PART 6 – EDDY CURRENT

SPECIAL DETAILED INSPECTION OF THE REAR SPAR LOWER CAP AND LOWER AFT PLANK

1. Purpose

   A. The non–destructive testing procedure that follows is for the inspection of:

      (1) Surface cracks in the wing lower aft panel common to the rear spar.

      (2) Surface cracks in the center rear spar web and lower cap.

      (3) Surface cracks in the outer rear spar web and lower cap.

      (4) Surface cracks in the outer rear spar web at the Main Landing Gear (MLG) support structure attachments (Bolt hole inspection).

      (5) Subsurface cracks in the wing lower aft panel.

      (6) Subsurface cracks in the rear spar lower cap.

         NOTE: The information in this procedure is given for left side of the aircraft; the right side is typical unless specified.

2. Personnel Qualification

   A. Except stated otherwise, the inspection procedures are written for and to be executed by a minimum Level 2 eddy current inspector certified to NAS 410 (EN 4179) or equivalent standard acceptable to the National Airworthiness Authorities (NAA) to whom the operator is responsible.

3. Applicability

   A. Effectivity: As listed in the applicable Time Limits/Maintenance Checks (TLMC) Manual, Chapter 5.

   B. Reference Information

Reference	Designation
AMM TASK 07–10–01–582–801	Lifting of the Complete Aircraft with Jacks
AMM TASK 07–10–01–586–801	Lowering of the Complete Aircraft
AMM TASK 12–11–01–650–801	Pressure Refueling

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Reference	Designation
AMM TASK 12–11–09–650–801	Suction Defueling
AMM TASK 27–11–17–000–801	Removal of the Aileron Control Surfaces
AMM TASK 27–11–17–400–801	Installation of the Aileron Control Surfaces
AMM TASK 28–11–01–000–801	Removal of the Wing–Tank Access Panels
AMM TASK 28–11–01–400–801	Installation of the Wing–Tank Access Panels
AMM TASK 28–11–02–000–801	Removal of the Surge–Tank Access Panels
AMM TASK 28–11–02–400–801	Installation of the Surge–Tank Access Panels
AMM TASK 28–11–03–000–801	Removal of the Collector–Tank Access Panels
AMM TASK 28–11–03–400–801	Installation of the Collector–Tank Access Panels
AMM TASK 32–12–09–000–801	Removal of the Door Linkage
AMM TASK 32–12–09–400–801	Installation of the Door Linkage
AMM TASK 32–30–00–910–801	Extension and Retraction
AMM TASK 53–32–01–000–801	Removal of the Main Landing Gear (MLG) Wheel–Bin Assembly
AMM TASK 53–32–01–400–801	Installation of the Main Landing Gear (MLG) Wheel–Bin Assembly
AMM TASK 53–63–05–000–801	Removal of the Under–Wing Fairing
AMM TASK 53–63–05–400–801	Installation of the Under–Wing Fairing
AMM TASK 57–20–01–000–801	Removal of the Aileron–Control Access Panel (531SB/631SB)
AMM TASK 57–20–01–400–801	Installation of the Aileron–Control Access Panel (531SB/631SB)
AMM TASK 57–51–07–961–801	Discard the Trunnion to the Rear Spar Tension–Pins, Part No. MS21250–08, Non–Serialized
AMM TASK 57–52–01–000–801	Removal of the Trailing Edge Access Panels (from 571AB/671AB to 571FB/671FB)

EFFECTIVITY: ALL

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Reference	Designation
AMM TASK 57–52–01–400–801	Installation of the Trailing Edge Access Panels (from 571AB/671AB to 571FB/671FB)
AMM TASK 57–52–01–000–802	Removal of the Trailing–Edge Aileron–Area Closure–Panels (from 551AB/651AB to 551BB/651BB)
AMM TASK 57–52–01–400–802	Installation of the Trailing–Edge Aileron–Area Closure–Panels (from 551AB/651AB to 551BB/651BB)
AMM TASK 57–52–01–000–803	Removal of the MLG Auxiliary–Actuator Access Panel (581BT/681BT)
AMM TASK 57–52–01–400–803	Installation of the MLG Auxiliary–Actuator Access Panel (581BT/681BT)
AMM TASK 57–52–01–000–805	Removal of the Trailing–Edge Access Panel (554AB/654AB)
AMM TASK 57–52–01–400–805	Installation of the Trailing–Edge Access Panel (554AB/654AB).
Part 1 Section 1B	Aircraft Basic Dimension
Part 1 Section 1C	Zones
Part 1 Section 6A	Eddy Current Inspection–General Information
SPM–MM 51–23–00–100–801	Removal of Sealants
SPM–MM 51–25–00–110–801	Solvent Cleaning
SRM Chapter 51–01–00	Protective and Decorative Paint Finishes
SRM Chapter 51–23–04	Pressure, Environmental and Fuel Tank Sealing
TLMC 5–10–30	Task No. 57–11–00–108

4. Tools, Equipment and Materials

A. Tooling and Equipment

Reference	Manufacturers' Reference and/or Specification
BA CRS AL35–45	Calibration Reference Standard made from aluminum alloy (35–45% IACS), that contains 0.008 in (0.203 mm), 0.020 in (0.508 mm) and 0.040 in (1.016 mm) deep Electrical Discharge Machined (EDM) notches
BA CRS EXMM100–50101–001	Calibration Reference Standard made from aluminum alloy containing electrical discharge machined (EDM) notches
BA CRS EXMM100–50101–007	Calibration Reference Standard made from aluminum alloy containing electrical discharge machined (EDM) notches
BA CRS EXMM100–50101–011	Calibration Reference Standard made from aluminum alloy containing electrical discharge machined (EDM) notches
BA CRS EXMM100–50101–013	Calibration Reference Standard made from aluminum alloy containing electrical discharge machined (EDM) notches
BA CRS EXMM100–50101–017	Calibration Reference Standard made from aluminum alloy containing electrical discharge machined (EDM) notches
BA CRS EXMM100–50101–019	Calibration Reference Standard made from aluminum alloy containing electrical discharge machined (EDM) notches
EC–RH22–TL–6	Cable for SPC–304R/Fe
EC NDT SPC–304R/Fe	Subsurface probe, 4–100 kHz Frequency, 0.160 in (4.064 mm) diameter, 5.91 in (150.114 mm) length
General Electric (GE) 33A100	Rotating Bolthole Scanner
General Electric (GE) 33A103	Rotating Bolthole Scanner Cable

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Reference	Manufacturers' Reference and/or Specification
General Electric (GE) No. 105P4F	Surface Pencil Probe, 500 kHz Frequency, Fe/NFe, Absolute, Shielded, 0.130 in (3.302 mm) diameter, 4.50 in (114.30 mm) length
General Electric (GE) 205P4F	Surface probe, 45 degrees tip, 500 kHz frequency, NFe/Fe, absolute, shielded, 0.130 in (3.302 mm) diameter, 4.50 in (114.30 mm) length, 0.750 in (19.05 mm) tip length
General Electric (GE) 309P24F	Surface Probe, 90 degrees tip, 500 kHz frequency, NFe/Fe, absolute, shielded, 0.130 in (3.302 mm) diameter, 4.50 in (114.30 mm) length, 0.250 in (6.35 mm) tip length.
General Electric (GE) No. 700P16A	Spot Face (Reflection) Probe, 300 Hz–100 kHz Frequency Range, 0.630 in (16.002 mm) Diameter
General Electric (GE) VMUR101X	Dynamic Rotating Bolt Hole Probe, 200kHz–2 MHz Frequency Range, 0.50 to 0.625 in (12.7 to 15.88 mm) diameter, 3.0 in (76.2 mm) length
Hocking Phasec 2200	Eddy Current–Instrument–Impedance–Plane Type
Techna NDT P2D–4L6–R	12 pin Lemo to 4 pin Lemo cable
Techna NDT SDP .7–50H–4L	Spot Face Probe, 50 Hz to 5 kHz, reflection, 0.700 in (17.78 mm) diameter
Commercially Available	Coaxial Cable BNC to Microdot
Commercially Available	Circle Template (non–conductive)
Commercially Available	Explosion proof light source
Commercially Available	Inspection mirror

Reference	Manufacturers' Reference and/or Specification
Commercially Available	Ruler (non conductive)

NOTE: Equivalent eddy current equipment may be used, provided that it meets the requirements of this procedure. The equipment must be capable of resolving the reference notches in the calibration standard at the required level of resolution and sensitivity.

To gain access to the inspection area due to accessibility or user preference, it is permissible to use a probe of different configuration from the one specified. The test frequency used may range from 100 kHz to 2.0 MHz for surface inspection.

B. Consumable Materials

Reference	Manufacturers' Reference and/or Specification
Aliphatic Naphtha	Specification TT–N–95, Type II
Commercially Available	Cloth Lint–Free
Commercially Available	Non–Conductive Tape

5. Item Description

A. Parts Examined in this Procedure

Item No.	Part Name	Drawing or Part Number	Material
1	Panel Aft Lower	1005721113	AL 7475–T7351
2	Rear Spar – Center	1005711116	AL 7050–T7451
3	Rear Spar – Outer	1005721122	AL 7475–T7351

NOTE: Parts that do not include an Item No. are not called out in the Figure.

Numbers that do not include a dashed suffix under Drawing or Part Number column are drawing numbers.

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6. Access – Zones

A. The inspection zone is in Unit Zones 161/162 and 531/631 (Part 1 Section 1C).

7. Job Set–Up Information

A. Preparation and Cleaning

(1) Locate and identify all areas that require inspection. (Refer to Figure 1 , Figure 2 , Figure 3 , Figure 4 , Figure 5 , Figure 6 , Figure 7 and , Figure 8, and Paragraph 5.A).

(2) The inspection is performed from the exterior and interior of the wing.

(3) Defuel the aircraft and purge the fuel tanks (AMM TASK 12–11–09–650–801).

(4) Lift the aircraft on jacks (AMM TASK 07–10–01–582–801).

(5) Remove the forward under wing fairing (182AA) (AMM TASK 53–63–05–000–801).

(6) Remove the wheel bin assemblies (171BZ/172BZ) (AMM TASK 53–32–01–000–801).

(7) Remove the access panels (554AB/654AB) (AMM TASK 57–52–01–000–805).

(8) Remove the trailing edge access panel (571AB/671AB) (AMM TASK 57–52–01–000–801).

(9) Remove the trailing–edge aileron–area closure–panels (from 551AB/651AB to 551BB/651AB) (AMM TASK 57–52–01–000–802).

(10) Remove the aileron control access panel (531SB/631SB) (AMM TASK 57–20–01–000–801).

(11) Remove the aileron control surfaces. (AMM TASK 27–11–17–000–801).

(12) Remove the access panels that follow (AMM TASK 28–11–01–000–801):

ACCESS	DESIGNATION
161AB/162AB, 161BB/162BB	Access Panel, Center Wing Box
531AB, 531BB, 531CB, 531DB, 531FB, 531KB, 531NB	Access Panel, Wing Box, Left

ACCESS	DESIGNATION
631AB, 631BB, 631CB, 631DB, 631FB, 631KB, 631NB	Access Panel, Wing Box, Right

(13) Remove the surge tank access panel that follow (531RB/631RB) (AMM TASK 28–11–02–000–801).

(14) Remove the collector tank access panel (161AZ/162AZ) (AMM TASK 28–11–03–000–801).

(15) Remove the sealant around the fasteners identified for inspection (SPM–MM 51–23–00–100–801).

WARNING: OBEY THE PRECAUTIONS THAT FOLLOW WHEN YOU USE SOLVENTS. SOLVENTS ARE DANGEROUS BECAUSE THEY CAN BE FLAMMABLE, POISONOUS AND CAN CAUSE INJURY.

- USE APPROVED EYE AND BODY PROTECTION
- DO THE WORK IN AN AREA THAT HAS A GOOD FLOW OF CLEAN AIR
- MAKE SURE THAT THE AREA HAS NO SPARKS, FLAMES, OR HOT SURFACES
- OBEY THE MANUFACTURER'S INSTRUCTIONS
- DO NOT LET THE SOLVENT TOUCH YOUR SKIN, EYES, OR MOUTH
- GET MEDICAL AID IMMEDIATELY IF IRRITATION OCCURS
- OBEY ALL THE LOCAL HEALTH AND SAFETY PRECAUTIONS AND REGULATIONS.

(16) Clean the area to be tested (SPM–MM 51–25–00–110–801).

(17) It is not necessary to remove the finish from the parts unless they show deterioration or local damage.

(18) If the paint or primer in the area to be tested is damaged, remove the paint and primer, do the inspection and replace the primer and paint (SRM Chapter 51–01–00).

(19) Prepare the bolt hole surface for the bolt hole eddy current inspection as follows:

(a) Disconnect the connecting rod from the main landing gear door (AMM TASK 32–12–09–000–801).

(b) Retract the main landing gear (AMM TASK 32–30–00–910–801).

(c) Remove the main landing gear auxiliary actuator access panel (581BT/681BT) (AMM TASK 57–52–01–000–803).

CAUTION: ONLY ONE BOLT IS TO BE REMOVED AT A TIME. DAMAGE TO THE AIRCRAFT STRUCTURE AND HOLE MISALIGNMENT CAN OCCUR IF MORE THAN ONE BOLT IS REMOVED. BOLTS, WASHERS AND NUTS ARE TO BE REPLACED WITH NEW ITEMS.

(d) Remove and discard one of the bolts from the main landing trunnion attachment at WS67.02 (AMM TASK 57–51–07–961–801).

(e) Visually inspect the hole to be inspected for conditions that may interfere with the inspection such as burrs, sealant, galling, out–of–round conditions or offset at component interface.

(f) Clean the inner side of the hole (SPM–MM 51–25–00–110–801).

NOTE: If a bushing is installed in the fastener hole to be inspected, please contact Bombardier Aerospace.

(g) If a reaming operation is required to correct the above condition, before enlarging any holes, permission must be obtained from Bombardier Business Aircraft Customer Support Engineering, Montreal.

(h) Repeat paragraphs 7.A. (19)(d) to 7.A. (19)(g) for the remaining holes when required.

NOTE: Magnifying glass, borescope or other optical aids may be used to enhance the visual inspection.

8. Equipment Calibration for the Inspection of Surface Cracks in the Aft Lower Wing Panel, Center Rear Spar Lower Cap and Web and the Outer Rear Spar Lower Cap and Web

NOTE: Make sure that you follow the manufacturer's instrument instructions when you operate the test equipment.

A. Calibrate the eddy current instrument as follows:

(1) Connect the applicable surface probe with the coaxial cable to the eddy current instrument.

(2) Turn the instrument [ON]. Adjust and set the instrument controls as shown in Table 1 Calibration Data, Instrument Settings.

(3) Put the probe (coil) tip perpendicular to the surface of AL35–45 Calibration Reference Standard (CRS) away from the EDM notch and the edge. (Refer to Figure 9).

(4) Balance the eddy current instrument. Adjust the instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

(5) Move the probe (coil) tip across the EDM notch, and adjust the instrument sensitivity [GAIN] to obtain an amplitude signal as shown in Table 1, Calibration Data, Screen Display.

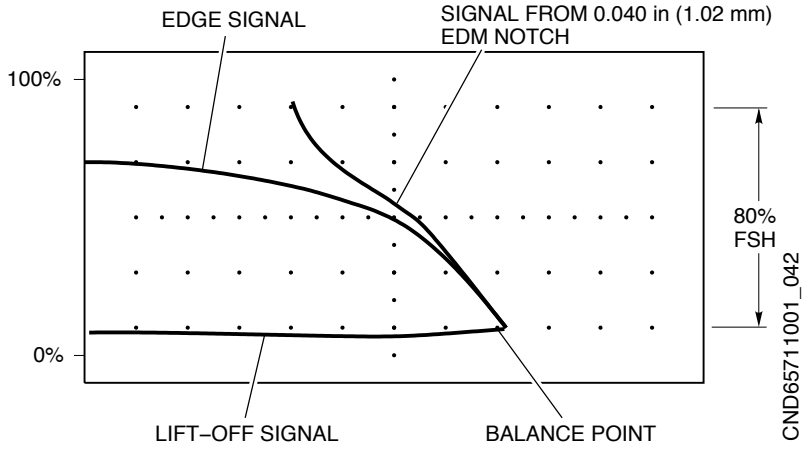
(6) Differentiate between the EDM notch and the edge signals by moving the probe over the edge of the reference standard. The signal obtained from the edge shall slant–off towards the upper left quadrant as shown in Table 1 Calibration Data, screen display.

(7) If the inspection area is painted, carry out the lift–off compensation prior to inspection. Refer to paragraph 8.B.

Table 1 – Calibration Data

Instrument Settings	
Mode	ABS, Ch1
Display	XY
View	Ch 1
Ch 1 Frequency	500 kHz
Ch 1 Phase	301.0°
Ch 1 Gain	46 dB
Ch 1 X:Y	X –8 dB
Hi–Pass	DC
Lo–Pass	200 Hz
Balance Load	47 µH
X–Pos	40
Y–Pos	–40

Screen Display



NOTE: The instrument settings listed may vary from instrument to instrument.

B. Lift–Off Compensation Calibration

(1) After calibration as outlined in paragraph 8.A put the probe (coil) tip perpendicular to the inspection surface. DO NOT balance the instrument.

(2) Compare the screen displays between the operating point on the inspection surface and the balance point on the CRS.

(3) If the operating point on the inspection surface matches the balance point on the CRS, no compensation for paint thickness is required. Proceed to the inspection procedure.

(4) If the operating point on the inspection area does not match the balance point on the CRS, but has moved to the left, compensation for the paint thickness is required. Do as follows:

(a) Attach a strip of non–conductive tape or shim to cover the CRS surface including the EDM notches.

(b) Put the probe (coil) tip perpendicular to the surface of the CRS. Rebalance the instrument. Compare the operating point on the inspection surface to the balance point on the CRS.

(c) If the operating point on the inspection surface is to the left of the balance point on the CRS, add an additional strip of tape or shim until the balance point on the CRS matches the operating point of the inspection area.

(d) If the operating point on the inspection surface is to the right of the balance point on the CRS covered with tape, remove a strip of tape or shim until the balance point on the CRS matches the operating point of the inspection area.

(e) If lift–off compensation and calibration requirements cannot be met, remove the paint or coating prior to inspection.

(5) Slide the probe across the EDM notch covered with tape on the CRS.

(6) Adjust the [GAIN] to obtain an eddy current amplitude signal from the EDM notch as shown in Table 1 Screen Display.

(7) Proceed to the inspection procedure.

9. Inspection for Surface Cracks in the Aft Lower Wing Panel, Center Rear Spar Lower Cap and Web and the Outer Rear Spar Lower Cap and Web

NOTE: Monitor the screen display carefully at all times and make a note of all distinct relevant indications. Include the screen height of each signal and its relative location on the part.

When scanning, if the balance point drops below the screen display from the original balance point, it could indicate the original balance location contains a defect. In such a case rebalance on an adjacent area and scan the original balance point for possible defects before continuing the inspection.

Instrument calibration verification intervals

– Every 15 minutes of continuous operation.
– When a set–up parameter and/or equipment i.e. probe change
– When the inspection is completed.
– When the amplitude of the calibration signal has varied, recalibrate the instrument and repeat the inspection again at all locations from the last valid calibration
– Make sure that the operation point is on the screen display at all times.

When scanning, if the balance point drops below the screen display from the original balance point, it could indicate the original balance location contains a defect. In such a case rebalance on an adjacent area and scan the original balance point for possible defects before continuing the inspection.

Rebalance the instrument for each new scan path.

Do each scan of the inspection area at the same probe speed as used during the calibration process.

NOTE: Use a non–conductive circle template as a probe guide when performing circular scans around the fasteners.

Use a non–conductive straight edge as a probe guide for thickness scan to ensure proper probe placement and a constant edge distance.

The smallest practical size diameter hole on the template is the one that gives approximately one probe diameter between the edge of the fastener hole and the edge of the probe.

Make sure that you remove sealant around the fasteners to be inspected. You do not need to remove the high–temperature sealant in BL0.00 to BL20.00.

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A. Inspect the Lower Aft Wing Panel as follows:

NOTE: The inspection is carried out from the wing exterior.

(1) After calibration as outlined in paragraph 8, put the probe on the lower surface of the lower aft wing panel (1) at BL0.00, adjacent to the initial fastener to be inspected, (Refer to Figure 1, Sheet 1, Detail A) for inspection area.

(2) Rebalance the instrument. If necessary, adjust instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

(3) Make a full circular (360 degrees) scan around the fastener using a circle template as a probe guide. Make sure that the probe (coil) tip stays perpendicular to the inspection surface at a constant edge distance. (Refer to Figure 1, Sheet 2, Detail B) for typical scan path.

(4) Repeat paragraphs 9.A.(1) to 9.A. (3). for all remaining lower aft wing panel (1) fasteners requiring inspection between BL0.00 and WS331.350. (Refer to Figure 1 Sheet 2 , Details B, C and Sheet 3, Detail D) for inspection areas and typical scan paths.

NOTE: Fasteners covered by existing structure are inspected using subsurface eddy current.

B. Inspect the Rear Spar Web around the Fuel System Fastener Holes as follows:

NOTE: The motive flow attachment fastener holes are inspected from the wing interior. All other locations are inspected from the wing exterior.

The inspection of the APU Feed attachment is only applicable to the right side of the aircraft.

(1) After calibration as outlined in paragraph 8, put the probe (coil) tip on the rear surface of the rear spar (2) web, adjacent to the initial fastener to be inspected at the engine feed attachment between BL0.00 and BL20.00. (Refer to Figure 2, Sheet 1, Detail B) for inspection area.

(2) Balance the instrument. If necessary, adjust instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

(3) Make a full circular (360 degrees) scan around the fastener using the fastener as a probe guide. Make sure that the probe (coil) tip stays perpendicular to the inspection surface at all times. (Refer to Figure 2, Sheet 1, Detail B) for typical scan path.

(4) Repeat paragraphs 9.B. (1) through 9.B. (3) for the remaining fasteners common to the engine feed attachment. (Refer to Figure 2, Sheet 1, Detail A) for inspection areas and typical scan paths.

(5) Repeat paragraphs 9.B. (1) through 9.B. (3) around the engine feed attachment hole. (Refer to Figure 2, Sheet 1, Detail A) for inspection areas and typical scan paths.

(6) Repeat paragraphs 9.B. (1) through 9.B. (5) on the rear surface of the rear spar (2) for the APU feed attachment between BL0.00 and BL20.00 (right side only). (Refer to Figure 2, Sheet 1, Detail A) for inspection areas and typical scan paths.

(7) Repeat paragraphs 9.B. (1) through 9.B. (5) on the rear surface of the rear spar (3) for the fuel vent attachment outboard of WS216.78. (Refer to Figure 2, Sheet 2, Detail B) for inspection areas and typical scan paths.

(8) Repeat paragraphs 9.B. (1) through 9.B. (5) on the forward surface of the rear spar (2) for the motive flow attachment between BL0.00 and BL20.00. (Refer to Figure 2, Sheet 2, Detail C) for inspection areas and typical scan paths.

C. Inspect the Rear Spar Web at the Aileron System Cut–Outs between WS331.34 and WS356.47 as follows:

NOTE: The inspection is carried out from the wing exterior.

(1) After calibration as outlined in paragraph 8, put the probe (coil) tip on the rear surface of the rear spar (3) web, adjacent to the initial cut–out to be inspected between WS331.35 and WS356.48. (Refer to Figure 3, Sheet 1, Detail A) for inspection area.

(2) Balance the instrument. If necessary, adjust the instrument [PHASE] control to obtain a horizontal lift–off signal moving from right to left (with increasing lift–off) across the screen display.

(3) Make a full circular (360 degrees) scan around the cut–out. Make sure the probe (coil) tip stays at a constant edge distance and perpendicular to the inspection surface at all times. (Refer to Figure 3, Sheet 1, Detail B) for typical scan path.

(4) Repeat paragraphs 9.C. (1) through 9.C. (3) for the remaining cut–outs requiring inspection between WS331.35 and WS356.47. (Refer to Figure 3, Sheet 2, Detail C and Sheet 3, Detail E) for inspection areas and typical scan path.

D. Inspect the Rear Spar Cut–Outs which are covered by Existing Structure as follows:

(1) After calibration as outlined in paragraph 8, place the 90 degrees probe (coil) tip on the rear spar (3) cut–out thickness. (Refer to Figure 3, Sheet 2, Detail C) for inspection area and Section D–D for typical probe position.

(2) Balance the instrument. If necessary, adjust instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

(3) Make a scan of the spar web thickness where the inspection of the cut out rear surface is not possible. Use a straight edge as a probe guide. Make sure the probe (coil) tip stays at a constant edge distance and perpendicular to the inspection surface at all times. (Refer to Figure 3, Sheet 2, Detail C) typical scan path.

(4) Repeat paragraphs 9.D. (1) through 9.D. (3) for the remaining cut–out requiring inspection between WS331.35 and WS356.47 (Refer to Figure 3, Sheet 3, Detail E) for inspection area and typical scan path.

E. Inspect the Rear Spar Lower Cap as follows

NOTE: The inspection is carried out from the wing interior.

(1) After calibration as outlined in paragraph 8, put the probe (coil) tip on the rear spar lower cap, adjacent to the initial fastener to be inspected at WS20.00. (Refer to Figure 4, Sheet 2, Detail B) for inspection area.

(2) Balance the instrument. If necessary, adjust the instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

(3) Make a full circular (360 degrees) scan around the fastener using the fastener as a probe guide. Make sure the probe (coil) tip stays perpendicular to the inspection surface at all times. (Refer to Figure 4, Sheet 2, Detail B) for typical scan path.

(4) Repeat paragraphs 9.E. (1) through 9.E. (3). for all rear spar lower cap fasteners requiring inspection between BL20.00 and WS35.596. (Refer to Figure 4, Sheet 2, Detail B) for inspection areas and typical scan path.

(5) Repeat paragraphs 9.E. (1) through 9.E. (3). for all rear spar lower cap fasteners requiring inspection between WS52.750 and WS135.394. (Refer to Figure 4, Sheet 2, Detail C) for inspection areas and typical scan path.

(6) Repeat paragraphs 9.E. (1) through 9.E. (3). for the rear spar lower cap fasteners requiring inspection outboard of WS196.430 and outboard of WS257.465. (Refer to Figure 4, Sheet 3, Detail D) for inspection areas and typical scan path.

F. Inspect the Rear Spar Web at the MLG Support Structure Attachment as follows:

NOTE: The inspection is carried out from the wing interior.

(1) After calibration as outlined in paragraph 8, put the probe (coil) tip on the forward surface of the rear spar (3) web, adjacent to the initial fastener to be inspected inboard of FS52.75. (Refer to Figure 5) for inspection area.

(2) Balance the instrument. If necessary, adjust instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

(3) Make a full circular (360 degrees) scan around the fastener using the fastener as a probe guide. Make sure that the probe (coil) tip stays perpendicular to the inspection surface at all times. (Refer to Figure 5) for typical scan path.

(4) Repeat paragraphs 9.F. (1) through 9.F. (3) for the remaining fasteners identified for inspection between WS52.750 and WS80.281. (Refer to Figure 5) for inspection areas and typical scan path.

10. Indication Evaluation

A. Any distinct vertical deflection signal that occurs over a short scan distance (one probe tip diameter) is considered a suspect indication and is cause for further investigation.

B. Any rapid up dot movement signal that stays at the up position over a longer scan distance is considered a suspect indication and is cause for further investigation.

C. Make sure that the indication is not caused by edge effect, abrupt change in geometry, localized variations in conductivity, permeability or other non–relevant factors.

D. Evaluate all suspect crack indications by comparing their phase angle, amplitude and shape to the calibration standard EDM notch signal.

E. If a crack is detected, determine its length and its location.

11. Acceptance or Rejection Criteria

A. Any distinct vertical deflection signal, which equals to 50% or greater than the response from the 0.040 in (1.02 mm) EDM notch as shown in Table 1 is classified as a crack and is cause for rejection.

B. Any rapid upward dot movement signal which equals to 50% or greater than the response from the 0.040 in (1.02 mm) deep EDM notch as shown in Table 1 and remains at the upward position momentarily or over a longer period of time is classified as a crack indication and cause for rejection.

12. Equipment Calibration for the Inspection of Subsurface Cracks in the Wing Aft Lower Panel between BL0.00 and WS35.59

NOTE: Make sure that you follow the manufacturer's instrument instructions when you operate the test equipment.

A. Calibrate the Eddy Current Instrument as follows:

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(1) Connect the pencil probe No. SPC–304R/Fe with cable No. EC–RH22–TL–6 to the eddy current instrument.

(2) Turn the instrument [ON]. Adjust and set the instrument controls as noted in Table 2, Calibration Data, Instrument Settings.

(3) Place the probe (coil) tip perpendicular on the surface of the fairing support (dummy) of CRS EXMM100–50101–001, adjacent to the fastener and away from the EDM notch. (Refer to Figure 10, Probe Position A (PPA)).

(4) Balance the instrument. If necessary, adjust instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

(5) Move the probe around the fastener across the subsurface EDM notch A (NA) and adjust the instrument sensitivity [GAIN] to obtain an amplitude signal as shown in Table 2, Calibration Data, Screen Display. (Refer to Figure 10).

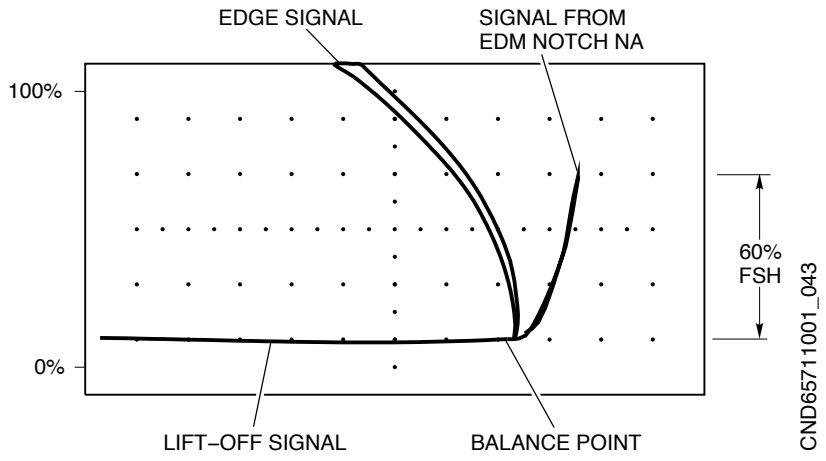
(6) Differentiate between the EDM notch and the edge signals by moving the probe over the edge of the reference standard.

(7) If the inspection area is painted, carry out the lift–off compensation prior to inspection. Refer to Step 12.B.

Table 2 – Calibration Data

Instrument Settings	
Mode	REFL, Ch 1
Display	XY
View	Ch 1
Ch 1 Frequency	5.0 kHz
Ch 1 Phase	267.0°
Ch 1 Gain	51 dB
Ch 1 X:Y	X–2 dB
Hi–Pass	DC
Lo–Pass	30 Hz
Balance Load	–
X–Pos	40
Y–Pos	–40

Screen Display



NOTE: The instrument settings listed may vary from instrument to instrument.

B. Lift–Off Compensation Calibration

(1) After calibration as outlined in paragraph 12.A. put the probe (coil) perpendicular to the inspection surface. DO NOT balance the instrument.

(2) Compare the screen displays between the operating point on the inspection surface and the balance point on the CRS.

(3) If the operating point on the inspection surface matches the balance point on the CRS, no compensation for paint thickness is required. Proceed to the inspection procedure.

(4) If the operating point on the inspection area does not match the balance point on the CRS, but has moved to the left, compensation for the paint thickness is required. Do as follows:

(a) Attach a strip of non–conductive tape or shim to cover the CRS surface including the EDM notches.

(b) Put the probe (coil) flat and firmly to the skin surface of the CRS. Rebalance the instrument. Compare the operating point on the inspection surface to the balance point on the CRS.

(c) If the operating point on the inspection surface is to the left of the balance point on the CRS, add an additional strip of tape or shim until the balance point on the CRS matches the inspection area.

(d) If the operating point on the inspection surface is to the right of the balance point on the CRS covered with tape, remove a strip of tape or shim until the balance point on the CRS matches the inspection area.

(e) If lift–off compensation and calibration requirements cannot be met, remove the paint or coating prior to inspection.

(5) Move the probe across the EDM notch NA covered with tape on the CRS.

(6) Adjust the [GAIN] to obtain an eddy current amplitude signal from the EDM NA as shown in Table 2 Screen Display.

(7) Proceed to the inspection procedure.

13. Inspection of Subsurface Cracks in the Wing Aft Panel between BL0.00 and WS35.59

NOTE: The inspection is carried out from the wing exterior.

When scanning, if the balance point drops below the screen display from the original balance point, it could indicate the original balance location contains a defect. In such a case rebalance on an adjacent area and scan the original balance point for possible defects before continuing the inspection.

Instrument calibration verification intervals

– Every 15 minutes of continuous operation
– When a set–up parameter, and/or equipment i.e. probe change
– When the inspection is completed
– When the amplitude of the calibration signal has varied, recalibrate the instrument and repeat the inspection again at all locations from the last valid calibration
– Make sure that the operation point is on the screen display at all times.

Rebalance the instrument for each new scan paths.

Do each scan of the inspection area at the same probe speed as used during the calibration process.

Make sure that the inspection surface is well illuminated i.e. clearly visible.

A. After calibration as outlined in paragraph 12, put the probe on the fairing support, adjacent to the initial fastener to be inspected that is common to the wing aft lower panel (1). (Refer to Figure 6) for inspection area.

B. Balance the instrument. If necessary, adjust instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

C. Make a full circular (360 degrees) scan around the fastener using the fastener as a probe guide. Make sure the probe (coil) tip stays perpendicular to the inspection surface at all times. (Refer to Figure 6) for typical scan paths.

D. Repeat paragraphs 13.A though 13.C for all remaining fairing support fasteners common to the wing aft lower panel (1). (Refer to Figure 6) for inspection areas and typical scan path.

14. Indication Evaluation

A. Any distinct vertical deflection signal that occurs over a short scan distance (one probe tip diameter) is considered a suspect indication and is cause for further investigation.

B. Make sure that the indication is not caused by edge effect, abrupt change in geometry, localized variations in conductivity, permeability or other non–relevant factors.

C. Evaluate all suspect crack indications by comparing their phase angle, amplitude and shape to the calibration standard EDM notch signal.

D. If a crack is detected, determine its length and its location.

15. Acceptance or Rejection Criteria

A. Any distinct vertical deflection signal, which equals to 50% or greater than the response from EDM notches NA as shown in Table 2 is classified as a crack and is cause for rejection.

B. Any rapid upward dot movement signal which equals to 50% or greater than the response from EDM notch NA as shown in Table 2 and remains at the upward position momentarily or over a longer period of time is classified as a crack indication and is cause for rejection.

16. Equipment Calibration for the Inspection of Subsurface Cracks in the Rear Spar Lower Cap between WS85.74 and WS331.35 – Small Fasteners

NOTE: Make sure that you follow the manufacturer's instrument instructions when you operate the test equipment.

A. Calibrate the Eddy Current Instrument as follows:

(1) Connect the 700P16A spot probe with cable P2D–4L6–R to the eddy current instrument.

(2) Turn the instrument [ON]. Adjust and set the instrument controls as shown in Table 3 Calibration Data, Instrument Settings.

(3) Center the spot probe over the notch free fastener of CRS EXMM100–50101–007. (Refer to Figure 11, Probe Position A (PPA)).

NOTE: Use a non–conductive circle template to center the probe over the fastener.

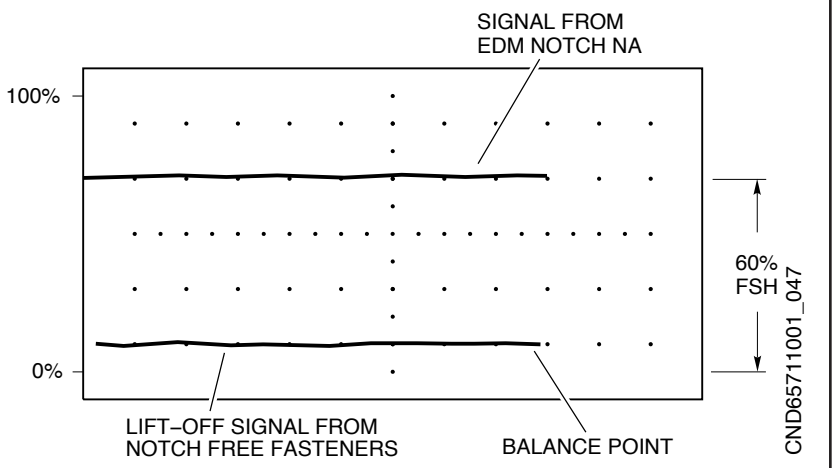
(4) Balance the eddy current instrument. Adjust the instrument [PHASE] control to obtain a horizontal lift–off signal moving from right to left (with increasing lift–off) across the screen display.

(5) Center the spot probe over the fastener contains the EDM notch NA of CRS EXMM100–50101–007. (Refer to Figure 11, Probe Position B (PPB)).

(6) Adjust the instrument sensitivity [GAIN] to obtain a lift–off signal from EDM notch NA as shown in Table 3, Calibration Data, Screen Display.

(7) If the inspection area is painted, carry out the lift–off compensation prior to inspection. Refer to paragraph 16.B.

Table 3 – Calibration Data

Instrument Settings		Screen Display
Mode	REFL, Ch 1	
Display	XY	
View	Ch 1	
Ch 1 Frequency	3.0 kHz	
Ch 1 Phase	272.0°	
Ch 1 Gain	56 dB	
Ch 1 X:Y	X –8 dB	
Hi–Pass	DC	
Lo–Pass	30 Hz	
Balance Load	–	
X–Pos	40	
Y–Pos	–40	

NOTE: The instrument settings listed may vary from instrument to instrument.

B. Lift–Off Compensation Calibration

(1) After calibration as outlined in paragraph 16.A. put the probe (coil) perpendicular to the inspection surface. DO NOT balance the instrument.

(2) Compare the screen displays between the operating point on the inspection surface and the balance point on the CRS.

(3) If the operating point on the inspection surface matches the balance point on the CRS, no compensation for paint thickness is required. Proceed to the inspection procedure.

(4) If the operating point on the inspection area does not match the balance point on the CRS, but has moved to the LEFT, compensation for the paint thickness is required. Do as follows:

(a) Attach a strip of non–conductive tape or shim to cover the CRS surface including the EDM notches.

(b) Put the probe (coil) flat and firmly to the skin surface of the CRS. Rebalance the instrument. Compare the operating point on the inspection surface to the balance point on the CRS.

(c) If the operating point on the inspection surface is to the left of the balance point on the CRS, add an additional strip of tape or shim until the balance point on the CRS matches the inspection area.

(d) If the operating point on the inspection surface is to the right of the balance point on the CRS covered with tape, remove a strip of tape or shim until the balance point on the CRS matches the inspection area.

(e) If lift–off compensation and calibration requirements cannot be met, remove the paint or coating prior to inspection.

(5) Center the probe over the fastener with EDM notch NA covered with tape on the CRS.

(6) Adjust the [GAIN] to obtain an eddy current amplitude signal from the EDM NA as shown in Table 3 Screen Display.

(7) Proceed to the inspection procedure.

17. Inspection of Subsurface Cracks in the Rear Spar Lower Cap between WS85.74 and WS331.35 – Small Fasteners:

NOTE: The inspection is carried out from the wing exterior.

Instrument calibration verification intervals.

– Every 15 minutes of continuous operation
– When a set–up parameter, and/or equipment i.e. probe change
– When the inspection is completed
– When the amplitude of the calibration signal has varied, recalibrate the instrument and repeat the inspection again at all locations from the last valid calibration.
– Make sure that the operation point is on the screen display at all times.

Make sure that the inspection surface is well illuminated i.e. clearly visible.

A. After calibration as outlined in paragraph 16, put the probe on the wing panel lower surface, centered over the initial small fastener to be inspected that is common to the rear spar (3) lower cap. (Refer to Figure 7, Sheet 2, Detail B) for inspection area.

B. Compare the position of the operating point with the signals used for calibration on both the EDM notched and notch free locations.

C. Repeat paragraphs 17.A. and 17.B. for the remaining small fasteners common to the rear spar (3) lower cap to be inspected between WS85.74 and WS331.35. (Refer to Figure 7, Sheet 2, Details B and Sheet 3, Detail C) for inspection areas and typical probe position.

D. Refer to paragraph 24 for indication evaluation and to paragraph 25 for Acceptance or Rejection Criteria.

18. Equipment Calibration for the Inspection of Subsurface Cracks in the Rear Spar Lower Cap at WS94.70 and Outboard of WS155.740 – Large Fasteners

NOTE: Make sure that you follow the manufacturer's instrument instructions when you operate the test equipment.

A. Calibrate the eddy current instrument as follows:

(1) Connect the 700P16A spot probe with cable P2D–4L6–R to the eddy current instrument.

(2) Turn the instrument [ON]. Adjust and set the instrument controls as shown in Table 3 Calibration Data, Instrument Settings.

(3) Center the spot probe over the notch free fastener of CRS EXMM100–50101–007. (Refer to Figure 11, Probe Position C (PPC)).

NOTE: Use a non–conductive circle template to center the probe over the fastener.

(4) Balance the eddy current instrument. Adjust the instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

(5) Center the spot probe over the fastener containing the EDM notch NB of CRS EXMM100–50101–007. (Refer to Figure 11, Probe Position D (PPD)).

(6) Adjust the instrument sensitivity [GAIN] to obtain a lift–off signal from EDM notch NB as shown in Table 3 Calibration Data Screen Display.

(7) If the inspection area is painted, carry out the lift–off compensation prior to inspection. Refer to paragraph 18.B.

NOTE: The instrument settings listed may vary from instrument to instrument.

B. Lift–Off Compensation Calibration:

(1) After calibration as outlined in paragraph 18.A. put the probe (coil) perpendicular to the inspection surface. DO NOT balance the instrument.

(2) Compare the screen displays between the operating point on the inspection surface and the balance point on the CRS.

(3) If the operating point on the inspection surface matches the balance point on the CRS, no compensation for paint thickness is required. Proceed to the inspection procedure.

(4) If the operating point on the inspection area does not match the balance point on the CRS, but has moved to the left, compensation for the paint thickness is required. Do as follows:

(a) Attach a strip of non–conductive tape or shim to cover the CRS surface including the EDM notches.

(b) Put the probe (coil) flat and firmly to the skin surface of the CRS. Rebalance the instrument. Compare the operating point on the inspection surface to the balance point on the CRS.

(c) If the operating point on the inspection surface is to the left of the balance point on the CRS, add an additional strip of tape or shim until the balance point on the CRS matches the inspection area.

(d) If the operating point on the inspection surface is to the right of the balance point on the CRS covered with tape, remove a strip of tape or shim until the balance point on the CRS matches the inspection area.

(e) If lift–off compensation and calibration requirements cannot be met, remove the paint or coating prior to inspection.

(5) Center the probe over the fastener with EDM notch NB covered with tape on the CRS.

(6) Adjust the [GAIN] to obtain an eddy current amplitude signal from EDM NB as shown in Table 3 Screen Display.

(7) Proceed to the inspection procedure.

19. Inspection of Subsurface Cracks in the Rear Spar Lower Cap at WS94.70 and Outboard of WS155.740 – Large Fasteners:

NOTE: The inspection is carried out from the wing exterior.

Instrument calibration verification intervals.

- Every 15 minutes of continuous operation
- When a set–up parameter, and/or equipment i.e. probe change
- When the inspection is completed
- When the amplitude of the calibration signal has varied, recalibrate the instrument and repeat the inspection again at all locations from the last valid calibration
- Make sure that the operation point is on the screen display at all times.

Make sure that the inspection surface is well illuminated i.e. clearly visible.

A. After calibration as outlined in paragraph 18 put the probe on the wing panel lower surface, centered over the initial large fastener to be inspected near WS94.70. (Refer to Figure 7, Sheet 2, Detail B) for inspection area and typical probe position.

B. Compare the position of the operating point with the signals used for calibration on both the EDM notched and notch free locations.

C. Repeat paragraphs 19.A. and 19.B. for the remaining large fasteners to be inspected at WS94.704. (Refer to Figure 7, Sheet 2, Detail B) for inspection areas and typical probe position.

D. Refer to paragraph 24 for indication evaluation and to paragraph 25 for Acceptance or Rejection Criteria.

20. Equipment Calibration for the Inspection of Subsurface Cracks in the Rear Spar under the Door Land between WS331.35 and WS356.47 – Small Fasteners

NOTE: Make sure that you follow the manufacturer's instrument instructions when you operate the test equipment.

A. Calibrate the Eddy Current Instrument as follows:

(1) Connect the SDP.7–50H–4L spot probe with cable P2D–4L6–R to the eddy current instrument.

(2) Turn the instrument [ON]. Adjust and set the instrument controls as shown in Table 4 Calibration Data, Instrument Settings.

(3) Center the spot probe over the notch free fastener of CRS EXMM100–50101–013. (Refer to Figure 14, Probe Position A (PPA)).

NOTE: Use a non–conductive circle template to center the probe over the fastener.

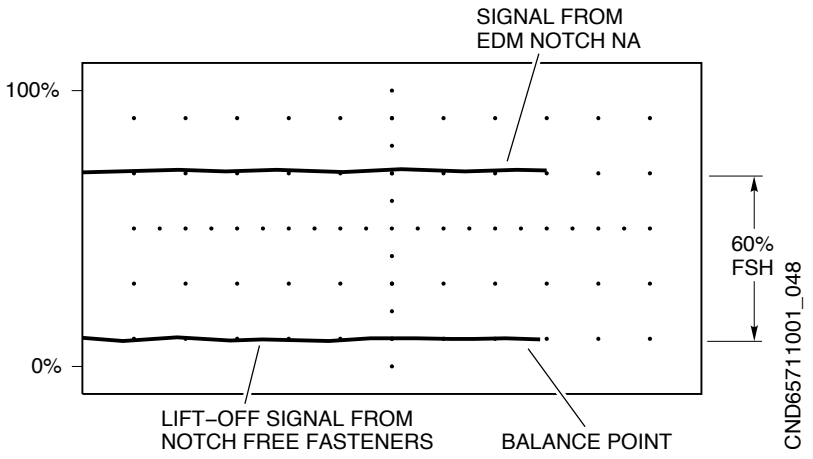
(4) Balance the eddy current instrument. Adjust the instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

(5) Center the spot probe over the fastener containing the EDM notch NA of CRS EXMM100–50101–013. (Refer to Figure 14, Probe Position B (PPB)).

(6) Adjust the instrument sensitivity [GAIN] to obtain a lift–off signal from EDM notch NA as shown in Table 4 Calibration Data Screen Display.

(7) If the inspection area is painted, carry out the lift–off compensation prior to inspection. Refer to paragraph 20.B.

Table 4 – Calibration Data

Instrument Settings		Screen Display
Mode	REFL, Ch 1	
Display	XY	
View	Ch 1	
Ch 1 Frequency	1.2 kHz	
Ch 1 Phase	248.0°	
Ch 1 Gain	59 dB	
Ch 1 X;Y	X –8 dB	
Hi–Pass	DC	
Lo–Pass	30 Hz	
Balance Load	–	
X–Pos	40	
Y–Pos	–40	

NOTE: The instrument settings listed may vary from instrument to instrument.

B. Lift–Off Compensation Calibration

(1) After calibration as outlined in paragraph 20.A. put the probe (coil) perpendicular to the inspection surface. DO NOT balance the instrument.

(2) Compare the screen displays between the operating point on the inspection surface and the balance point on the CRS.

(3) If the operating point on the inspection surface matches the balance point on the CRS, no compensation for paint thickness is required. Proceed to the inspection procedure.

(4) If the operating point on the inspection area does not match the balance point on the CRS, but has moved to the left, compensation for the paint thickness is required. Do as follows:

(a) Attach a strip of non–conductive tape or shim to cover the CRS surface including the EDM notches.

(b) Put the probe (coil) flat and firmly to the skin surface of the CRS. Rebalance the instrument. Compare the operating point on the inspection surface to the balance point on the CRS.

(c) If the operating point on the inspection surface is to the left of the balance point on the CRS, add an additional strip of tape or shim until the balance point on the CRS matches the inspection area.

(d) If the operating point on the inspection surface is to the right of the balance point on the CRS covered with tape, remove a strip of tape or shim until the balance point on the CRS matches the inspection area.

(e) If lift–off compensation and calibration requirements cannot be met, remove the paint or coating prior to inspection.

(5) Center the probe over the fastener with EDM notch NA covered with tape on the CRS.

(6) Adjust the [GAIN] to obtain an eddy current amplitude signal from EDM NA as shown in Table 4 Screen Display.

(7) Proceed to the inspection procedure.

21. Inspection of Subsurface Cracks in the Rear Spar under the Door Land between WS331.35 and WS356.47 – Small Fasteners:

NOTE: The inspection is carried out from the wing exterior.

Instrument calibration verification intervals

- Every 15 minutes of continuous operation.
- When a set–up parameter, and/or equipment i.e. probe change.
- When the inspection is completed.
- When the amplitude of the calibration signal has varied, recalibrate the instrument and repeat the inspection again at all locations from the last valid calibration.
- Make sure that the operation point is on the screen display at all times.

Make sure that the inspection surface is well illuminated i.e. clearly visible.

A. After calibration as outlined in paragraph 20 put the probe on the wing panel lower surface, centered over the initial small fastener to be inspected that is common to the door land. (Refer to Figure 7, Sheet 5, Detail H) for inspection area and typical probe position.

B. Compare the position of the operating point with the signals used for calibration on both the EDM notched and notch free locations.

C. Repeat paragraphs 21.A. and 21.B. for the remaining small fasteners to be inspected common to the door land between WS331.35 and WS356.47. (Refer to Figure 7, Sheet 5, Detail H) for inspection areas and typical probe position.

D. Refer to paragraph 26 for indication evaluation and to paragraph 27 for Acceptance or Rejection Criteria.

22. Equipment Calibration for the Inspection of Subsurface Cracks in the Rear Spar under the Door Land at WS331.35 – Large Fasteners:

NOTE: Make sure that you follow the manufacturer's instrument instructions when you operate the test equipment.

A. Calibrate the eddy current instrument as follows:

(1) Connect the SDP.7–50H–4L spot probe with cable P2D–4L6–R to the eddy current instrument.

(2) Turn the instrument [ON]. Adjust and set the instrument controls as shown in Table 6 Calibration Data, Instrument Settings.

(3) Center the spot probe over the notch free fastener of CRS EXMM100–50101–011. (Refer to Figure 12, Probe Position A (PPA)).

NOTE: Use a non–conductive circle template to help center the probe over the fastener.

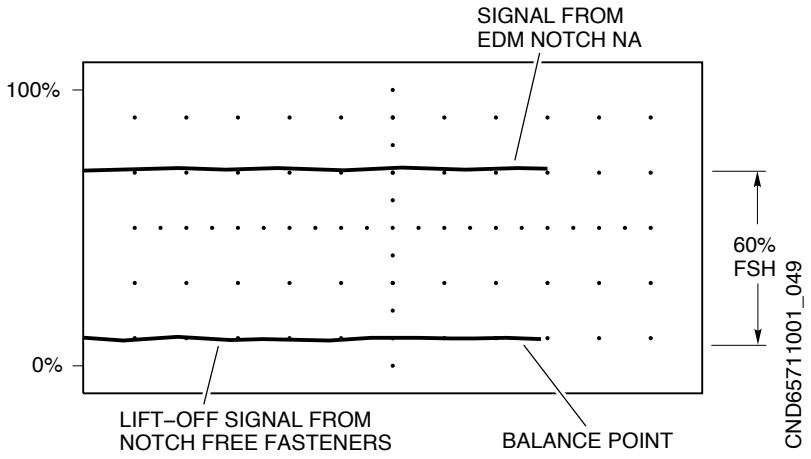
(4) Balance the eddy current instrument. Adjust the instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

(5) Center the spot probe over the fastener containing the EDM notch NA of CRS EXMM100–50101–011. (Refer to Figure 12, Probe Position B (PPB)).

(6) Adjust the instrument sensitivity [GAIN] to obtain a lift–off signal from EDM notch NA as shown in Table 5 Calibration Data Screen Display.

(7) If the inspection area is painted, carry out the lift–off compensation prior to inspection. Refer to paragraph 22.B.

Table 5 – Calibration Data

Instrument Settings		Screen Display
Mode	REFL, Ch 1	
Display	XY	
View	Ch1	
Ch 1 Frequency	1.2 kHz	
Ch 1 Phase	248.0°	
Ch 1 Gain	59 dB	
Ch 1 X:Y	X –8 dB	
Hi–Pass	DC	
Lo–Pass	30 Hz	
Balance Load	–	
X–Pos	40	
Y–Pos	–40	

NOTE: The instrument settings listed may vary from instrument to instrument.

B. Lift–Off Compensation Calibration:

(1) After calibration as outlined in paragraph 22.A. put the probe (coil) perpendicular to the inspection surface. DO NOT balance the instrument.

(2) Compare the screen displays between the operating point on the inspection surface and the balance point on the CRS.

(3) If the operating point on the inspection surface matches the balance point on the CRS, no compensation for paint thickness is required. Proceed to the inspection procedure.

(4) If the operating point on the inspection area does not match the balance point on the CRS, but has moved to the left, compensation for the paint thickness is required. Do as follows:

(a) Attach a strip of nonconductive tape or shim to cover the CRS surface including the EDM notches.

(b) Put the probe (coil) flat and firmly to the skin surface of the CRS. Rebalance the instrument. Compare the operating point on the inspection surface to the balance point on the CRS.

(c) If the operating point on the inspection surface is to the left of the balance point on the CRS, add an additional strip of tape or shim until the balance point on the CRS matches the inspection area.

(d) If the operating point on the inspection surface is to the right of the balance point on the CRS covered with tape, remove a strip of tape or shim until the balance point on the CRS matches the inspection area.

(e) If lift–off compensation and calibration requirements cannot be met, remove the paint or coating prior to inspection.

(5) Center the probe over the fastener with EDM notch NA covered with tape on the CRS.

(6) Adjust the [GAIN] to obtain an eddy current amplitude signal from EDM NA as shown in Table 5 Screen Display.

(7) Proceed to the inspection procedure.

23. Inspection of Subsurface Cracks in the Rear Spar under the Door Land at WS331.35 – Large Fasteners

NOTE: The inspection is carried out from the wing exterior.

Instrument calibration verification intervals

- Every 15 minutes of continuous operation.
- When a set–up parameter, and/or equipment i.e. probe change.
- When the inspection is completed.
- When the amplitude of the calibration signal has varied, recalibrate the instrument and repeat the inspection again at all locations from the last valid calibration.
- Make sure the operation point is on the screen display at all times.

Make sure that the inspection surface is well illuminated i.e clearly visible.

A. After calibration as outlined in paragraph 22 put the probe on the wing panel lower surface, centered over the initial large door land fastener to be inspected. (Refer to Figure 7, Sheet 4, Detail F) for inspection areas and typical probe position.

B. Compare the position of the operating point with the signals used for calibration on both the EDM notched and notch free locations.

C. Repeat paragraphs 23.A. and 23.B. for the remaining large door land fastener to be inspected at WS 331.35. (Refer to Figure 7, Sheet 4, Detail F) for inspection areas and typical probe position.

D. Refer to paragraph 26 for indication evaluation and to paragraph 27 for acceptance or rejection criteria.

24. Equipment Calibration for the Inspection of Subsurface Cracks in the Rear Spar under the Door Land at WS331.35 – Small Fasteners

NOTE: Make sure that you follow the manufacturers instrument instructions when you operate the test equipment.

A. Calibrate the eddy current instrument as follows:

(1) Connect the SDP.7–50H–4L spot probe with cable P2D–4L6–R to the eddy current instrument.

(2) Turn the instrument [ON]. Adjust and set the instrument controls as shown in Table 6 Calibration Data, Instrument Settings.

(3) Center the spot probe over the notch free fastener of CRS EXMM100–50101–019. (Refer to Figure 15, Probe Position A (PPA)).

NOTE: Use a non–conductive circle template to help center the probe over the fastener.

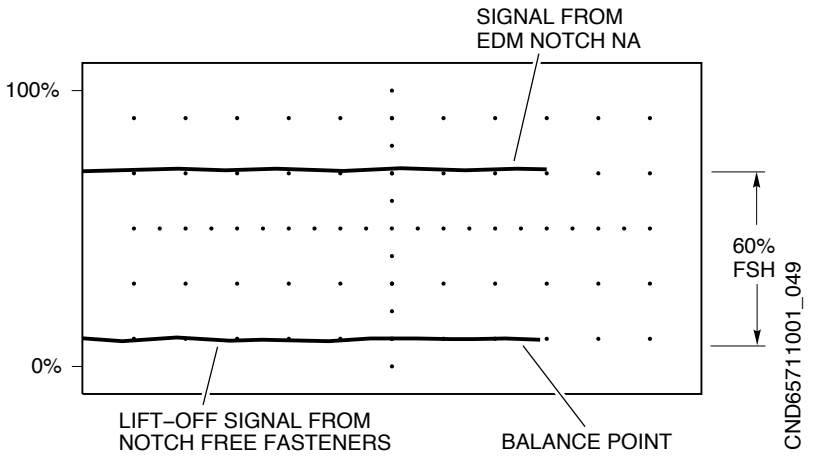
(4) Balance the eddy current instrument. Adjust the instrument [PHASE] control to obtain a horizontal lift–off signal moving from right–to–left (with increasing lift–off) across the screen display.

(5) Center the spot probe over the fastener containing the EDM notch NA of CRS EXMM100–50101–019. (Refer to Figure 15, Probe Position A (PPA)).

(6) Adjust the instrument sensitivity [GAIN] to obtain a lift–off signal from EDM notch NA as shown in Table 6 Calibration Data Screen Display.

(7) If the inspection area is painted, carry out the lift–off compensation prior to inspection. Refer to paragraph 24.B.

Table 6 – Calibration Data

Instrument Settings		Screen Display
Mode	REFL, Ch 1	
Display	XY	
View	Ch1	
Ch 1 Frequency	0.95 kHz	
Ch 1 Phase	78.0°	
Ch 1 Gain	74 dB	
Ch 1 X:Y	X –8 dB	
Hi–Pass	DC	
Lo–Pass	30 Hz	
Balance Load	–	
X–Pos	40	
Y–Pos	–40	

NOTE: The instrument settings listed may vary from instrument to instrument.

B. Lift–Off Compensation Calibration:

(1) After calibration as outlined in paragraph 24.A. put the probe (coil) perpendicular to the inspection surface. DO NOT balance the instrument.

(2) Compare the screen displays between the operating point on the inspection surface and the balance point on the CRS.

(3) If the operating point on the inspection surface matches the balance point on the CRS, no compensation for paint thickness is required. Proceed to the inspection procedure.

(4) If the operating point on the inspection area does not match the balance point on the CRS, but has moved to the left, compensation for the paint thickness is required. Do as follows:

(a) Attach a strip of nonconductive tape or shim to cover the CRS surface including the EDM notches.

(b) Put the probe (coil) flat and firmly to the skin surface of the CRS. Rebalance the instrument. Compare the operating point on the inspection surface to the balance point on the CRS.

(c) If the operating point on the inspection surface is left of the balance point on the CRS, add an additional strip of tape or shim until the balance point on the CRS matches the inspection area.

(d) If the operating point on the inspection surface is to the right of the balance point on the CRS covered with tape, remove a strip of tape or shim until the balance point on the CRS matches the inspection area.

(e) If lift–off compensation and calibration requirements cannot be met, remove the paint or coating prior to inspection.

(5) Center the probe over the fastener with EDM notch NA covered with tape on the CRS

(6) Adjust the [GAIN] to obtain an eddy current amplitude signal from EDM NA as shown in Table 6 Screen Display.

(7) Proceed to the inspection procedure.

25. Inspection of Subsurface Cracks in the Rear Spar under the Door Land at WS331.35 – Small Fasteners

NOTE: The inspection is carried out from the wing exterior

Instrument calibration verification intervals

- Every 15 minutes of continuous operation.
- When a setup parameter, and/or equipment i.e. probe change.
- When the inspection is completed.
- When the amplitude of the calibration signal has varied, re–calibrate the instrument and repeat the inspection again at all locations from the last valid calibration.
- Make sure the operation point is on the screen display at all times.

Make sure that the inspection surface is well illuminated i.e clearly visible.

A. After calibration as outlined in paragraph 24 put the probe on the wing panel lower surface, centered over the initial small door land fastener to be inspected. (Refer to Figure 7, Sheet 6, Detail J) for inspection areas and typical probe position.

B. Compare the position of the operating point with the signals used for calibration on both the EDM notched and notch free locations.

C. Repeat paragraphs 25.A. and 25.B. for the remaining small door land fastener to be inspected at WS 331.35. (Refer to Figure 7, Sheet 6, Detail J) for inspection areas and typical probe position.

26. Indication Evaluation

A. Any distinct vertical signal shifting that occurs when comparing to a notch free fastener signal is considered a suspect indication and is cause for further investigation.

B. Make sure that the indication is not caused by edge effect, abrupt change in geometry, localized variation in conductivity, permeability or other non–relevant factors.

C. Evaluate all suspect crack indications by comparing their lift–off signal, and vertical shift to the calibration EDM notch signal.

27. Acceptance or Rejection Criteria

A. Any distinct trace signal, which is equal or greater than the response from the EDM notch used for calibration as shown in the applicable screen display is classified as a crack and is cause for rejection.

28. Equipment Calibration for the Bolt Hole Eddy Current (BHEC) Inspection of the Rear Spar Web at the Main–Landing Gear (MLG) Attachment Fitting

NOTE: Make sure that you follow the manufacturer's instrument instructions when you operate the test equipment.

A. Calibrate the eddy current instrument as follows:

(1) Connect the rotary bolt–hole probe VMUR101X to the drive unit and connect the cable to the drive unit and the eddy current instrument.

(2) Adjust the probe collar to fit the 0.500 in (12.70 mm) diameter hole in the calibration reference standard EXMM100–50101–017. There should be a light positive drag while inserting and withdrawing the probe from the hole, but not too tight to cause excessive wear on the coil. (Refer to Figure 13).

(3) Do the phase angle calibration as follows:

(a) Set the instrument to the XY display mode.

(b) Set and adjust the instrument controls as noted in Table 7, Calibration Data, Instrument settings.

(c) Start the probe drive unit.

(d) Align and insert the probe in the 0.500 in (12.7 mm) diameter hole in the calibration reference standard EXMM100–50101–017 contains the 0.250 in (6.35 mm) deep EDM notch.

(e) Adjust the instrument Phase (Rotation) control to position in the EDM notch signal in the upward vertical direction. Refer to Table 7, Calibration Data, Screen Display.

(4) Do the sensitivity calibration as follows:

(a) Set the instrument to the YT display mode. Refer to Table 8 Calibration Data, Screen Display.

(b) Align and insert the probe in the 0.500 in (12.7 mm) diameter hole in the calibration reference standard contains the 0.250 in (6.35 mm) deep EDM notch. Maximize the signal from the notch and adjust the Gain control to give a 100% amplitude signal above the zero datum. Refer to Table 8, Calibration Data, Screen Display.

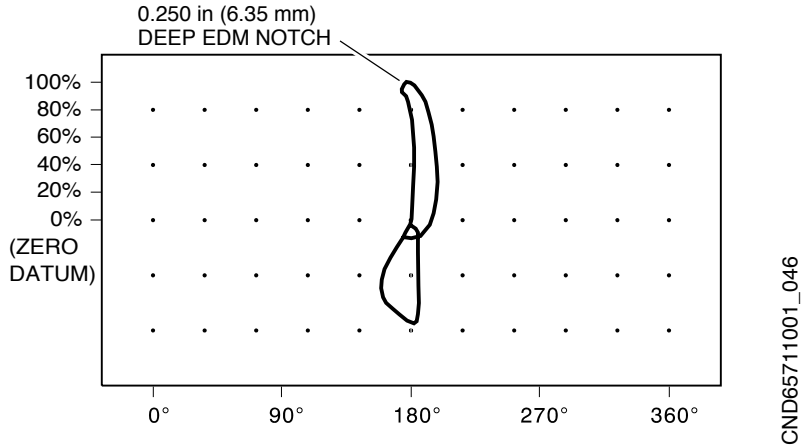
(c) Note the relative position of the drive unit with the notch at 180 degrees or at the center of the time base.

(d) Align and insert the probe in the notch–free the 0.500 in (12.7 mm) diameter hole in the calibration reference standard. When the probe goes over the edge, there should be two small signals parting left and right from the screen display center when crossing the interface between the MLG fitting and the Rear Spar Web. Refer to Table 9. The wavy signal will disappear when the probe coil is on constant material. Make sure that the noise level does not exceed 10% above the zero datum.

Table 7 – Calibration Data

Instrument Settings	
ROTARY	33A100
RPM	1500
Display	XY
Frequency	500 kHz
Phase	270.0°
Gain	33.0 dB
X:Y	0.0 dB
Hi–Pass	100 Hz
Lo–Pass	1500 Hz
Balance Load	–
X–Pos	0
Y–Pos	0

Screen Display

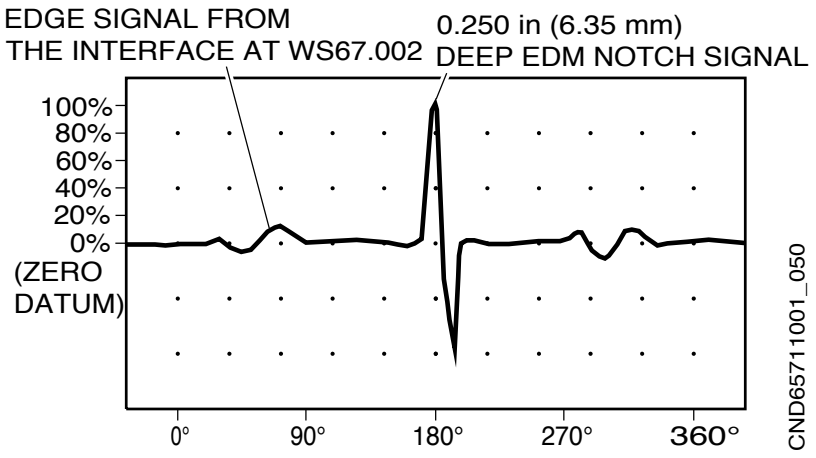


NOTE: The instrument settings listed may vary from instrument to instrument.

Table 8 – Calibration Data

Instrument Settings	
ROTARY	33A100
RPM	1500
Display	YT
Frequency	500 kHz
Phase	270.0°
Gain	33.0 dB
X:Y	0.0 dB
Hi–Pass	100 Hz
Lo–Pass	1500 Hz
Balance Load	–
X–Pos	0
Y–Pos	0

Screen Display

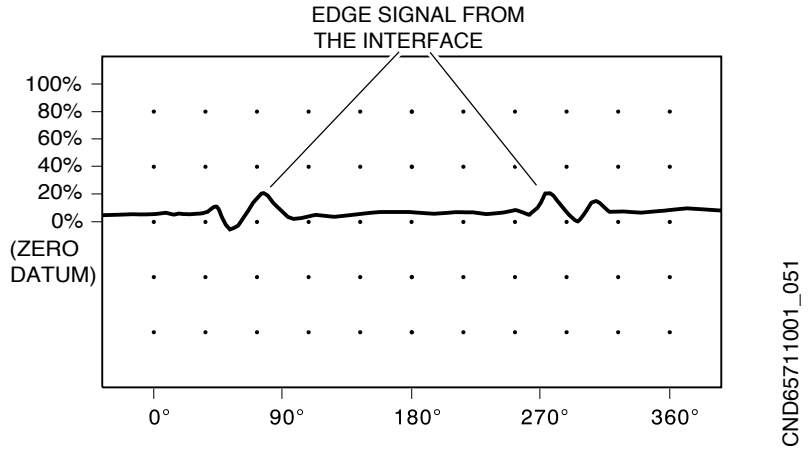


NOTE: The instrument settings listed may vary from instrument to instrument.

Table 9 – Calibration Data

Instrument Settings	
ROTARY	33A100
RPM	1500
Display	YT
Frequency	500 kHz
Phase	270.0°
Gain	33.0 dB
X:Y	0.0 dB
Hi–Pass	100 Hz
Lo–Pass	1500 Hz
Balance Load	–
X–Pos	0
Y–Pos	0

Screen Display



NOTE: The instrument settings listed may vary from instrument to instrument.

29. Inspection of the Rear Spar Web at the Main–Landing–Gear (MLG) Attachment Fitting:

NOTE: Monitor the screen display carefully at all times and make a note of all distinct relevant indications. Include the screen height of each signal and its relative location on the part.

Instrument calibration verification intervals

- Every 15 minutes of continuous operation.
- When a set–up parameter, and/or equipment i.e. probe change.
- When the inspection is completed.
- When the amplitude of the calibration signal has varied, recalibrate the instrument and repeat the inspection again at all locations from the last valid calibration.

Make sure that the inspection surface is well illuminated i.e clearly visible.

A. After calibration as outlined in paragraph 28, if necessary, re–adjust the probe diameter to fit the initial attachment hole at WS67.02. (Refer to Figure 8, Sheet 1, Detail A) for inspection area.

B. Align the rotating probe with the hole to be inspected. Slowly and carefully insert the probe into the hole until the entire surface of the rear spar (3) has been inspected.

C. Rotate the probe drive unit 90 degrees and repeat the inspection.

D. Carefully withdraw the probe from the hole.

E. Note all vertical deflection indication 50% or greater above the time base, the probe depth and the zero datum for determination of its depth and direction.

CAUTION: INSTALL THE NEW MLG ATTACHMENT FITTING BOLT, WASHER AND NUT BEFORE THE SECOND BOLT IS REMOVED.

F. Wet install and torque the new MLG attachment fitting bolt. (SPM–MM 51–23–00–390–809 and SPM–MM 20–21–00–910–801).

G. Repeat paragraphs 29.A to 29.E for the second MLG attachment fitting hole. (Refer to Figure 8, Sheet 1, Detail A) for inspection area.

30. Indication Evaluation:

A. Make sure that the indication is not caused by the parts interface.

B. To determine the depth of the indicated cracks parallel to the bore axis, do as follows:

(1) Align and insert the rotating probe slowly and carefully into the hole containing the crack indication until a maximized vertical signal from the crack is displayed on the screen display. Adjust the Gain control to obtain a 100% FSH vertical signal from the crack.

(2) Feed the probe through the hole until a 25% FSH vertical signal is displayed. This is the threshold for establish the ends (start and finish) of the crack. Make a mark on the probe shaft to indicate the finish point of the crack.

(3) Slowly withdraw the probe from the hole until a 25% FSH vertical signal is displayed. Mark on the shaft of the probe to identify the start point of the crack.

(4) Measure the distance between the start and the finish points on the shaft of the probe. This is the total length of the crack.

(5) Measure the distance between the start point (found in paragraph 30.B.(3)) and the center of the coil. This is the depth at which the crack starts.

C. To determine the location of the indicated cracks on the circumference of the hole, do as follows:

(1) With the probe rotating in the hole, turn the probe drive unit until the crack indication signal is displayed at 180 degrees on the screen display.

(2) The crack location is relative to the position of the drive unit. Refer to paragraph 28.A.(4).(c).

31. Acceptance or Rejection Criteria:

A. Any distinct vertical deflection signal, which equals 50% or greater than the response from the EDM notch as shown in Table 8 is classified as a crack and is cause for rejection.

32. Reporting

A. Record and report all rejections to Bombardier Aerospace by e–mail at:

SRPSA@aero.bombardier.com (preferred) or

Contact Bombardier Aerospace by phone at:

Customer Response Center (CRC):

Local and International: 514–855–2999

North America only: 1–866–JET–1247 (1–866–538–1247) Toll Free.

33. Close Out

A. If the finish on the inspection area was removed, replace the finish (SRM Chapter 51–01–00).

B. Wet install the MLG attachment fitting bolt, washer and nut removed for the bolt hole inspection with new items. (SPM–MM 51–23–00–390–809) (AMM TASK 57–51–07–961–801).

C. Remove all equipment, tools and unwanted materials from the work area.

D. Install the main landing gear auxiliary actuator access panel (581BT/681BT). (AMM TASK 57–52–01–400–803).

E. Extend the main landing gear (AMM TASK 32–30–00–910–801).

F. Reconnect the connecting rod from the main landing gear door (AMM TASK 32–12–09–400–801).

G. Reapply sealant around all fasteners identified for inspection (SRM Chapter 51–23–04).

H. Install the collector tank access panels (161AZ/162AZ) (AMM TASK 28–11–03–400–801).

I. Install the aileron control surfaces (AMM TASK 27–11–17–400–801).

J. Install the aileron control access panels (531SB/631SB) (AMM TASK 57–20–01–400–801).

K. Install the surge tank access panels (531RB/631RB) (AMM TASK 28–11–02–400–801).

L. Install the access panels that follow AMM TASK 28–11–01–400–801:

ACCESS	DESIGNATION
161AB/162AB, 161BB/162BB	Access Panel, Center Wing Box
531AB, 531BB, 531CB, 531DB, 531FB, 531KB, 531NB	Access Panel, Wing Box, Left
631AB, 631BB, 631CB, 631DB, 631FB, 631KB, 631NB	Access Panel, Wing Box, Right

M. Install the trailing–edge aileron–area closure–panels (from 551AB/651AB to 551BB/651AB) (AMM TASK 57–52–01–400–802).

N. Install the trailing edge access panels (from 571AB/671AB to 571FB/671FB) (AMM TASK 57–52–01–400–801).

O. Install the access panels (554AB/654AB) (AMM TASK 57–52–01–400–805).

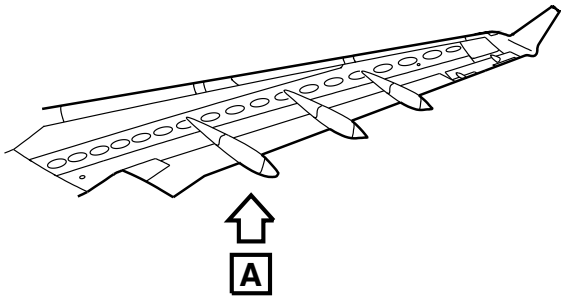
P. Install the MLG auxiliary actuator access panels (581BT/681BT) (AMM TASK 57–52–01–400–803).

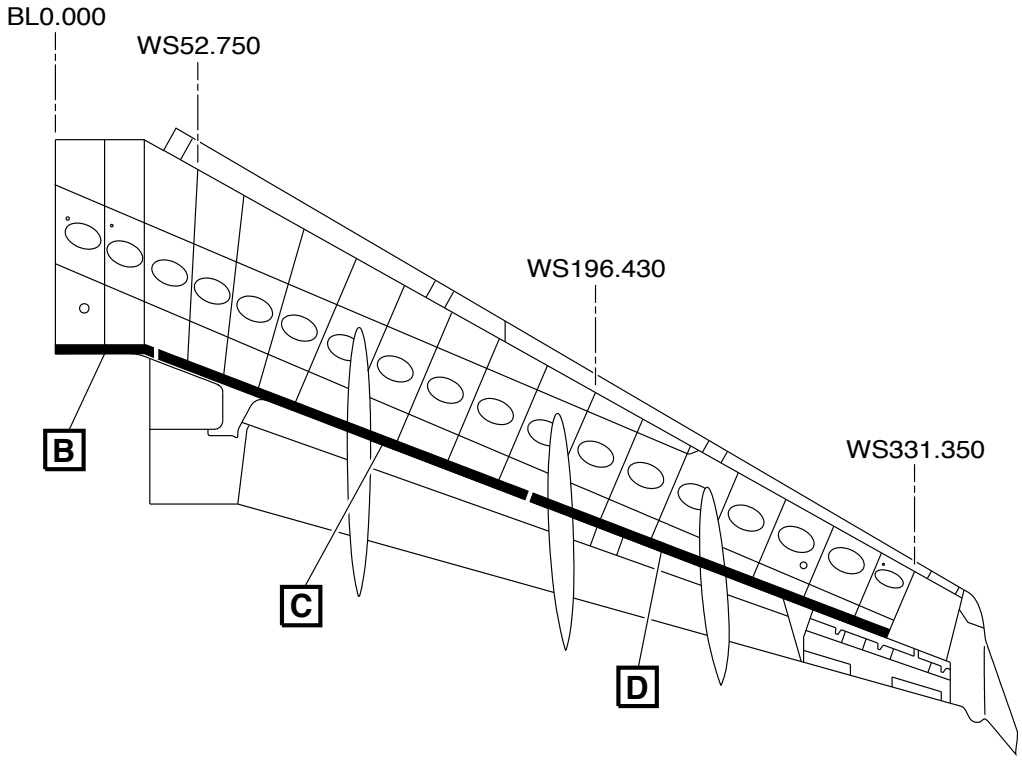
Q. Install the wheel bin assemblies (171BZ/172BZ) (AMM TASK 53–32–01–400–801).

R. Install the forward under wing fairing (182AA) (AMM TASK 53–63–05–400–801).

S. Lower the aircraft on the ground (AMM TASK 07–10–01–586–801).

T. Refuel the aircraft (AMM TASK 12–11–01–650–801).





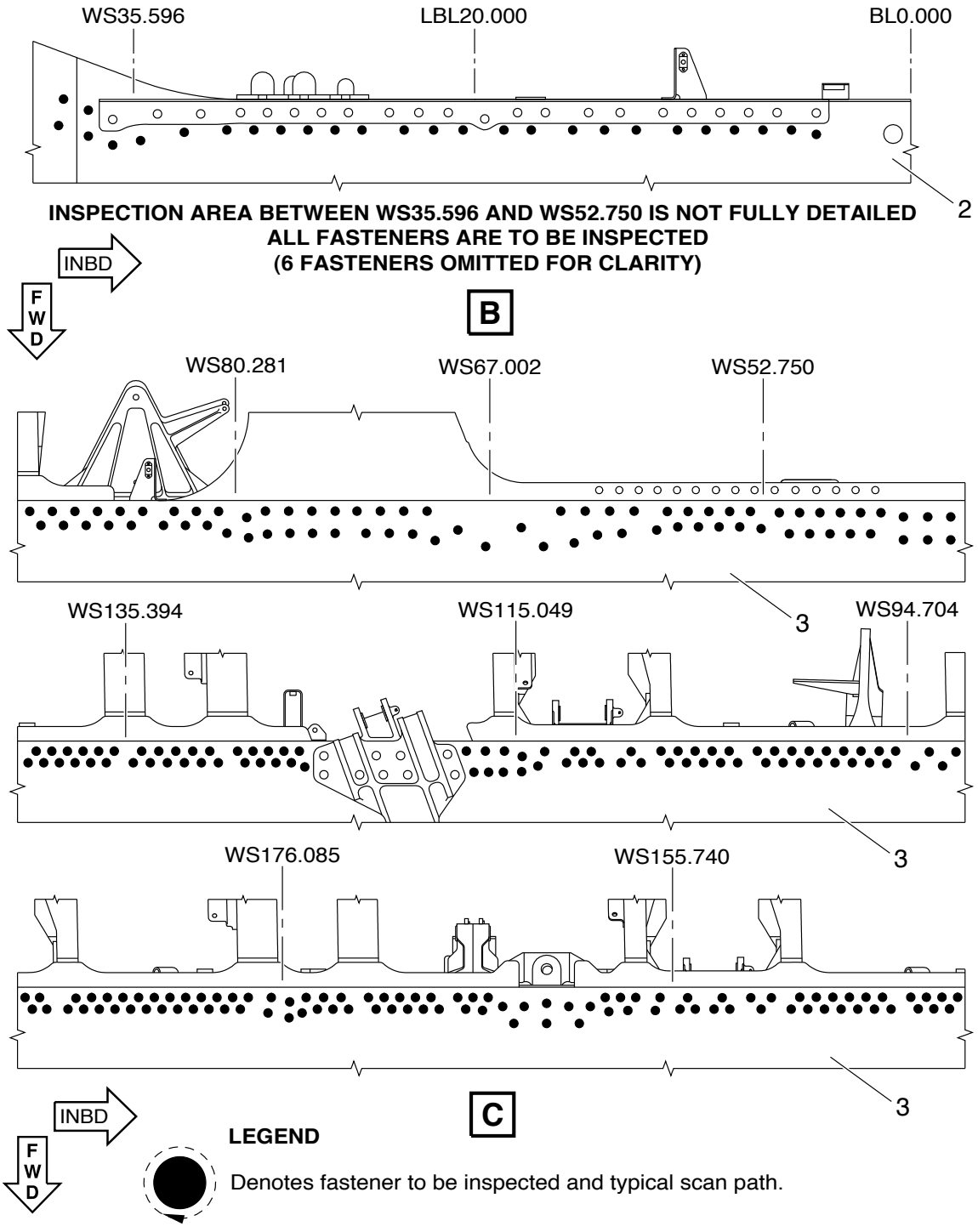
VIEW LOOKING UP

A

CND65711001_008

Surface Inspection of the Lower Aft Plank
Figure 1 (Sheet 1 of 3)

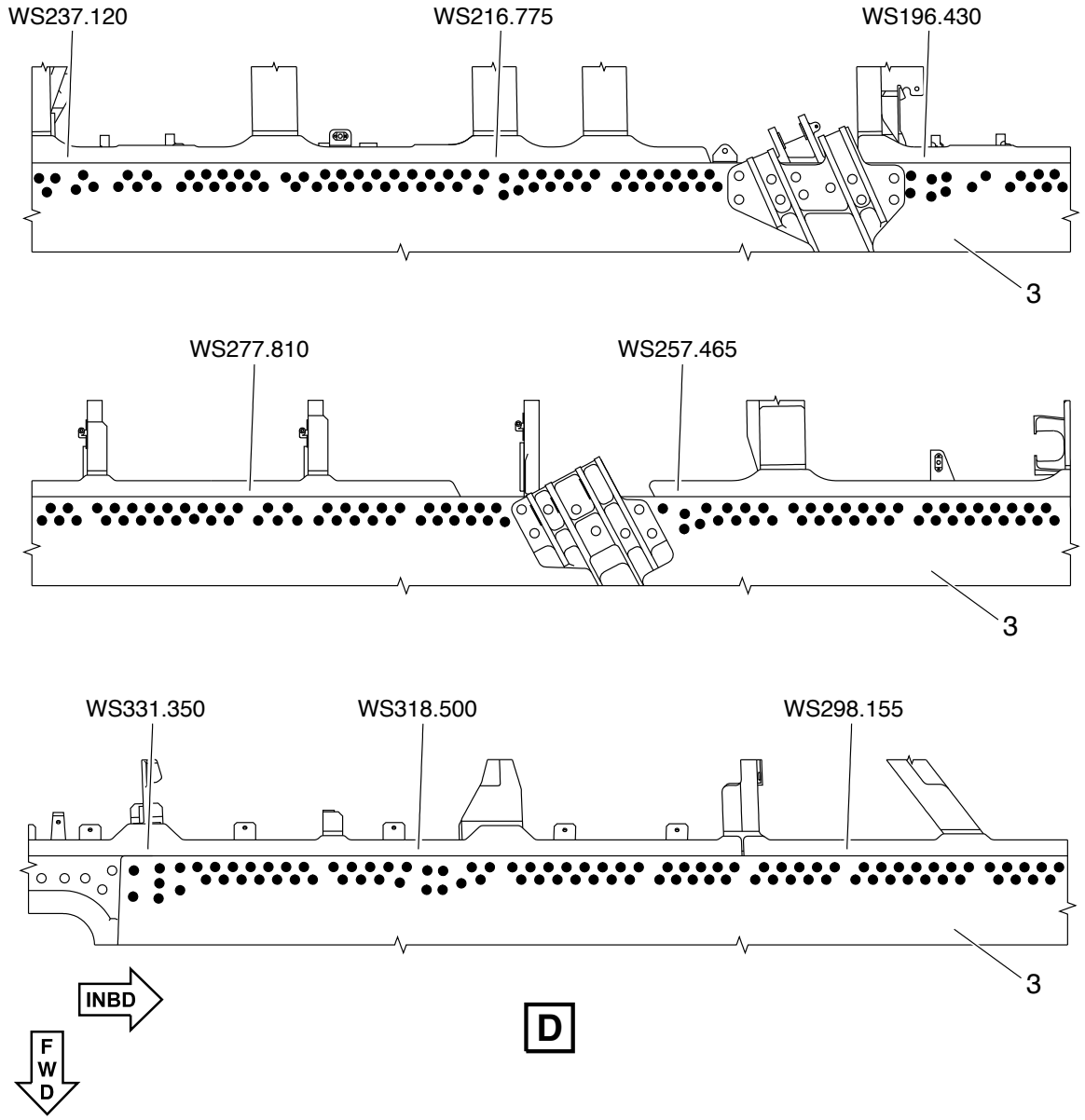
PART 6 – EDDY CURRENT



Surface Inspection of the Lower Aft Plank
Figure 1 (Sheet 2 of 3)

EFFECTIVITY: ALL

PART 6 – EDDY CURRENT



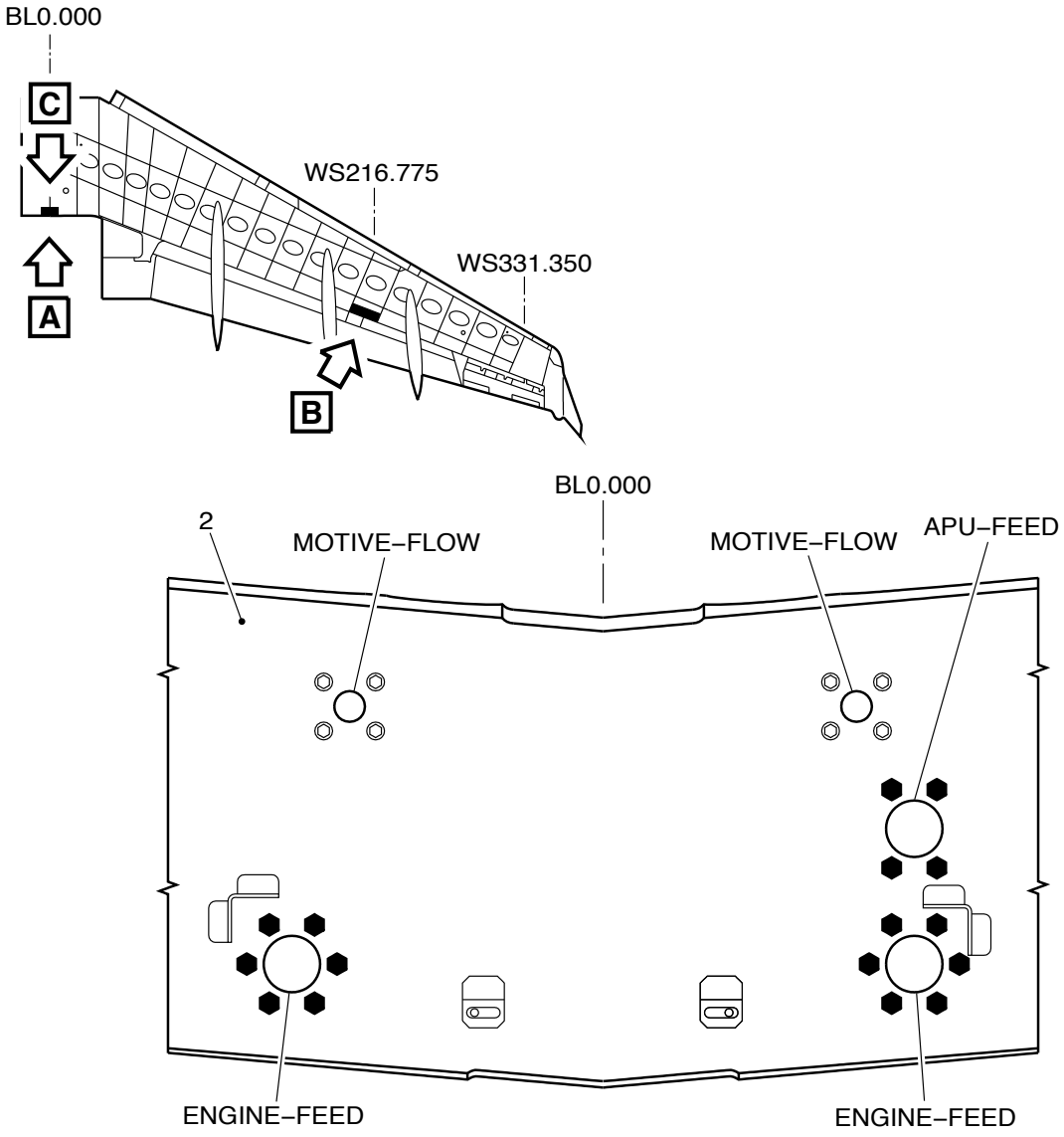
LEGEND

Denotes fastener to be inspected and typical scan path.

CND65711001_010

Surface Inspection of the Lower Aft Plank
Figure 1 (Sheet 3 of 3)

EFFECTIVITY: ALL



VIEW LOOKING FORWARD

A

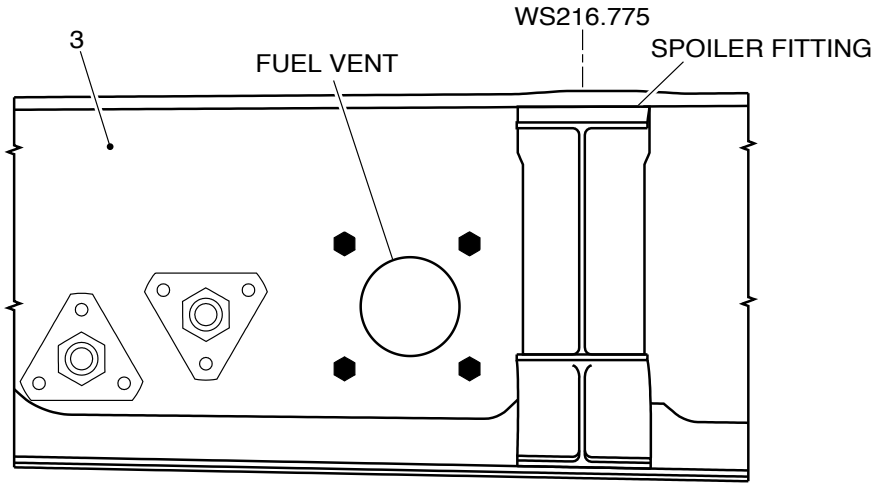
LEGEND

Denotes fastener and hole to be inspected and typical scan path.

CND65711001_028

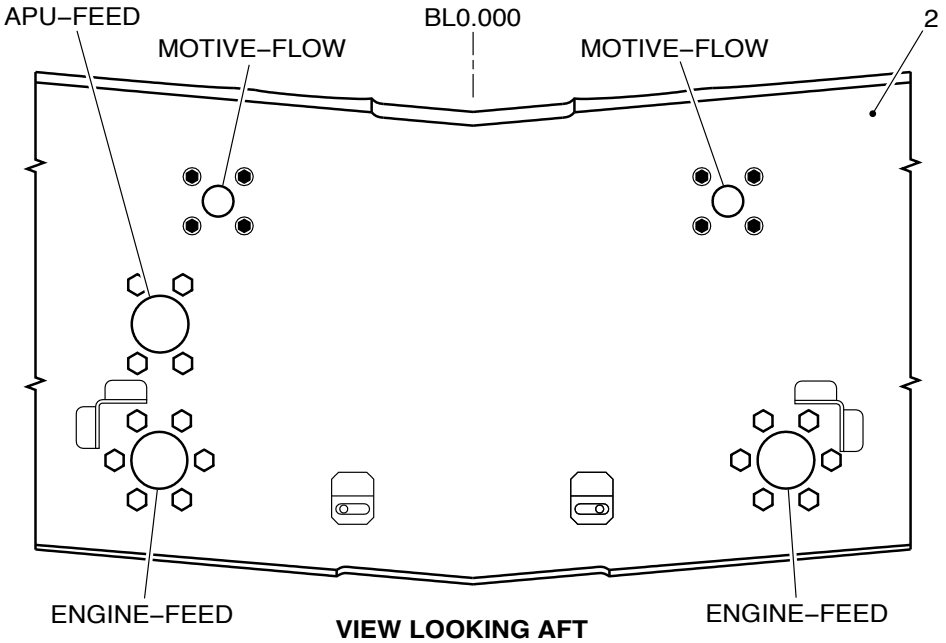
Surface Inspection of the Rear Spar Web System Holes and Cutouts
Figure 2 (Sheet 1 of 2)

PART 6 – EDDY CURRENT



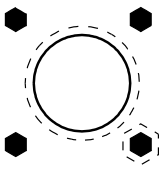
VIEW LOOKING FORWARD

B



VIEW LOOKING AFT

C



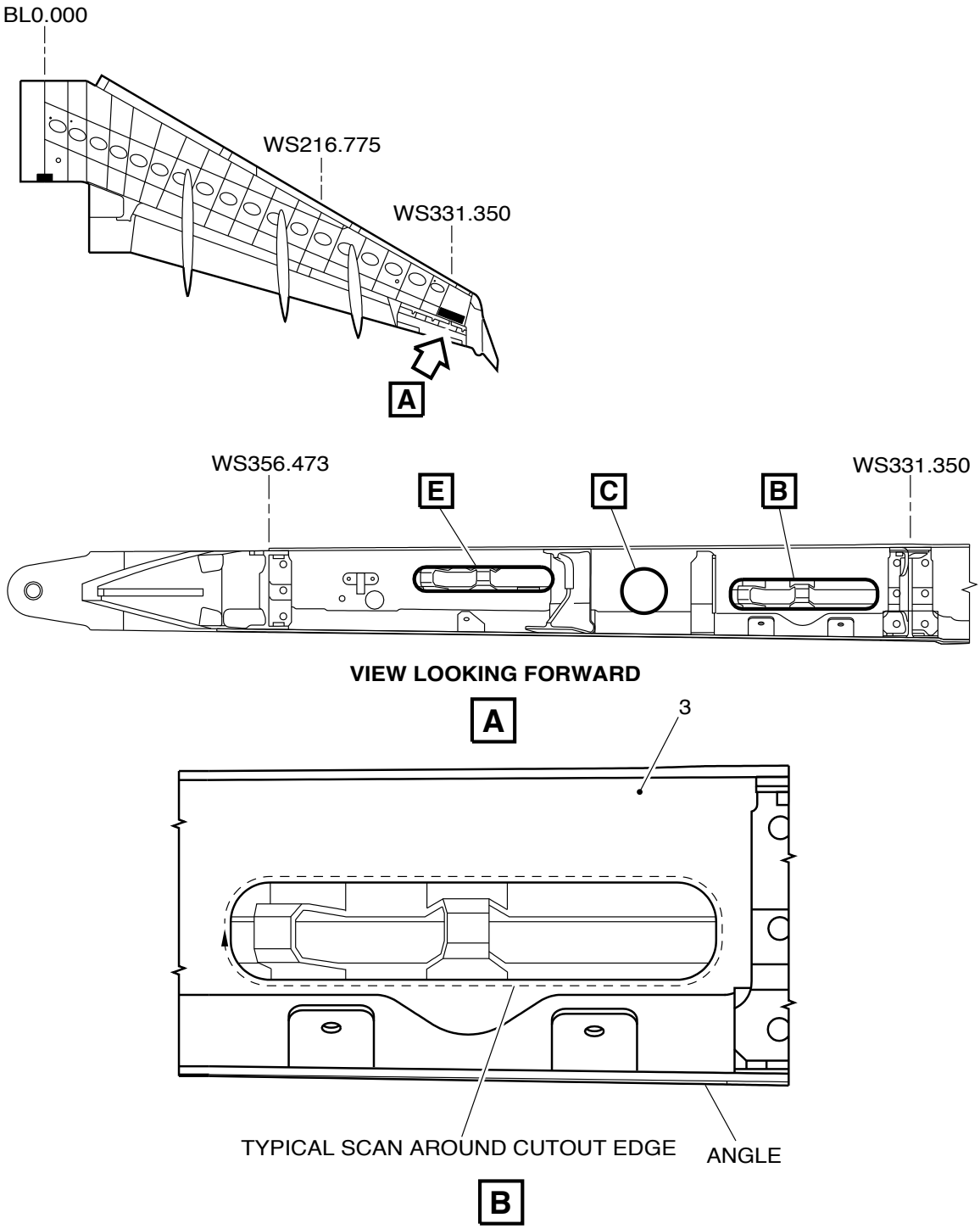
LEGEND

Denotes fastener and hole to be inspected and typical scan path.

CND65711001_029

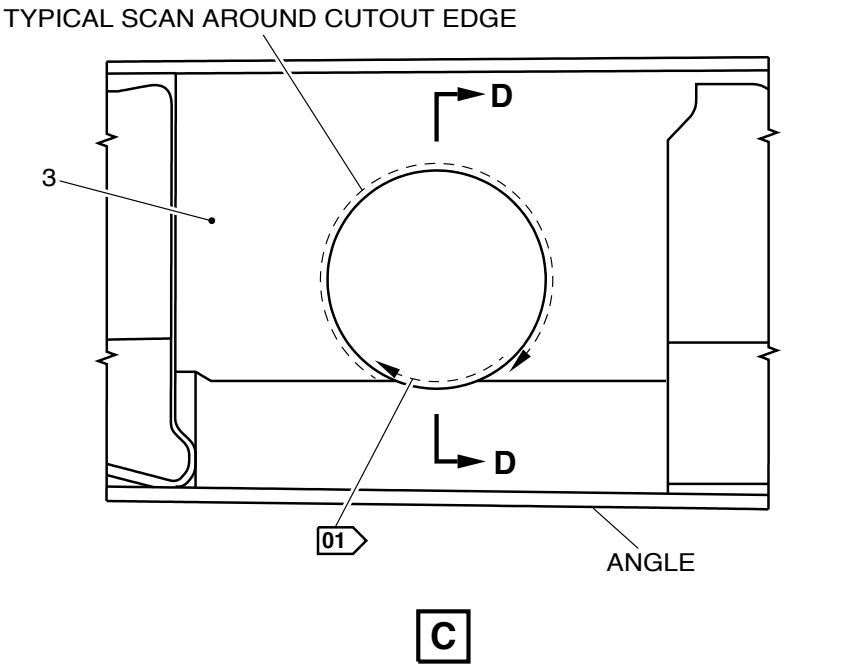
Surface Inspection of the Rear Spar Web System Holes and Cutouts
Figure 2 (Sheet 2 of 2)

PART 6 – EDDY CURRENT



Surface Inspection of the Rear Spar Web Aileron Cutouts
Figure 3 (Sheet 1 of 3)

EFFECTIVITY: ALL



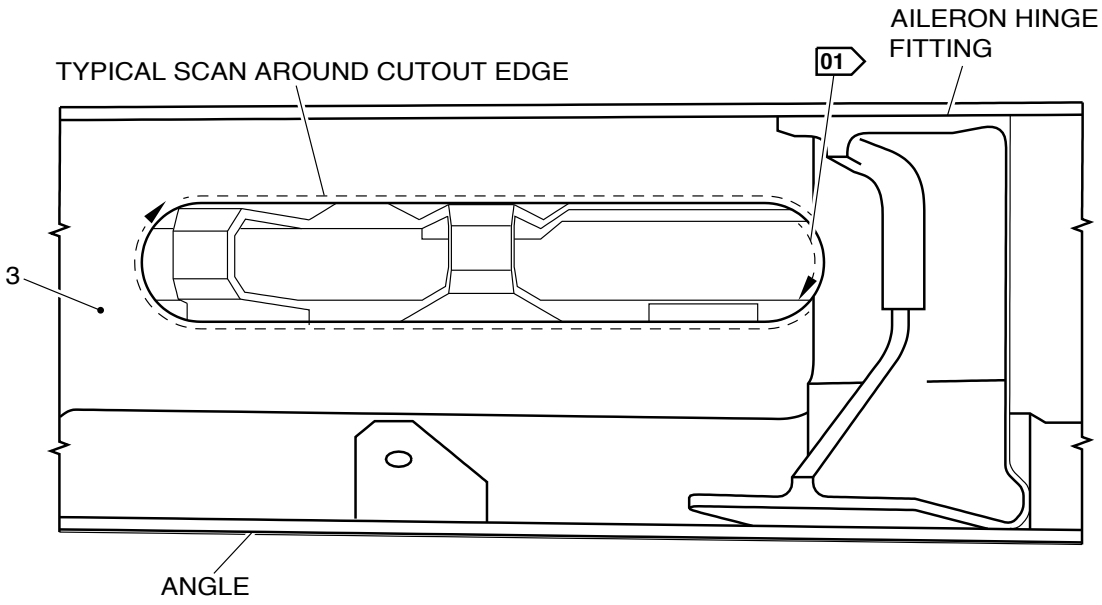
NOTE

01 Typical thickness scan where the rear spar is covered by the angle.

TYPICAL PROBE POSITION

D–D

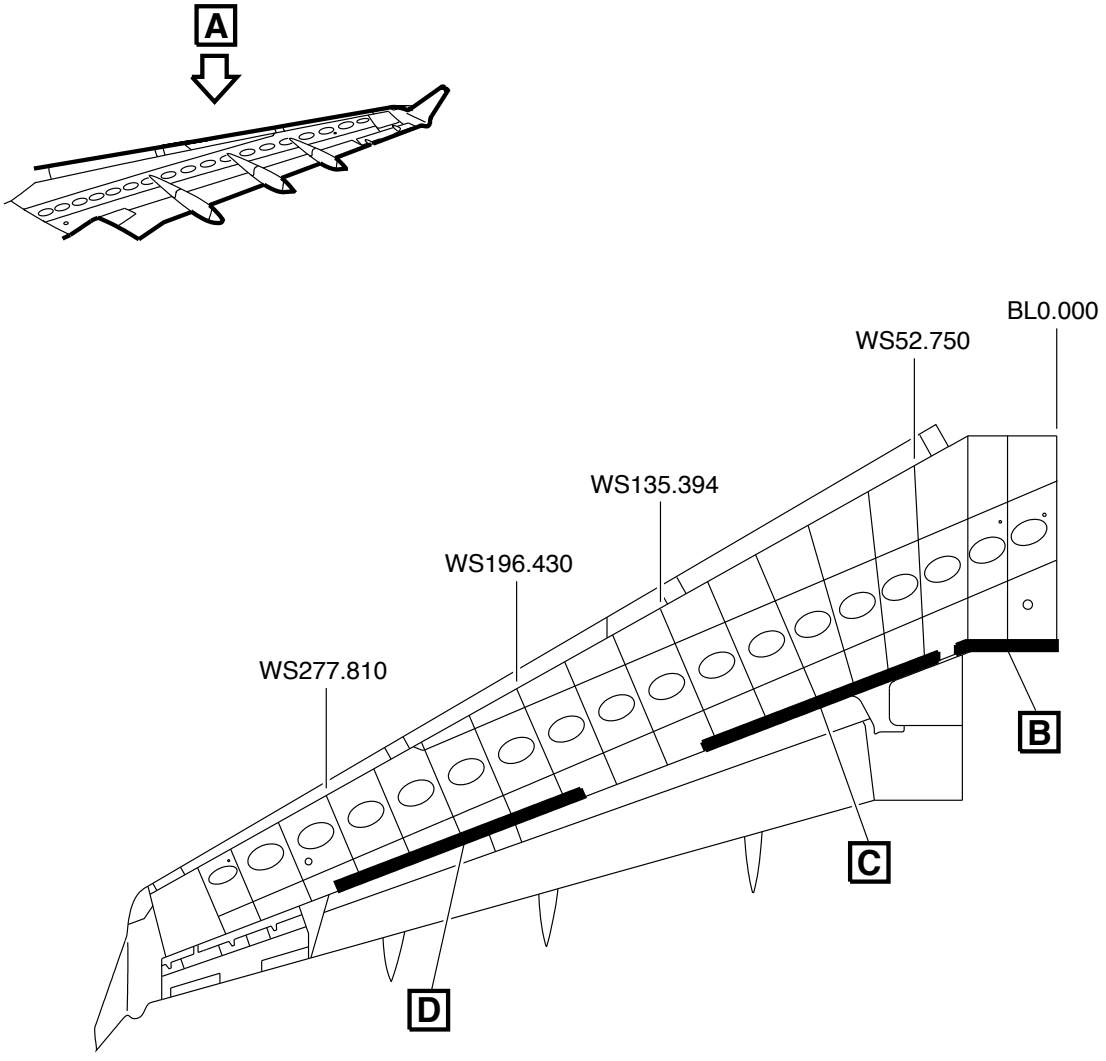
Surface Inspection of the Rear Spar Web Aileron Cutouts
Figure 3 (Sheet 2 of 3)



CND65711001_032

Surface Inspection of the Rear Spar Web Aileron Cutouts
Figure 3 (Sheet 3 of 3)

EFFECTIVITY: ALL



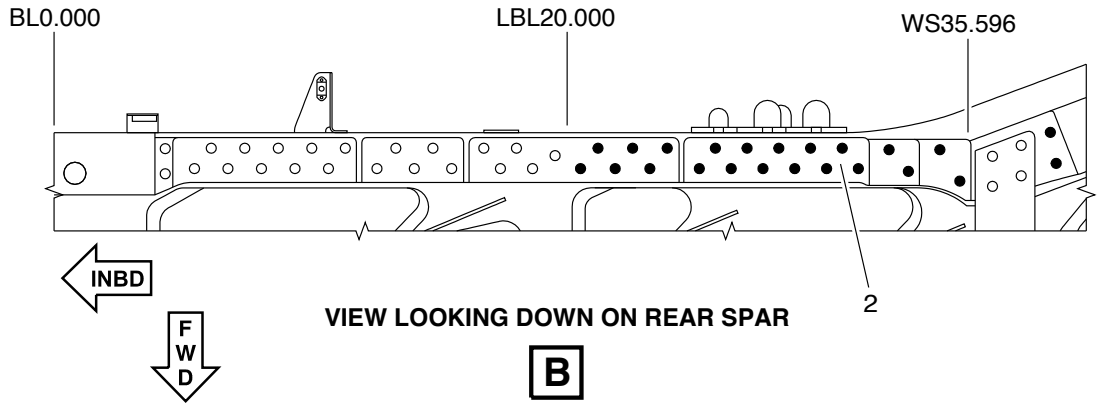
VIEW LOOKING DOWN
(UPPER PLANKS NOT SHOWN FOR CLARITY)

A

CND65711001_011

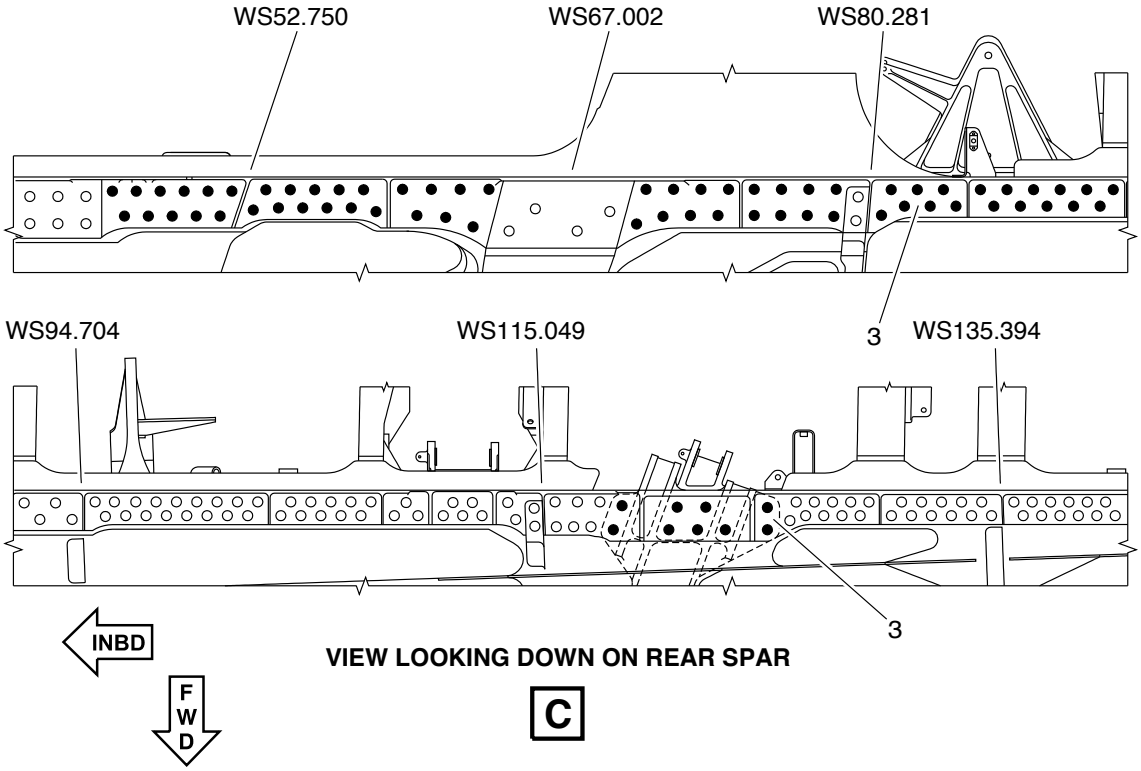
Surface Inspection of the Rear Spar Lower Cap
Figure 4 (Sheet 1 of 3)

PART 6 – EDDY CURRENT



VIEW LOOKING DOWN ON REAR SPAR

B



VIEW LOOKING DOWN ON REAR SPAR

C

CND65711001_012

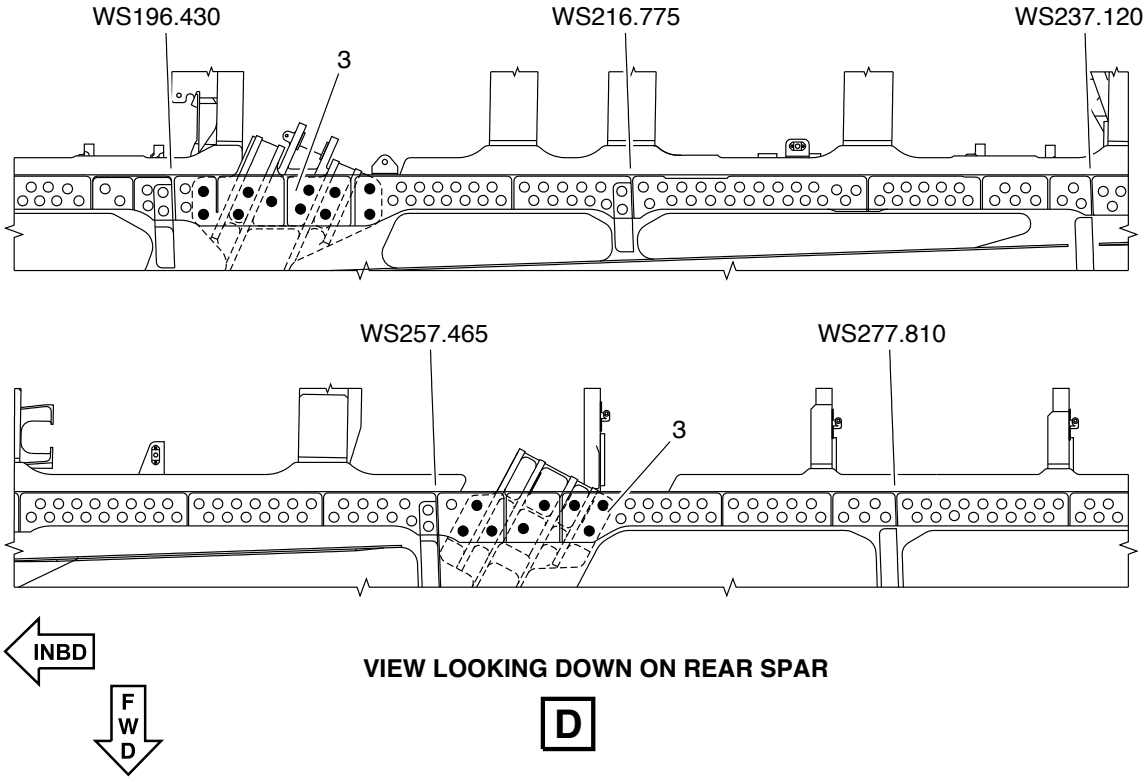
LEGEND

Denotes fastener to be inspected and typical scan path.

Surface Inspection of the Rear Spar Lower Cap
Figure 4 (Sheet 2 of 3)

EFFECTIVITY: ALL

PART 6 – EDDY CURRENT



VIEW LOOKING DOWN ON REAR SPAR

D

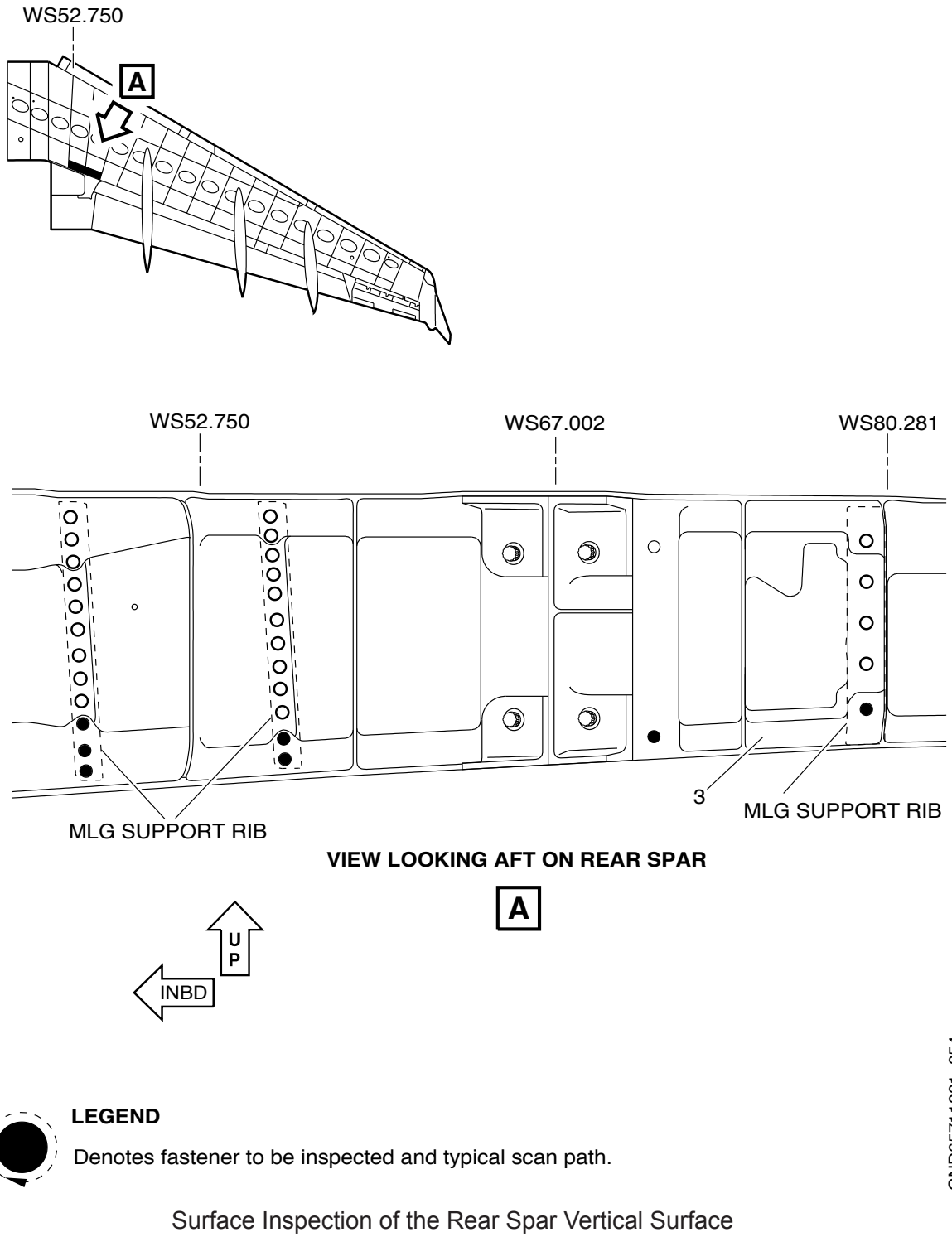
LEGEND

Denotes fastener to be inspected and typical scan path.

CND65711001_013

Surface Inspection of the Rear Spar Lower Cap
Figure 4 (Sheet 3 of 3)

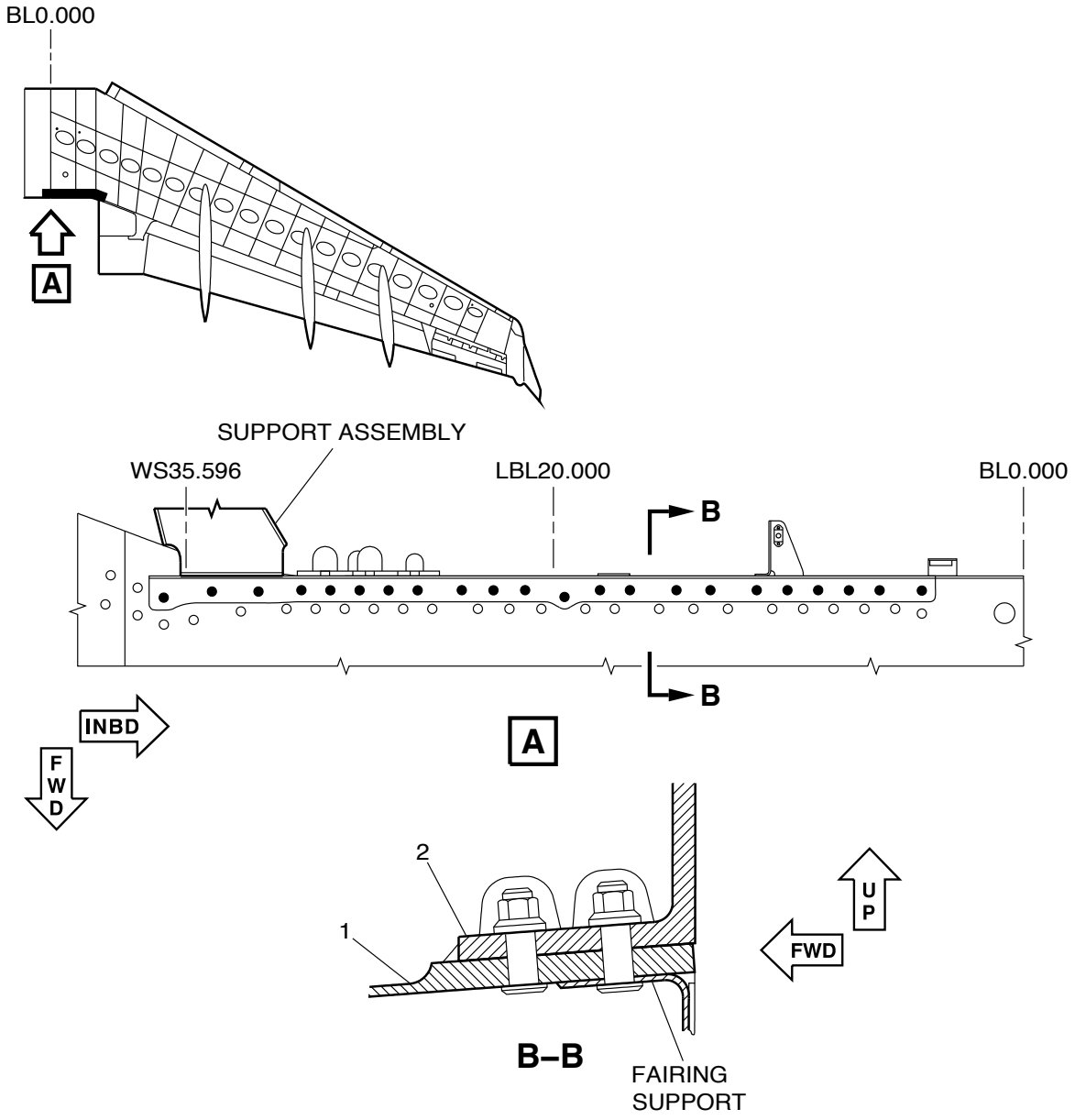
EFFECTIVITY: ALL



Surface Inspection of the Rear Spar Vertical Surface
Figure 5

EFFECTIVITY: ALL

PART 6 – EDDY CURRENT

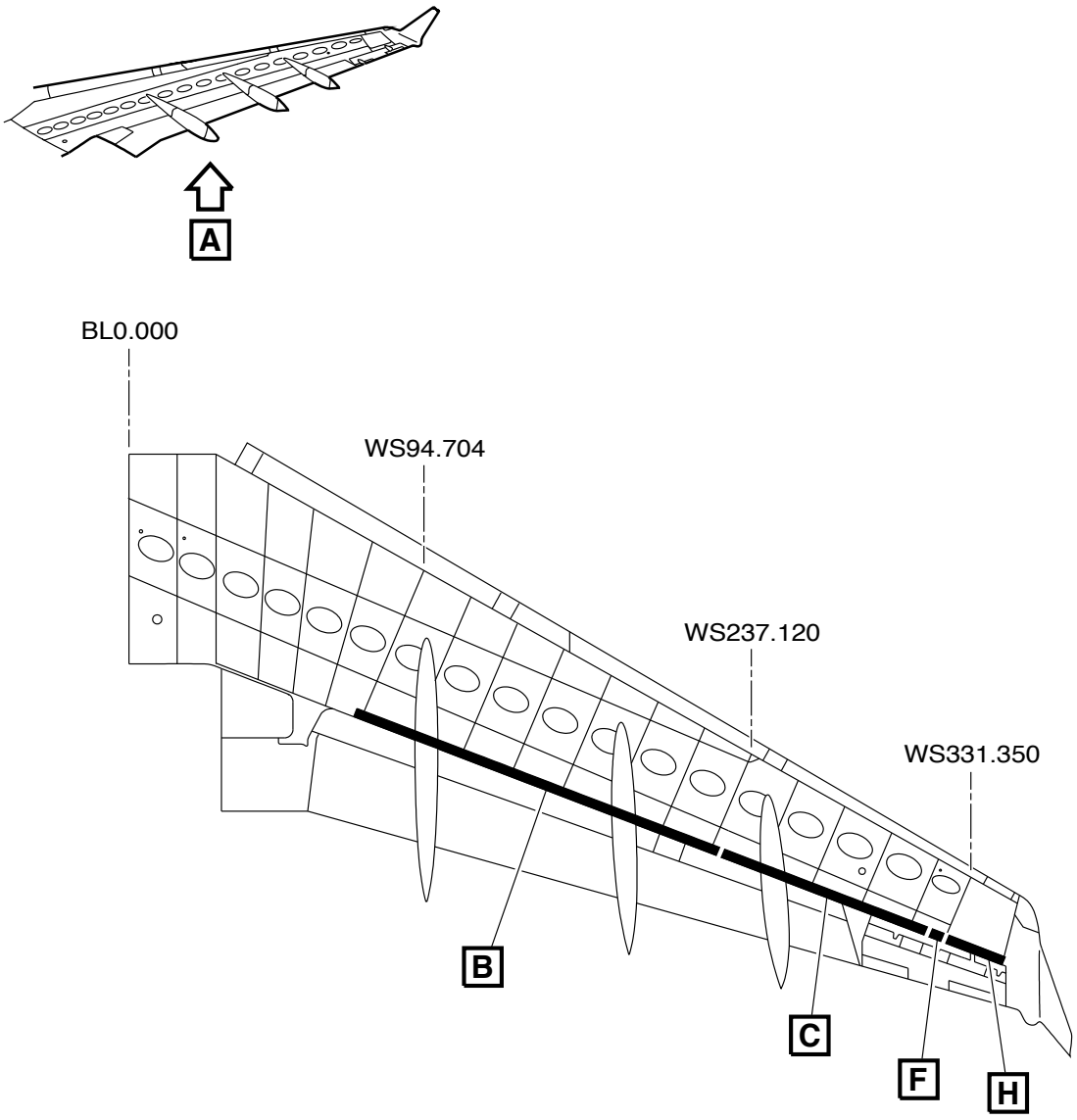


LEGEND

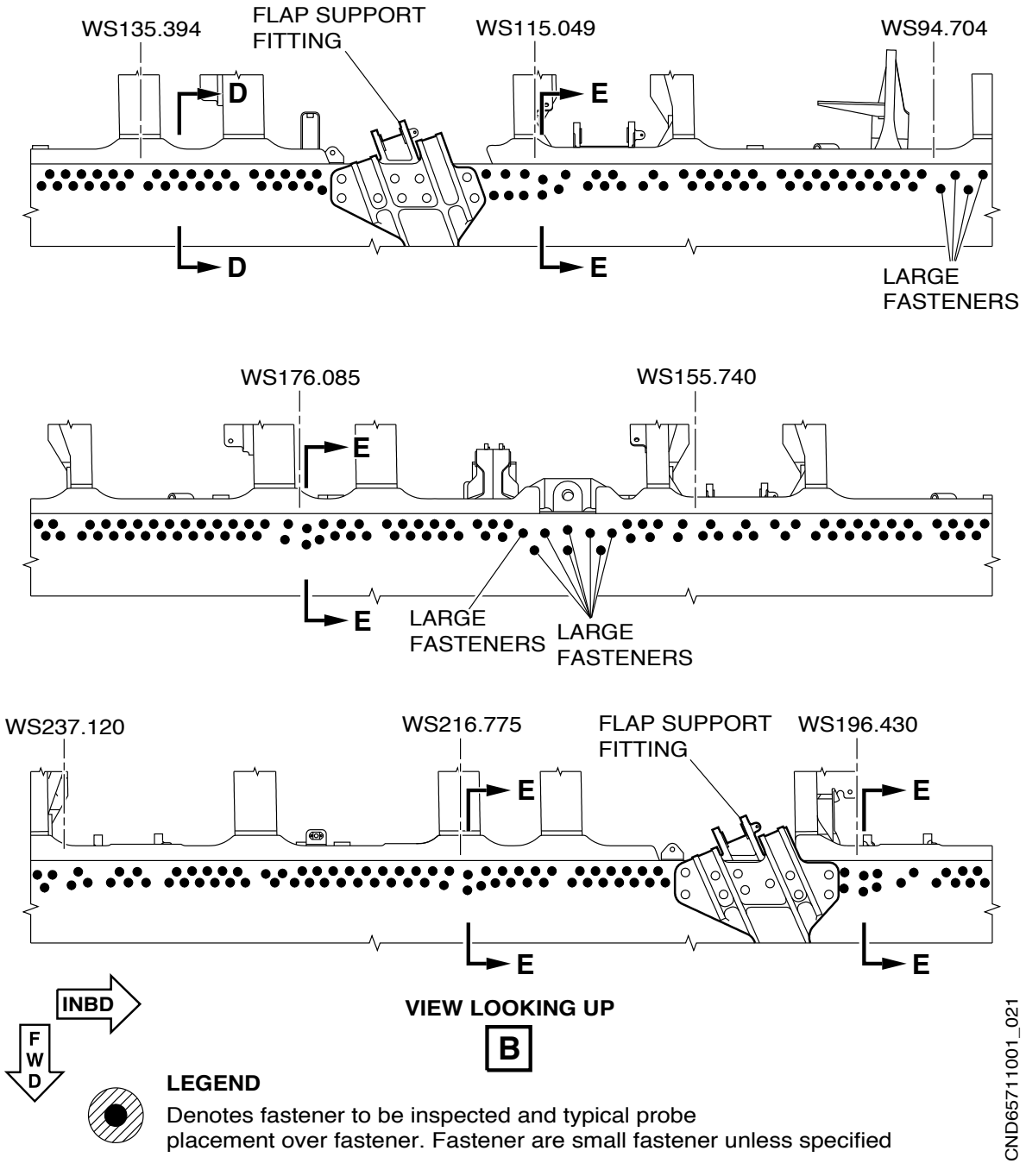
Denotes fastener to be inspected and typical scan path.

Subsurface Inspection of the Lower Wing Panel Between BL 0.00 and WS35.59
Figure 6

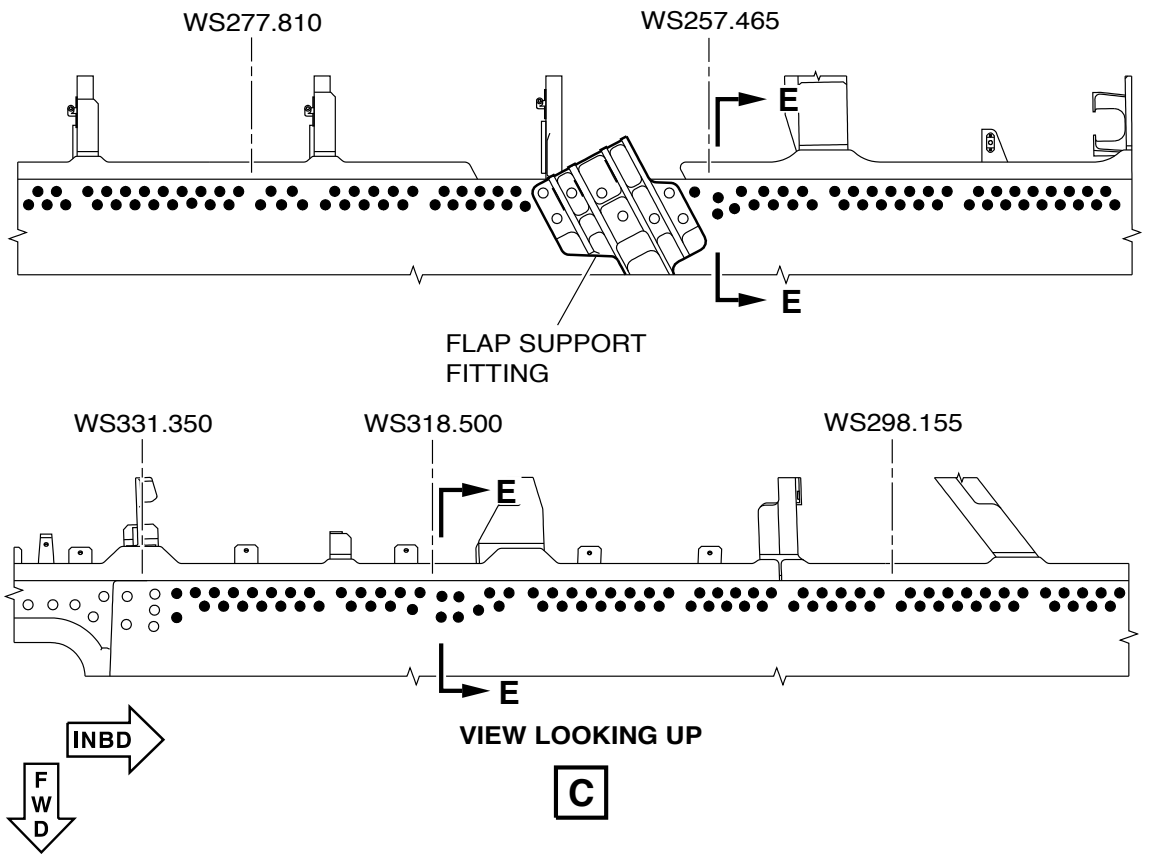
EFFECTIVITY: ALL

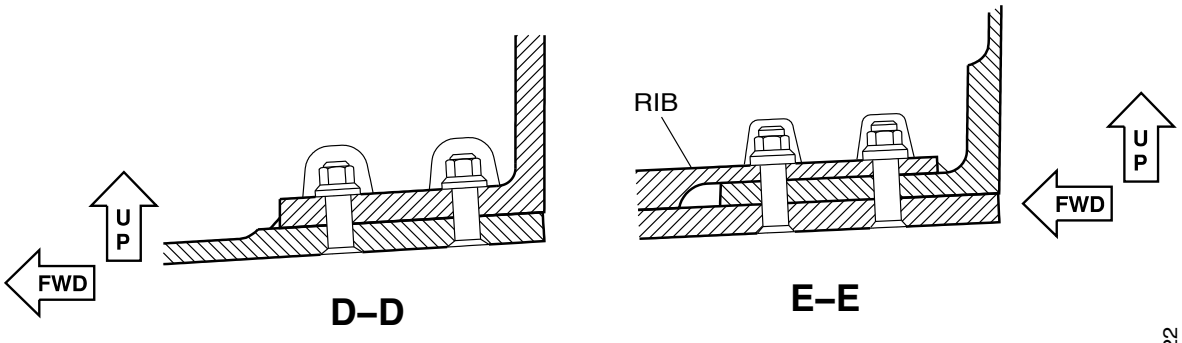


Subsurface Inspection of the Rear Spar Lower Cap between WS85.735 and WS356.473
Figure 7 (Sheet 1 of 6)



Subsurface Inspection of the Rear Spar Lower Cap between WS85.735 and WS356.473
Figure 7 (Sheet 2 of 6)





CND65711001_022

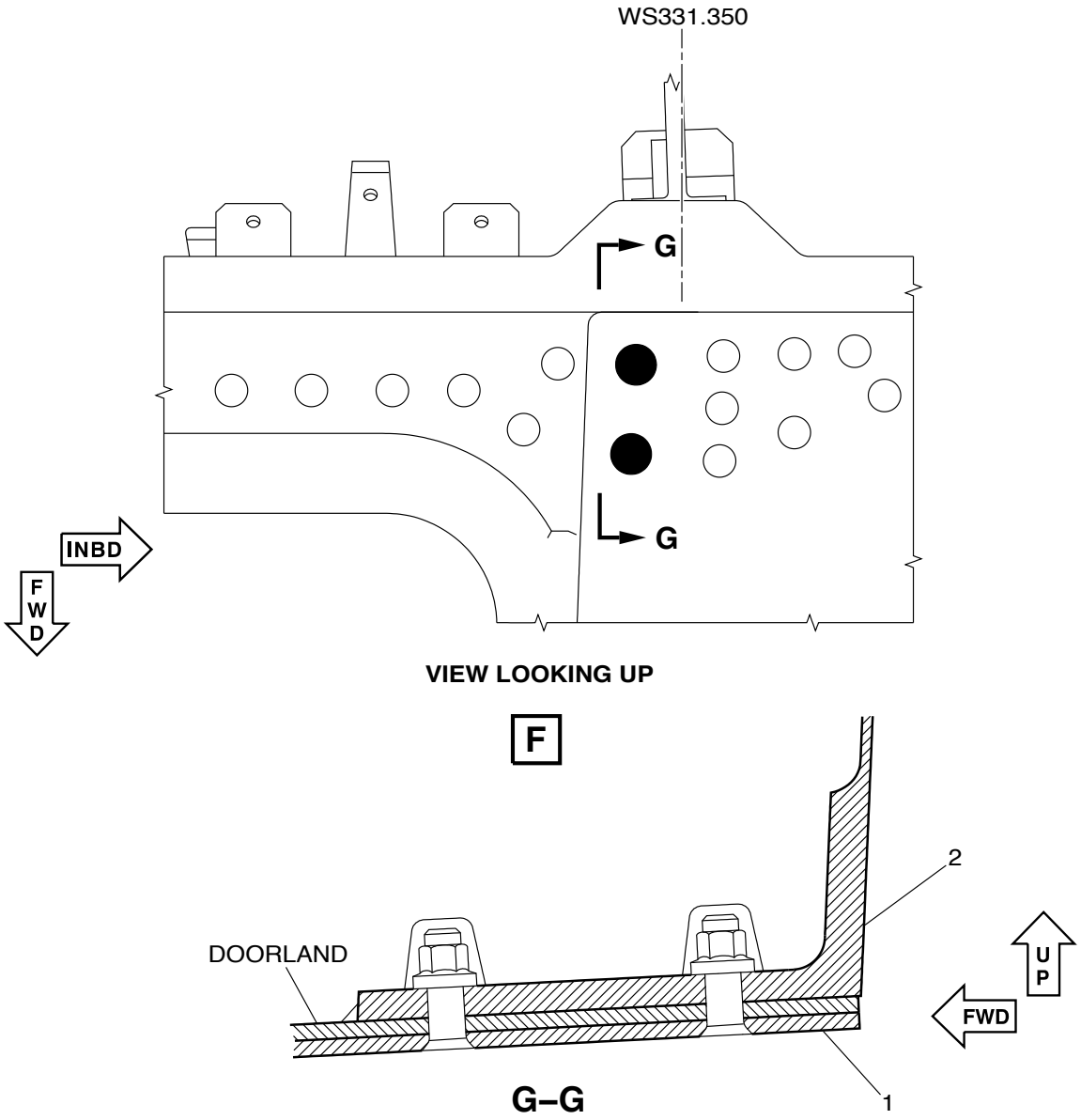
LEGEND

Denotes fastener to be inspected and typical probe placement over fastener. Fastener are small fastener unless specified

Subsurface Inspection of the Rear Spar Lower Cap between WS85.735 and WS356.473
Figure 7 (Sheet 3 of 6)

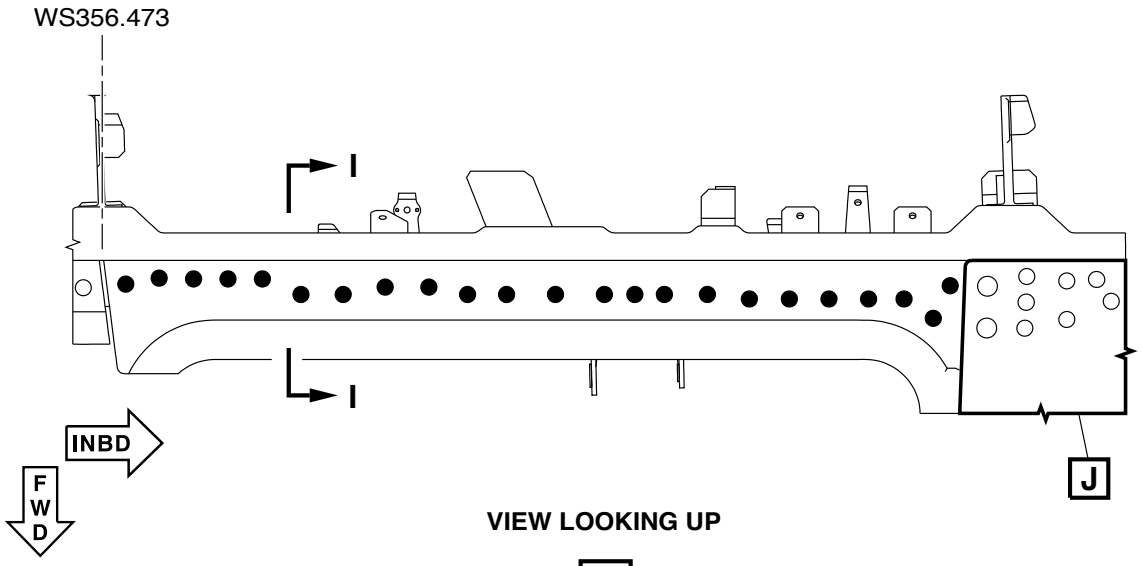
EFFECTIVITY: ALL

PART 6 – EDDY CURRENT



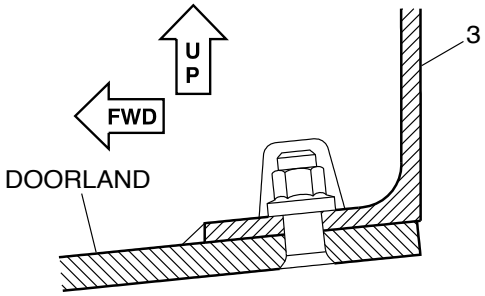
Subsurface Inspection of the Rear Spar Lower Cap between WS85.735 and WS356.473
Figure 7 (Sheet 4 of 6)

EFFECTIVITY: ALL



VIEW LOOKING UP

H



I–I

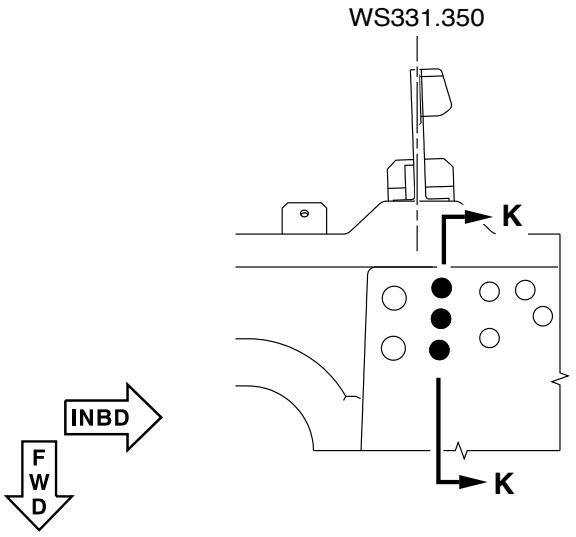
CND65711001_027

LEGEND

Denotes fastener to be inspected and typical probe placement over small fastener

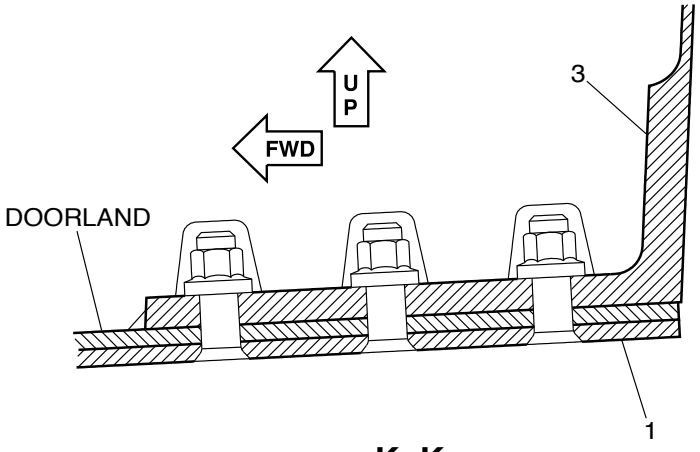
Subsurface Inspection of the Rear Spar Lower Cap between WS85.735 and WS356.473
Figure 7 (Sheet 5 of 6)

EFFECTIVITY: ALL



VIEW LOOKING UP

J



K–K

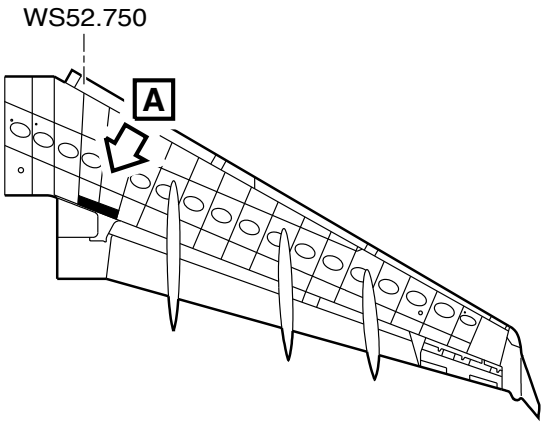
CND65711001_081

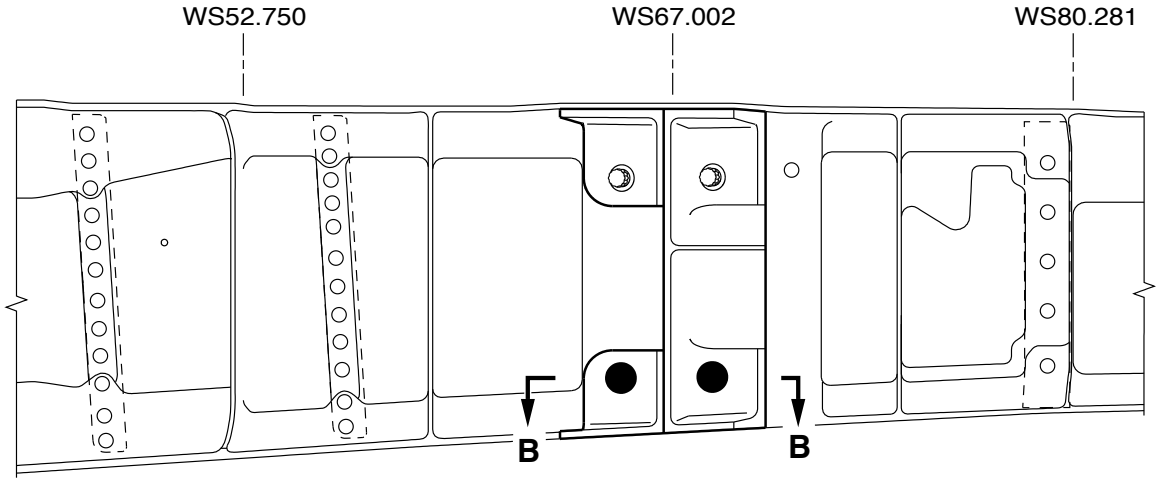
LEGEND

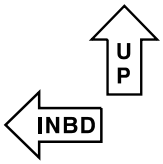
Denotes fastener to be inspected and typical probe placement over small fastener

Subsurface Inspection of the Rear Spar Lower Cap between WS85.735 and WS356.473
Figure 7 (Sheet 6 of 6)

EFFECTIVITY: ALL







VIEW LOOKING AFT ON REAR SPAR

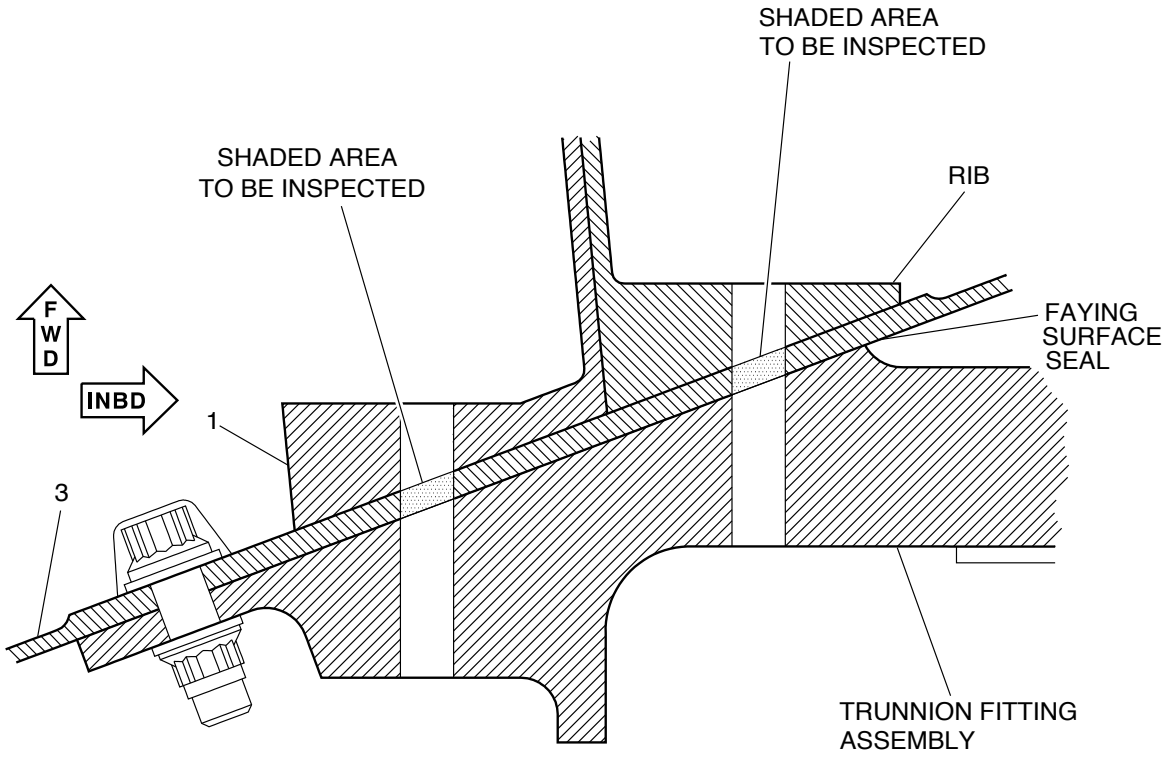
A

CND65711001_033

LEGEND

Denotes holes to be inspected using bolt hole eddy current (BHEC), (Qty 2)

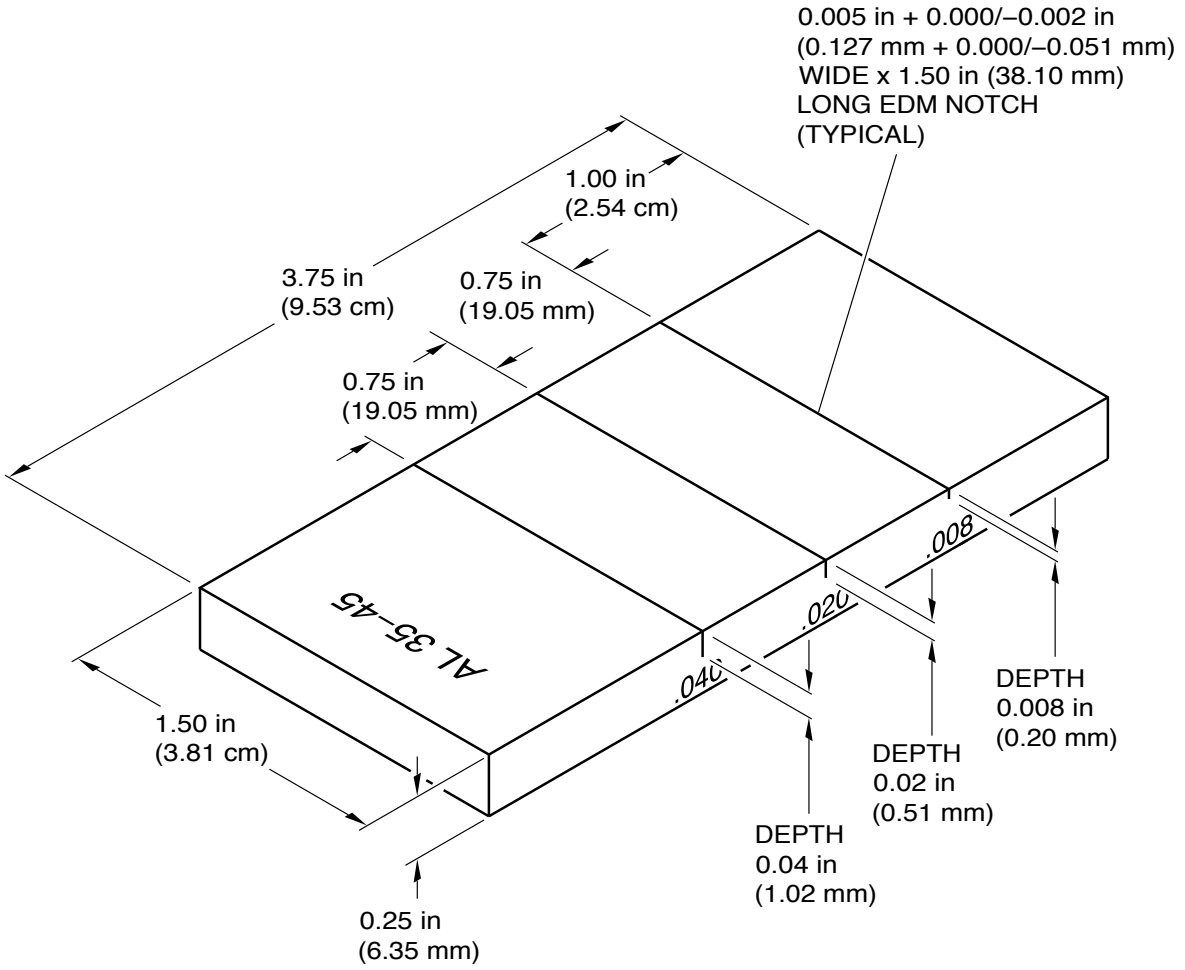
Bolt Hole Eddy Current Inspection of the Rear Spar Vertical Cap at WS67.002
Figure 8 (Sheet 1 of 2)



B–B

CND65711001_034

Bolt Hole Eddy Current Inspection of the Rear Spar Vertical Cap at WS67.002
Figure 8 (Sheet 2 of 2)

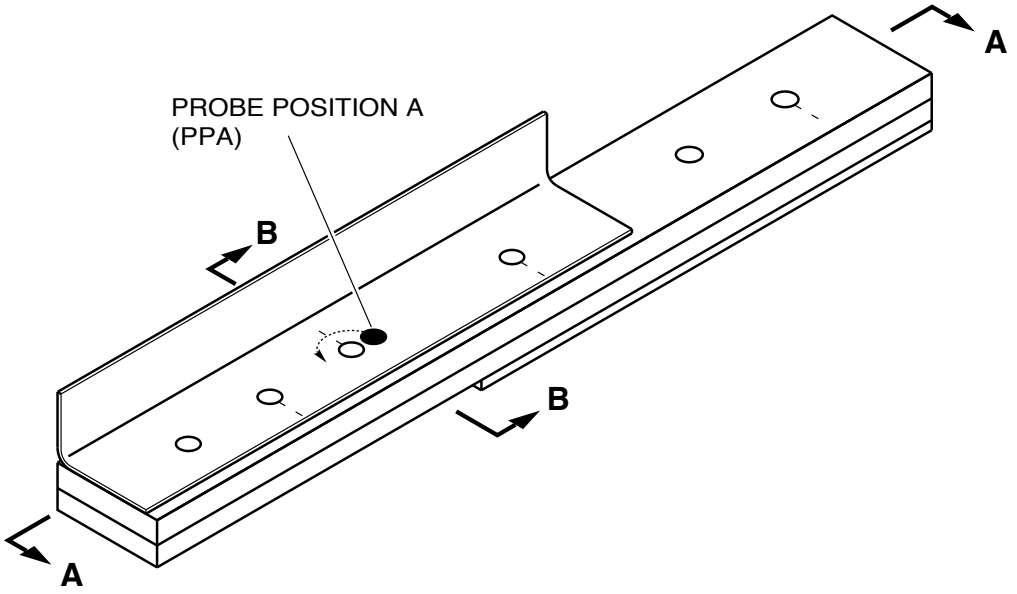


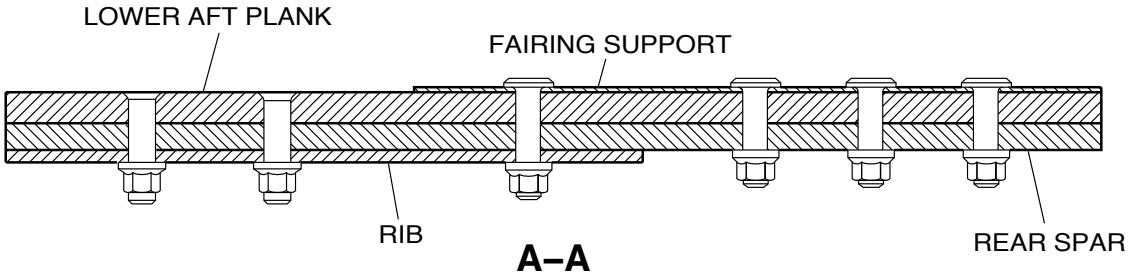
CND65711001_001

Calibration Reference Standard – AL35–45
Figure 9

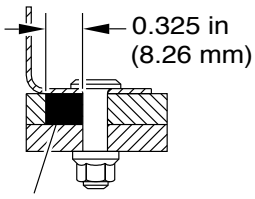
EFFECTIVITY: ALL

PART 6 – EDDY CURRENT





A–A



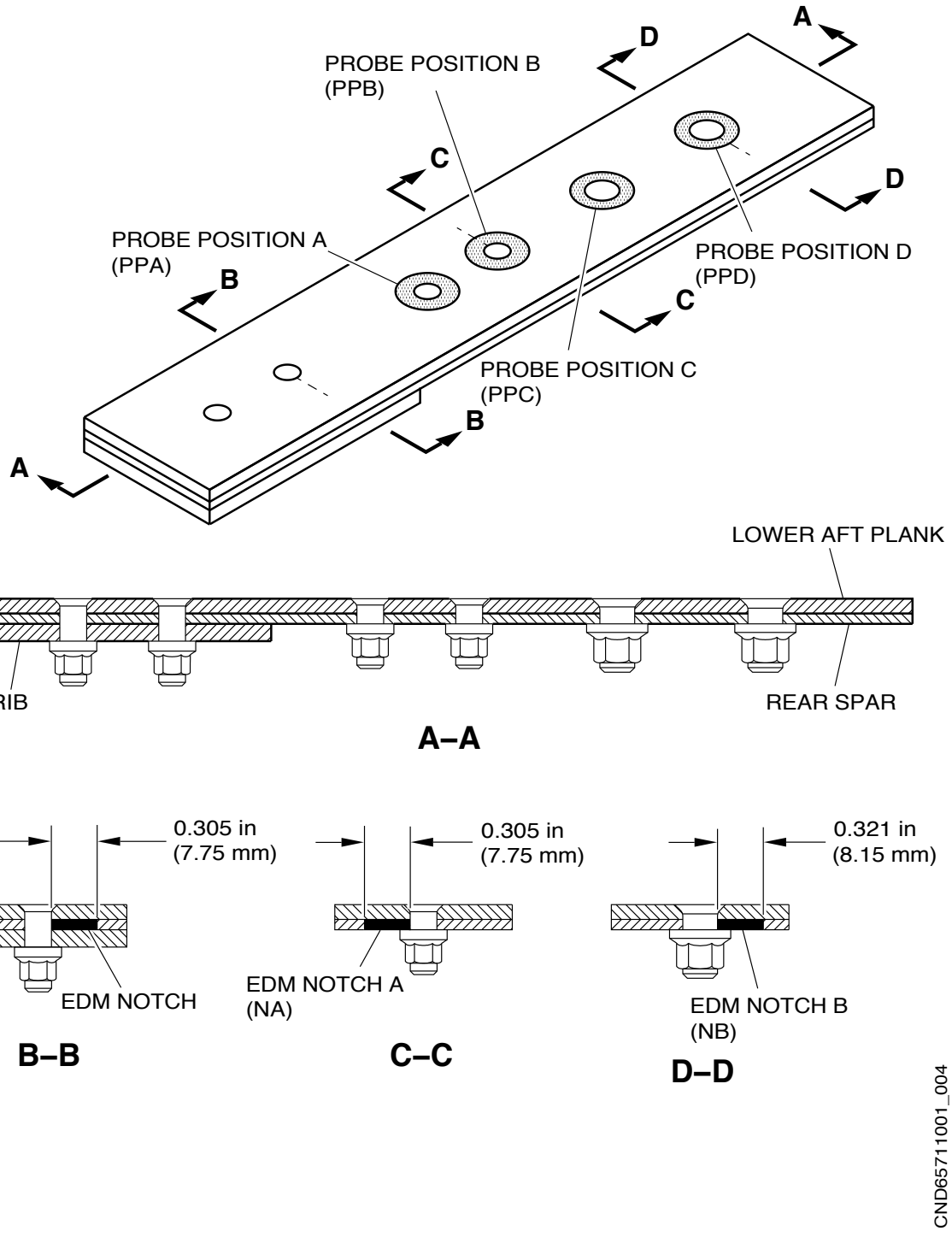
B–B

LEGEND

Denotes typical scan path

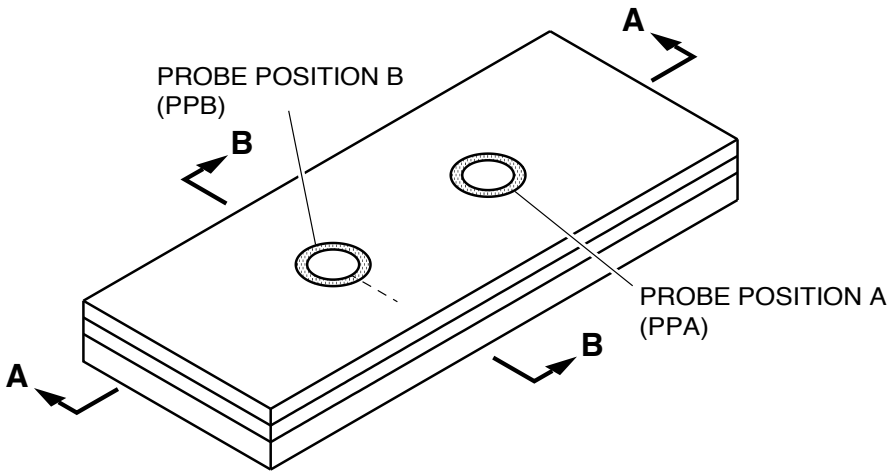
CND65711001_002

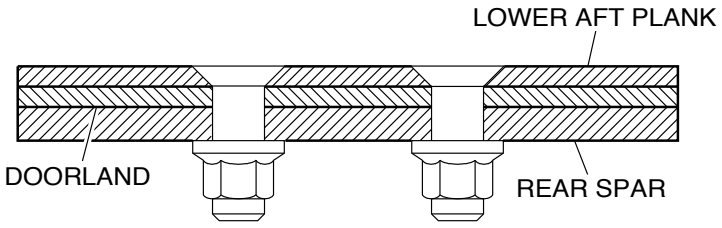
Calibration Reference Standard – EXMM100–50101–001
Figure 10



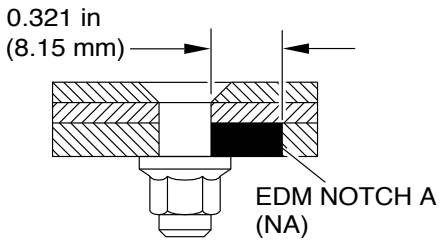
Calibration Reference Standard – EXMM100–50101–007
Figure 11

EFFECTIVITY: ALL





A–A

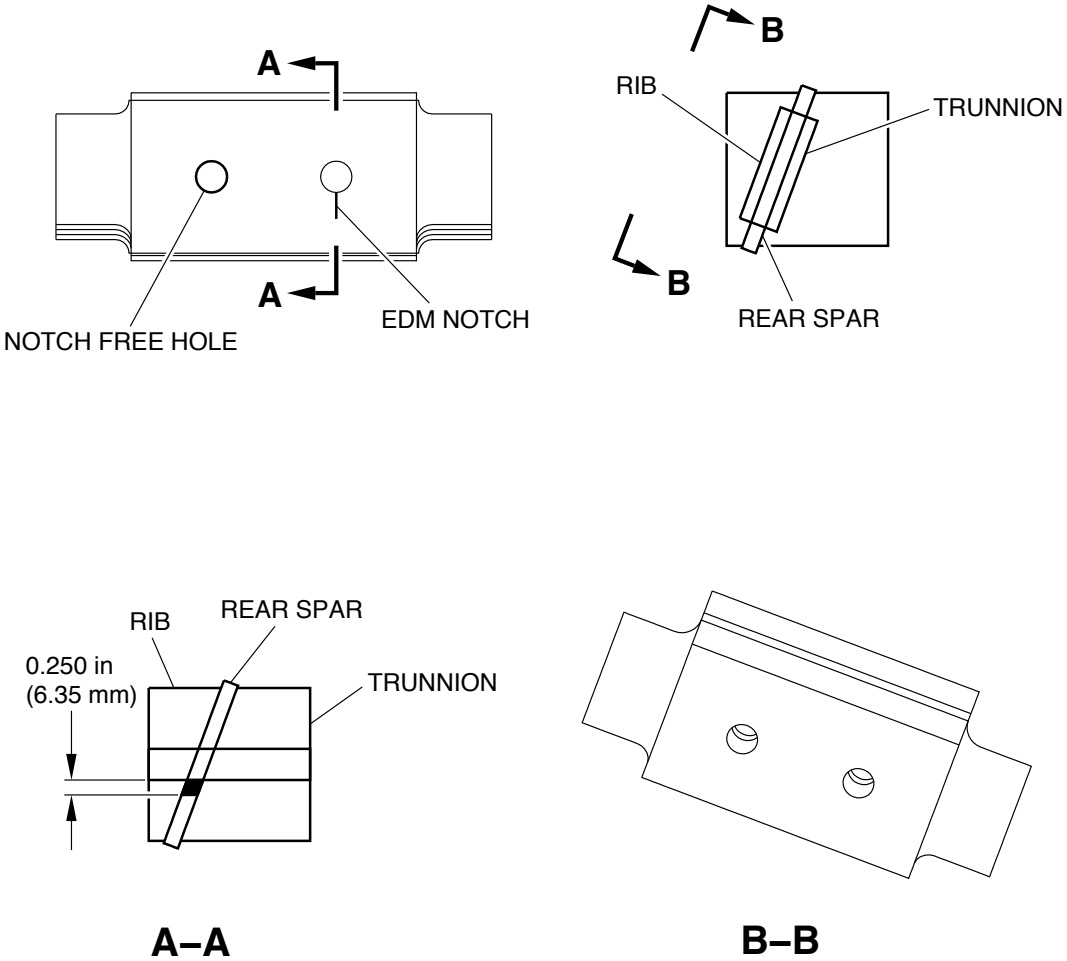


B–B

CND65711001_005

Calibration Reference Standard – EXMM100–50101–011
Figure 12

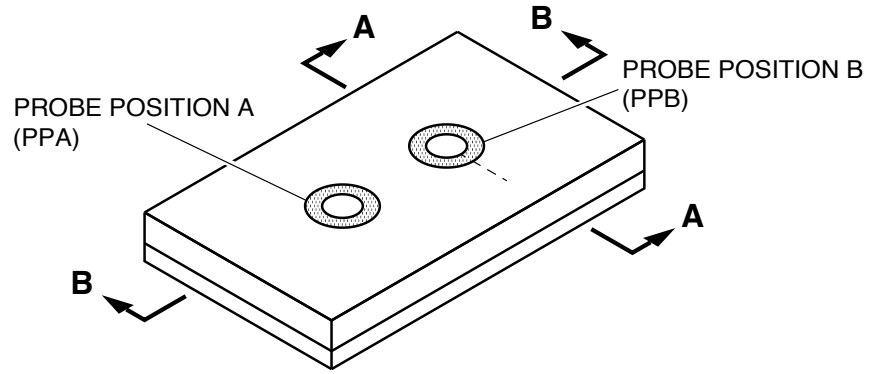
PART 6 – EDDY CURRENT

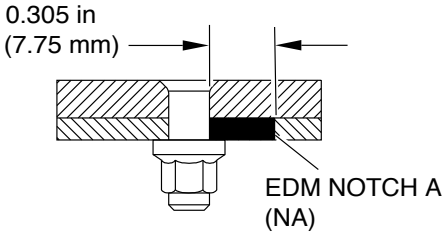


CND65711001_007

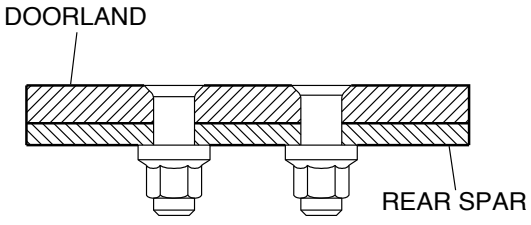
Calibration Reference Standard – EXMM100–50101–017
Figure 13

EFFECTIVITY: ALL





A–A

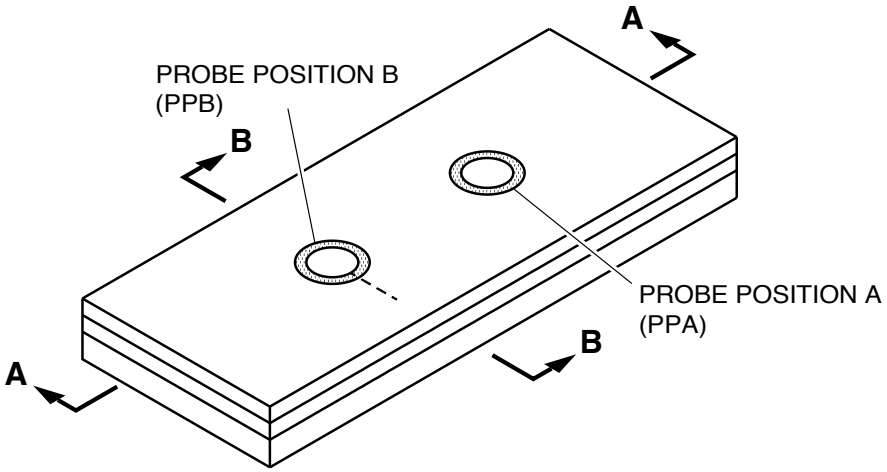


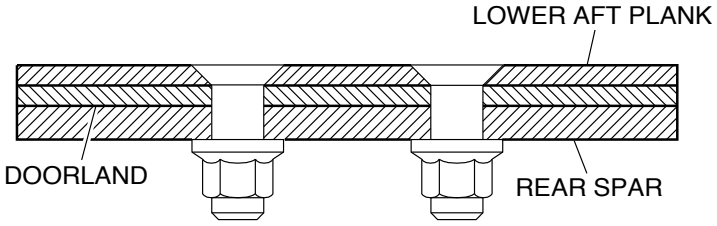
B–B

CND65711001_061

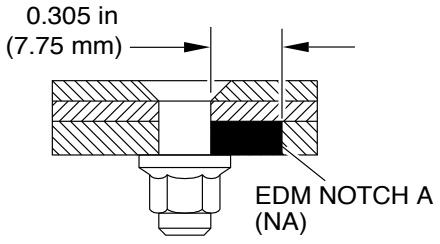
Calibration Reference Standard – EXMM100–50101–013
Figure 14

PART 6 – EDDY CURRENT





A–A



B–B

CND65711001_071

Calibration Reference Standard – EXMM100–50101–019
Figure 15

EFFECTIVITY: ALL

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