

## 19. Elevator Balance Modification



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Completed

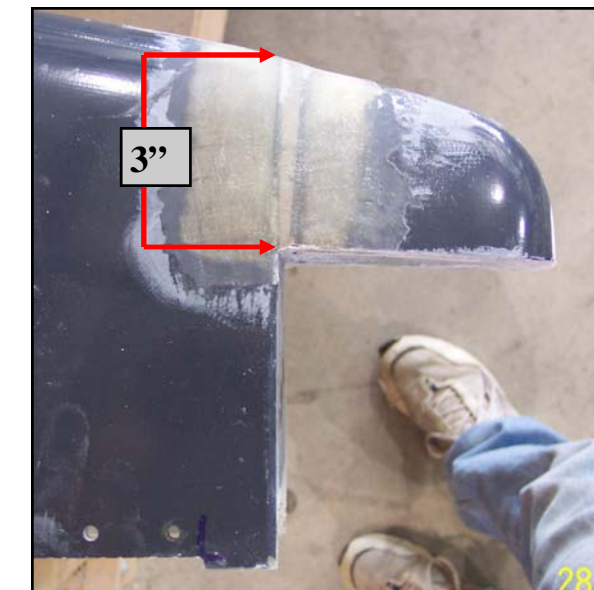
### Elevator Balance Modification

**Note:** The horizontal tail and elevator have an aerodynamic balance molded in place. After initial flight testing it was found the balance was not needed, however the molds have not been change on current kits. With the full balance the aircraft will be very light in pitch and must not be flown with out a modification made. There are two modifications possible. The first modification (revision1) matches the stick feel in roll of the standard wing lightning. The second modification ( revision 2) matches the stick feel in roll with the sport wing tip extensions installed. It is for the builder to decide which one to build. Revision 2 can be built for either set up and feels good. Revision 1 should only be used with the standard wing.

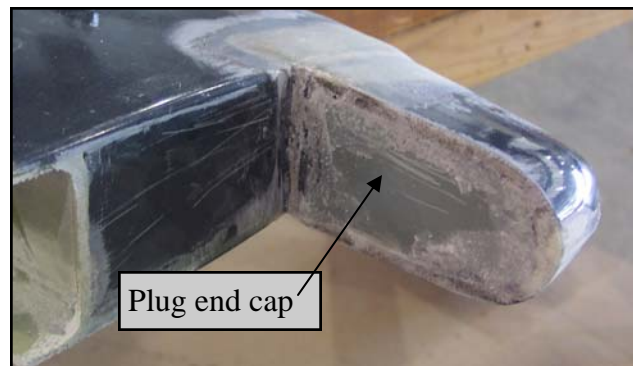
### Balance modification revision #1

1. Take one of the elevators and measure back from the leading edge of the balance 3 inches.

2. Cut this off of the elevator and bond to the horizontal tail with a mix of 5 min epoxy and flox.



3. When the epoxy cures put 1 layup over the seam, 2 inches wide and 7 inches long.



4. Make a plug for the end using scrap fiberglass, bond in and let cure.

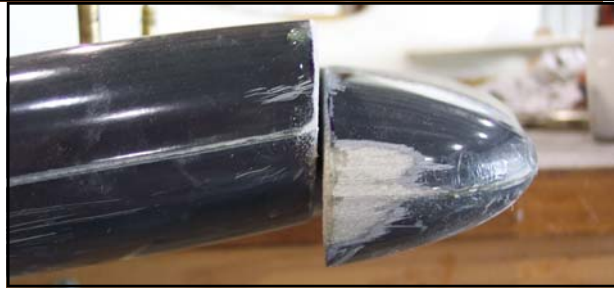
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5. The elevator must now be trimmed to allow clearance for down elevator. Trim 1/2" off the bottom of the elevator and nothing on top. The elevator should look like the picture below.



6. Full down elevator is 15 degrees, this is where the clearance will be most critical, there must be a 1/8" gap between the elevator and horizontal tail when at full deflection down.



7. Before making an end cap for the elevator temporarily mount the elevator to the horizontal tail and check for the correct Gap.



8. When satisfied, make an end cap for the elevator.

9. Repeat for the other elevator and horizontal tail



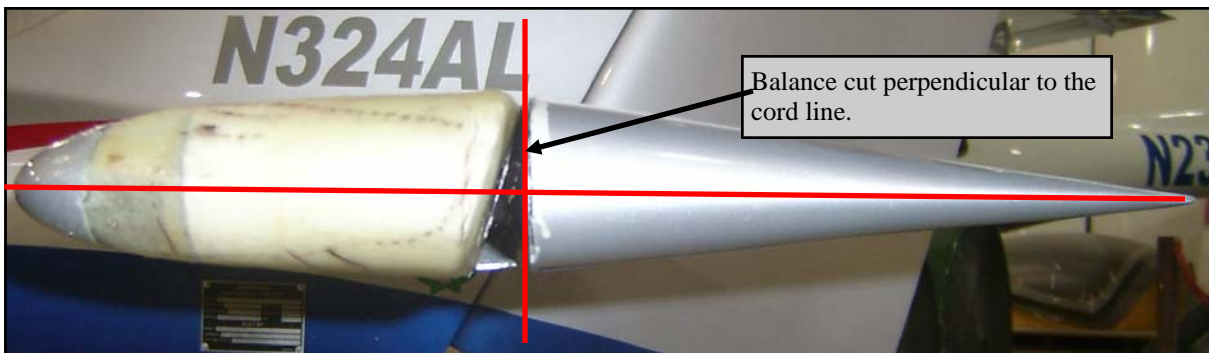
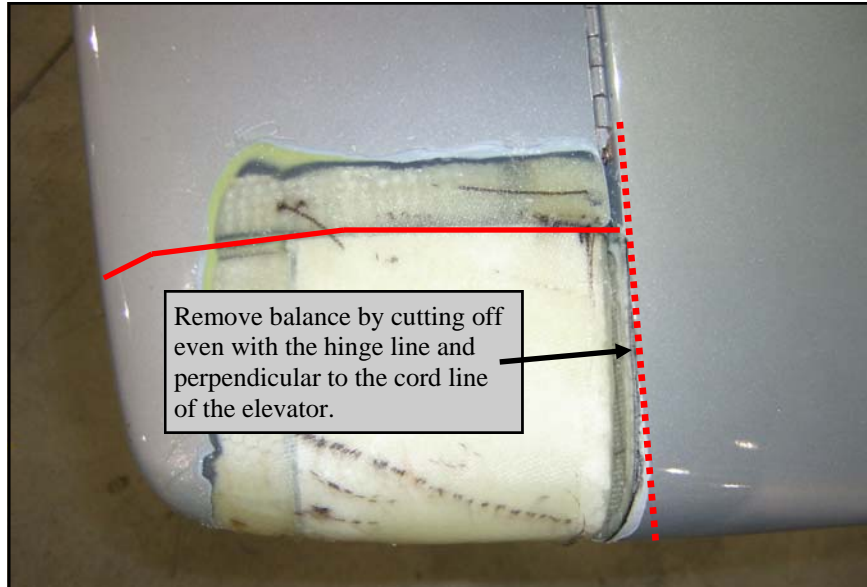
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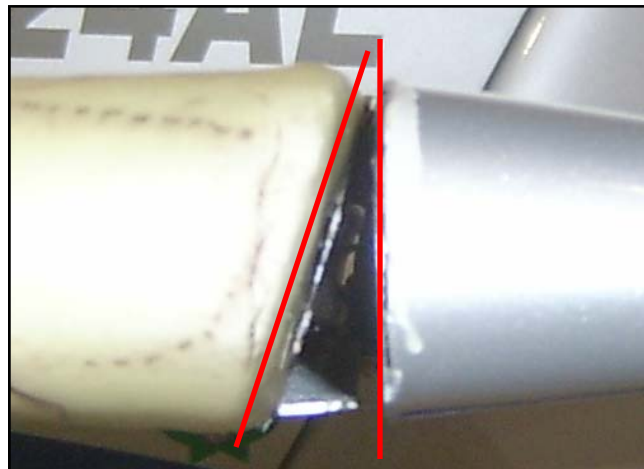
### Balance modification Revision #2

1. Locate one of the elevators.
2. Draw a line across the balance to the elevator tip that is in line with the hinge line / leading edge of the elevator. This should be the same on the bottom of the elevator, take care to make the cut and front of the elevator perpendicular to the cord of the elevator.



3. Bond the balance which was just removed to the horizontal stabilizer. Make sure it looks like one part and that the leading edge is straight and the tip is horizontal. The same technique which was used in revision 1
4. Remove the gelcoat either side of the bonding seams.
5. Using 1 layer of 8-10oz glass strip the balance to the horizontal tail. The strip should be as long as needed and 2" wide.

6. Trim the bottom of the now bonded balance forward about 3/8" to start. This will allow the elevator to come down to the required amount of 15 degrees.

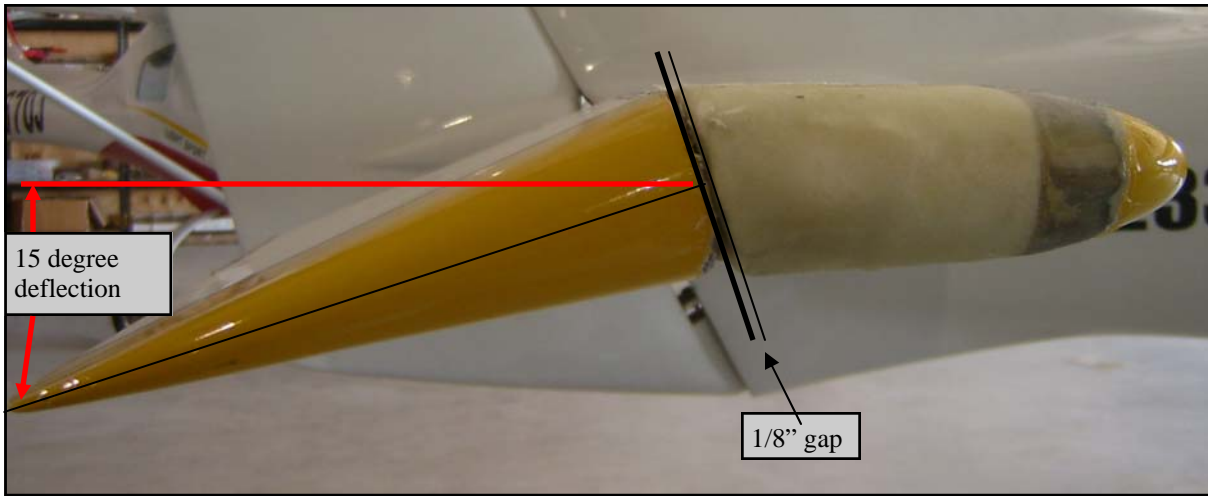




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- 7. The elevator should be able to deflect down to 15 degrees and have no interference with the new horizontal tail tip.
- 8. The gap should be no tighter than 1/8".



- 9. When the clearance is found to be adequate make a plug for the elevator and the horizontal tail and bond it in.



- 10. If making this modification ( revision #2) to an existing Lightning it is much easier to accomplish the following way.
- 11. Remove what is remaining of the balance from the elevator as described from the first page.
- 12. Hold the elevator in trail or as if neutral (the seatbelts work great for this).
- 13. Glue in a piece of high density foam. It should be thicker than the tail and stick out past the tip
- 14. Shape the foam to match the profile of the tail.
- 15. Follow #7 and #8 above to get the correct gap between the elevator and the foam.
- 16. Remove the paint to bare glass with in 1" of the seam.

- 17. Cover the foam in 2 layers of 8oz glass making sure to run over the horizontal tail area which was sanded. Than a final layer of 4oz glass for a good finish.
- 18. Do not forget to cover the back between the elevator as well as there will be no plug needed.
- 19. Fabricate a plug as described in #9 above for the elevator.

