EFFECTIVITY
MODEL: 707/720 SERVICE BULLETIN REFERENCE: 1541, 1548, 2027 SSI DOCUMENT (D6-44860) REFERENCE: SSD 54-A05-04 54-A15-04 54-A25-04 54-A35-04 54-A45-04

PART 4 - ULTRASONIC

NACELLES/PYLONS – ATTACH FITTINGS

1. Purpose

   A. To detect cracks in inboard and outboard nacelle strut front spar aluminum fitting clevis lugs. See Details I and II.

      NOTE: No inspection required on steel fitting clevis lugs. Reference Service Bulletin 2027.

2. Equipment

   A. Any ultrasonic equipment that satisfies the requirement of this procedure may be used. The following equipment was found acceptable during the development of this procedure:

      (1) Instrument - Nortec NDT-131, Nortec Corporation.

      (2) Transducers

         (a) 10 MHz, 0.25-inch diameter element in a 0.375-inch diameter, 0.75-inch long cylindrical case with a side-mounted connector.

         (b) 5 MHz, 0.25 x 0.25-inch element producing a 45 degree refracted angle in aluminum, mounted in a 0.47-inch high (max), 0.37-inch wide, 0.75-inch long case with a front-mounted microdot connector: P/N SPO 2255, Nortec Corporation.

            NOTE: Refer to Part 1, 51-06-00, par. 7 for information on equipment manufacturers.

   B. Fabricate reference standard per Detail III and Table I.

   C. Fabricate transducer positioning fixture per Detail IV.

   D. Couplant is light oil or grease.

Nacelle Strut Front Spar Fitting Clevis Lugs
Figure 1 (Sheet 1)

3. Preparation for Inspection

A. Remove inboard and outboard nacelle fairings for access to spar fitting. See Detail II.

B. Smooth rough surfaces as necessary by polishing lightly with abrasive cloth.

C. Clean inspection area thoroughly to remove old grease, grit, or other foreign material.

D. Apply a thin couplant film to inspection area.

4. Instrument Calibration

A. Inspect for cracks in aft side of lug hole. See Detail VIII.

(1) Connect transducer and make preliminary instrument adjustments.

(2) Place transducer on side of standard to obtain a back reflection from the one-inch thick section, Detail V.

(3) Adjust instrument to obtain two back reflections on oscilloscope.

(4) Select transducer positioning fixture which will fit radius of the part per Detail IV.

(5) Place transducer in positioning fixture. Place positioning fixture on reference standard as shown in Detail VIII.

(6) Rotate transducer in positioning fixture to obtain a maximum response from the simulated crack. Inspection is done using a refracted longitudinal wave.

(7) Adjust sensitivity to obtain a 50% of full scale response from the simulated crack.

B. Inspect for cracks in forward side of lug hole. See Detail IX.

(1) Connect transducer and make preliminary instrument adjustments.

(2) Place transducer on top of standard to obtain a back reflection. See Detail VI.

(3) Adjust instrument to obtain one back reflection on oscilloscope.

(4) Position transducer as shown in Detail IX.

(5) Adjust sensitivity to obtain a 50% of full scale response from the simulated crack.

C. Inspect for cracks in top and bottom of lug hole. See Detail X.

(1) Connect transducer and make preliminary instrument adjustments.

(2) Place transducer on top of standard to obtain one back reflection. See Detail VII.

(3) Adjust instrument to center back reflection on oscilloscope screen.

(4) Position transducer to detect standard notch as shown in Detail X.

(a) Slightly angle 45° transducer toward edge of lug for maximum response from simulated crack.

(5) Adjust sensitivity to obtain a 50% of full scale response from simulated crack.

5. Inspection Procedure

A. Calibrate instrument per Section 4.

B. Place transducer on fitting to inspect area around lug hole for which instrument has been calibrated. See Details VIII, IX, or X.

C. If transducer positioning fixture radius does not make good contact with lug radius, place sandpaper on lug radius and lightly work fixture back and forth until proper curvature is obtained.

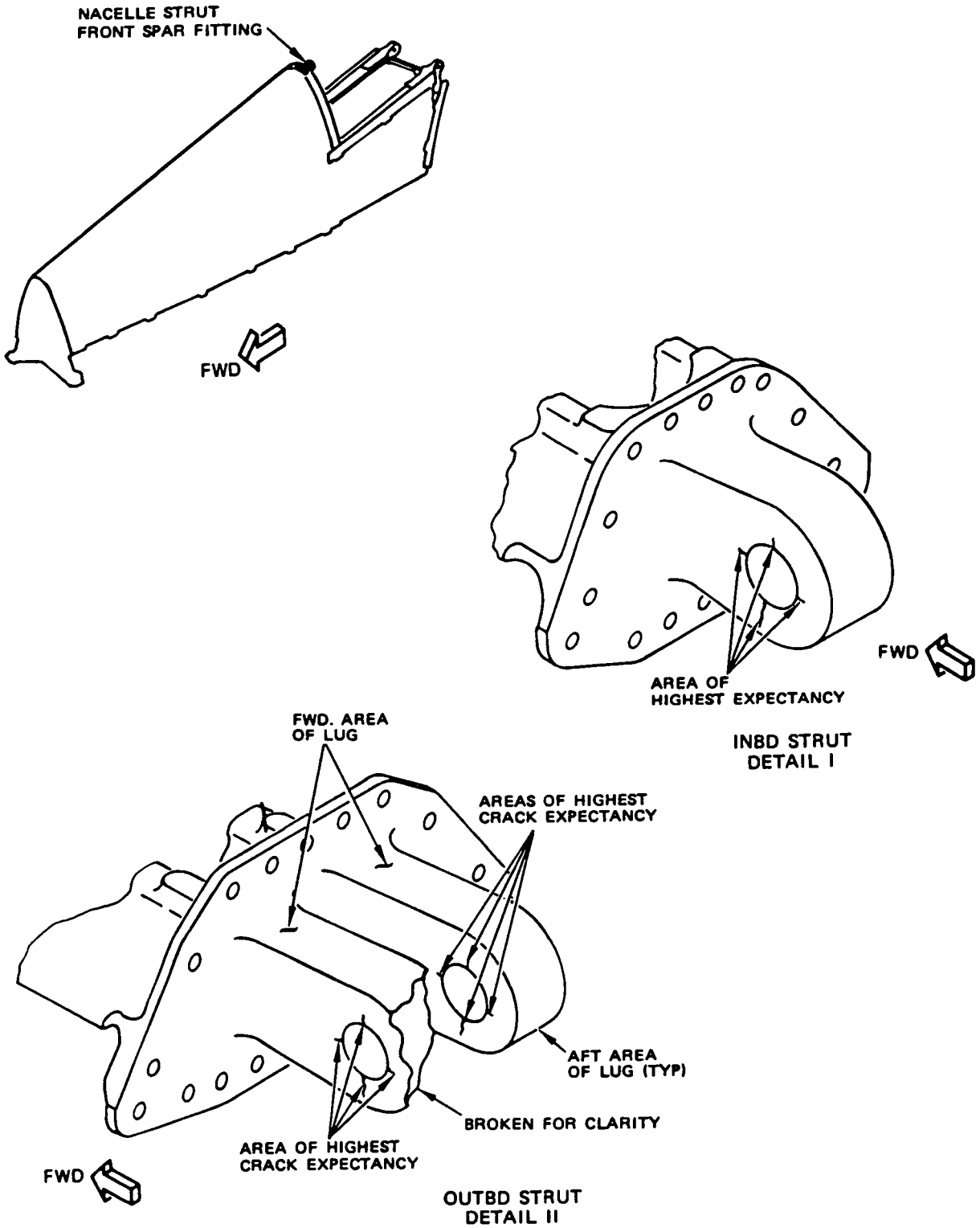
D. Scan area around lug hole by moving transducer positioning fixture forward and aft.

E. Slightly angle 45° transducer toward edge of lug when scanning.

F. Compare response from fitting being inspected with response from reference standard. A response indication equal to or greater than response from reference standard simulated crack represents a crack.

G. Verify all crack indications by visual or other nondestructive testing methods.

Nacelle Strut Front Spar Fitting Clevis Lug
Figure 1 (Sheet 3)



Nacelle Strut Front Spar Fitting Clevis Lugs
Figure 1 (Sheet 4)

EFFECTIVITY	LOCATION	ID	R	A	ANGLE	BOEING PART NUMBER
2	INBOARD	1.027	1.51	0.140	11°	150
2	OUTBOARD	0.964	1.18	0.110	5°	151
3	INBOARD	1.027	1.20	0.140	5°	152
3	OUTBOARD	0.964	1.13	0.110	5°	153
4	INBOARD	1.059	1.60	0.140	12°	154
5	OUTBOARD	0.964	1.39	0.110	10°	155
TOLERANCE		± 0.005	± 0.010	± 0.010	± 1°	—

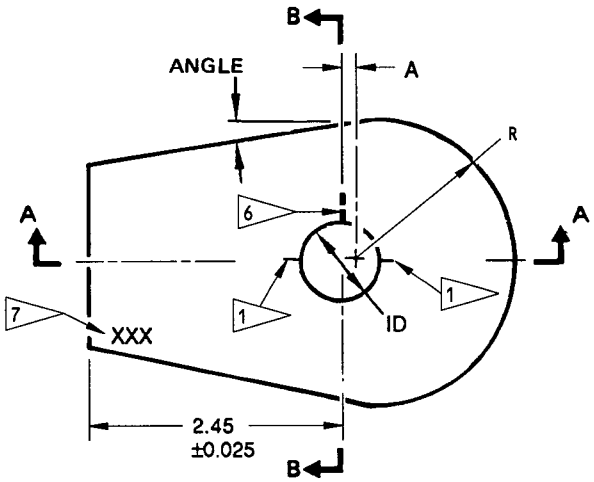
NOTES

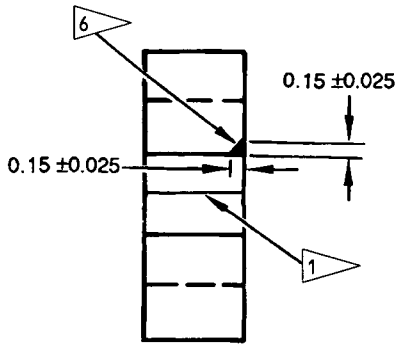
- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: ALUMINUM
- THE MAXIMUM WIDTH FOR ALL OF THE EDM NOTCHES IS 0.007 INCH

1 EDM NOTCH 0.030 DEEP (FULL LENGTH OF HOLE BORE)

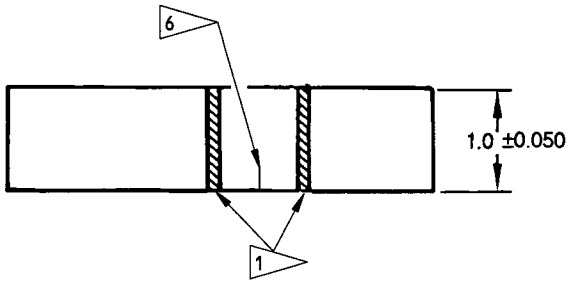
6 EDM CORNER NOTCH

7 ETCH OR STEEL STAMP THE BOEING PART NUMBER SPECIFIED IN THE TABLE ABOVE





SECTION B–B



SECTION A–A

REFERENCE STANDARD
DETAIL III

Nacelle Strut Front Spar Fitting Clevis Lugs
Figure 1 (Sheet 5)

NOTES

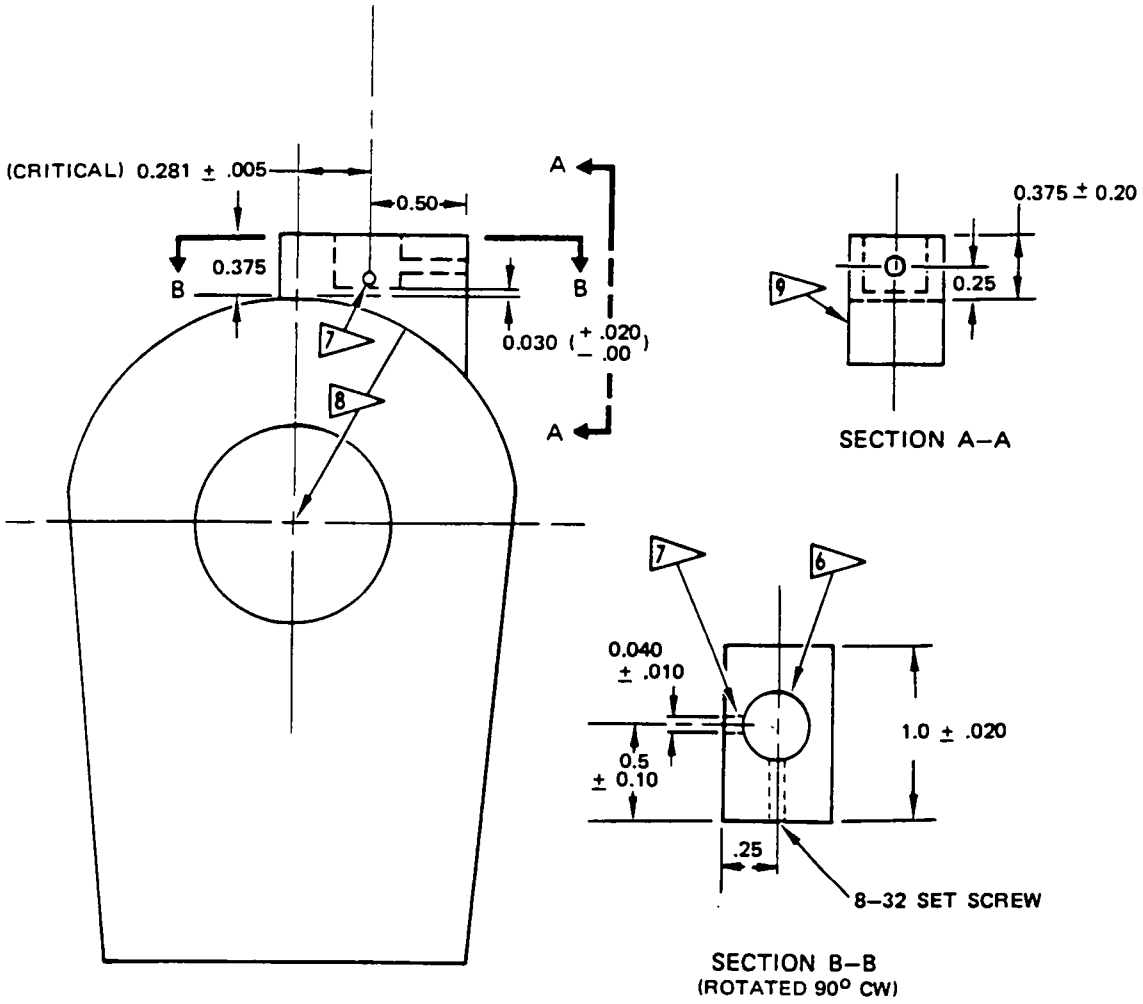
| 2 | 13, 20, 35, 45, 58, 61, 62, 68, 70, 71, 75, 76, 83, 84, 87, 91, 94, 96, 100, 101, 102, 105, 112 thru 114, 127 thru 129, 144, 145, 163, 164, 169 thru 171, 175, 176, 200 thru 205, 216, 266, 271, 272, 275, 302, 330, 334, 353.

| 3 | 18, 19, 21 thru 25, 27, 28, 32, 33, 34, 37, 38, 46, 48, 49, 55, 56, 57 85, 95, 109, 130 thru 132, 141, 142, 146 thru 148, 172, 178, 179, 182 thru 188, 191, 196, 208, 225, 226, 232 thru 236, 239 thru 242, 246 thru 248, 252 thru 255, 259 thru 261, 265, 267, 278, 279, 284, 285, 289, 297, 298, 347.

| 4 | 1 thru 12, 14 thru 17, 26, 29 thru 31, 36, 39 thru 44, 47, 50 thru 54, 59, 60, 63, 64, 66, 67, 72, 77, 108, 119, 140, 190, 197, 201, 202, 203 204, 210, 211, 213, 218, 219, 221 thru 224, 227 thru 231, 237, 238, 243 thru 245, 249 thru 251, 256 thru 258, 262, 263, 268, 270, 273, 276, 277, 280, 281, 286 thru 288, 290 thru 292, 294 thru 296, 299 thru 301, 303 thru 321, 323 thru 327, 329 thru 333, 335 thru 346, 348 thru 352, 354 thru 423, 425 thru 438, 440.

| 5 | All except airplanes listed in 2 and 3 .

Nacelle Strut Front Spar Fitting Clevis Lug
Figure 1 (Sheet 6)



8 RADIUS	IDEAL SPECIALTY POS. FIXTURE NO.	BOEING PART NUMBER
1.22	6410–18	150P1
1.62	6410–19	150P2

NOTES

- MATERIAL: LUCITE OR PLEXIGLASS
- ALL DIMENSIONS ARE IN INCHES

6 FLAT BOTTOM HOLE: 0.380 DRILL (± 0.001) DIMENSION

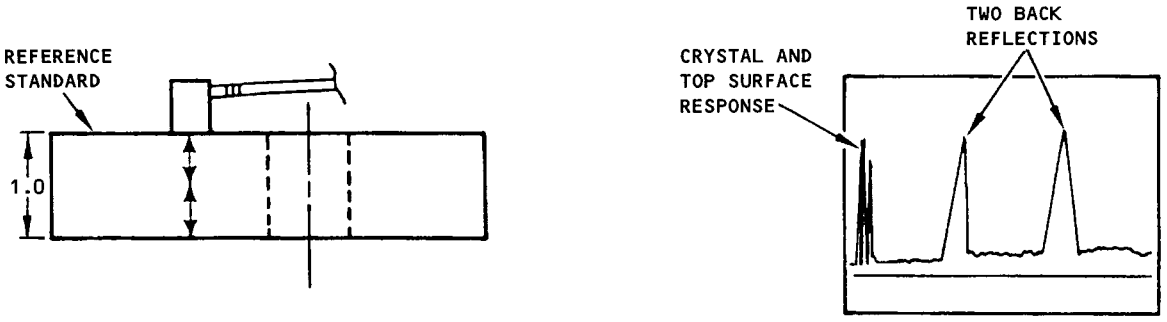
7 DRILL RELIEF HOLE FLUSH WITH BOTTOM OF 6

8 FOR LUG RADII OF 1.13, 1.18 OR 1.20 USE POSITIONING FIXTURE WITH BOTTOM CONTOUR RADIUS OF 1.22 (+0.010 –0.000). FOR LUG RADII OF 1.40, 1.51 OR 1.60, USE POSITIONING FIXTURE WITH BOTTOM CONTOUR RADIUS OF 1.62 (+0.010 –0.000)

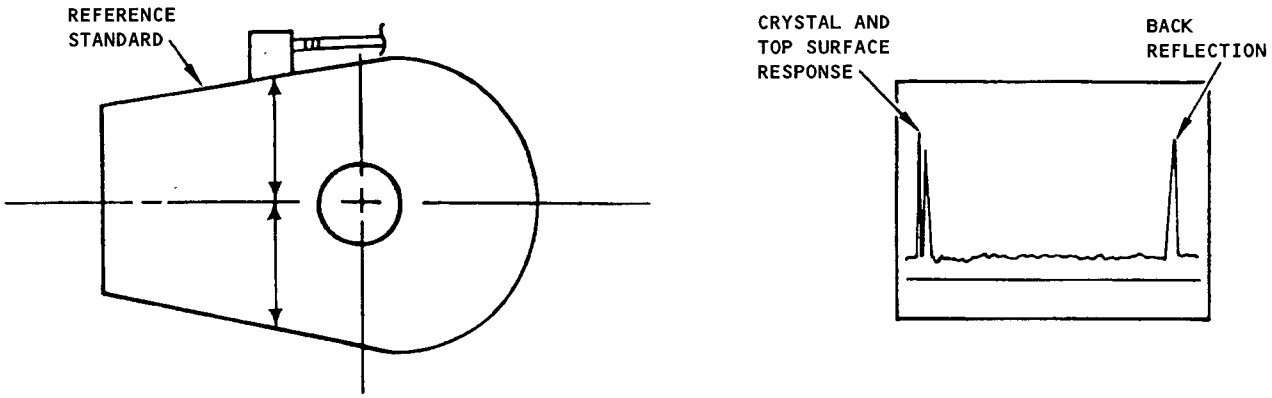
9 ETCH WITH 150P1

TRANSDUCER POSITIONING
FIXTURE
DETAIL IV

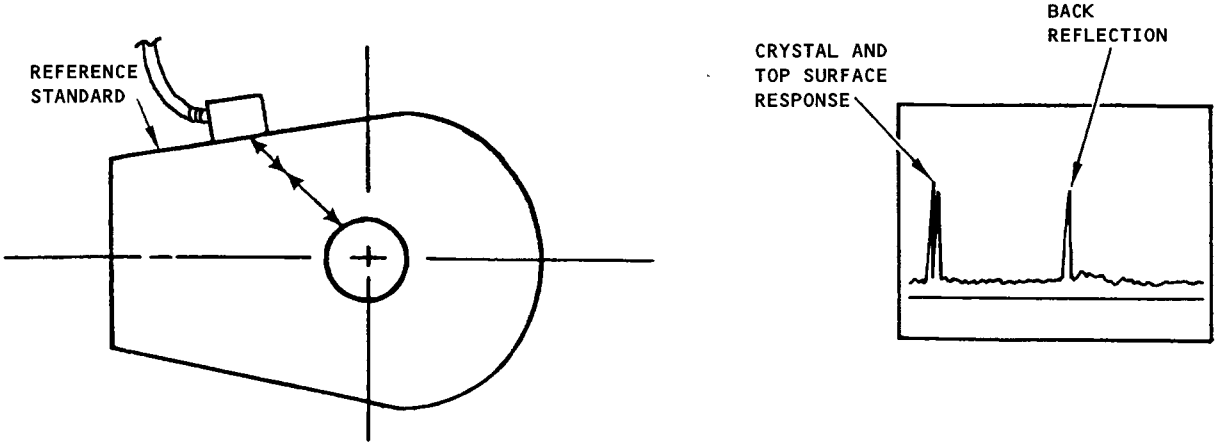
Nacelle Strut Front Spar Fitting Clevis Lugs
Figure 1 (Sheet 7)



LUG HOLE CALIBRATION - AFT SIDE
DETAIL V

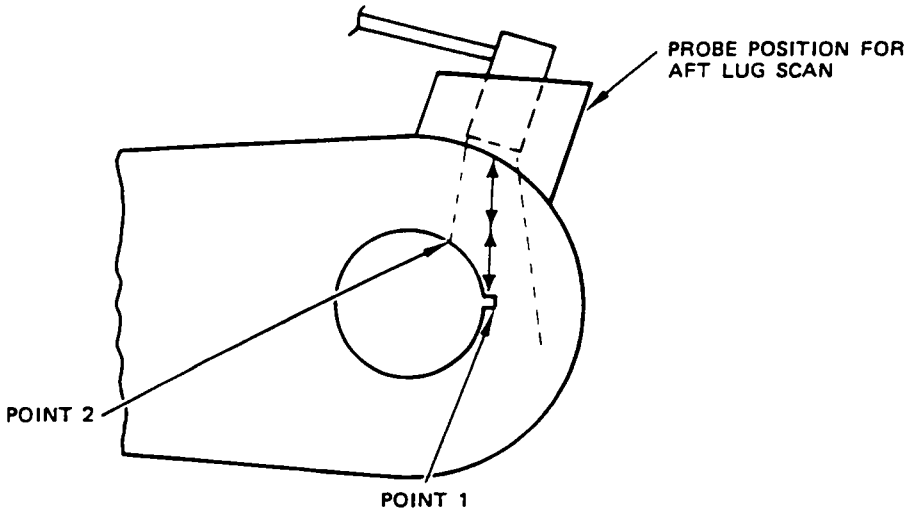


LUG HOLE CALIBRATION - FWD SIDE
DETAIL VI



LUG HOLE CALIBRATION - TOP AND BOTTOM
DETAIL VII

Nacelle Strut Front Spar Fitting Clevis Lugs
Figure 1 (Sheet 8)

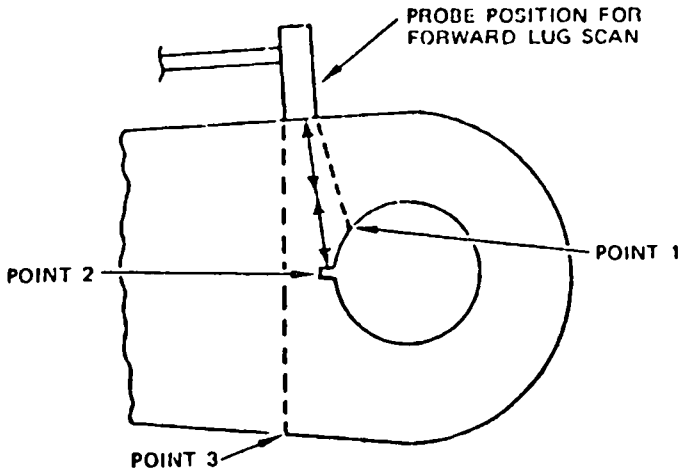


RESPONSE PATTERN FROM REFERENCE STANDARD

DETAIL VIII

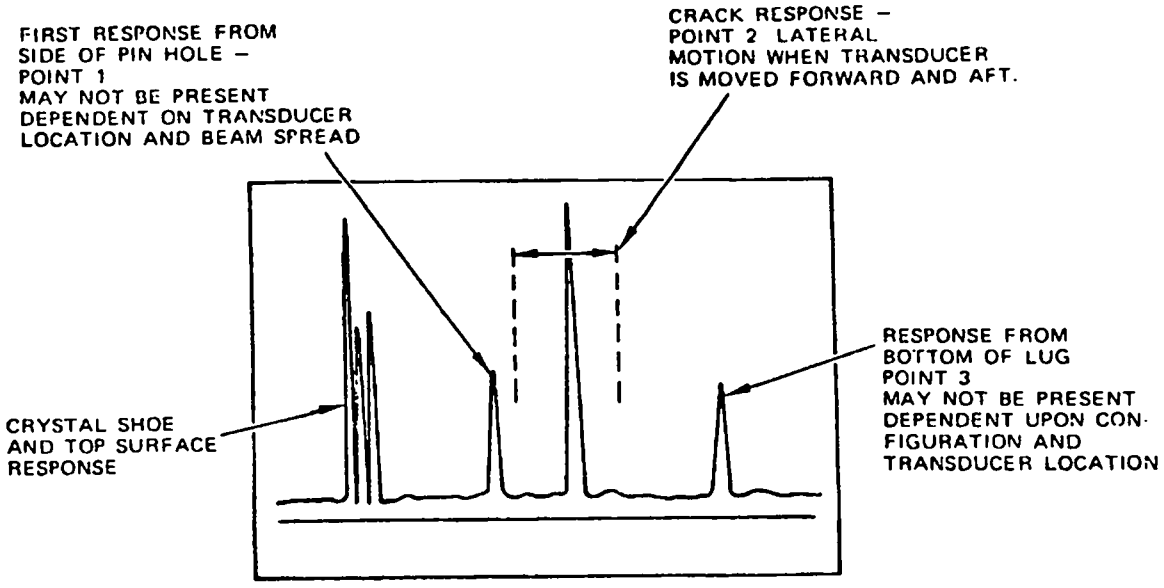
Nacelle Strut Front Spar Fitting Clevis Lugs
Figure 1 (Sheet 9)

NONDESTRUCTIVE TEST



STANDARD
90° LONGITUDINAL
WAVE TRANSDUCER

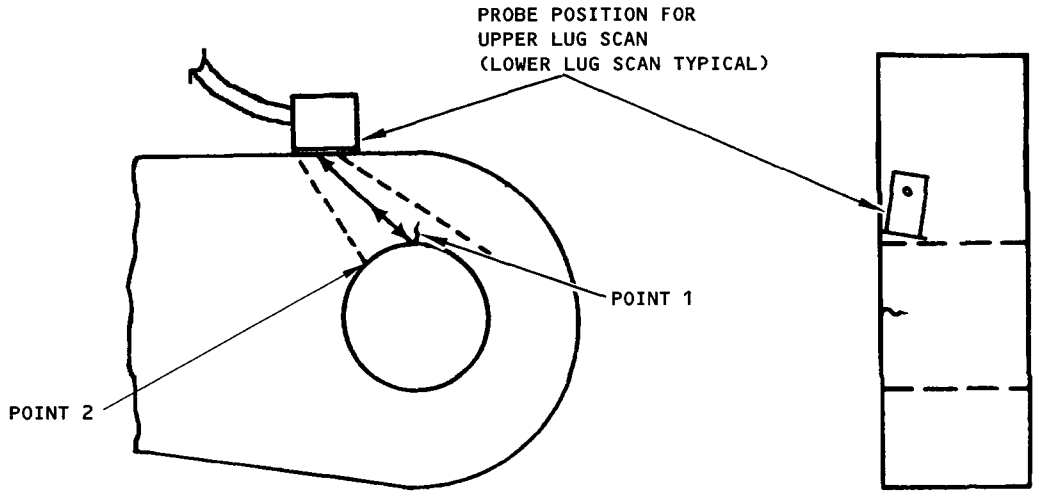
AFT



RESPONSE PATTERN FROM REFERENCE STANDARD

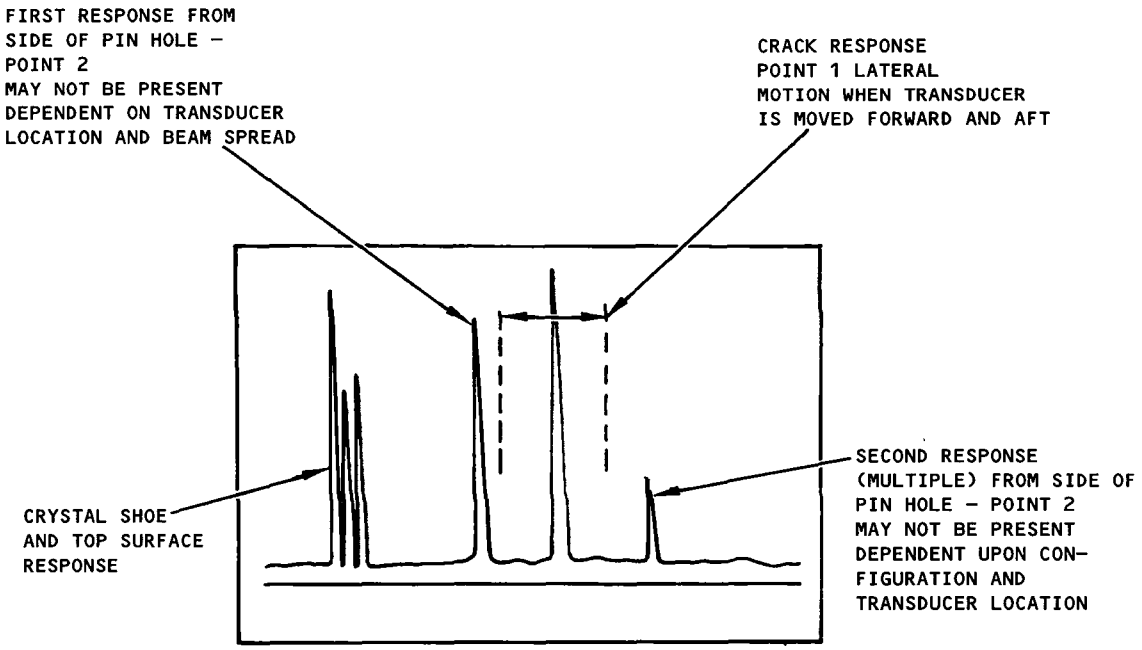
DETAIL IX

Nacelle Strut Front Spar Fitting Clevis Lugs
Figure 1 (Sheet 10)



45° SHEAR WAVE TRANSDUCER

AFT



RESPONSE PATTERN FROM REFERENCE STANDARD
DETAIL X

Nacelle Strut Front Spar Fitting Clevis Lugs
Figure 1 (Sheet 11)

PART 4 - ULTRASONIC
NACELLE STRUT - OVERWING SUPPORT FITTING - FUSE BOLT

1. Purpose

   A. Use this procedure to do an ultrasonic inspection of the fuse bolts at the overwing support fittings on the inboard and outboard nacelle struts for fatigue cracks. See Detail I.

   B. Fatigue cracks can occur in the circumferential direction at the approximate area where the overwing fitting lug interfaces with the nacelle strut fitting. See Detail I for the inspection areas and the areas for possible cracks to occur.

   C. The inspection uses a longitudinal wave transducer installed in a positioner. The minimum crack that can be satifactorily found with this procedure is 0.080-inch (2 mm) deep by 0.25-inch (6 mm) long.

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 10 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) Epoch 2002 - Panametrics

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

         (c) USD 10 - Krautkramer Branson

         (d) USL 42 - Krautkramer Branson

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 1)

(2) Transducer -- Use a longitudinal wave transducer with a crystal diameter not larger than 0.125-inch (3.2 mm). A case diameter not larger than 0.20-inch (5.1 mm) is necessary. A 10 Mhz transducer is recommended, but other frequencies can be used if the instrument can be calibrated as specified in par. 4. These transducers were used to prepare this procedure:

(a) A 10 Mhz, 0.125-inch diameter (3.2 mm) transducer. Case dimensions: 0.190-inch diameter (4.8 mm) by 0.60-inch long (15 mm). Part number 389-002-190; Manufacturer: KB Aerotech.

(b) A 10 Mhz, 0.125-inch diameter (3.2 mm) transducer. Case dimensions: 0.190-inch diameter (4.8 mm) by 1.00-inch long (25.4 mm). Part number Y-M-1/8-10; Manufacturer: Nortec (Staveley Instruments, Inc.).

(3) Reference Standard -- Make reference standard NDT1036 as specified in Detail III.

(4) Transducer Positioner -- Make transducer positioner(s) NDT1036-P1, NDT1036-P2 and/or NDT1036-P4, as specified in Detail IV. Find the positioner(s) that are necessary to do the inspection for the bolt(s) to be examined in Detail II.

(5) Couplant -- All ultrasonic couplants that will not cause damage to the airplane structure can be used. Commercial grease or oil can be used if the sensitivity requirements of par. 4 are satisfactory.

3. Preparation for Inspection

A. Remove the necessary fairings to get access to the inspection surface of the bolt.

B. Identify the inspection surface. The inspection surface is the head end of the bolt. See Detail I.

C. Remove all paint and sealant from the inspection surface and clean fully. Use a nonabrasive scraper to remove the paint. The part number is etched on the head of the bolt and can cause the surface to be rough. If necessary, lightly sand this area by approved methods to permit the transducer to fully touch the part.

NOTE: Make sure that the part number is not removed.

D. Make sure the transducer positioner that is to be used will fit into the bolt hole and turn easily. If the positioner will not fit, remove a sufficient amount of paint. If the fit is too loose, put tape around the positioner insert.

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 2)

4. Instrument Calibration

NOTES: 1) The reference standard has four calibration positions identified as "A", "B", "C", and "D". Detail II identifies what calibration position to use for each bolt part number.

2) Because the transducer is small, a positioner is used during the inspection. Only one positioner is necessary to do an inspection of a bolt. See Detail II.

A. Connect the transducer to the instrument with a coaxial cable and do the initial adjustments of the instrument.

NOTE: Do not use reject.

B. Set the instrument frequency to 10 Mhz. Refer to par. 2.A.(1).

C. Find the part number on the bolt to be examined.

D. Identify the transducer positioner necessary to examine the bolt from Detail II. Use Table I for the inboard nacelle bolts and Table II for the outboard nacelle bolts.

E. Put the transducer into the positioner made for the bolt to be examined. Align the bottom of the transducer with the bottom of the hole. Tighten the setscrew lightly.

F. Calibrate the instrument for metal distance as follows:

(1) For the Inboard Nacelle Bolt (see Detail V, view A):

(a) Put couplant on the side of reference standard NDT1036 with the 1.0-inch (22 mm) dimension and put the transducer on as shown in Detail V, view A.

(b) Adjust the instrument delay and range controls to get the back surface signals at 20%, 40%, 60%, 80%, and 100% of full screen width. The instrument is now calibrated for a 5.0-inch (127 mm) instrument screen range. See Detail V, view A.

(2) For the Outboard Nacelle Bolt (see Detail V, view B):

(a) Put couplant on the side of reference standard NDT1036 with the 3.0-inch (76 mm) dimension and put the transducer on as shown in Detail V, view B.

(b) Adjust the instrument delay and range controls to get the back surface signals at 50% and 100% of full screen width. The instrument is now calibrated for a 6.0-inch (152 mm) instrument screen range. See Detail V, view B.

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 3)

G. Calibrate the instrument for sensitivity as follows:

(1) For the inboard nacelle bolt (see Detail VI, view A):

(a) Refer to Table I in Detail II to identify what transducer position on the reference standard to use for the bolt to be examined.

(b) Put couplant on the surface of the reference standard at the location identified and put the transducer on the reference standard at that location above the notch. See Detail VI for the example display that shows the usual transducer/positioner location above the notch.

(c) Move the positioner above the notch to get the maximum signal height from the notch. The approximate screen locations for the notch signals at the transducer positions are as follows:

Position "A" = 2.0 inch (50 mm) = 40% full screen width

Position "B" = 2.3 inch (58 mm) = 46% full screen width

(d) Adjust the instrument gain controls to get the notch signal at 80% full screen height. Turn the transducer in the positioner hole to make sure the notch signal is at a maximum amplitude and adjust the setscrew so that it is tight. Move the positioner above the notch to be sure the signal is at a maximum height of 80%. See Detail VI, view A.

(e) Increase the gain 6 dB.

(f) Examine all noise signals to make sure the signal-to-noise ratio is less than 3:1. If the signal-to-noise ratio is less than 3:1, try a different transducer.

NOTE: Make sure the initial pulse is not more than 8% of full screen width. If necessary, adjust the instrument controls or use a different transducer.

(2) For the outboard nacelle bolt (see Detail VI, view B):

(a) Refer to Table II in Detail II to identify what transducer position on the reference standard to use for the bolt to be examined.

(b) Put couplant on the surface of the reference standard at the location identified and put the transducer on the reference standard at that location above the notch. See Detail VI for the example display that shows the usual transducer/positioner location above the notch.

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 4)

(c) Move the positioner above the notch to get the maximum signal height from the notch. The approximate screen location for the notch signals at the transducer positions are as follows:

Position "C" = 3.9 inch (99 mm) = 65% full screen width

Position "D" = 0.6 inch (15 mm) = 10% full screen width

(d) Adjust the instrument gain controls to get the notch signal at 80% full screen height. Turn the transducer in the positioner hole to make sure the notch signal is at a maximum amplitude and adjust the setscrew so that it is tight. Move the positioner above the notch one more time to make sure the signal is at a maximum height of 80%. See Detail VI, view B.

(e) Increase the gain 6 dB.

(f) Examine all noise signals to make sure the signal-to-noise ratio is larger than 3:1. If the signal-to-noise ratio is less than 3:1, try a different transducer.

NOTE: Make sure the initial pulse is not more than 8% of full screen width. If necessary, adjust the instrument controls or use a different transducer.

5. Inspection Procedure

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

B. Do the instrument calibration as specified in par. 4.

C. Put couplant on the inspection surface of the bolt. See Detail I.

D. Put the transducer positioner into the bolt hole until the transducer touches the inspection surface. Monitor the screen display for a back surface signal or ultrasonic signals from the bolt configuration if a back surface signal does not show. See Detail VII for examples of an inboard and outboard bolt inspection which shows the types of ultrasonic signals that can show on the screen display. Turn the positioner to different locations if signals do not show. Loosen the positioner setscrew and adjust the height of the transducer, if necessary, to increase the signal(s) amplitude. Refer to the tables in Detail II for the location of where the back surface signal will be for the bolt to be examined.

NOTE: If you do not get a back surface or bolt configuration signal(s), do a check to make sure there is good transducer contact.

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 5)

E. Make a complete scan inspection of the bolt inspection surface. As you make a scan, monitor the ultrasonic signals which occur in the area identified as the bolt inspection area in Table I and/or II of Detail II. Carefully monitor the areas identified as bolt crack locations in Table I and/or II of Detail II. Also monitor the signal(s) from the back surface or the bolt configuration to make sure you keep good transducer contact.

NOTE: For the inspection of the outboard nacelle bolt, it can be necessary to calibrate for sensitivity on the transducer positions "C" and "D". If ultrasonic signals to the right of the initial pulse extend into the inspection area, calibrate on transducer position "C" and examine the area again.

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

6. Inspection Result

A. A bolt that does not have a crack indication and does not show a loss of the back surface signal is acceptable.

B. A loss of the back surface signal can be caused by a crack in the bolt.

C. Do more analysis on a bolt with an ultrasonic signal that is 40% or more of full screen height. Do more analysis in the monitored areas as follows:

(1) Make sure that the signal is not caused by too much couplant. Clean the inspection area of all couplant and then put only a small quantity of couplant on the inspection area. Do the inspection one more time. If the ultrasonic signal was caused by too much couplant, it will be gone. If the ultrasonic signal does not go away, continue to par. 6.C.(2).

(2) It is possible that a surface condition on the inner surface of the bolt hole has caused the signal. Look at the inner diameter of the bolt at the approximate location where the ultrasonic indication occurs. Try to dampen the ultrasonic signal. Put a small quantity of couplant on the tip of a cotton swab and rub the inner surface of the bolt at the location where the ultrasonic signal occurred. The signal will move up and down if a surface condition has caused the ultrasonic signal. If the ultrasonic signal cannot be dampened, continue to par. 6.C.(3).

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 6)

(3) It is possible that an ultrasonic signal can occur at the areas identified as possible bolt crack locations in Table I and/or II of Detail II and not be a crack. The signal can be caused by a tight fit at the bearing to bolt interface. Do an analysis as follows:

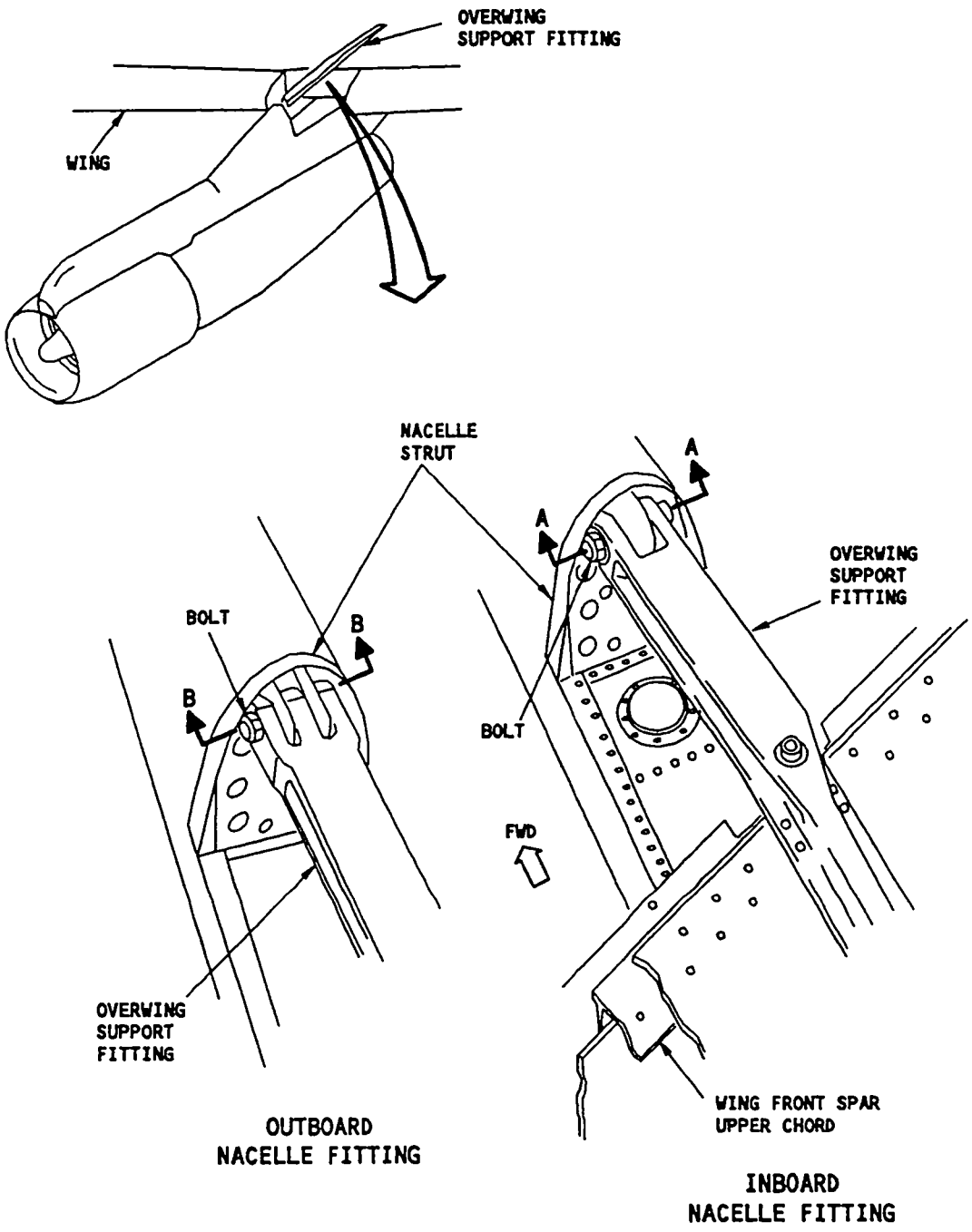
(a) If possible, do a check from the threaded end. Make sure a back surface signal can be seen to be sure sound is transmitted into the bolt. If a back surface signal is seen and the signal shows again at the same location in the bolt, continue on with the analysis.

(b) Take the weight off of the bolt and move the bolt out a short distance. Do a check again to see if the ultrasonic signal moved to a different location on the screen display or went away. If the signal has not changed, reject the bolt for a possible crack.

D. Remove the bolt from the airplane, after you are satisfied that all the checks above have been made to identify the cause of the ultrasonic signal.

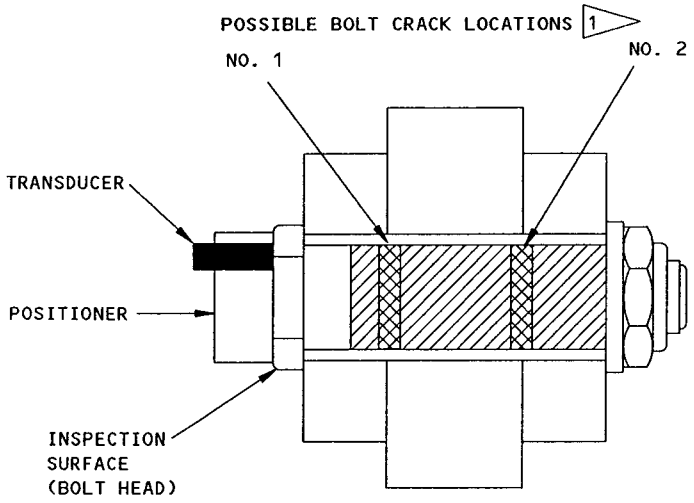
E. Do other nondestructive examinations on the bolt to identify the cause of the ultrasonic signal.

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 7)

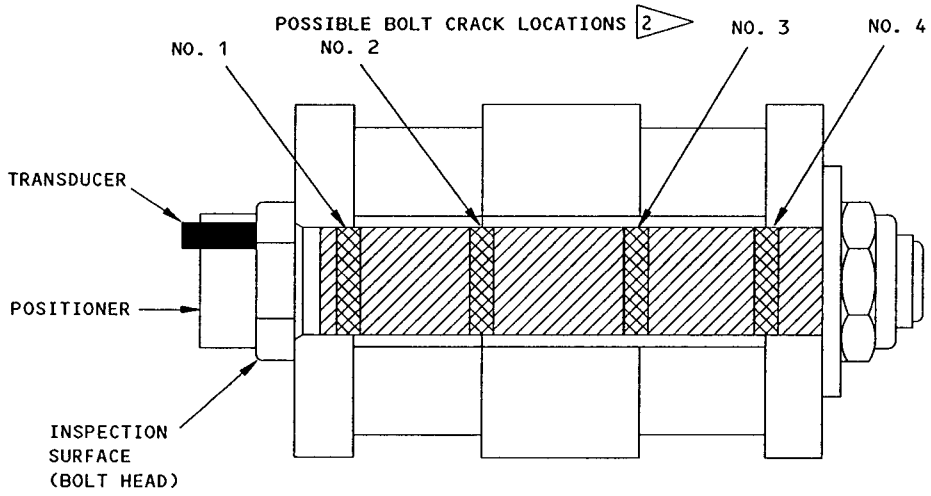


INSPECTION AREAS FOR THE OVERWING SUPPORT FITTING FUSE BOLT
DETAIL I

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 8)



INBOARD NACELLE FITTING
A-A



OUTBOARD NACELLE FITTING
B-B

NOTES:

INSPECTION AREA, DETAIL II IDENTIFIES THE INSTRUMENT SCREEN LOCATIONS OF THE INSPECTION AREA FOR THE BOLT TO BE EXAMINED.

AREA TO CAREFULLY MONITOR FOR POSSIBLE CRACKS.

1 SEE TABLE I, DETAIL II FOR THE INSTRUMENT SCREEN LOCATION.

2 SEE TABLE II, DETAIL II FOR THE INSTRUMENT SCREEN LOCATION.

INSPECTION AREAS FOR THE OVERWING SUPPORT FITTING FUSE BOLT
DETAIL I (CONT)

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 9)

BOLT PART NUMBER	BOLT BACK SURFACE SIGNAL METAL DISTANCE IN. (MM) [%FSW] 2	BOLT INSPECTION AREA METAL DISTANCE START IN. (MM) [%FSW] 2	BOLT INSPECTION AREA METAL DISTANCE END IN. (MM) [%FSW]	POSSIBLE BOLT CRACK LOCATIONS 1 METAL DISTANCE IN. (MM) [%FSW] 2 NO. 1	POSSIBLE BOLT CRACK LOCATIONS 1 METAL DISTANCE IN. (MM) [%FSW] 2 NO. 2	TRANSDUCER POSITION ON REFERENCE STANDARD 3	TRANSDUCER POSITIONER NUMBER: NDT1036-
66-21098	3.5 (89) [70%]	0.5 (13) [10%]	2.7 (69) [54%]	1.0 (25) [20%]	2.1 (53) [42%]	A	P2
66-1009	3.5 (89) [70%]	0.5 (13) [10%]	2.7 (69) [54%]	1.0 (25) [20%]	2.1 (53) [42%]	A	P4
66-11258	3.6 (91) [72%]	0.5 (13) [10%]	2.7 (69) [54%]	1.0 (25) [20%]	2.1 (53) [42%]	A	P4
204-70265-2 4	REMOVE THE FUSE BOLT FROM THE AIRPLANE AND DO A MAGNETIC PARTICLE EXAMINATION AS SPECIFIED IN SOPM 20-20-01.						
65-23413-10	3.5 (89) [70%]	0.5 (13) [10%]	2.7 (69) [54%]	1.0 (25) [20%]	2.1 (53) [42%]	A	P4
65-23413-19	3.6 (91) [72%]	0.5 (13) [10%]	2.7 (69) [54%]	1.0 (25) [20%]	2.1 (53) [42%]	A	P4
65-23413-22	3.5 (89) [70%]	0.5 (13) [10%]	2.7 (69) [54%]	1.0 (25) [20%]	2.1 (53) [42%]	A	P2
65-23413-23	3.8 (97) [76%]	0.5 (13) [10%]	3.1 (79) [62%]	1.1 (28) [22%]	2.3 (58) [46%]	B	P4
65-23413-25	3.9 (99) [78%]	0.5 (13) [10%]	3.1 (79) [62%]	1.1 (28) [22%]	2.3 (58) [46%]	B	P4
65-23413-27	3.9 (99) [78%]	0.5 (13) [10%]	3.1 (79) [62%]	1.1 (28) [22%]	2.3 (58) [46%]	B	P4

INBOARD NACELLE BOLTS
TABLE I

CALIBRATION AND INSPECTION DATA
DETAIL II

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 10)

BOLT PART NUMBER	BOLT BACK SURFACE SIGNAL METAL DISTANCE IN. (MM) [%FSW] [2]	BOLT INSPECTION AREA METAL DISTANCE START IN. (MM) [%FSW] [2]	BOLT INSPECTION AREA METAL DISTANCE END IN. (MM) [%FSW]	POSSIBLE BOLT CRACK LOCATIONS [1] METAL DISTANCE IN. (MM) [%FSW] [2] NO. 1	NO. 2	NO. 3	NO. 4	TRANSDUCER POSITION ON REFERENCE STANDARD [3]	TRANSDUCER POSITIONER NUMBER: NDT1036-
66-24006	5.00 (127) [83%]	0.5 (13) [8%]	4.2 (107) [70%]	0.7 (18) [12%]	1.7 (43) [28%]	2.9 (74) [48%]	3.9 (99) [65%]	C AND D	P1
66-1022	5.00 (127) [83%]	0.5 (13) [8%]	4.2 (107) [70%]	0.7 (18) [12%]	1.7 (43) [28%]	2.9 (74) [48%]	3.9 (99) [65%]	C AND D	P2
66-11259	5.00 (127) [83%]	0.5 (13) [8%]	4.2 (107) [70%]	0.7 (18) [12%]	1.7 (43) [28%]	2.9 (74) [48%]	3.9 (99) [65%]	C AND D	P4
65-23413-9	5.00 (127) [83%]	0.5 (13) [8%]	4.2 (107) [70%]	0.7 (18) [12%]	1.7 (43) [28%]	2.9 (74) [48%]	3.9 (99) [65%]	C AND D	P2
65-23413-11	5.00 (127) [83%]	0.5 (13) [8%]	4.2 (107) [70%]	0.7 (18) [12%]	1.7 (43) [28%]	2.9 (74) [48%]	3.9 (99) [65%]	C AND D	P4
65-23413-14	5.00 (127) [83%]	0.5 (13) [8%]	4.2 (107) [70%]	0.7 (18) [12%]	1.7 (43) [28%]	2.9 (74) [48%]	3.9 (99) [65%]	C AND D	P1
65-23413-24	5.25 (133) [88%]	0.5 (13) [8%]	4.5 (114) [75%]	0.8 (20) [13%]	1.8 (46) [30%]	3.0 (76) [50%]	4.0 (102) [67%]	C AND D	P4
65-23413-26	5.25 (133) [88%]	0.5 (13) [8%]	4.5 (114) [75%]	0.8 (20) [13%]	1.8 (46) [30%]	3.0 (76) [50%]	4.0 (102) [67%]	C AND D	P1
65-23413-28	5.25 (133) [88%]	0.5 (13) [8%]	4.5 (114) [75%]	0.8 (20) [13%]	1.8 (46) [30%]	3.0 (76) [50%]	4.0 (102) [67%]	C AND D	P2

OUTBOARD NACELLE BOLTS
TABLE II

NOTES:

- ALL METAL DISTANCES IDENTIFIED IN TABLES I AND II ARE MEASURED FROM THE HEAD OF THE BOLT.

[1] APPROXIMATE LOCATIONS WHERE POSSIBLE CRACKS WILL START. SEE DETAIL I FOR THE IDENTIFIED LOCATION.

[2] %FSW = POSITION OF THE SIGNAL IS A PERCENTAGE OF FULL SCREEN WIDTH.

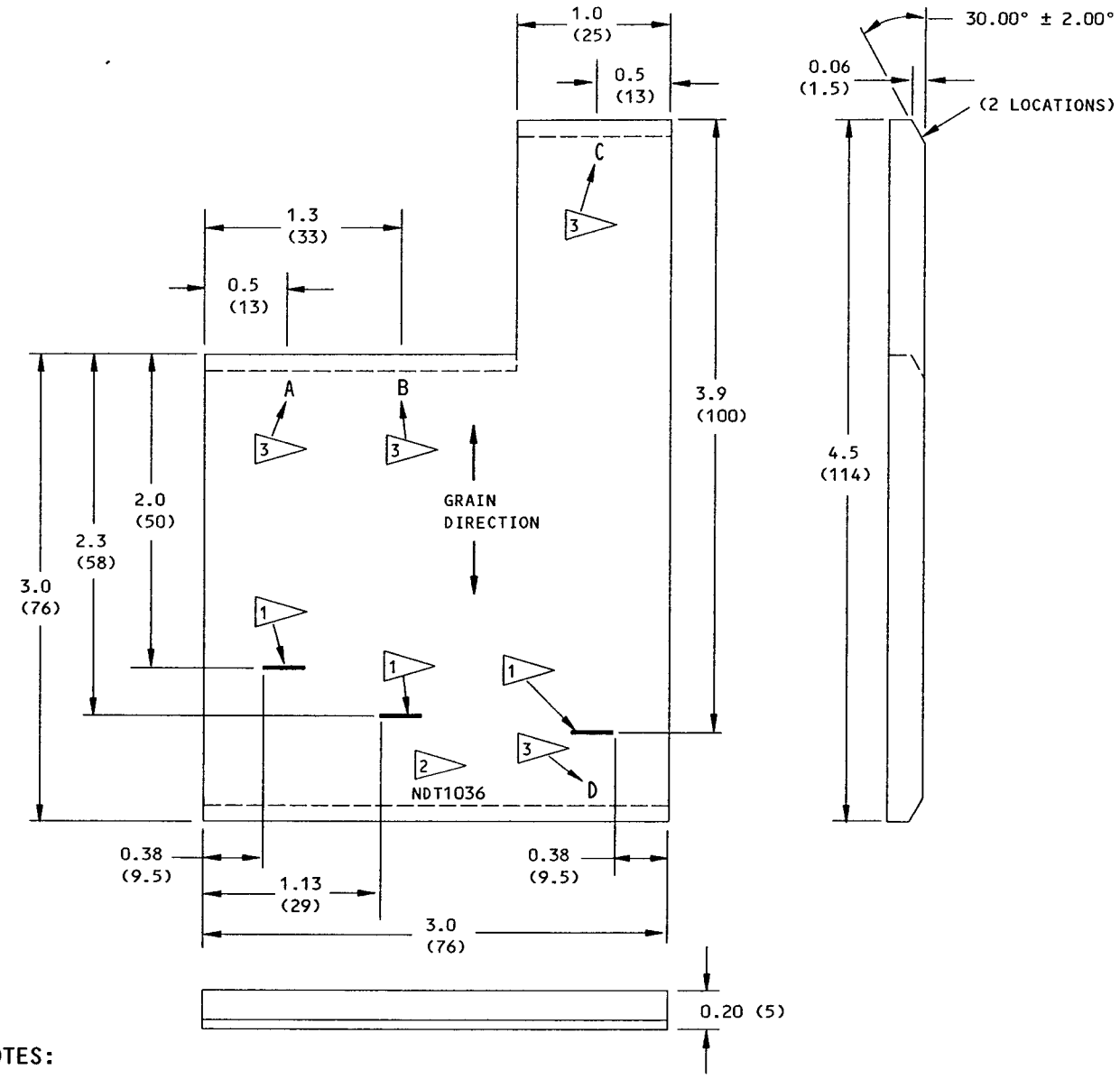
[3] THE TRANSDUCER POSITION IS IDENTIFIED BY THE LETTER ON THE REFERENCE STANDARD.

[4] THE INNER DIAMETER OF THE 204-70265-2 FUSE BOLT HAS A CONFIGURATION THAT CAUSES CRACK TYPE ULTRASONIC SIGNALS TO OCCUR WHEN IT IS EXAMINED IN THE AREA IDENTIFIED BY FLAGNOTE 1. FOR THIS REASON, THE 204-70265-2 FUSE BOLT IS EXAMINED BY MAGNETIC PARTICLE INSPECTION.

CALIBRATION AND INSPECTION DATA
DETAIL II (CONTINUED)

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 11)

E45858



NOTES:

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

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 R_a OR BETTER
- DEBURR SHARP EDGES

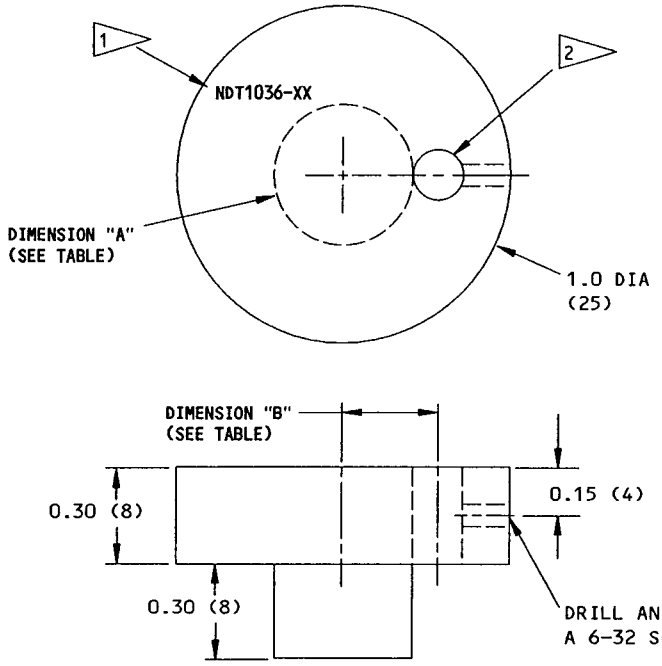
1 EDM NOTCH:
WIDTH - 0.015 (0.4) ±0.005 (0.13)
LENGTH - 0.25 (6) ±10%
DEPTH - 0.080 (2) ±10%

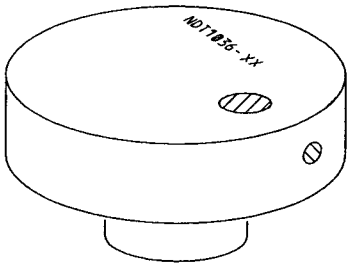
2 ETCH OR STEEL STAMP THE REFERENCE STANDARD NUMBER NDT1036

3 ETCH OR STEEL STAMP THE LETTER IDENTIFIED FOR THE TRANSDUCER POSITION

REFERENCE STANDARD NDT1036
DETAIL III

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 12)





TRANSDUCER POSITIONER NUMBER	DIMENSION	
	A	B
NDT1036-P1	0.425 (10.80)	0.308 (7.80)
NDT1036-P2	0.480 (12.20)	0.336 (8.50)
NDT1036-P4	0.522 (13.30)	0.357 (9.10)

NOTES:

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

INCHES	MILLIMETERS
X.XXX = ±0.002	X.XX = ±0.05
X.XX = ±0.025	X.X = ±0.5
X.X = ±0.050	X = ±1

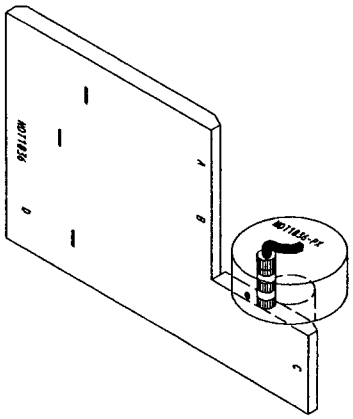
- MATERIAL: PLEXIGLASS, LUCITE OR EQUIVALENT
- SURFACE ROUGHNESS: 63 R_a OR BETTER

1 ETCH OR SCRIBE THE TRANSDUCER POSITIONER NUMBER AS SPECIFIED IN THE TABLE ABOVE

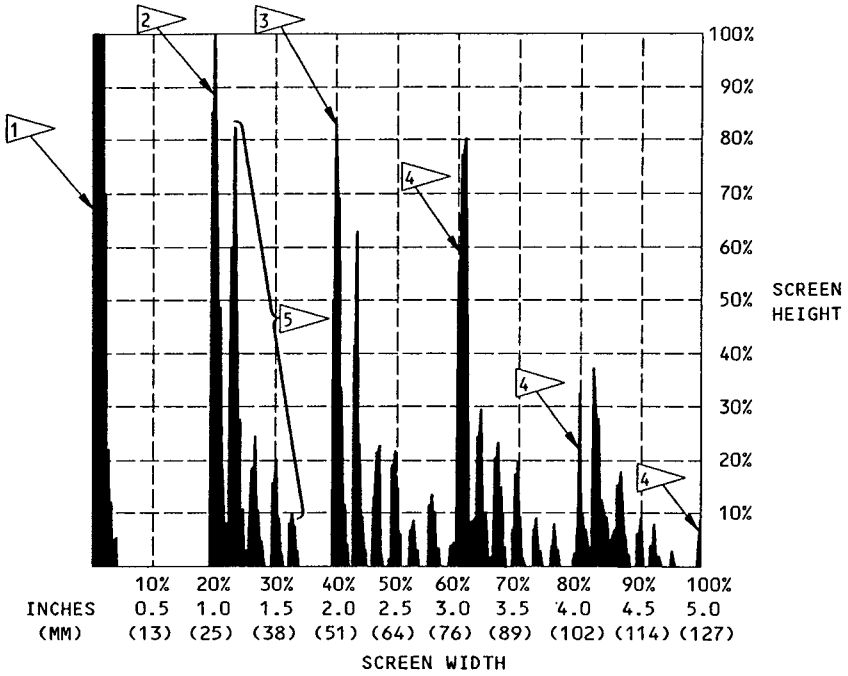
2 THE TRANSDUCER HOLE MUST BE 0.002 (0.05) LARGER THAN THE OUTSIDE DIAMETER OF THE TRANSDUCER.

TRANSDUCER POSITIONER NDT1036-P1, P2 AND P4
DETAIL IV

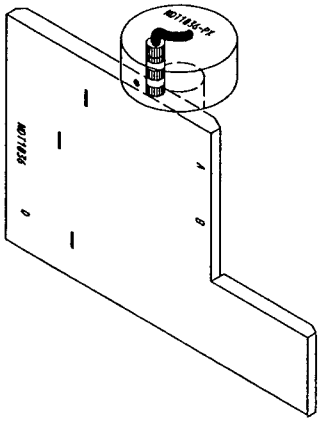
Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 13)



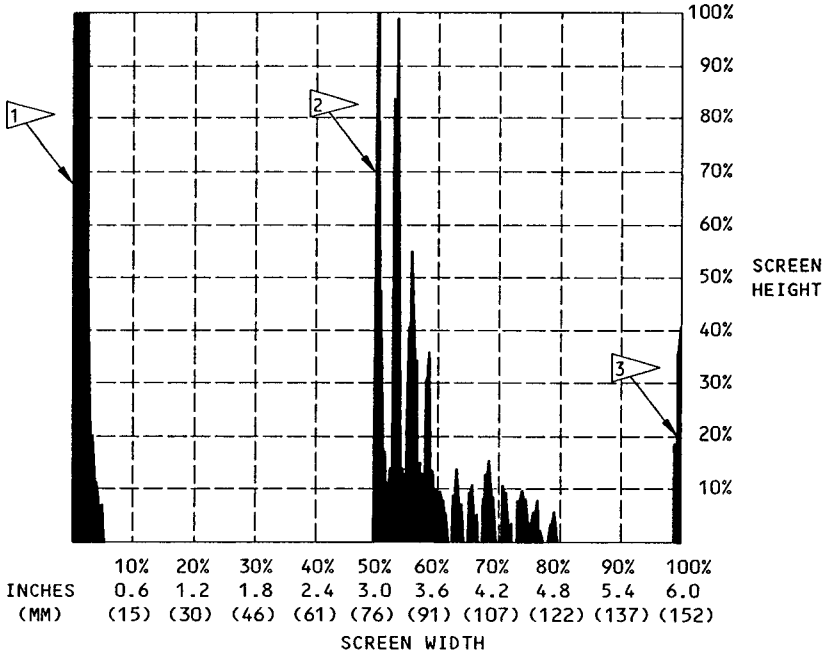
USUAL TRANSDUCER/POSITIONER LOCATION ON THE REFERENCE STANDARD FOR THE INBOARD NACELLE BOLTS



INSTRUMENT CALIBRATION FOR DISTANCE - INBOARD NACELLE BOLT VIEW A



USUAL TRANSDUCER/POSITIONER LOCATION ON THE REFERENCE STANDARD FOR THE OUTBOARD NACELLE BOLTS



INSTRUMENT CALIBRATION FOR DISTANCE - OUTBOARD NACELLE BOLT VIEW B

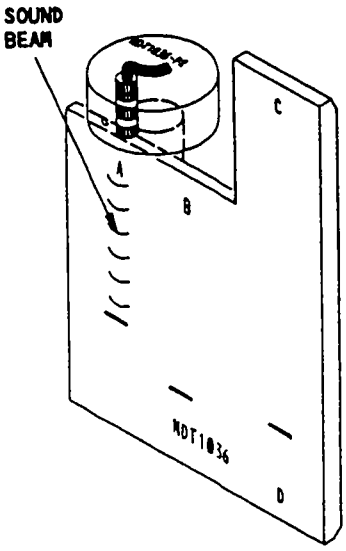
NOTES:

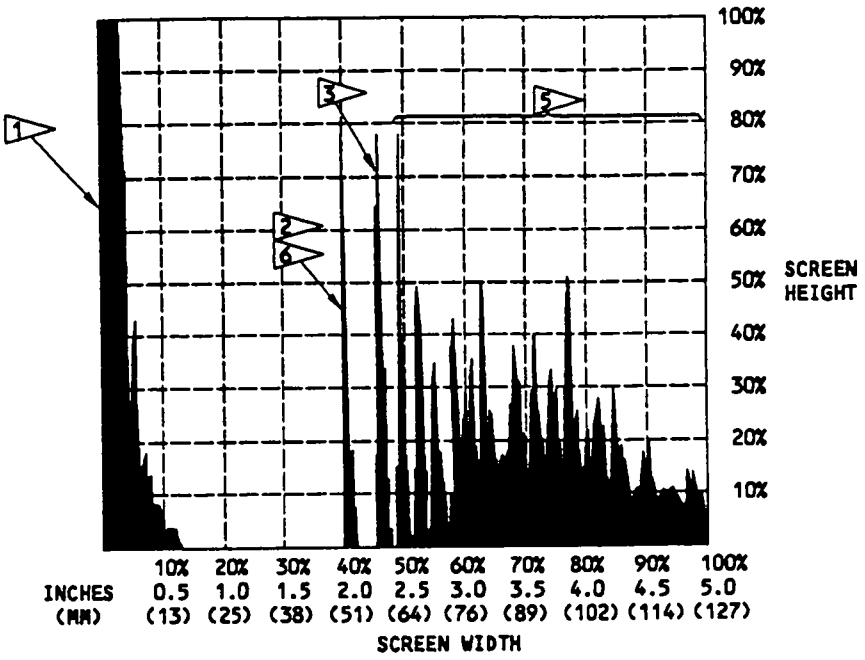
- THE SCREEN DISPLAYS IN VIEWS A AND B ARE EXAMPLES. THE SIGNALS CAN LOOK DIFFERENT WITH OTHER INSTRUMENT/TRANSDUCER COMBINATIONS.

1 > INITIAL PULSE SIGNAL
2 > FIRST BACK SURFACE SIGNAL
3 > SECOND BACK SURFACE SIGNAL
4 > MULTIPLE BACK SURFACE SIGNAL
5 > USUAL MODE CONVERSION SIGNALS THAT FOLLOW THE BACK SURFACE SIGNAL

INSTRUMENT DISTANCE CALIBRATION DETAIL V

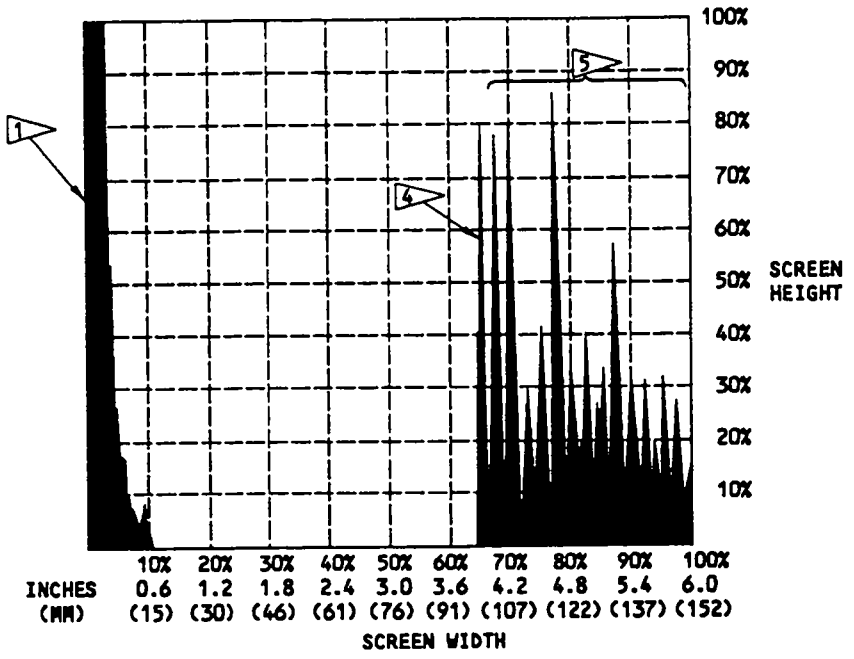
Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 14)





INSTRUMENT CALIBRATION FOR SENSITIVITY - INBOARD NACELLE BOLT
VIEW A

THE DISPLAY SHOWS THE USUAL TRANSDUCER/POSITIONER LOCATION ON THE REFERENCE STANDARD AT TRANSDUCER POSITION "A" FOR THE SENSITIVITY CALIBRATION FROM THE EDM NOTCH. THE TRANSDUCER/ POSITIONER LOCATION WILL BE THE SAME AT TRANSDUCER POSITIONS "B", "C" AND "D".



INSTRUMENT CALIBRATION FOR SENSITIVITY - OUTBOARD NACELLE BOLT
VIEW B

NOTES:

- THE SCREEN DISPLAYS IN VIEWS A AND B ARE EXAMPLES. THE SIGNALS CAN LOOK DIFFERENT WITH OTHER INSTRUMENT/TRANSDUCER COMBINATIONS.

1> INITIAL PULSE SIGNAL

2> EDM NOTCH SIGNAL AT TRANSDUCER POSITION "A"

3> EDM NOTCH SIGNAL AT TRANSDUCER POSITION "B"

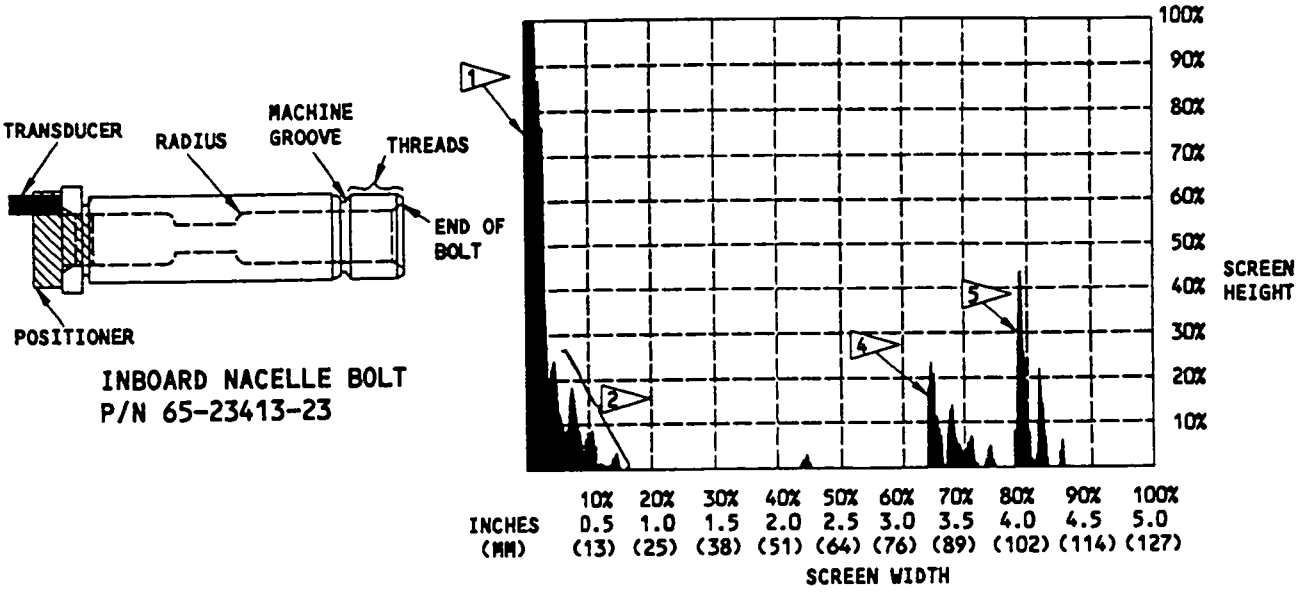
4> EDM NOTCH SIGNAL AT TRANSDUCER POSITION "C"

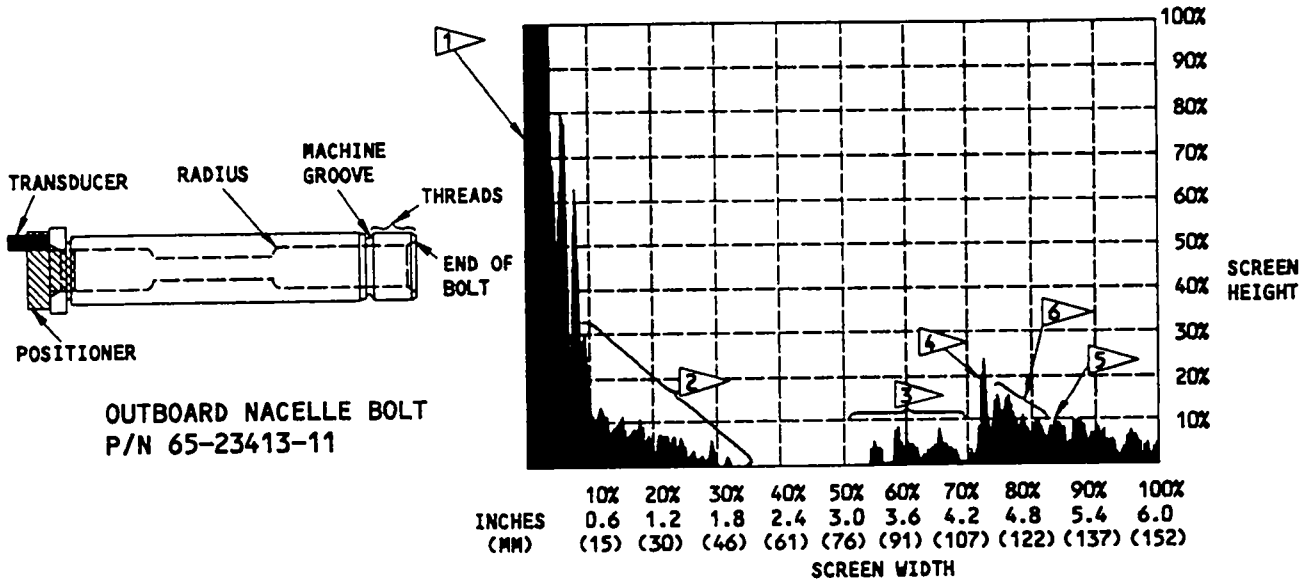
5> BACK SURFACE AND MODE CONVERSION SIGNALS

6> EDM NOTCH SIGNAL ADDED TO THE SCREEN DISPLAY TO SHOW THE LOCATION

INSTRUMENT SENSITIVITY CALIBRATION
DETAIL VI

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 15)





NOTES:

- THE SCREEN DISPLAYS ARE EXAMPLES THAT SHOW ULTRASONIC SIGNALS FROM AN INBOARD AND OUTBOARD NACELLE BOLT. THE DISPLAYS ARE EXAMPLES OF THE TYPES OF SIGNALS TO MONITOR DURING THE INSPECTION. THE BACK SURFACE AND MODE CONVERSION SIGNAL HEIGHTS CAN BE DIFFERENT WITH OTHER BOLT PART NUMBERS.

1 INITIAL PULSE SIGNAL

2 SIGNALS FROM COUPLANT AND THE POSITIONER TO THE INNER HOLE SURFACE INTERFACE. THESE SIGNALS CAN CHANGE IN AMPLITUDE DURING THE SCAN INSPECTION.

3 SIGNALS FROM THE INNER HOLE RADIUS

4 SIGNAL FROM THE EDGE OF THE MACHINE GROOVE

5 BACK SURFACE SIGNAL FROM THE END OF THE PART

6 SIGNALS FROM THE THREADS

BOLT INSPECTION EXAMPLES
DETAIL VII

Nacelle Strut Overwing Support Fitting Fuse Bolt
Figure 2 (Sheet 16)