

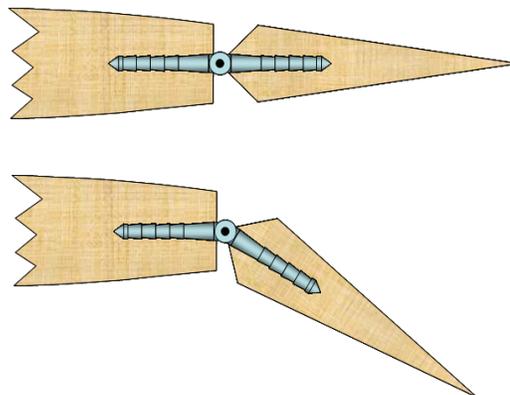
## Scale Hinges

This tip is hinging on an important builders' decision...what kind of hinges to use. (My apologies to the true comedians out there!) Of the many scale features that we can include in our models, one that is often overlooked is the flight surface hinge type and location. True, hinges have to be functional and there is no room for failure here. However, that should not prevent you from considering the scale hinge locations and types in your next project. In fact, scale hinge styles can even improve the flight performance over some of the conventional hinge choices. Scale flight surface motion is one of those features that can really add to a model's looks, especially of models after WWI.

In early aircraft and those that operate at slower speeds, hinge design is simple. Later on, as cantilever spars thickened aircraft wings and air speeds increased, aeronautical engineers found ways to streamline and minimize the gap between the flight surface and wing or stabilizer. Minimizing this gap can enhance the performance of your model and its control surfaces.

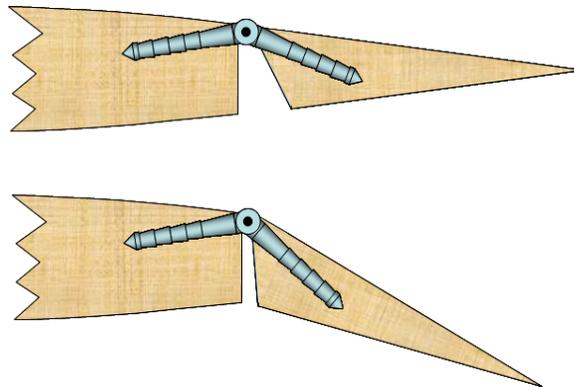
I like to replicate the number and placement as well as the type of hinge. In some cases I have fashioned hinges from aluminum or aircraft plywood. I also use Robart™ Hinge Points™ quite often. I find them easy to use, reliable and they offer many options for installation. I'll discuss a few. The first is the straight forward, conventional placement. You can also use flat or C.A. hinges here. This requires the leading edge of the flight surface (and sometimes the trailing edge of the wing) to be beveled. A result is a gap between the wing and flight control surface that would not be part of the full scale subject.

Conventional model hinge



A simple improvement is the high mounted hinge location. This design also works well with flat or C.A. hinges. Extending the flat hinge the entire length of the flight surface also helps to seal the gap. Take a close look at the aileron on a Cessna or Piper at your local airport and you'll see that they are built this way using "piano" style hinges.

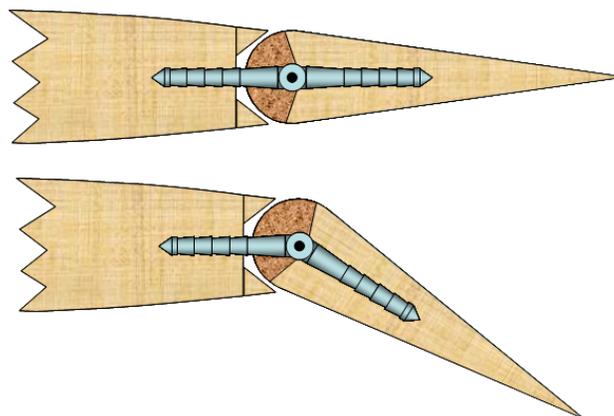
High mounted hinge



Now for some real fun; Aircraft of the golden era and beyond often use hinges that are recessed into the flight surface. This allows the surface to smoothly rotate while keeping the gap minimized. This can also be used in combination with triangle stock "cuffs" added to the trailing edge of the wing to keep the gap small. Locate (recess) the pivot line of the hinge aft of the leading edge of the control surface a distance equal to  $\frac{1}{2}$  of the thickness of the control surface. This

will ensure that the gap is maintained throughout the full deflection of the control surface. In the area near the hinge, the control surface will need to be hollowed out always to clear the wing side of the hinge.

Recessed and cuffed hinge



I've included a picture of recessed Hinge Points™ in the elevator of the Gloster Gauntlet project that I built. From the picture, you can see that the pivot line of the hinges is well inside the elevator. A very important note here is to make sure all of the hinges' pivot points all fall on the same line. Otherwise the surface will bind when deflecting which robs the batteries of power and over time will loosen the hinges. What ever method is used, the motion of the hinges should be smooth and almost effortless.



There is one more style that I will describe; this is one that I used on my Douglass Devastator. Mounting the hinge underneath the control surface requires that the hinge is recessed even further back. In this case the pivot point of the hinge is located aft of the control surface leading edge by a distance equal to the thickness of the control surface. Care must be taken to ensure that enough of the hinge is anchored in the wing. If not, a custom hinge might be required.

Recessed underneath hinge

