Rivet, Rivet, Rivets Everywhere

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Even a casual close up look at many full-scale aircraft will disclose one of the most often used method of construction, the lowly rivet.They may be round head, brazier head, flush, or some esoteric special such as those used on the supersonic SR-71 Blackbird.They can be thick or thin and there may be only a few, or thousands.Any scale modeler should find rivets interesting as well as challenging.After all, if it shows on the full-scale aircraft it should be represented on a model of that aircraft. No?

The good news is that there are only a few ways to use riveting in construction.The oldest method was to overlap sheets of aluminum, drill holes at a prescribed spacing from the edge and each other, install a rivet, and use an air hammer with a concave shaped set face to peen, or upset the unformed end of the rivet shank against a metal 'bucking' bar.The rivet swells and forms a joint that will approximate the strength of the aluminum sheet.Repeat fifty thousand times or so and you have a B-17 Superfortress, ready to go to war.With this method modelers have to consider replicating the overlap as well as the rivets.

The only other construction method is to butt join aluminum sheets over an internal former of some sort, drill, and then countersink each and every rivet hole to match a flat head flush rivet.A smooth faced air hammer is used to 'set' the rivet, again with a metal bucking bar.Howard Hughes built his racer with flush rivets, but after they were set, he had a machine made to shave the rivets completely flush with the surface for absolute minimum drag.All modern high performance aircraft are flush riveted, sometimes by automated computer controlled machines.The join lines are all but invisible, and the rivets can be represented with a simple indented circle pressed or lightly machined into the finished surface.

There is little reason to attempt to show riveting in scales smaller than 1:6.A rivet with a 0.250 dia. Head at 1:6 would be only 0.040 " or 1.0 mm, a dot. Judging, even for craftsmanship is from four feet.This represents a full-scale distance of 24 feet and it's pretty hard to see a 1/4 " diameter rivet from twenty four feet away, especially if they are flush rivets.

Rivet edge spacing and spacing are specified by the manufacturer or designer, but since we are not relying on the simulated rivet for anything but 'looks', we can just make them look right and no judge will downgrade you if you are off a few.

Twenty rivets in a panel edge looks just as good as 22 do, or, eighteen.Having a straight line of rivets, however, is important because the human eye can see a wavy line from a mile away.A straightedge is your friend in riveting.

Let's do a little raised head riveting on a 1:6 scale wing panel.First you need to lightly draw out the panel lines.Simulating panel lines is grist for another article so we'll just talk about the rivets.

After laying out the panel lines you need to decide on the rivet spacing and whether there will be two rows or one row of rivets.Two rows made a stronger joint and the rivets were staggered relative to each other.The spacing on most aircraft would be about two to three inches apart and at 1:6 that would make the spacing a little over 0.400 inch.Draw a light pencil line on the panel and divide the length by 0.400 to see how many rivets to mark on the panel.If the ends

aren't quite even, adjust the spacing up or down a small amount to make them come out evenly.EX: a 4.5 long panel would use 11.25 rivets.Expand the spacing just a 'smidge' and mark eleven rivets.With practice you can freehand the rivets just fine.

There are multiple ways to simulate raised rivets.My personal favorite is using a small hypodermic syringe with the needle tip ground square with RC-56 canopy glue to drop a small dot of glue on the surface at each rivet mark.RC-56 dries without the shrinking you get with most other glues such as aliphatic resin (yellow) glue.It works best if you dispense the glue without touching the surface with the hypodermic needle and you can lay down a lot of rivets in a short time when you get the feel for it.If you make a mistake just wipe off the offending rivet and put a new one down.This should all be done before the final color coat of paint is applied.

Another way that works well, but is a bit slower, is to use 30 minute epoxy mixed with a small amount of 91% isopropyl alcohol (rubbing alcohol) to thin the mixed epoxy to a creamy viscosity.Mix small amount because a small amount makes a bunch of rivets and when it starts to set-up you need a new batch.

A $1/16^{th}$ inch ball end artists sculpting tool is a perfect tool to dip into the epoxy and then, touched to the surface leaving a perfectly round 'rivet' behind.Each dip of the tool will usually make two to three rivets.Patience is virtue when simulating rivets.A tapered piece of music wire can be used too.Larger dia. of rod makes larger rivets.

If you are planning to "weather" the surface you can mix aluminum powder from an art supply store to make 'aluminum' rivets and when you wear of the paint for that weathered look, the rivets look very real.

For flush rivets the procedure is much simpler.I modified a small 25 watt soldering iron by slipping nesting pieces of brass tubing over the tip until I got the right diameter for my scale.At 1:6 scale I need just 0.040 dia. which is really small and hard to control, so I cheat a bit and use $1/16^{th}$ inch (0.062") I. D. tubing here.This is the smallest flush rivet that is practical.Lay out the rivet lines as you did before and scale the spacing.

With a hot iron, very quickly, just touch the surface of the panel with the squared tubing tip and, voila, you have a flush rivet in the surface.When I needed to do a bunch of riveting like this I put together a light dimmer switch in series with the soldering iron to adjust the voltage to adjust the heat so it wasn't so sensitive to the timing.With care, this method can be done after final paint is applied so the paint doesn't fill the simulated rivet mark.

Over the years I have seen at least twenty different ways to simulate rivets.The methods given here represent, in my opinion, the best or easiest way to add rivet realism to a scale model.

Models/web articles/rivets8/2011Ron Peterka