

### **PART 6 - EDDY CURRENT**

#### HORIZONTAL STABILIZER - PIVOT FITTINGS - SPLICE PLATE SURFACE INSPECTION

### 1. Purpose

- A. Use this procedure to examine the pivot rib splice plates for cracks. The pivot rib splice plate locations are at the pivot fittings of the horizontal stabilizer. See Figure 1 for the inspection areas.
- B. A meter display instrument or an impedance plane display instrument can be used to do this inspection.
- C. MPD Appendix B DTR Check Form Reference:
  - (1) ITEM 55-10-I13B

#### 2. Equipment

- A. General
  - (1) Refer to Part 1, 51-01-00, for data about the equipment manufacturers.
- B. Instrument
  - (1) Refer to Part 1, 51-06-00, for instrument data.
- C. Probe
  - (1) Refer to Part 6, 51-00-01 or Part 6, 51-00-19 for probe data.
- D. Reference Standard
  - (1) Refer to Part 6, 51-00-01 or Part 6, 51-00-19 for reference standard data.

### 3. Preparation for Inspection

A. Get access to the horizontal stabilizer torque box.

## **WARNING:** MAKE SURE TO FOLLOW ALL SAFETY PROCEDURES WHEN YOU ISOLATE THE HORIZONTAL STABILIZER ACTUATOR.

- B. Make sure the horizontal stabilizer is locked in the mid position.
- C. Remove any sealant on the inspection surfaces. See Figure 1, Sheet 2.
- D. Make sure the inspection surfaces are clean.

#### 4. Instrument Calibration

- A. Refer to the calibration procedure in Part 6, 51-00-01 to calibrate a meter display instrument and a handheld probe for the splice plate inspection.
- B. Refer to the calibration procedure in Part 6, 51-00-19 to calibrate an impedance plane display instrument and a handheld probe for the splice plate inspection.

#### 5. Inspection Procedure

- A. Do a scan for cracks along the edge of the splice plate as shown in Figure 1, Sheet 2.
  - NOTE: If there is access, do the scan along the upper or lower surface at the splice plate. See Figure 1, Sheet 2, Flagnote 1.
  - (1) Refer to the inspection procedure in Part 6, 51-00-01, for instruments with a meter display.
  - (2) Refer to the inspection procedure in Part 6, 51-00-19, for instruments with an impedance plane display.

## 6. Inspection Results

A. Refer to the inspection results in Part 6, 51-00-01 when the splice plate is examined with a meter display instrument and a handheld probe.

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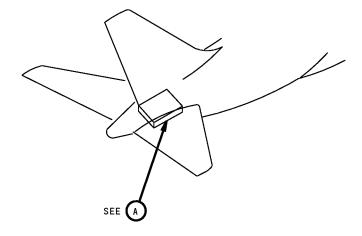


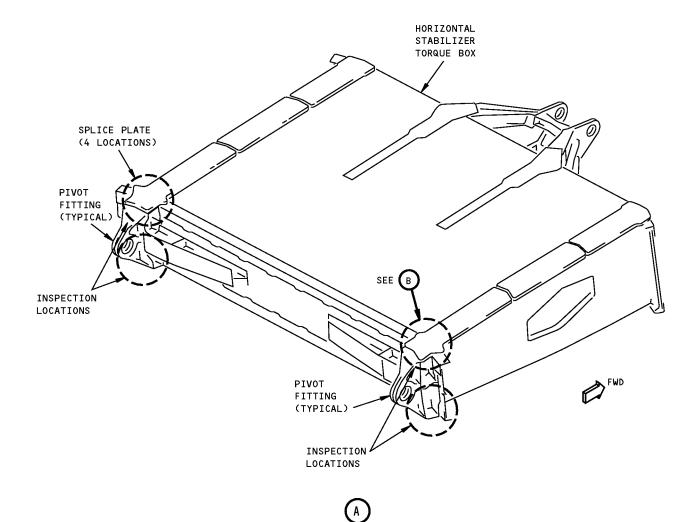
B. Refer to the inspection results in Part 6, 51-00-19 when the splice plate is examined with an impedance plane display instrument and a handheld probe.

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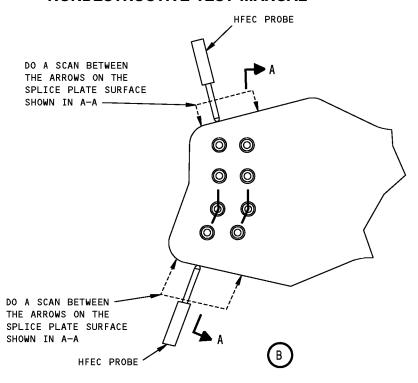


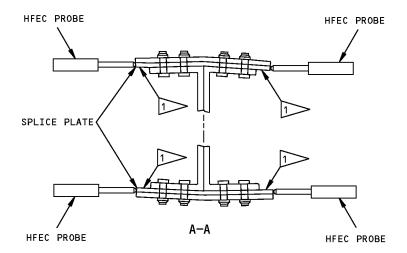
Horizontal Stabilizer - Splice Plate Inspection Figure 1 (Sheet 1 of 2)

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## **NOTES**

- DO THE SCAN ON THE SPLICE PLATE SURFACE BETWEEN THE ARROWS.
- DO THE SCAN AT ALL 4 SPLICE PLATE LOCATIONS.
- NOT ALL STRUCTURE IS SHOWN.

DO A SCAN ON THIS SURFACE WHERE THERE IS ACCESS

Horizontal Stabilizer - Splice Plate Inspection Figure 1 (Sheet 2 of 2)

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#### HORIZONTAL STABILIZER - PIVOT FITTINGS - BOLT HOLE INSPECTION

#### 1. Purpose

- A. Use this procedure to examine the upper and lower attachment holes of the pivot fittings in the horizontal stabilizer for cracks.
- B. It is necessary to remove the bolts identified in Figure 1 to do this procedure.
- C. A meter display instrument, an impedance plane display instrument, or a rotary scanner instrument can be used to do this procedure.
- D. Part 2, 55-10-01 is an alternative inspection procedure.
- E. MPD Appendix B DTR Check Form Reference:
  - (1) ITEM 55-10-I13B and C

## 2. Equipment

- A. General
  - (1) Refer to Part 1, 51-01-00, for data about the equipment manufacturers.
- B. Instrument
  - (1) Refer to Part 1, 51-06-00, for instrument data.
- C. Probe
  - (1) It is necessary to use a 0.437 inch (11.1 mm) diameter probe.
  - (2) Refer to Part 6, 51-00-04 or Part 6, 51-00-11 for manual probe data, or Part 6, 51-00-16 for rotary scanner probe data.
- D. Reference Standard
  - (1) Refer to Part 6, 51-00-04, Part 6, 51-00-11, or Part 6, 51-00-16 for reference standard data.

### 3. Preparation for Inspection

A. Get access to the horizontal stabilizer torque box.

**WARNING:** MAKE SURE TO FOLLOW ALL SAFETY PROCEDURES WHEN YOU ISOLATE THE HORIZONTAL STABILIZER ACTUATOR.

- B. Make sure the horizontal stabilizer is locked in the mid position.
- C. Remove the fasteners from the inspection location identified in Figure 1.
- D. Refer to Part 6, 51-00-16 for hole preparation.

#### 4. Instrument Calibration

- A. Refer to the calibration procedure in Part 6, 51-00-04 to calibrate a meter display instrument and a handheld probe for this bolt hole inspection.
- B. Refer to the calibration procedure in Part 6, 51-00-11 to calibrate an impedance plane display instrument and a handheld probe for this bolt hole inspection.
- C. Refer to the calibration procedure in Part 6, 51-00-16 to calibrate a rotary scanner instrument for this bolt hole inspection.

## 5. Inspection Procedure

A. Use the applicable procedure referenced below to examine the upper and lower bolt holes of the pivot fittings for cracks. Make sure to examine all three layers of the pivot fittings. Make sure to do a careful inspection of the center layer.

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- (1) Refer to the inspection procedure in Part 6, 51-00-04 to examine the bolt holes for cracks with a meter display instrument and a handheld probe.
- (2) Refer to the inspection procedure in Part 6, 51-00-11 to examine the bolt holes for cracks with an impedance plane display instrument and a handheld probe.
- (3) Refer to the inspection procedure in Part 6, 51-00-16 to examine the bolt holes for cracks with a rotary scanner instrument.

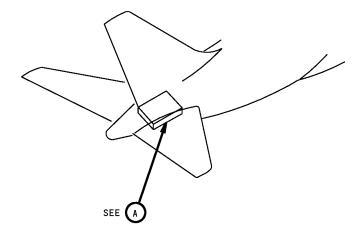
## 6. Inspection Results

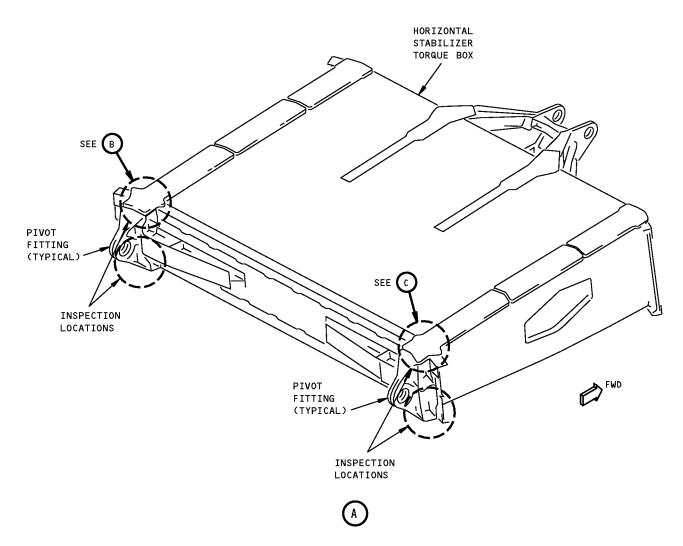
- A. Refer to the inspection results in Part 6, 51-00-04 when the bolt holes are examined with a meter display instrument and a handheld probe.
- B. Refer to the inspection results in Part 6, 51-00-11 when the bolt holes are examined with an impedance plane display instrument and a handheld probe.
- C. Refer to the inspection results in Part 6, 51-00-16 when the bolt holes are examined with a rotary scanner instrument.

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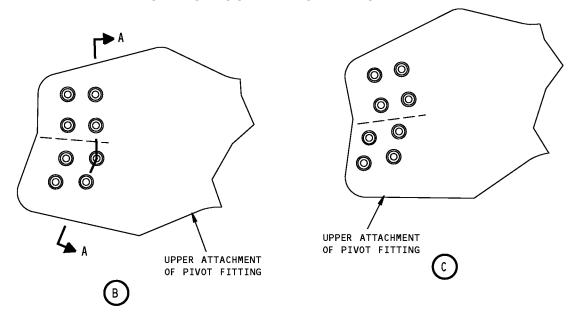


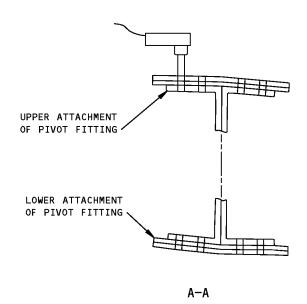


Horizontal Stabilizer - Pivot Fittings - Bolt Hole Inspections Figure 1 (Sheet 1 of 2)



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#### **NOTES**

- BOLT HOLE INSPECTION LOCATIONS
- UPPER FITTINGS ARE SHOWN;
   LOWER FITTINGS ARE ALMOST THE SAME.
- EACH PIVOT FITTING HAS AN UPPER AND A LOWER ATTACHMENT. EACH ATTACHMENT HAS 8 HOLES.

Horizontal Stabilizer - Pivot Fittings - Bolt Hole Inspections Figure 1 (Sheet 2 of 2)

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### **PART 6 - EDDY CURRENT**

#### HORIZONTAL STABILIZER - PIVOT FITTING LUG HOLE

### 1. Purpose

- A. Use this procedure to do an inspection for surface cracks in the pivot fitting lug holes of the horizontal stabilizer. There are two pivot fitting lugs to be examined by this procedure.
- B. See Figure 1 for the location of the inspection area.
- C. MPD Appendix B DTR Check Form Reference:
  - (1) ITEM 55-10-I13A

### 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.
      - NOTE: A meter display instrument can be used.
    - (b) Operates at a frequency range of 100 kHz to 500 kHz.
    - (c) The instrument specified below was used to prepare this procedure.
      - 1) Phasec 1.1 Hocking; Hocking Krautkramer.

## C. Probe

- (1) Use a pencil probe that:
  - (a) Operates at a frequency range of 100 kHz to 500 kHz.
  - (b) Has a maximum external diameter of 0.15 inch (3.8 mm).
  - (c) Has a minimum length of 11.5 inches (292 mm) that can be bent.
    - NOTE: The minimum length includes a 4.0 inch (101 mm) long handle to make sure a stable inspection can be done.
  - (d) Has a maximum drop of 0.10 inch (2.54 mm).
  - (e) Is shielded.
- (2) The pencil probe specified below was used to help prepare this procedure.
  - (a) NEC 2052; NDT Engineering Corp.
    - NOTE: This probe has a Fischer Tri-axial connector and can be used with an absolute or a differential instrument.
    - NOTE: Identify the instrument and connector type the probe will be used with if you make an order for this probe and a probe cable.

#### D. Reference Standard

(1) Use reference standard 126. Refer to Part 6, 51-00-01, par. 2.C.(1) and Fig. 4 for data about reference standard 126.

## 3. Preparation for Inspection

A. Identify the inspection areas as shown in Figure 1.

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- B. Put the horizontal stabilizer in the neutral position.
- C. Remove the access panels, 313 CLX and 314 CRX, to get access to the lower inspection area of the pivot fitting lug at the horizontal stabilizer. See Figure 1.

WARNING: MAKE SURE THAT THE HORIZONTAL STABILIZER CANNOT BE MOVED WHEN YOU EXAMINE THE PIVOT FITTING LUG OF THE HORIZONTAL STABILIZER.

D. Open the 312 AR access tail door to get access to the pivot fitting lug at the horizontal stabilizer. See Figure 1. You will have to go on top of the horizontal stabilizer center section to get to this inspection area.

### 4. Instrument Calibration

- A. Set the instrument frequency between 100 and 500 kHz.
- B. Put a 0.006-inch (0.15 mm) nonconductive shim on top of the reference standard. See Figure 2, flagnote 1.

NOTE: Two sheets of writing paper, approximately 0.003 inch (0.07 mm) thick can be used for the nonconductive shim.

- C. Put the probe coil on the nonconductive shim at a location that is away from the notch. See Figure 2, flagnote 2.
- D. Balance the instrument as specified in the manufacturers instructions.
- E. Adjust the balance point to put it at 20 percent of full screen height and 80 percent of full screen width. See Figure 2.
- F. Adjust the instrument phase control so that the lift-off signal moves horizontally to the left. See Figure 2, flagnote 3.
- G. Slowly move the probe coil across the notch and adjust the gain control to get a signal that is 30 percent of full screen height above the balance point. See Figure 2, flagnotes 4 and 5.

## 5. Inspection Procedure

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- NOTE: This inspection procedure is necessary to do on the outboard and inboard sides of the pivot fitting lugs of the horizontal stabilizer. External and internal inspection access is necessary to get to the pivot fitting lug inspection areas.
- A. Do an external inspection of the lower inspection areas of the pivot fitting lug for the horizontal stabilizer as follows:
  - (1) Calibrate the instrument as specified in Paragraph 4.A. thru Paragraph 4.G.
  - (2) Get access to the lower inspection areas of the pivot fitting lug at the horizontal stabilizer specified in Paragraph 3. and Figure 3, flagnote 1.
  - (3) Put the probe on the outboard or inboard side of the pivot fitting lug, adjacent to the lug retainer bearing. See Figure 3, flagnote 2.
    - (a) Make sure the probe coil is against the horizontal stabilizer pivot fitting lug.
  - (4) Do a check of the balance point position on the screen display. If the balance point has moved horizontally to the left so that it is off the screen display, calibrate the instrument again as follows:

NOTE: An increase in sealant thickness adjacent to the retainer bearing will cause the balance point to move to the left. This increase in sealant thickness will decrease the probe sensitivity.

(a) Put a 0.009-inch (0.22 mm) nonconductive shim on top of the reference standard and calibrate the instrument as specified in Paragraph 4.C. thru Paragraph 4.G. to increase the probe lift-off.

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- (b) Do Paragraph 5.A.(3) and do a check of the balance point position.
- (c) If the balance point moves to the left again, remove the sealant in the inspection area that is adjacent to the retainer bearing and calibrate the instrument as specified in Paragraph 4.B. thru Paragraph 4.G. again.
- (5) Slowly move the probe in the lower inspection area range as shown in Figure 3, flagnote 5. Make sure to keep the probe adjacent to the retainer bearing (Figure 3, flagnote 3). The lower inspection area is the area below the horizontal centerline of the lug at WL 239.20.
- (6) Do Paragraph 5.A.(1) thru Paragraph 5.A.(5) on the opposite (inboard or outboard) side of the pivot fitting lug. See Figure 3, flagnotes 1 and 3.
- (7) Do Paragraph 5.A.(1) thru Paragraph 5.A.(6) on the other pivot fitting lug for the horizontal stabilizer.

<u>WARNING</u>: MAKE SURE THAT THE HORIZONTAL STABILIZER CANNOT BE MOVED WHEN YOU EXAMINE THE UPPER INSPECTION AREA OF THE PIVOT FITTING LUG OF THE HORIZONTAL STABILIZER.

- B. Do an internal inspection of upper inspection areas of the pivot fitting lugs for the horizontal stabilizer. See Figure 3, flagnote 4 for probe access.
  - NOTE: Get access to the upper inspection areas from on top of the horizontal stabilizer center section.
  - (1) Do Paragraph 5.A.(1) thru Paragraph 5.A.(6) on the upper inspection areas of the pivot fitting lugs.
  - (2) Do Paragraph 5.A.(1) thru Paragraph 5.B.(1) on the other pivot fitting lug for the horizontal stabilizer.

## 6. Inspection Results

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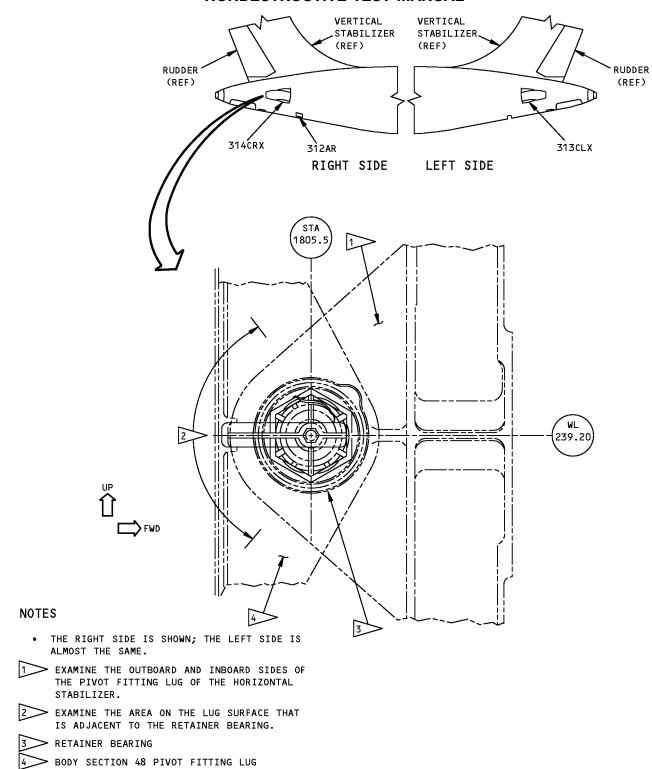
- A. A signal that is 20 percent (or more) of the display above the balance point is a sign that there is a possible crack.
- B. Remove sealant at the crack location with a nonmetallic tool. Calibrate the instrument and examine the crack location as specified in Paragraph 4.A. thru Paragraph 4.G. and Paragraph 5.A. or Paragraph 5.B.
- C. Compare the signal you get during the inspection to the signal you got during calibration from the crack in the reference standard. A rapid upscale movement is an indication of a crack.
- D. If crack signal during the inspection is the same as the crack signal from the reference standard, disassemble the pivot fitting lug of the horizontal stabilizer and do a surface eddy current or a penetrant inspection at the possible crack location. Refer to SOPM 20-20-02 for the penetrant inspection procedure.
- E. The conditions below can cause a signal to occur that is almost the same as a crack signal.
  - (1) The probe is angled too much at the steel retainer bearing and the probe coil has touched the retainer bearing.
    - (a) If this occurs, examine the lug inspection surface again with the probe coil 90 degrees to the lug inspection surface.
  - (2) A steel chip can be in the sealant adjacent to the fitting retainer bearing.
    - (a) If this occurs, remove the sealant and examine the lug inspection area again.

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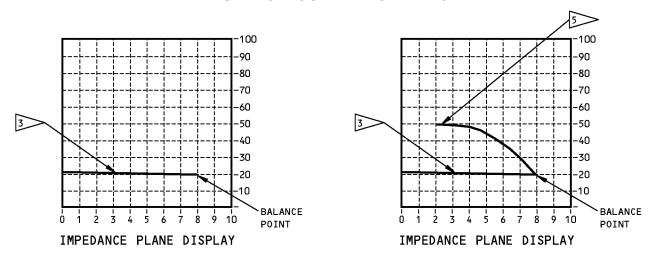


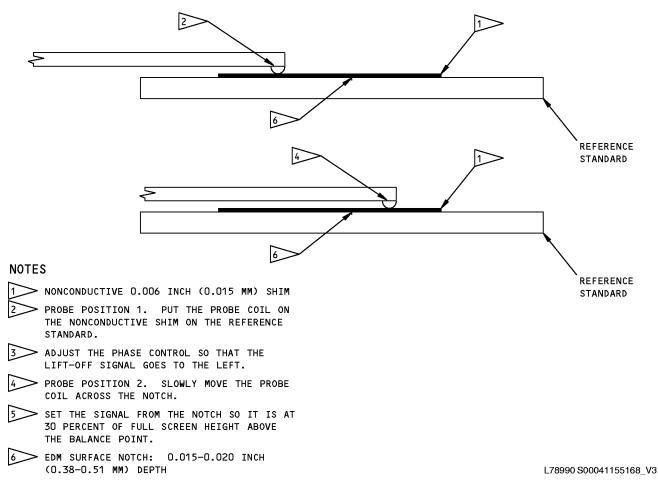
Horizontal Stabilizer - Pivot Fitting Lug Inspection Area Figure 1



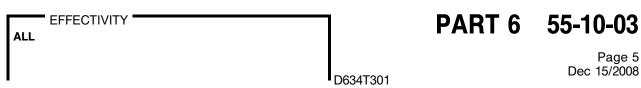


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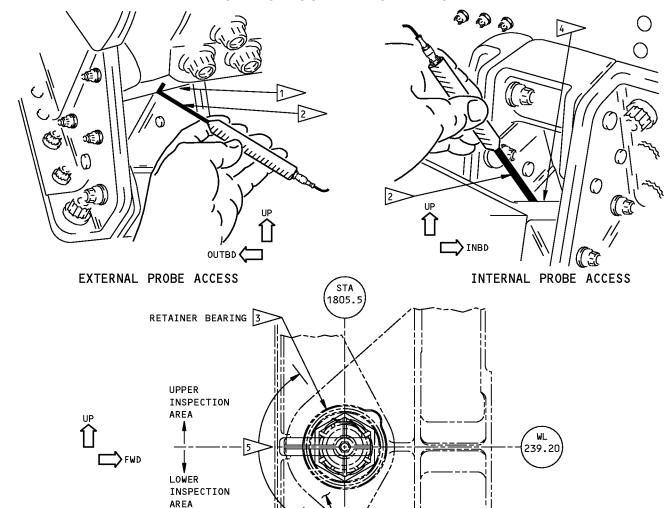




Horizontal Stabilizer - Pivot Fitting Lug Inspection Area Figure 2







#### **NOTES**

- THE RIGHT SIDE IS SHOWN; THE LEFT SIDE IS ALMOST THE SAME.
- EXAMINE THE OUTBOARD AND INBOARD SIDES OF THE PIVOT FITTING LUG OF THE HORIZONTAL STABILIZER.
- PUT THE PROBE BETWEEN THE PIVOT FITTING LUG OF THE HORIZONTAL STABILIZER AND THE PIVOT FITTING LUG OF BODY SECTION 48.
  GET ACCESS THROUGH ACCESS PANELS 313CLX AND 314CRX.
- PUT THE PROBE COIL ON THE PIVOT FITTING LUG SO IT IS 90 DEGREES TO THE INSPECTION SURFACE.

- MOVE THE PROBE IN THE INSPECTION AREA ADJACENT TO THE RETAINER BEARING.
- PUT THE PROBE BETWEEN THE PIVOT FITTING LUG OF THE HORIZONTAL STABILIZER AND THE PIVOT FITTING LUG OF BODY SECTION 48.

  GET ACCESS FROM ON TOP OF THE HORIZONTAL STABILIZER CENTER SECTION.
- 5 INSPECTION AREA RANGE
- PIVOT FITTING LUG OF THE HORIZONTAL STABILIZER
- 7 PIVOT FITTING LUG OF BODY SECTION 48

## Horizontal Stabilizer - Pivot Fitting Lug Inspection Figure 3

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### **PART 6 - EDDY CURRENT**

#### HORIZONTAL STABILIZER - REAR SPAR UPPER CHORD

#### 1. Purpose

- A. Use this procedure to do an inspection for cracks that reach the edge of the upper chord on the rear spar of the horizontal stabilizer.
- B. See Figure 1 for the location of the inspection areas.
- C. This procedure uses an instrument with an impedance plane or a meter display.
- D. MPD Appendix B DTR Check Form Reference:
  - (1) ITEM 55-10-I31

## 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 or meter display.
    - (b) Operates at a frequency range of 100-500 kHz.
  - (2) The instruments specified below were used to help prepare this procedure:
    - (a) Phasec 1.1; Hocking Krautkramer
    - (b) Defectometer 2.835; Foerster Instruments, Inc.
    - (c) MIZ-22; Zetec, Inc.
    - (d) Locator UH; Hocking Krautkramer
    - (e) MIZ-10A, MIZ-10B; Zetec, Inc.

## C. Probes

- (1) A shielded probe that has a diameter less than 0.2 inch (5.1 mm) is necessary. Refer to Part 6, 51-00-01, or Part 6, 51-00-19 for more about probe selection. See Part 1, 51-01-00 for a list of manufacturers of eddy current probes.
- (2) These probes were used to help prepare this procedure:
  - (a) MP902-50B/L500K: NDT Engineering Inc.
  - (b) SS-AFB2X6: Tyvin Inc.
- D. Reference Standards
  - (1) Use reference standard 126. Refer to Part 6, 51-00-01, or Part 6, 51-00-19 for data about the reference standard.

### 3. Preparation for Inspection

- A. To get access to the inspection areas, remove access door 341AZ and get into the center section of the horizontal stabilizer. See Figure 1.
- B. Remove loose paint, dirt and sealant from the surface of the inspection area. See Figure 1.

#### 4. Instrument Calibration

A. Refer to par. 4 in Part 6, 51-00-01 or Part 6, 51-00-19 for calibration instructions.

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## 5. Inspection Procedure

A. Examine the upper chord on each side of the horizontal stabilizer for cracks. The inspection areas are identified in Figure 1. Refer to par. 5 in Part 6, 51-00-01 or Part 6, 51-00-19 for the inspection procedure. Be careful to follow the directions in par. 5.D.(5) for the correct scan procedure.

## 6. Inspection Results

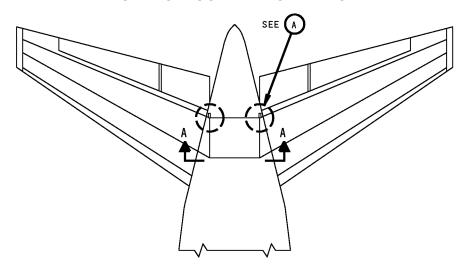
A. Refer to par. 6 in Part 6, 51-00-01 or Part 6, 51-00-19 to make an analysis of possible crack signals.

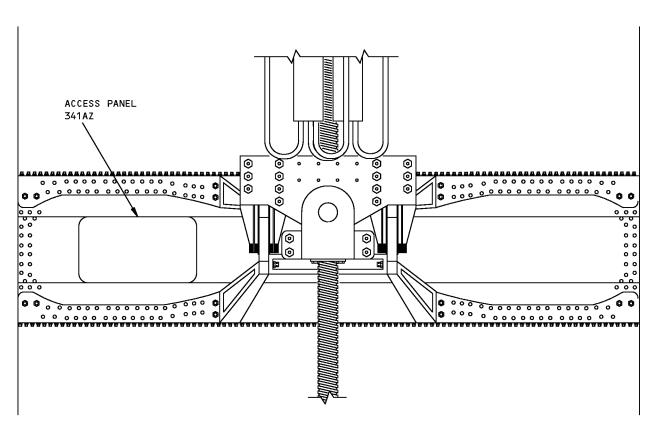
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FRONT OF THE CENTER SECTION OF THE HORIZONTAL STABILIZER

A-A

Inspection Areas and Access Figure 1 (Sheet 1 of 2)

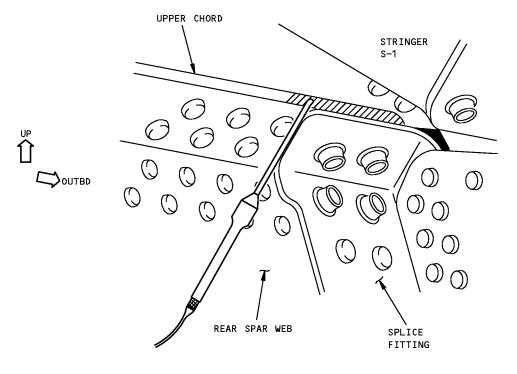
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RIGHT SIDE SHOWN LEFT SIDE OPPOSITE

A

NOTES

=INSPECTION AREA

Inspection Areas and Access Figure 1 (Sheet 2 of 2)

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## **PART 6 - EDDY CURRENT**

#### HORIZONTAL STABILIZER - UPPER AND LOWER ATTACHMENTS OF THE JACKSCREW FITTING

### 1. Purpose

- A. Use this procedure to do an inspection for surface cracks in the upper and lower attachments of the jackscrew fitting for the horizontal stabilizer.
- B. See Figure 1 for the inspection locations.
- C. MPD Appendix B DTR Check Form Reference:
  - (1) ITEM 55-10-I14B

#### 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 or a meter display.
  - (b) Operates at a frequency range of 50 to 500 kHz.
- (2) The instruments specified below were used to help prepare this procedure:
  - (a) Phasec 2200; Hocking, Inc.
  - (b) NDT 19e; Staveley, Inc.

## C. Probes

- (1) A straight probe is recommended, but a right-angle probe can be if a satisfactory inspection can be done.
- (2) The probe specified below was used to help prepare this procedure:
  - (a) MP-30; NDT Engineering Corp.

## D. Reference Standard

- (1) For meter display instruments, refer to Part 6, 51-00-01, for reference standard data.
- (2) For impedance plane display instruments, refer to Part 6, 51-00-19 for reference standard data.

#### 3. Preparation for Inspection

- A. Get access to the inspection area through access door 312AR.
- B. Remove loose paint, dirt, and grease from the inspection surfaces.

## 4. Instrument Calibration

- A. For meter display instruments, refer to par. 4 in Part 6, 51-00-01 for the calibration instructions.
- B. For impedance plane display instruments, refer to par. 4 in Part 6, 51-00-19 for the calibration instructions.

### 5. Inspection Procedure

- A. Examine the jackscrew for cracks around each fastener identified in Figure 1. Make sure to examine all the fasteners in the upper attachment and the lower attachment.
  - (1) For meter display instruments, refer to par. 5 in Part 6, 51-00-01 for the inspection procedure.

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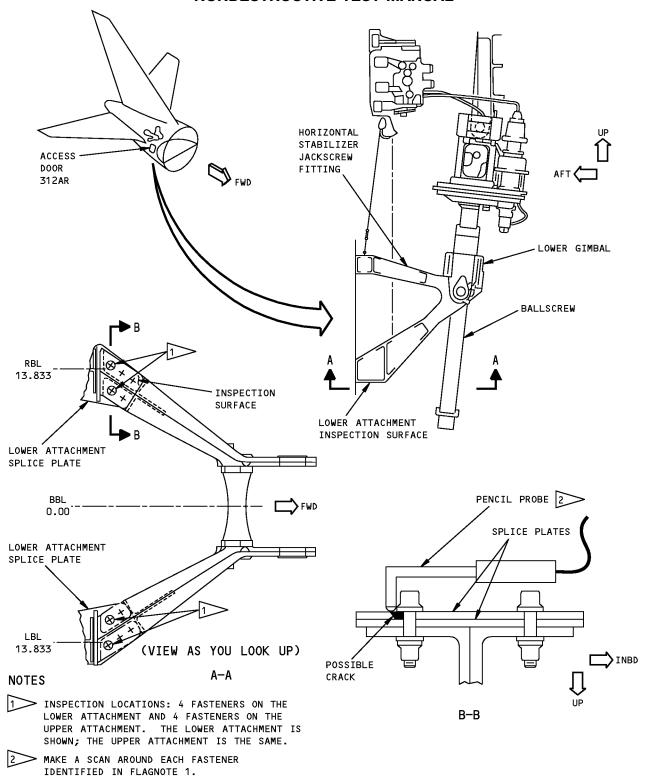
(2) For impedance plane display instruments, refer to par. 5 in Part 6, 51-00-19 for the inspection procedure.

## 6. Inspection Results

- A. For meter display instruments, refer to par. 6 in Part 6, 51-00-01 to make an analysis of the inspection results.
- B. For impedance plane display instruments, refer to par. 6 in Part 6, 51-00-19 to make an analysis of the inspection results.

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## Lower and Upper Attachment Inspection Locations Figure 1

