

# THE REVERSE "S" HOOK

## STEP BY STEP

The Reverse "S" (RS) hook prop shaft is designed to keep the rubber motor of a plane centered on the prop shaft. By centering the motor, the RS keeps the motor from "walking" around the prop hook and at minimum inducing a lot of wobble to the motor, and at worst, walking off the hook entirely. Some guys have suggested that it is a black art to bending a RS hook. It is not. Follow these procedures and practice, it is fairly easy, and well worth the time to learn.

For learning, it is best to use 1/32" music wire. It is easy enough to bend, yet stiff enough to get it correct. Do not use really soft wire such as a paper clip or copper wire, it is too easy to get it bent into the incorrect shapes and not be able to see what went wrong. It is also best to use a really good pair (read as stiff, and not too long of nose) of needle nose pliers.

**Step 1.** Start with a wire that is much longer than what is needed for the prop shaft. It can be cut down to size later. Grip the wire with the tip of the pliers about 1 inch from one end of the wire.

**Step 2.** Bend both ends of the wire around the tip of the pliers. If your fingers are not strong enough, press the wire up against a block of wood, or use another pair of pliers. After removing the pliers, the wire will look like a RS, with very long ends. Use the pliers to close up the curve of the RS. Both the top and bottom of the RS should be about equal, with equal curves. However, the curves do not have to be exact, just close. Look at them again. Maybe a little tighter on the RS. Finish Step 2 by turning the RS flat and squeezing it flatter. All of the wire of the RS should be in a single plane at this point. Look at it flat on. If it is not straight, straighten it now.

This is probably a good time to point out that all directions here, such as away from, right, left, up, or down are all from the pilot's point of view.

This is where most of the mistakes are made while making RS hooks. Pay attention! Look at the wire. A backwards "S" should be visible, not an "S". (That is, so long as a right-handed prop is going to be used.)

**This** **Not This**  
**2** **S**

**Step 3.** Grab the RS again with the pliers, bend the one inch side away from you. Bend it a little more than 90 degrees to the flat plane of the "S". Try to keep the "S" full, only bend the end down. After this bend, the wire can be rotated to where the one inch side is pointed down, as pictured here. This one inch side can now be cut down or off. The length does not really matter too much. Some people get rid of it completely. However a good rule of thumb is to cut it to the same length that the "S" is tall. Cutting it off can be done with a pair of side cutters, the cutters on the pliers or best, a rotary tool with a cutoff wheel. In any case the end should be polished and all burrs removed. This is where the rubber motor, or "O" ring will be slipped onto the prop shaft. A sharp edge on this part of the wire can be disastrous to the motor or "O" ring. If a Crockett hook or "T" hook is used between the rubber motor and the prop shaft it is not so important to deburr the end, but it is still a good practice. Stay tuned to future newsletters for details about Crockett hooks and "T" hooks.

**Step 4.** Grip the RS with the pliers again, this time, bend the long end of the wire in the same direction as the short end. That is, if looking at the RS, bend it forward. In this picture it is up. This bend is going to be more than 90 degrees. It needs to be bent where it will cross a line drawn from the center of the RS forward. It should meet that line about one "S" height forward.

This picture shows that a little more clearly. Notice that the long side almost touches the short side.

**Step 5.** The last bend takes place at the point where the long end crosses the line forward from the center of the RS. Grip the long end at the point where it crosses the center line from the RS and bend it to that line. The long end of the wire should now be perpendicular to the RS and should be pointing directly at the center of the RS.

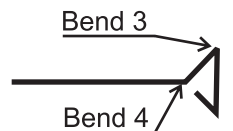
Chances are, it will not be perfectly lined up. The goal is to have the RS perpendicular to the long part of the shaft and centered on the shaft. Two tests will confirm this.

**First Test.** Hold the shaft pointing left to right and spin it. It will be very easy to see if the RS is perpendicular to the shaft. If not, bend it a little until it is.

**This** **Not This**

**Second Test.** Point the shaft forward, look through the RS to the shaft. Spin the shaft. A dark spot will develop in the center of the RS. If the dark spot seems to rotate around the center, it is not lined up with the shaft. This usually takes a little tweaking at bends 3 and 4. After this second test, repeat the first test. For a cool video of this go to YouTube.com and do a search for merlin2360, look for the Reverse "S" Hook video.

Happy Wire Bending!



Article by: Chris A. Boehm