Section 3. of this Non-Modification Service Bulletin, comply with the Federal Aviation Regulations and are FAA approved for the engine models listed.

F. Manpower

Estimate of manhours to embody this Service Bulletin

9 hours

G. References

(1) Internal reference number - 03VR815.

(2) ATA Locator - 72-31-00.

2. Material Information

None.

3. Accomplishment Instructions

A. NOTES

NOTE: This section covers the inspection procedure for fan blades with and without Metco 58 coating on the blade root. For blades with Metco 58 coating use paragraph C. below. For blades without Metco 58 coating use paragraph D. below.

NOTE: IAE have produced a training video that demonstrates the ultrasonic inspection method which assists with the contents of this NMSB.

Tools and Equipment

(1) For Ultrasonic Inspection:

(a) Ultrasonic flaw detector - For operation in the 5 - 10 MHz range (IAE recommend the use of Buehler Krautkramer - USN52 {Kratkramer Branson - USN52} or EPOCH3B).

(b) Ultrasonic couplant CoMat 06-148

(c) Items (d) and (e) are included in kit: IAE2R19429

(d) Test block QC6827 - IAE2R19315

(e) Ultrasonic probe - IAE2R19316

(2) For Binocular Inspection:

(a) Desk lamp (local supply), 40 - 50 W bulb with shade less than 110 mm. diameter and 110 mm. length

(b) Blade mounting fixture, local manufacture

(c) Binocular (local supply), minimum magnification range of x10 to x30 and overhang such that centre of binocular can be positioned 350 mm. away from the edge of base mounting

NOTE: Advice on suitable binoculars can be provided by IAE. An example of a suitable binocular would be a Nikon SMZ645 with x10 eyepieces and C-US2 stand.

B. Calibration of Ultrasonic Detector

(1) Set up the ultrasonic flaw detector for dual or through transmission operation, with zero delay.

(2) Set the amplifier switch to 5-10 MHz.

(3) Apply couplant to the rear angled flank and position the probe on the test block.

(4) Identify the signal produced by the large slot A. With the range control, position this signal at division line 5 on the time base and adjust the amplitude to approximately 50 percent screen height.

(5) Increase the gain by 20dB. Move the probe over slot B and identify the signal produced. Adjust the amplifier to bring the signal to 60 percent screen height.

(6) If a monitor gate is available, position it between the 4.5 and 5.5 division lines on the time base. Adjust any visual or audible alarms to trigger at 60 percent screen height.

C. Ultrasonic Inspection - Blades with Metco 58 Coating on the Fan Blade Root (Post SB 72-0375 and Post SB 72-0384)

WARNING: YOU MUST PUT A WARNING NOTICE ON THE INSTRUMENT PANEL IN THE COCKPIT TO TELL PERSONS NOT TO START THE ENGINES.

WARNING: YOU MUST MAKE SURE THAT THE ENGINE HAS BEEN SHUT DOWN FOR AT LEAST 5 MINUTES BEFORE STARTING THE INSPECTION.

WARNING: YOU MUST MAKE SURE THAT THE RED WARNING PENNANTS ON THE WORKMAT CAN BE SEEN AT A DISTANCE FROM THE AIRCRAFT.

CAUTION: THIS SECTION OF THE NON-MODIFICATION SERVICE BULLETIN APPLIES TO FAN BLADES WITH METCO 58 ON THE ROOT. IT IS IMPORTANT THAT YOU USE THE CORRECT INSPECTION TASK TO PREVENT POSSIBLE DAMAGE TO THE FAN BLADE. IF THE FAN BLADES DO NOT HAVE METCO 58 ON THE ROOT GO TO PARAGRAPH D. BELOW.

CAUTION: IF ANY PART OF THIS INSPECTION CANNOT BE COMPLIED WITH SATISFACTORILY THEN THE BLADE MUST BE SENT TO A FACILITY CAPABLE OF PERFORMING THE INSPECTION IN ACCORDANCE WITH THE DEFINED PROCEDURE.

(1) Remove the fan blades. (Refer to Aircraft Maintenance Manual (AMM) 72-31-11, Removal/Installation)

(2) Do a general inspection of the fan blades. (Refer to AMM 72-31-11, Inspection/Check)

(3) Do an ultrasonic inspection on each of the fan blades

(a) Remove any loose particles of dry film lubricant on the fan blade root using a lint free cloth

(b) Apply the couplant to the concave face of the blade root flanks at the area to be inspected. Position the probe at the front of the leading edge of the concave blade root flank and move the probe along the first 2.4in. (60 mm.) of the chordal width of the blade root. (Refer to Fig. 2)

(c) Monitor the signal very carefully as you move the probe over this area

(d) Reject the blade if a signal greater than 60 percent screen height is produced between the 4.5 and 5.5 division lines on the time base

(e) Apply the couplant to the convex face of the blade root flank at the area to be inspected. Position the probe at 1.77in. (45 mm.) from the front face of the blade root (immediately behind the front chocking pad, if still installed) and move the probe along the next 4.33in. (110 mm.) of the chordal width of the blade root, terminating the inspection at 6.10in. (155 mm.) from the front face of the blade root (approximately 3.3in. (85 mm.) from the rear face of the root)

(f) Monitor the signal very carefully as you move the probe over this area

(g) Reject the blade if a signal greater than 60 percent screen height is produced between the 4.5 and 5.5 division lines on the time base

CAUTION:

DO NOT USE SCOTCHBRITE ON LOCATION Z OF THE BLADE DEFINED IN FIGURE 3. THIS HAS A DETRIMENTAL EFFECT ON THE COATING.

(h) Subsequently to the above, if excess dry film lubricant is still present at the ultrasonic reject indication position on the blade root flank in the areas X and Y defined in Fig.3, remove this by lightly rubbing with Scotchbrite (using CoMat 05-125 to 05-127). Repeat the ultrasonic check as in (a), (b), (d) and (e) above. If a signal greater than 60 percent screen height is still present between the 4.4 and 5.5 division lines on the time base perform para (4) below

(i) If no cracking is present following step (g), it is recommended to record that an ultrasonic inspection has been successfully completed.

(j) If fan blade life is in excess of 2500 cycles from new or since last DFL application, the fan blade root must be re-coated with DFL (Refer to AMM, 72-31-11, VRS1030)

(4) Clean and re-ultrasonically inspect the fan blades that have failed inspection during paragraphs (d) or (g) above

(a) Clean the fan blade root in accordance with EM procedure 72-31-11-100-002-B00

(b) Apply the couplant to the concave face of each blade root flank at the area to be inspected. Position the probe at the front of the leading edge of the concave blade root flank and move the probe along the first 2.4in. (60 mm.) of the chordal width of the blade root. (Refer to Fig. 2)

(c) Monitor the signal very carefully as you move the probe over this area

(d) Reject the blade if a signal greater than 60 percent screen height is produced between the 4.5 and 5.5 division lines on the time base

(e) Apply the couplant to the convex face of the blade root flank at the area to be inspected. Position the probe at 1.77in. (45 mm.) from the front face of the blade root (immediately behind the front chocking pad, if still installed) and move the probe along the next 4.33in. (110 mm.) of the chordal width of the blade root, terminating the inspection at 6.10in. (155 mm.) from the front face of the blade root (approximately 3.3in. (85 mm.) from the rear face of the root)

(f) Monitor the signal very carefully as you move the probe over this area

(g) Reject the blade if a signal greater than 60 percent screen height is produced between the 4.5 and 5.5 division lines on the time base

(h) If any blades continue to fail ultrasonic inspection at paragraphs (d) or (g) above, perform paragraph (5) below

(i) If no cracking is present following step (g), it is recommended to record that an ultrasonic inspection has been successfully completed.

(j) Prior to return to service the fan blade root must be re-coated with DFL (Refer to AMM, 72-31-11, VRS1030)

(5) Binocular inspect the fan blades that have failed inspection during paragraphs (d) or (g) above

(a) Send the blades to an appropriate overhaul facility that can remove the Metco 58 from the blade root and binocular inspect the blades

D. Ultrasonic Inspection - Blades without Metco 58 Coating on the Fan Blade Root (Pre SB 72-0375 and Pre SB 72-0384)

WARNING: YOU MUST PUT A WARNING NOTICE ON THE INSTRUMENT PANEL IN THE COCKPIT TO TELL PERSONS NOT TO START THE ENGINES.

WARNING: YOU MUST MAKE SURE THAT THE ENGINE HAS BEEN SHUT DOWN FOR AT LEAST 5 MINUTES BEFORE STARTING THE INSPECTION.

WARNING: YOU MUST MAKE SURE THAT THE RED WARNING PENNANTS ON THE WORKMAT CAN BE SEEN AT A DISTANCE FROM THE AIRCRAFT.

CAUTION: THIS SECTION OF THE NON-MODIFICATION SERVICE BULLETIN APPLIES TO FAN BLADES WITHOUT METCO 58 ON THE ROOT. IT IS IMPORTANT THAT YOU USE THE CORRECT INSPECTION TASK TO PREVENT POSSIBLE DAMAGE TO THE FAN BLADE. IF THE FAN BLADES DO HAVE METCO 58 ON THE ROOT GO TO PARAGRAPH C. ABOVE.

CAUTION: IF ANY PART OF THIS INSPECTION CANNOT BE COMPLIED WITH SATISFACTORILY THEN THE BLADE MUST BE SENT TO A FACILITY CAPABLE OF PERFORMING THE INSPECTION IN ACCORDANCE WITH THE DEFINED PROCEDURE.

(1) Remove the fan blades. (Refer to Aircraft Maintenance Manual (AMM) 72-31-11, Removal/Installation)

(2) Do a general inspection of the fan blades. (Refer to AMM 72-31-11, Inspection/Check)

(3) Do an ultrasonic inspection on each of the fan blades

(a) Remove any loose particles of dry film lubricant on the fan blade root using a lint free cloth

(b) Apply the couplant to the concave face of the blade root flanks at the area to be inspected. Position the probe at the front of the leading edge of the concave blade root flank and move the probe along the first 2.4in. (60 mm.) of the chordal width of the blade root. (Refer to Fig. 2)

(c) Monitor the signal very carefully as you move the probe over this area

(d) Reject the blade if a signal greater than 60 percent screen height is produced between the 4.5 and 5.5 division lines on the time base

(e) Apply the couplant to the convex face of the blade root flank at the area to be inspected. Position the probe at 1.77in. (45 mm.) from the front face of the blade root (immediately behind the front chocking pad, if still installed) and move the probe along the next 4.33in. (110 mm.) of the chordal width of the blade root, terminating the inspection at 6.10in. (155 mm.) from the front face of the blade root (approximately 3.3in. (85 mm.) from the rear face of the root)

(f) Monitor the signal very carefully as you move the probe over this area

(g) Reject the blade if a signal greater than 60 percent screen height is produced between the 4.5 and 5.5 division lines on the time base

CAUTION:

DO NOT USE SCOTCHBRITE ON LOCATION Z OF THE BLADE DEFINED IN FIGURE 3. THIS HAS A DETRIMENTAL EFFECT ON THE COATING.

(h) Subsequently to the above, if excess dry film lubricant is still present at the ultrasonic reject indication position on the blade root flank in the areas X and Y defined in Fig.3, remove this by lightly rubbing with Scotchbrite (using CoMat 05-125 to 05-127). Repeat the ultrasonic check as in (a), (b), (d) and (e) above. If a signal greater than 60 percent screen height is still present between the 4.4 and 5.5 division lines on the time base perform para (4) below

(i) If no cracking is present following step (g), it is recommended to record that an ultrasonic inspection has been successfully completed.

(j) If fan blade life is in excess of 2500 cycles from new or since last DFL application, the fan blade root must be re-coated with DFL (Refer to AMM, 72-31-11, VRS1030)

(4) Clean and re-ultrasonically inspect the fan blades that have failed inspection during paragraphs (d) or (g) above

(a) Clean the fan blade root in accordance with EM procedure 72-31-11-100-002-A00

(b) Apply the couplant to the concave face of each blade root flank at the area to be inspected. Position the probe at the front of the leading edge of the concave blade root flank and move the probe along the first 2.4in. (60 mm.) of the chordal width of the blade root. (Refer to Fig. 2)

(c) Monitor the signal very carefully as you move the probe over this area

(d) Reject the blade if a signal greater than 60 percent screen height is produced between the 4.5 and 5.5 division lines on the time base

(e) Apply the couplant to the convex face of the blade root flank at the area to be inspected. Position the probe at 1.77in. (45 mm.) from the front face of the blade root (immediately behind the front chocking pad, if still installed) and move the probe along the next 4.33in. (110 mm.) of the chordal width of the blade root, terminating the inspection at 6.10in. (155 mm.) from the front face of the blade root (approximately 3.3in. (85 mm.) from the rear face of the root)

(f) Monitor the signal very carefully as you move the probe over this area

(g) Reject the blade if a signal greater than 60 percent screen height is produced between the 4.5 and 5.5 division lines on the time base

(h) If any blades continue to fail ultrasonic inspection at paragraphs (d) or (g) above, perform paragraph (5) below

(i) If no cracking is present following step (g), it is recommended to record that an ultrasonic inspection has been successfully completed. Prior to return to service the fan blade root must be re-coated with DFL (Refer to AMM, 72-31-11, VRS1030)

(5) Binocular inspection of a fan blade rejected following ultrasonic inspection

CAUTION: IF ANY PART OF THIS INSPECTION CANNOT BE COMPLIED WITH SATISFACTORILY THEN THE BLADE MUST BE SENT TO A FACILITY CAPABLE OF PERFORMING THE INSPECTION IN ACCORDANCE WITH THE DEFINED PROCEDURE.

NOTE: This technique covers additional binocular inspection of V2500 fan blade roots for possible top edge of bedding cracking, detected by ultrasonic inspection.

NOTE: The persons carrying out this inspection should be proficient at binocular inspections. Additional specific training is recommended for this inspection, contact IAE.

(a) Preparation

(i) Ensure that the dry film lubricant has been removed from the fan blade root using TASK 72-31-11-100-002-A00

(b) Inspection

(i) Position the fan blade in mounting fixture to view the side of the fan blade root presenting an ultrasonic indication

(ii) Adjust lamp to optimum illumination position for highlighting top edge of bedding at ultrasonic position. See Figure 4.

(iii) Set magnification of binocular to x10 and bring the top edge of bedding at the ultrasonic indication position into focus. Adjust magnification to x30 and re-focus if necessary.

(iv) Slowly traverse along the blade, inspecting the top edge of bedding 10 mm. either side of the ultrasonic indication position. See Figure 4.

(v) Check any suspicious features by inspecting at the highest magnification available.

NOTE: The inspection should cover the area approximately 2 mm. above and below the top edge of bedding. Re-focus the binocular and adjust the lamp as required.

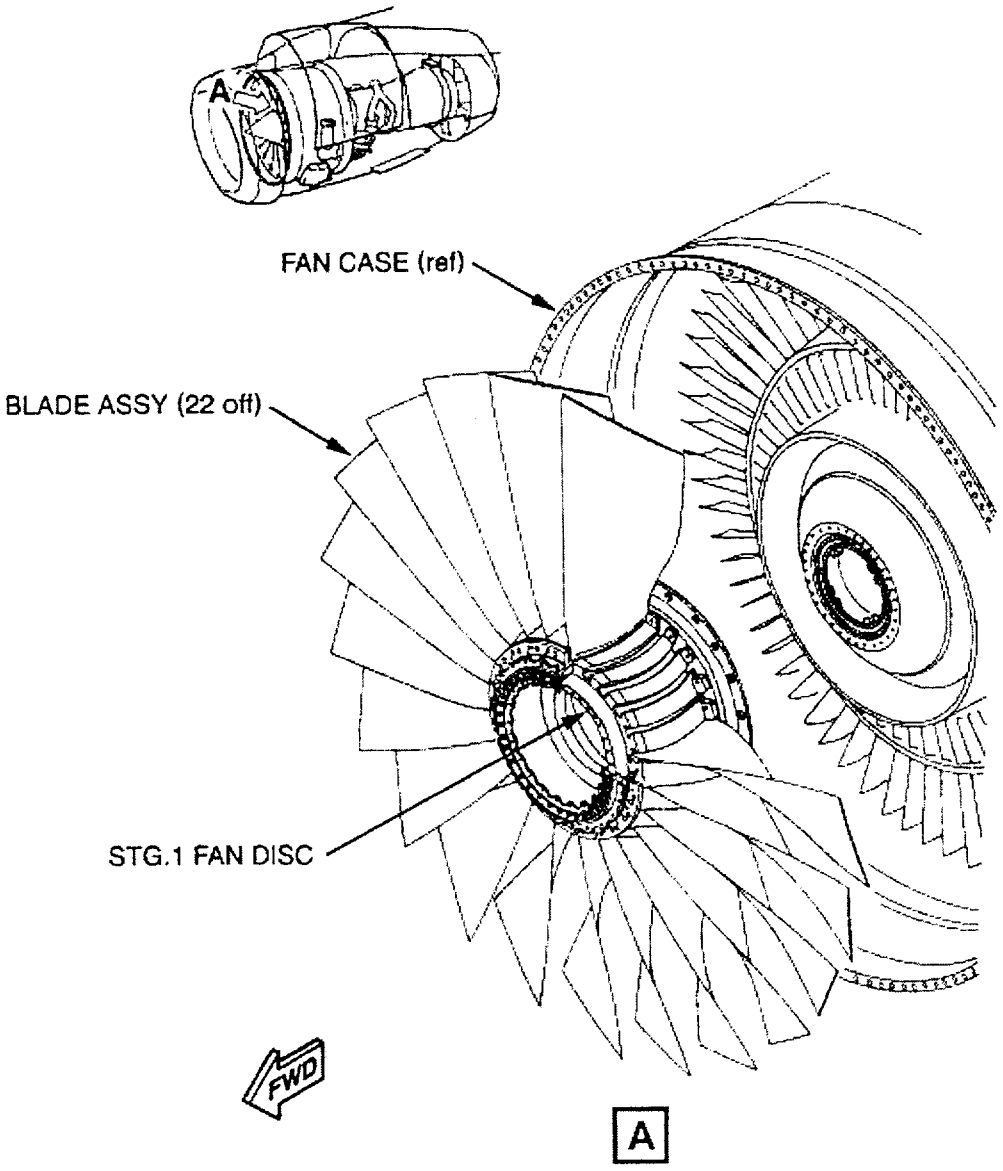
(vi) Repeat steps (i) to (v) above for each ultrasonic indication position.

(c) Rejection criteria

(i) Reject any blade exhibiting a crack-like feature running axially along the root in the inspected region.

(ii) Reject any blade exhibiting a 'scar' or crater-like feature.

(iii) If no cracking is present it is recommended to record that inspection has been successfully completed. Prior to return to service the fan blade root must be re-coated with DFL (Refer to AMM, 72-31-11, VRS1030)



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Location of blade assembly and Stage 1 fan disc
Fig.1

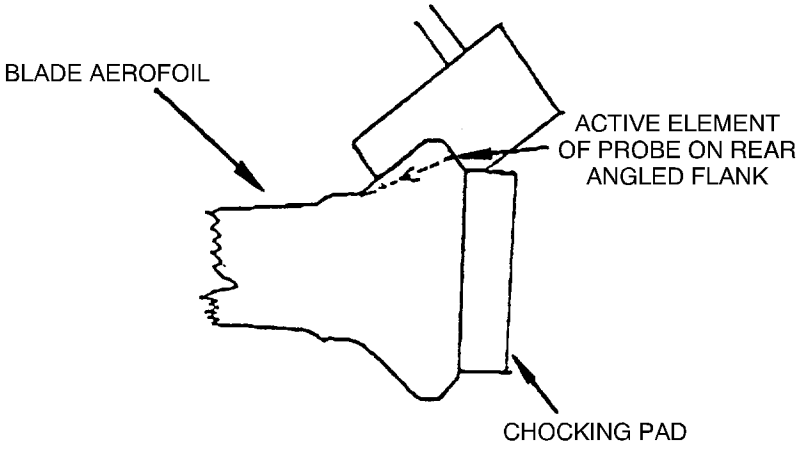

FIGURE 2

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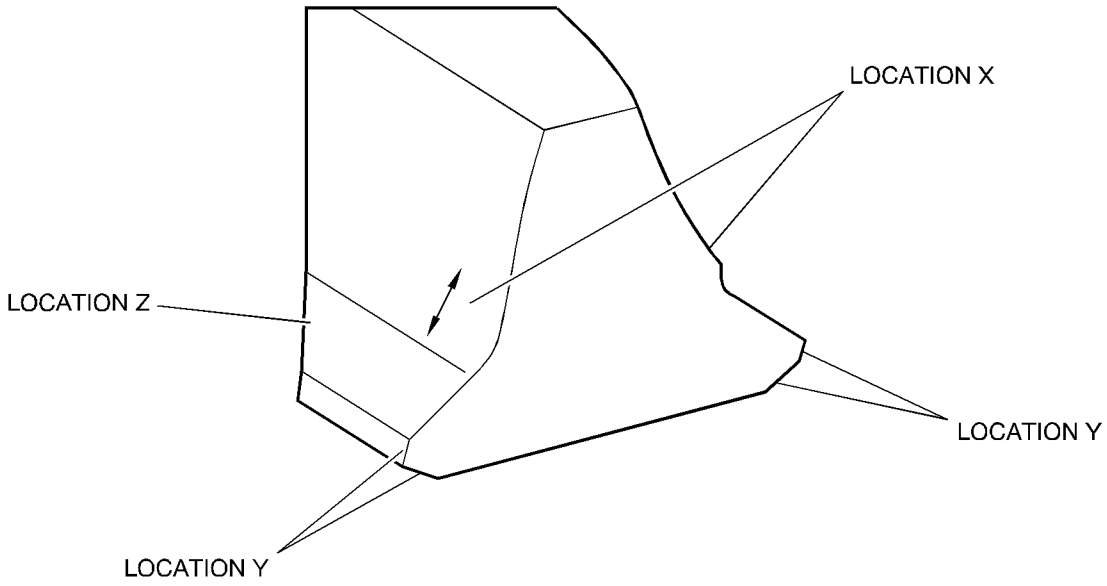
Position of probe on fan blade concave root flank
Fig.2



ACTIONS :

1) At the ultrasonic reject indication locations, on either the concave or the convex flanks, remove any excess Dry Film Lubricant (DFL) by lightly rubbing with 'Scotchbrite' using CoMat No 05-125 to 05-127 in the following areas:
   - above the top edge of the bedding (location X)
   - at the lower corner of the root where the ultrasonic probe locates (location Y)

   CAUTION 1: On post SB 72-0375 and post SB72-0384 (Metco 58 coated root) fan blades it is essential not to "scotchbrite" the fan blade bedding surface (Location Z) as this will have a detrimental effect to the coating.

2) If excessive DFL is present, at location X and/or Y that cannot be removed by lightly rubbing with 'Scotchbrite' it is permissable to remove this using a non metallic scraper and then remove any loose residual DFL using 'Scotchbrite'

   CAUTION 2: On post SB 72-0375 and post SB72-0384 (Metco 58 coated root) fan blades it is important not to damage the fan blade bedding surface (Location Z) when using a scraper

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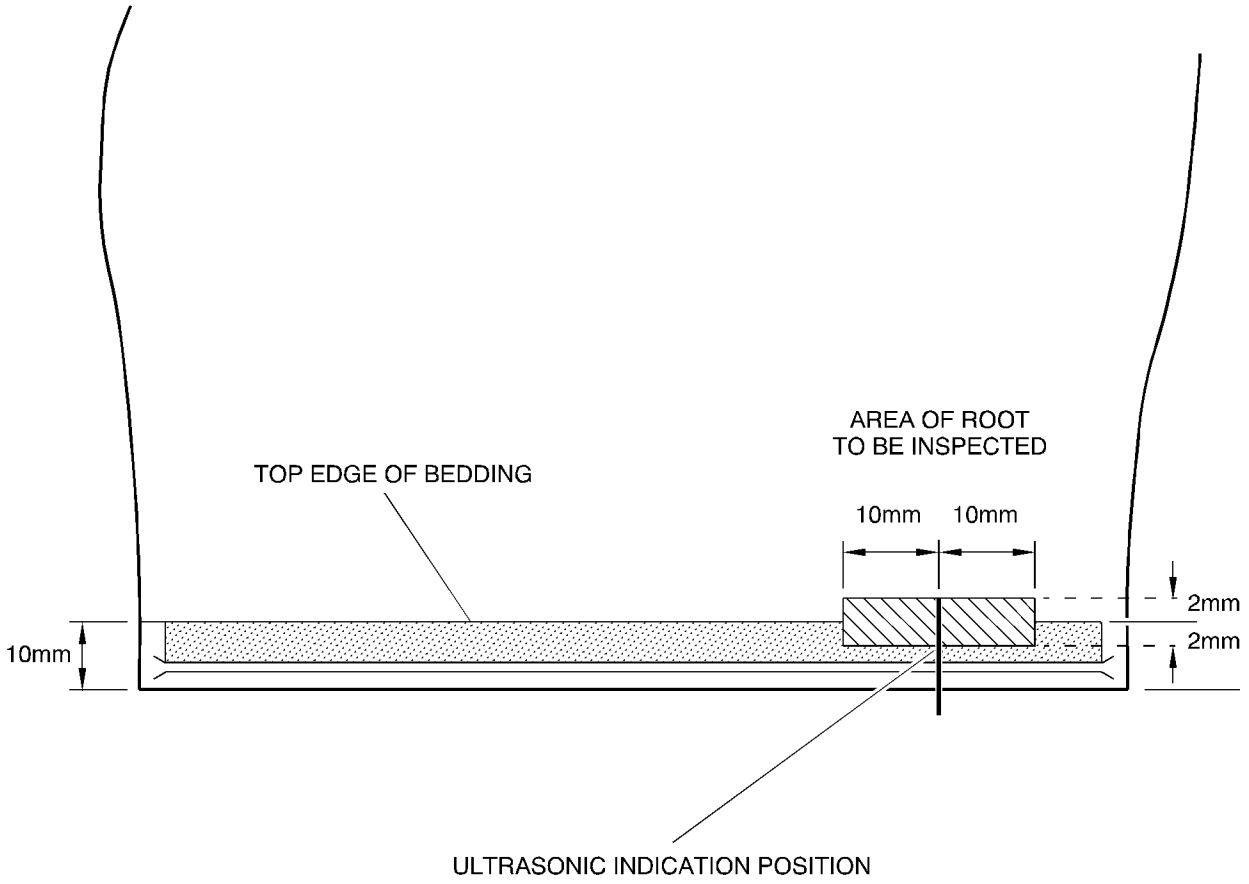
Removal of excess dry film lubricant
Fig.3



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Inspection areas
Fig.4