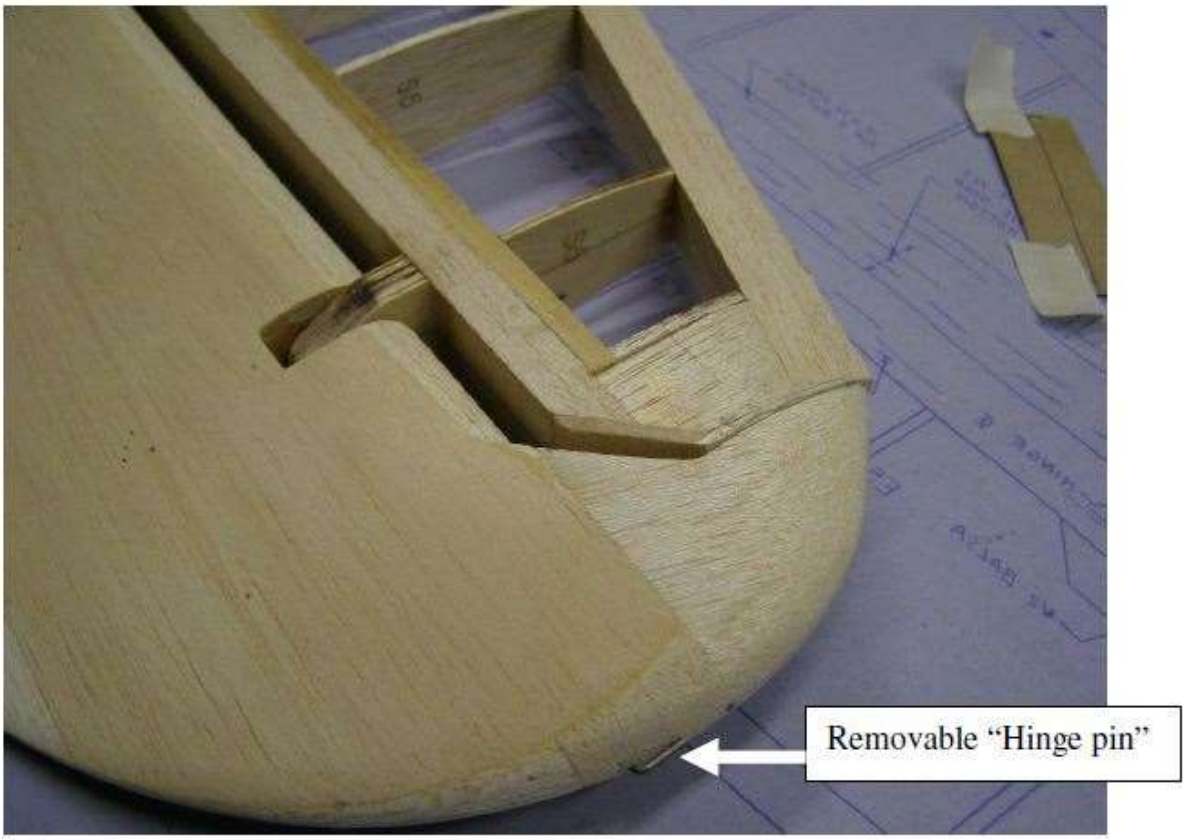
THE HANGAR
Exclusive Content

# Scale Hinges: Building Secrets of the Pros

Gerry Yarrish  Featured News, Scale  12 Comments



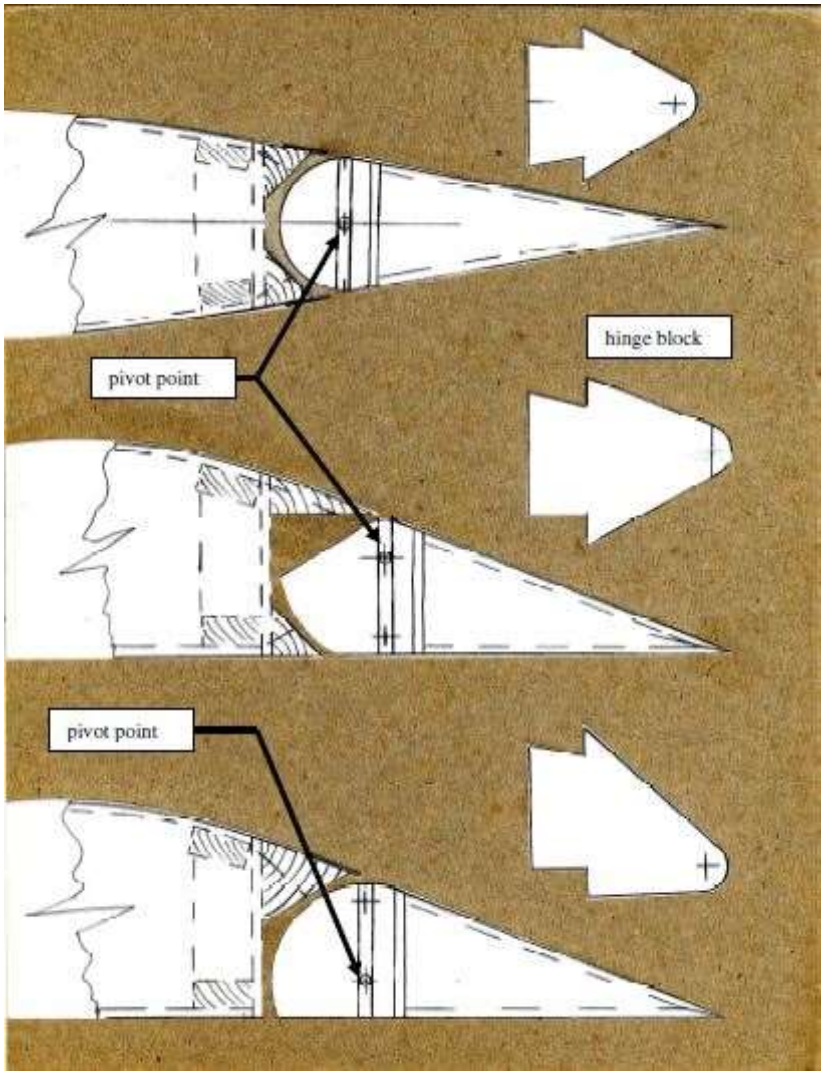
This often complicated construction technique is now simplified and shown here by master scale design/builder and competition pilot Roy Vaillancourt. The photos are from his latest project the Fairey Firefly. Roy's technique requires common building supplies but nothing the average RC builder/modeler can not accomplish in his own workshop.


There are many ways to do "scale hinges", Some methods are easier then others. We must remember here that the ultimate goal of doing scale hinges is to give the appearance that we have replicated the full size bird in form and function. In our quest to perfect our model we sometimes design ourselves into a corner trying to be clever. Thus making this a very frustrating endeavor. Rule number one when doing scale hinges: When in doubt copy the full size bird.... Rule number two when doing scale hinges: Keep things as simple as possible....What I'll show you here is just one way I have attempted to replicate the hinging used on the Fairy FireFly. These techniques can be applied to many types of aircraft.

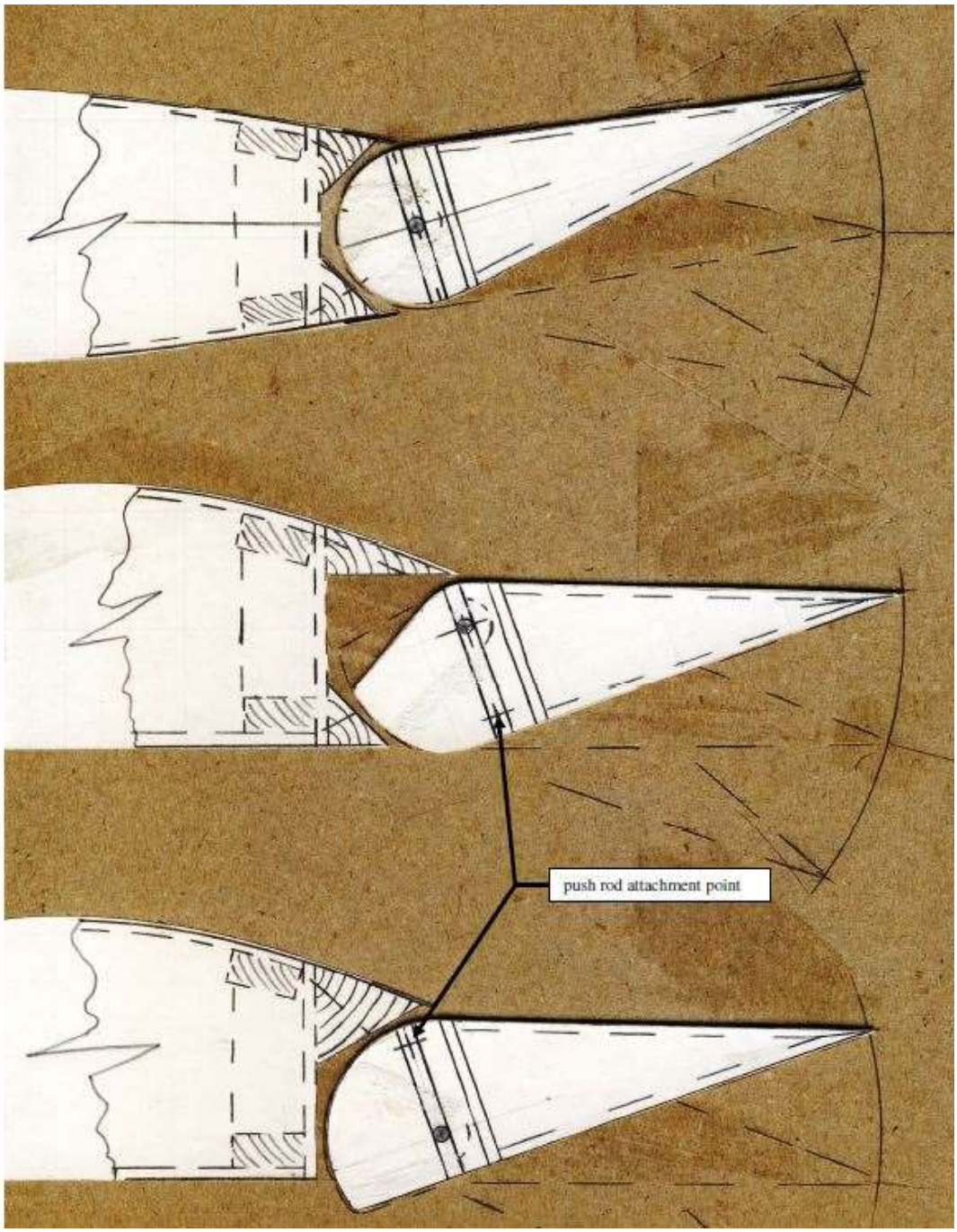
(Above) Roy's Current building project, the WW2 British Fairy Firefly

*Hinge types*

Before we discuss how to make scale hinges, let's look at the three basic designs normally used. They are: "Center hinged", "Top hinged", and "Bottom hinged". Center hinged: is typical for Elevators and Rudder use.

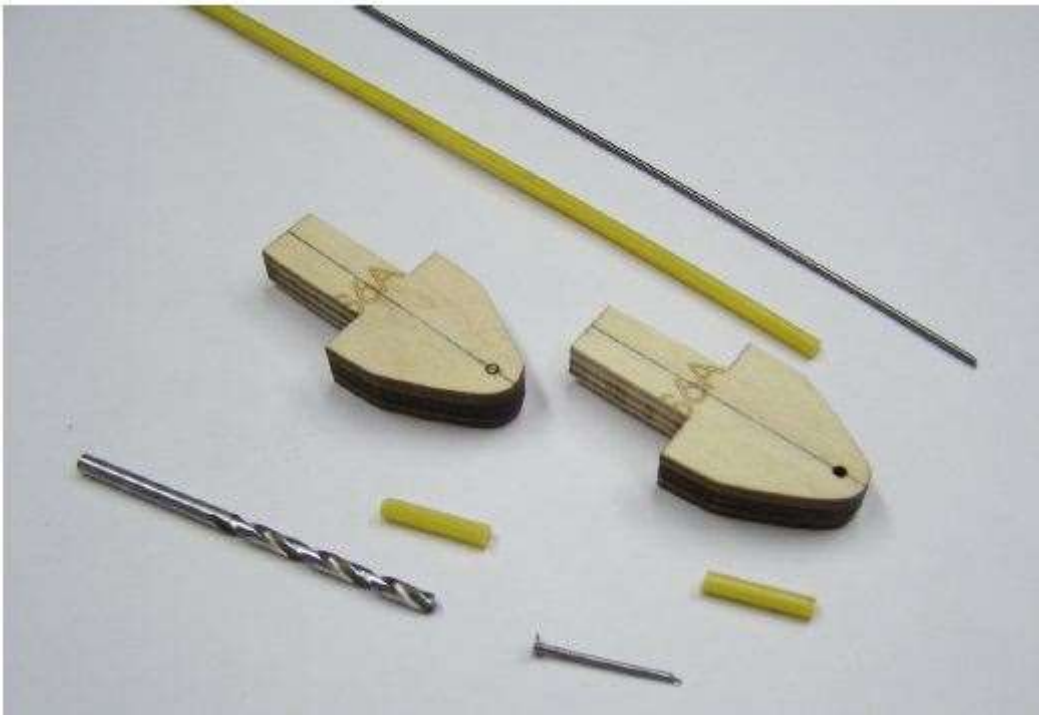



Top hinged: is an Aileron hinge. Bottom hinged: is also an aileron use but is also used a lot for flaps or accessory doors. The sketches at the right show the three basic designs along with a respective "hinge block" design that is aimed at keeping things simple to make, strong enough for the job and still provide scale functionality.

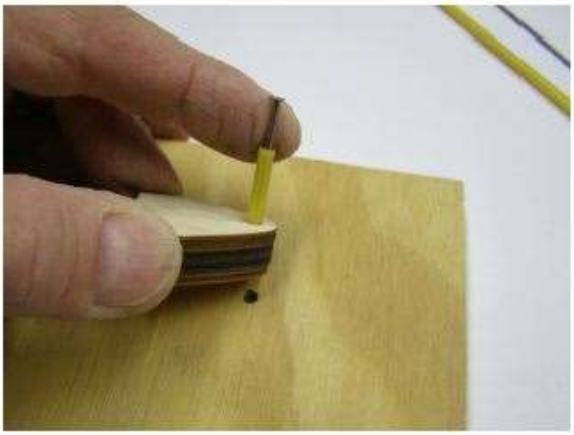


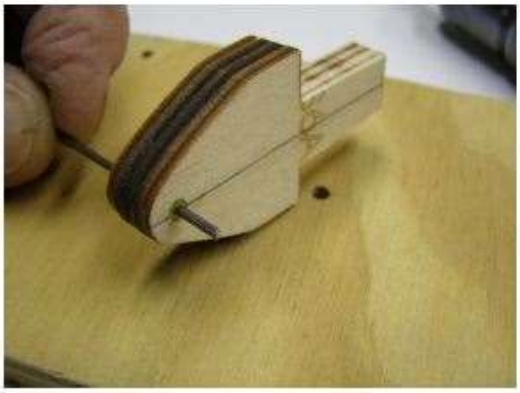

## Making the Hinges

I like to make the hinges from aircraft grade plywood. In the Fire Fly's case the thinnest hinge is 1/4 inch thick. (I have used 1/8 thickness on the Typhoon and the FW-190 with great success). The "bearing" material is the yellow inner part from a NY-ROD set. The "Hinge Pin" is a piece of .074 music wire. This fits the inside of the yellow NY-ROD with a slight slip fit with no slop.



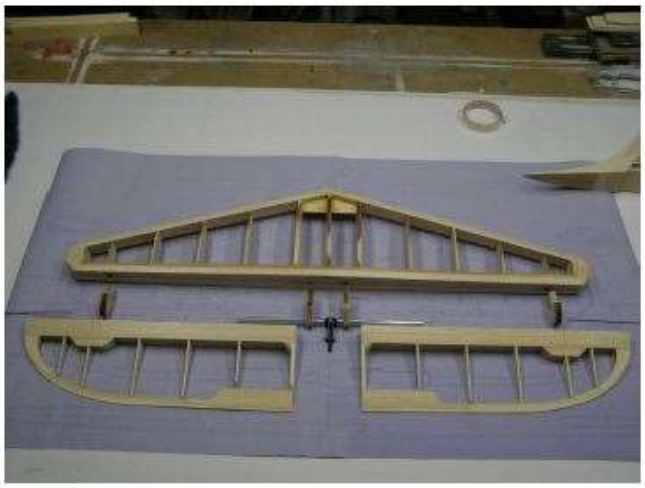
After cutting the hinges to shape they are drilled for a “press fit” of the yellow NY-ROD. The NYROD is driven into the hole using a small nail as a support and “pressing” tool. After the NY-ROD is installed it is trimmed flush to both sides of the hinge. DONE.....The beauty of this type of installation is that if the NY-ROD bushing ever wears out it can be replaced with very little effort even after the plane is all painted.

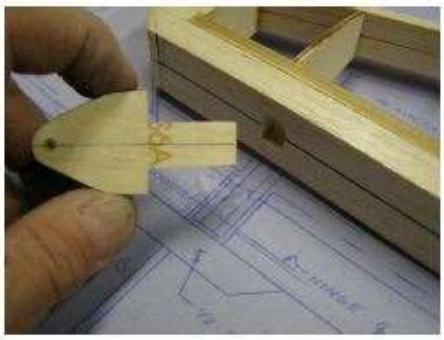


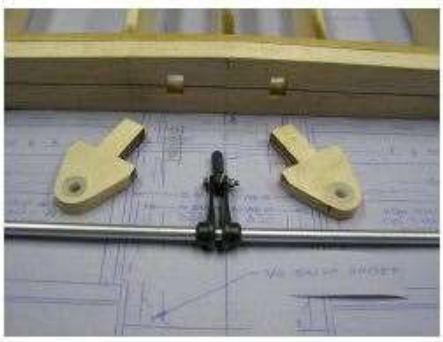


Stabilizer and Elevators:

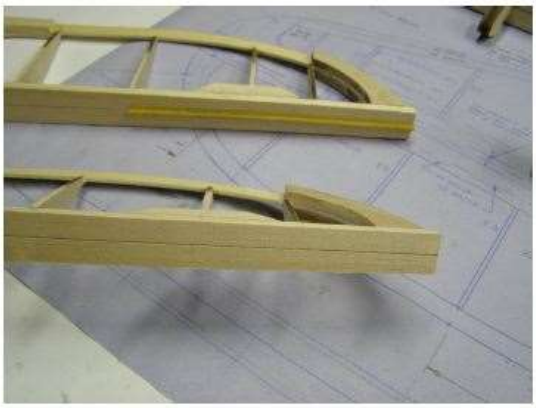
The Aluminum tube shown here is 12 inches long. It is 1/4" outside dia. with a .049 thick wall. This will get epoxied into each elevator half. 1/4 dia Aluminum tubing is available in three different wall thickness. .015, .035 and .049. Solid Aluminum rod is also available but brings with it an increase in weight. The "hinge blocks" that support the elevator shaft have nylon bushings pressed into them to provide a nice wear-free and slippery hinge.

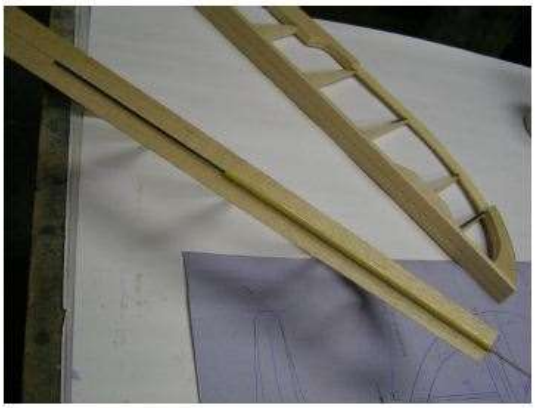






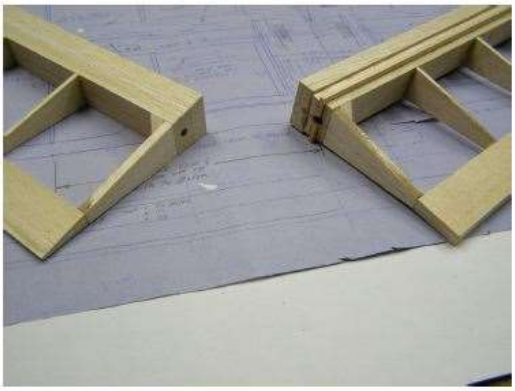
(Above) Details of the elevator hinges. Note the nylon insert for the joiner rod to ride smoothly inside of.

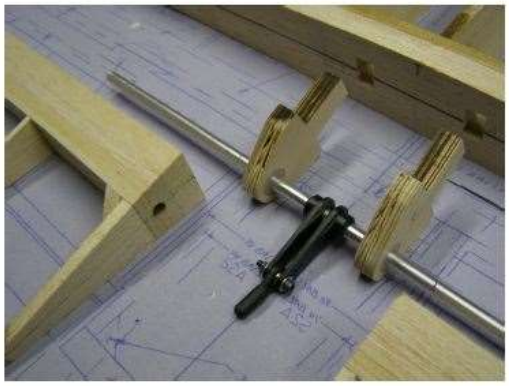




**The wire is used to keep the Ny-Rod straight while gluing.**

Note the use of "center lines" drawn on all parts.



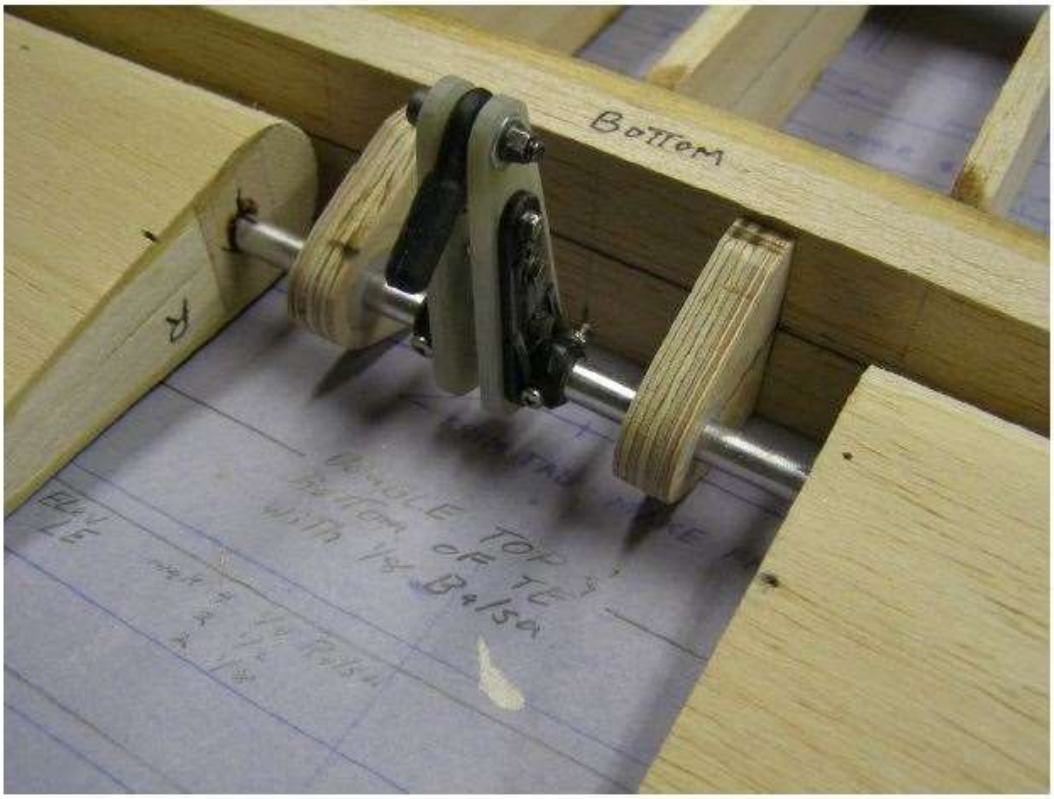


(Above) View of the inboard side of the elevator prior to shaping.

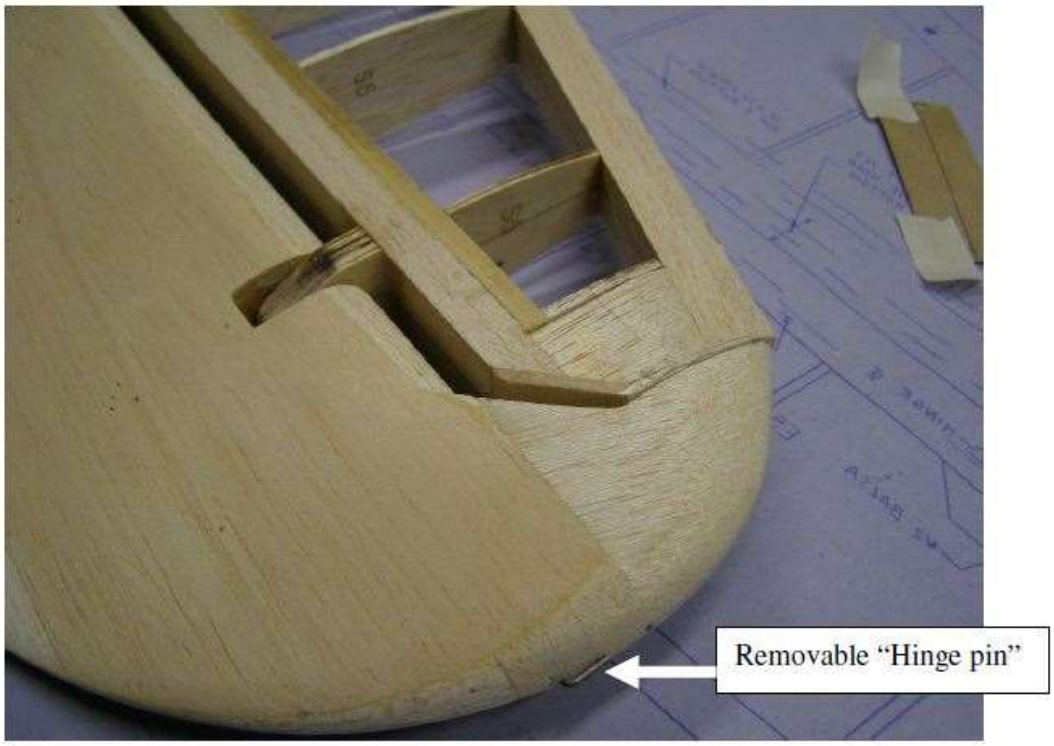
(above) Details of elevator horns and joiner rod.

(Above) cutting the elevator hinge slots.


(Above) Elevator hinging assembly details, before and after sheeting and before and after shaping the leading edge.




(Above) Inboard elevator joiner and horn detail.




(above) Elevator tip detail showing the end of the removable hinge pin. Also not the precise fit of the hinge into the matching hinge notch.

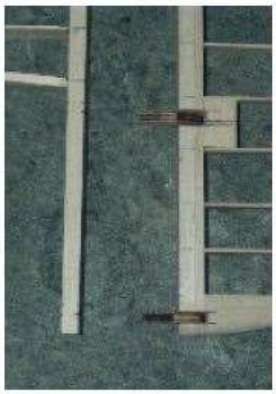
### Fin and Rudder:

This assembly utilizes all the methods presented for the Stab and Elevator but is a lot more simplified. You’ll note that there are only TWO hinges, One top and one bottom. You’ll also note that they are quite thick and heavy duty and are representative of the scale sizes and locations. The top hinge is 3/4 of an inch thick. While the bottom hinge is 1/2 inch thick.

**The top hinge is 3/4 of an inch**

**thick. While the bottom hinge is 1/2 inch thick**

The applications shown above for the Stab/Elevator assembly and the Fin/Rudder assembly can be used for many different aircraft. The shapes may vary a little but the concepts will all be the same.

(Above) Here are a few pictures of the Typhoon rudder and fin just to give you the idea.

(Above) Tail surfaces attached to the fuselage.

Aileron Hinges:

The hinges shown here are for the Fairy Firefly. They are of the “Bottom Hinge” variety.

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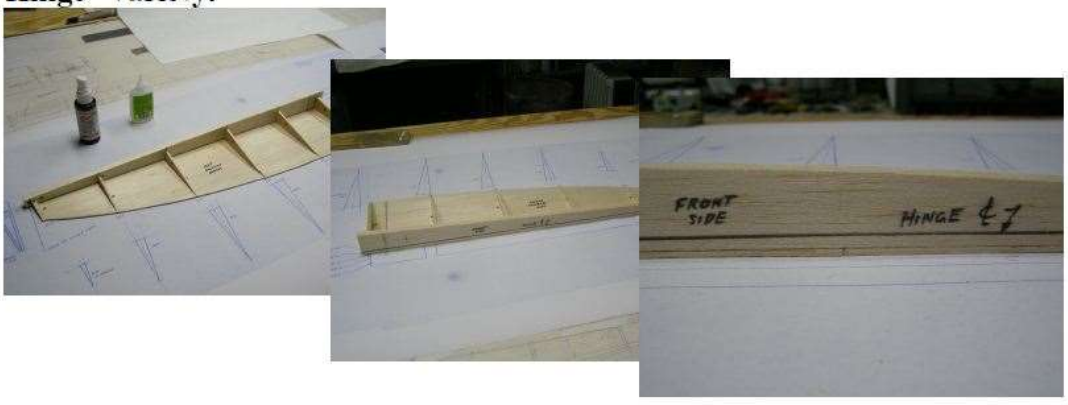
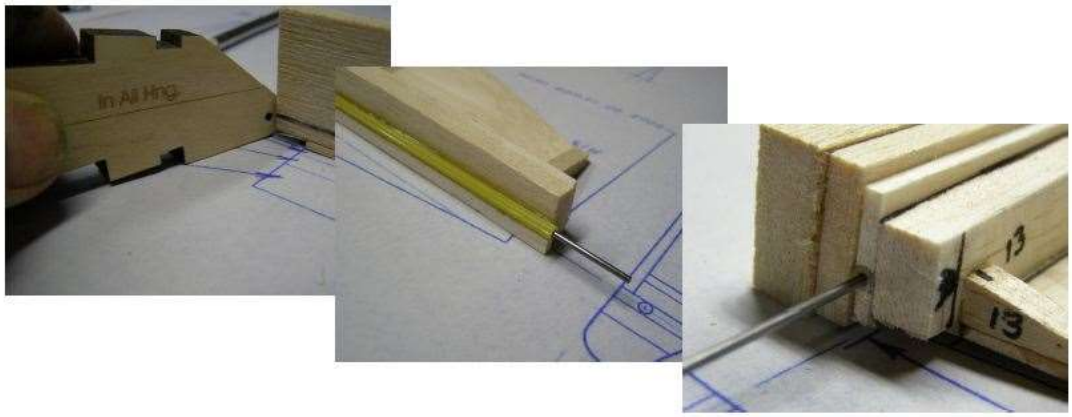
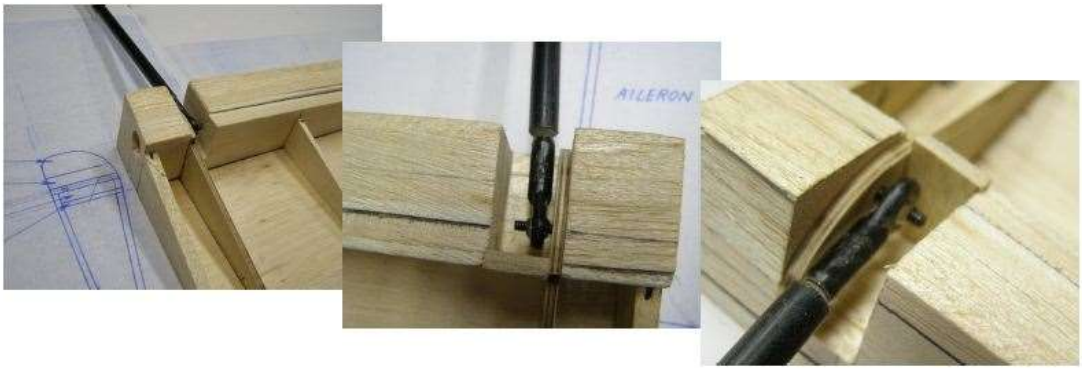


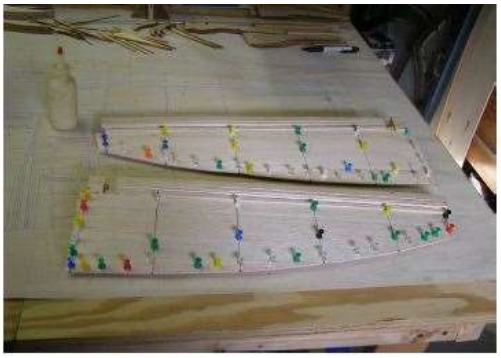
(Above) basic Aileron construction.

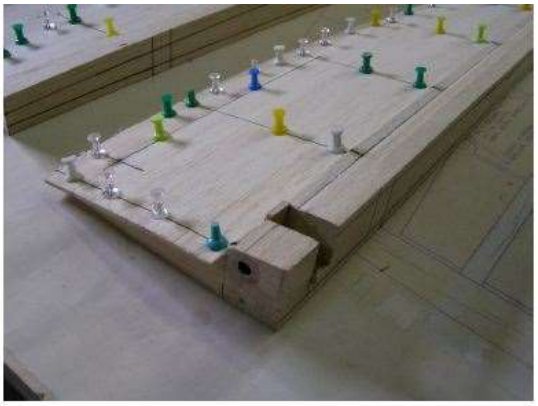



(Above) leading edge build up with gauge for keeping hinges aligned.

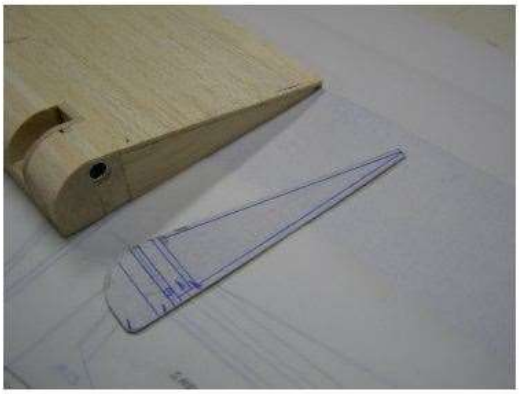


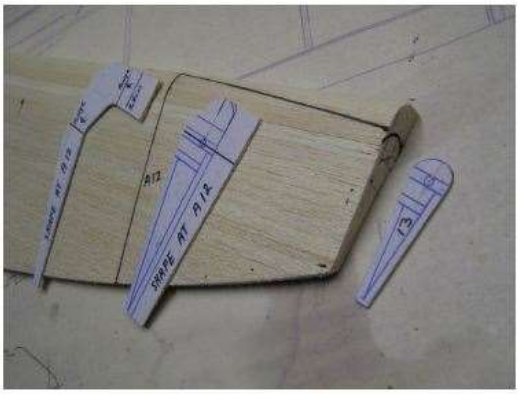

(Above) scale inset aileron control linkage.



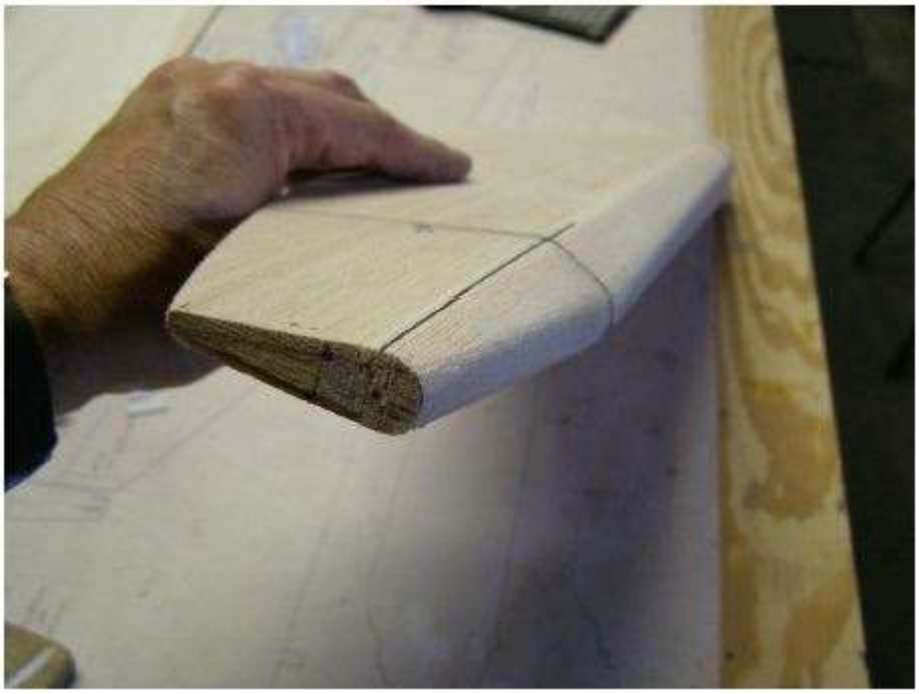


**Both sides sheeted.**

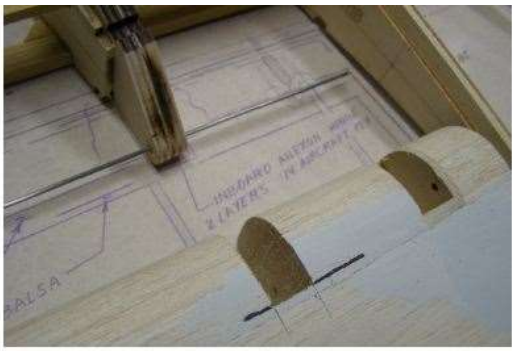


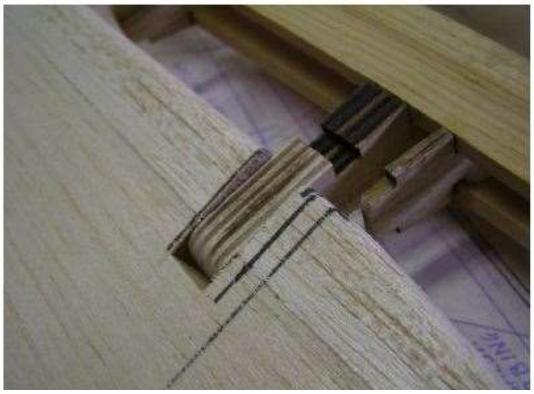
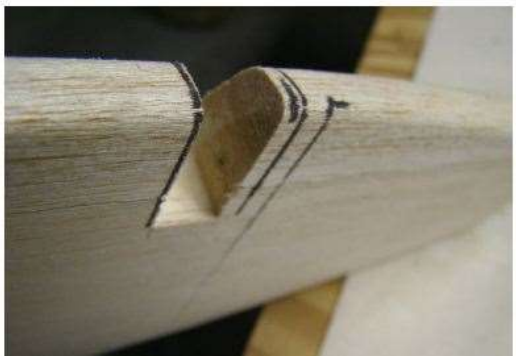



**Template and shape at the root end.** **Templates and shapes at the tip end.**



(Above) aileron tip shaped to final profile.



(Above) Mating aileron and hinges to main wing structure.


(Above) final aileron installation complete. The wing is now sheeted and made ready to be finished.

About the Author–

Roy Vaillancourt is the president of Vailly Aviation. His specialty is giant scale WWII Warbirds. Vailly Aviation has been serving the giant scale enthusiast since 1986. Roy is an active scale contestant and has competed regularly at TOP GUN and The U.S. Scale Masters Championships plus many other scale competitions for more than the past 25 years. Roy has served as the East Coast Vice Chairman of the U.S. Scale Masters Association and is the first recipient of the coveted Harris Lee award. He has written numerous articles for many of the major model magazines dealing with all aspects of scale modeling. Roy and his wife Nancy operate Vailly Aviation out of their home as a part time venture to help contribute to the scale modeling community. In “real life” Roy is a retired mechanical engineer from the aerospace industry. He is a degreed mechanical engineer (2 degrees) with over 35 years experience as a manufacturing and design specialist in the aerospace field for many of the noted full-scale aviation corporations such as Lockheed Martin and British Aerospace. He has also written many articles on the design and fabrication of full-scale aircraft components ranging from engine parts to landing gear and airframe parts and assemblies. This knowledge acquired in the full-scale world is passed on to those in the modeling field.

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