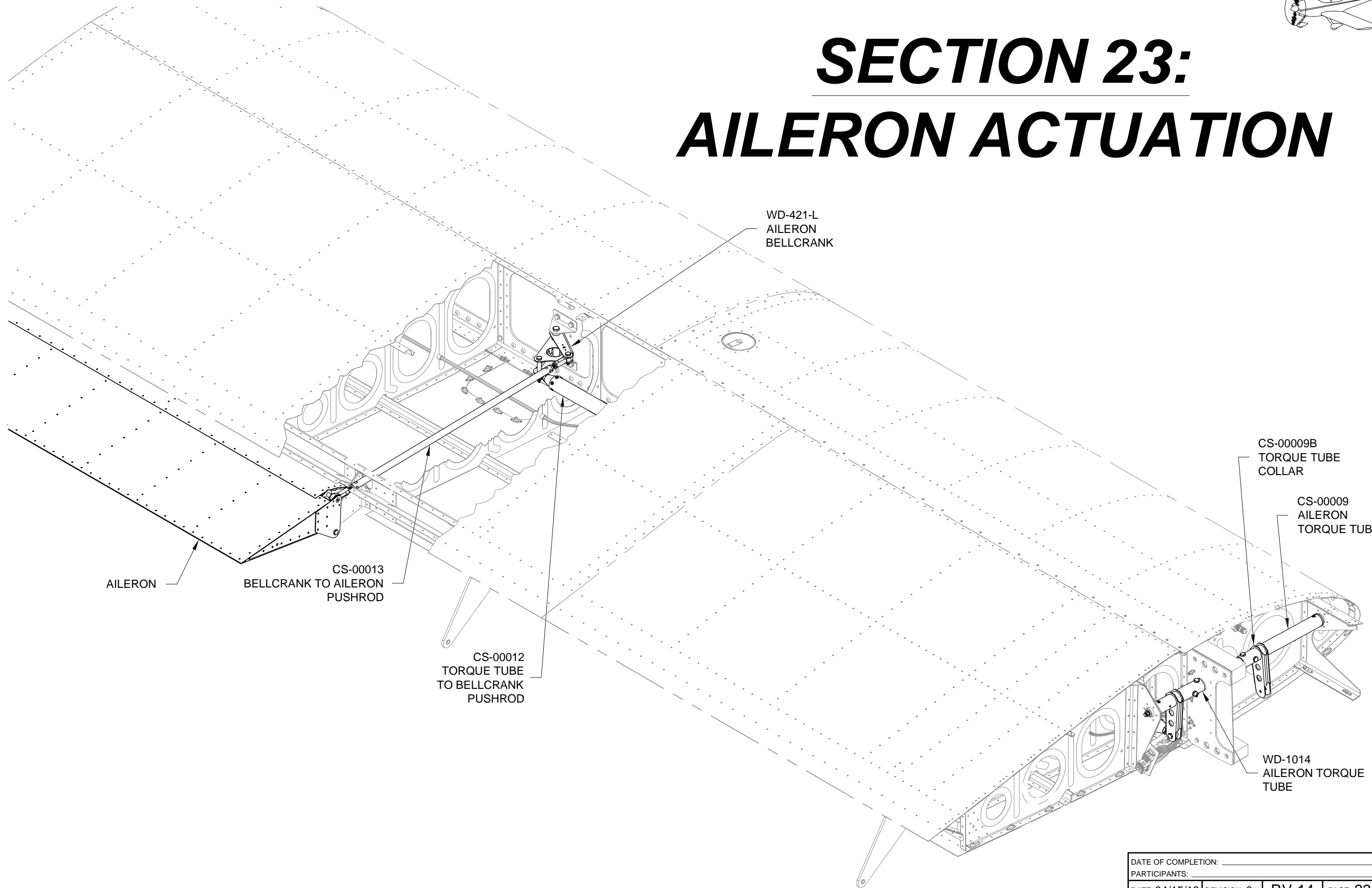


SECTION 23: AILERON ACTUATION





Step 1: Secure the Left Wing in the Cradle assembled on Page 17-02. See Figure 1.

Attach the Aileron to the W-1014 Outboard Aileron Hinge Bracket and W-1013 Inboard Aileron Hinge Bracket in the Wing as shown in Figure 1 and Figure 2.

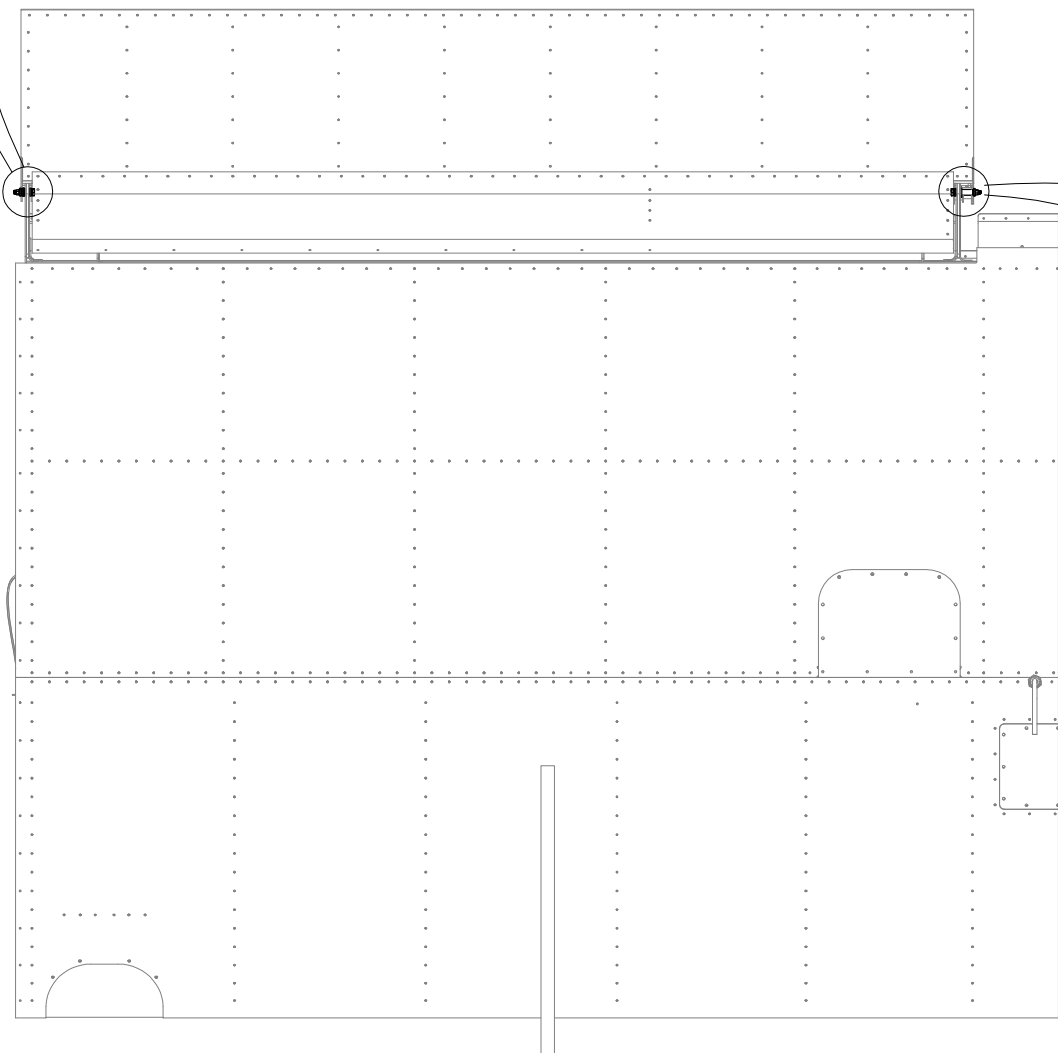
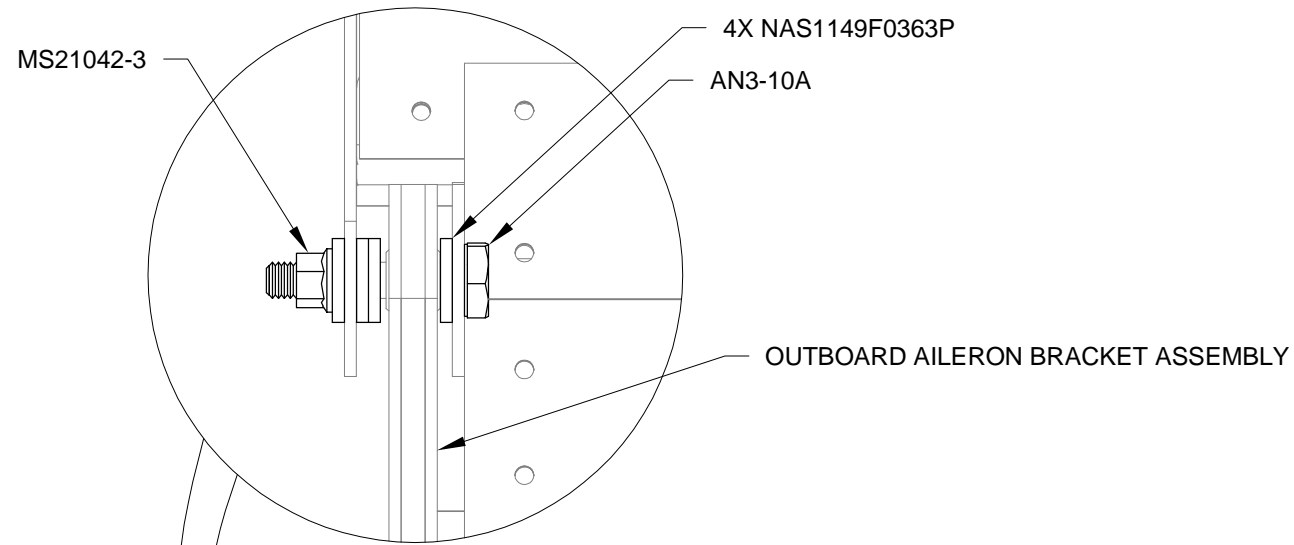


FIGURE 2: AILERON ATTACH HARDWARE

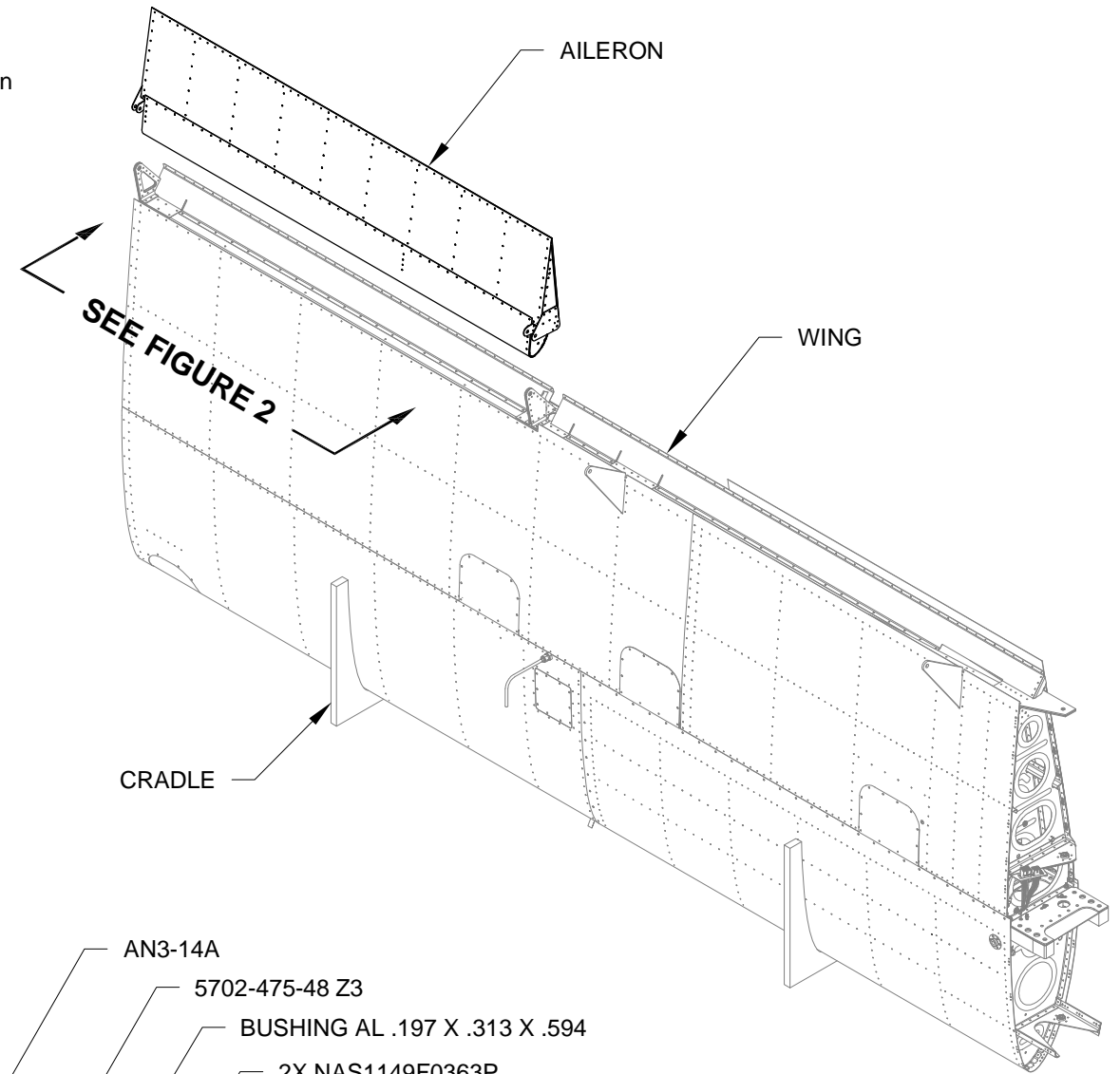
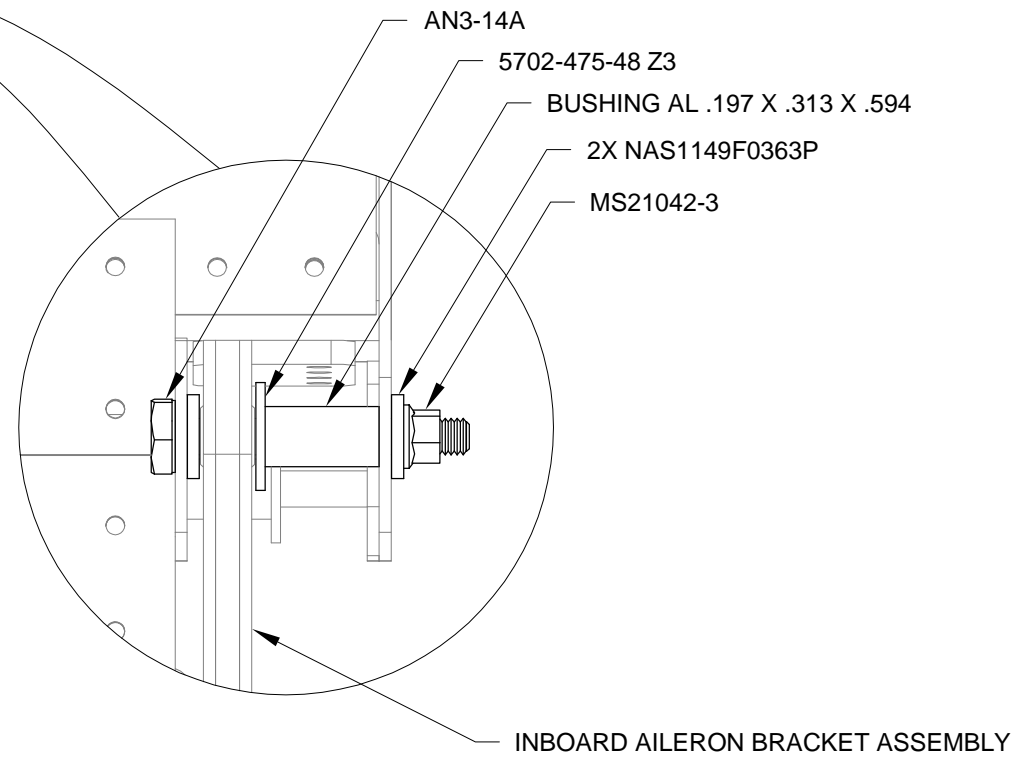
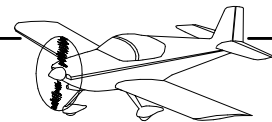


FIGURE 1: AILERON & WING





Step 1: Fabricate two CS-00012 Torque Tube to Bellcrank Pushrods by cutting two pieces of AT6-035 X 1 1/8 to the length shown in Figure 1.

A hacksaw with a fine tooth blade or die grinder with an abrasive cutting disc works well here.

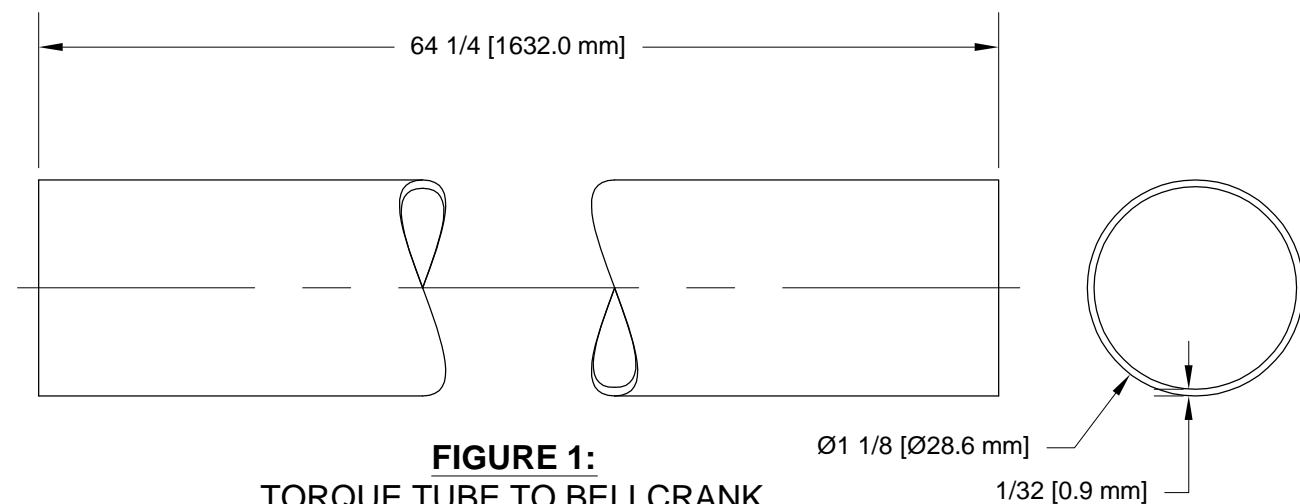


FIGURE 1:
TORQUE TUBE TO BELLCRANK
PUSHROD FABRICATION

Step 2: Cut-out Page 23-11, Figure 1 and use it as a wrap-around template for locating the rivet holes in both ends of both CS-00012 Torque Tube to Bellcrank Pushrods.

Use clear tape to make the template into a ring and align it with the end of the pushrod.

Center-punch the "cross hairs" in the wrap-around template. Remove the template.

Drill #40 the six pilot holes in each end of both torque tube to bellcrank pushrods using the center-punch marks as drill guides.

Deburr the holes in the torque tube to bellcrank pushrods.

Step 3: Sand the outer diameter of a VA-111 Threaded Rod End as required to allow a tight slip fit into the end of one of the CS-00012 Torque Tube to Bellcrank Pushrods.

Proper engagement of the threaded rod end in the torque tube to bellcrank pushrod is when the end of the tube coincides with the edge of the taper in the threaded rod end. See Figure 2.

Match-Drill #30 the threaded rod end using the pilot holes in the torque tube to bellcrank pushrod as drill guides. Insert clecos in the holes as match-drilling progresses around the circumference of the torque tube to bellcrank pushrod.

Repeat until the threaded rod ends have been match-drilled to both ends of the torque tube to bellcrank pushrods.

Mark the threaded rod ends so that they can be re-installed in the same position as when they were match-drilled.

Remove the threaded rod ends from the torque tube to bellcrank pushrods and deburr the holes.

Prime the interior, exterior and tube ends of the threaded rod ends and torque tube to bellcrank pushrods.

Permanently install the threaded rod ends to the torque tube to bellcrank pushrods using the rivets called-out in Figure 2.

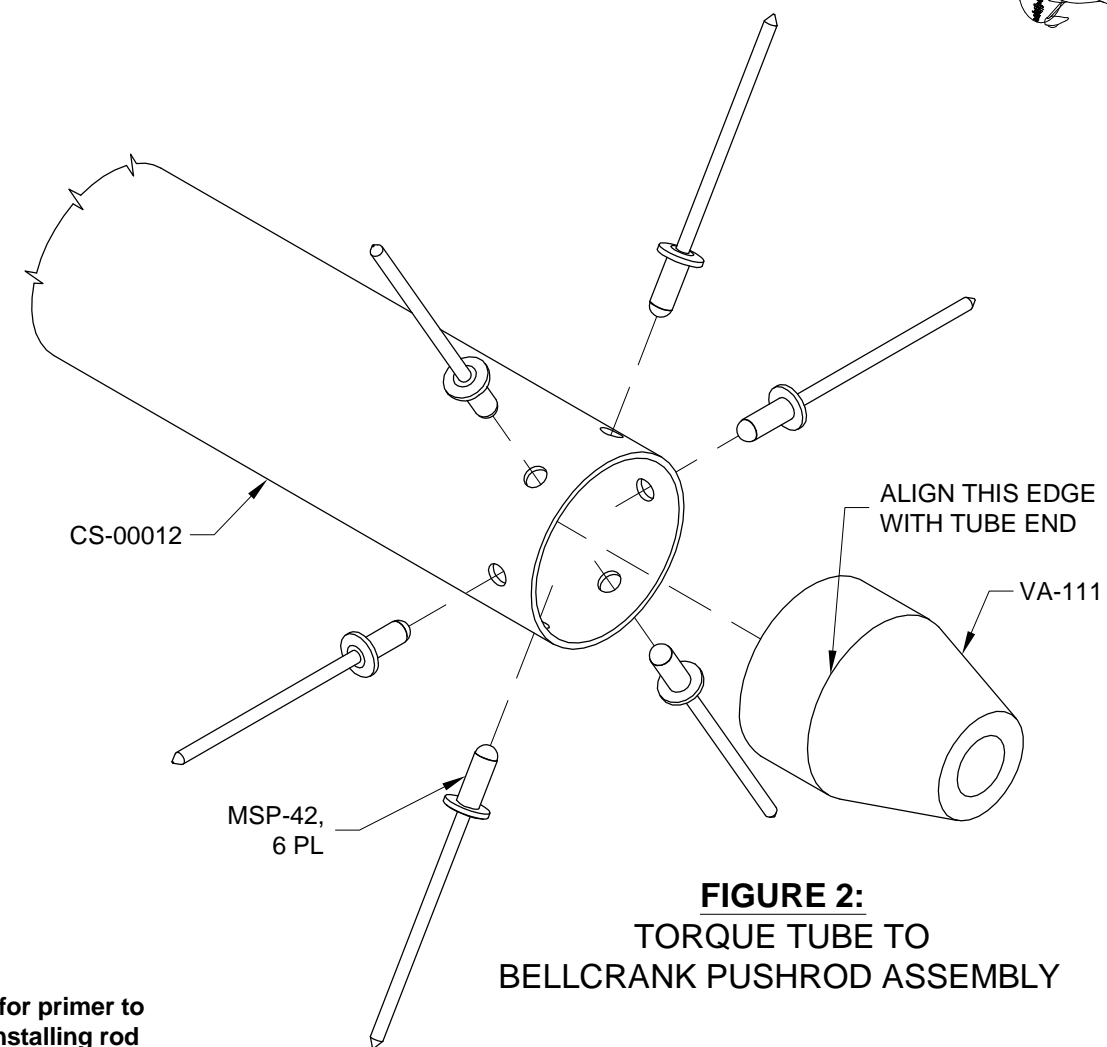


FIGURE 2:
TORQUE TUBE TO
BELLCRANK PUSHROD ASSEMBLY

NOTE: Allow time for primer to fully cure before installing rod end bearings.

Step 4: Install rod end bearings and jam nuts into the VA-111 Threaded Rod Ends as shown in Figure 3.

The correct engagement of the rod end bearings yields a bearing center-to-bearing center length of 67 7/16 [1712.9 mm].

The rod end bearing engagement may be adjusted during installation of the CS-00012 Torque Tube to Bellcrank Pushrod.

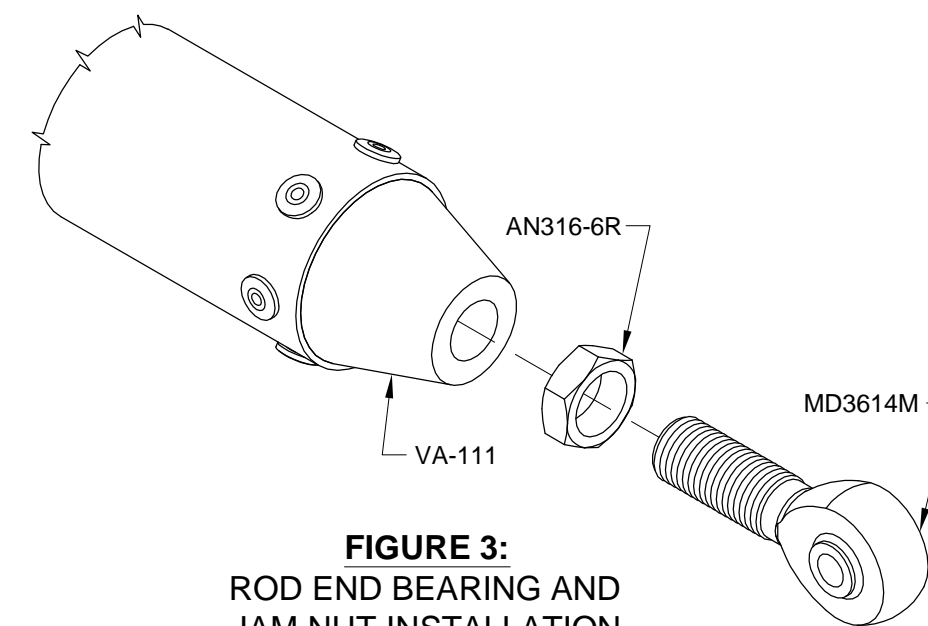
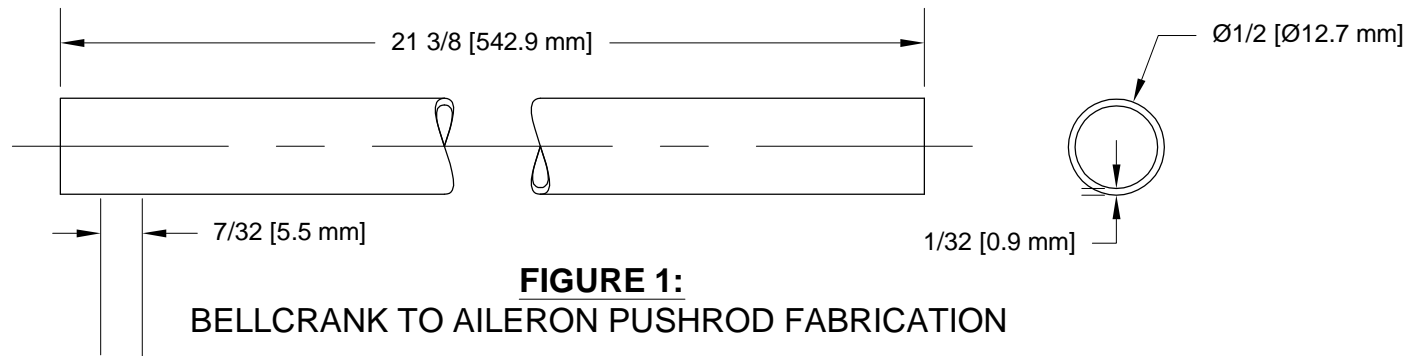


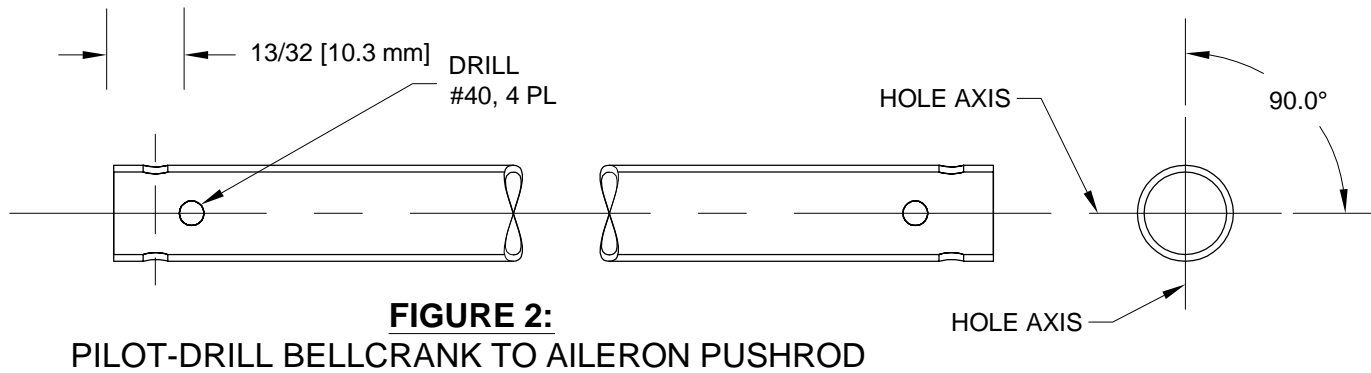
FIGURE 3:
ROD END BEARING AND
JAM NUT INSTALLATION

Step 1: Fabricate two CS-00013 Bellcrank to Aileron Pushrods by cutting two pieces of ST4130-035 X 1/2 (powder coated) to the length shown in Figure 1.



Step 2: Drill #40 the four pilot holes in each end of both CS-00013 Bellcrank to Aileron Pushrods as shown in Figure 2. Use a drill press to drill the holes and use a vee-block to support the pushrod tube while drilling.

Deburr the holes in the bellcrank to aileron pushrods.



Step 3: Insert an AN490-HT8P Threaded Rod End into the end of one of the CS-00013 Bellcrank to Aileron Pushrods until the step on the threaded rod end rests on the end of the bellcrank to aileron pushrod.

Match-Drill #30 the threaded rod end using the pilot holes in the bellcrank to aileron pushrod as drill guides. Insert clecos in the holes as match-drilling progresses.

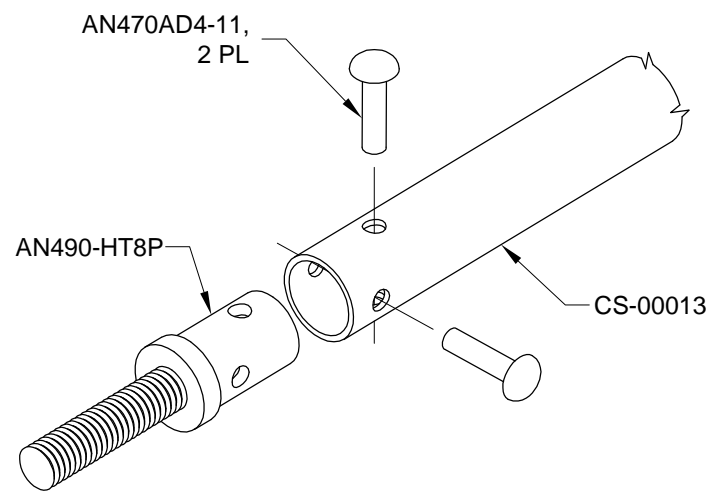
Repeat until threaded rod ends have been match-drilled to both ends of the bellcrank to aileron pushrods.

Mark the threaded rod ends so that they can be re-installed in the same position as when they were match-drilled.

Remove the threaded rod ends from the bellcrank to aileron pushrods and deburr the holes.

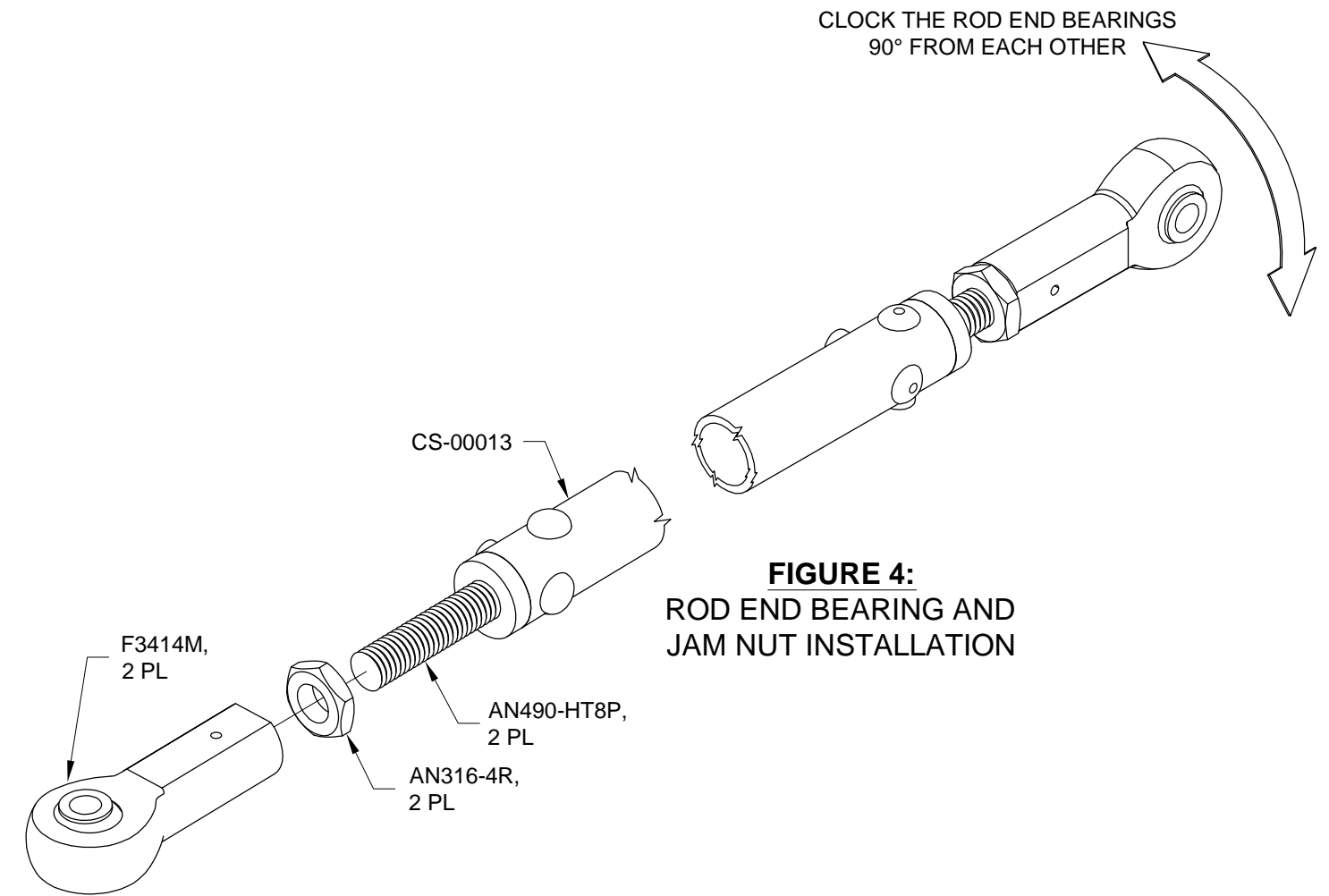
Prime the inside of the bellcrank to aileron pushrod.

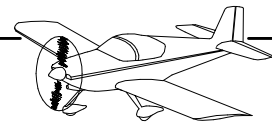
Permanently install the threaded rod ends to the bellcrank to aileron pushrods as shown in Figure 3. These rivets can be difficult to set without them leaning over. Use a hand squeezer to squeeze them a little at a time. If the rivet begins to lean over, adjust the position of the rivet in the squeezer dies to oppose the leaning tendency.



Step 4: Install rod end bearings and jam nuts into the AN490-HT8P Threaded Rod Ends as shown in Figure 4.

The correct engagement of the rod end bearings yields a bearing center-to-bearing center length of 25 1/4 inches [641.2 mm]. The rod end bearing engagement may be adjusted later during installation of the CS-00013 Bellcrank to Aileron Pushrod.





Step 1: Cleco a nutplate to the W-421-R Aileron Bellcrank through the screw hole. This nutplate allows for attachment of an autopilot servo pushrod and is installed on the right aileron bellcrank only.

Final-Drill #40 the nutplate rivet holes in the right aileron bellcrank.

Rivet a nutplate to the Aileron Bellcrank as shown in Figure 1.

Final-Drill #12 the .188 [4.8 mm] holes in both aileron bellcranks.

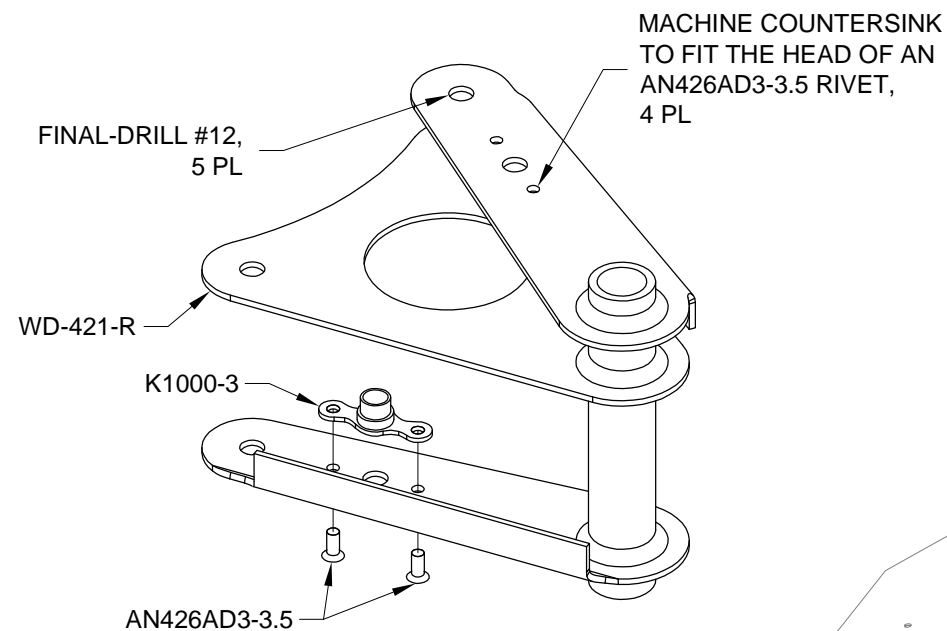
Step 2: Check that the length of both of the BUSH BS-.245 X .375 X 2.781 Aileron Bellcrank Bushings are between 2 3/4 inches [69.9 mm] and 2 25/32 inches [70.6 mm]. Trim if/as required.

Check that an AN4 bolt will fit the inside diameter of the aileron bellcrank bushings. If required, enlarge the inside diameter of the bushings using a 1/4 [6.4 mm] drill or reamer.

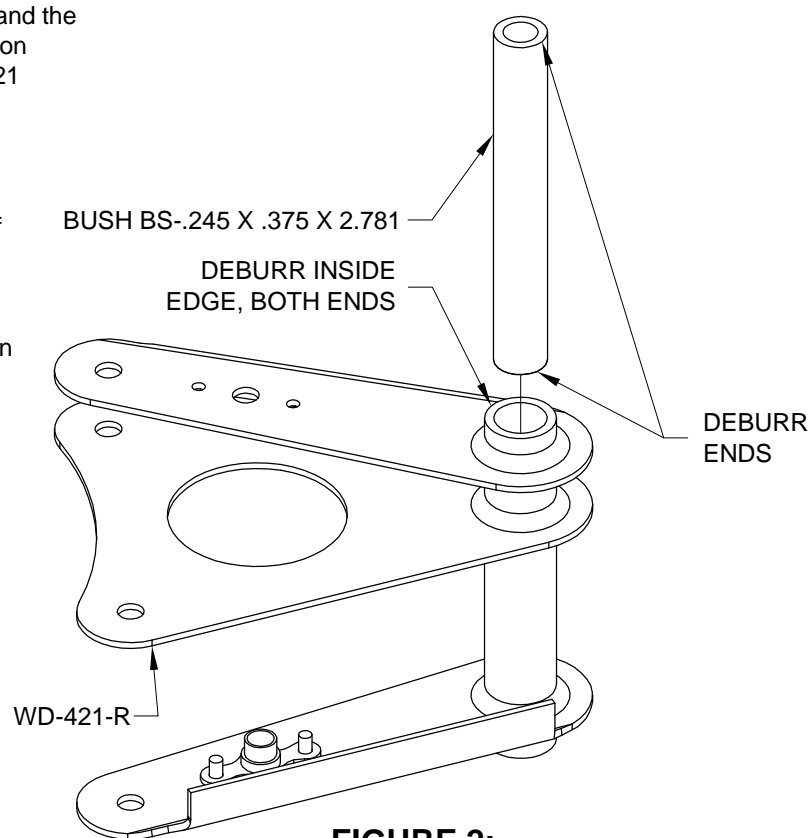
Deburr the ends of the aileron bellcrank bushings and the inside edge and ends of the pivot tubes in the aileron bellcrank so that they slide easily inside the WD-421 Aileron Bellcranks as shown in Figure 2.

The pivot tube of the aileron bellcrank must be 1/32 [0.8 mm] to 1/16 [1.6 mm] shorter than the aileron bellcrank bushing. File the ends of the aileron bellcrank pivot tubes if/as required to achieve the correct length.

Insert an aileron bellcrank bushing into each aileron bellcrank as shown in Figure 2.



**FIGURE 1:
AILERON BELLCRANK
NUTPLATE INSTALLATION**

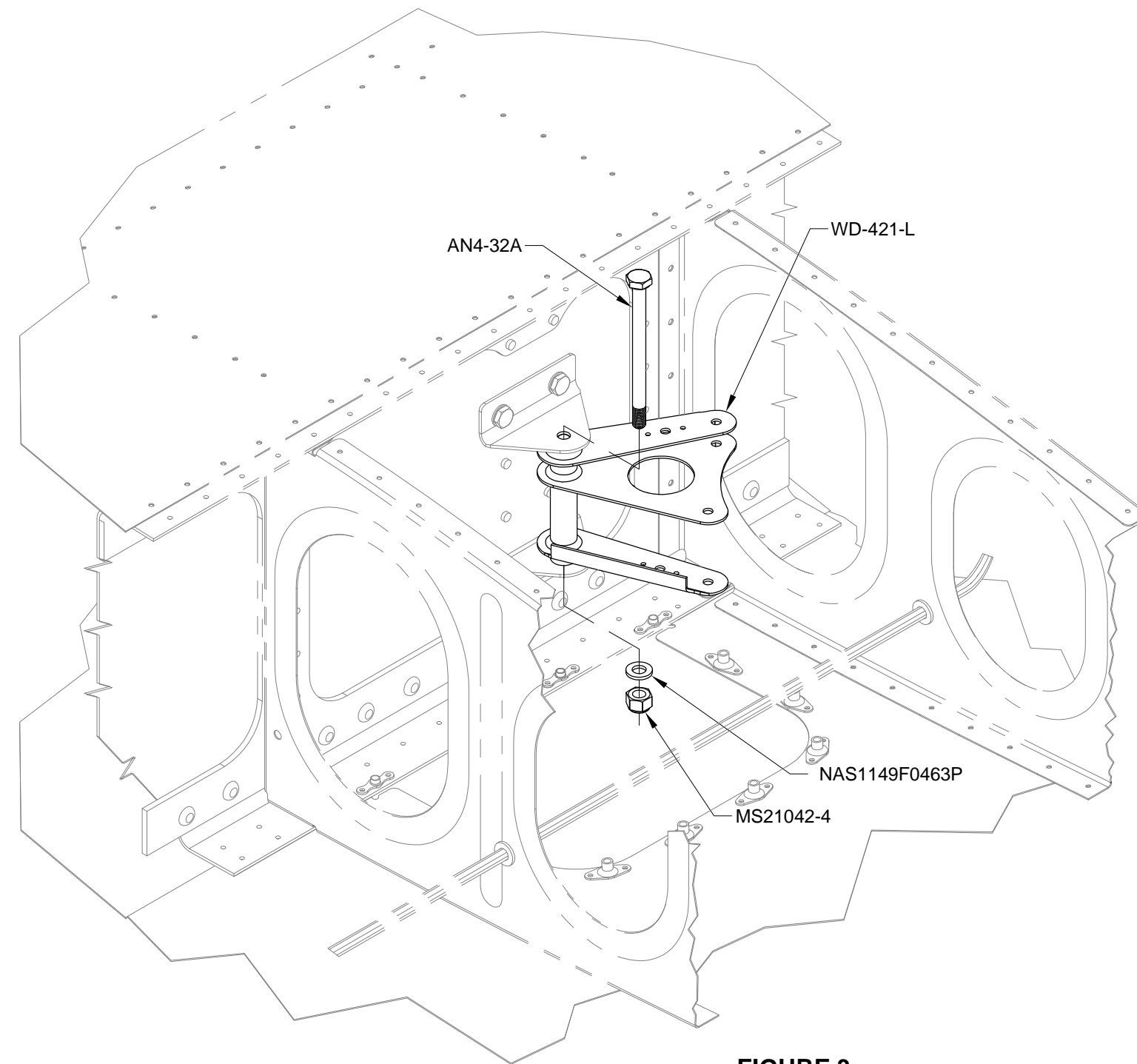


**FIGURE 2:
AILERON BELLCRANK
BUSHING INSTALLATION**

Step 3: Install the WD-421-L Aileron Bellcrank and BUSH BS-.245 X .375 X 2.781 Aileron Bellcrank Bushing subassembly into the left wing as shown in Figure 2.

Install the WD-421-R Aileron Bellcrank and BUSH BS-.245 X .375 X 2.781 Aileron Bellcrank Bushing subassembly into the right wing.

When the nuts are torqued to the value called-out in Section 5.20, the aileron bellcranks must rotate freely on their aileron bellcrank bushings.



**FIGURE 3:
AILERON BELLCRANK INSTALLATION
(LEFT UPPER WING SKIN OMITTED FOR CLARITY)**



Step 1: Insert CS-0009B Torque Tube Collar through the forward side of the 1 1/8 inch [28.6 mm] diameter hole in the spar web. See Figure 1.

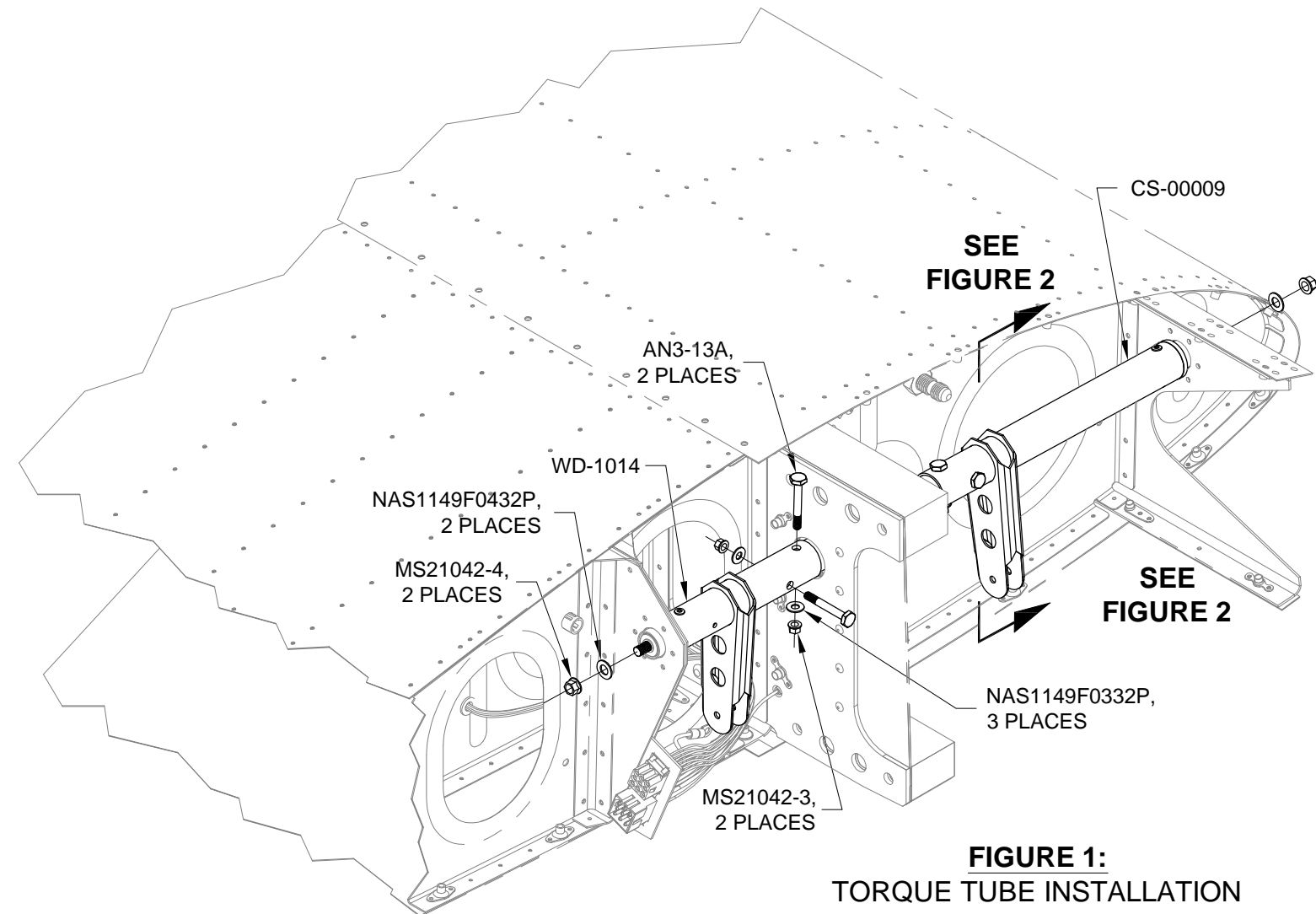
Step 2: Angle the CS-0009B Torque Tube Collar down as it extends aft through the hole in the spar web and slip the WD-1014 Aft Torque Tube Subassembly over the torque tube collar. Engage the WD-1014 Aft Torque Tube Subassembly and the torque tube collar far enough to allow the threaded ends of the torque tube subassemblies to be inserted into the flanged bearings riveted into the wing structure. Disengage the aft torque tube subassembly and torque tube collar slightly as the threaded ends of the torque tube subassemblies are inserted into the bearings. See Figure 1.

Step 3: Install washers and nuts on the pushrod ends of the CS-0009 and WD-1014 Torque Tube Subassemblies as shown in Figure 1.

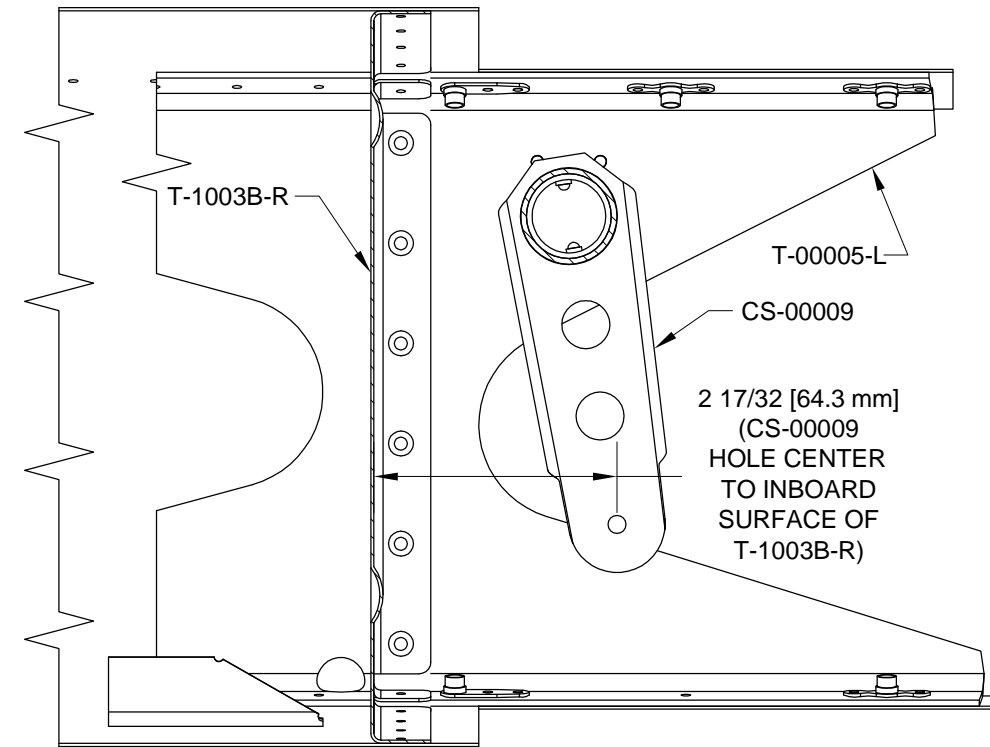
Step 4: Check to see if the bolt holes in the WD-1014 Aft Torque Tube Subassembly and CS-0009B Torque Tube Collar line-up properly.

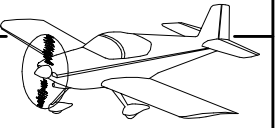
If the bolt holes in the aft torque tube subassembly and torque tube collar misalign in the forward/aft direction then NAS1149F0463 or NAS1149F0432 washers should be installed between the torque tube subassemblies and the flanged bearings as required to eliminate the forward/aft hole misalignment. There should be little or no pre-load on the wing structure when the aileron torque tube installation is complete.

Install bolts, washers, and nuts as shown in Figure 1 to attach the aft torque tube subassembly to the torque tube collar.



Step 5: Figure 2 shows the "neutral position" of the CS-0009 Forward Torque Tube Subassembly. The correct rigging of the aileron actuation system is defined by the forward torque tube subassembly, WD-421 Aileron Bellcrank, and Aileron all being in their neutral positions at the same time.





NOTE: CHECK PRINTED SCALE 1:1
BEFORE USING THE TEMPLATE!

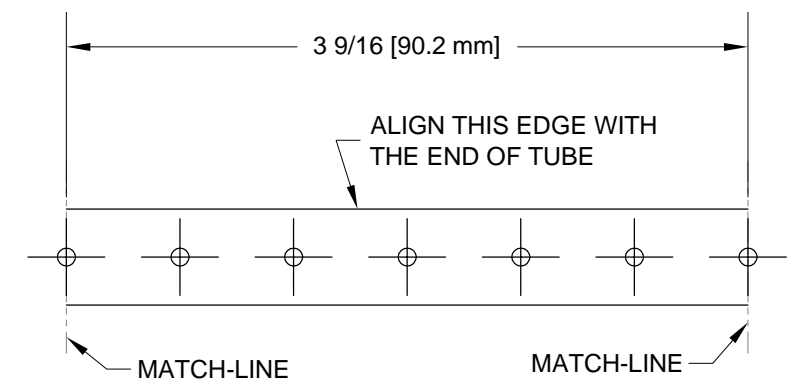


FIGURE 1:
PUSHROD RIVET
HOLE LOCATION
TEMPLATE



THIS PAGE INTENTIONALLY LEFT BLANK