PART 4 - ULTRASONIC

NUMBER 1, 2, 7 AND 8 OUTBOARD FLAP TRACKS

1. Purpose

A. Use this procedure to do an ultrasonic inspection to find cracks in the upper flange of the number 1, 2, 7 and 8 outboard flap tracks (see Figure 1).

B. This ultrasonic inspection will examine the flap track for cracks at the outboard fastener hole where the flap track is attached to the wing rear spar. The inspection examines the outboard side of the hole for a crack that can start at the upper or lower edge of the hole and go to the edge of the outboard flange. This procedure will find a 0.10 inch (2.5 mm) corner crack. See Figure 1, Sheet 2.

C. This inspection uses two shear wave transducers that are specially made to do the inspection without the removal of structure and with access from the aft side of the wing rear spar. The transducers are put on the outer edge of the upper flange (transducer inspection surface). The two transducers are made to point a 45 degree sound wave beam in the forward and aft direction. One transducer points the sound beam 8 degrees to the right and the other points the sound 8 degrees to the left. The two transducers together, will examine the upper and lower edges of the hole from the forward and aft side of the hole. Figure 1 shows the transducer positions on the inspection surface (the surface that the transducer is put on to examine the inspection area). Figure 3 shows the transducers.

D. Service Bulletin Reference: 737-57-1249, 737-57A1271

2. Equipment

NOTE: Refer to Part 1, 51-01-00, for data about the equipment manufacturers.

A. All ultrasonic equipment that can do the calibration instructions of this procedure can be used.

(1) Instrument - An ultrasonic instrument that can operate at 4 to 6 MHz, is necessary. Broadband instruments can be used if they can do the calibration instructions of this procedure. These instruments were used to prepare this procedure:

(a) Sonic-136 - Staveley Instruments, Inc.

(b) USD 15 - Krautkramer Branson

(c) USN 50 - Krautkramer Branson

(2) Transducers - Two specially made 5 MHz transducers with compound angles of 45 and 8 degrees are used to put a shear wave in steel. The 45 degree angle is along the length of the transducer. Transducer SUS921R angles the sound to the right side 8 degrees, transducer SUS921L angles the sound to the left side 8 degrees. The two transducers have a 6 inch (152 mm) handle. The transducers are attached to the handle with a pin to let the transducer turn 180 degrees. Figure 3 shows the two transducers.

(a) SUS921R - NDT Engineering Corp

(b) SUS921L - NDT Engineering Corp

(3) Reference Standard - Make Reference Standard NDT3021 as specified in Figure 2.

NOTE: The reference standard is also used in Part 6, 57-50-01, for the eddy current inspection on the outboard edge of the upper flange.

(4) Couplant - All ultrasonic couplants that will not cause damage to the airplane structure can be used. A light commercial grease works well.

3. Prepare for the Inspection

A. Identify the transducer inspection surface. See Figure 1.

B. Lower the flaps all the way down.

C. Remove the center outboard fairing.

D. Clean the inspection surface, remove sealant if it is on the inspection surface.

4. Instrument Calibration

A. Connect the transducer to the instrument with a coaxial cable.

B. Set the instrument frequency to 4 to 6 MHz.

C. Put a sufficient amount of couplant on the inspection surface of reference standard NDT3021. Details I and II in Figure 4 identify the transducer positions for the instrument calibration.

D. Put the transducer on the inspection surface with the sound beam pointed in the direction of the hole. See Detail I in Figure 4 for the transducer position with transducer SUS921R. See Detail II in Figure 4 for the transducer position with transducer SUS921L.

NOTE: Make sure the transducer is on the reference standard with the side of the transducer (the side opposite the handle) flush with the front side (the side with the notch at the hole) of the reference standard.

E. Adjust the instrument delay, range and gain controls to get a signal from the hole to be on the screen display.

F. Move the transducer along the surface to get a maximum signal from the hole.

G. Adjust the instrument delay and range controls to get the maximum hole signal set to 80% of full screen width with the initial pulse set to 0% of full screen width. See Detail III in Figure 4 for the screen display.

H. Move the transducer along the surface in the direction of the notch to get a signal from the notch. Monitor the distance the transducer moved from the position where the transducer was set to get the maximum hole signal to the position to get the notch signal.

I. Move the transducer back and forward along the surface to get a maximum signal from the notch.

J. Adjust the instrument gain control to get the notch signal to 80% of full screen height. See Detail IV in Figure 4 for the screen display.

NOTE: Do not use reject.

K. Increase the gain 6 dB. Do not remove the 6 dB gain during the inspection.

5. Inspection Procedure

A. Put a sufficient amount of couplant on the transducer inspection surface of the flap track. Figure 1 shows the transducer inspection surface and the transducer positions.

B. Put the transducer on the flap track a short distance forward or aft of the hole. Detail II in Figure 1 shows the transducer positions with transducer SUS921L and Detail III shows the transducer positions with transducer SUS921R.

NOTE: The transducer positions shown in Details II and III in Figure 1 are set with the sound beam pointed at the hole.

C. Move the transducer on the inspection surface to put the edge of the transducer (the edge opposite of the handle) as flush as possible to the edge of the applicable flap track flange (upper or lower edge) shown in Details II and III in Figure 1.

NOTE: Transducer SUS921R in Detail III in Figure 1, shown with the transducer in a position that looks forward and up, is to be put as near to the top of the flange as possible. Make sure you get a hole signal to show on the screen display.

D. Make a slow scan on the inspection surface in the direction of the hole to get a signal from the hole and continue to scan towards the hole to examine the inspection area. As you make a scan, monitor for ultrasonic signals that occur between 60% and 80% of full screen width.

NOTE: Keep the edge of the transducer as flush to the edge of the flap track flange as possible when you do the scan inspections. The scan inspection with transducer SUS921R to examine the upper edge as shown in Detail III in Figure 1 will not have an edge for the transducer to follow.

E. Do Paragraph 5.B. thru Paragraph 5.D. again with the other transducer to examine the inspection areas from the opposite direction.

F. Do Paragraph 5.A. thru Paragraph 5.E. again to examine all of the flap tracks (numbers 1, 2, 7 and 8).

G. Refer to Paragraph 6. to make an analysis of the ultrasonic signals that occurred during this inspection.

6. Inspection Results

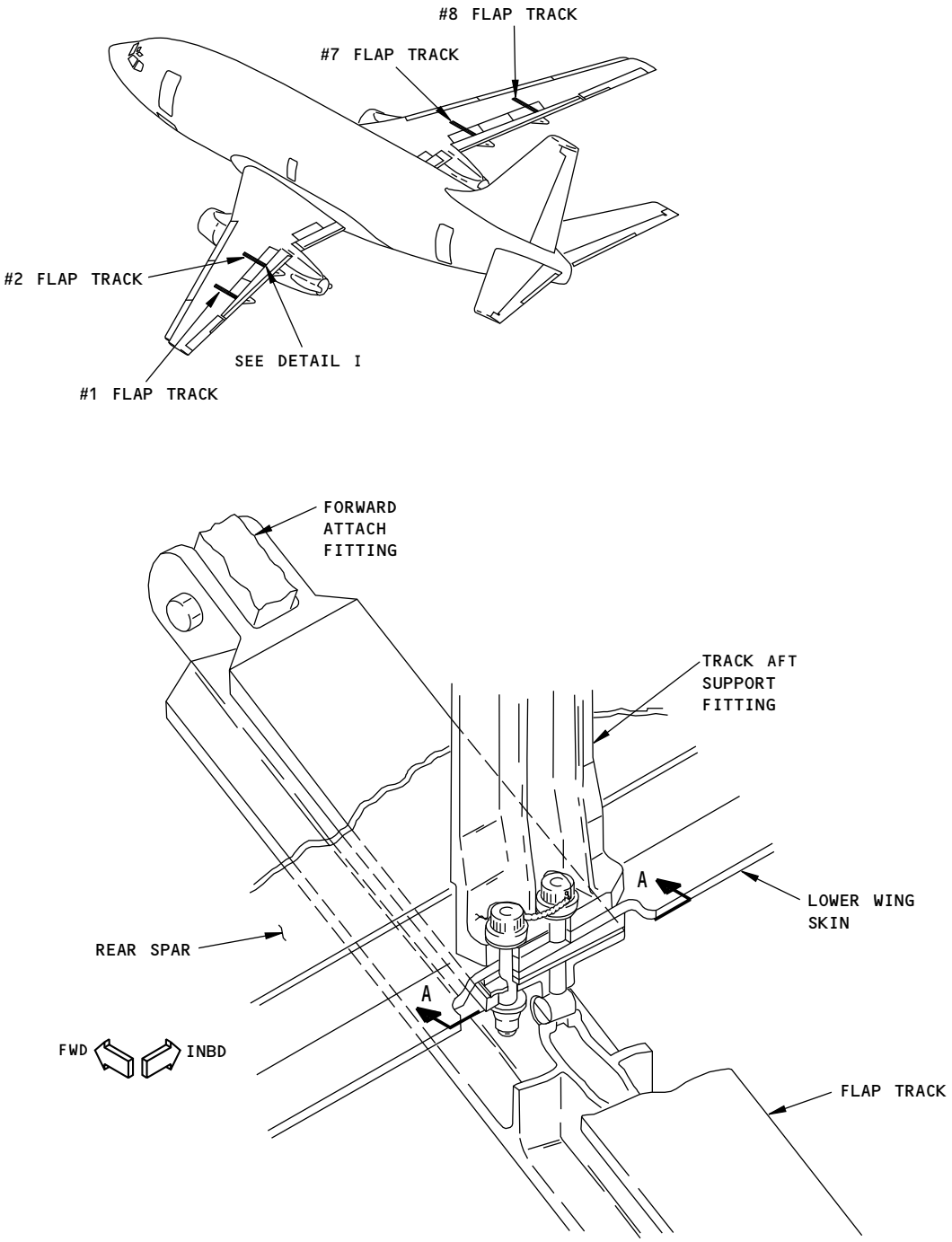
A. An ultrasonic signal that is 40% or more of full screen height and is between 60 to 80% of full screen width, is a sign of a possible crack.

NOTE: Look for the signal from the hole to increase to a maximum of 80% of full screen width and then decrease as you do the scan to the hole. A crack signal will show just to the left of the hole signal, with a decrease in the hole signal. An off angle crack can show at the same screen width location as the hole signal. Be very careful to monitor the screen display for such a crack. Monitor the position of the transducer at all times to help identify the cause of signals.

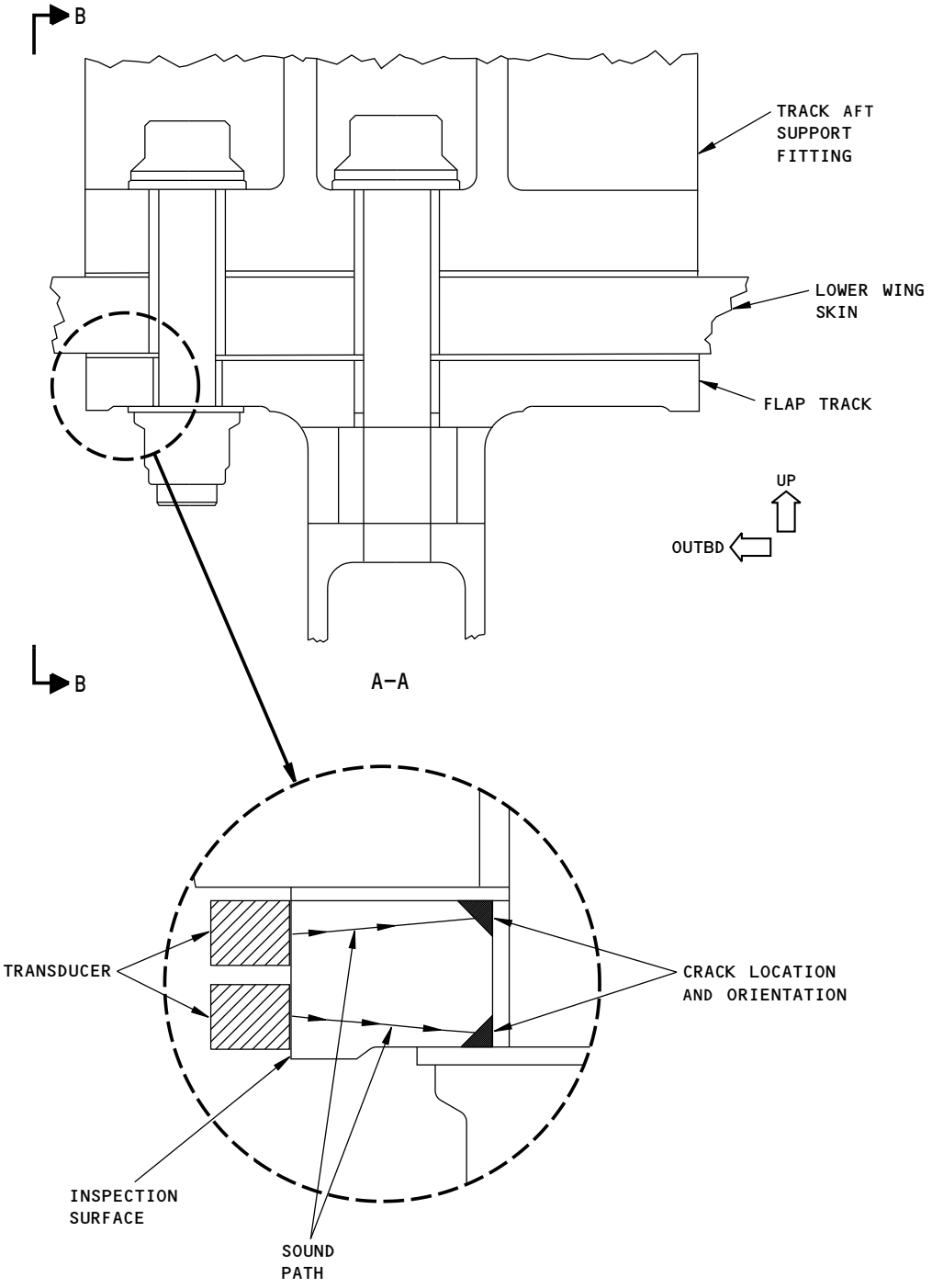
B. Corrosion on the inside surface of the hole, in the inspection area, can cause a signal to look wide or have multiple echoes.

C. Remove the (2) track aft attach bolts and lower the aft end of the track to get access to the holes. Refer to the Airplane Maintenance Manual (AMM), Chapter 27-51.

D. Do an open hole eddy current inspection as specified in Part 6, 51-00-00, Procedure 19.



Numbers 1, 2, 7 and 8 Outboard Flap Track Inspection Areas
Figure 1 (Sheet 1 of 3)



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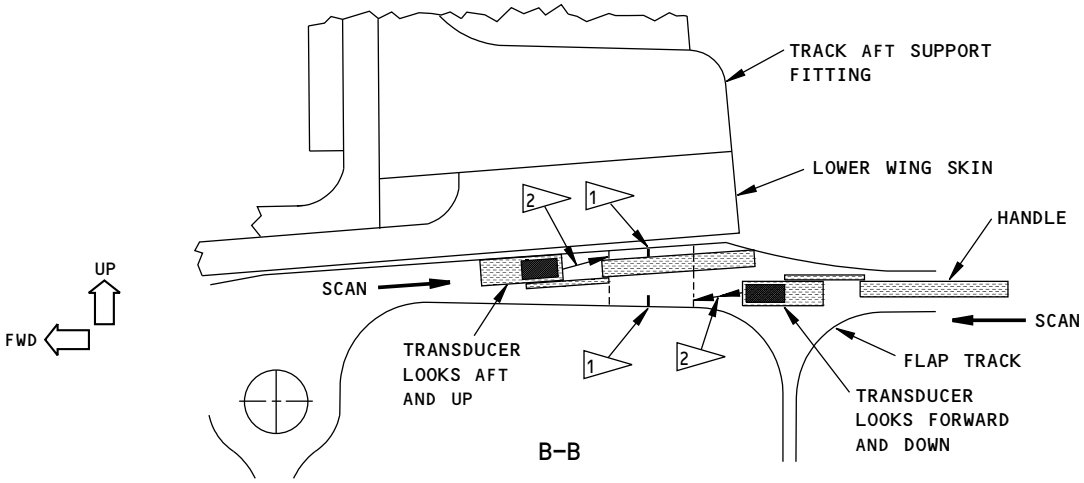
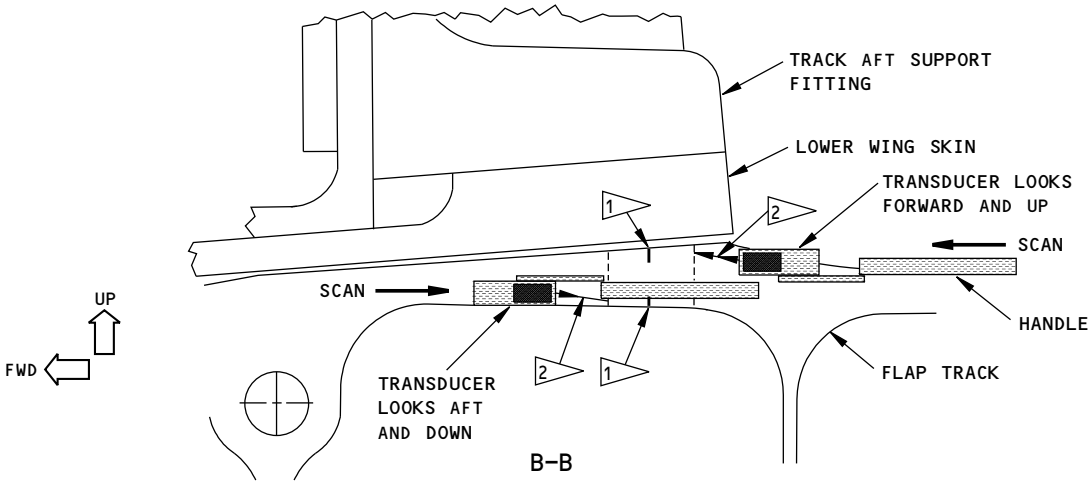
Numbers 1, 2, 7 and 8 Outboard Flap Track Inspection Areas
Figure 1 (Sheet 2 of 3)



TRANSDUCER POSITIONS WITH
TRANSDUCER SUS921L
DETAIL II



TRANSDUCER POSITIONS WITH
TRANSDUCER SUS921R
DETAIL III

NOTES:

- DETAILS II AND III ARE VIEWS FROM THE #1 AND #2 FLAP TRACKS. TO EXAMINE THE #7 AND #8 FLAP TRACKS, USE TRANSDUCER SUS921R IN DETAIL II AND TRANSDUCER SUS921L IN DETAIL III.
- THE TRANSDUCERS SHOWN IN DETAILS II AND III ARE POSITIONED WITH THE SOUND BEAM SET ON THE HOLE.
- GET ACCESS FROM THE AFT SIDE OF THE REAR SPAR TO POSITION THE TRANSDUCER ON THE FORWARD AND AFT SIDE OF THE HOLE. IT IS NECESSARY TO TURN THE TRANSDUCER 180 DEGREES TO LOOK AT THE HOLE FROM THE OPPOSITE DIRECTION. FOR EXAMPLE, IF TRANSDUCER SUS921R IS POSITIONED ON THE AFT SIDE, IT LOOKS FORWARD AND UP, THEN TURN THE TRANSDUCER 180 DEGREES AND POSITION IT ON THE FORWARD SIDE OF THE HOLE TO LOOK AFT AND DOWN.

1 CRACK LOCATION ON THE OUTBOARD SIDE OF THE FASTENER HOLE

2 SOUND PATH

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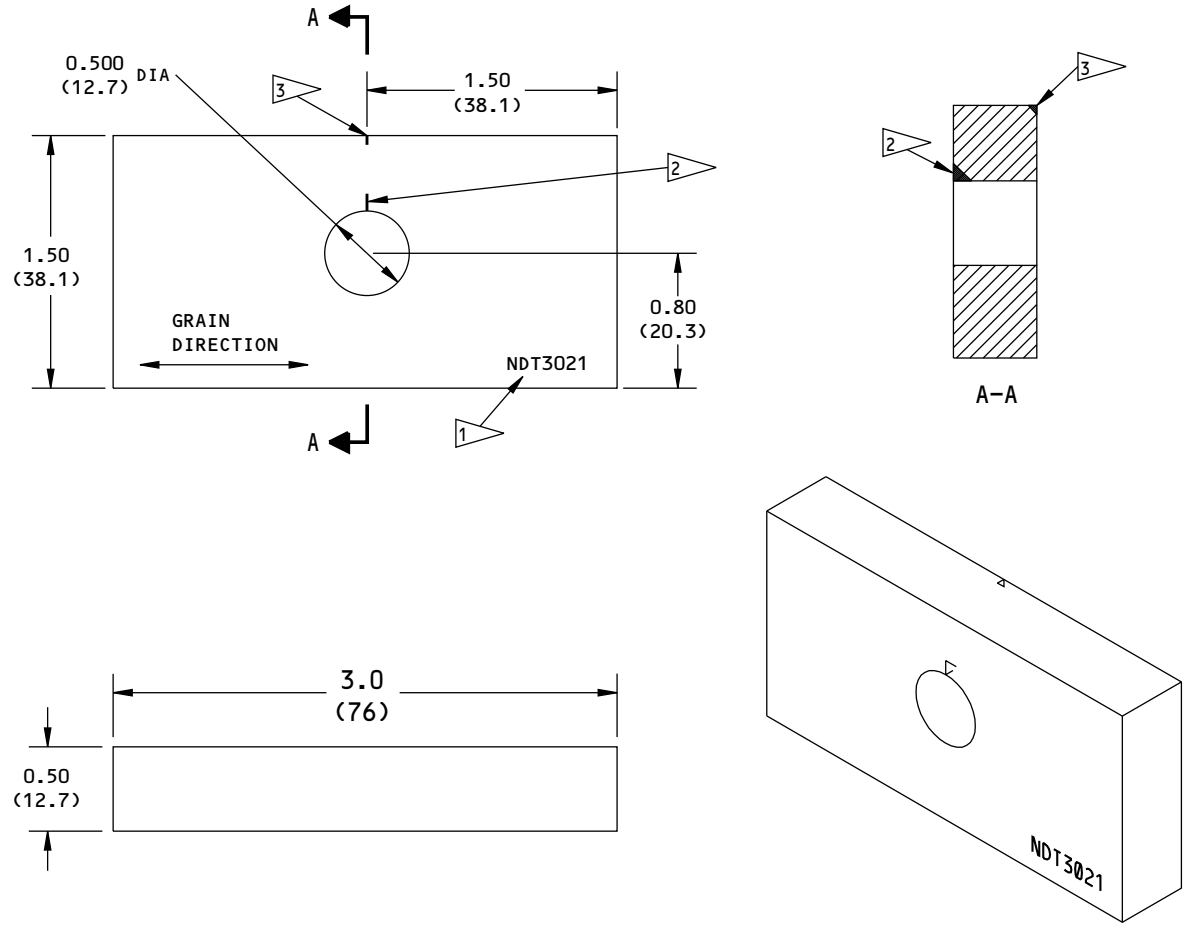
Numbers 1, 2, 7 and 8 Outboard Flap Track Inspection Areas
Figure 1 (Sheet 3 of 3)



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCES (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ±0.005	X.XX = ±0.1
X.XX = ±0.025	X.X = ±0.5
X.X = ±0.050	X = ±1

- MATERIAL: 4330, 4330M, 4340 OR 4340M STEEL
- SURFACE ROUGHNESS: 63 Ra OR BETTER

1 ETCH OR SCRIBE THE REFERENCE STANDARD NUMBER NDT3021

2 EDM NOTCH - CORNER
WIDTH - 0.005 (0.13) ±0.002 (0.05)
LENGTH - 0.100 (2.50)
DEPTH - 0.100 (2.50)
THE NOTCH MUST BE WITHIN ±0.005 (0.13) OF THE CENTERLINE OF THE HOLE AS SHOWN.

3 EDM NOTCH - CORNER
WIDTH - 0.005 (0.13) ±0.002 (0.05)
LENGTH - 0.050 (1.3)
DEPTH - 0.050 (1.3)

THIS NOTCH IS USED FOR THE INSTRUMENT CALIBRATION IN PART 6, 57-50-01.

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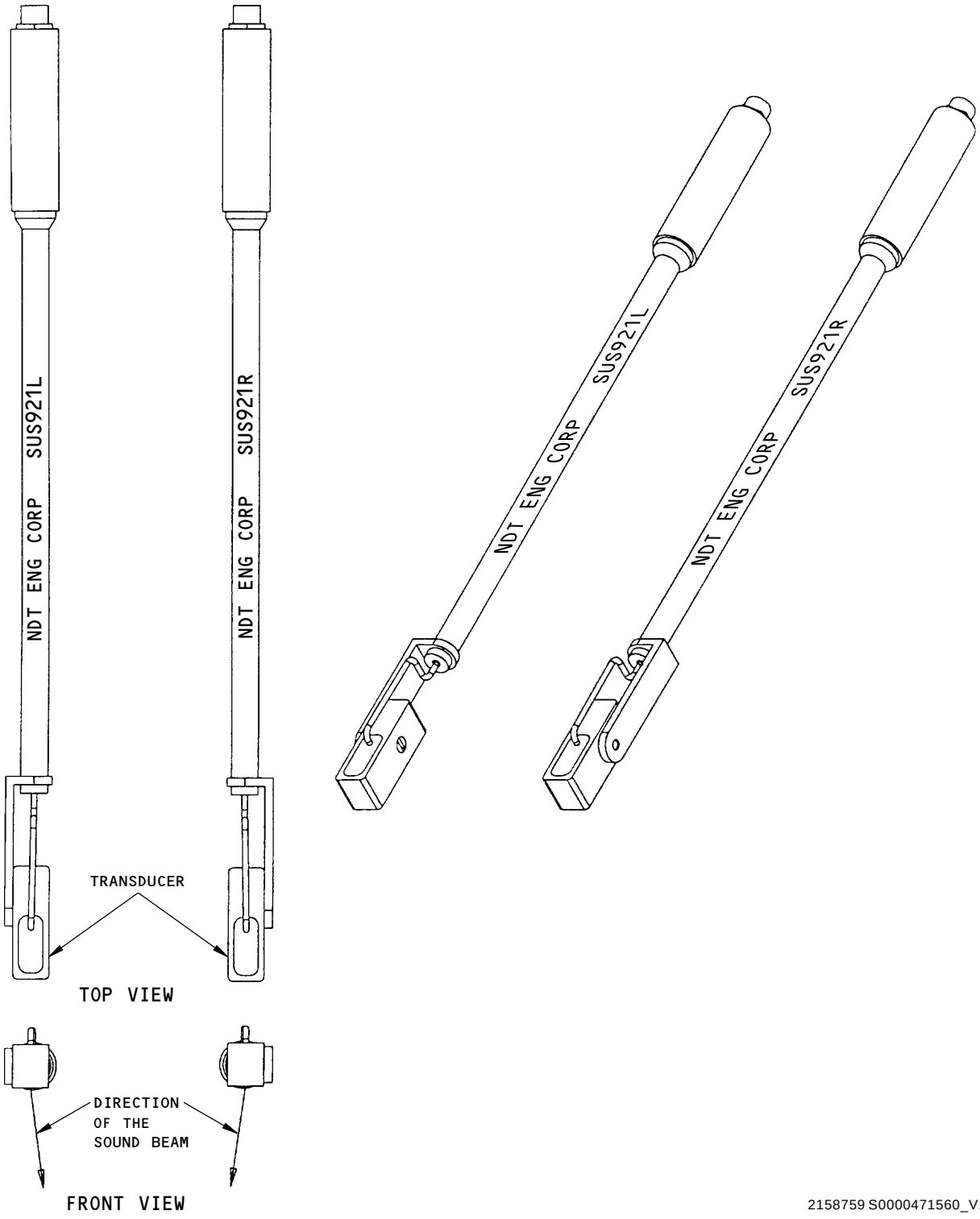
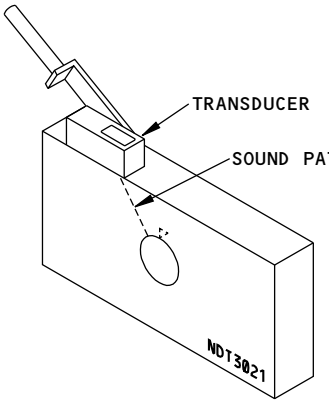
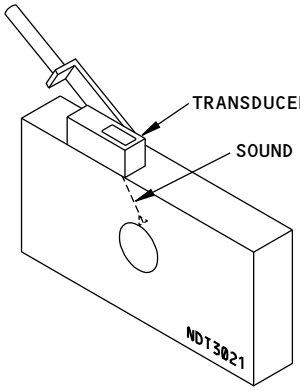
Reference Standard NDT3021
Figure 2



Transducers SUS921R and SUS921L
Figure 3

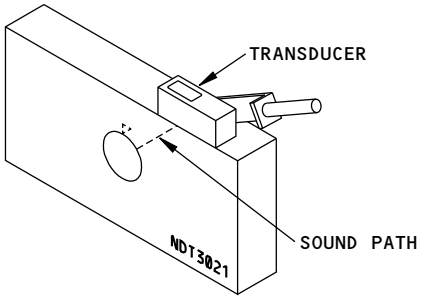


TRANSDUCER POSITION TO GET
A SIGNAL FROM THE HOLE

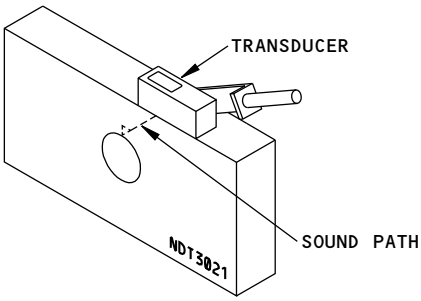


TRANSDUCER POSITION TO GET
A SIGNAL FROM THE NOTCH

TRANSDUCER POSITION FOR CALIBRATION
WITH TRANSDUCER SUS921R
DETAIL I

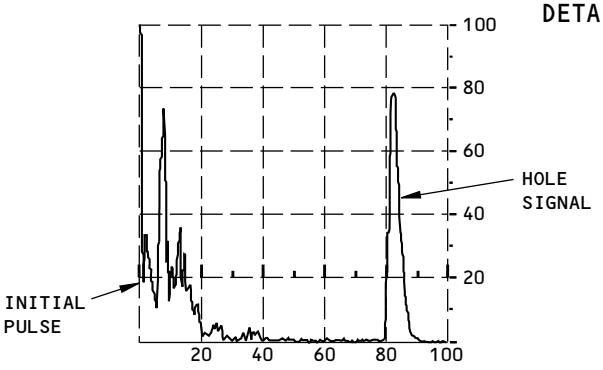


TRANSDUCER POSITION TO GET
A SIGNAL FROM THE HOLE

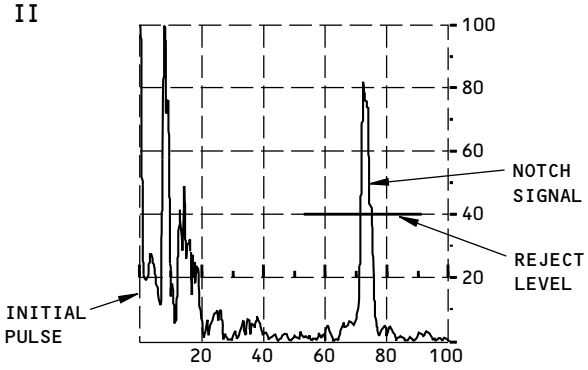


TRANSDUCER POSITION TO GET
A SIGNAL FROM THE NOTCH

TRANSDUCER POSITION FOR CALIBRATION
WITH TRANSDUCER SUS921L
DETAIL II



SCREEN DISPLAY OF
THE HOLE SIGNAL
DETAIL III



SCREEN DISPLAY OF
THE NOTCH SIGNAL
DETAIL IV

NOTES:

- THE SCREEN DISPLAYS, DETAILS III AND IV, ARE EXAMPLES.

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Instrument Calibration
Figure 4

PART 4 - ULTRASONIC

OUTBOARD MIDFLAP CARRIAGE SPINDLES

1. Purpose

A. Use this ultrasonic procedure to examine the outboard midflap carriage spindle for a complete fracture. There are a total of four carriage spindles to examine on the airplane (two carriage spindles on each flap). See Figure 1 for the location of the carriages.

B. This procedure looks for a complete fracture within a 2.25 inch (57 mm) inspection area that starts at the spindle radius. There are two configurations of carriages; one has a 0.75 inch (19 mm) tooling hole on the most forward end of the spindle and the other configuration is without the hole. Figure 2 shows the inspection areas and the two carriage configurations.

C. This inspection uses a zero degree, longitudinal wave transducer that is installed in a contoured positioner. The transducer inspection surface is a radius on the most forward end of the spindle. See Figure 2, Section B-B for the transducer inspection surface (the surfaces that the transducer is put on to examine the inspection area) for the carriage with the tooling hole. See Figure 2, Section C-C for the transducer inspection surface for the carriage without the tooling hole.

D. Service Bulletin Reference: 737-57A1277

2. Equipment

A. General

(1) Use inspection equipment that can be calibrated on the reference standard as specified in Paragraph 4.

(2) Refer to Part 1, 51-01-00, for data about the equipment manufacturers.

B. Instrument

(1) Use an ultrasonic instrument that:

(a) Operates at a frequency between 4 and 6 MHz. Broadband instruments can be used if they can do the calibration instructions of this procedure.

(2) The instruments specified below were used to help prepare this procedure.

(a) USD 15, USN 50/52; Hocking Krautkramer

(b) Sonic 136, Nortec 1000; Staveley Instruments

C. Transducer

(1) Use a transducer that:

(a) Operates at a frequency between 4 and 6 MHz.

(b) Is a zero degree, longitudinal wave with an element diameter of 0.250 inches (6.4 mm).

(c) Has a length that will go completely into the transducer positioner identified in Figure 3.

(2) The transducers that follow were used to help prepare this procedure:

(a) 5 MHz, 0.250 inch (6 mm) element diameter, gamma series transducer. Case dimensions: 0.375 inch (10 mm) diameter by 0.75 inch (19 mm) long. Part number 389-011-280, made by Krautkramer.

(b) 5 MHz, 0.250 inch (6 mm) element diameter, gamma series transducer. Case dimensions: 0.375 inch (10 mm) diameter by 0.50 inch (13 mm) long. Part Number SUC166-8T, made by NDT Engineering Corp.

D. Transducer Positioner

(1) Use transducer positioner NDT3038-P1. See Figure 3 for the data about the transducer positioner.

E. Reference Standard

(1) Use reference standard NDT3038. See Figure 4 for data about the reference standard.

F. Couplant

(1) Use a couplant that will not cause damage to the airplane structure. A light grease works good.

3. Prepare for the Inspection

A. Identify the transducer inspection surfaces. See Figure 2, Sections B-B and C-C.

B. Lower the flaps to the full down position.

C. Clean the transducer inspection surface. It is necessary to remove paint only if the paint is loose or soft. Make the surface smooth if it is rough.

4. Instrument Calibration

A. For instruments that are not broadband, set the frequency between 4 and 6 MHz.

B. Put a small amount of couplant in the hole of the transducer positioner and put the transducer completely in the hole. Tighten the set-screw lightly to keep the transducer in the positioner.

C. Put a sufficient amount of couplant on the transducer inspection surface of reference standard NDT3038. Detail I in Figure 5 identifies the transducer positions for the instrument calibration.

D. Put the transducer on the inspection surface at transducer position 1 with the sound beam pointed in the direction of the back surface of the reference standard. See Detail I in Figure 5.

E. Adjust the instrument gain, delay and range controls to get a signal from the back surface to occur on the screen display.

F. Turn the transducer a small amount from side to side along the surface to get a maximum signal from the back surface.

G. Adjust the instrument delay and range controls to put the back surface signal at 70% of full screen width (FSW) with the initial pulse set to 0% of FSW. See Detail II in Figure 5 for the screen display.

H. Move the transducer to transducer position 2, with the sound beam pointed in the direction of the hole. See Detail I in Figure 5.

I. Turn the transducer a small amount from side to side and move it up and down along the surface to get a maximum signal from the hole. See Detail III in Figure 5.

J. Adjust the instrument gain control to get the hole signal to 80% of FSH. The signal from the hole will occur at a screen display location of approximately 52% of FSW. See Detail III in Figure 5.

NOTE: Do not use reject.

5. Inspection Procedure

A. Prepare for the inspection as specified in Paragraph 3.

B. Calibrate the instrument as specified in Paragraph 4.

C. Put a sufficient amount of couplant on the transducer inspection surface. See Figure 2, Section B-B for the carriage configuration with the tooling hole and Section C-C for the carriage configuration without the tooling hole.

D. Examine the carriage spindle for a complete fracture as follows:

(1) Put the transducer in the middle of the transducer inspection surface, with the sound beam pointed along the centerline of the carriage spindle. See Figure 2, Section B-B and C-C for the location of the transducer inspection surface.

(2) Move the transducer up and down in the transducer inspection surface area and monitor the screen display for the signals that follow:

(a) A signal from the bolt hole in the spindle that occurs at approximately 51% to 55% of FSW.

(b) A signal from a complete fracture that can occur between 22% and 45% of FSW.

(c) Signals that are not in the inspection area to make sure the transducer touches the carriage. Figure 6 shows signals that can occur that are caused from the configuration of the carriage spindle.

E. Refer to Paragraph 6. to make an analysis of the ultrasonic signals that occurred during this inspection.

6. Inspection Results

A. A signal that is between approximately 51% and 55% of FSW and is 10% (minimum) of FSH, is a signal from the bolt hole in the spindle. Do not increase the gain from the calibration setting. The spindle does not have a complete fracture and is satisfactory if the above signals occur on the screen display and a signal does not occur at 80% (or more) of FSH and between 22% and 45% of FSW. Figure 6 shows signals that can occur in a satisfactory spindle without a complete fracture.

NOTE: (1) It is possible to get signals from the spindle radius to occur in the inspection area if the transducer is turned to the side, away from the centerline or moved to the upper or lower edge of the inspection area. Make sure the transducer is aligned with the centerline of the spindle axis and that the signal from the bolt hole occurs on the screen display.

NOTE: (2) Some spindles have a tooling hole, as shown in Figure 2. It is possible to get a signal to occur in the inspection area when the transducer is moved to the edge of the hole. The sound beam is refracted to an edge on the bottom of the spindle. Make sure the transducer is positioned between the edge of the hole and the bottom of the inspection surface.

NOTE: (3) Continue to do an analysis of the spindle as specified in Paragraph 6.B. if the spindle was found to be "not satisfactory" during Paragraph 6.A. If the spindle was found satisfactory during Paragraph 6.A., the inspection is complete and no more analysis is necessary.

B. A signal that is 80% (or more) of FSH and between 22% and 45% of FSW, is a possible complete fracture indication (it does not make a difference if a bolt hole signal between approximately 51% and 55% of FSW occurs or not). A spindle that causes this type of signal is not satisfactory if the transducer is on the centerline of the inspection zone when the signal occurs.

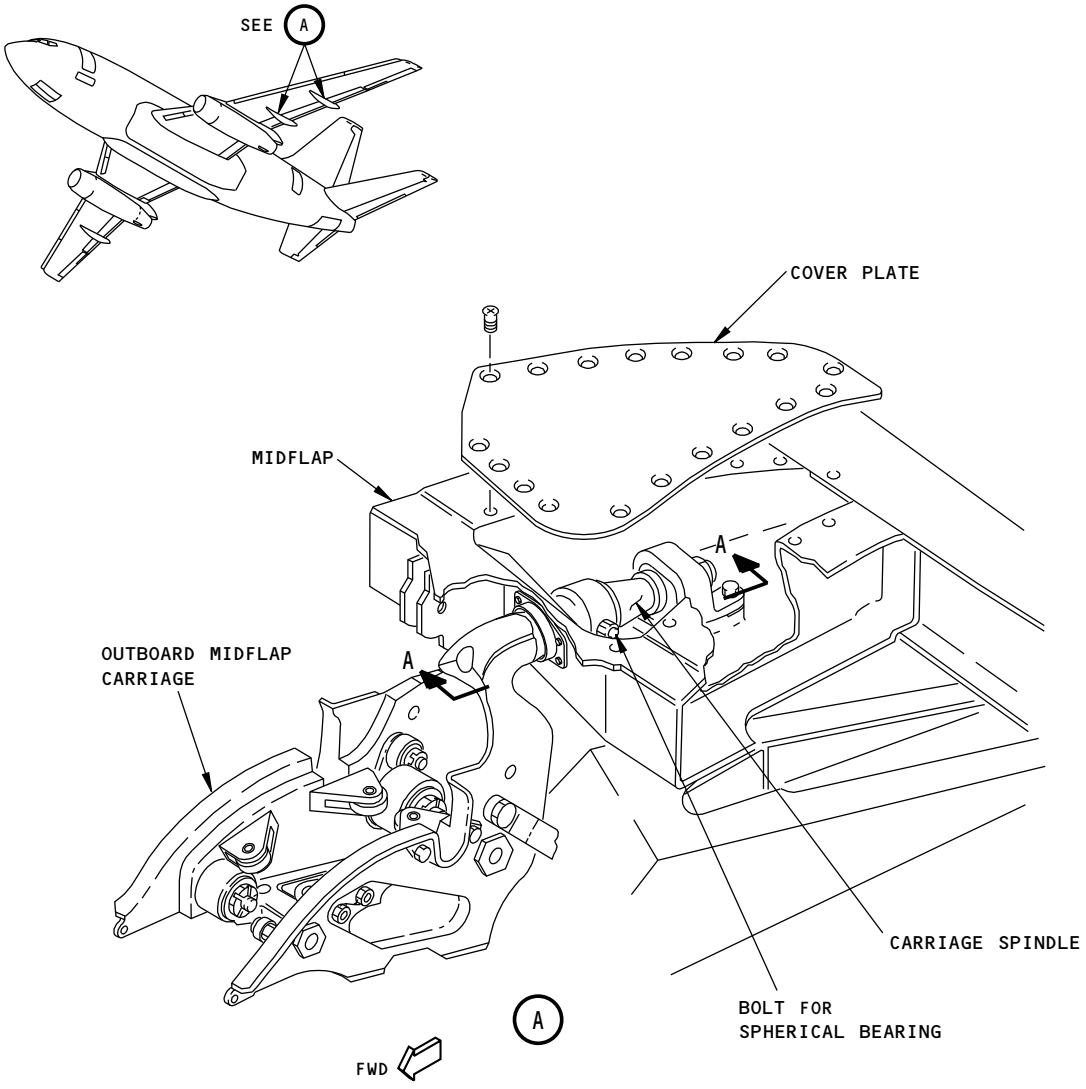
(1) If a complete fracture indication is not found during Paragraph 6.B. and the spindle was found to be "not satisfactory" during Paragraph 6.A., continue to do an analysis as specified in Paragraph 6.C.

C. A complete fracture that is not 90 degrees to the spindle axis can cause a fracture signal to not occur on the screen display or a signal to be less than 80% of FSH between 22% and 45% FSW, along with a complete loss of the bolt hole and threaded end signals. Do the steps that follow if the above condition occurs:

(1) Increase the instrument gain by 6 dB to get a bolt hole signal to occur. If a signal occurs between 51% and 55% of FSW, the spindle is not fractured and is satisfactory.

(2) If the bolt hole signal does not occur, remove paint and do the inspection again.

(3) If the bolt hole signal does not occur, the spindle is not satisfactory.



LEFT OUTBOARD MIDFLAP CARRIAGE SHOWN;
RIGHT OUTBOARD MIDFLAP CARRIAGE IS ALMOST THE SAME

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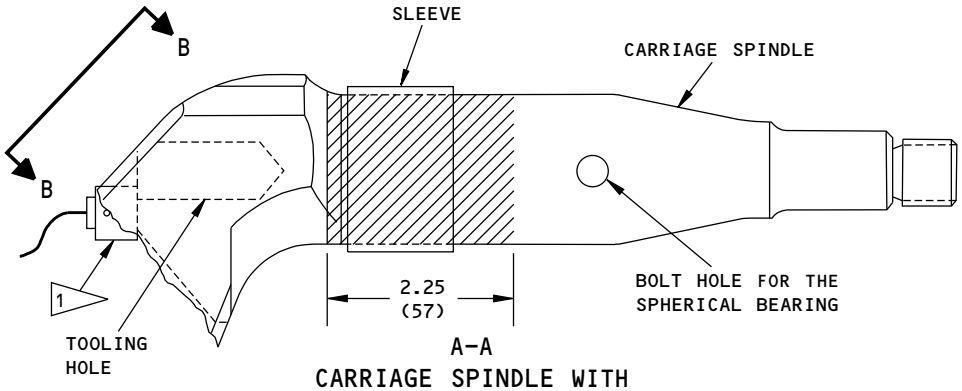
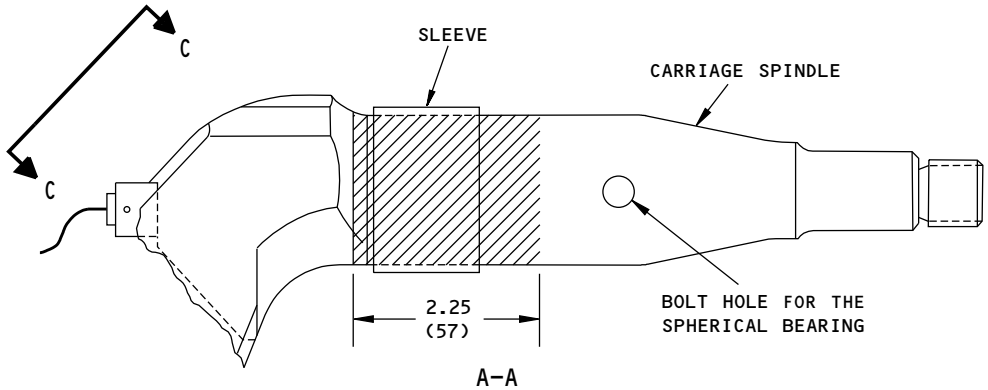
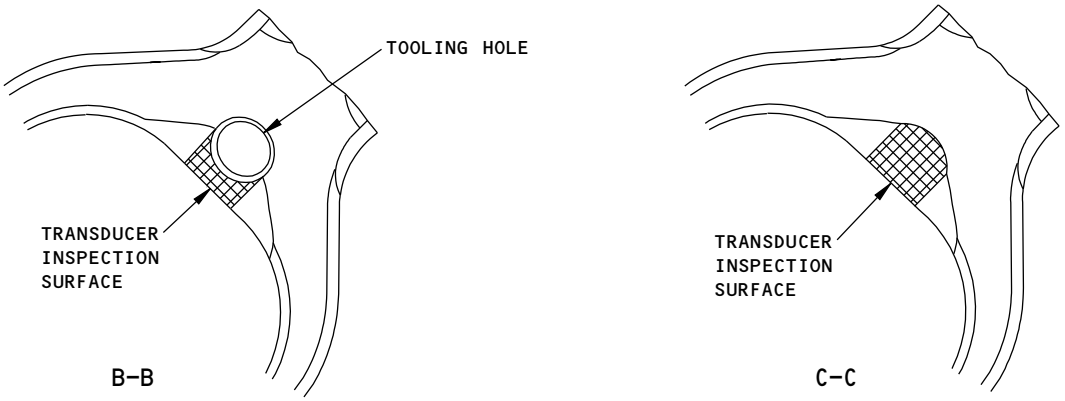
Outboard Midflap Carriage Spindle Inspection
Figure 1



CARRIAGE SPINDLE WITH THE TOOLING HOLE



CARRIAGE SPINDLE WITHOUT THE TOOLING HOLE



NOTES:

INSPECTION AREA

TRANSDUCER INSPECTION SURFACE

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- SECTIONS B–B AND C–C SHOW THE TRANSDUCER INSPECTION SURFACE. THE TRANSDUCER IS NOT SHOWN IN SECTIONS B–B AND C–C.

1 POSITION THE CENTER OF THE TRANSDUCER BEWEEN THE BOTTOM EDGE OF THE TOOLING HOLE AND THE EDGE OF THE RADIUS.

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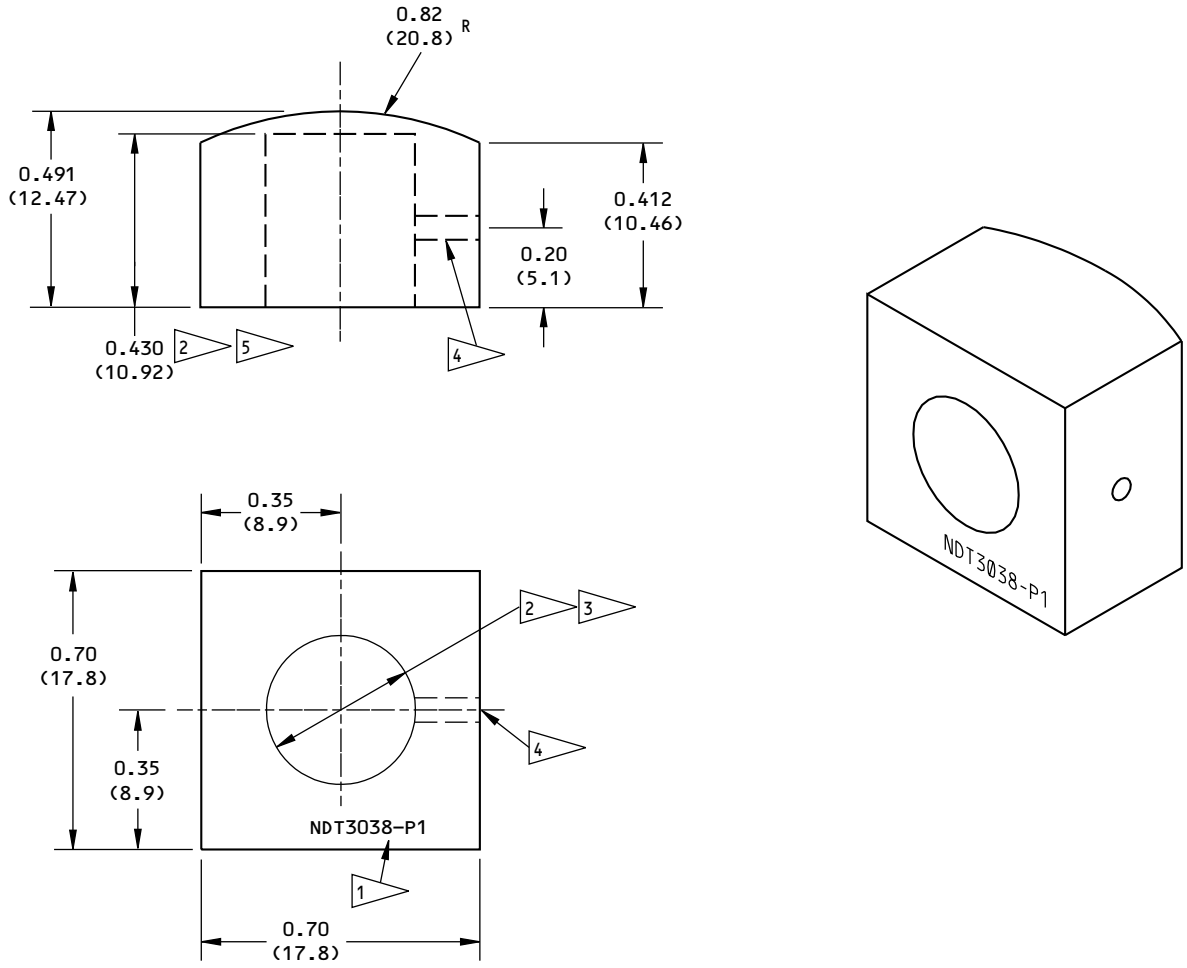
Inspection Area
Figure 2



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCES:

INCHES	MILLIMETERS
X.XXX = ±0.002	X.XX = ±0.05
X.XX = ±0.010	X.X = ±0.3
X.X = ±0.020	X = ±0.5

- MATERIAL: PLEXIGLASS, LUCITE OR EQUIVALENT
- SURFACE ROUGHNESS: 63 Ra OR BETTER

1. ETCH OR SCRIBE THE TRANSDUCER POSITIONER NUMBER NDT3038-P1
2. FLAT BOTTOM HOLE
3. DRILL THE FLAT BOTTOM HOLE DIAMETER 0.002 (0.05) LARGER THAN THE OUTER DIAMETER OF THE TRANSDUCER USED.
4. DRILL AND TAP FOR A 6-32 SET SCREW ON THE CENTERLINE OF THE TRANSDUCER HOLE AS SHOWN.
5. THE DEPTH OF THE FLAT BOTTOM HOLE (FLAG NOTE 2) WAS INITIALLY SPECIFIED TO BE 0.400 (10.16). IF YOU HAVE ONE OF THESE TRANSDUCER POSITIONERS, IT IS NOT NECESSARY TO REPLACE IT OR CHANGE THE DEPTH OF THE HOLE IF IT CAN BE CALIBRATED ON THE REFERENCE STANDARD.

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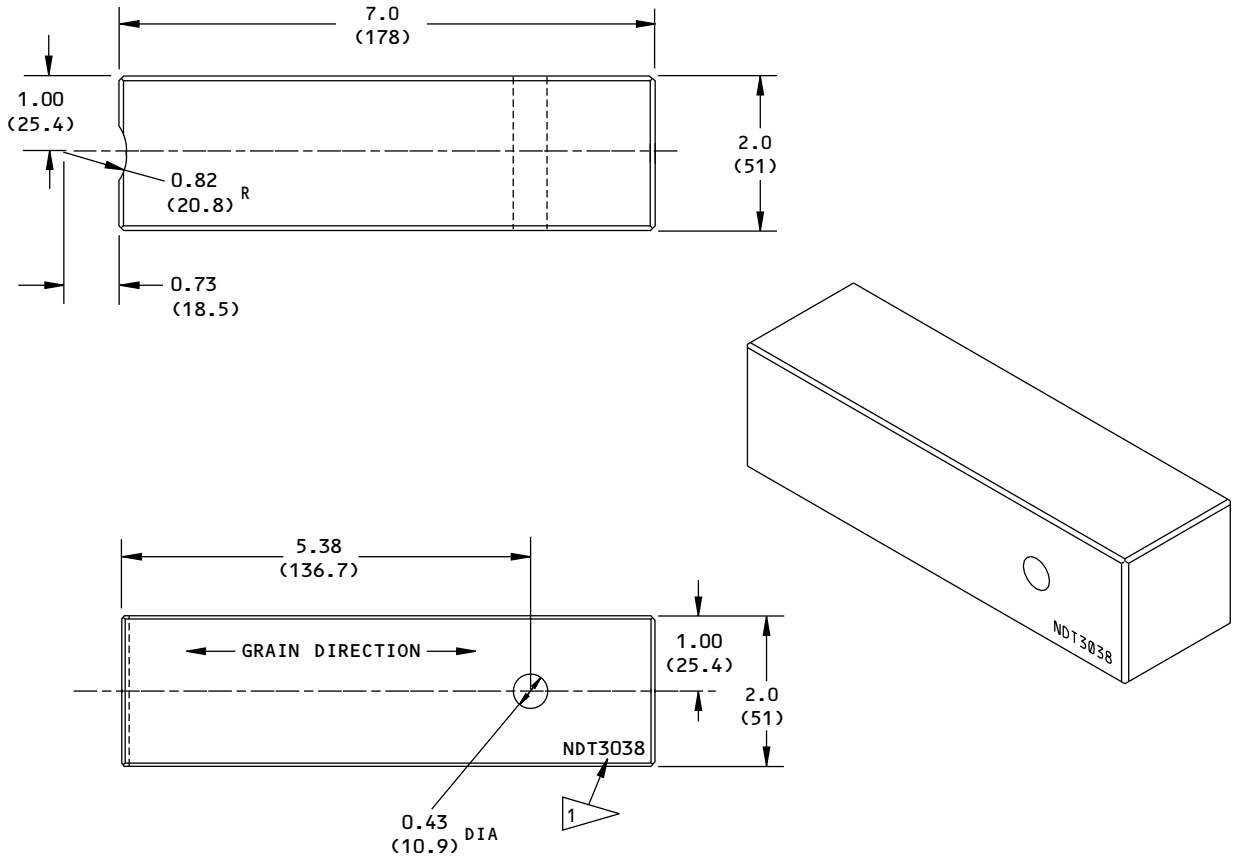
Transducer Positioner NDT3038-P1
Figure 3



NOTES:

- ALL DIMENSIONS ARE IN INCHES
  (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCES (UNLESS SPECIFIED DIFFERENTLY):

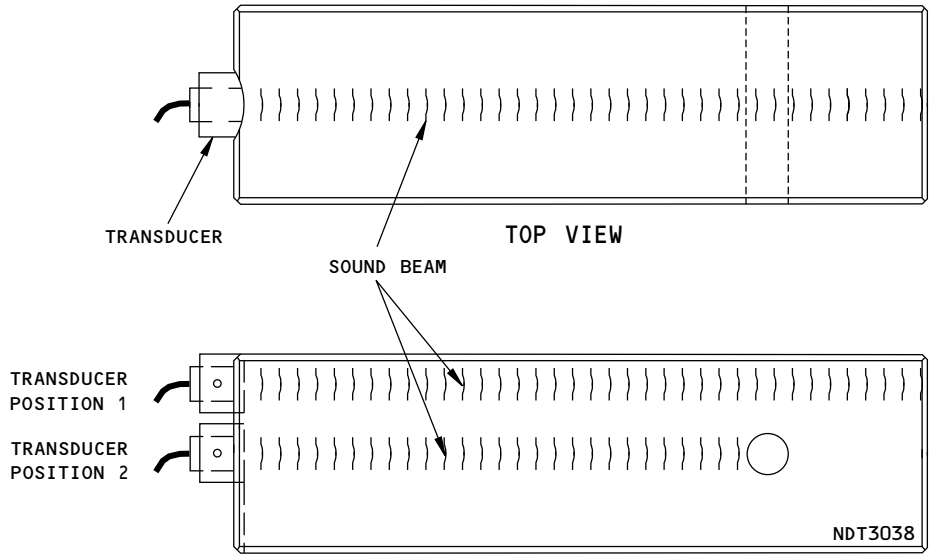
INCHES	MILLIMETERS
X.XXX = ±0.005	X.XX = ±0.10
X.XX = ±0.025	X.X = ±0.5
X.X = ±0.050	X = ±1

- SURFACE ROUGHNESS = 63 Ra OR BETTER
- MATERIAL: 4330, 4330M, 4340 OR 4340M STEEL
- PUT A 0.040 (1.0) TO 0.060 (1.5) CHAMFER ON ALL THE EDGES OF THE REFERENCE STANDARD TO REMOVE SHARP EDGES.
- APPLY A CORROSION PROTECTION FINISH TO THE REFERENCE STANDARD SURFACES.

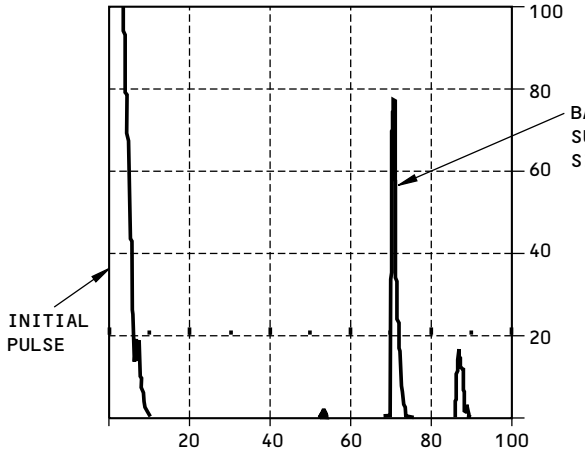
1 ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT3038

2158766 S0000471567_V1

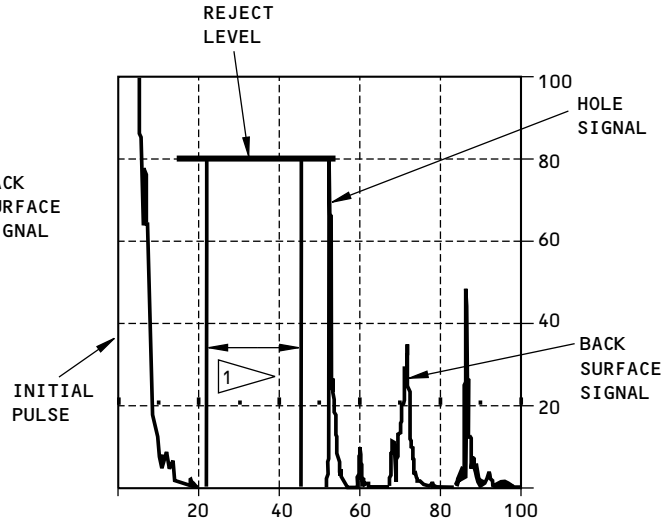
Reference Standard NDT3038
Figure 4



TRANSDUCER POSITIONS ON
THE REFERENCE STANDARD
DETAIL I



SCREEN DISPLAY WITH TRANSDUCER
AT TRANSDUCER POSITION 1
DETAIL II



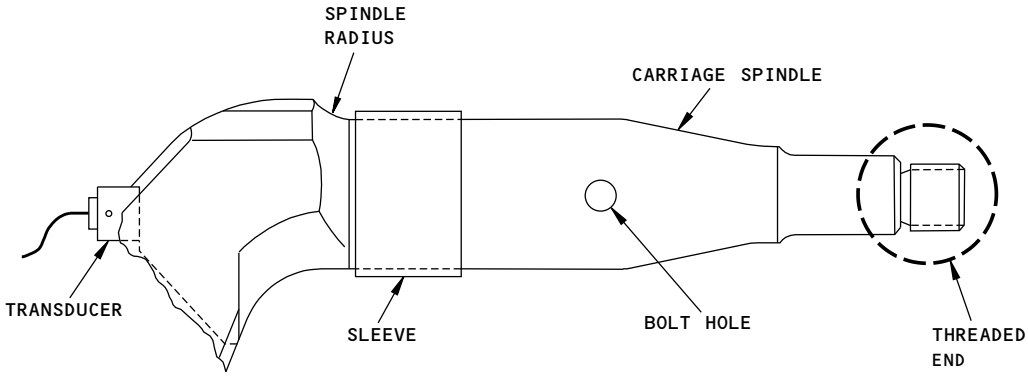
SCREEN DISPLAY WITH TRANSDUCER
AT TRANSDUCER POSITION 2
DETAIL III

NOTES:

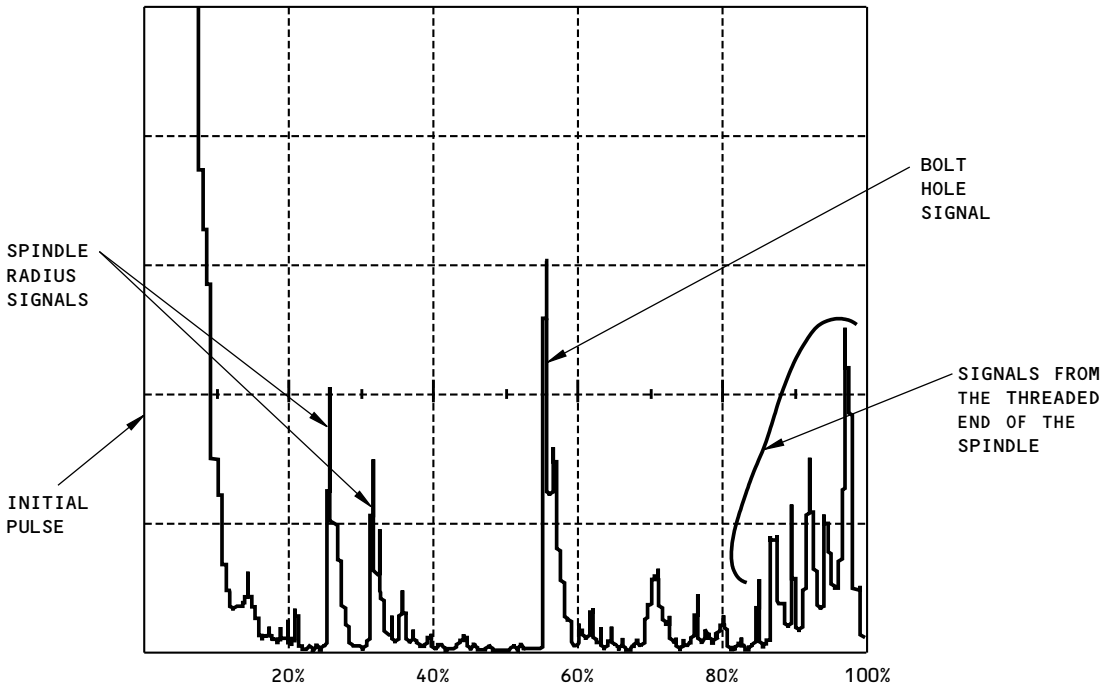
1 THE INSPECTION AREA IS 22 TO 45 PERCENT OF FULL SCREEN WIDTH.

2158767 S0000471568_V1

Instrument Calibration
Figure 5



CARRIAGE WITHOUT
THE TOOLING HOLE
DETAIL I



SCREEN DISPLAY OF ACTUAL
SIGNALS FROM A CARRIAGE SPINDLE
DETAIL II

NOTES:

- THE SIGNALS FROM THE SPINDLE RADIUS OCCUR IN THE INSPECTION AREA AND ARE AT A MAXIMUM WHEN THE TRANSDUCER IS TURNED AWAY FROM THE CENTERLINE OF SPINDLE. TYPICALLY, THE SIGNALS ARE 10% OR LESS OF FULL SCREEN HEIGHT WHEN THE TRANSDUCER IS ALIGNED WITH THE CENTERLINE OF THE SPINDLE.

2158770 S0000471569_V1

Ultrasonic Signals from an Actual Carriage Spindle
Figure 6

PART 4 - ULTRASONIC

INBOARD TRAILING EDGE FLAP - TORQUE TUBE OF THE CARRIAGE ASSEMBLIES AT WBL 66.5 AND 191

1. Purpose

A. Use this procedure to find cracks in the torque tube of the carriage assemblies at WBL 66.5 and 191. The torque tubes are attached to the midflap of the inboard trailing edge flap assembly. See Figure 1 for the location of the carriage assemblies.

B. There are two torque tube configurations:

(1) One configuration is for the carriage assembly at WBL 191 for all the -100/-200 airplanes.

(2) The other configuration is for the carriage assembly at WBL 66.5 for all the -100 thru -500 airplanes and the carriage assembly at WBL 191 for all the -300 thru -500 airplanes.

C. This ultrasonic inspection will examine the torque tube for cracks at all the fastener locations where the torque tube attaches to three ribs of the midflap. The inspection examines each fastener hole from two opposite sides. The fastener holes go around the circumference of the torque tube. This procedure can find cracks that are 0.15 inch (3.8 mm) through the thickness of the torque tube, and come out circumferentially from the fastener hole. Figure 1 has an example that shows the typical location and orientation of a crack that can be found with this procedure.

D. This inspection uses a specially made transducer with two 5 MHz, 65 degree, shear wave elements mounted into one case. The transducer is made with the two elements mounted in a way that points the sound beam in opposite directions to each other (right hand/left hand configuration). The transducer will examine all the fastener holes in the torque tube, without the removal of the torque tube from the midflap. Access to all the fastener locations is from the lower surface of the midflap. Figure 1 shows the transducer inspection areas and the configuration of the ribs and fastener locations to be examined.

2. Equipment

NOTE: Refer to Part 1, 51-01-00, for data about the equipment manufacturers.

A. All ultrasonic equipment that can do the calibration instructions of this procedure can be used.

(1) Instrument - Use an ultrasonic instrument that can operate from 4 to 6 MHz. Broadband instruments can be used if they can do the calibration instructions of this procedure. These instruments were used to help prepare this procedure:

(a) Sonic-136, Nortec 1000; Staveley Instruments, Inc.

(b) USD 15, USN 50, 52L, 60; Krautkramer Branson

(2) Transducer - A specially made transducer with two 5 MHz elements, mounted opposite to each other. Each element points a 65 degree shear wave into the thickness of the steel torque tube. The case of the transducer is attached to a 4 inch (102 mm) long, flexible handle, made to let the transducer case swivel. The transducer specified below was used to help prepare this procedure.

(a) SUS 944; NDT Engineering Corp.

(3) Reference Standards - Make the applicable reference standards as follows:

(a) To examine the torque tube for the carriage assembly at WBL 191 on all the -100/-200 airplanes, use reference standard NDT3043. See Figure 2.

(b) Use reference standard NDT3044 to examine the torque tube for the carriage assemblies at WBL 66.5 on all the -100 thru -500 airplanes and at WBL 191 on all the -300 thru -500 airplanes. See Figure 3.

(4) Couplant - All ultrasonic couplants that will not cause damage to the airplane structure can be used. A light commercial grease works good.

(5) Visual Aids - Use a borescope or an inspection mirror to help see the transducer when you examine the fastener locations near the upper surface of the torque tube.

3. Prepare for the Inspection

A. Identify the transducer inspection surfaces. See Figure 1.

B. Lower or remove the inboard trailing edge flaps to get complete access to the lower surface of the midflap.

C. Remove the lower skin panels of the midflap, as necessary, to get access to the inspection areas on the torque tubes.

D. Clean the inspection surfaces on the torque tube. Remove sealant if it is on the inspection surface. Remove paint only if it is loose. Use a light abrasive (Scotch-Brite™) to make the inspection surface smooth.

4. Instrument Calibration

NOTE: The calibration instructions below are the same for each of the two transducer elements that will be used to examine all the fastener locations.

A. Calibrate the equipment to examine the torque tube for the carriage assembly at WBL 191 for all of the -100 and -200 airplanes as follows:

(1) Calibrate the instrument to examine the six fastener locations at the rib at WBL 167.4.

(a) Set the instrument frequency from 4 to 6 MHz.

(b) Set the switch on the transducer cable for the applicable transducer element to be used.

(c) Put a sufficient amount of couplant on the inspection surface identified as section “A” of reference standard NDT3043. See Details I and II in Figure 4 for the transducer locations during calibration.

(d) Put the transducer on the inspection surface identified as section “A” of the reference standard as shown in Detail I in Figure 4.

1) Make sure the front edge of the transducer case is on the scribe line and the sound beam points in the direction of the hole.

2) Adjust the instrument delay, range and gain controls to get a signal from the hole on the screen display.

(e) Move the transducer along the surface to get a maximum signal from hole.

(f) Adjust the instrument delay and range controls to get the maximum hole signal set to 60% of full screen width with the initial pulse set to 0% of full screen width. See Detail III in Figure 4 for the screen display.

(g) Move the transducer along the surface in the direction of the notch, with the sound beam pointed at the notch. See Detail II in Figure 4.

1) Adjust the instrument gain as necessary to keep the notch signal on the screen display.

2) Move the transducer from side to side along the scribe line to get a maximum signal from the notch.

3) Monitor the distance that the transducer is moved from the position for the hole signal to the position for the maximum signal from the notch.

(h) Adjust the instrument gain to get the maximum notch signal (approximately 70% of full screen width) to be between 50 and 80% of full screen height. See Detail IV in Figure 4 for the screen display.

NOTE: Do not use reject.

(i) Increase the gain 6 dB. Do not remove the 6 dB gain during the inspection.

(2) Calibrate the instrument to examine the ten fastener locations at the inner and outer ribs at WBL 175.3.

(a) Do Paragraph 4.A.(1)(a) thru Paragraph 4.A.(1)(i) again, but use section “B” on reference standard NDT3043.

B. Calibrate the equipment to examine the torque tube for the carriage assembly at WBL 66.5 for all the -100 and -500 airplanes, and the carriage assembly at WBL 191 for all the -300 thru -500 airplanes, as follows:

(1) Calibrate the instrument to examine the six fastener locations at the rib at WBL 82.5 for all of the -100 thru -500 airplanes and WBL 175 for all the -300 thru -500 airplanes.

(a) Do Paragraph 4.A.(1)(a) thru Paragraph 4.A.(1)(i) again, but use section “A” on reference standard NDT3044.

(2) Calibrate the instrument to examine the twelve fastener locations at the inner and outer ribs at WBL 74.5 for all of the -100 thru -500 airplanes and WBL 183.0 for all the -300 thru -500 airplanes.

(a) Do Paragraph 4.A.(1)(a) thru Paragraph 4.A.(1)(i) again, but use section “B” on reference standard NDT3044.

5. Inspection Procedure

A. Examine the torque tube for the carriage assembly at WBL 191 for all of the -100 and -200 airplanes (see Figure 1) as follows:

(1) Examine the six fastener locations at the rib at WBL 167.4 as follows:

(a) Calibrate the instrument as specified in Paragraph 4.A.(1).

(b) Put a sufficient amount of couplant on the transducer inspection surface area of the torque tube at all of the fastener locations. See Figure 1 for the transducer inspection surface and the fastener locations.

(c) Put the transducer on the inspection surface area of the torque tube with the front of the transducer against the rib flange and pointed in the direction of the fastener hole to be examined. A signal from the fastener hole will occur at approximately 60% of full screen width. See Details I and II in Figure 5 for some typical transducer positions on the torque tube.

(d) Move the transducer along the rib flange in the circumferential direction, on each side of the fastener hole. During the scan inspection, do the steps that follow:

1) Keep the transducer against the rib flange at all times.

2) Turn the transducer a small amount (approximately 10 degrees) in the forward and aft directions to examine for off-angle cracks as you do the scan.

3) As you move and/or turn the transducer away from the fastener hole, monitor the screen display for crack type signals.

a) A possible crack signal from the fastener hole will occur at approximately 60 to 80% of full screen width.

4) The signal from the fastener hole will decrease quickly as the transducer is moved or turned away. Look for a signal that will occur to the right of the hole signal as you move or turn the transducer.

NOTE: Signals from the fastener holes can look different (wider and less amplitude) than the hole from the reference standard.

5) Carefully monitor the direction and position of the transducer at all times to help identify the causes of the signals that occur.

(e) Do Paragraph 5.A.(1)(c) thru Paragraph 5.A.(1)(d) at all the fastener locations where you have sufficient access. Do the calibration again with the other transducer element to examine the remaining fastener holes.

NOTE: Bend the handle as much as necessary to get the transducer to the inspection area for the fastener locations near the upper surface of the midflap.

NOTE: When necessary, use a borescope or an inspection mirror to help see the transducer positions.

(f) Refer to Paragraph 6. to make an analysis of the ultrasonic signals that occur during this inspection.

(2) Examine the ten fastener locations at the inner and outer ribs at WBL 175.3 as follows:

(a) Calibrate the instrument as specified in Paragraph 4.A.(2).

(b) Do Paragraph 5.A.(1)(b) thru Paragraph 5.A.(1)(f) again.

B. Examine the torque tube for the carriage assembly at WBL 66.5 for all the -100 and -500 airplanes, and the carriage assembly at WBL 191 for all the -300 thru -500 airplanes (see Figure 1), as follows:

(1) Examine the six fastener locations at the rib at WBL 82.5 for all of the -100 thru -500 airplanes and at WBL 175 for all of the -300 thru -500 airplanes.

(a) Calibrate the instrument as specified in Paragraph 4.B.(1).

(b) Do Paragraph 5.A.(1)(b) thru Paragraph 5.A.(1)(f) again. See Figure 1 for the transducer inspection surfaces and the fastener locations.

(2) Examine the twelve fastener locations at the inner and outer ribs at WBL 74.5 for all the -100 thru -500 airplanes and WBL 183.0 for all the -300 thru -500 airplanes, as follows:

(a) Calibrate the instrument as specified in Paragraph 4.B.(2).

(b) Do Paragraph 5.A.(1)(b) thru Paragraph 5.A.(1)(f) again. See Figure 1 for the transducer inspection surfaces and the fastener locations.

6. Inspection Results

A. An ultrasonic signal that is 50% (or more) of the signal height set in Paragraph 4.A.(1)(h) and is also between 60 to 90% of full screen width is a sign of a possible crack.

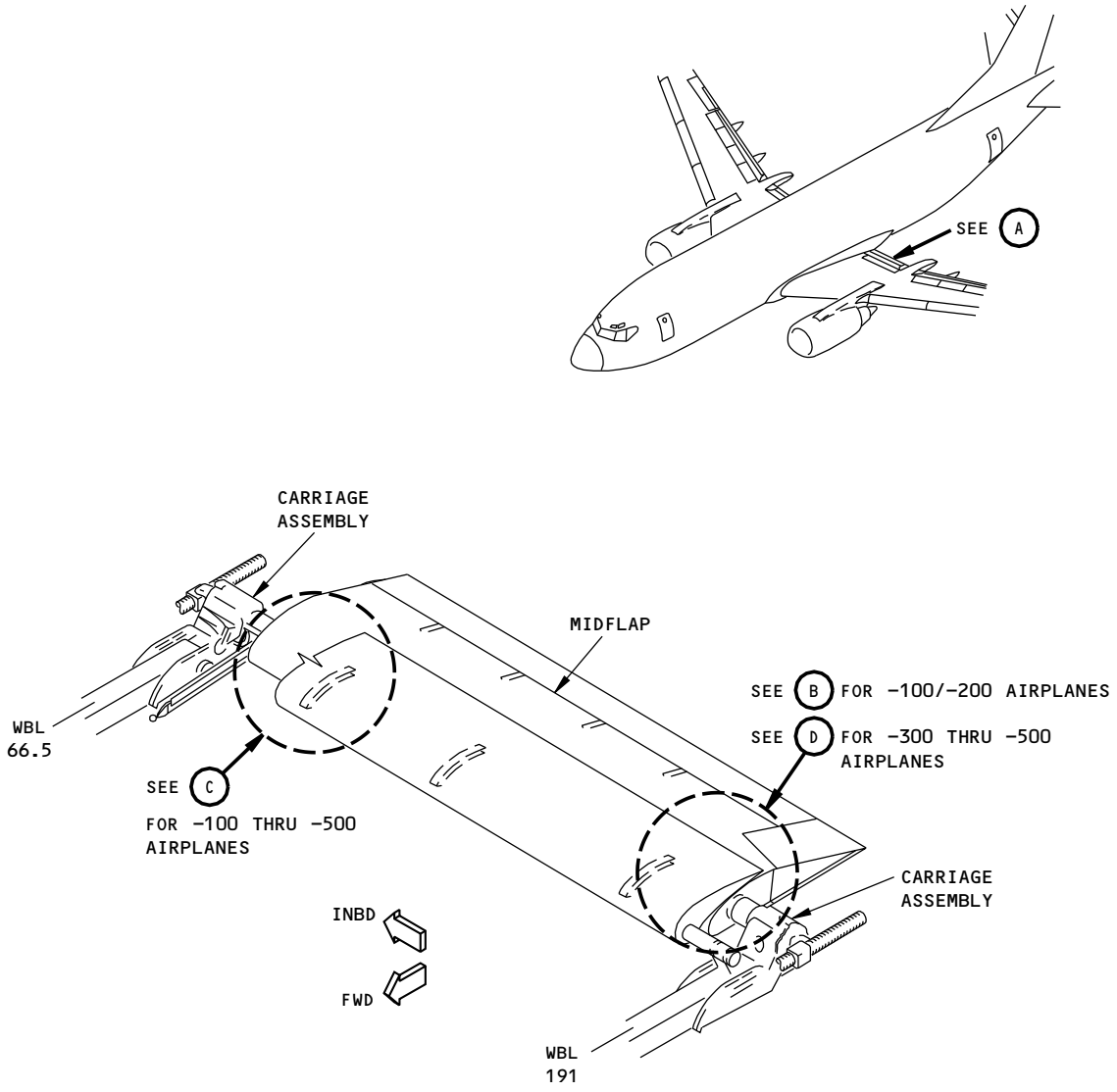
B. Make an analysis of a possible crack signal as follows:

(1) Make sure of the position of the transducer. A signal from the fastener hole will be at a maximum signal height with the transducer pointed at the center of the hole.

(2) A crack signal will occur immediately to the right of the hole signal on the screen display, with a decrease in the hole signal. Move the transducer away from the rib flange and turn it as necessary to get the signal from the indication to be at a maximum height.

(3) An off angle crack can occur at the same screen width location as the hole signal. Be very careful to monitor the screen display for such a crack.

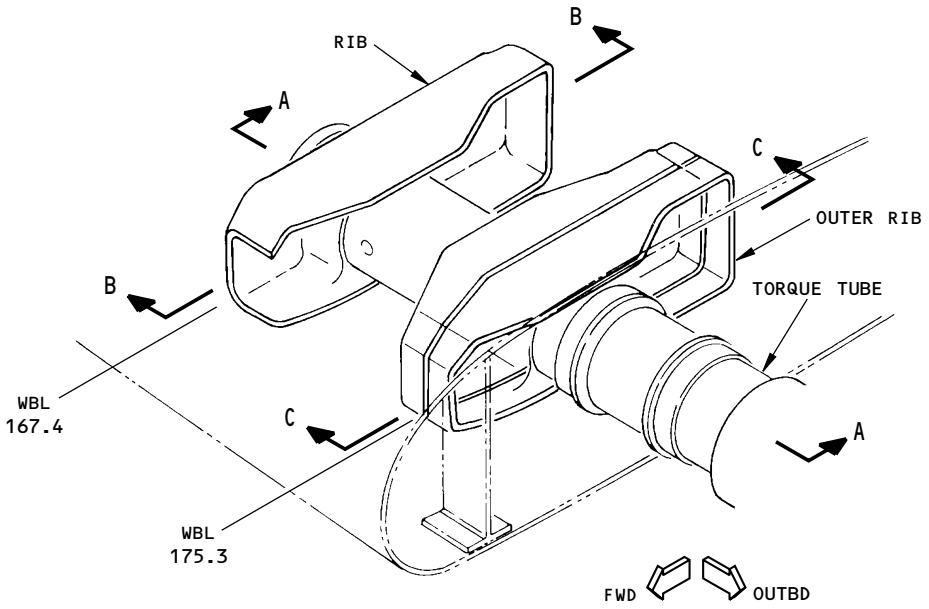
(4) Monitor the position of the transducer at all times to help identify the cause of signals.



INBOARD TRAILING EDGE FLAP ASSEMBLY
THE LEFT SIDE IS SHOWN;
THE RIGHT SIDE IS OPPOSITE

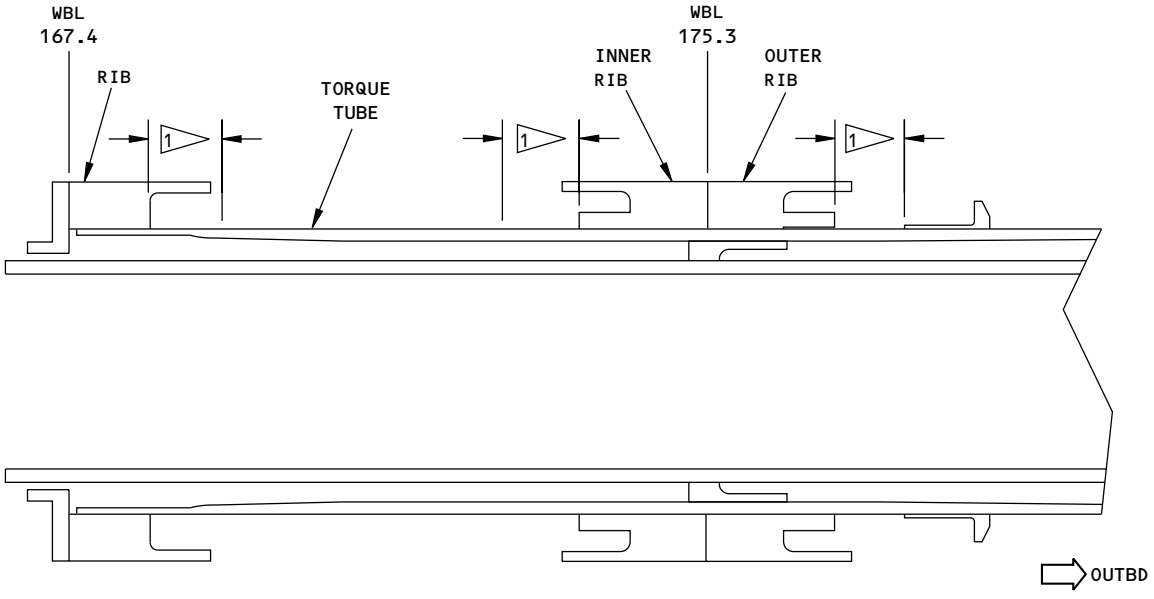
2158776 S0000471571_V1

Inboard Trailing Edge Flap - Torque Tube Inspection Areas for the Carriage Assemblies at WBL 66.5 and 191
Figure 1 (Sheet 1 of 6)



B

-100 AND -200 AIRPLANES



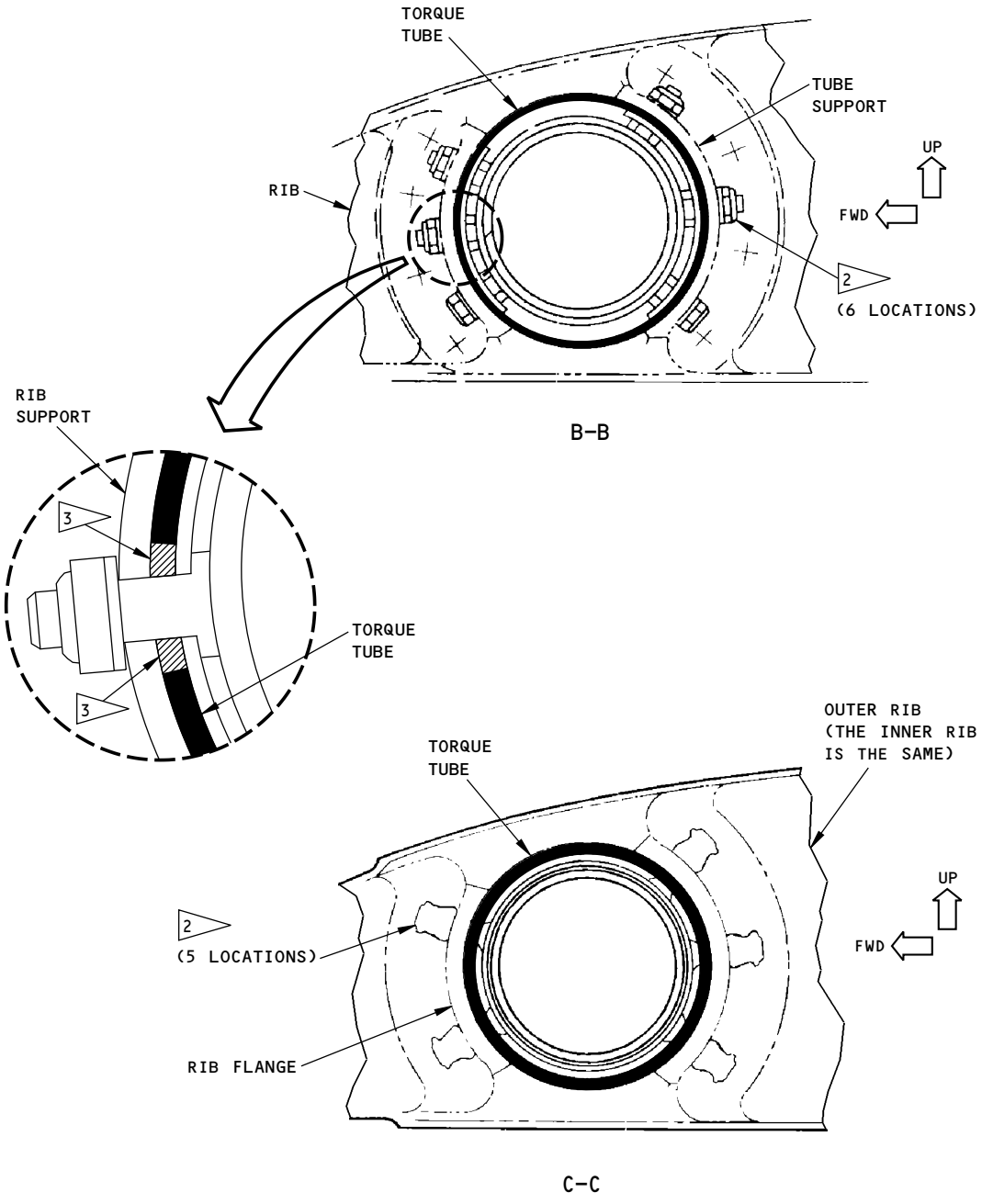
A-A

NOTES:

1 TRANSDUCER INSPECTION SURFACE AREA

2158779 S0000471572_V1

Inboard Trailing Edge Flap - Torque Tube Inspection Areas for the Carriage Assemblies at WBL 66.5 and 191
Figure 1 (Sheet 2 of 6)



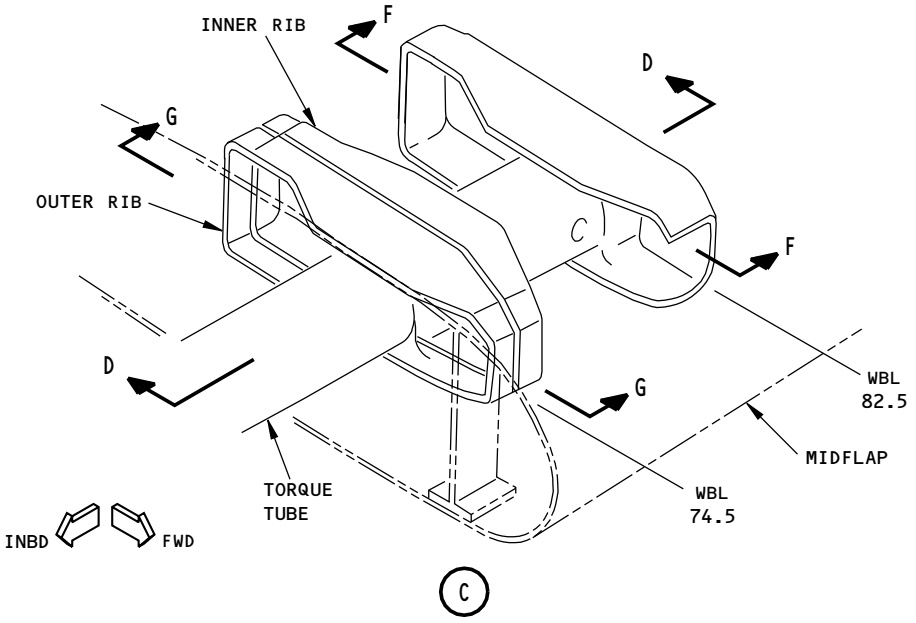
NOTES:

2 FASTENER LOCATION TO EXAMINE

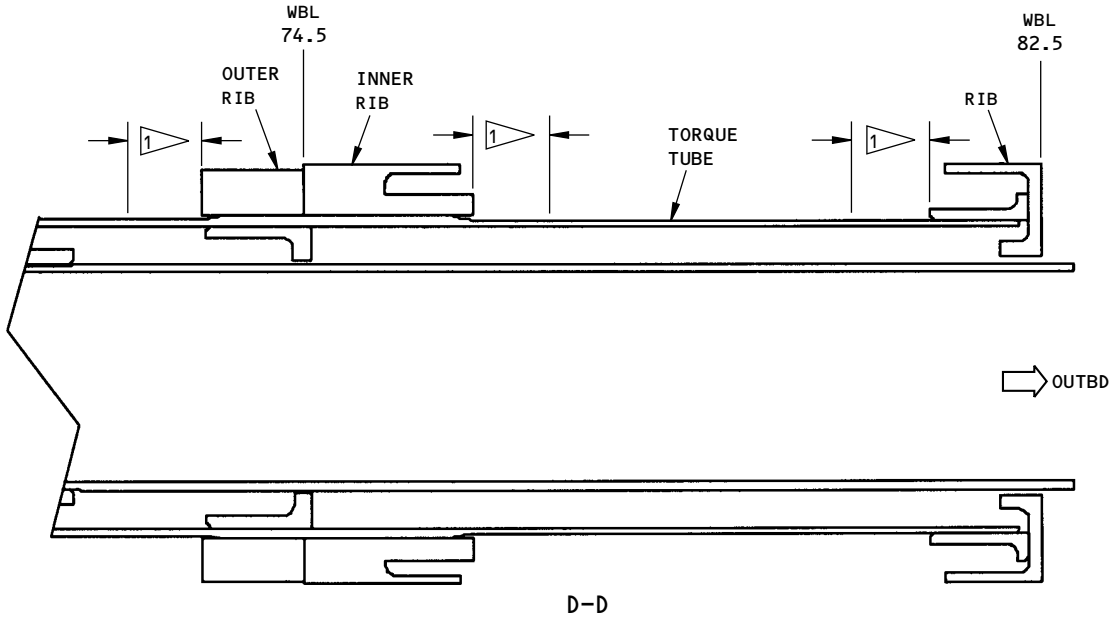
3 TYPICAL CRACK LOCATION AND ORIENTATION IN THE TORQUE TUBE

2158780 S0000471573_V1

Inboard Trailing Edge Flap - Torque Tube Inspection Areas for the Carriage Assemblies at WBL 66.5 and 191
Figure 1 (Sheet 3 of 6)



-100 THRU -500 AIRPLANES



D-D

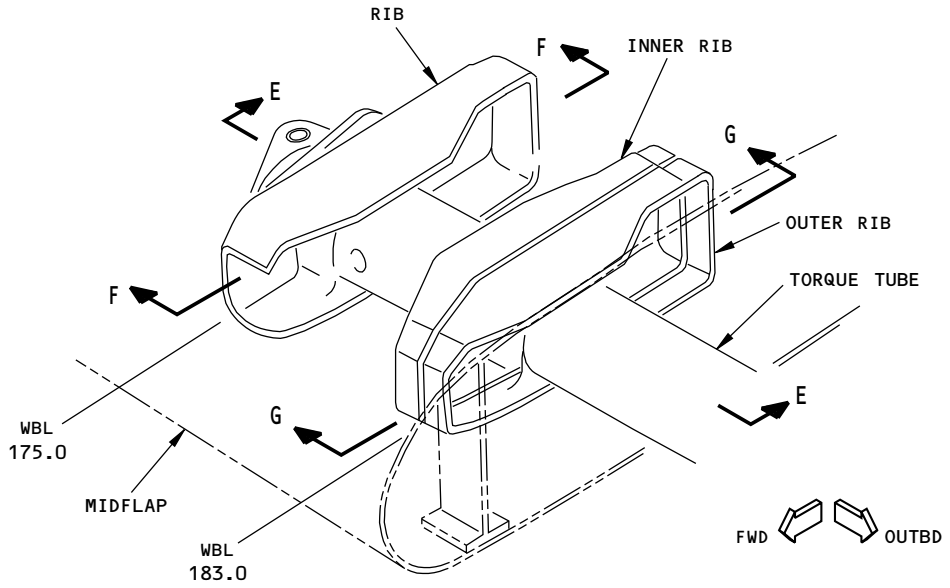
NOTES:

- THE TORQUE TUBE USED ON THE WBL 66.5 CARRIAGE ASSEMBLY FOR THE -100 THRU -500 AIRPLANES IS THE SAME AS THE TORQUE TUBE USED ON THE WBL 191 CARRIAGE ASSEMBLY FOR THE -300 THRU -500 AIRPLANES.

1 TRANSDUCER INSPECTION SURFACE AREA

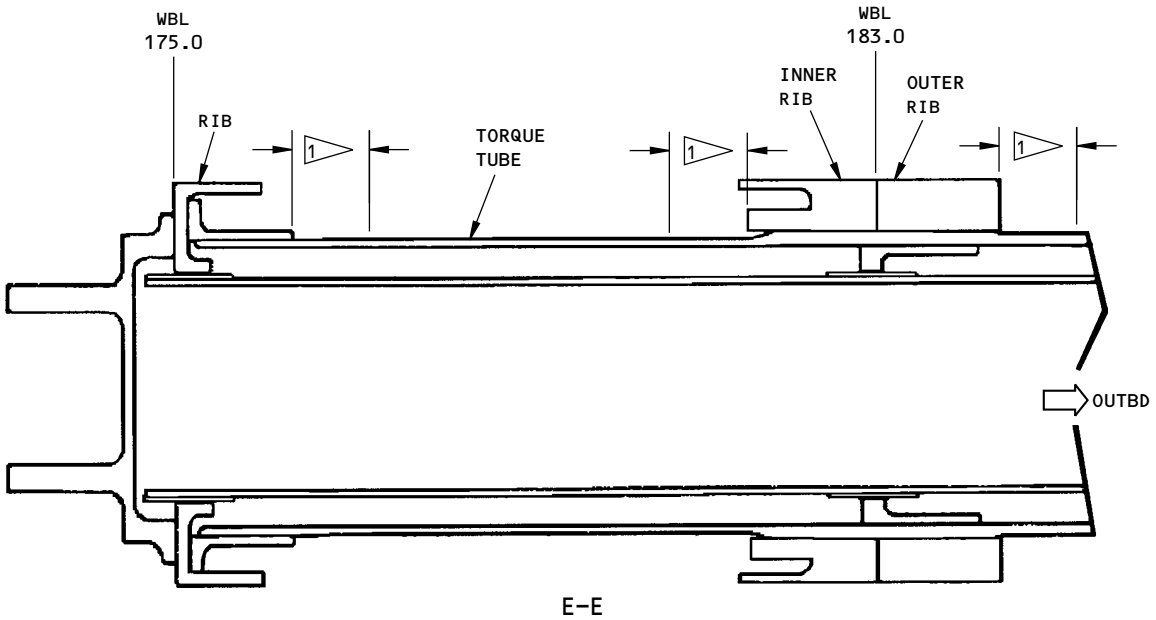
2158781 S0000471574_V1

Inboard Trailing Edge Flap - Torque Tube Inspection Areas for the Carriage Assemblies at WBL 66.5 and 191
Figure 1 (Sheet 4 of 6)



D

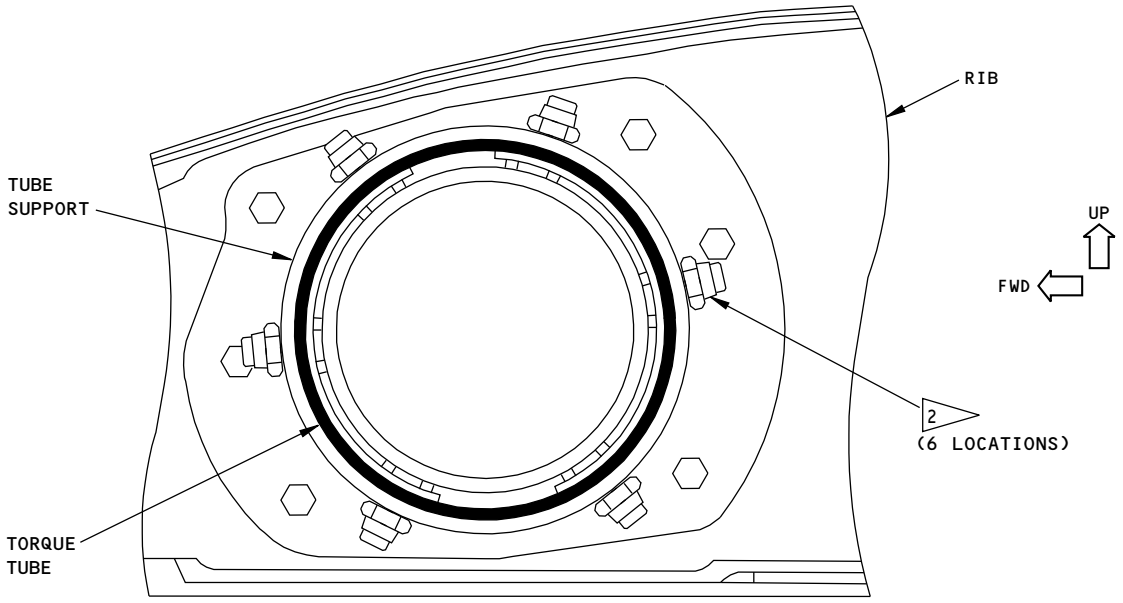
-300 THRU -500 AIRPLANES



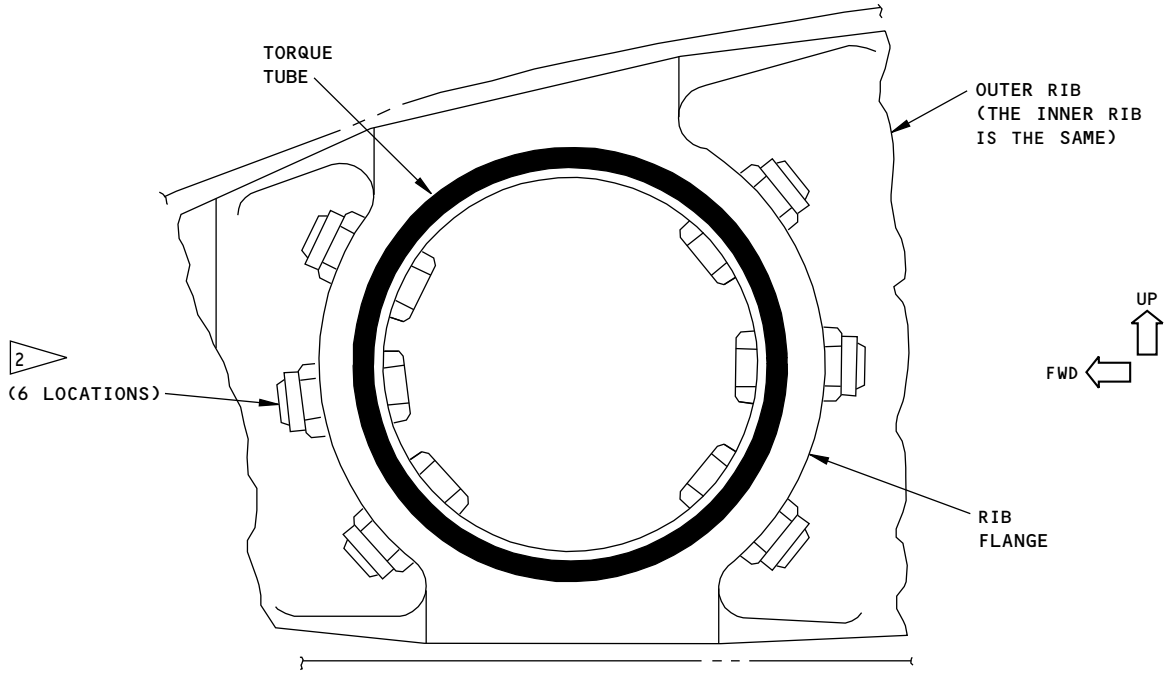
E-E

2158782 S0000471575_V1

Inboard Trailing Edge Flap - Torque Tube Inspection Areas for the Carriage Assemblies at WBL 66.5 and 191
Figure 1 (Sheet 5 of 6)



F-F



G-G

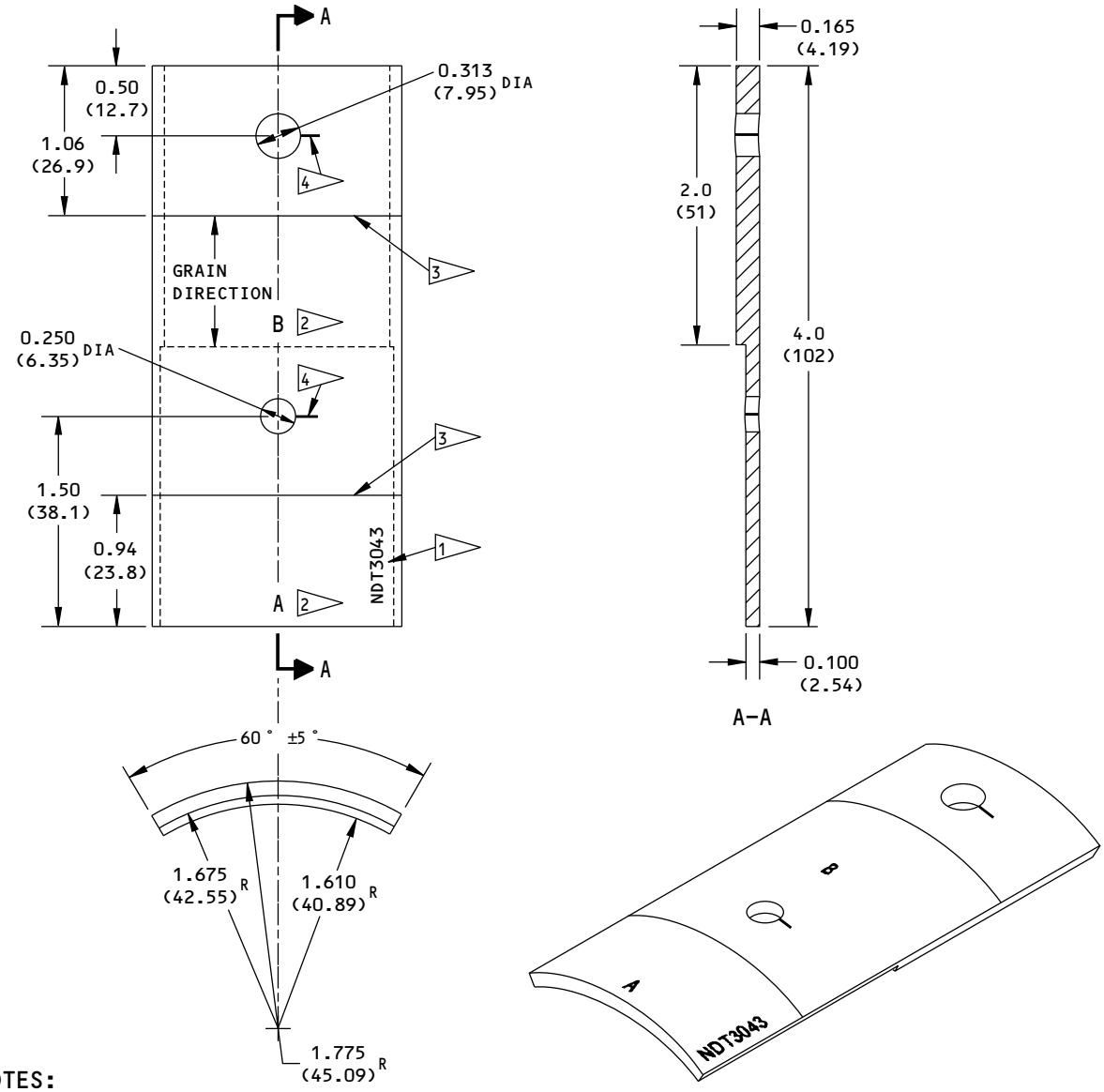
NOTES:

- SECTIONS F-F AND G-G SHOWN ABOVE ARE VIEWS OF THE OUTBOARD SIDE OF THE OUTBOARD END OF THE MIDFLAP.

2 FASTENER LOCATION TO EXAMINE

2158783 S0000471576_V1

Inboard Trailing Edge Flap - Torque Tube Inspection Areas for the Carriage Assemblies at WBL 66.5 and 191
Figure 1 (Sheet 6 of 6)



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS IN PARENTHESES).
- TOLERANCES (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ±0.005	X.XX = ±0.10
X.XX = ±0.025	X.X = ±0.5
X.X = ±0.050	X = ±1

- MATERIAL: 4330, 4330M, 4340 OR 4340M STEEL
- SURFACE ROUGHNESS: 63 Ra OR BETTER.

1 ETCH OR SCRIBE THE REFERENCE STANDARD NUMBER NDT3043

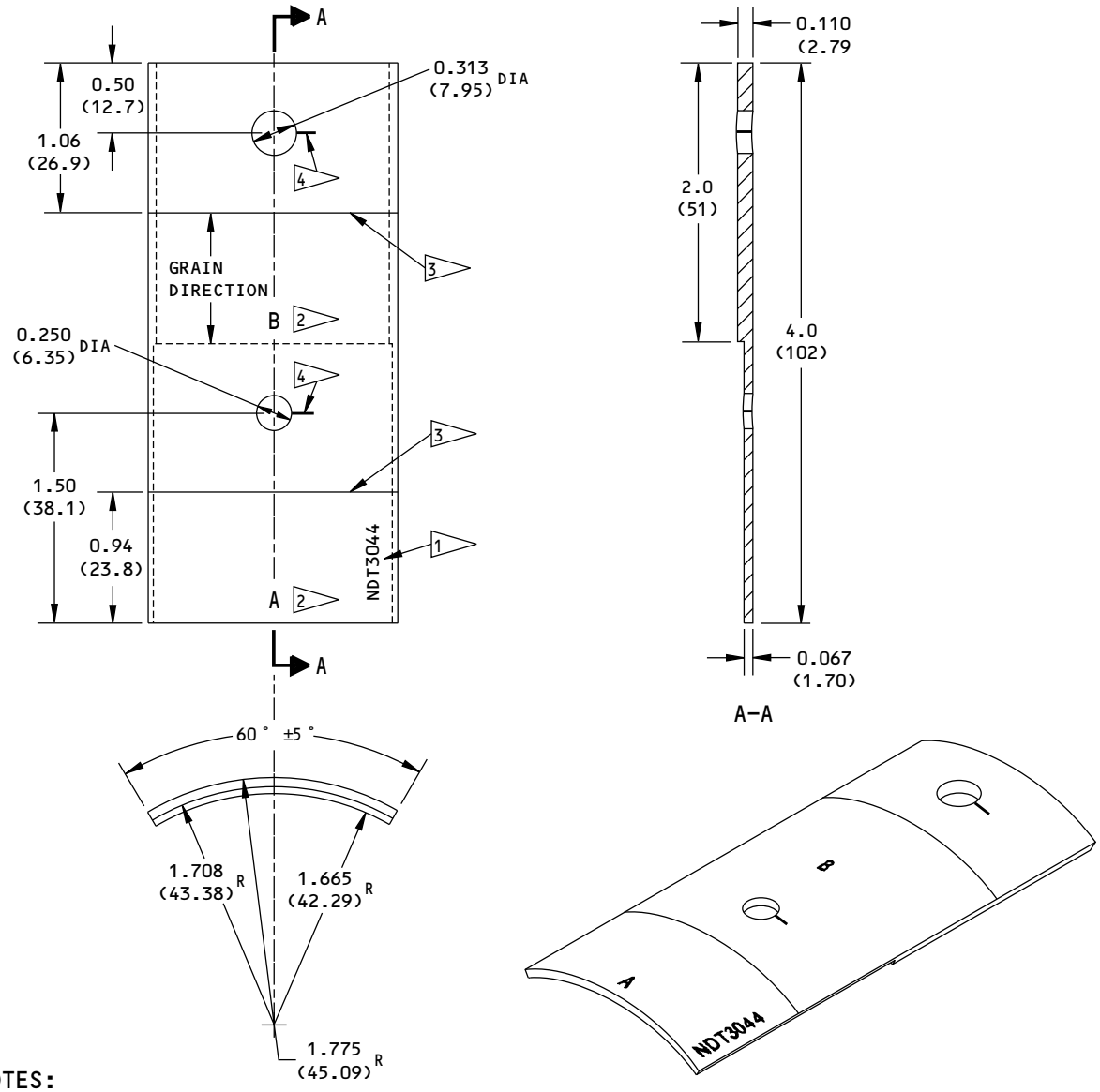
2 ETCH OR STEEL STAMP THE LETTER SHOWN TO IDENTIFY THE SECTION OF THE REFERENCE STANDARD TO USE FOR THE INSTRUMENT CALIBRATION.

3 SCRIBE A LINE FOR THE TRANSDUCER POSITION USED FOR THE INSTRUMENT CALIBRATION.

4 RECTANGULAR EDM NOTCH
WIDTH - 0.010 (0.25) ±0.002 (0.05)
LENGTH - 0.150 (3.81)
DEPTH - THROUGH THE THICKNESS
PUT THE NOTCH WITHIN ±0.010 (0.25) OF THE CENTERLINE OF THE HOLE.

2158784 S0000471577_V1

Reference Standard NDT3043
Figure 2



NOTES:

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS IN PARENTHESES).
- TOLERANCES (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS
X.XXX = ±0.005	X.XX = ±0.10
X.XX = ±0.025	X.X = ±0.5
X.X = ±0.050	X = ±1

- MATERIAL: 4330, 4330M, 4340 OR 4340M STEEL
- SURFACE ROUGHNESS: 63 Ra OR BETTER.

1 ETCH OR SCRIBE THE REFERENCE STANDARD NUMBER NDT3044

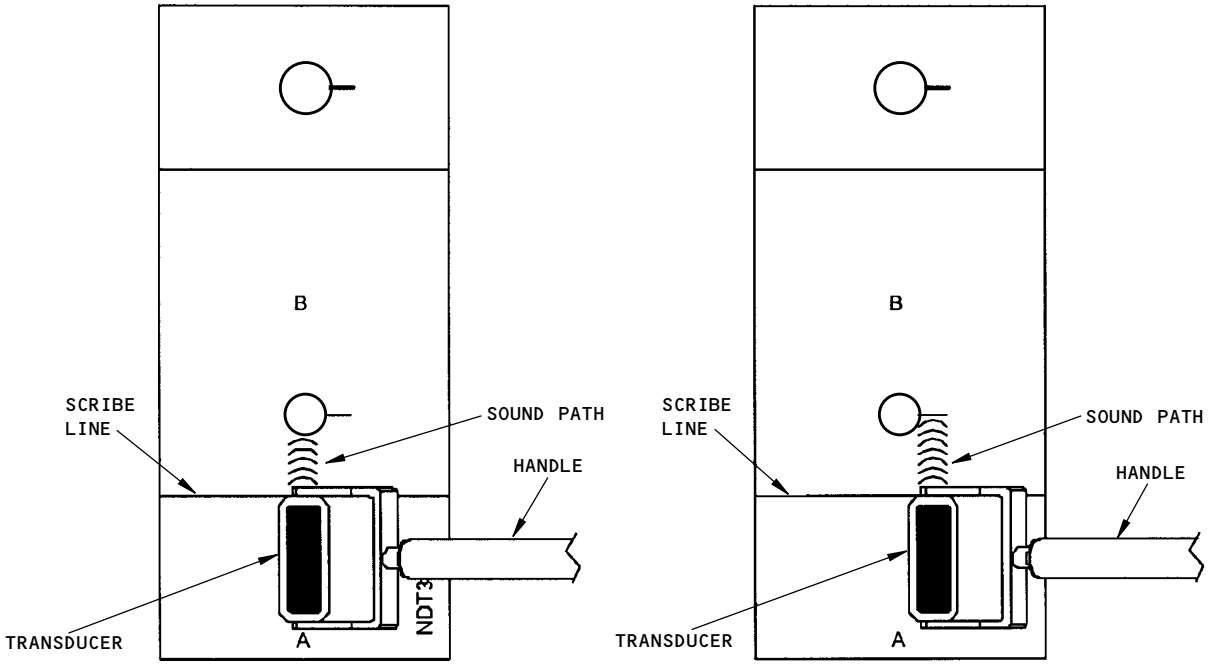
2 ETCH OR STEEL STAMP THE LETTER SHOWN TO IDENTIFY THE SECTION OF THE REFERENCE STANDARD TO USE FOR THE INSTRUMENT CALIBRATION.

3 SCRIBE A LINE FOR THE TRANSDUCER POSITION USED FOR THE INSTRUMENT CALIBRATION.

4 RECTANGULAR EDM NOTCH
WIDTH - 0.010 (0.25) ±0.002 (0.05)
LENGTH - 0.150 (3.81)
DEPTH - THROUGH THE THICKNESS
PUT THE NOTCH WITHIN ±0.010 (0.25) OF THE CENTERLINE OF THE HOLE.

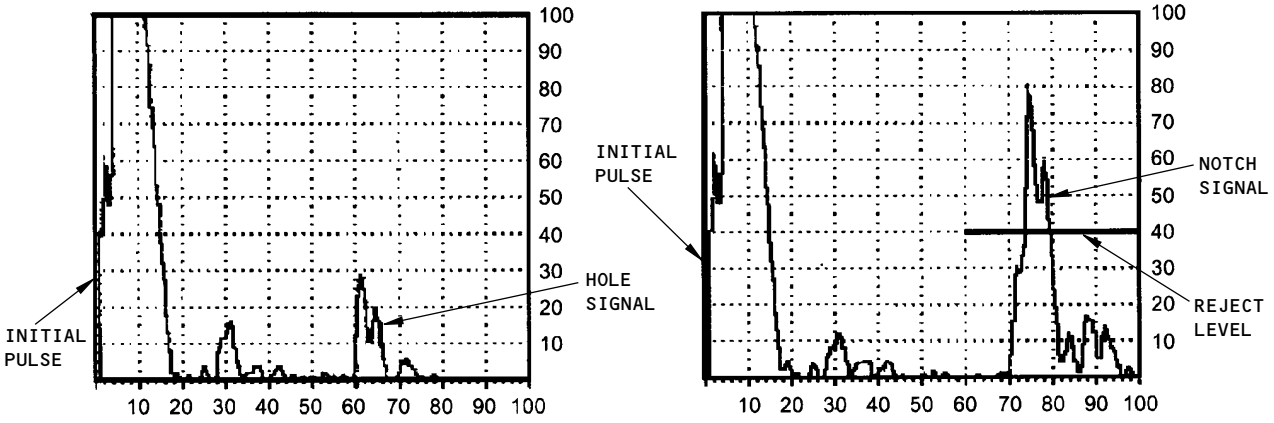
2158786 S0000471578_V1

Reference Standard NDT3044
Figure 3



TYPICAL TRANSDUCER POSITION ON THE REFERENCE STANDARD TO GET A SIGNAL FROM THE HOLE
DETAIL I

TYPICAL TRANSDUCER POSITION ON THE REFERENCE STANDARD TO GET A SIGNAL FROM THE NOTCH
DETAIL II



SCREEN DISPLAY OF THE HOLE SIGNAL
DETAIL III

SCREEN DISPLAY OF THE NOTCH SIGNAL
DETAIL IV

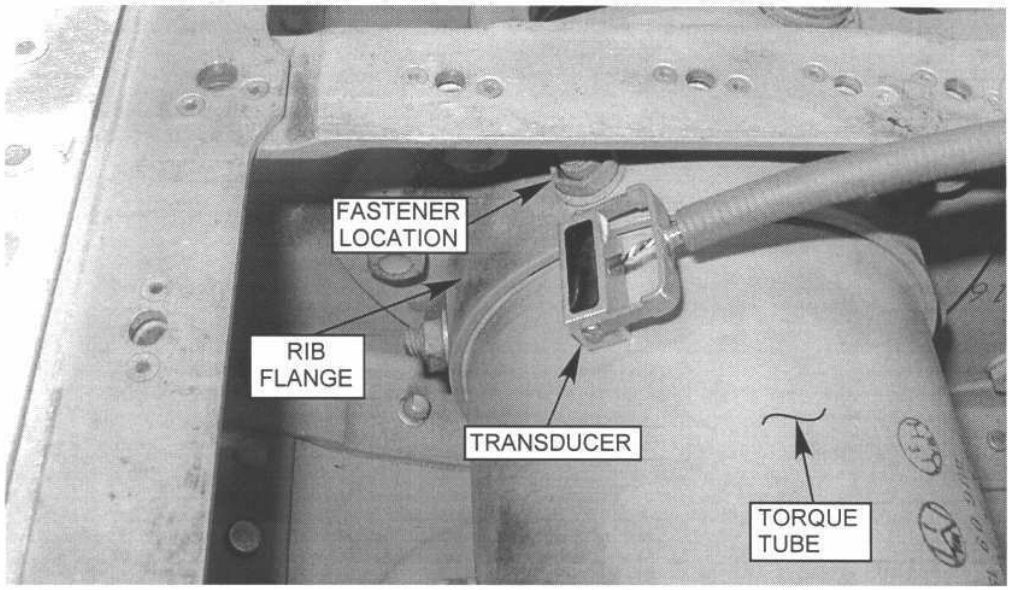
NOTES:

- THE TRANSDUCER POSITIONS SHOWN IN DETAILS I AND II ONLY SHOW THE CALIBRATION OF THE RIGHT SIDE ELEMENT. TURN THE TRANSDUCER 180 DEGREES TO DO THE CALIBRATION OF THE LEFT SIDE ELEMENT.
- THE SCREEN DISPLAYS, DETAILS III AND IV, ARE EXAMPLES.

2158787 S0000471579_V1

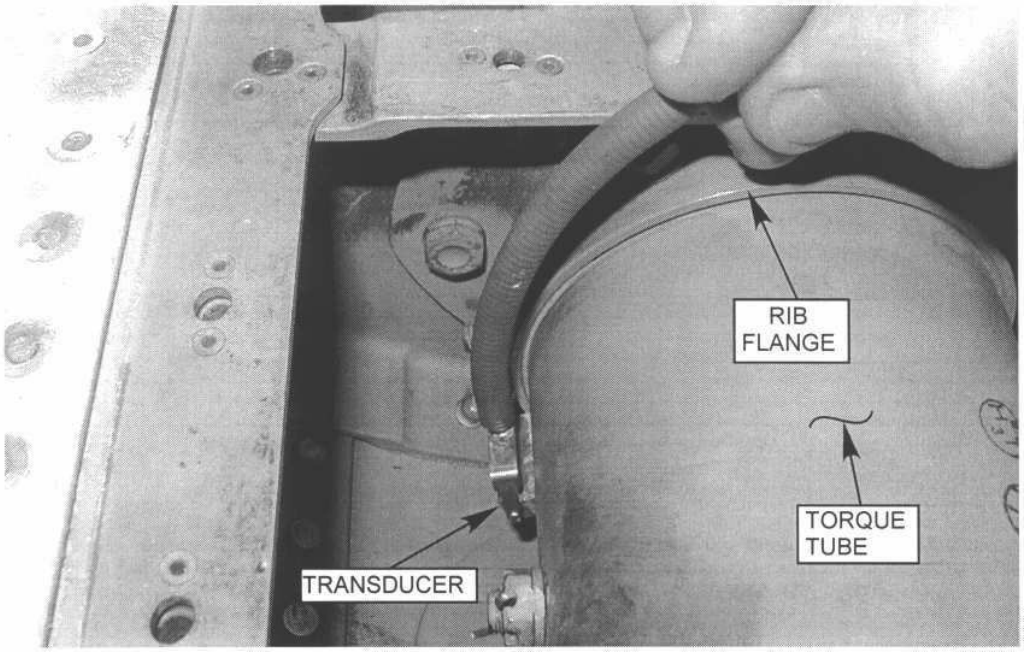
Instrument Calibration on Reference Standards NDT3043 and NDT3044
Figure 4

FWD



TYPICAL TRANSDUCER POSITIONED AT A FASTENER LOCATION
DETAIL I

FWD



TRANSDUCER POSITION TO GET TO FASTENER LOCATIONS NEAR
THE UPPER SURFACE OF THE TORQUE TUBE
DETAIL II

2159427 S0000471583_V1

Transducer Positions on the Torque Tube
Figure 5

PART 4 - ULTRASONIC

ACTUATOR HINGE FITTING LUGS OF GROUND SPOILERS 4 AND 5

1. Purpose

A. Use this procedure to examine the actuator hinge fitting lugs at ground spoilers 4 and 5 for cracks. The basic part number of the actuator hinge fitting is 65-67186. See Figure 1 for the inspection area.

B. This procedure uses an ultrasonic shear wave transducer to examine the forward side of the actuator hinge fitting lugs for cracks that can start at the hole of the lugs.

C. This procedure uses an ultrasonic longitudinal wave transducer to examine the aft side of the actuator hinge fitting lugs for cracks that can start at the hole of the lugs.

D. The actuator hinge fitting lugs are aluminum.

E. This inspection is done externally to the airplane.

2. Equipment

A. General

(1) Use equipment that can be calibrated on the reference standard as specified in Paragraph 4.

(2) Refer to Part 1, 51-01-00, for data about the equipment manufacturers.

B. Instruments

(1) Use a pulse-echo ultrasonic instrument to do this inspection. The instruments that follow were used to help prepare this procedure.

(a) Epoch 600; Olympus NDT

(b) USMGo; GE Inspection Technologies

(c) USN 60; GE Inspection Technologies

C. Transducers

(1) To examine the forward side of the lug, use a 10 MHz transducer that is medium dampened and has a 0.187 to 0.220 inch (4.7 to 5.6 mm) element that can put a 70 degree shear wave in aluminum. The transducer case must have a width that is from 0.25 to 0.26 inches (6.4 to 6.6 mm), a length that is from 0.50 to 0.60 inch (12.7 to 15.24 mm), and have a top or side mounted connector. The transducer that follows was used to help prepare this procedure.

(a) SA-7010S; Techna NDT

(2) To examine the aft side of the lug, use a 5 MHz transducer that is medium dampened and has a 0.187 to 0.220 inch (4.7 to 5.6 mm) element that can put a longitudinal wave in aluminum. The transducer must have a minimum diameter of 0.25 inch (6.4 mm). The transducer that follows was used to help prepare this procedure.

(a) TC5-185T; Techna NDT

D. Reference Standards

(1) Use reference standard NDT3220 to help calibrate the instrument. See Figure 2 for data about reference standard NDT3220.

E. Positioner

(1) Use transducer positioner NDT3220-P to help do this inspection. See Figure 3 for data about transducer positioner NDT3220-P.

F. Couplant

(1) Use couplant that is permitted for use with the airplane structure.

3. Prepare for the Inspection

A. Make sure the ground spoiler configuration and actuator hinge fitting part numbers are correct.

B. Identify the inspection areas shown in Figure 1.

NOTE: It can be necessary to access the upper surface of the wings to do this inspection. Ground spoilers 4 and 5 must be in the locked (down) position to do this inspection.

CAUTION: FOLLOW ALL FALL PROTECTION SAFETY PROCEDURES.

C. Remove the paint and the nonskid coating from the inspection surface.

D. Clean the inspection surface.

4. Instrument Calibration

A. Calibrate the instrument to examine the forward side of the actuator hinge fitting lugs of the ground spoilers as follows:

(1) Connect the transducer identified in Paragraph 2.C.(1) to the instrument and set the instrument to the Pulse-Echo mode.

(2) Set Delay to zero and set Reject to zero.

(3) Set Range to 2 inches (50.8 mm).

(4) Put couplant at Position 1 on reference standard NDT3220. See Figure 4, Detail I.

(5) Put transducer positioner NDT3220-P on the reference standard as shown in Figure 4, Detail I.

(6) Put the transducer at Position 1 on the reference standard and turn the transducer to point it at the opposite side of the lug.

(7) Keep the transducer pointed at the opposite edge of the lug and move the transducer towards Position 2 until the signal from notch A is at a maximum height on the screen display as shown in Figure 4, Detail III.

NOTE: It is necessary to keep the transducer pointed in the direction of the opposite edge of the reference standard to get the maximum signal from the notch.

(8) Adjust the range to put the notch A signal at approximately 60 percent of full screen width (FSW) as shown in Figure 4, Detail III.

(9) Adjust the gain to set the notch A signal at 80 percent of full screen height (FSH).

NOTE: Make sure that the signal-to-noise ratio on the screen display is 5:1. If the signal-to-noise ratio is not 5:1, do not use the transducer. The noise signal must not be more than 16 percent of FSH when the notch A signal is set to 80 percent of FSH.

(10) Put the transducer at Position 3 on the reference standard and turn the transducer to point it at the opposite side of the lug as shown in Figure 4, Detail II.

(11) Keep the transducer pointed at the opposite edge of the lug and move the transducer towards Position 4 until the signal from notch B is at a maximum height on the screen display.

NOTE: It is necessary to keep the transducer pointed in the direction of the opposite edge of the reference standard to get the maximum signal from the notch.

(12) If the signal from notch B is less than 80 percent of FSH, then adjust the gain to set the notch signal to 80 percent of FSH.

NOTE: If the signal from notch B is more than 80 percent of FSH, do not decrease the gain.

(13) Increase the gain by 6 dB.

NOTE: Do not change the instrument settings.

B. Calibrate the instrument to examine the aft side of the actuator hinge fitting lugs of the ground spoilers as follows:

(1) Connect the transducer identified in Paragraph 2.C.(2) to the instrument and set the instrument to the Pulse-Echo mode.

(2) Set Delay to zero and Reject to zero.

(3) Set Range to 2 inches (50.8 mm).

(4) Put couplant at position 5 on reference standard NDT3220. See Figure 5, Detail I.

(5) Put the transducer at position 5 on the reference standard as shown in Figure 5, Detail I.

(6) Move the transducer until the signal from the lug hole is at a maximum height on the screen display. See Figure 5, Detail II.

(7) Adjust the range to put the lug hole signal at 40 percent of FSW as shown in Figure 5, Detail II.

NOTE: A multiple signal from the lug hole will occur at approximately 75 percent of FSW.

(8) Adjust the gain until the lug hole signal is at 80 percent of FSH.

(9) Monitor the screen display and move the transducer in the direction of Position 6 at notch C (mid-bore EDM notch) until the signal from notch C is at a maximum height on the screen display.

NOTE: The signal from the lug hole and the multiple signal will decrease and go out of view and the signal from the notch will come into view at approximately 85 percent of FSW. See Figure 5, Detail III.

(10) Adjust the gain to put the notch C signal at 80 percent of FSH as shown in Figure 5, Detail III.

5. Inspection Procedure

A. Examine the forward side of the actuator hinge fitting lugs of ground spoiler 4 or 5 for cracks as follows:

(1) Calibrate the instrument as specified in Paragraph 4.A.

NOTE: There are a total of four actuator hinge fitting lugs to examine: two actuator hinge fitting lugs (inboard and outboard) for each ground spoiler.

(2) Identify the inspection area on the actuator hinge fitting lugs (see Figure 1).

(3) Apply a thin layer of couplant on the inspection surface.

(4) Put transducer positioner NDT3220-P on the inspection surface as shown in Figure 1.

NOTE: It is only necessary to use the transducer positioner to examine the forward side of the actuator hinge fitting lugs. It can be necessary to hold the transducer positioner down when you make the scan.

(5) Do the scans that follow to examine the forward side of the actuator hinge fitting lugs for cracks. As you do the scans, monitor the screen display for signals that occur between 60 and 90 percent of FSW.

(a) Put the transducer on one edge of the inspection surface.

(b) Turn the transducer to point it at the opposite side of the lug.

(c) Keep the transducer pointed at the opposite edge of the actuator fitting lug and move it (make a scan) from the aft side to the forward side of the actuator hinge fitting lug. See Figure 1.

(d) Put the transducer on the other edge of the inspection surface and do Paragraph 5.A.(5)(b) and Paragraph 5.A.(5)(c) again to examine the other edge of the actuator hinge fitting lug for cracks.

(e) Put the transducer in the center of the actuator hinge fitting lug and move it (make a scan) from the aft side to the forward side of the actuator hinge fitting lug.

(6) Do Paragraph 5.A.(2) thru Paragraph 5.A.(5) again until you have examined the forward side of the inboard and outboard actuator hinge fitting lugs on ground spoiler 4 or 5. See Figure 1.

B. Examine the aft side of the actuator hinge fitting lugs of ground spoiler 4 or 5 for cracks as follows:

(1) Calibrate the instrument as specified in Paragraph 4.B.

(2) Identify the inspection area on the actuator fitting hinge lugs. See Figure 1.

(3) Apply a thin layer of couplant on the inspection surface.

(4) Do the scans that follow to examine the aft side of the actuator hinge fitting lugs for cracks. As you do the scans, monitor the screen display for signals that occur between 55 and 90 percent of FSW.

(a) Put the transducer on one edge of the inspection surface.

(b) Move the transducer to make a scan from the forward side to the aft side of the actuator hinge fitting lug.

NOTE: The hinge lug hole signal will go out of view as you move the transducer towards the aft side of the actuator hinge fitting lug.

(c) Put the transducer on the other edge of the inspection surface and do Paragraph 5.B.(4)(b) again to examine the other edge of the actuator hinge fitting lug for cracks.

(d) Do Paragraph 5.B.(4)(b) again to make a scan in the center of the actuator hinge fitting lug.

(5) Do Paragraph 5.B.(2) thru Paragraph 5.B.(4) again until you have examined the aft side of the inboard and outboard actuator hinge fitting lugs on ground spoiler 4 or 5. See Figure 1.

C. Do Paragraph 5.A. and Paragraph 5.B. again to examine the actuator hinge fitting lugs of the ground spoiler for cracks on the opposite side of the airplane.

6. Inspection Results

A. Areas that cause signals to occur that are 40 percent (or more) of FSH must be rejected for possible cracks. Areas that cause these signals to occur must be examined some more as follows:

(1) Compare the signals that occur during the inspection with the signals from a different lug on the ground spoiler on the same or a different airplane.

(2) Compare the signals that occur during the inspection with the signals you got from the reference standard during calibration.

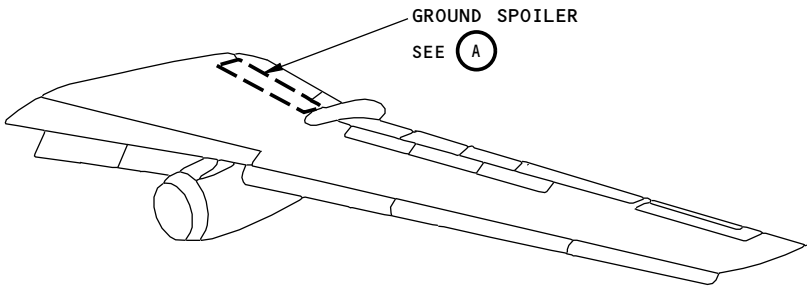
(a) If the crack signal is from the forward side of the actuator hinge fitting lug, calibrate the instrument again as specified in Paragraph 4.A. but do not add the 6 dB of gain at the end of the calibration.

(b) If the crack signal is from the aft side of the actuator hinge fitting lug, calibrate the instrument again as specified in Paragraph 4.B.

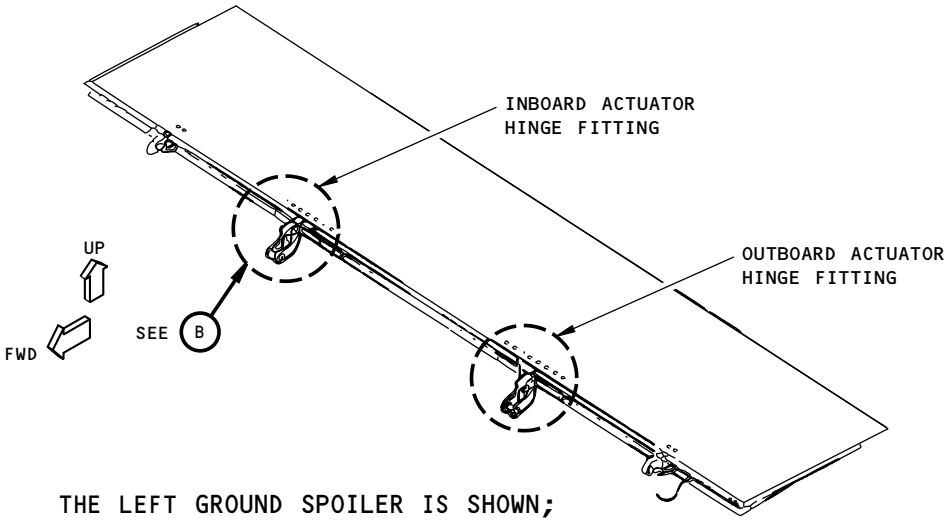
(c) Do the inspection again on the area that causes the crack signal to occur and compare the notch signals from the reference standard with the signals you now get from the actuator hinge fitting lug.

(d) Signals that are 40 percent (or more) of FSH are signs of a crack.

B. To make sure there is a crack, remove the bushing and do an open hole eddy current inspection as specified in Part 6, 51-00-00, Procedure 16.

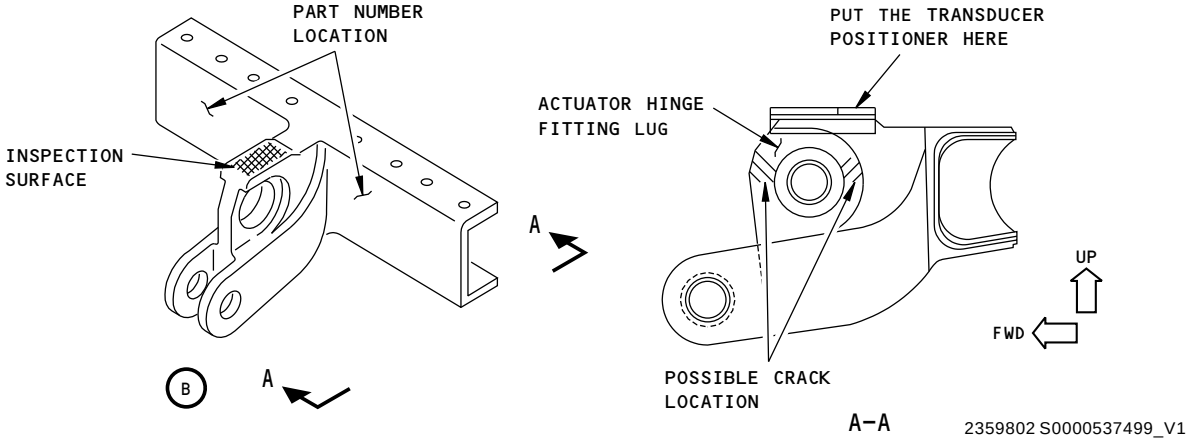


THE LEFT WING IS SHOWN;
THE RIGHT WING IS OPPOSITE

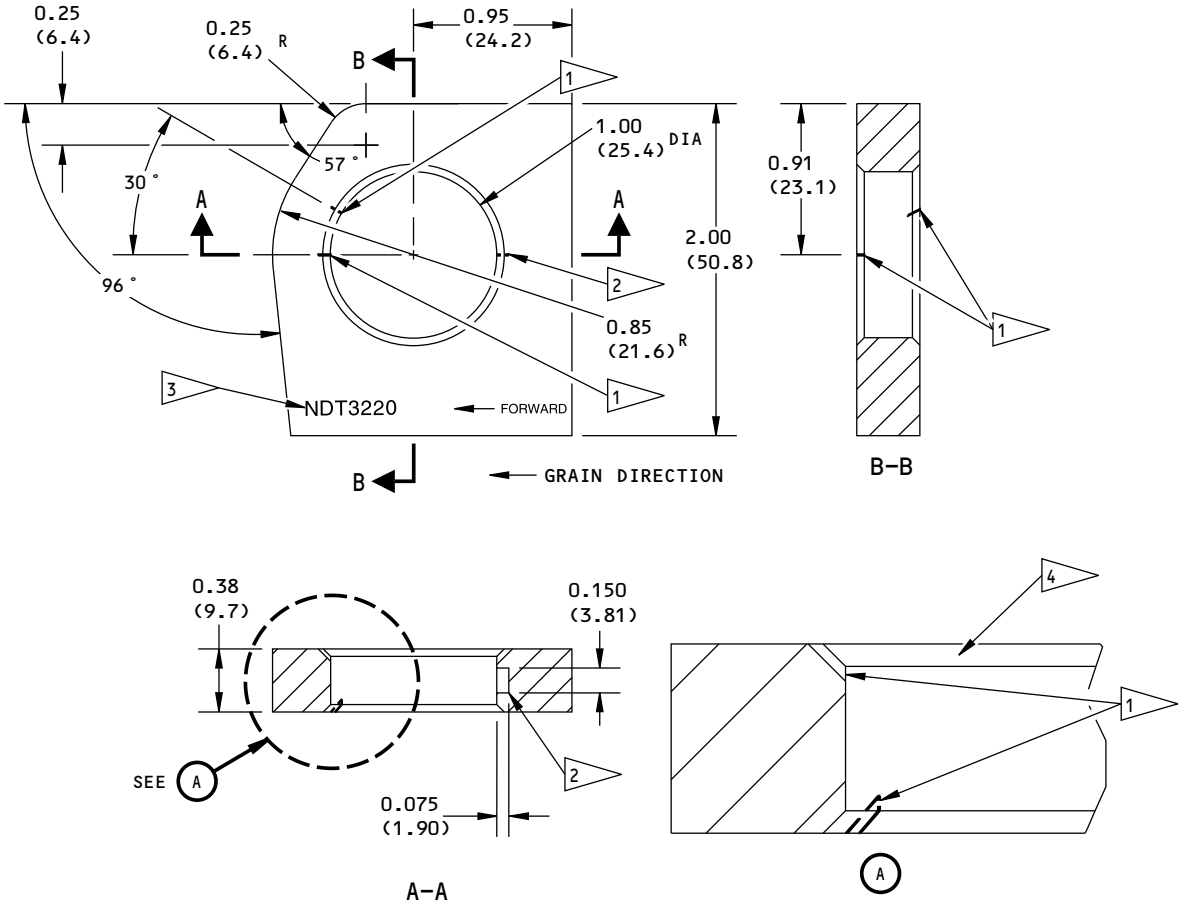


THE LEFT GROUND SPOILER IS SHOWN;
THE RIGHT GROUND SPOILER IS OPPOSITE

A



Inspection Area
Figure 1



NOTES

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

INCHES	MILLIMETERS	ANGULAR
X.XXX = ±0.005	X.XX = ±0.10	±2 °
X.XX = ±0.025	X.X = ±0.5	
X.X = ±0.050	X = ±1	

- MATERIAL: 7075-T73 (OR EQUIVALENT) AIRCRAFT GRADE ALUMINUM
- SURFACE ROUGHNESS: 63 Ra OR BETTER

1 EDM CORNER NOTCH: 0.075 (1.90) X 0.075 (1.90) X 0.007 (0.18) WIDE; THE EDM NOTCH DIMENSIONS ARE BEFORE THE CHAMFER EDGE

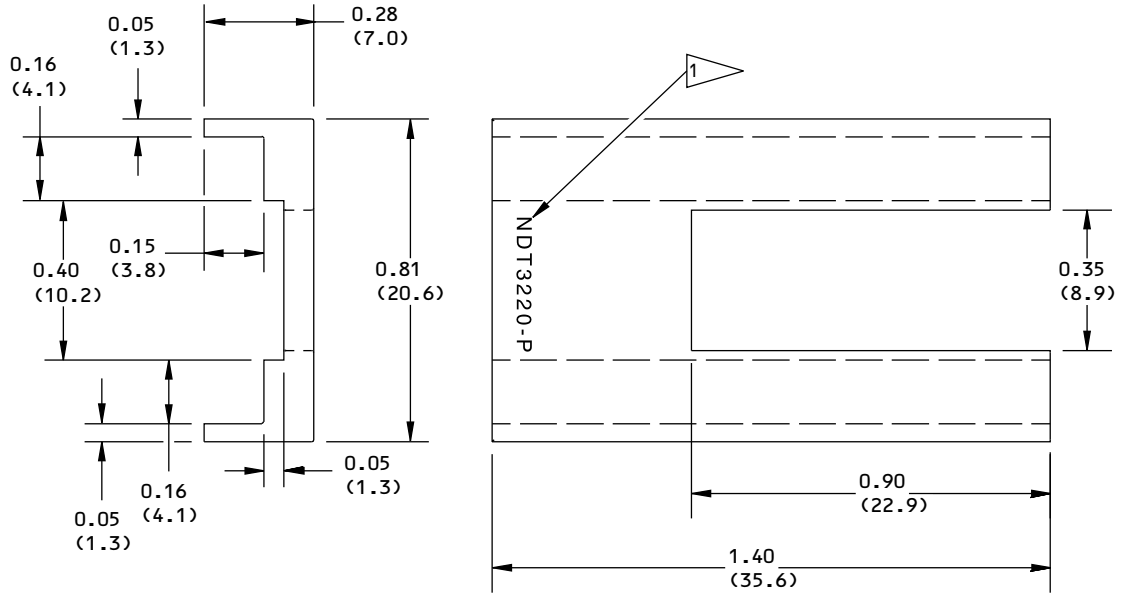
2 EDM MID-BORE NOTCH:
LENGTH: 0.150 (3.81)
DEPTH: 0.075 (1.90)
WIDTH: 0.007 (0.18)

3 ETCH OR STAMP THE REFERENCE STANDARD NUMBER, NDT3220, AND ADD THE ARROW AND THE WORD "FORWARD" AT (APPROXIMATELY) THE LOCATIONS SHOWN

4 CHAMFER EACH SIDE OF THE HOLE: 45 ° X 0.045 (1.14)

2359805 S0000537500_V1

Reference Standard NDT3220
Figure 2



NOTES

- ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES)
- TOLERANCE (UNLESS SPECIFIED DIFFERENTLY):

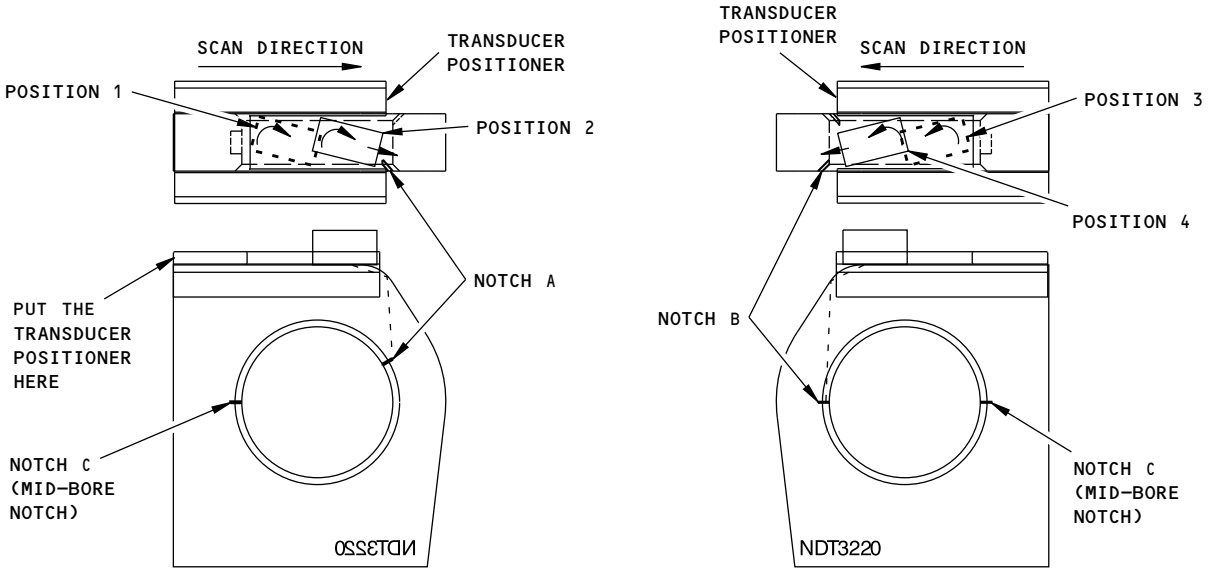
INCHES	MILLIMETERS
X.XXX = ±0.005	X.XX = ±0.10
X.XX = ±0.025	X.X = ±0.5
X.X = ±0.050	X = ±1

- MATERIAL: ALUMINUM OR ABS PLASTIC
- SURFACE ROUGHNESS: 125 Ra OR BETTER

1 ETCH OR STAMP THE POSITIONER NUMBER, NDT3220-P, AT APPROXIMATELY THIS LOCATION

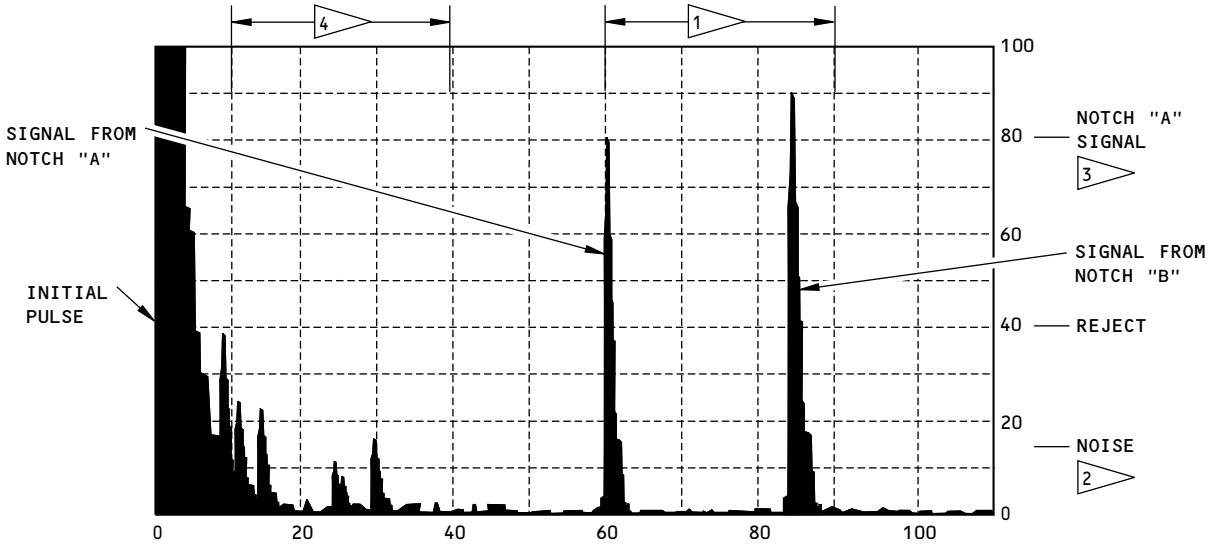
2359814 S0000537501_V1

Transducer Positioner NDT3220-P
Figure 3



DETAIL I

DETAIL II



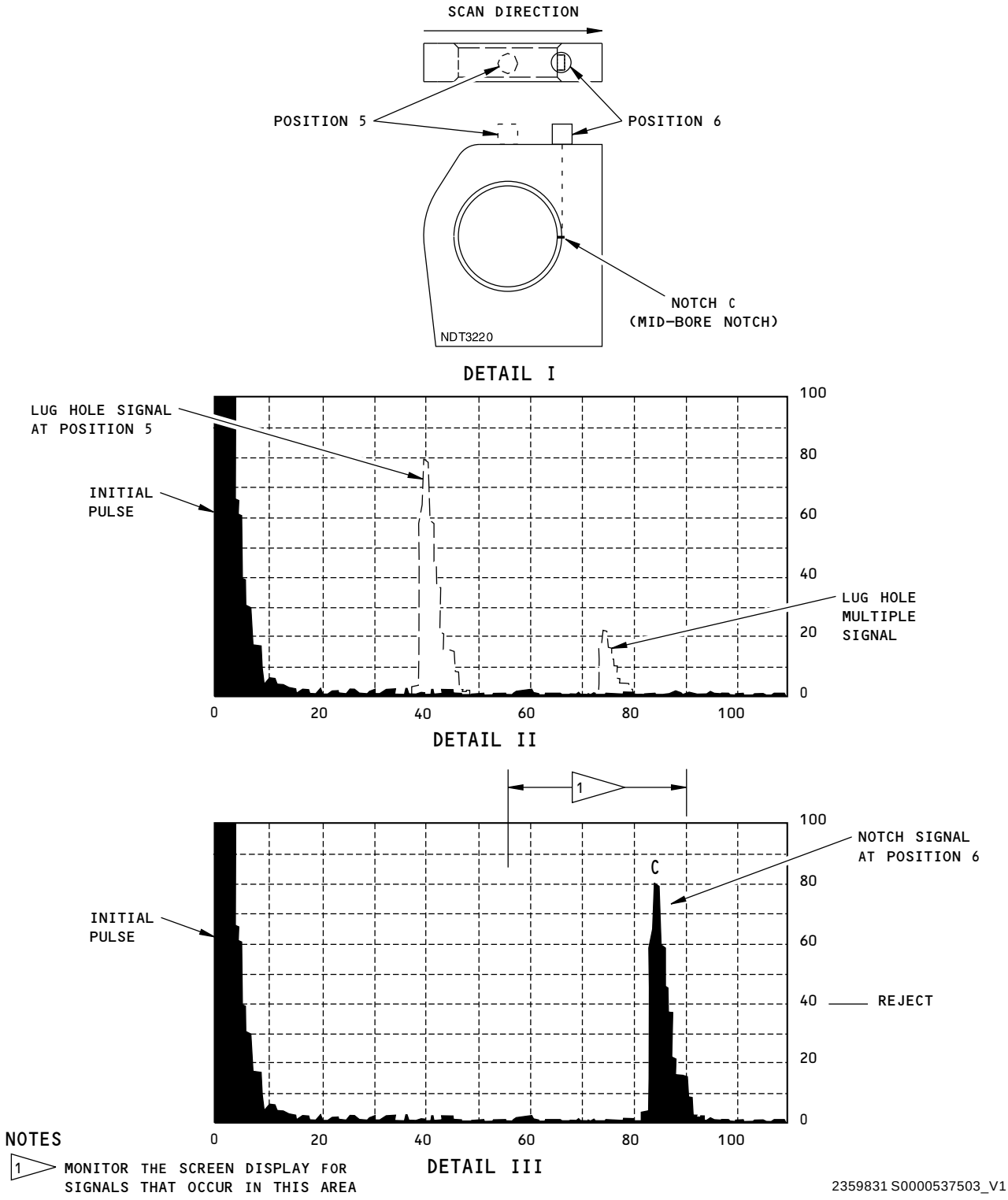
DETAIL III
CALIBRATION SCREEN DISPLAY

NOTES

1. MONITOR THE SCREEN DISPLAY FOR SIGNALS THAT OCCUR IN THIS AREA. KEEP A 5:1 SIGNAL-TO-NOISE RATIO IN THE INSPECTION AREA.
2. MAXIMUM NOISE SIGNAL AT 16% OF FSH.
3. NOTCH SIGNAL AT 80% OF FSH
4. IGNORE THE SIGNALS THAT COME INTO VIEW IN THIS AREA

2359829 S0000537502_V1

Calibration to Examine the Forward Side of the Lug (Shear Wave)
Figure 4



Calibration to Examine the Aft Side of the Lug (Longitudinal)
Figure 5