PART 6 - EDDY CURRENT

WING UPPER SKIN AND SHEAR TIE AT WBL 103.56 AND 157.00 (LFEC)

1. Purpose

A. To detect cracks in wing upper skin and shear tie at WBL 103.56 and 157.00 using low frequency eddy current.

NOTE: Inspection at WBL 103.56 is only valid for airplanes that have not been repaired per SB 57-1144.

B. Service Bulletin Reference: 737-57-1102, 737-57-1144

2. Equipment

A. Any eddy current instrument and probe combination that satisfies performance requirements of this procedure is suitable for this inspection. The following equipment was used in development of this procedure.

NOTE: Refer to Part 1, 51-01-00, for information on equipment manufacturers.

(1) Instrument - Eddy current instrument operable at 350 Hz.

(a) MIZ-10 or MIZ-10A; Zetec Inc.

(2) Probe - Ring (encircling) probe, 0.50-inch (1.27 cm) ID, 1.10-inch (2.79 cm) OD, usable at 350 Hz.

(a) P/N SPO 783; Nortec Inc.

(3) Reference Standards - Manufacture reference standard per Figure 1.

3. Prepare for the Inspection

A. Clean inspection area and remove loose paint.

4. Instrument Calibration

A. Calibration for fastener hole crack inspection using low frequency eddy current ring probe.

(1) Connect probe and set instrument frequency to 350 Hz.

(2) Place probe on reference standard per Position 1 in Figure 2.

NOTE: Use probe position over reference standard fastener having same magnetic properties as fasteners to be inspected.

(3) Balance instrument per manufacturer's instructions.

(4) Adjust liftoff control per manufacturer's instructions to obtain the same response when the probe is on bare standard as when probe is lifted off part by 0.006 inch (approximately the thickness of two sheets of paper).

NOTE: The probe is located at Position 1 during liftoff calibration.

(5) Adjust meter response with probe at Position 1 using meter position control to indicate 20 percent of full scale.

(6) Position probe over notched portion of reference standard. Meter response should be upscale. Refer to Position 2 of Figure 2.

NOTE: Use probe position over reference standard fastener having same magnetic properties as fasteners found on airplane.

(7) Adjust instrument sensitivity to obtain 80 percent of full scale meter response, or 60 percent of full scale response difference between notched and unnotched locations (Positions 1 and 2).

(8) Reposition probe at Position 1 and recheck balance and liftoff. If readjustments are made, recheck sensitivity per Paragraph 4.A.(6) and Paragraph 4.A.(7).

5. Inspection Procedure

A. Inspection of fastener hole for cracks using low frequency eddy current ring probe (Inspection Codes A thru E).

(1) Check fastener locations on airplane with a permanent magnet to determine fastener material (steel vs. titanium). See Figure 3 and Figure 4.

(2) Calibrate instrument per Paragraph 4.A.

(3) Establish airplane baseline response for a particular inspection code.

NOTE: Establish baseline responses of fasteners in Figure 3 and Figure 4 separately.

(a) Compare all fasteners of the same inspection codes from left and right wings together.

NOTE: Because of conductivity difference, a downscale baseline shift of between 80 and 100 percent of full scale is to be expected when comparing the inspection locations against the reference standard.

(b) Select the fastener from this group with the lowest response and set the meter response to 20 percent of full scale at this location using the meter position control.

NOTE: Do not change instrument sensitivity when establishing the aircraft baseline response.

(c) Refer back to this location periodically to ensure that instrument response is the same as originally recorded. (Changes in meter response may occur as a result of instrument drift or probe temperature change.)

(4) Inspect each fastener of same inspection code by visually centering probe over the fastener and manipulating probe to obtain a minimum meter response.

6. Inspection Results

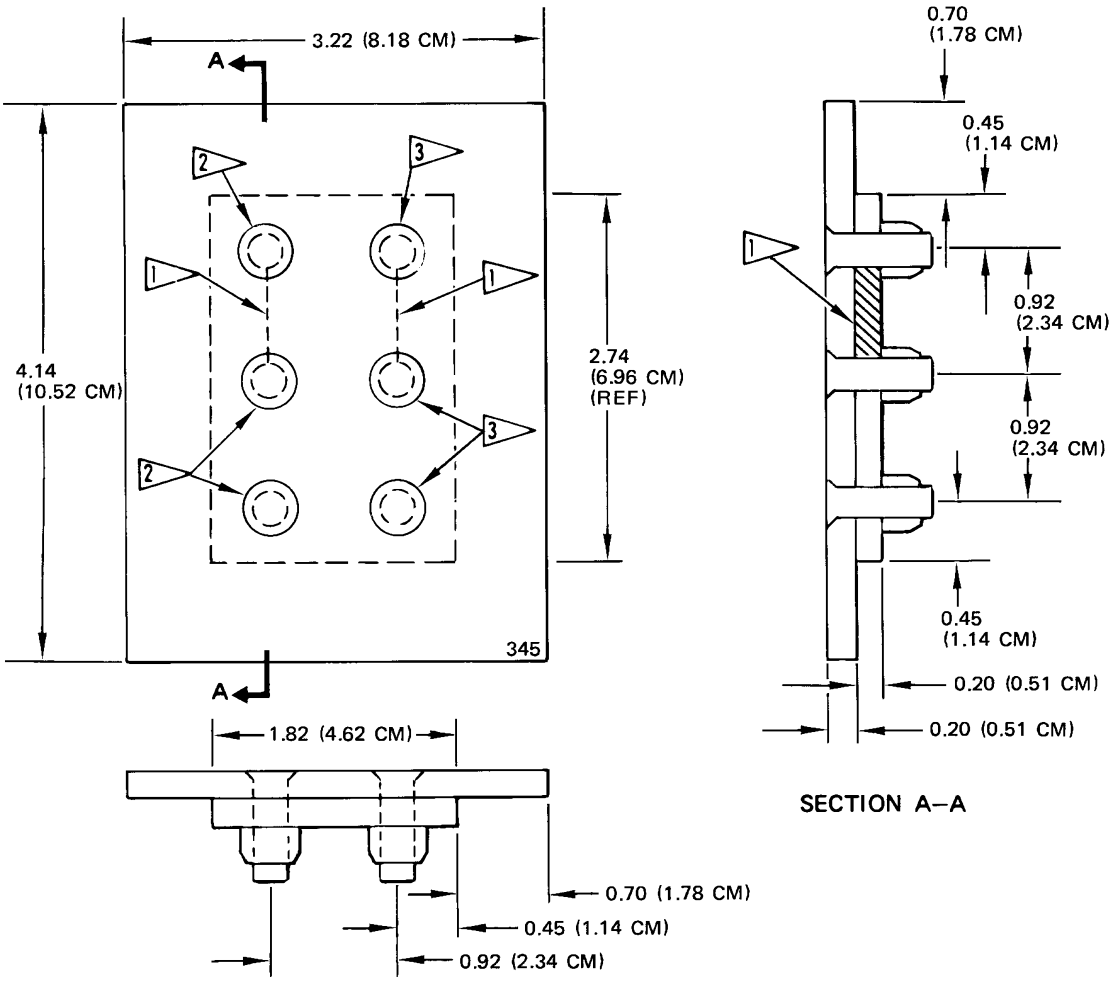
A. Meter responses 40 percent of full scale above the baseline are potential crack indications, and further investigation is required anywhere these occur.

(1) The following conditions may cause meter reading changes similar to crack indications.

(a) Magnetic metal chips in paint - Remove paint and reinspect.

(b) Difference in fastener material (magnetic versus nonmagnetic) - confirm by using a permanent magnet to determine magnetic properties of the fasteners. If fastener material is different, complete recalibration is required. Remove and replace fasteners in reference standard with the same type of fastener as found in the aircraft and recalibrate.

(2) When investigating crack-like indications, compare meter response obtained at same location on the opposite side of the airplane or on another airplane of same configuration.



NOTES

- ALL DIMENSIONS ARE IN INCHES (CENTIMETERS IN PARENTHESES)
- TOLERANCE: X.X ± 0.05 (0.13 CM), X.XX ± 0.02 (0.05 CM), X.XXX ± 0.005 (0.013 CM)
- MATERIAL: 7075–T6 OR 2024–T3, –T4 ALUMINUM
- ETCH OR STEEL STAMP WITH 345
- P/N 6412–254 AVAILABLE FROM IDEAL SPECIALTY CO.

1 JEWELER'S SAWCUT 0.030 (0.08 CM) MAX WIDTH

2 BACB30GY8–6 STEEL LOCKBOLT, BACC30K8 COLLAR (3 PLACES)

3 BACB30NW8–6 TITANIUM HI–LOK, BACC30M8 COLLAR (3 PLACES)

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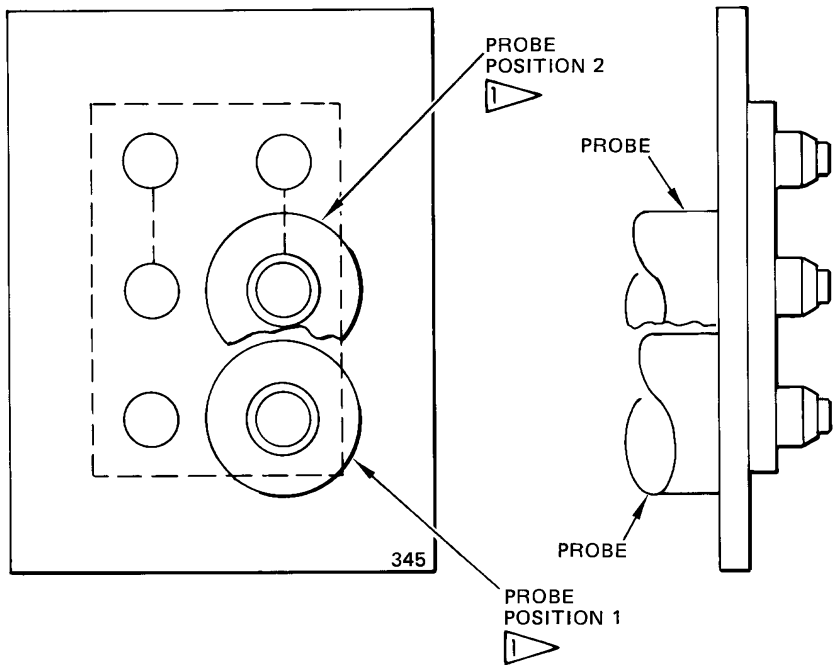
Reference Standard 345
Figure 1



NOTE

1 PROBE POSITION SHOWN FOR CALIBRATION WITH TITANIUM FASTENERS ONLY. FOR CALIBRATION WITH STEEL FASTENERS USE SIMILAR POSITION ON LEFT SIDE OF REFERENCE STANDARD

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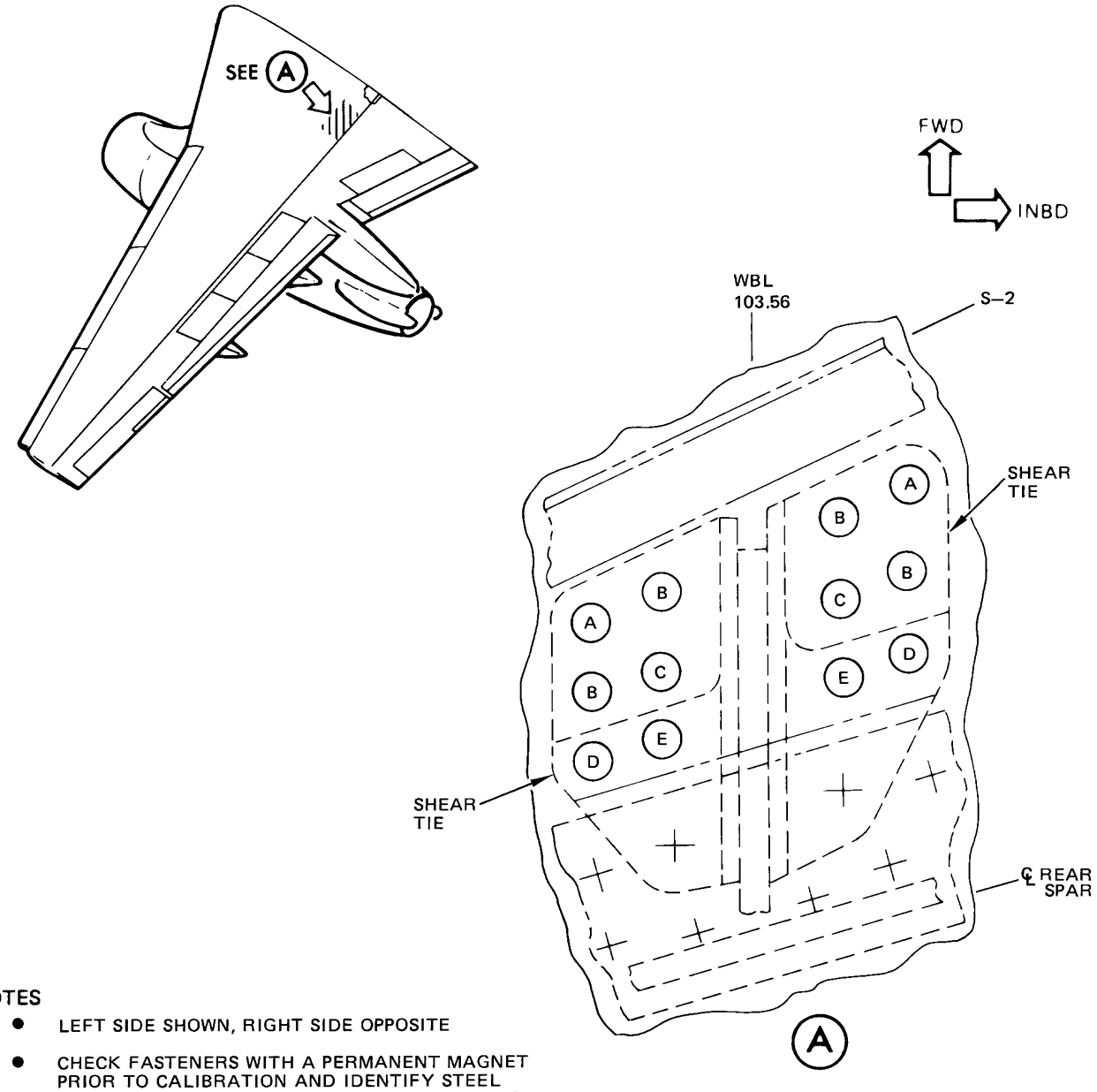
Probe Calibration Positions on Reference Standard 345
Figure 2



NOTES

- LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE
- CHECK FASTENERS WITH A PERMANENT MAGNET PRIOR TO CALIBRATION AND IDENTIFY STEEL FASTENERS. USE FASTENERS OF SAME TYPE AS FOUND ON AIRPLANE FOR CALIBRATION

(A) FASTENERS TO BE INSPECTED – LETTER DESIGNATES INSPECTION GROUPING OF LOCATIONS WITH SIMILAR BASELINE RESPONSES

NOTE: BECAUSE OF CONDUCTIVITY DIFFERENCE, A DOWNSCALE BASELINE SHIFT OF 80 TO 100 PERCENT OF FULL SCALE IS TO BE EXPECTED WHEN COMPARING FASTENER LOCATIONS AGAINST THE REFERENCE STANDARD.

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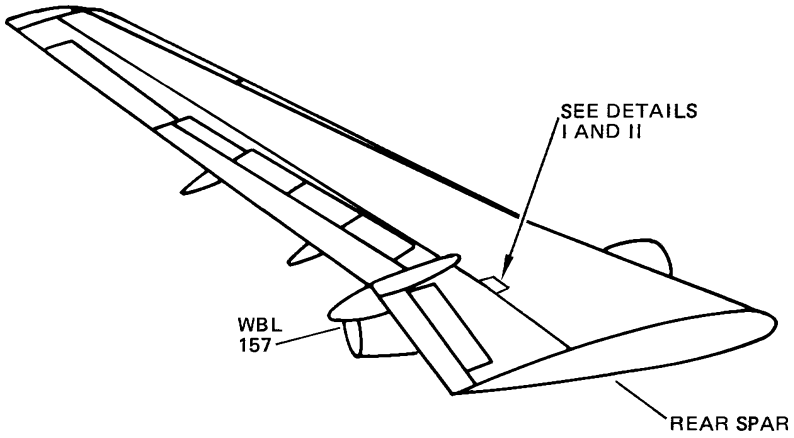
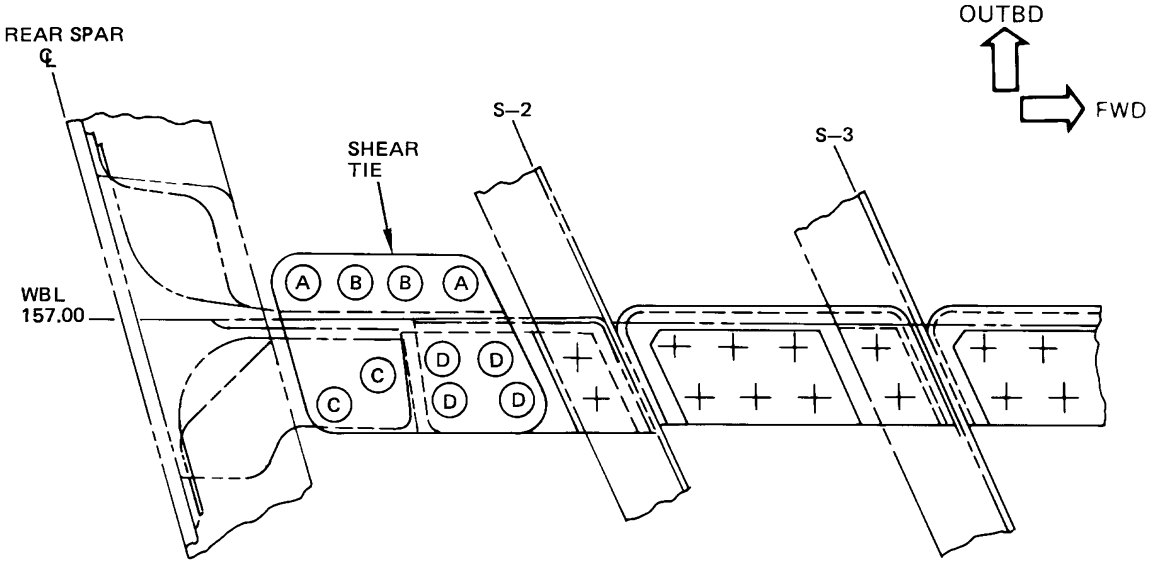
Wing Upper Skin and Shear Tie at WBL 103.56
Figure 3





INSPECTION OF BASIC GROSS WEIGHT AIRPLANES
DETAIL I

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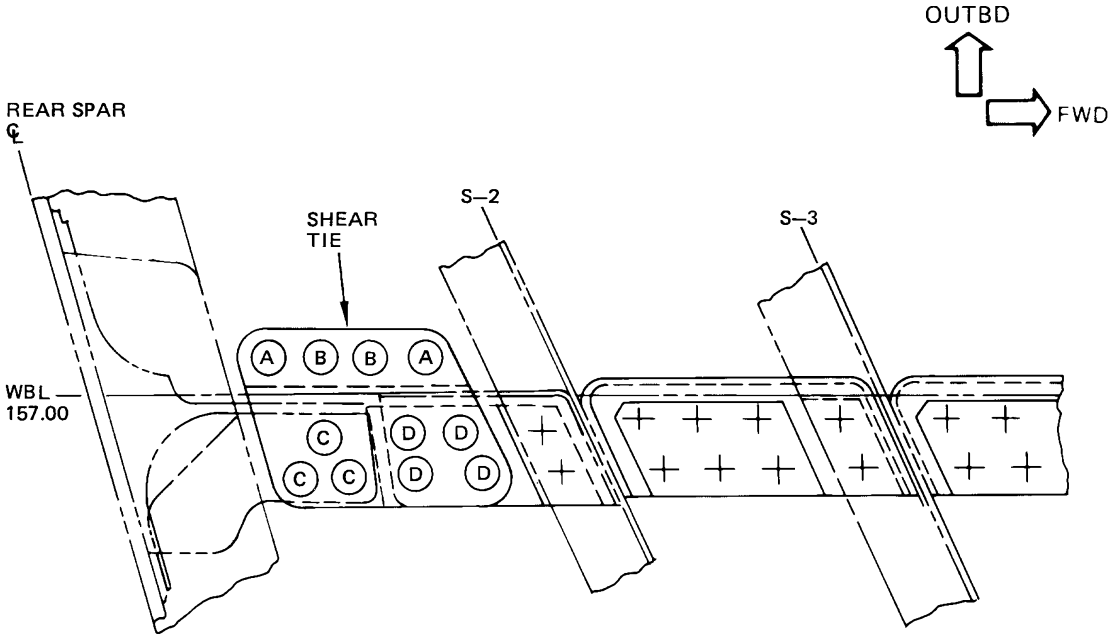
Wing Upper Skin and Shear Tie at WBL 157.00
Figure 4 (Sheet 1 of 2)



INSPECTION OF HIGH GROSS WEIGHT AIRPLANES
DETAIL II

NOTES

- LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE
- CUM LINE NO. 1 THRU 387 ONLY
- CHECK FASTENERS WITH A PERMANENT MAGNET PRIOR TO CALIBRATION AND IDENTIFY STEEL FASTENERS. USE FASTENERS OF SAME TYPE AS FOUND ON AIRPLANE FOR CALIBRATION

(A) FASTENERS TO BE INSPECTED – LETTER DESIGNATES INSPECTION GROUPING OF LOCATIONS WITH SIMILAR BASELINE RESPONSES

NOTE: BECAUSE OF CONDUCTIVITY DIFFERENCE, A DOWNSCALE BASELINE SHIFT OF 80 TO 100 PERCENT OF FULL SCALE IS TO BE EXPECTED WHEN COMPARING FASTENER LOCATIONS AGAINST THE REFERENCE STANDARD.

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Wing Upper Skin and Shear Tie at WBL 157.00
Figure 4 (Sheet 2 of 2)

PART 6 - EDDY CURRENT

FLAP TRACKS 2 AND 7 FWD ATTACHMENT FITTING NUTS

1. Purpose

A. To find if the nuts that have a sealant cover are made from A286 CRES steel or aluminum. The nuts are located at the forward attachment fitting of the inboard flap track of the outboard flap (track numbers 2 and 7) at Wing Buttock Line 254.0.

B. Service Bulletin Reference: 737-57A1202

2. Equipment

A. Instrument - All eddy current instruments that can operate between 15 kHz and 25 kHz can be used. The following instrument was used to make this procedure:

(1) MIZ-10B; Zetec, Inc.

B. Probe - All probes that can operate at 15 - 25 kHz and that get the necessary conditions for this procedure are satisfactory. A driver pick-up probe is recommended to give sufficient sensitivity. A differential probe can be used if it can get the necessary sensitivity of Paragraph 4. The following probes were used to make this procedure:

(1) DP 500-SP (Driver Pick-up); Zetec, Inc.

(2) RS 205-5 (Reflection); NDT Eng. Corp.

C. Reference Standard - Standard 379, refer to Figure 2.

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

3. Prepare for the Inspection

A. Get access to the inspection area through the inboard and outboard wing tank access holes at WBL 254.0 Left and Right.

B. Identify the bolts that are to be examined. The four bolts on each side of the airplane are to be examined. Refer to Figure 1 and Service Bulletin 737-57A1202.

C. Make the surface clean.

4. Instrument Calibration

A. Set the frequency between 15 kHz and 25 kHz.

B. Hold the probe away from the surface of the reference standard (probe in air) and balance the instrument by referring to the manufacturers instructions.

C. Adjust the meter position control to put the needle at the 50 percent of the full scale position.

D. Put the probe on the surface of the standard at the location marked Position 1 on Figure 3. Adjust the instrument lift-off to get no more than a 5 percent difference from the 10 percent of full scale position.

E. Put the probe over the aluminum nut at the location marked Position 2 on Figure 3. The response must be an up-scale movement. If the response is down-scale, the phase must be turned 180 degrees and the procedure for calibration from Paragraph 4.B. to Paragraph 4.D. must be done again.

F. Adjust the sensitivity of the instrument to get a needle movement between 90 and 100 percent of the full scale position.

G. Put the probe over the stainless steel nut at the location marked Position 3 on Figure 3. The needle movement must be 50 to 60 percent of the full scale position.

H. Do a check of the position of the needle again when the probe is put on the aluminum nut by referring to Paragraph 4.E. and Paragraph 4.F.

5. Inspection Procedure

A. Do the calibration of the instrument by referring to Paragraph 4.

B. Put the probe over the nut to be inspected as shown in Figure 4.

NOTE: Do not adjust the sensitivity of the instrument.

C. Examine the four fasteners on each track (eight total per airplane). At regular times make sure the responses from the calibration standard. If the response is not satisfactory, calibrate again and examine all fastener locations since the last calibration.

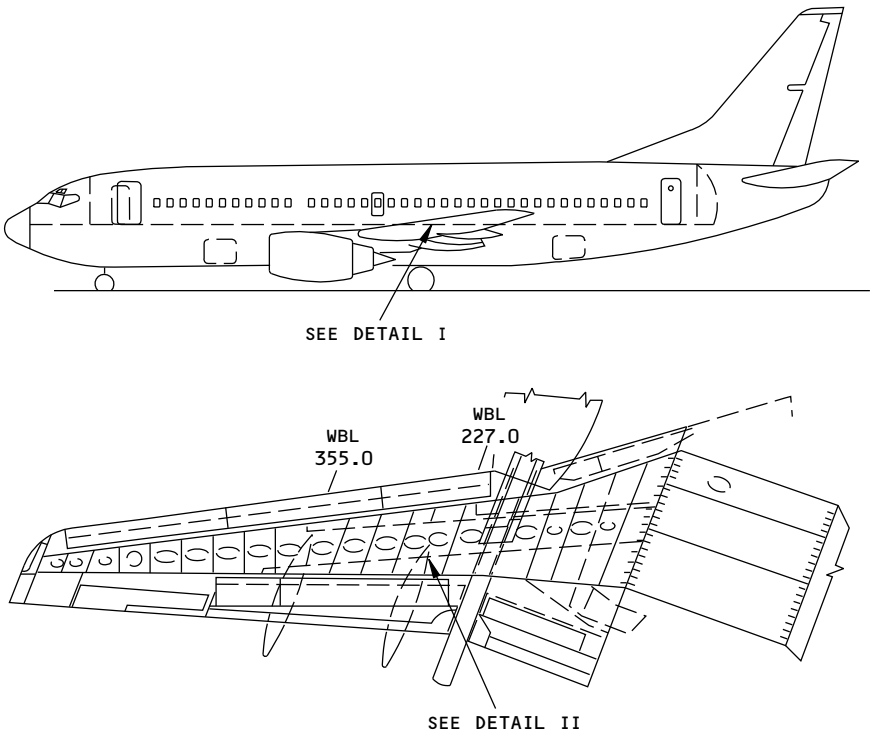
D. Note the instrument response for each of the nuts in the area of inspection.

6. Inspection Results

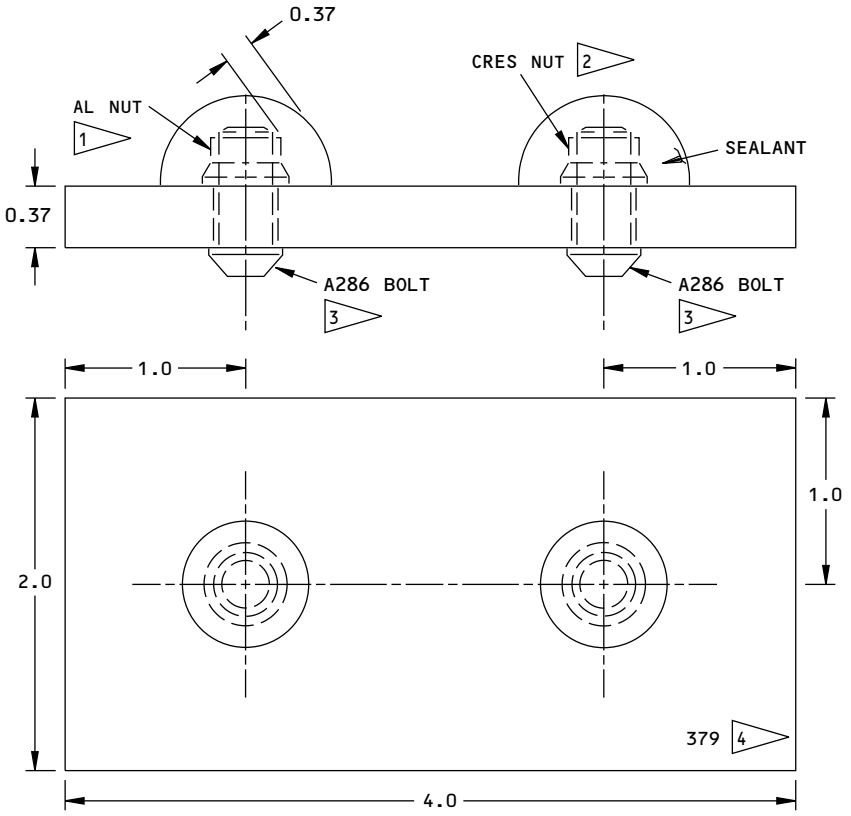
A. A deflection of the needle that is 90% (or more) of the full scale shows that the nut is aluminum.

B. A deflection of the needle that is approximately 50 percent of the full scale shows that the nut is A286 steel.

C. If there is no needle response, there can be too much sealant. It can be necessary to carefully cut away the sealant to get a thickness almost the same as the reference standard. Do a check of the calibration of the instrument again before cutting the sealant.



Inspection Location
Figure 1



NOTES

- ALL DIMENSIONS ARE IN INCHES
- MATERIAL: ALUMINUM
- SEALANT - BMS 5-26 TYPE II, BMS 5-95, OR ANY NONCONDUCTIVE MATERIAL MAY BE USED, 0.375 APPROXIMATE THICKNESS
- TOLERANCE - X.X 0.02
  X.XX 0.01
  X.XXX 0.005

1 ALUMINUM NUT BACN10WM6

2 A286 CRES NUT BACN10HR6CS OR BACN10HR6CD

3 A286 CRES BOLTS BACB30LE6

4 ETCH OR STEEL STAMP WITH 379

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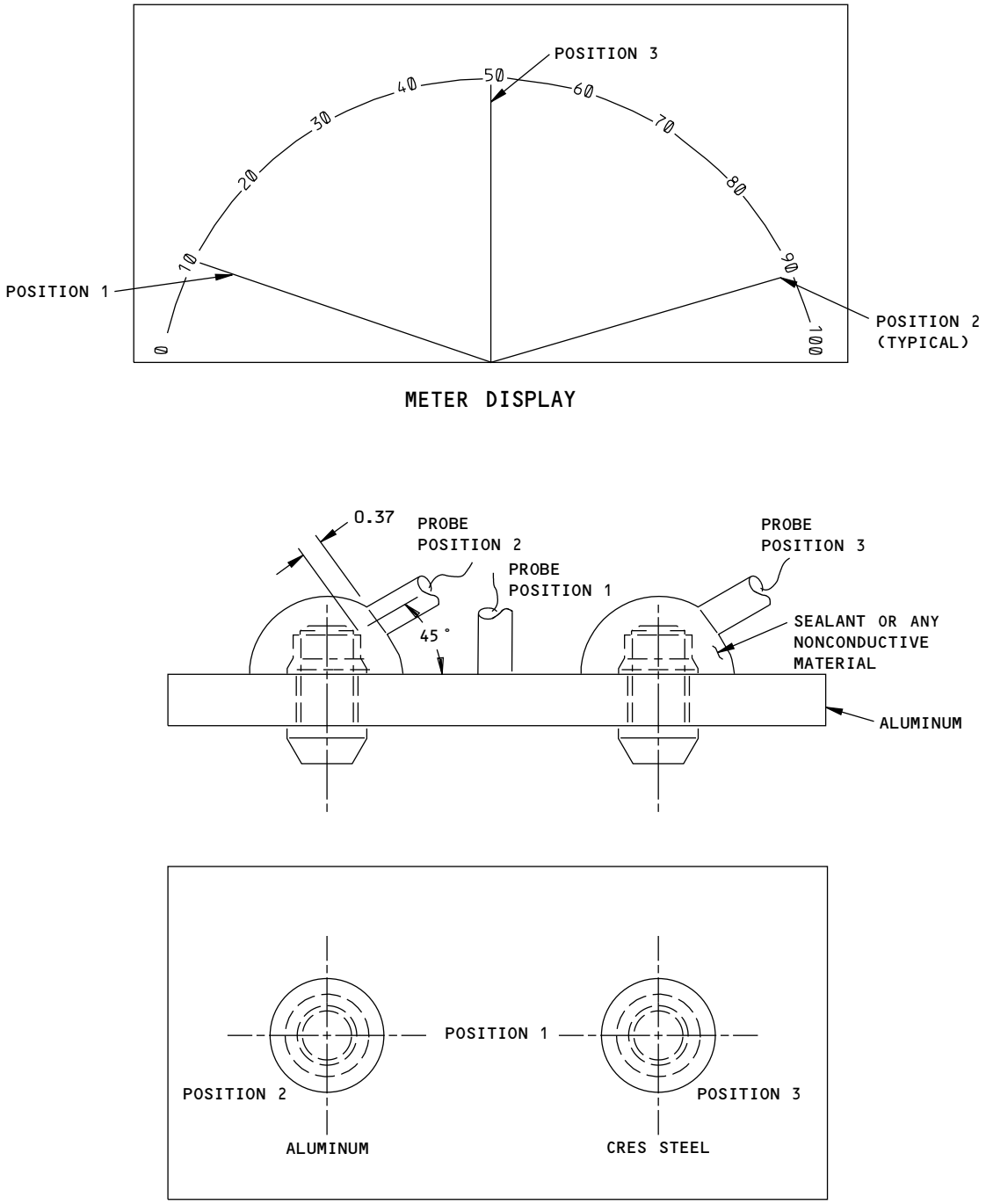
Reference Standard 379
Figure 2



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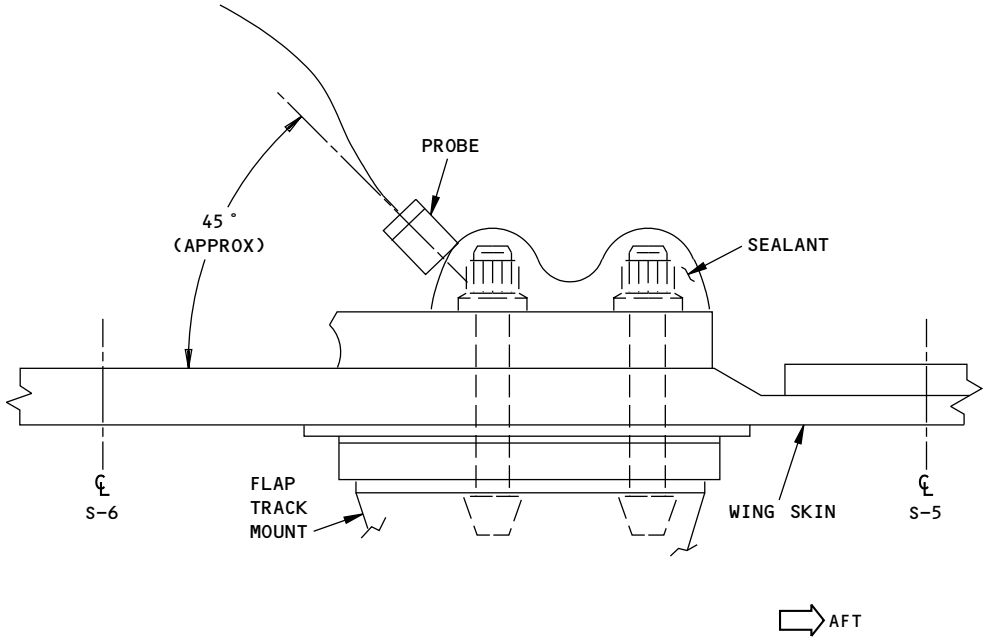
Instrument Calibration
Figure 3



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Inspection Procedure
Figure 4

PART 6 - EDDY CURRENT

INBOARD SUPPORT FITTING OF THE MAIN LANDING GEAR SUPPORT BEAM

1. Purpose

A. Use this procedure to help examine the inboard support fitting of the main landing gear (MLG) support beam for cracks in the lugs. There are six lugs on the aluminum inboard support fitting; four large lugs and two small lugs. Only the four large lugs must be examined with this procedure. See Figure 1 for the inspection areas.

B. The inboard support fitting is at the inboard end of the MLG support beam. See Figure 1 for the inspection areas.

C. 737 Maintenance Planning Data (MPD) Damage Tolerance Rating (DTR) Check Form Reference:

(1) Item: 57-51-16

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 eddy current instrument that:

(a) Has an impedance plane display.

(b) Operates at a frequency range of 50 to 500 kHz.

(2) The instrument that follows was used to help prepare this procedure.

(a) Nortec 500D; Olympus

C. Probes

(1) Use a shielded, right-angle surface probe that has these properties:

(a) A maximum tube diameter of 0.100 inch (2.54 mm).

(b) A drop of 0.030 inch (0.76 mm).

(c) Is 6.5 inches (165 mm) long with a 4 inch (102 mm) work length.

(d) Operates from 50 to 500 kHz.

(2) The probe that follows was used to help prepare this procedure.

(a) AF-5065; Aerofab NDT

D. Reference Standards

(1) Use reference standard 126, or an equivalent, as given in Part 6, 51-00-00, Procedure 23, paragraph 5.B.(1).

3. Prepare for the Inspection

WARNING: MAKE SURE THAT THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONS, AND DAMAGE TO EQUIPMENT.

A. Get access to the inboard support fitting at the inboard end of the MLG support beam. Refer to the Maintenance Planning Document (MPD) for instructions.

B. Remove all dirt, grease, and sealant that is around the inner and outer bushings of the four large lugs of the inboard support fitting.

4. Instrument Calibration

A. Calibrate the equipment as specified in Part 6, 51-00-00, Procedure 23, paragraph 5. Use reference standard 126 to help calibrate the equipment.

5. Inspection Procedure

A. Examine the inboard support fitting for the MLG support beam for cracks as specified in Part 6, 51-00-00, Procedure 23, paragraph 6, and the steps that follow:

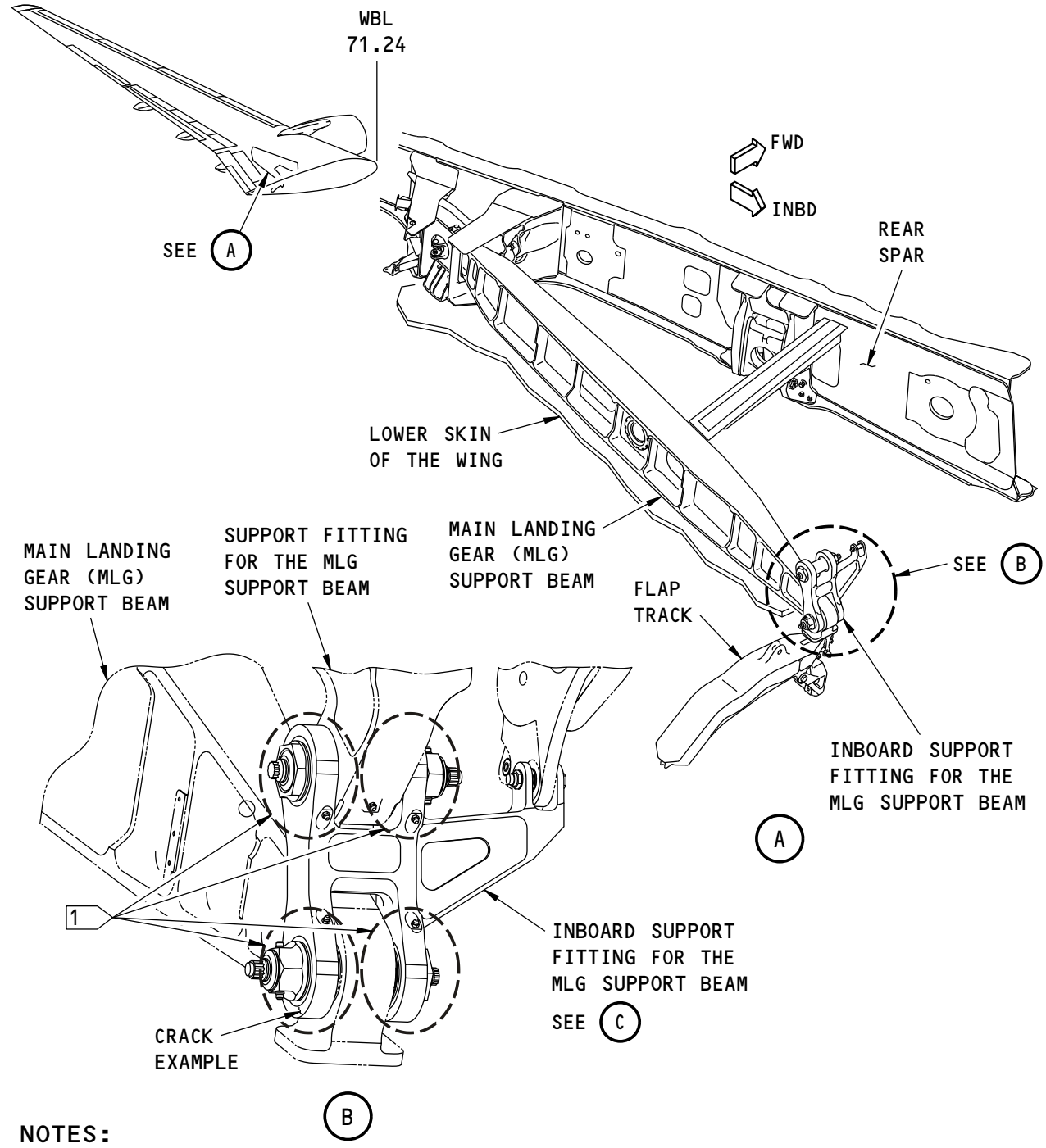
(1) Do 360 degree scans around the inner and outer bushings in each of the four large lugs.

(2) Keep the probe tip lightly against the inboard support fitting and use the bushing as a probe guide during the inspection.

B. Do Paragraph 5.A. again to examine the inboard support fitting on the opposite wing for cracks.

6. Inspection Results

A. Refer to Part 6, 51-00-00, Procedure 23, paragraph 7, for instructions to help make an analysis of the indications that occur during the inspection.



NOTES:

- THE LEFT MAIN LANDING GEAR (MLG) SUPPORT BEAM IS SHOWN; THE RIGHT MLG SUPPORT BEAM IS OPPOSITE

1 EXAMINE THE LUGS OF THE INBOARD SUPPORT FITTING FOR CRACKS

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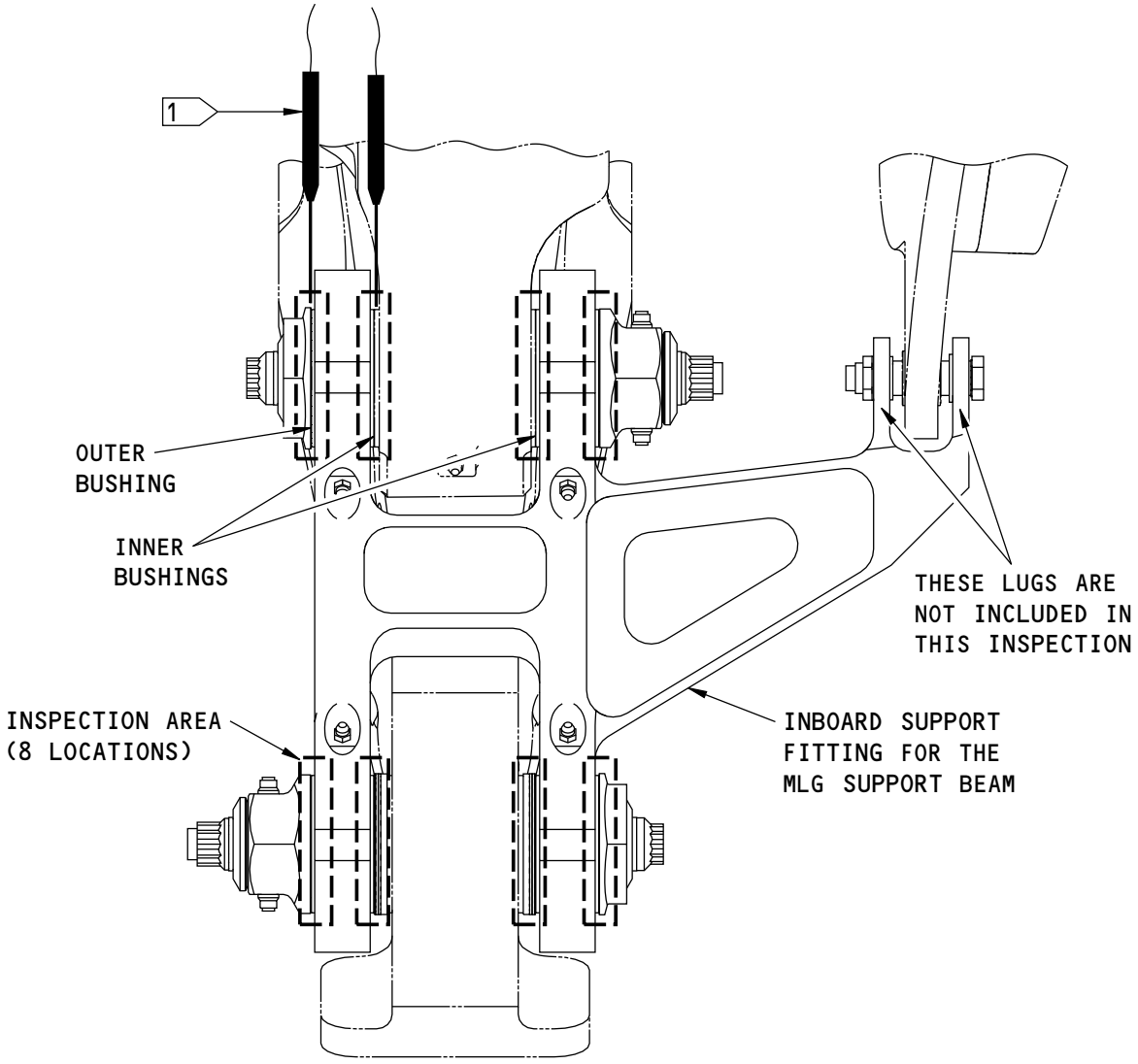
Inspection Areas
Figure 1 (Sheet 1 of 2)



NOTES:

- EXAMINE THE LUGS OF THE INBOARD SUPPORT FITTING AT THE INBOARD END OF THE MLG SUPPORT BEAM FOR THE LEFT AND RIGHT WINGS.

1 MAKE A 360 DEGREE SCAN AROUND THE INNER AND OUTER BUSHINGS TO LOOK FOR CRACKS IN THE LUGS

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Inspection Areas
Figure 1 (Sheet 2 of 2)