#### **REVISION DESCRIPTION:**

#### 1) Page: 12-03 REV 1:

Step 1: and Figure 1: Final-Drill s.b. Match-Drill.

Step 4: Updated flox mixture description to match later description (removed "peanut butter-like" description).

#### Page 12-07 REV 1:

Step 2: Added "Match-Drill #40" before "Final-Drill #30"

Step 4: Moved "machine countersink" to beginning of second sentence and deleted "Deburr"

#### Page 12-08 REV 1:

In Figure 1 moved forward bend to better match installation with empennage fairing.

#### Page 12-09 REV 1:

Step 1: Added "Adjust the bends of the empennage gap cover if/as required to achieve a good fit."

Step 2: Added "...and cleco..." aft "Match-Drill"

#### 2) Page 12-10 REV 1:

Page completely redone, new instructions and images

Page 12-11 REV 1:

Complete re-write

Page 12-12 REV 1:

Complete re-write

Page 12-13 REV 1:

Complete re-write

Page 12-14 REV 1:

Was page 10

Page 12-15 REV 0:

Was page 11

Page 12-16 REV 0:

Was page 12





NOTE: The steps on this page apply only if installing a tail light. Detailed tail light installation instructions are supplied in Section OP-56 Tail Lighting. If not installing the tail light, skip to Page 12-04.

Step 1: Center the R-00911B Rudder Fairing Doubler on the aft end of the R-911 Bottom Rudder Fairing as shown in Figure 1. Tape in place.

Match-Drill #30 and cleco the holes called out in Figure 1. Match-Drill the #43 holes called out in Figure 1.

Use a marker to trace around the opening in the rudder fairing doubler. Remove the rudder fairing doubler, deburr, and machine countersink as shown in Figure 1.



Step 2: Remove hatched area of the R-911 Rudder Bottom Fairing as shown in Figure 2. Drill several holes around the inside of the traced line, but stop short of the line traced in Step 1. Finish removing the material up to the traced line with sandpaper wrapped around a round object.

Step 3: Use coarse sandpaper, 60 grit works well, to roughen the surface of the R-911 Rudder Bottom Fairing and the facing surface of the R-00911B Rudder Fairing Doubler.

Clean both surfaces well with a solvent such as denatured alcohol.

Step 4: Mix a small batch of epoxy resin and add flox to a smooth consistency that will not drip, but is not too stiff to sag when the mixing cup is tipped from side to side. Spread this mixture on the roughened surface of the R-911 Rudder bottom Fairing.

Install the R-00911B Rudder Fairing Doubler with the rivets called out in Figure 2. There should be enough of the epoxy resin flox mixture between the parts to come up to, or just beyond, the adjacent edges of the parts. These edges can be sanded to a smooth finish after curing.

Run a drill bit through the top and bottom holes left open for later attachment of tail light (see Figure 1 for drill size). Clean bit before epoxy cures.

Allow assembly to cure before sanding or installing the rudder bottom fairing.

Step 5: Tap 4-40 the holes for light mounting screws (screws installed in Section OP-56) as shown in Figure 2.



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NOTE: It is necessary to modify the R-911 Bottom Rudder Fairing to clear the tail spring in tail wheel configurations. Steps on this page apply only to tail wheel configurations. Skip to Page 12-05 for tri-gear configuration.

Step 3: Remove hatched area of the R-911 Rudder Bottom Fairing as shown in Figure 3, but stop short of the line traced in Step 2. Finish removing the material up to the traced line with a sanding block.

Step 1: Measure and mark the location shown in Figure 1 on the R-911 Rudder Bottom Fairing. The mark should be located along the center line of the part as shown in Figure 2.



### FIGURE 1: MARKING RUDDER BOTTOM FAIRING

Step 2: Cut and paste the Rudder Bottom Fairing Trim Template (found on Page 12-13) to stiff material such as poster board. Remove hatched area in the center of the template so that it will fit over the end of the R-911 Rudder Bottom Fairing as shown in Figure 2.





#### NOTE: Steps 4-7 see Page 12-06 Figure 2, 3 and 4 for similar fabrication process.

Step 4: Cut two pieces of glass fabric large enough to fit over the opening created in the R-911 Rudder Bottom Fairing. Glass fabric should be oversized to allow for trimming and sanding later.

Coat a piece of scrap aluminum sheet with wax (candle wax will work) to use as a form for the fiberglass patch. Lay up the two layers of glass fabric using epoxy resin. Apply peel ply or similar material over the patch for a good surface finish.

Allow patch to cure flat, then remove peel ply fabric. The patch should pop off of the aluminum sheet easily when the aluminum is gently flexed.

Step 5: Place the fiberglass patch over the opening cut in the R-911 Rudder Bottom Fairing in Step 3. Trace edge of opening onto patch piece.

Remove patch and trim the piece, leave a small amount of material beyond the traced line. The edges will be sanded after the parts have bonded together.

Step 6: Sand surface of R-911 Rudder Bottom Fairing where parts meet, and the interior around the opening with coarse sand paper. Clean all surfaces with a solvent such as denatured alcohol.

Bond the patch to the rudder bottom fairing with a small amount of epoxy resin and allow to set.

Step 7: Cut a piece of glass fabric to fit inside the R-911 Rudder Bottom Fairing. The template used to cut the hole in the rudder bottom fairing has a trace line for the interior fabric that allows for 1/2 inch [12.7 mm] overlap.

Apply a fillet of flox mixture around the interior of the cutout. Place glass fabric layer inside the rudder bottom fairing and bond to patch and rudder bottom fairing with epoxy resin.

Allow rudder bottom fairing to cure fully before sanding patch edges.

# FIGURE 3: RUDDER BOTTOM FAIRING

<u>Step 1:</u> Trim any extra material from the recessed area of the R-909 Rudder Tip Fairing per dimension given in Figure 1. Coarse 80 grit sandpaper on a wood block works well for this step.



### FIGURE 1: RUDDER TIP MODIFICATION

<u>Step 2:</u> Trim the aft edge of the flange on the R-909 Rudder Tip Fairing as shown in Figure 2 to remove interference between flange and the Rudder Assembly trailing edge.

Step 3: Insert the R-909 Rudder Tip Fairing into the end of the rudder assembly and push the tip firmly forward. Check that the aft end is aligned with the trailing edge of the rudder. When satisfied with the fit, match-drill #40 and cleco the rudder assembly to the rudder tip fairing.

Working from front to back, final-drill #30 the holes just drilled in the Rudder Assembly and rudder tip fairing. See Figure 2.

<u>Step 4:</u> Remove the R-909 Rudder Tip Fairing from the Rudder Assembly. Deburr and dimple the rudder tip attach holes in the Rudder Assembly for CS4-4 blind rivets as shown in Figure 2. Machine countersink the holes in the rudder tip fairing for the dimples in the Rudder Assembly.

Step 5: Cleco then rivet the R-909 Rudder Tip Fairing to the Rudder Assembly using the rivets called out in Figure 2.



NOTE: Complete Steps 6-9 for both the right and left elevator assemblies. E-912 Elevator Tip Fairing Installation for the left side is shown.

<u>Step 6:</u> Trim the aft edge of the flange on the E-912 Elevator Tip Fairing as shown in Figure 3 to remove interference between the flange and the elevator trailing edge and allow the tip to be fully inserted into the end of the elevator. Trimming the width of the molded flange may also be required. See Page 12-02 Figure 1 for the correct width.

<u>Step 7:</u> Insert the E-912 Elevator Tip Fairing into the end of the elevator. Push the fairing tightly towards the front and check that the aft end is aligned with the trailing edge of the elevator then match-drill #40 and cleco the elevator tip fairing using the holes in the E-901A Top Elevator Skin, E-901B Bottom Elevator Skin and E-913 Elevator Counterbalance Skin as a drill guides. Final-Drill the holes #30. Work from the front towards the trailing edge.

<u>Step 8:</u> Remove the E-912 Elevator Tip Fairing from the Elevator Assembly. Deburr and dimple the elevator tip attach holes in the E-1001A Top Elevator Skin, E-1001B Bottom Elevator Skin and E-913 Elevator Counterbalance Skin for a CS4-4 blind rivet. Machine countersink the holes in the elevator tip fairing for the dimples in the elevator skins.

Step 9: Cleco and rivet the E-912 Elevator Tip Fairing onto the Elevator Assembly per the callouts in Figure 3.



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NOTE: Complete Steps on this page for both sides of the Horizontal Stabilizer Assembly.

NOTE: Temporarily attach the Elevator Assembly to the Horizontal Stabilizer Assembly for the following steps. See Section 11 for assembly instructions.

Step 1: Trim the width of the molded flange on the HS-910 Horizontal Stabilizer Tip Fairing if required to meet the dimensions given on Page 12-02 Figure 1. Progressively trim away the aft edge of the horizontal stabilizer tip fairing to leave a minimum 1/8 inch gap between the aft edge of the tip fairing and the forward face of the elevator counterbalance arm. Move the elevator to check clearance at all positions. See Figure 1.

Step 2: Match Drill #40 the HS-910 Horizontal Stabilizer Tip Fairing to the HS-901 Horizontal Stabilizer Skin. Final-Drill #30 the #40 holes.



FIGURE 1: CREATING GAP

Step 3: Take a piece of scrap aluminum sheet large enough to fit over the aft opening of the HS-910 Horizontal Stabilizer Tip Fairing. Bend scrap sheet to fit the angle of the horizontal stabilizer tip fairing aft edge (exact angle is not critical).

Place the horizontal stabilizer tip on the aluminum scrap sheet and trace the edge onto the sheet. Coat the scrap aluminum sheet with wax (candle wax will work).

Step 4: Using the traced area as a guide, cut two layers of glass fabric larger than traced area to allow for trimming and sanding later. Lay up two layers of glass fabric using epoxy resin on the bent sheet. Apply peel ply or similar material over the patch for a good surface finish.

Allow patch to cure, then remove peel ply fabric. The patch should pop off of the aluminum sheet easily when the aluminum is gently flexed. See Figure 2.



FIGURE 2: FIBERGLASS FABRICATION (LEFT AND RIGHT LAY-UPS SHOWN)

Step 5: Cleco the HS-910 Horizontal Stabilizer Tip Fairing to the Horizontal Stabilizer Assembly. Place the fiberglass patch over the opening in the HS-910 Horizontal Stabilizer Tip Fairing and trace edge of opening onto patch piece.

Remove patch and trim the piece, leave a small amount of material beyond the traced line. The edges will be sanded after the parts have bonded together. See Figure 3 and Figure 4.

Step 6: Sand surface of HS-910 Horizontal Stabilizer Tip Fairing where parts meet, and the interior around the opening with coarse sand paper. Clean all surfaces with a solvent such as denatured alcohol.

Bond the patch to the horizontal stabilizer tip fairing with a small amount of epoxy resin. Secure patch to the fairing with tape and allow to cure.

Step 7: Cut a piece of glass fabric to fit inside the HS-910 Horizontal Stabilizer Tip Fairing. Allow for 1/2 inch [12.7 mm] overlap.

Apply a fillet of flox mixture around the interior where the two pieces meet. Place this glass fabric layer inside the horizontal stabilizer tip fairing and bond to the patch and the horizontal stabilizer tip fairing with epoxy resin.

Allow horizontal stabilizer tip fairing to cure fully before sanding patch edges.



### FIGURE 3: FIBERGLASS PATCH

Step 8: Deburr and dimple the horizontal stabilizer tip attach holes in the HS-901 Horizontal Stabilizer Skin for CS4-4 blind rivets. Machine countersink the holes in the HS-910 Horizontal Stabilizer Tip Fairing for the dimples in the horizontal stabilizer skins.

Step 9: Cleco and rivet the HS-910 Horizontal Stabilizer Tip Fairing to the Horizontal Stabilizer Assembly. See Figure 5.



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# FIGURE 4: TIP FAIRING MODIFICATION

<u>Step 1:</u> Trim the width of the molded flange on the VS-909 Vertical Stabilizer Tip Fairing if required to meet the dimensions given on Page 12-02 Figure 1. Trim away the aft edge of the vertical stabilizer tip fairing so the aft edge is perpendicular to the bottom surface and flush with the vertical edge on the VS-801PP Skin as shown in Figure 1. This will provide a minimum 1/8 gap between the aft face of the vertical stabilizer tip fairing and the forward face of the rudder counterbalance arm.

<u>Step 2:</u> Match-Drill #40 then final-drill #30 and cleco the VS-909 Vertical Stabilizer Tip Fairing using the holes in the VS-801PP Skin as a drill guide. Work from the front to back.

<u>Step 3:</u> Close in the aft facing opening of the VS-909 Vertical Stabilizer Tip Fairing by fabricating a fiberglass patch. Lay up two layers of glass fabric on a sheet of aluminum scrap material which has been coated with wax. Note that the patch needs to be longer than the opening in the vertical stabilizer tip fairing to allow for gap between fairing and VS-706 Tip Rib.

Allow the patch to cure. Gently flex the aluminum sheet and the fiberglass patch should release.

Trace, trim and attach the patch to the aft edge of the vertical stabilizer tip fairing using the same technique described Page 12-06 Steps 4-7 for the HS-910 Horizontal Stabilizer Tip Fairing. See Figures 2, 3 and 4 this page.

<u>Step 4:</u> Dimple the holes in the VS-801PP Skin for CS4-4 rivets. Machine countersink #30 the VS-909 Vertical Stabilizer Tip Fairing holes for dimples in the skin.

Finish the edges of the vertical stabilizer tip fairing patch.

<u>Step 5:</u> Rivet the VS-909 Vertical Stabilizer Tip Fairing to the Vertical Stabilizer Assembly using the hardware called out in Figure 1.







FIGURE 2: TRACE VERTICAL STABILIZER TIP FAIRING

# FIGURE 3: TRIMMED FAIRING PATCH MATERIAL

Step 6: Attach the R-911 Rudder Bottom Fairing to the Rudder Assembly using the hardware called out in Figure 5.



FIGURE 5: MATCH-DRILLING RUDDER BOTTOM FAIRING

FIGURE 1: VERTICAL STABILIZER TIP FAIRING INSTALLATION





# FIGURE 4: VERTICAL STABILIZER TIP FAIRING AND PATCH

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#### NOTE: Attach the Vertical Stabilizer Assembly to the Aft Fuse Assembly for the following steps. See Section 11 for assembly instructions.

the bends of the empennage gap cover if/as required to achieve a good fit.

F-14111-L and F-14111-R Empennage Gap Covers. Match-Drill #40 and cleco the left empennage gap cover using a 12" extension bit as shown in Figures 1 and 2. Remove the left side empennage gap cover.

manner as the left. See Figure 2. Reinstall the left side empennage gap cover.





NOTE: The F-01496 Empennage Fairing is supplied in the Finish Kit.

NOTE: Use a slow turning drill when blind drilling to prevent the bit from wandering. Press the fairing tightly against metal surface before drilling.

Step 1: Trim the F-01496 Empennage Fairing to 1/8 [3.2 mm] outside of the scribe line as shown in Figure 1.

Step 2: Apply tape to the aft upper inner surface of empennage fairing corners to prevent scratching the Vertical Stabilizer Assembly during the fitting process.

Step 3: Hold the empennage fairing in position on the empennage and check for continuous contact between the fairing flanges and the aircraft skins.

Mark the fairing and sand to remove any thick spots. See Figure 1.

Step 4: Hold fairing in position and check the empennage fairing fit to the leading edges of the Horizontal and Vertical Stabilizer Assemblies as shown in Figure 2.

Mark areas of interference and sand to shape as required to match the profile of the fairing to the leading edges.

Step 5: If there is a gap between the Horizontal Stabilizer Assembly leading edge and the empennage fairing that is more than 1/16 [1.6 mm] when the Vertical Stabilizer Assembly and fairing are in contact, trim the fairing at the contact point between the Vertical Stabilizer Assembly and the empennage fairing as shown in Figure 3.

Recheck the fit, sand if required to achieve a better fit.

It is acceptable to trim to or beyond the scribe line as required to allow the fairing to move aft into alignment with the Horizontal Stabilizer Assembly as shown in Figure 2.



FIGURE 1: EMPENNAGE FAIRING TRIM





# FIGURE 3: EMPENNAGE FAIRING AT VERTICAL STABILIZER

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FIGURE 2: EMPENNAGE FAIRING PLACEMENT



NOTE: If the F-01496 Empennage Fairing was sanded at the location of a screw attach point, and visibility is hindered, sand the inner surface with 320 grit sandpaper and wet the surface to allow good visibility through the part.

<u>Step 2:</u> Blind-Drill #40 the holes through the empennage fairing starting in the forward most fairing attach holes of the Vertical Stabilizer Assembly and the Horizontal Stabilizer Assembly. Work toward the back alternating side to side and clecoing each hole as it is drilled. See Figures 1 & 2.

Step 3: Blind-Drill #27 the holes around the front of the fairing that are common to the aft fuse skins and insert 1/8 clecos.

Final-Drill #27 the #40 holes drilled in Step 2.

Final-Drill #27 the aft upper hole in the F-14111-L & -R Empennage Gap Covers as shown in Figure 2.

<u>Step 4:</u> Machine countersink the #27 holes in the empennage fairing for #6 flush screws before removing the fairing from the Aft Fuselage Assembly. Countersinks that are slightly too shallow are preferred in fiberglass.

Step 5: Remove the empennage fairing and empennage gap covers from the Aft Fuselage Assembly.

Step 6: Dimple the upper aft hole in the empennage gap covers for the head of a flush #6 screw. See Figure 2.

Dimple the corresponding holes in the Vertical Stabilizer Assembly as shown in Figure 2. These dimples may be finished with a machine countersink if required to achieve a better final fit with the empennage gap covers.

<u>Step 7:</u> Using a nutplate with a #6 screw screwed through from the back side as a guide pin, match-drill #40 the nutplate attach holes into the Vertical Stabilizer Assembly and Horizontal Stabilizer Assembly. There will be some play between the screw and the hole, make an effort to center the screw in the hole while drilling. Cleco the first hole before drilling the second.



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Step 2: Dimple the nutplate attach holes in the Horizontal Stabilizer Assembly. Note that some of the nutplate attach holes will have very little edge distance on the rib flanges and the dimples will appear to form poorly. At this location the fairing will cover the



Step 1: Inspect the F-01496 Empennage Fairing edges for consistent contact with the skins. Mark on the skin and on the fairing in the areas where gap is occurring.

Step 2: Remove the fairing and adjust the finish trim line for screw hole edge distance as required see Page 12-11 Figures 1 & 2.

Trim the fairing to the scribe lines and/or marked lines around the perimeter.

Sand the trimmed edges smooth and scuff any areas that were marked as having a gap from the underlying skins.

Clean the surface with compressed air to remove dust.

Step 3: Apply thin cellophane packing tape as a release agent to fuselage, horizontal stabilizer skins, and vertical stabilizer skin in areas where gap was noticed. See Figure 1.

Step 4: Mix epoxy with flox to a smooth consistency that will not drip, but is not too stiff to sag when the mixing cup is tipped from side to side.

Smear the flox mixture onto the areas that had gaps. Carefully reinstall the fairing and attach with screws. Check for epoxy that squeezed out in gapped areas, and press flox mixture in from the outside if a gap is still apparent. Allow the epoxy to cure.

Step 5: In areas where the edge of the fairing is thicker than desired (possibly at the leading edge interfaces) apply tape to the adjacent metal skin for protection and sand fairing to the desired profile and thickness.

#### Step 6: Remove the fairing.

Use medium grit sandpaper to sand the inner surface of the fairing where it has contact with any metal skin when installed.

Clean the sanded areas and brush a wet coat of epoxy into the surface to seal in and cover all the weave of the fiberglass. This will prevent the fibers from wearing through the paint and metal skins in service.

The outer surface of the fairing can now be prepped for finishing as desired and all tape removed from the metal skins.

Step 7: Attach the empennage fairing using the hardware called out on Page 12-12 Figures 1 & 2.



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	16 [406.4 mm]



# TOM FAIRING TRIM TEMPLATE

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