International
Aero Engines **ALERT**

Date: July 6, 2000

Subject: Transmittal of Revision 4 to Alert Service Bulletin Number V2500-NAC-78-A0182

Service Bulletin Revision History:

Event	Date
Basic Issue	Nov. 19/99
Revision 1	Nov. 29/99
Revision 2	Jan. 07/00
Revision 3	Apr. 28/00
Revision 4	Jul. 06/00

Reasons for issuance of Revision:

(1) Revise the Concurrency Statement on page 2 of the bulletin.

(2) To delete the text in Paragraph 2.C. which instructed application of silicone grease to the v-blade.

(3) To delete CoMat 04-007 Silicone Grease from Paragraph 3.D. because it is no longer required.

Effect on Past Compliance:

(1) None.

List of Effective Pages:

Page No.	Rev No.	Date
1 and 2	4	Jul. 06/00
3 thru 5	3	Apr. 28/00
6	2	Jan. 07/00
7	3	Apr. 28/00
8	2	Jan. 07/00
9	4	Jul. 06/00
10 thru 12	2	Jan. 07/00
13	3	Apr. 28/00
14	2	Jan. 07/00
15	4	Jul. 06/00
16	2	Jan. 07/00
17	3	Apr. 28/00

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

International
Aero Engines **ALERT**

ALERT SERVICE BULLETIN

NACELLE - EXHAUST - OUTER V-BLADE, THRUST REVERSER - INSPECTION FOR CRACKS AND/OR MISSING PIECES

MODEL APPLICATION

V2500-D5

BULLETIN INDEX LOCATOR

78-00-00

Compliance Category Code

Internal Reference No.

November 18, 1999
Revision 4 - July 6, 2000

V2500-NAC-78-A0182

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

NACELLE - EXHAUST - OUTER V-BLADE, THRUST REVERSER - INSPECTION FOR CRACKS AND/OR MISSING PIECES

1 Planning Information

A. Effectivity

(1) Aircraft: MD-90

(2) Nacelle: All V2500-D5 thrust reversers (in-service and spares).

B. Concurrent Requirements

(1) For v-blades that are found acceptable (without cracks or missing pieces or that can be re-worked with the instructions in this service bulletin), you must do V2500-NAC-78-0183 (which instructs application of dry film lubricant to, the v-blade) at the same time you do this service bulletin. **Repeat application of dry film lubricant every "3A" check as instructed in V2500-NAC-78-0183.**

R
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(2) For in-service thrust reversers, you must do V2500-ENG-72-0371 (which instructs application of dry film lubricant to the engine v-groove) at the same time you do this service bulletin.

C. Reason

(1) Condition

The thrust reverser outer v-blade can crack in service.

(2) Background

Four thrust reversers have been found with cracks in the outer v-blade. One of these was found with a 12 inch (304.8 mm) piece missing.

(3) Objective

To examine the thrust reverser outer v-blade and fan case rear extension v-groove for cracks and recommend appropriate action to be taken.

(4) Substantiation.

Not applicable.

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

R

D. Description

The thrust reverser outer v-blade is examined for cracks and missing pieces in accordance with the instructions in this service bulletin.

(1) **For thrust reverser halves with less than 6000 flight cycles**:

(a) **If no cracks are found**, the operator must report the findings to BFGoodrich (Rohr) and IAE. This inspection must be repeated every 2000 flight cycles until 6000 flight cycles. Once 6000 flight cycles is reached, this inspection must be repeated every 500 flight cycles until further notice.

(b) **If cracks or missing pieces are found in only one end** of the outer v-blade of a thrust reverser half, a stop drill hole is made, and the operator must report the findings to BFGoodrich (Rohr) and IAE. This inspection must be repeated every 500 flight cycles until further notice. If emergency reverse thrust is used, you must perform the inspection specified in the Aircraft Maintenance Manual, Chapter 71-01-19, TASK 71-01-19-211-801, Inspection of the Engine After Thrust Reverser Emergency Engagement.

(c) **If cracks or missing pieces are found in both ends** of the outer v-blade of a thrust reverser half , or the cracks or missing pieces extend more than 11 inches (279,4 mm) from the end of the v-blade, that thrust reverser half must be removed, a replacement installed, and the operator must report the findings to BFGoodrich (Rohr) and IAE.

The fan case rear extension v-groove is examined for cracks. If any cracks are found, their length and location are reported to IAE for disposition.

(2) **For thrust reverser halves with 6000 or more flight cycles**:

(a) **If no cracks are found**, the operator must report the findings to BFGoodrich (Rohr) and IAE. This inspection must be repeated every 500 flight cycles until further notice.

(b) **If cracks or missing pieces are found in only one end** of the outer v-blade of a thrust reverser half, a stop drill hole is made, and the operator must report the findings to BFGoodrich (Rohr) and IAE. This inspection must be repeated every 500 flight cycles until further notice. If emergency reverse thrust is used, you must perform the inspection specified in the Aircraft Maintenance Manual, Chapter 71-01-19, TASK 71-01-19-211-801, Inspection of the Engine After Thrust Reverser Emergency Engagement.

(c) **If cracks or missing pieces are found in both ends** of the outer v-blade of a thrust reverser half , or the cracks or missing pieces extend more than 11 inches (279,4 mm) from the end of the v-blade, that thrust reverser half must be removed, a replacement installed, and the operator must report the finding to BFGoodrich (Rohr) and IAE.

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

R The fan case rear extension v-groove outer flange surface (refer to Figure 3) is examined for cracks. If any cracks are found, their length and location are reported to IAE for disposition.

R E. Approval

Incorporation of this Service Bulletin must be accomplished in conjunction with Boeing Service Bulletin MD90-78A039 Revision 01 which has received exclusive FAA approval for MD-90 Series aircraft.

R F. Compliance

Category 3

R Accomplish first inspection within 10 days of the the basic issue date of this service bulletin.
R Repeat inspections every 500 or 2000 flight cycles, as defined in Paragraph 1. C., until further notice.

R NOTE: If you do not accomplish as above, you must "lock-out" (de-activate) the thrust reverser until you accomplish this inspection (Refer to the MD90 Master Minimum Equipment List for limits of aircraft operation with the thrust reverser de-activated).

R G. Manpower

VENUE			ESTIMATED MANHOURS
(1)	In Service		
	(a)	To gain access	0.5 M/Hrs.
R	(b)	To inspect outer v-blade	1.0 M/Hrs.
	(c)	To inspect fan case v-groove, outer flanges	1.0 M/Hrs
	(d)	To check latch adjustment	0.5 M/Hrs.
	(e)	To return to service	0.5 M/Hrs.
		Total	3.5 M/Hrs. per Thrust Reverser and engine v-groove (7.0 M/Hrs. per aircraft)

R H. Material - Cost and Availability

None.

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

R I. Tooling - Cost and Availability

None required.

R J. Weight and Balance

(1)	Weight change	None
(2)	Moment arm	No effect
(3)	Datum	Engine Front Mount Centreline (Powerplant Station PPS 100.0)

R K. Electrical Load Data

Not affected.

R L. References

	Chapter/Section
MD-90 Aircraft Maintenance Manual	71-01-19 78-30-00 78-32-00
Overhaul Processes and Consumables Index (PCI-V2500-1IA)	
IAE Standard Practices/Processes Manual (SPP-V2500-1IA)	70-09-00 70-23-05
MD90 Master Minimum Equipment List	78-32-01

R Service Bulletin V2500-ENG-72-0371

R Service Bulletin V2500-NAC-78-0183

R M. Other Publications Affected

None.

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

NOTE: If, during incorporation of this ALERT service bulletin, you find that a replacement thrust reverser is required to keep an aircraft in service:

Please contact the BFGoodrich (Rohr) 24-hour A.O.G. department:
Telephone - (619) 691-2089
FAX - (619) 691-3916

NOTE: Thrust reversers that require repair may be sent to the following BFGoodrich Maintenance Repair & Overhaul (MRO) facilities:

Rohr Aero Services, Inc.
16150 South Greeno Road
Fairhope, Alabama 36532-5530
U.S.A.
Phone - 334-928-3220
FAX - 334-928-2849
Attention: - Craig Corey
Phone - 334-929-1058

BFGoodrich Aerospace (Rohr)
Rohr Aero Services, Ltd.
C/O BAE Military & Aerostructures Ltd.
Glanson Prestwick International Airport
South Ayrshire
Scotland KA9 2RW
United Kingdom
Phone - 44-1292-670200
FAX - 44-1292-672854
Attention - Ian Forrest
Phone - 44-1292-670225
FAX - 44-1292-6702151
Cell - 44-7771733712

BFGoodrich Aerospace
Rohr Aero Services Asia, Pte. Ltd.
1 Loyang Way 2
Singapore 507103
Singapore
Phone - 65-548-0706
FAX - 65-542-9646
Attention: - Andy Kwek
Phone - 65-548-0702

2. Accomplishment Instructions

A. Pre-requisite Instructions

CAUTION: THERE MAY BE LOOSE PIECES OF OUTER V-BLADE WHEN YOU OPEN THE THRUST REVERSER. REMOVE AND RETAIN ANY LOOSE PIECES OF V-BLADE FOR LATER INVESTIGATION.

(1) Open the thrust reverser halves. Look for, remove, and retain any loose pieces of outer v-blade for later investigation. Refer to the MD-90 Aircraft Maintenance Manual, Chapter 78-32-00, Page Block 201.

B. Examine the outer v-blade of the upper and lower thrust reverser halves for cracks or missing pieces.

WARNING: SOLVENT IS CLASSIFIED AS A HAZARDOUS MATERIAL WHICH MAY CAUSE INJURY OR ILLNESS IF NOT PROPERLY USED. THIS PRODUCT SHOULD BE USED ONLY IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFIC SAFETY AND HEALTH RECOMMENDATIONS. PRIOR TO USE OF THIS PRODUCT, CAREFULLY READ THE APPLICABLE "MATERIAL SAFETY DATA SHEET" AND FOLLOW ALL LISTED SAFETY AND HEALTH PRECAUTIONS.

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

R (1) Clean the outer v-blade at the aft radius location with a clean lint free cloth (CoMat 02-099) and solvent (CoMat 01-438) or equivalent.

(2) Visually examine the outer v-blade of each thrust reverser half for cracks or missing pieces. Use 10X magnification. Give special attention to the ends and the aft radius of the v-blade. If you suspect a crack, you must do a local high or ultra-high sensitivity penetrant inspection of the area. Refer to the IAE Standard Practices/Processes Manual (SPP-V2500-1IA), TASK 70-23-05-230-501. Refer to Figure 1.

CAUTION: CRACKS OR MISSING PIECES ARE ALLOWED IN ONLY ONE END OF THE OUTER V-BLADE OF EACH THRUST REVERSER HALF. CRACKS OR MISSING PIECES MAY EXTEND NO MORE THAN 11 INCHES (279,4 MM) FROM THE END OF THE V-BLADE. IF YOU FIND CRACKS OR MISSING PIECES IN BOTH ENDS OF THE V-BLADE OF ANY THRUST REVERSER HALF, OR THE CRACKS OR MISSING PIECES EXTEND MORE THAN 11 INCHES (279,4 MM) FROM THE END OF THE V-BLADE, YOU MUST REPLACE THAT HALF.

NOTE: Damage such as gouges, nicks, scratches, and wear, is acceptable until further notice. Make note of the presence of this damage for future reference/repair action. Refer to the Report Form at the back of this Service Bulletin.

(a) If you find cracks or missing pieces in only one end of the outer v-blade of the thrust reverser half and the cracks or missing pieces extend no more than 11 inches (279,4 mm) from the end of the v-blade, you must:

1 Immediately stop drill the crack. Refer to Figure 2.

a Make a pilot hole then drill a 0.25 inch (6,35 mm) hole as shown in Figure 2 or, if the crack or missing piece extends beyond the specified hole location, drill the 0.25 inch (6,35 mm) hole one inch beyond the end of the crack or missing piece. Remove the burrs from the finished hole.

2 Immediately examine the fan case rear extension v-groove for cracks as instructed in Paragraph 2.D.

3 Notify BFGoodrich (Rohr) and IAE of your findings. Refer to the Report Forms at the back of this Service Bulletin.

4 Complete the remainder of the procedures in this service bulletin.

5 Repeat this every 500 flight cycles until further notice. If emergency reverse thrust is used, you must perform the inspection specified in the Aircraft Maintenance Manual, Chapter 71-01-19, TASK 71-01-19-211-801, Inspection of the Engine After Thrust Reverser Emergency Engagement.

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

(b) If you find cracks or missing pieces in both ends of the v-blade of any thrust reverser half or if the crack or missing piece extends more than 11 inches (279,4 mm) from the end of the v-blade, you must:

1 Immediately remove the half and replace it with an acceptable half.

R 2 Immediately examine the fan case rear extension v-groove outer flange surfaces for cracks as instructed in Paragraph 2.D.

3 Notify BFGoodrich (Rohr) and IAE of your findings. Refer to the Report Form at the back of this Service Bulletin

4 If the replacement thrust reverser half does not have a crack or missing piece, you must:

a Complete the remainder of the procedures in this service bulletin.

b Repeat this inspection at the following intervals:

1 For thrust reverser halves with less than 6000 flight cycles, repeat every 2000 flight cycles until 6000 flight cycles. Once 6000 flight cycles is
R reached, this inspection must be repeated every 500 flight cycles until
R further notice. If emergency reverse thrust is used, you must perform the
R inspection specified in the Aircraft Maintenance Manual, Chapter 71-01-
R 19, TASK 71-01-19-211-801, Inspection of the Engine After Thrust
R Reverser Emergency Engagement.

2 For thrust reverser halves with 6000 or more flight cycles, this
R inspection must be repeated every 500 flight cycles until further notice.
R If emergency reverse thrust is used, you must perform the inspection
R specified in the Aircraft Maintenance Manual, Chapter 71-01-19, TASK
R 71-01-19-211-801, Inspection of the Engine After Thrust Reverser
R Emergency Engagement.

5 If the replacement thrust reverser half has a crack or missing piece, you must:

a Make a pilot hole then drill a 0.25 inch (6,35 mm) hole as shown in Figure 2 or, if the crack or missing piece extends beyond the specified hole location, drill a 0.25 inch (6,35 mm) hole one inch beyond the end of the crack or missing piece. Remove the burrs from the finished hole.

b Complete the remainder of the procedures in this service bulletin.

R c Repeat this inspection every 500 flight cycles until further notice. If emergency
R reverse thrust is used, you must perform the inspection specified in the Aircraft

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

Maintenance Manual, Chapter 71-01-19, TASK 71-01-19-211-801, Inspection of the Engine After Thrust Reverser Emergency Engagement.

(c) If you do not find a crack or missing piece in the v-blade of any thrust reverser half on any one aircraft:

1 Report the findings to BFGoodrich (Rohr) and IAE. Refer to the Report Form at the back of this Service Bulletin.

2 Continue with the remainder of the procedures in this service bulletin.

3 Repeat this inspection at the following intervals:

a For thrust reverser halves with less than 6000 flight cycles, repeat every 2000 flight cycles until 6000 flight cycles. Once 6000 flight cycles is reached, this inspection must be repeated every 500 flight cycles until further notice. If emergency reverse thrust is used, you must perform the inspection specified in the Aircraft Maintenance Manual, Chapter 71-01-19, TASK 71-01-19-211-801, Inspection of the Engine After Thrust Reverser Emergency Engagement.

b For thrust reverser halves with 6000 or more flight cycles, this inspection must be repeated every 500 flight cycles until further notice. If emergency reverse thrust is used, you must perform the inspection specified in the Aircraft Maintenance Manual, Chapter 71-01-19, TASK 71-01-19-211-801, Inspection of the Engine After Thrust Reverser Emergency Engagement.

R C.

D. Examine the fan case rear extension v-groove outer flange surfaces for cracks.

(1) Clean the v-groove outer flange surfaces with a lint free cloth (CoMat 02-099) and solvent (CoMat 01-438) or equivalent.

(2) Visually examine the outer flange surfaces of the v-groove for cracks. Use 10X magnification. If you suspect a crack, you must do a local high or ultra-high sensitivity penetrant inspection of the area. Refer to the IAE Standard Practices/Processes Manual (SPP-V2500-1IA), TASK 70-23-05-230-501. Refer to Figure 3.

(a) If you find a crack or damage in the v-groove or on the flange abutment faces of the fan case rear extension, you must contact IAE for disposition. Refer to the Report Form at the back of this service bulletin.

E. Post-requisite Instructions

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

(1) Close the thrust reverser halves. Refer to the MD-90 Aircraft Maintenance Manual, Chapter 78-32-00, page block 201.

CAUTION: IT IS NECESSARY THAT THE CLOSING FORCE OF EACH THRUST REVERSER AND FAN COWL LATCH IS PROPERLY ADJUSTED. GIVE PARTICULAR ATTENTION TO THE THRUST REVERSER NUMBER 1 (V-BLADE) LATCH.

(2) Check that the closing force of each of the thrust reverser and translating sleeve latches is 45-55 lbf (200-245 N). Start with the forward (v-groove) latch and move aft. Give special attention to the forward (v-groove) latch. Use a push-pull gage. Adjust as necessary. Report if the forward (v-groove) latch required adjustment (Refer to the Report Form at the back of this service bulletin). Refer to Figure 4.

NOTE: The closing force of each latch must be measured at the tip of the latch handle and with all other latches engaged with their final closing force.

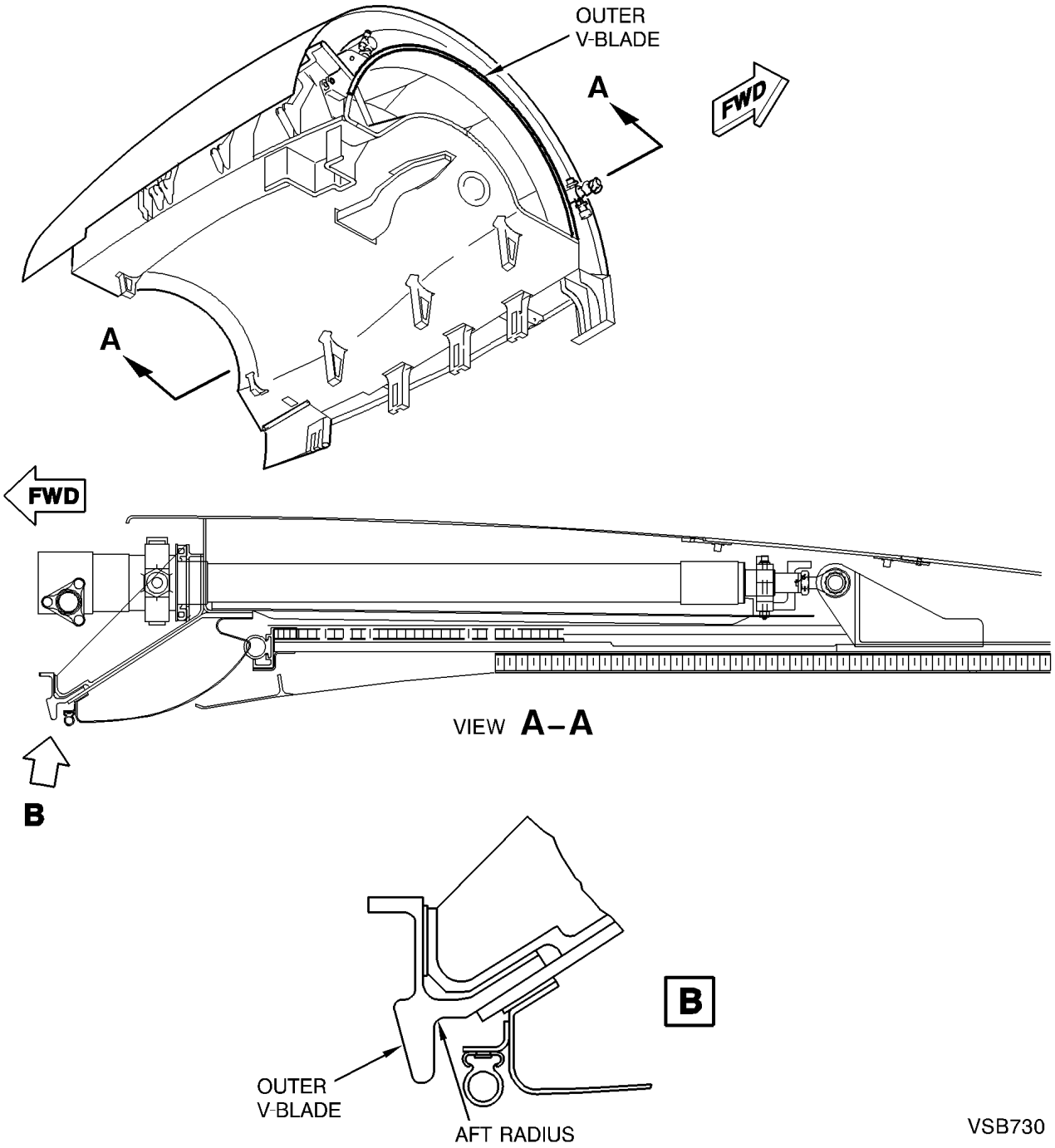
(3) Check that the closing force of each of the fan cowl latches is 20-25 lbf (89-111,2 N). Use a push-pull gage. Adjust as necessary.

NOTE: The closing force of each latch must be measured at the tip of the latch handle and with all other latches engaged with their final closing force.

F. Record of Accomplishment

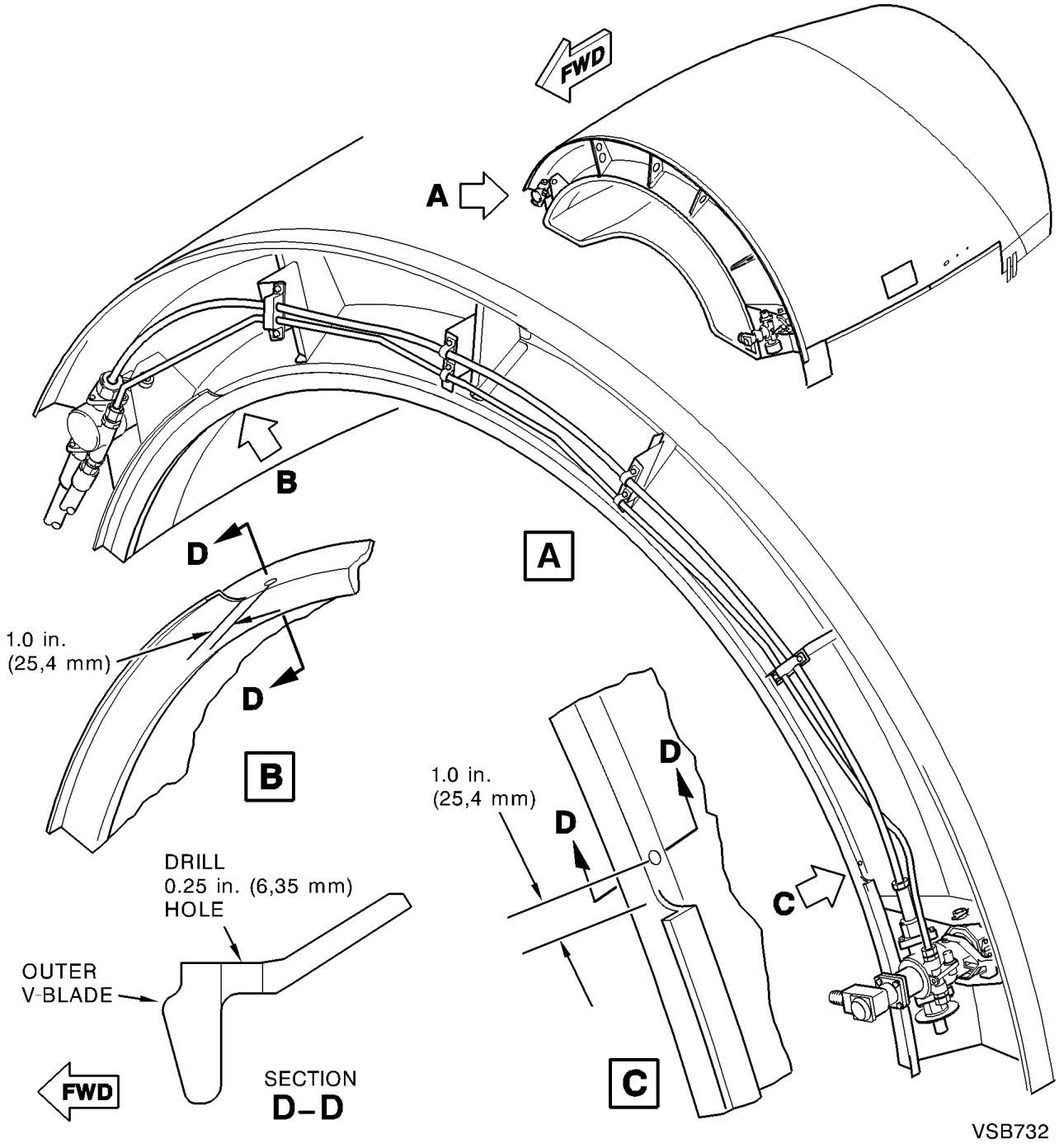
(1) A record of accomplishment is necessary. Write in the applicable records and metal stamp, electroetch, or vibroetch on the thrust reverser data plate that Service Bulletin V2500-NAC-78-A0182 has been done. Refer to the IAE V2500 Standard Practices/Processes Manual, Chapter 70-09-00.

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).



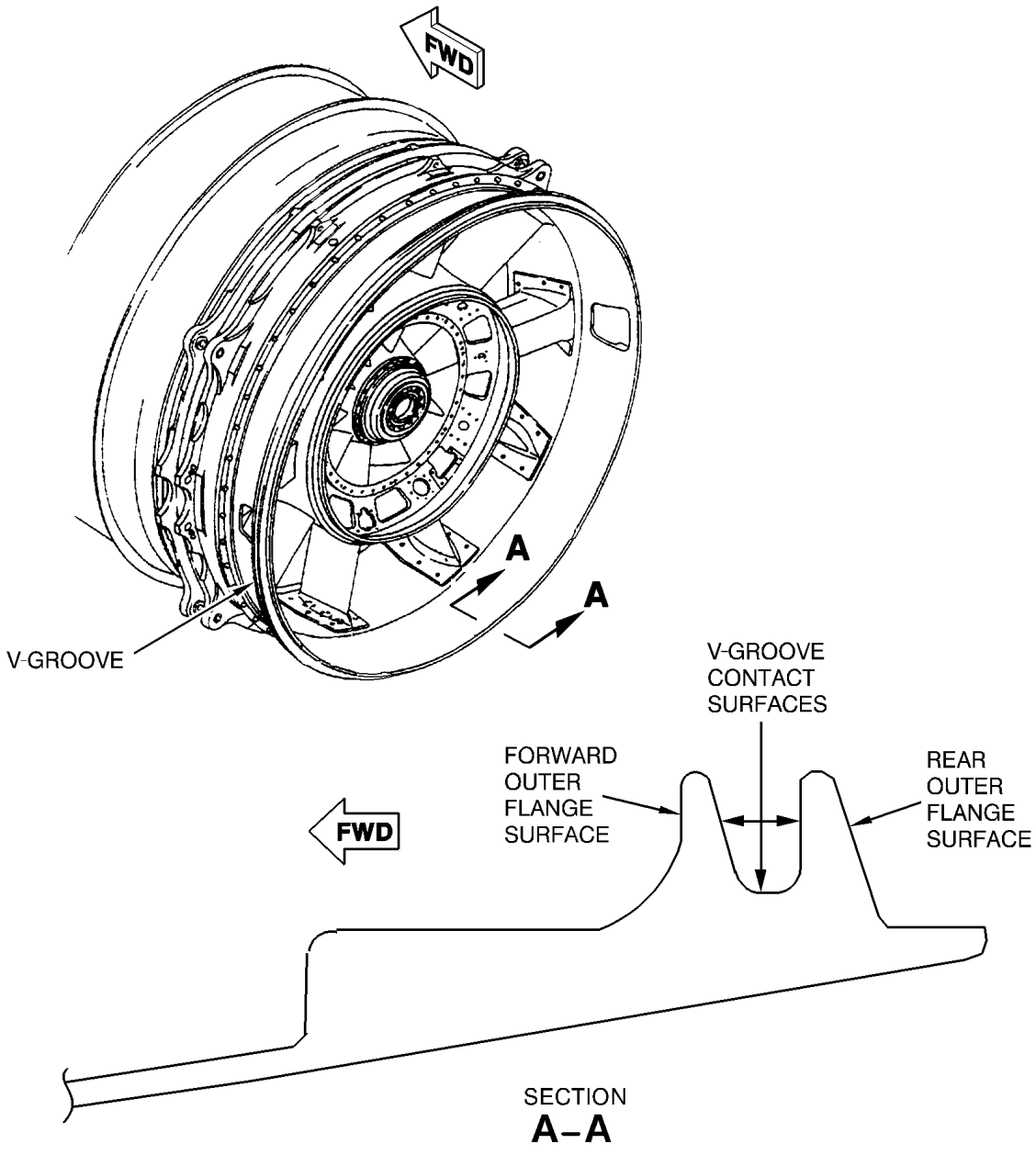
Thrust Reverser Outer V-Blade Inspection
Figure 1

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).



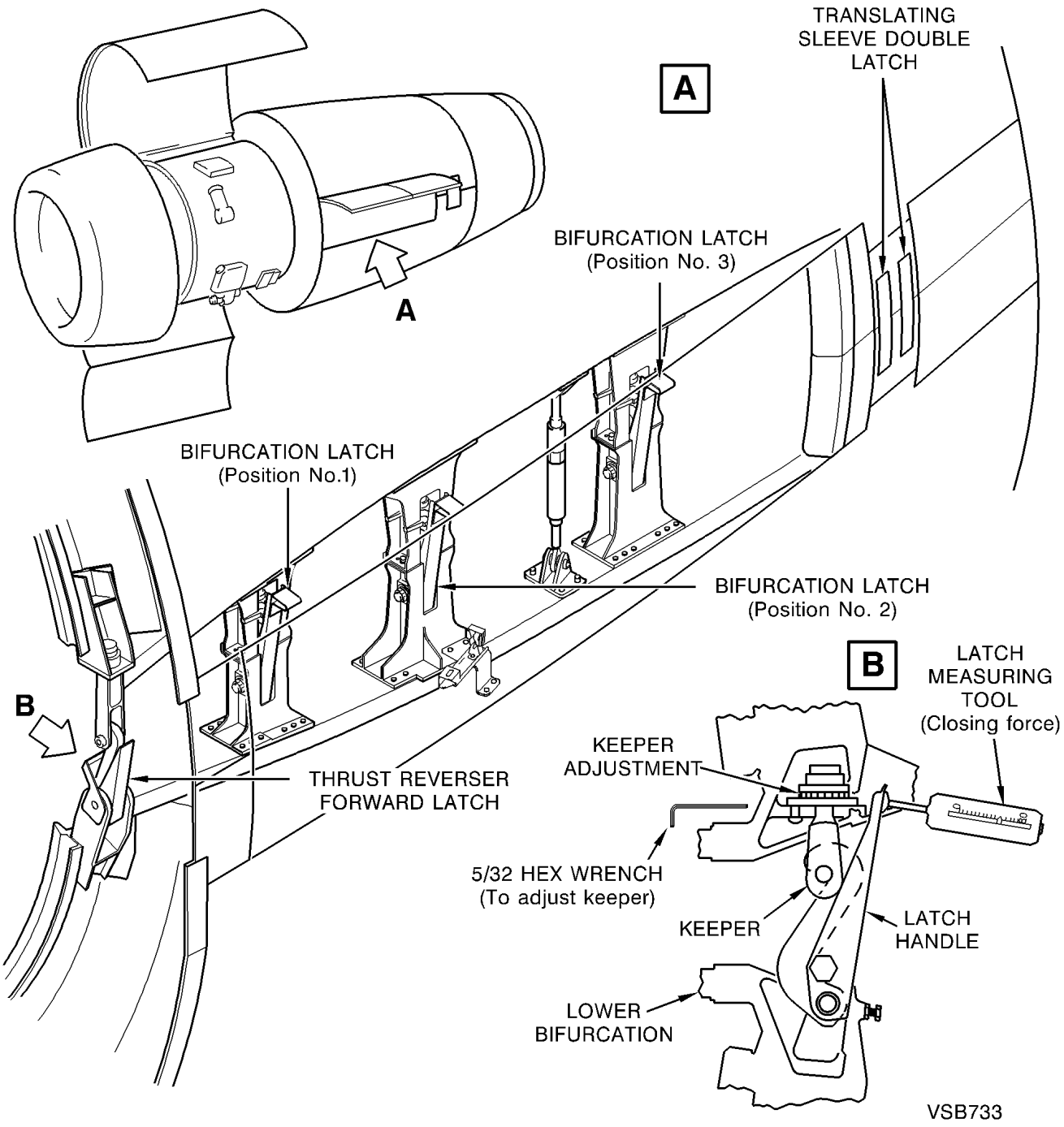
Outer V-Blade Crack or Missing Piece Stop Drill
Figure 2

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).



Fan Case Rear Extension Inspection
Figure 3

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).



Thrust Reverser Latch Adjustment
Figure 4

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

3. Material Information

Applicability: For each V2500-D5 thrust reverser to incorporate this Bulletin.

A. Kits Associated with this Bulletin:

None.

B. Parts affected by this Bulletin:

None.

C. Instruction/Disposition Code Statements

None.

D. Materials Required to Incorporate this Service Bulletin:

R

CoMat 01-438	Solvent - or equivalent
CoMat 02-099	Lint free cloth - or equivalent

NOTE: To identify the consumable materials, refer to the Overhaul Processes and Consumable Index PCI-V2500-1IA.

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

V2500-NAC-78-A0182 Thrust Reverser Report Form			
Date			
Operator			
Aircraft	**Tail Number**		
	Flight Hours		
	Flight Cycles		
Thrust Reverser	**Serial Number(s)**		
	Part Number(s)		
	Flight Cycles		
	Engine Position		
	Number of Outer V-blade Cracks (if any)		
	Location of Outer V-blade Cracks (if any)		
	Size/Length of Outer V-blade Cracks (if any)		
	Description of V-Blade Damage Other Than Cracks		
	Forward (V-Groove) Latch Required Adjustment	**Yes**	**No**

Please fax this form to:
IAE Technical Services Manager - 44-1332-244067
BFGoodrich - Robert Rothwell - (619) 691-6403

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

V2500-NAC-78-A0182 Fan Case Rear Extenson Report Form		
Date		
Operator		
Aircraft	**Tail Number**	
Engine	**Engine Serial Number** **Hours** **Cycles**	
Forward Outer Flange Surface	**Number of Cracks**	**Size/Length**
		Location(s)
Rearward Outer Flange Surface	**Number of Cracks**	**Size/Length**
		Location(s)
Forward/Rearward/ Bottom Contact Face (delete as applicable)	**Number of Cracks**	**Size/Length**
		Location(s)
Forward Outer Flange Surface	**Damage Other Than Cracks**	**Description**
		Location
Rearward Outer Flange Surface	**Damage Other Than Cracks**	**Description**
		Location
Forward Contact Face	**Damage Other Than Cracks**	**Description**
		Location
Rearward Contact Face	**Damage Other Than Cracks**	**Description**
		Location
Bottom Contact Face	**Damage Other Than Cracks**	**Description**
		Location

Please fax this form to:
IAE Technical Services Manager - 44-1332-244067
BFGoodrich - Robert Rothwell - (619) 691-6403

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).