

# **Nomad**

# SERVICE BULLETIN

## **FLIGHT CONTROLS – RUDDER PEDAL PIVOT ARMS – INSPECTION AND REPAIR (MOD N794)**

### **1. PLANNING INFORMATION**

#### **A. Effectivity**

##### **(1) Aircraft affected**

All Nomad N22 Series and N24 Series aircraft whose log books do not show compliance with Service Bulletin ANMD-27-42 Rev 3, Part 2

#### **NOTE**

Rudder pedal pivot arm assemblies already repaired under Part 2, Rev 1 of this Service Bulletin are to be inspected for corrosion and treated according to Steps 2.B.(4) to 2.B.(6)(e)Z then protection treated according to Steps 2.B.(11) to 2.B.(13)(c)5.

##### **(2) Spares affected**

All Rudder Pedal Arm Assemblies PN 1/N-45-981, 2/N-45-982, 2/N-45-981 and 1/N-45-982.

#### **B. Reason**

(1) Cracks have been reported in several Pivot Arm Sub-assemblies PN 2/N-45-965 at the junction of the Angled Pivot Arm PN 1/N-45-974. Evidence of corrosion has been found to exist inside the pivot arm tube.

(2) Reason for Rev 4

Requirement for internal inspection and dent limits added.  
Editorial changes to enhance readability.

#### **C. Description**

Pivot Arm Sub-Assemblies are removed and inspected by the Fluorescent Dye Penetrant process for evidence of cracking around the spigot sleeve weldment housing the angled pivot pin. Cracked arms shall be repaired by incorporating Mod N794.

This modification consists of removing the cracked spigot and welding an improved spigot in place. The pivot arm is treated for corrosion, where it exists, and the inside surface protection treated.

#### **D. Compliance**

##### **(1) Part 1 – Inspection (Pre Mod N794 Pivot Arms)**

(a) Spigot Housing Weld Area (dye penetrant inspection)

1 Pilot's Controls

At or before 1000 hours TTIS and every 'C' Inspection (300 hours TIS) thereafter.

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### 2 Co-Pilot's Controls

- (i) If single pilot operation, at or before 1500 hours TTIS and every 'C' Inspection (300 hours TIS) thereafter.
- (ii) If two pilot operation, at or before 1000 hours TTIS and every 'C' Inspection (300 hours TIS) thereafter.

(b) With all other welded areas, visual inspection is to be carried out each time Pivot Arm is removed for above inspections.

### (2) **Part 1 – Inspection (Post Mod N794 Pivot Arms)**

Visual inspection of all welded areas at 1800 hours TIS after the incorporation of Mod N794.

### (3) **Part 2– Repair (Mod N794)**

Mod N794 is mandatory and is to be carried out within 900 TIS or 12 months from the receipt of Service Bulletin ANMD–27–42 Revision 1 (dated 15 Nov 93), whichever is earlier.

### E. **Approval**

The requirement detailed herein has been approved by a person authorised under Civil Aviation Regulation 35 and conforms with the type certificate requirements.

### F. **Manpower**

- (1) Inspection – 16 manhours
- (2) Repair – 32 manhours
- (3) Removal/Installation – 8 manhours

### G. **Materials , Price and Availability**

Available upon application to ASTA Defence (Logistics).

### H. **Tooling , Price and Availability**

None

### I. **Weight and Balance**

None

### J. **References**

Maintenance Manual Chap 27–20–04

Illustrated Parts Catalogue Chap 27–20–02

Airworthiness Directive AD/GAF N22/56

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## K. Publications Affected

Inspection Requirements Manual

Illustrated Parts Catalogue Chap 27-20-02

Maintenance Manual Chap 27-20-04

## 2. ACCOMPLISHMENT INSTRUCTIONS

### A. Part 1 – Inspection

(1) Pre mod N794 Pivot Arms

(a) Remove rudder pedal pivot arms (Ref MM Chap 27-20-04 and IPC Chap 27-20-02).



**WARNING**

DO NOT OPERATE FLIGHT CONTROLS WITH CONTROL COMPONENTS DISCONNECTED OR WHEN PERSONNEL ARE WORKING IN THE AREA CONCERNED. SERIOUS INJURY TO PERSONNEL OR DAMAGE TO COMPONENTS AND STRUCTURE COULD OCCUR.

- (b) Chemically strip paint from the area around the central spigot of the rudder pedal pivot arms, degrease and dry thoroughly (Ref Fig 1).
- (c) Fluorescent dye penetrant inspect the area around the shaft housing (Ref Fig 1) for evidence of cracking in, or adjacent to, the welds. Any cracking is cause for rejection.
- (d) Reprotect bare metal using Zinc Chromate Primer.
- (e) Inspect (using x10 magnification and boosted light) all areas of tubing including all welding at upper and lower ends of the pivot arms. Inspect for dents and cracks (Ref Fig 1). Any cracking is cause for rejection.

#### NOTE

Dents are NOT acceptable within 4 inches of centre welded spigot. Smooth shallow dents max. 0.020 inch deep are acceptable outside the 8 inch region. Dented area not to exceed 5% of this region (Ref Fig 1).

(f) Reassemble the serviceable rudder pedal pivot arms into the aircraft and check rigging (Ref MM Chap 27-20-00).



**CAUTION**

ENSURE THAT THE RUDDER CONTROL SYSTEM IS FREE FROM OBSTRUCTION.

- (g) Perform a dual inspection of the rudder control circuit in the area which has been disassembled.
- (h) Perform a functional test of the aircraft wheel brake system (Ref MM Chap 32-40-00).

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(2) Post mod N794 Pivot Arms

- (a) Remove flight compartment seats and floor to gain access to rudder pedal pivot arms (Ref MM Chap 25-10-00)
- (b) Visually inspect (using x10 magnification and boosted light) all areas of tubing including all welding at upper and lower ends of the pivot arms. Inspect for dents and cracks. Any cracking is cause for rejection.

**NOTE**

Dents are NOT acceptable within 4 inches of centre welded spigot. Smooth shallow dents max. 0.020 inch deep are acceptable outside the 8 inch region. Dented area not to exceed 5% of this region.

If inspection cannot be adequately achieved with pivot arms in situ then pivot arms should be removed (Ref Pre-Mod N794 inspections).

- (c) Install flight compartment seats and floor (Ref MM Chap 25-10-00)

**B. Part 2 – Repair**

- (1) Remove angled pivot pin 1/N-45-974 from boss on rear pivot arm assembly by filing off the small end of the taper pin MS24692-159P and then driving it out.
- (2) Remove existing shaft housing PN 1/N-45-975 (Ref Fig 2)

**NOTE**

Procedure for clamping the pivot arm while machining out the old shaft housing is recommended in Part 3. of this Service Bulletin.

- (3) Machine the existing hole in the pivot arm to a diameter of 1.51 to 1.52in ready for the new shaft housing.
- (4) Inspect the internal surfaces of the pedal arm assemblies for corrosion.
- (5) Rudder pedal pivot arm assemblies which show evidence of superficial corrosion (internally and externally) are to be treated according to step (6) before proceeding.

**NOTE**

Pedal pivot arm assemblies exhibiting severe corrosion (internally and externally), in the form of loose rust flakes, or severe pitting should be scrapped.

- (6) This procedure covers the treatment of light corrosion.

(a) **Health and Safety Precautions**

- 1 This process requires the use of hazardous chemicals, including acids and Toxic Solvents. The current Material Safety Data Sheets for the materials involved should be read and comprehended.
- 2 The necessary precautions should be followed to ensure the good health and safe environment of all employees.

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(b) **Prepare Inhibited Hydrochloric Acid Pickle (100 Units)**

**WARNING**

MIXING ACID AND WATER GENERATES LARGE QUANTITIES OF HEAT. **ALWAYS** ADD ACID TO WATER. **DO NOT** ADD WATER TO ACID.

- 1 To a suitable container add 35 Units of deionised/distilled water.
- 2 Add 54 Units of Hydrochloric Acid 20<sup>0</sup>Be, mix well.
- 3 Add 0.625 Units of Turco Acryl Inhibitor, mix well.
- 4 Top up to 100 Units with deionised/distilled water, mix well.
- 5 Store in a sealed container.

(c) **Prepare Phosphoric Acid Pickle (100 Units)**

**WARNING**

MIXING ACID AND WATER GENERATES LARGE QUANTITIES OF HEAT. **ALWAYS** ADD ACID TO WATER. **DO NOT** ADD WATER TO ACID.

- 1 To a suitable container add 35 Units of deionised/distilled water.
- 2 Add 17x100/Concentration (%) Units of Phosphoric Acid, mix well.
- 3 Add 25 Units of Isopropyl Alcohol, mix well.
- 4 Top up to 100 Units with deionised/distilled water, mix well.
- 5 Store in a sealed container to prevent evaporation of the alcohol.

(d) **Prepare Rudder Pedal Pivot Arm**

- 1 Open lower drain hole to 0.5in if required.

**NOTE**

Ignore Step 2 if the repair has already been carried out.

- 2 Plug the 1.51in holes with suitable rubber bungs.
- 3 If bearings have been removed, plug with suitable rubber bungs. If bearings are in situ, seal using lead tape or similar.
- 4 Seal all holes using lead tape.
- 5 Mask the entire outer surface of the pivot arm, using Adcoat 818C, ensuring the maskant does not enter the tube, bearings or pivot arm.
- 6 Degrease the inside by pouring 200 ml of Trichloroethylene solvent into the tube, seal the end and agitate with the intention of degreasing the entire inside surface.
- 7 Drain off the solvent and repeat step 6.
- 8 Rinse the inside of the tube with M.E.K.
- 9 Dispose of solvent according to current environmental protection regulations.

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(e) **Pickle Rudder Pedal Pivot Arm**

- 1 Fix the pivot arm in a vertical position with the opened 0.5in hole uppermost.
- 2 More than half fill the tube with the inhibited hydrochloric acid pickling solution (approximately 300ml) and let stand for 10 minutes.
- 3 Seal the 0.5in drain hole, reverse the tube and let stand for another 10 minutes.
- 4 Drain off the pickling solution and discard according to relevant environmental protection regulations.

**NOTE**

Agitate the pivot arm whilst draining to assist the removal of sludge.

- 5 Rinse the tube twice with hot water.
  - 6 Remove the rubber bungs from the 1.51in holes and flush the inside of the pivot arm with water under pressure to assist dislodging any corrosion products/sludge.
  - 7 Remove maskant.
- (7) Remove cadmium plating, in area to be welded, by buffing. Take care not to remove any parent metal.
- (8) Fit the new shaft housing PN 1/N-45-1707 ensuring that it protrudes no more than 0.07 to 0.09 in from the rear face of the pivot arm (Ref Fig 2 Section AA).
- (9) Weld the shaft housing to the pivot arm according to the requirements of MIL-STD-2219. Rods are to be suitable for use with chrome-molybdenum, 4130 steel.

**NOTE**

Post weld heat treatment (stress relieving) is not required.

- (10) Carry out a Magnetic Particle Inspection according to the requirements of ASTM E1444 on the welded area. Check for cracks.
- (11) Mask the outer surface of the pivot arm according to step (6)(d)5 and repeat step (6)(e)1 to 5 using the phosphoric acid solution.
- (12) Drain the tube well and dry in a oven at 70°C for 45 minutes. Allow to cool to below 38°C.
- (13) Carry out the following corrosion protection procedure.

(a) **Health and Safety Precautions**

- 1 This process requires the use of hazardous chemicals, including acids and Toxic Solvents. The current Material Safety Data Sheets for the materials involved should be read and comprehended.
- 2 The necessary precautions should be followed to ensure the good health and safe environment of all employees.

(b) **Protect Pivot Arm from Corrosion**

- 1 Ensure the inside of the tube is dry.
- 2 Pour sufficient Kephos 253 solution into the tube (approximately 150 ml) to wet the entire surface.

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- 3 Seal the ends of the tube and agitate, ensure the entire inner surface is wetted.
- 4 Drain off excess Kephos solution and discard according to relevant environmental protection regulations.
- 5 Dry in a oven at 70°C for 10 minutes. Allow to cool to below 38°C.
- 6 Repeat steps 1 to 5.

(c) **Prime Inside of Tube**

**NOTE**

Primer may be applied directly to cured Kephos 253 without further processing.

- 1 Pour about 100 ml of Bostik Epoxy Primer (Base 463-6-3, Converter X-306 and Thinners TL-52) or equivalent into the tube.
- 2 Seal the hole and rotate tube with the intention of wetting the entire inside surface.
- 3 Drain off excess primer and cure.
- 4 Repeat steps 1 to 3.
- 5 Remove all seals, bungs, and maskant.

(14) Protect the weld and surrounding bare metal using Zinc Chromate Primer.

(15) Machine and ream the shaft housing bore to a diameter of 0.625 to 0.6257in (Ref Fig 2).

**NOTE**

Insert a 5in long piece 0.5in nominal diameter bar in the shaft housing to provide correct alignment for machining in the milling machine. Set up as in Part 3.

(16) Wet assemble angled pivot pin 1/N-45-974 to boss on rear pivot arm assembly (Ref Fig 2).

(17) Drill shaft housing (Ref Fig 2) and ream to suit a 5/32in dia taper pin PN MS24692-161P (1:48 on dia taper).

(18) Wet assemble taper pin.

(19) Prior to peening, trim taper pin to comply with the following:

- (a) Small end to protrude between 1/2 to 1 diameter (Ref Fig 4).
- (b) Large end to protrude between 1/4 to 1/2 diameter (Ref Fig 4).

(20) Peen small end of taper pin to form as shown in Fig 4.

**NOTE**

To avoid slackening, the pin must be carefully driven into the reamed taper pin hole and the larger end of the pin must be supported during the peening of the small end. Use of excessive force during peening action may cause buckling and bowing of taper pin.

(21) Protect pin ends after installation using Zinc Chromate Primer.

(22) Re-identify Rudder Pedal Arm Assemblies using black indelible ink (Ref Para 3.).

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- (23) Reassemble the serviceable rudder pedal pivot arms into the aircraft and check rigging (Ref MM Chap 27-20-04).



ENSURE THAT THE RUDDER CONTROL SYSTEM IS FREE FROM OBSTRUCTION

- (24) Perform a dual inspection of the rudder control circuit in the area which has been disassembled.
- (25) Perform a functional test of the aircraft wheel brake system (Ref MM Chap 32-40-00).

C. **Part 3 , Recommended Procedure for Clamping while Machining Out the Pivot Arm Housing (Ref Fig 3.)**

**NOTE**

As the subsequent welding operation will be performed without the benefit of a jig it is important that the old pivot arm housing be accurately machined out to provide a snug location for the new housing.

- (1) Fit a straight 5in (approx) close fitting round bar in the bore of the existing shaft housing so that the axis of the bore of the shaft housing is extended on the same side of rudder pivot arm assembly as the projecting end fitting.
- (2) Using temporary clamps at each end of pivot arm, and by means of a dial indicator picking up on the surface of the 5in round bar, set the pivot arm up so that the squareness requirements are met in both planes at right angles to each other.

**NOTE**

The pivot arm is manufactured from thin wall steel tubing and care must be taken to avoid damaging it during the machining operation as it must be firmly supported if it is to be machined without chatter.

- (3) Provide two sets of clamping blocks, one on each side of the housing, to support the pivot arm while it is being machined out (Ref Fig 3).

**NOTE**

Clamping blocks can be made from roughly machined aluminium or steel blocks roughly profiled (Ref Fig 3).

- (4) Match the profile of the blocks to that of the pivot arm using automotive fibreglass type body filler (Ref Fig 3). Release agent should be used to stop the body filler adhering to the pivot arm.
- (5) Once set, use normal hold down clamps to clamp the top blocks onto the pivot arm.



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### 3. MATERIALS INFORMATION

#### A. Parts Required per Aircraft

Four modification parts kits ANMD-27-42-1 are required per aircraft, one for each rudder pedal arm assembly.

New Part No	Qty	Description	Old Part No	Instruction/Disposition
Contents of Service Bulletin Kit ANMD-27-42-1				
1/N-45-1707	1	Shaft Housing		
MS24692-161P	1	Pin Tapered		
1/N-45-974	1	Angled Pivot Pin		
Parts removed				
	1	Shaft Housing	1/N-45-975	Scrap
	1	Pin Tapered	MS24692-159P	Scrap
1/N-45-974	1	Angled Pivot Pin	1/N-45-974	Retain for spares
Parts modified and re-identified by operator				
1/N-03-1039	1	Rudder Pedal Arm Assy Pilot LHS	1/N-45-981	Rework
2/N-03-1039	1	Rudder Pedal Arm Assy Pilot LHS	2/N-45-982	Rework
3/N-03-1039	1	Rudder Pedal Arm Assy Co-Pilot LHS	2/N-45-981	Rework
4/N-03-1039	1	Rudder Pedal Arm Assy Co-Pilot RHS	1/N-45-982	Rework

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## **B. Materials Required for Corrosion and Protection Treatments**

Obtain the following items from local sources.

Isopropyl Alcohol  
Deionised or Distilled Water  
Phosphoric Acid  
Trichloroethylene Solvent  
Methyl Ethyl Ketone (MEK)  
Kephos 253, Henkel Australia Ltd  
Hydrochloric Acid  
Turco Acryl Inhibitor  
Adcoat 818C  
Synthetic Oil Resistant Epoxy Primer (Bostik)  
Zinc Chromate Primer  
Lead Tape: 3M 421 or equivalent  
Rubber Bungs

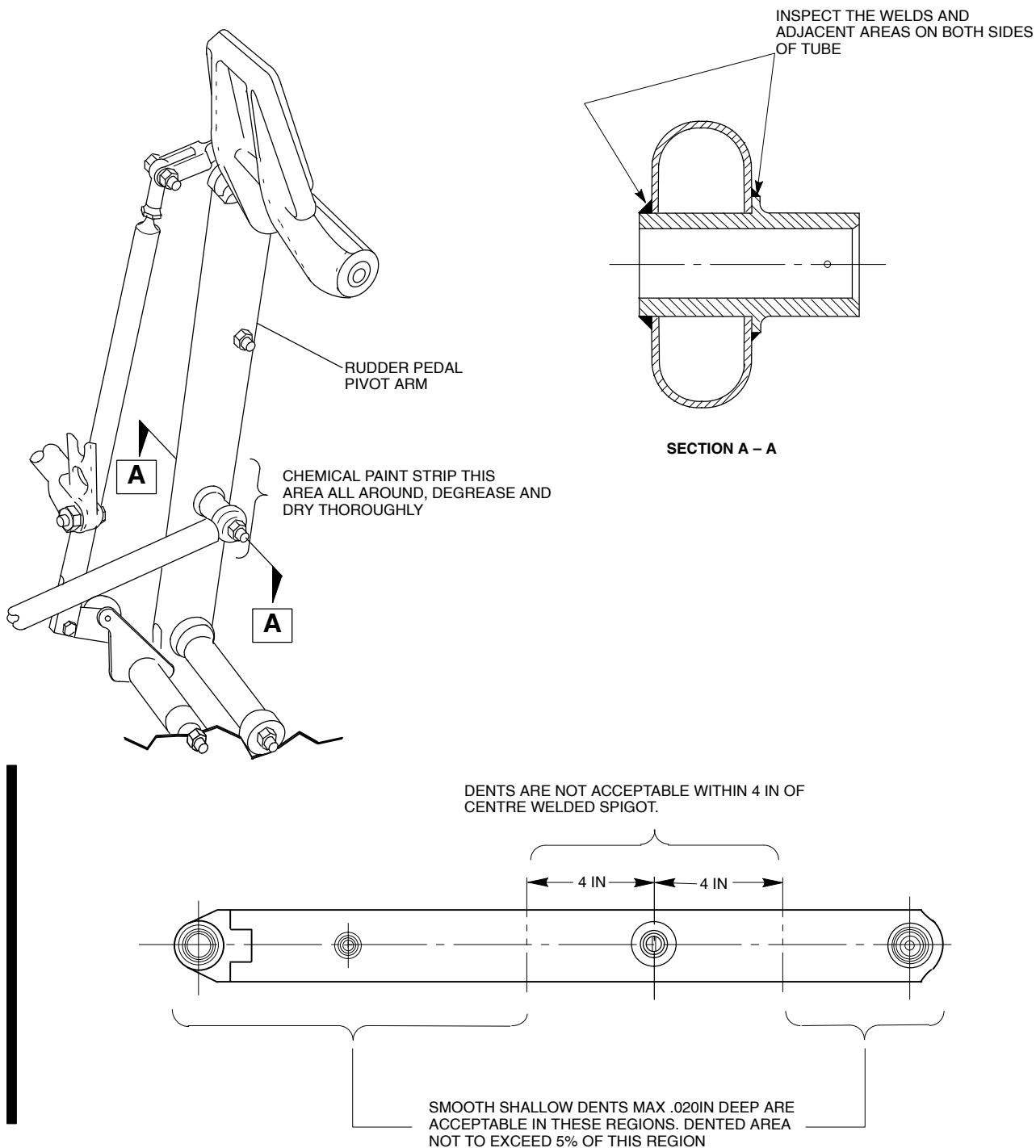
## **C. SPECIAL TOOLS AND EQUIPMENT**

Oven to 70°C  
Suitable containers to dispose of spent chemicals

## **D. RECORDING ACTION**

Record compliance with Service Bulletin ANMD-27-42 Rev 4 Part 1, Part 1 and Part 2, or Part 2 (as applicable) in the Airframe Log Book.

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**Figure 1 Rudder Pedal Pivot Arm Inspection Area**

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DRILL AND REAM TO SUIT  
5/32 DIA TAPER PIN PEEN END  
PIN TAPERED PN MS 24692-161P

REMOVE EXISTING SHAFT HOUSING  
PN 1/N-45-975 AND REPLACE WITH NEW  
SHAFT HOUSING PN 1/N-45-1707

\*EXTREME OUTER SURFACE  
OF PIVOT ARM

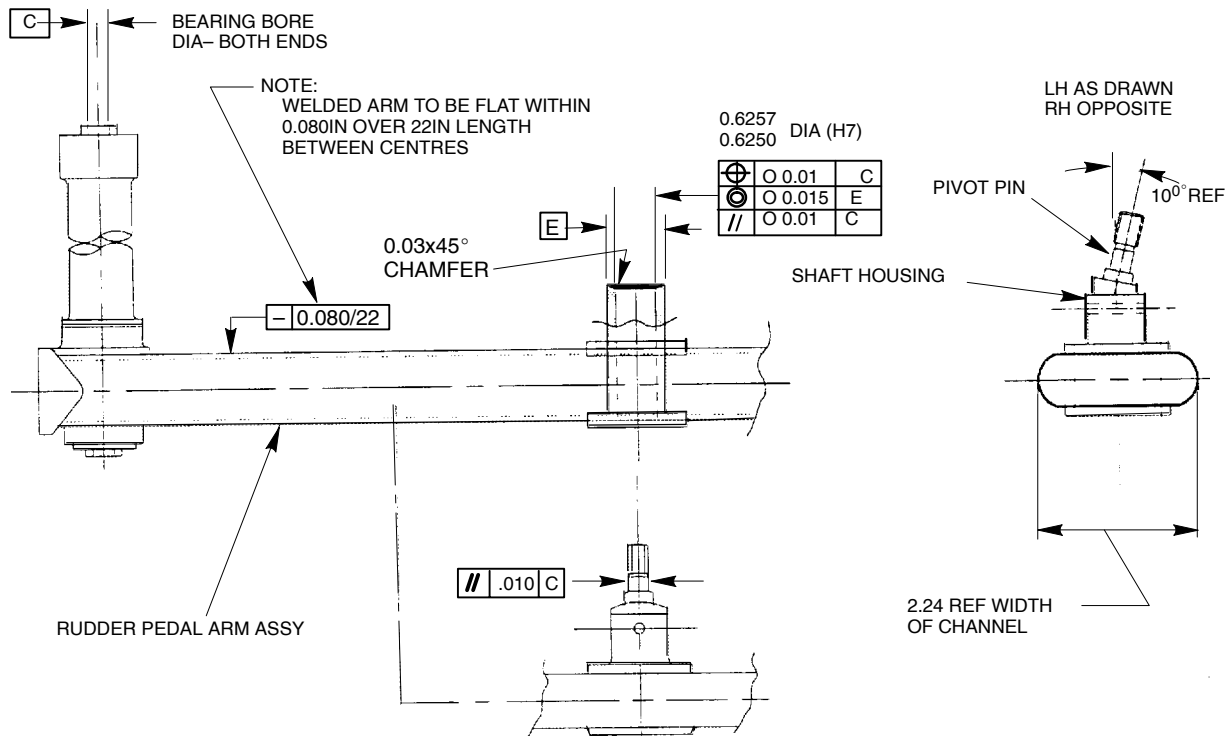
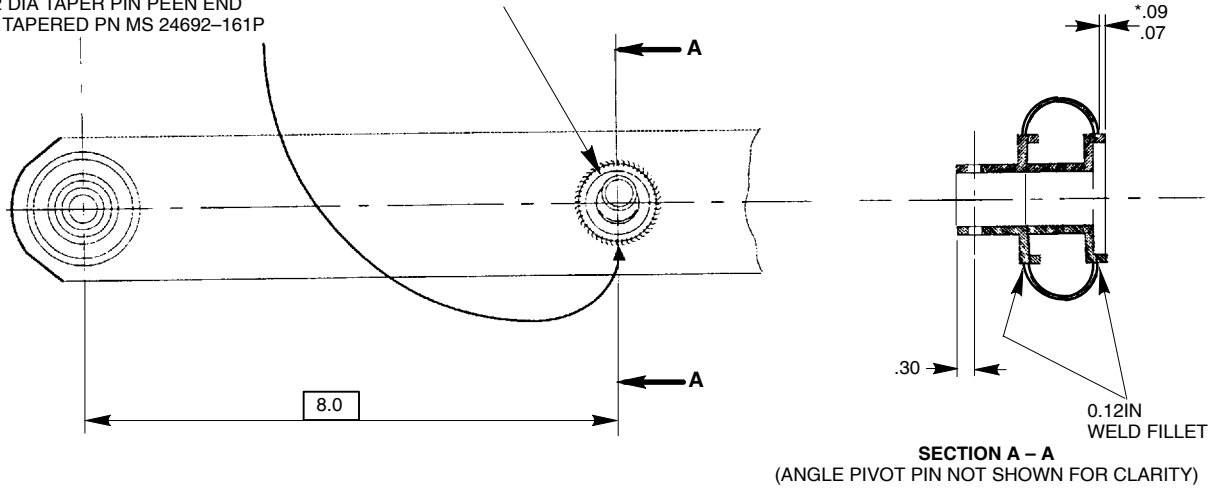
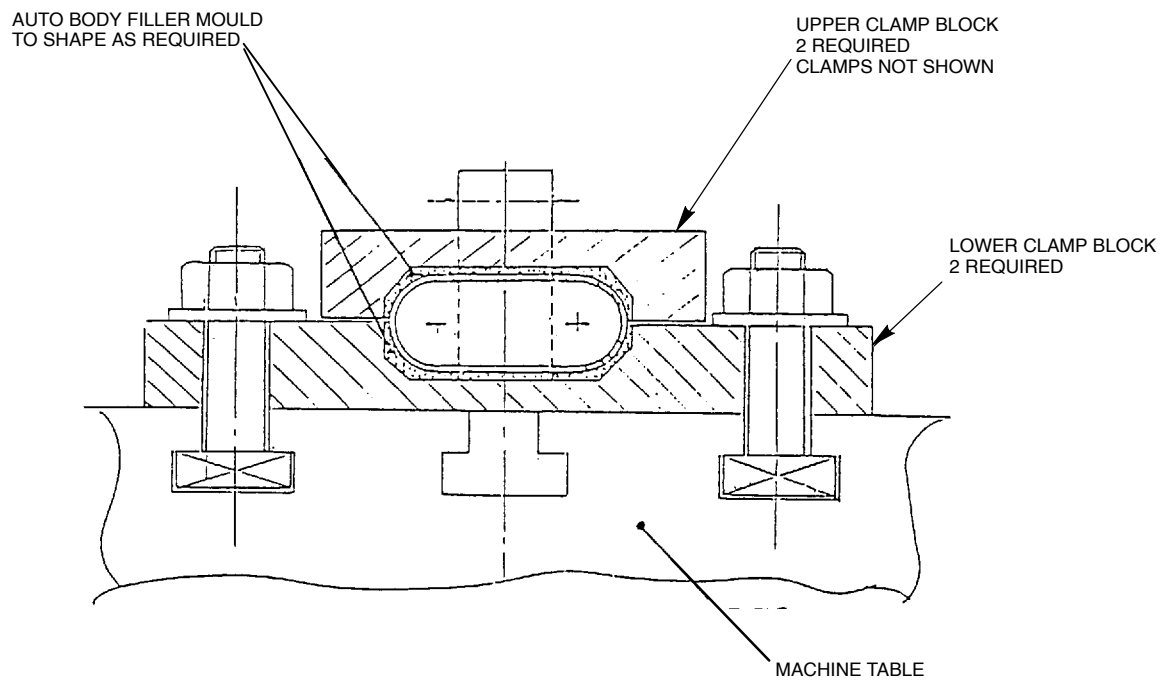


Figure 2 Rudder Pedal Rear Pivot Arm Assembly

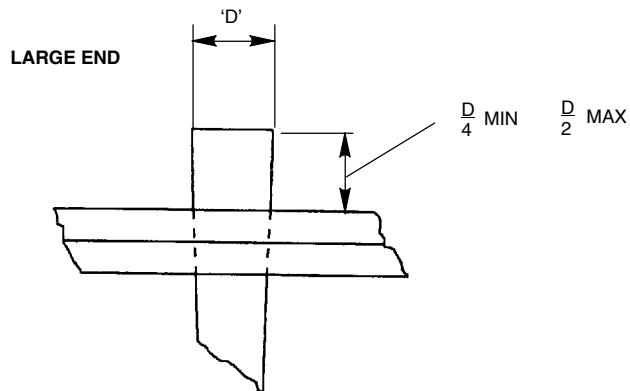
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**Figure 3 Recommended Clamping Procedure for the Pivot Arm Assembly**

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NOTE:  
DEFORMATION IS PERMISSIBLE ON LARGE  
END (MAY OCCUR DUE TO EFFECT OF THE  
ANVIL)

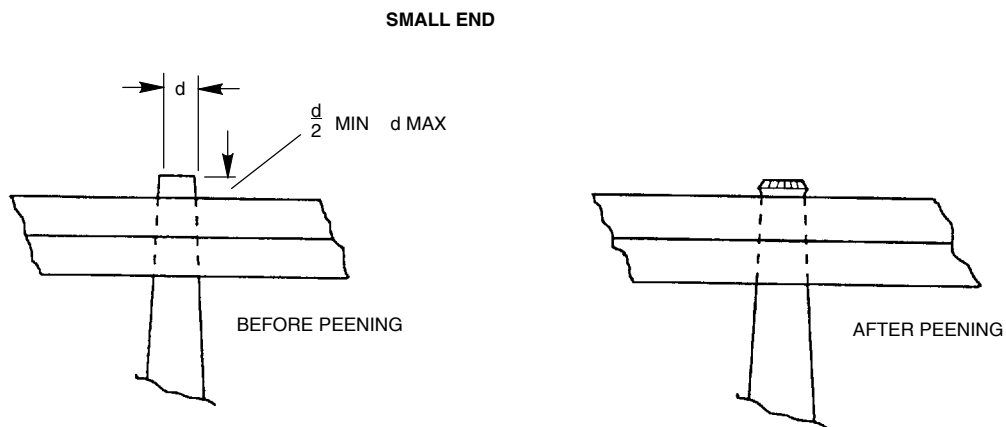


Figure 4 Retaining of Solid Taper Pins