# REVISION LIST

## CHAPTER 12 : VERTICAL CLOSEOUT

The following list of revisions will allow you to update the Legacy construction manual chapter listed above.

Under the “Action” column, “R&R” directs you to remove and replace the pages affected by the revision. “Add” directs you to insert the pages shown and “R” to remove the pages.

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<thead>
<tr>
<th>PAGE(S) AFFECTED</th>
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<tr>
<td>12-1 through 12-9</td>
<td>0/02-15-02</td>
<td>None</td>
<td>Current Revision is Correct</td>
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<tr>
<td>12-1</td>
<td>3/12-15-04</td>
<td>R&amp;R</td>
<td>Updated table of contents with page numbers.</td>
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<td>12-7</td>
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<td>12-7</td>
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Chapter 12: Vertical Closeout

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1. INTRODUCTION

2. PARTS LIST

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<th>PART NO. (P/N)</th>
<th>QTY</th>
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<tr>
<td>1</td>
<td>4044</td>
<td>1</td>
<td>Vertical Stabilizer/Rudder Skin, Left side</td>
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<tr>
<td>2</td>
<td>4460</td>
<td>2</td>
<td>Access Panel, Left/Right Elevator Weldment</td>
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<tr>
<td>3</td>
<td>4656</td>
<td>1</td>
<td>Lead Counterweight, Rudder</td>
</tr>
<tr>
<td>4</td>
<td>K1000-08</td>
<td>14</td>
<td>Nutplates</td>
</tr>
<tr>
<td>5</td>
<td>MS2-34</td>
<td>28</td>
<td>Rivets</td>
</tr>
<tr>
<td>6</td>
<td>MS24694-S3</td>
<td>14</td>
<td>Screw, Machine</td>
</tr>
</tbody>
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   Note:

   Optional Parts available through:
   (*) Lancair Avionics
   (**) Kit Components, Inc.
3. **CONSTRUCTION PROCEDURES**

A. **Counterweight Installation**

A 1. Fit the rudder counterweight as far forward as possible. Some trimming of the counterweight may be necessary.

A 2. Measure the weight of the rudder counterweight. It should weigh 3.0 lbs. or 1362 grams. Trim as necessary.

A 3. Pot the lead weight in place with epoxy/flox. Lead counterweight P/N: 4656

A 4. Install and fit a piece of 2 core 2 3/4" aft of the rib. The purpose of the compartment is to leave room for adding lead if necessary.

A 5. Apply a 2 BID reinforcement extending from the lead counterweight onto the rudder skin and onto the 2 core 2 rib.

A 6. Drill a 3/16" dia vent hole.
B. Left Vertical Skin Installation

Typical Vertical Tail Cross Section

Trim left vertical skin as necessary for a good fit in leading edge.

The trailing edges form a butt joint.

Left side of vertical skin

Carefully trim the left vertical skin in this area for a good fit to the horizontal stabilizer.

Fitting Left Vertical Skin
Fig. 12:B:1

Once properly fitted, drill for clecos every 2”-3”.

Prior to closing, you must carefully check the fit of the ribs and spars to the left vertical skin. We suggest using small pieces of play dough distributed evenly around the structure. Then practice the closing process (refer to figure 12 B:4) to check the fit.
Drill a series of 1/8" dia. holes close to the rudder counterweight closeout rib. These holes will be used as reference for cutting out the rudder counterweight.

Drill 1/8" diameter holes 3/16" aft of the pivot point of the upper and lower hinges.

**NOTE:**

DRILL HOLES IN BOTH LEFT AND RIGHT VERTICAL SKINS.
All compartments within the structure must have both a way to vent and a drain. A vent allows a passage for air with changing pressure. A drain allows water to escape. The drain should be in the lowest area of the compartment. The figure on the right shows a typical vent/drain arrangement.

Vent hole in rudder spar
Vent hole in rudder counte-weight closeout rib
Upper rudder rib vent hole
Vent hole in rudder spar
Vent hole in rudder spar
Vent hole in rib
Vent hole in rib
Vent hole in rib
Vent hole in rib
Vent hole in rudder spar
Vent hole in rib
Vent hole in rib
Vent hole in rudder spar
Vent hole in rib
After closing the vertical, drill a drain hole in the bottom of the rudder.

Vent and drain holes are typically 3/16" in diameter.
Use epoxy/flox or other approved adhesive for the closing process. Follow proper bonding procedures!

Use the left side of the vertical cradles for this step.

Foam dam installed prior to closing to prevent adhesive from “running away”. Install foam approx 3/4” from trailing edge.

Clamp short pieces of preferably angled aluminum to ensure a straight trailing edge.

Use a short straight edge in between the cradles to check for straightness.

Typical Vertical Member

Adhesive

$h_a$

Rib/spar etc.
C. Elevator Weldment Access Panel

C 1. Center the elevator weldment access panel in the joggle. Drill the holes for the screws using the inspection panel as a drill guide. Use a #20 drill.

C 2. Install the nutplates using MSC-34 pop rivets.

C 3. Trim the flange to approximately 5/8". Around the nutplates, this dimension will increase as necessary.

C 4. Countersink the holes for the elevator access panels using a 100 degree countersink.
D. Bonding the Vertical Stabilizer

**Leading edge of Vertical Stabilizer**

**VIEW AA**

2 BID L.E. reinforcement

Right vertical skin

Left vertical skin

Fill the area between the joint as necessary with epoxy/micro.

**BID Reinforcement**

**Fig. 12:D:1**

2 BID Reinforcement along leading edge. See view AA

**VIEW BB**

2 BID

Fill the area between the joint as necessary with epoxy/micro to avoid trapping air.

It isn't necessary to overlap the BID tapes at the junctions. Simply butt the joints.

2 BID Reinforcement

Note that it is advisable to butt the 2 BID-don't overlap

3 BID Reinforcement between horizontal stab and vertical (top and bottom, refer to figure 12:D:2)
BID Reinforcements Securing Horizontal Stabilizer

Fig. 12:D:2

Apply 2" wide 3 BID between horizontal stabilizer and vertical.

Micro fillet approximately 1 1/2" diameter. A film container works good for forming this radius.

Body work the horizontal stabilizer to the fillet. The micro will typically extend 8" to 10" outboard to blend in.