GlaStar and Sportsman Service Bulletin 67

Subject: Elevator counterweights

Applicability: All GlaStar and Sportsman Aircraft

Issue: Counterweight attachment to elevator end rib

Compliance Time: At or before next condition inspection

Discussion and Background Information:

The elevator counterweights on GlaStar and Sportsman aircraft are attached to the elevator end rib with three, #10 (3/16" diameter) countersunk machine screws. Since the majority of the weight is attached to the end rib in the forward (rounded) section lacking the flange that provides a degree of stiffness and support, we have recently made a design improvement on the Sportsman as a preventative measure to reduce the potential for stress cracks forming in the end rib. The improvement involves widening and lengthening the counterweight lead to reduce the number of layers of lead sheet to spread less load over a wider area of the rib, and most importantly, to displace the aft pair of fasteners as far aft of the rib flange edge as possible.

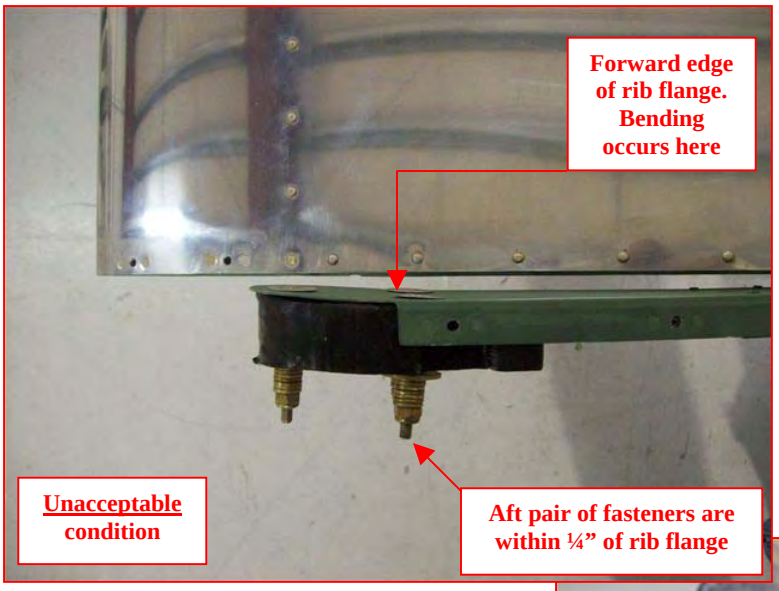
In lengthening the counterweight from 3.5" to 4.25" it allows the aft pair of AN509-10R26 machine screws to be located more than 1" aft of the rib flange as shown in the revised Figure 189 (Section X, Page 319) of the Sportsman Assembly manual. If the aft two holes are less than 1" from the end of the rib flange, the counterweight can bend the end rib creating the potential for stress cracks across the flat, unsupported portion of the rib face.

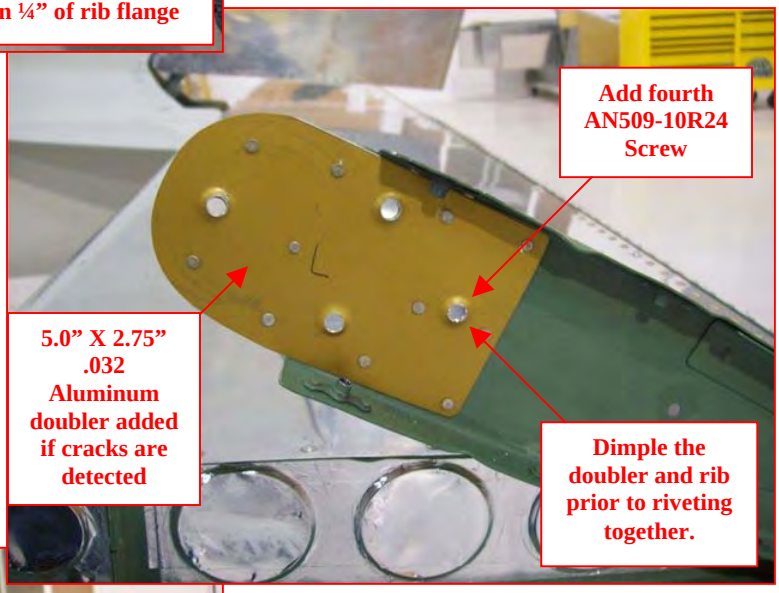
Required Action:

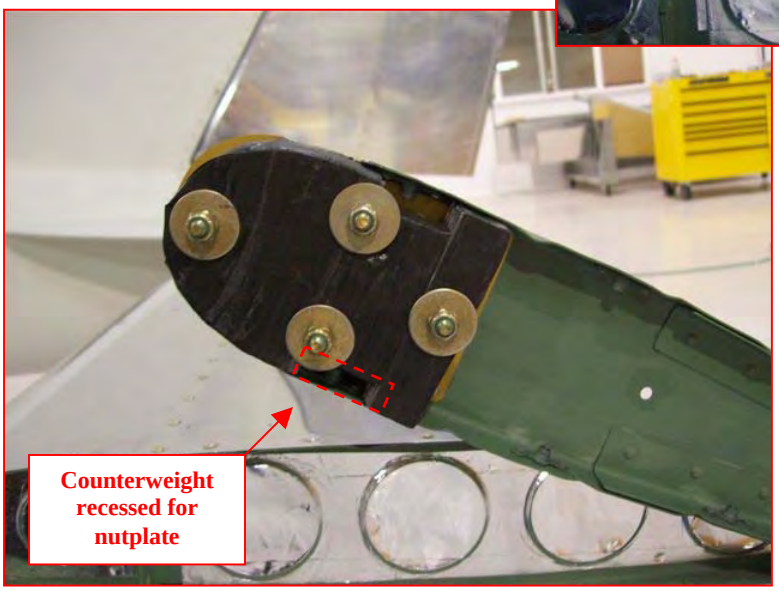
Case (1); Counterweights not yet installed.
In this case, follow the revised counterweight dimensions and fastener locations.

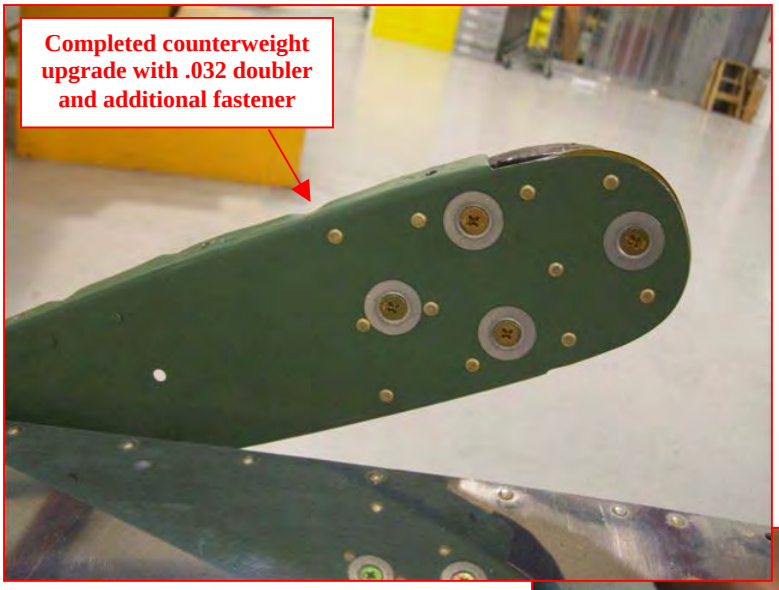
Case (2); Counterweights installed.
In this case, measure the distance between the forward edge of the rib flange and the aft pair of counterweight fasteners. If less than one inch, add a fourth fastener as far aft as feasible through the counterweight and rib. If any cracking of the rib face is detected, rivet an .032" aluminum doubler as reinforcement.

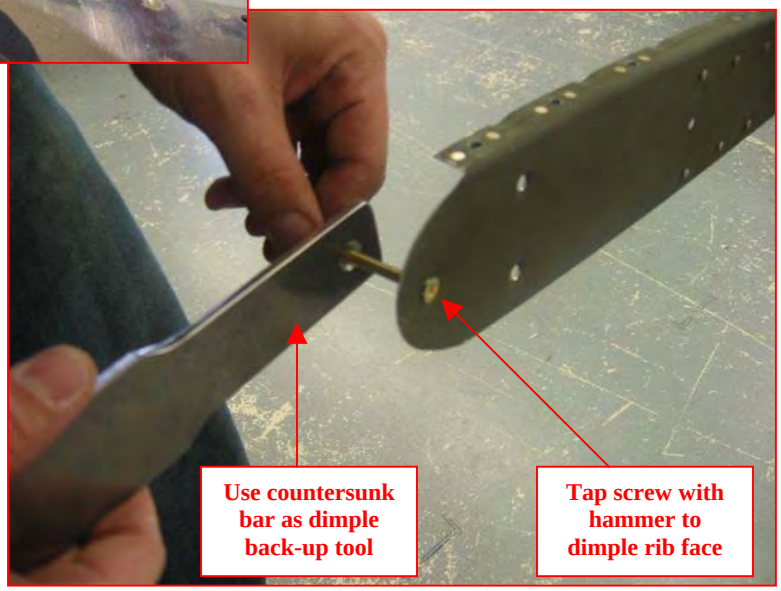
Note: The combination of the elevator tip fairing and the elevator tip rib provide the stiffness necessary to support the counterweight. Flight without the elevator tip fairings secured in position is forbidden. GlaStar and Sportsman owners are required to remove the elevator tip fairing and make a thorough inspection of the entire elevator counterweight rib at each annual condition inspection.











Possible Materials Required:

- **850-3235-028 Washer, Tinnerman #10**
- **"AN509-10R24 Screw, #10, 1 1/17" length (MS24694S66) or AN509-1032R32 Screw, #10, 2 1/32" length (MS24694S74)**
  (Note: Aircraft owner to determine which length of screw is installed on their aircraft. Hardware available from Aircraft Spruce & Specialty)"
- **AN364-1032A Nut, Self-Locking Shear, 10-32**
- **AN970-3 Washer. Large Steel, #10**
- **750-0372-002 Lead Sheet**
- **750-0220-008 Aluminum Sheet**

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Note: Quantities will vary by the type of repair the Aircraft Owner performs.

FROM SPORTSMAN ASSEMBLY MANUAL- SECTION X, FINAL ASSEMBLY (REV. A), PAGES 311 - 312 & 318 - 319

Please note: Text removed is indicated with a ~~strikethrough~~, text additions are indicated in **bold red text.**

Step 164: Install the Elevator Tip Fairings

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Note: Because of the shape of the fiberglass fairings, **the forward corners of the elevator CW ribs** may need to be trimmed to match the fiberglass contour. Do so carefully and trim only as much as required. **As shown in Figure 186, a minimum of 1" of rib flange must extend forward of the aft two counterweight holes to provide the necessary stiffness to support the counterweights.** The fairing must be installed while the elevator and stabilizer are joined together. Space the counterweight rib 1/4-**5/16"** from the edge of the stabilizer skin so no binding between the two can occur.

The elevator tip fairings and their nutplates are positioned and drilled in much the same way as the stabilizer fairings and nutplates. Begin by laying out and marking **sixteen** hole locations along the upper and lower edges of each fairing. As shown in Figure 186, all these locations should be **1/4"** outboard of the inboard edge of the fairing. The forward-most holes top and bottom should be positioned about **1/2"** aft of the leading edge of the fairing. The aft-most holes should be located roughly **4"** forward of the trailing edge of the fairing. The intervening holes should be spaced on roughly equal centers, but they should be shifted fore or aft as necessary to remain clear of the flutes in the rib flanges.

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Note: Because of the taper at the aft end of the tip rib, the aft-most two pairs of holes top and bottom must be staggered slightly to provide clearance for the fairing mounting screws.

When the hole locations have been marked, slide the fairing over the tip rib and position the fairing as far forward as possible so that the elevator trailing edge nests snugly in the fairing trailing edge. You may even trim the trailing edge slightly to achieve the desired results.

After you have the screw hole locations marked, remove the fairing and look at the rivets common to the tip rib and the elevator skin. This rib should be fully riveted between the screw hole locations, especially The forward 8 inches right up to the leading edge corner of the skin. Drill and install flush rivets in this area where the rivet spacing is greater than 1.38 inches, avoiding any flutes.

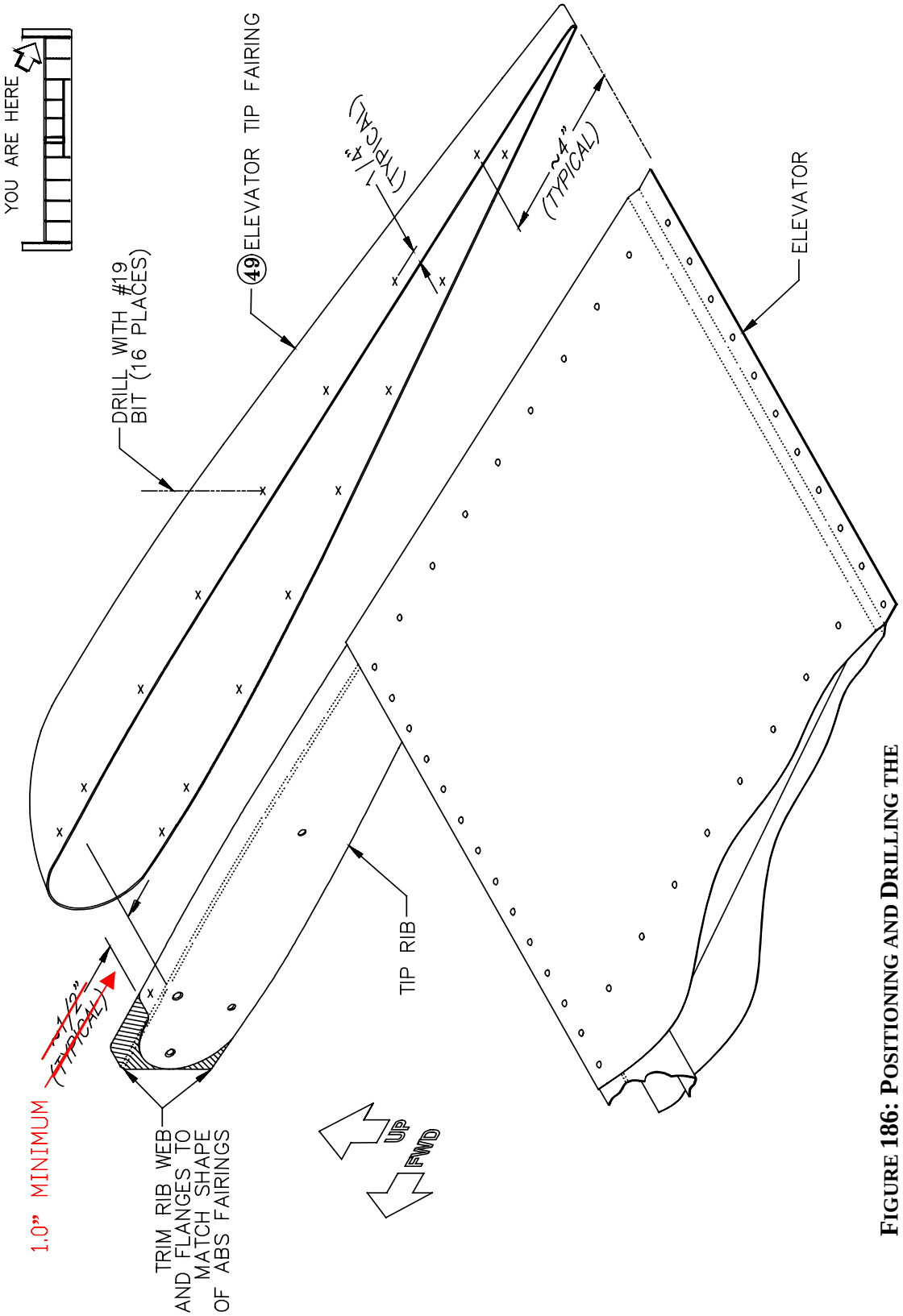

FIGURE 186: POSITIONING AND DRILLING THE ELEVATOR TIP FAIRINGS

Step 167: Cut and Install the Elevator Counterweights

As with the trim tab counterweight, the elevator counterweights are simple stacks of lead sheet. The exact number and dimensions of the lead pieces you'll need obviously depend on the results of your calculations in the preceding step. However, we recommend that you cut pieces about ~~**2"**~~ **2 5/8"** high by ~~**3 1/2"**~~ **4 1/4"** long. Cut a couple more pieces than are necessary to equal the counterweight amount you calculated in the preceding step.

Hint: For the neatest job, make a cardboard template of the shape of the tip rib, marking the locations of the two mounting screw holes. Use this template to cut out and drill the lead sheets.

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Note: The calculations by which you determined the amount of weight needed to counterbalance your elevator were based on a specific actual moment arm. This are will be correct **only if the weight you install is centered between the two mounting holes** you drilled in the tip ribs back in "SECTION V: ELEVATOR ASSEMBLY." Keep this in mind when sizing your stacked lead. **It will take approximately 17 pieces of 2 5/8" X 4 ¼" lead sheets per side.**

Remove the tip fairings, stack the lead pieces together in two equal stacks and drill two **#10** holes through each stack corresponding to the holes you drilled in the elevator tip rib webs in Step 40 of "SECTION V: ELEVATOR ASSEMBLY." Dimple the three #10 counterweight-mounting holes in each rib web with the male die **inboard**. Countersink the first piece of lead in each stack to match the dimples.

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Note: Refer back to Step 17 in "SECTION III: RUDDER ASSEMBLY" for the procedure for dimpling a #10 hole. Use one of the AN509-10R26 **flush-head machine screws** [137] as the male die.

Finally, weigh the lead with its mounting hardware: six AN509-10R26 flush-head machine screws, six 850-3235-028 beveled washers (Tinnerman), six AN970-3 large washers and six AN364-1032A nylon self-locking nuts, as shown in Figure 189. Subtract and/or trim lead pieces until the entire counterweight is equal to the required weight, and then install the weights on both sides, as shown in Figure 189.

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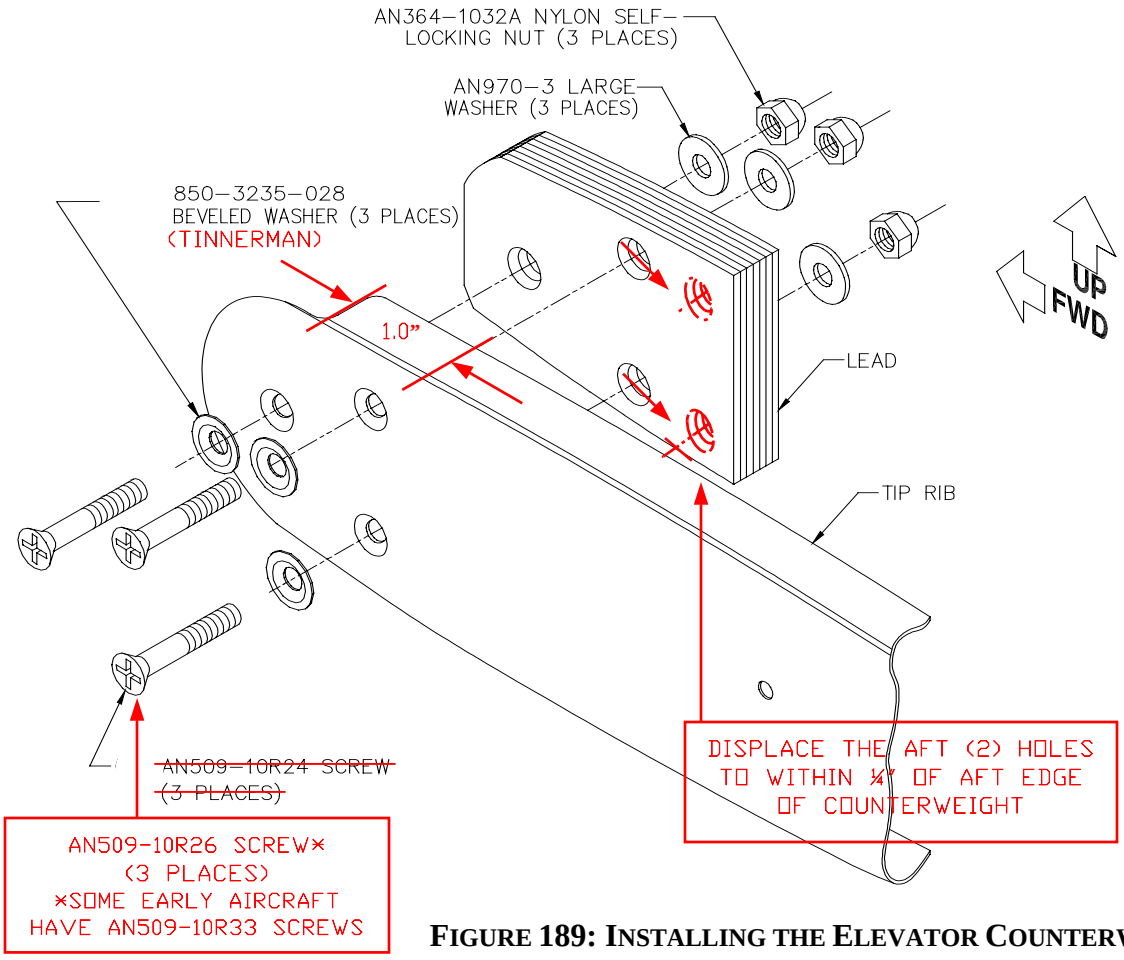

FIGURE 189: INSTALLING THE ELEVATOR COUNTERWEIGHT

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Note: It is important that the aft pair of holes be displaced a minimum of 1" aft of the rib flange as shown. If they do not meet this criteria, add a fourth AN509-10R26 screw aft of this pair.

Step 168: Finish the Tip Fairings

Now that you're through stacking weights on them, you can finish the elevator tip fairings, along with the stabilizer fairings. Fill the gaps where the close-outs meet the fairings with body filler and file and sand the corners round. Then sand and finish the entire fairing to your own standards and preferences. See the discussion of "PREPARING FIBERGLASS PARTS FOR FINISHING" in "SECTION II: TOOLS AND TECHNIQUES."

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