

BRISTOL AEROSPACE
LIMITED

ENGINEERING MEMORANDUM

TITLE

REPLACEMENT OF CENTER SECTION TRUSS LOWER
OUTBOARD WING FITTING TUBE CLUSTER

| | | | | | | | |
|----------------------|--------------|-------------|--------------|--|---|-----------|------------|
| E.M. NO. | | 15564 | | ISSUE | A | FILE CODE | 111 -11 |
| EFFECTIVE | | Immediately | | DISTRIBUTION:-- A--ACTION B--INFORMATION | | | |
| DWG. NO. | ISS. | | | | | | |
| W/O NO. | TO | | DESIGN | | | | |
| CUSTOMER'S ORDER NO. | E | | A/C | | | | |
| CUSTOMER | N | | PROD. | | | | |
| Can. Forces | I | | ELT/NIC | | | | |
| Expeditor | M | | E | | | | |
| Expeditor | E | | R | | | | |
| Expeditor | G | | O | | | | |
| Expeditor | A/C PLANNING | | A/C PLANNING | | | | |
| Expeditor | MANUF. | | MANUF. | | | | |
| Expeditor | MATERIAL | | MATERIAL | | | | |
| Expeditor | A/C BUPT. | | A/C BUPT. | | | | |
| Expeditor | MANUF. BUPT. | | MANUF. BUPT. | | | | |
| Expeditor | SALES/CONT. | | SALES/CONT. | | | | |
| Expeditor | INSPECTION | | INSPECTION | | | | |
| Expeditor | R.C.A.F. | | R.C.A.F. | | | | |
| Expeditor | TEST FLIGHT | | TEST FLIGHT | | | | |
| Expeditor | DWG. CONTROL | | DWG. CONTROL | | | | |

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|----------|-----------|---------------------------|---|-----------------------------|------------------------------|-----------------------------|----------|
| PART NO. | PART NAME | REASON FOR ISSUE | DISPOSITION OF STOCK | | | | AS NOTED |
| | | | CHECK BLOCKS AFFECTED | NOT AFFECTED | USE TO DEPLETION | REWORK | |
| | | STOP ORDER/RELEASE | PARTS COMPLETED | PARTS IN PROCESS | TOOLING | RAW MAT. | |
| | | REVISED DRAWING VARIATION | | | | INTERCHANGEABILITY AFFECTED | |
| | | OBsolete NOTICE | | | | STRENGTH AFFECTED | |
| | | USE AS NOTED | YES <input checked="" type="checkbox"/> | NO <input type="checkbox"/> | YES <input type="checkbox"/> | NO <input type="checkbox"/> | |

CONDITION: :-

A repair Procedure is required for the replacement of the Center Section Truss Lower Outboard Wing Fitting Tube Cluster.

SOLUTION: :-

Replacement of the Lower Outboard Wing Fitting Tube Cluster will be carried out in accordance with the following procedure:

- 1.0 Drain all Fuel Tanks and Propeller Anti-Icer Tank.
- 2.0 Remove the L.H. Main Fuel Tank. Drain and plug all Fuel Lines.
- 3.0 Level the Aircraft in the normal flying attitude. **APR 23 1968**
- 4.0 Remove the following items from the Aircraft:
 - 4.01 L.H. Outboard Wing Panel Assembly
 - 4.02 L.H. Engine
 - 4.03 L.H. Main Landing Gear
 - 4.04 L.H. Main Landing Gear Slide Tube
 - 4.05 L.H. Inboard and Outboard Main Landing Gear Doors

Note: Check Wing Alignment per Engineering Instructions prior to Wing removal.

5.0 Release and peel back the Left Hand Engine Nacelle Outboard Skins as shown per Figure 1.

6.0 Cut the Bulkhead Aft of the L.H. Landing Gear Slide Tube Cluster as shown per Figure 2. Release and remove the Bulkhead Section and Bulkhead Support Angle and retain for future installation.

RAY
JACK DESA
BOB
TOM
FILE MAIL

NOTE: WHEN EFFECTIVITY IS OMITTED FROM E.M., CHANGES ARE TO BE EFFECTIVE UPON PLANNING DEPARTMENT AUTHORIZATION.

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7.0 Remove the following items from the Aircraft:

- 7.1 L.H. Flap Control Gear Box Ass'y
- 7.2 L.H. Propeller Feathering Pump
- 7.3 L.H. Main Landing Gear Lower Limit Switch and Associated Bracketry.
- 7.4 L.H. Exhaust Tail Pipe Bracketry

8.0 Remove or displace all miscellaneous equipment interfering with the replacement of the Lower Outboard Wing-Fitting Tube Cluster.

9.0 Gauss check the Control Columns and the C/S Truss in the area of the L.H. Engine Nacelle. Record the Gauss Level.

10.0 From the L.H. Main Landing Gear Lower Slide Tube Cluster, cut out and remove the P/N 18-001035-4 (incorrectly installed Upper Outboard Reinforcement Plate) and the Lower Reinforcement Plate P/N 18-001035-7. Grind Flush to the Spar Cap all weld metal left by the removal of the Reinforcement Plates.

Caution

Do not cut or grind into the Truss Lower Spar.

11.0 Magnetic Particle Inspect the areas from which the Reinforcement Plates were removed paying particular attention to the area at the base of the Slide Tube Cluster. Using the Sonoflux Model AH-7 Inspection Unit, induce the Magnetic Field into the Truss Tube and Cluster by coiling the Electrical Cable around the Tube in the area to be inspected. Approximately 1000 Ampere Turns will be sufficient. Use adequate illumination and a 5 to 10 Power Lens to facilitate examination.

Caution

Before carrying out any Magnetic Particle Inspection, check for possible concentrations of flammable vapours using a suitable Combustible Gas Indicator. If necessary, take appropriate action to purge the area of flammable vapours prior to starting the Inspection.

12.0 All cracks and defects found on the Inspections as per Para 11.0 are to be referred to the Project Engineer.

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- 13.0 Cut and remove the existing Truss Wing Attach Fitting Tube Cluster as follows:
- 13.1 Install the Weld Repair Jig Tool No. T002391 in accordance with Bristol Drawing No. T002391 and by using the existing Upper Wing Fitting Bolt.
- 13.2 Trammel Check the location of the centerline of the Lower Pin, Item 19, Dwg. No. T002391, against points on the Truss to be designated by Engineering.
- 13.3 Cut out the Lower Fitting Cluster in accordance with Bristol Drawing No. 111-11009 and release from Jig.
- Caution
- Do not disturb the Jig Alignment.
- 14.0 Strip paint and thoroughly clean all residual linoleum and foreign matters from the interior and exterior of the Truss Tubes with Royaline. Mechanically clean as required all areas to be welded to remove any corrosion or scale.
- 15.0 Install new Lower Fitting Cluster P/N 404-184200-659 L.H. as follows:
- 15.1 Remove the 0.060 Shim, Item 15, Dwg. No. T002391 from the Jig.
- 15.2 Position the Cluster so that the Forward Fitting Lug butts up against the Forward Face of the Lower Jig Lug, Item 9, Dwg. No. T002391.
- 15.3 Install Pin, Item 20, Dwg. No. T002391 in the Lower Jig Lug and position the Pin and Cluster as shown per Figure 3. Trammel Check location of cluster using center of Pin, Item 20, and points on Truss previously specified by Engineering.
- Note: The centerline of the Replacement Cluster Fitting must be located as per Figure 3 to allow for weld shrinkage.
- 16.0 Trim Cluster as required to provide proper fitting. Tack Weld in place all Tube Members using good solid Tack Welds on all except the Vertical Truss Member. Refer to Bristol Drawing No. 111-11009.

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Note: Use only Light Tack Welds on the Vertical Truss Member. Prior to welding strip paint and thoroughly clean all inhibiting oil and foreign matters from the interior and exterior of all tubes of the replacement cluster. Mechanically clean as required all areas of the cluster, which are to be welded to remove any corrosion or scale.

Caution

Before commencing any heating or welding check for possible concentrations of flammable vapours using a suitable Combustible Gas Indicator. If necessary, take appropriate action to purge the area of flammable vapours before commencing work.

17.0 Carry out a trial installation of the wing as follows:

17.1 Remove the bushing from the lower attach fitting of the wing panel.

17.2 Remove the Jig Tool No. T002391 and carry out a trial installation of the wing using existing wing attach pin at the upper fitting location and Pin Item 19, Drawing No. T002391 at the lower wing attach fittings.

Note: With the aircraft in flying attitude, use a transit to check and ensure that the L.H. wing tip is approximately 1.5 inches higher than its original position. If the wing can be installed properly, no further adjustment of the replacement cluster is required. If the L.H. Wing Tip is appreciably more or less than 1.5 inches above its original position or if the Lower Truss and Wing Fittings do not line up, i.e. Lower Pin, Item 19, cannot be installed, refer to Engineering for further instructions.

18.0 Remove the Wing and complete the welding as follows:

18.1 Mechanically clean all areas to be welded to remove all heavy scale and/or corrosion. Thoroughly clean all areas with Royaline to remove dirt and foreign matter.

18.2 Reinstall the Jig Tool No. T002391 in accordance with Drawing No. T002391 using the existing wing attach bolt at the upper wing attach fittings.

18.3 Preheat weld area to 600° - 800° F. to burn off any volatile residues. Use a tempelstik or equivalent to control heating.

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Note:

Prior to carrying out any preheating or welding pack areas adjacent to weld with wet asbestos mud to minimize heat transfer. Ensure that the Truss is adequately vented.

18.4

T.I.G. Butt Weld the Cluster Tubes as shown per Bristol Drawing No. 111-11009 using Wire per MIL-R-5632 Cl. 2. The Welding Jig Tool No. T002391 must be in alignment at all times. Check Jig Alignment (refer to Para's 13.2 and 15.3) from time to time during welding to ensure that the Cluster is located within the limit per Para's 13.2 and 15.3, i.e. center of Lower Wing Attachment Hole must be within .035 inch of the center of Jig Hole. Should Jig Alignment deviate outside these limits, notify Engineering for further instructions.

18.5

Post heat all welds, immediately after welding, to 600° F to 800° F. Use a Tempelstik or equivalent to control heating. Wrap with Asbestos Sheets to ensure that the Welds are allowed to cool slowly.

18.6

Grind all welds flush to the Splice Tubes. (Refer to Bristol Drawing 111-11009). Use #240 or finer emery disc for final polishing, to eliminate transverse marks and scratches.

Caution

Do not grind into the Splice Tubes.

18.7

Magnetic Particle Inspect all welds in accordance with the procedure set forth per Para 11 at a minimum of 12 hours after completion of welding. Report all discrepancies to the Project Engineer.

19.0

Mechanically clean all areas to which Splice Sleeves are to be welded to remove all heavy scale and/or corrosion. Thoroughly clean affected areas with Royaline. Refer to Bristol Drawing 111-11009 for affected areas.

20.0

Install Splice Sleeves in accordance with Bristol Drawing No. 111-11009 and weld as follows:

Note: Remove entire Jig from the Aircraft prior to welding. Install the "C" portion of Jig from time to time during weldings

to ensure location of Lower Wing Attach Fittings hasn't changed. Refer any discrepancies to the Project Engineer for further instructions.

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- 20.1 Weld Splice Sleeves in place using T.I.G. Welding Process and Rod per MIL-R-5632 Class 2.
- 20.2 Post heat all welds, immediately after welding, to 600° F to 800° F using Tempelstik or equivalent to control heating. Ensure that all welds are allowed to cool slowly.
- 20.3 Magnetic Particle Inspect all welds in accordance with the procedure set forth in Para 11, at a minimum of 12 hours after completion of welding.
- 21.0 Install Reinforcement Plates, P/N 18-001035-5 and -7 in accordance with Beech Drawing 18-001035 except as follows:
- 21.1 Where T.I.G. Welding is required by the Drawing, Oxy Weld No. 65 Filler Rod is to be used.
- 21.2 The use of Electrodes per ASTM A316-58 Class 11018 is recommended in lieu of Class 11013 Electrodes.
- 21.3 Magnetic Particle Inspect all welds in accordance with the procedure set forth in Para 11, at a minimum of 12 hours after completion of welding. Refer all defects to the Project Engineer.
- 22.0 Carry out Trial Installation of Wing using existing Upper Hinge Pin and Pin, Item 19, Drawing No. T002391 at the Lower Attach Fittings. This may be done either before or after the Magnetic Particle Inspection per Para 21.3.
- 23.0 The Control Columns and all areas which were Magnetic Particle Inspected are to be thoroughly demagnetized and gauss checked for the presence of residual magnetism. Record the Gauss Level.
- 24.0 Refinish all weld repair areas of the Truss and Replacement Tubes and Splice Tubes with one coat Primer per Spec. MIL-P-8585, Color "Y", and two coats of Aluminum Lacquer per MIL-P-7178, Colour 515-101 per CGSB Spec. 1-GP-120.
- 25.0 Refill the Truss with Linoil and replace Vent Plugs.
- 26.0 Repair the Nacelle Bulkhead by splicing in place the sections of Bulkhead, removed as per Para 6. Reinstall the Support Angle. Refer to Figure 2 for details.
- 27.0 All miscellaneous equipment removed or displaced per Para 8 is to be reinstalled.
- 28.0 Reinstall the items removed per Para 7.

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29.0 Reinstall the L.H. Engine Nacelle Outboard Skins released per Para 5. Refer to Figure 1 for affected areas.

30.0 Reinstall the items removed per Para 4.

Note: New Bushings must be installed in the Lower Truss and Outer Wing Panel Attach Fittings. Refer to applicable RCAF Engineering Order for details of Bushing installation and rigging of wing. Check wing alignment per Engineering Instructions.

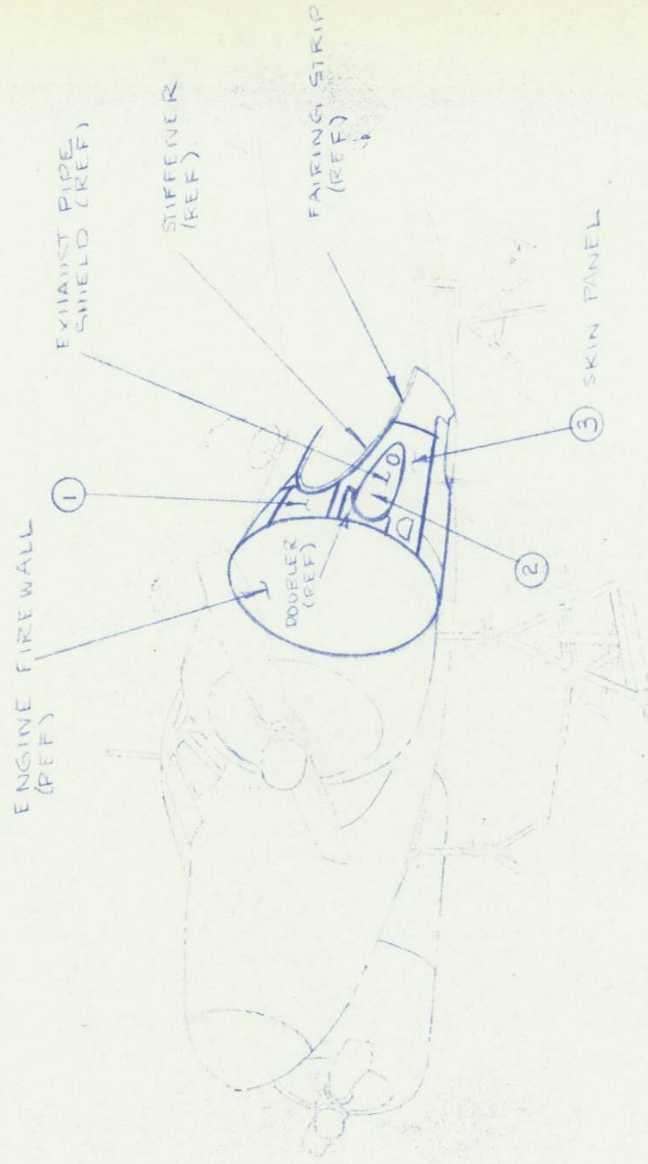
31.0 Carry out a Compass Swing in accordance with the applicable RCAF Engineering Order.

32.0 Carry out Primary Inspection prior to releasing Aircraft for RCAF Acceptance Flight.

Note: For Engineering Reference only. Beech Aircraft Corp. Structural Analysis Report 59-705 and Beech Letter File 52-67-11037 dated November 28, 1967, our Engineering File 1002-5186-00.

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- ① RELEASE SKIN PANEL AND PEEL BACK AS REQUIRED TO PERMIT CLEAR ACCESS TO THE TRUSS.
- ② RELEASE EXHAUST PIPE SHIELD FROM ENGINE FIREWALL.
- ③ RELEASE THE FAIRING STRIP AS REQUIRED TO PERMIT REMOVAL OF THE SKIN PANEL. RELEASE THE SKIN PANEL AS REQUIRED TO PERMIT REMOVAL OF THE SKIN, EXHAUST PIPE SHIELD, STIFFENER AND DOUBLER AS A UNIT.

FIGURE 1 SKIN PANEL REMOVAL -
L.H. ENGINE NACELLE.

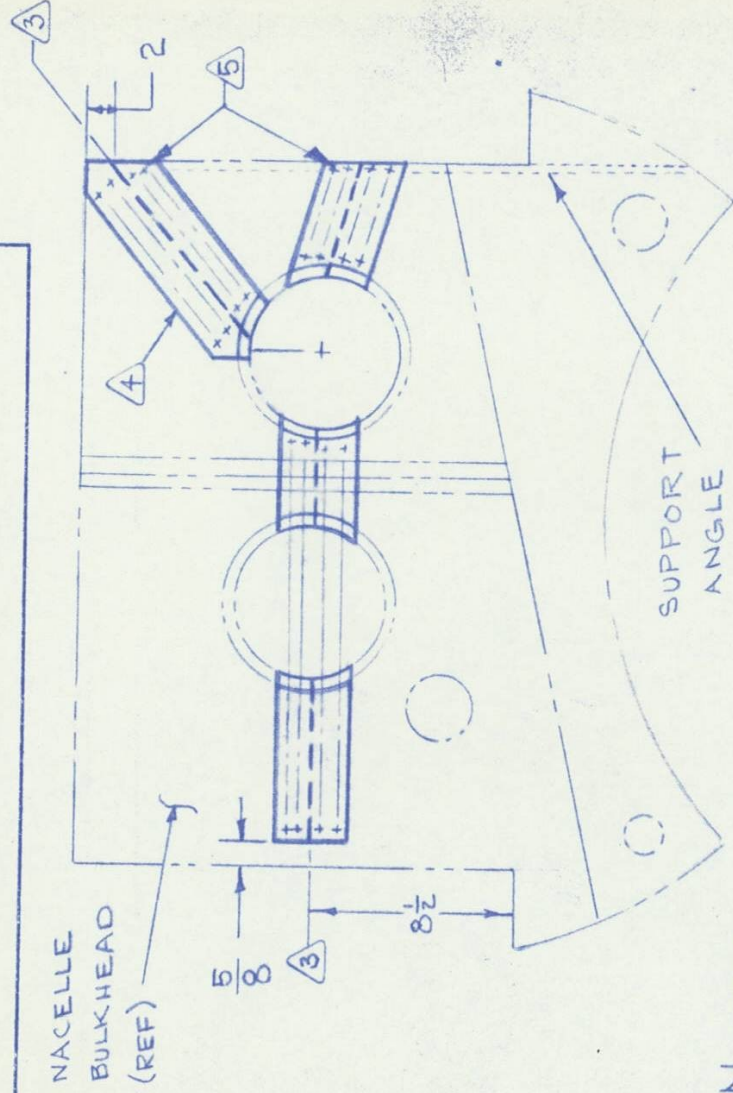
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NOTES:

1. ALL DIMENSIONS APPROXIMATE.

2. WHEN REINSTALLING SECTIONS REMOVED, PICK UP EXISTING RIVET PATTERNS WHERE POSSIBLE.

3. CUT BULKHEAD ALONG THIS LINE. RELEASE & REMOVE SECTION. REINSTALL AS SHOWN AFTER REPLACEMENT OF LOWER WING ATTACH FITTING TUBE CLUSTER.

NOTE: LOWER PORTION OF BULKHEAD ALREADY REMOVED FOR TRUSS MODIFICATION (REF EM 15403, PARA 8).

4. DOUBLER (4 REQUIRED) MAKE FROM .032 X $2\frac{1}{4}$ 2024-T4 (ALCLAD) ALUMINUM QQ-A-250/5. FORM TO AREA CONTOUR AS REQUIRED. FINISH WITH 1 COAT PRIMER PER MIL-P-8585, COLOUR Y, BEFORE INSTALLING.

5. M'S 20470AD4 RIVETS, $\frac{3}{4}$ " PITCH (APPROXIMATE), $\frac{1}{4}$ " MIN. EDGE DISTANCE. 2 STAGGERED ROWS PER SIDE.

FIGURE 2 NACELLE BULKHEAD (L.H. LOOKING AFT)

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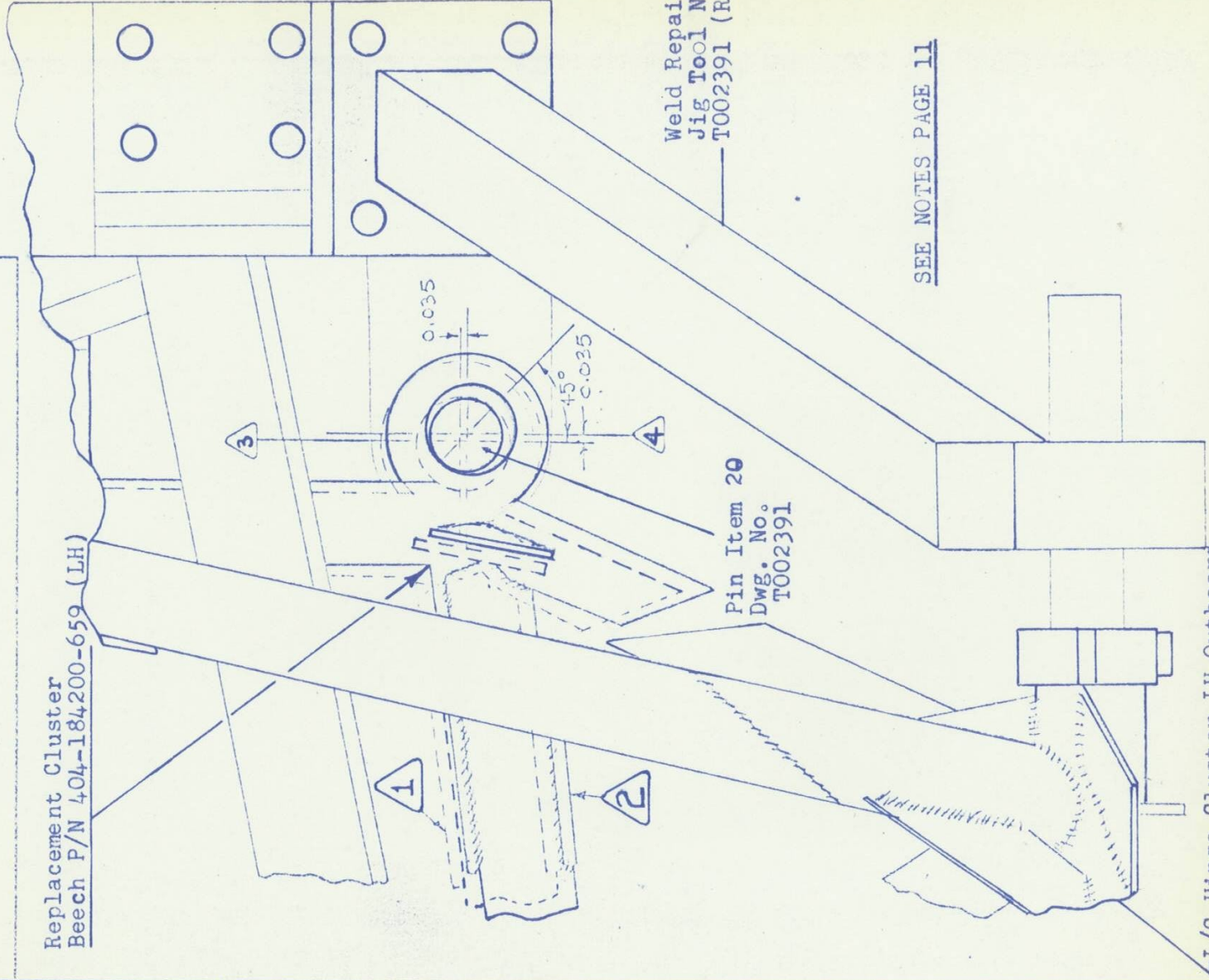
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Replacement Cluster
Beech P/N 404-184200-659 (LH)



SEE NOTES PAGE 11

DATE/DRAWN

L/G Hinge Cluster LH Outboard

LH TRUSS LWR. WING ATTACH FITTING - VIEW LOOKING AFT, WELD REPAIR
JIG INSTALLED

FIGURE 3

SHEET 10 of 11 SHEETS

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NOTES:

1. 

Dotted outline shows position of old Cluster.

2. 

Solid outline shows position of replacement Cluster prior to welding.

3. 

Centerline of old Cluster Wing Attach Fittings.

4. 

Centerline of Pin, Item 20.

Note: Cluster must be securely fixed at this location prior to Welding. Refer to Para 15.3 for details of checking location.

FIGURE 3 LH TRUSS LWR. WING ATTACH FITTING -
VIEW LOOKING AFT, WELD REPAIR JIG INSTALLED