

Rigging Small Scale Model Aircraft - Peter Williams



At our last modelling contest in August, I noticed that some of the models on the table had not been rigged, not so noticeable with a Fokker Triplane or a D.VII, but Camels and other non-cantilever types really need something to fill the void. Almost any photograph that you see, even the most out of focus and blurry will show some trace of rigging wires, so how do we achieve it? I hope that I can help.

I have tried rigging using cut to length pieces of wire and haven't even bothered to try stretched sprue (runner), in both cases I feel that to get acceptable stiffness and/or strength, the resulting rigging tends to be over-heavy and unrealistic, even worse than no rigging at all is rigging that looks like ship's anchor cables! And it is also fragile and easily dislodged by handling. I know the models aren't meant to be handled, but they do get handled, if only by me!

I have rigged biplanes in both 1/72 scale as well as 1/48 using the following method and I find it generally successful, but with a couple of problem areas that I am still experimenting with. I will discuss these later.



The best material I have found to use for the rigging itself, that looks like stranded steel wire, has not been on the market for at least twenty years, so I won't talk about it, although I still have a minuscule quantity that I use for special purposes, I initially avoided fishing line because it was always green (to fool the fish I suppose) but some is now available in a bronze colour which looks quite good, even though it is transparent, it is glossy and gives the effect of steel wires.

I generally use two sizes in 1/48, a 2kg. or smaller and a 2.7kg as some aircraft, especially the bigger types used more than one size of bracing wire, careful study of photographs should show this, the smaller size is also suitable for larger 1/72 scale subjects, such as the Sikorsky "Ilya Mourometz" but for smaller aircraft black or "smoke" invisible mending thread (nylon) is probably better. Until the advent of cyano-acrylate "super-glues" on the market, fishing line was not viable as it was impossible to glue it effectively.

1. Firstly Plan ahead, study photos and drawings of your chosen subject to ascertain where every rigging wire starts and ends, usually next to a strut, but not always, sometimes they attach directly to the strut or go through a hole in the fuselage, Nieuport 17 is a case in point wires attach to the top of the cabane struts (they are the ones in the centre on top of the fuselage) then down to a point close to the interplane struts, then from a point in the upper wing, close to the struts, a wire goes down through a hole in the fuselage side. A very good primary source are Windssock Datafiles covering many subjects in great detail.

2. Before final assembly, paint the fuselage, the top of the lower wing and the bottom of the top wing in their final colour not forgetting to add the roundels in some cases.
3. With a very fine drill in a hand held pin vice, size 80 or 79 will do nicely and being very careful as not only are these drills rather expensive, they are very fragile and very sharp, a stab in the finger can be quite painful, drill holes at all the rigging cable attachment points, drill right through. It can get rather tedious especially with something like an FE 2b which requires 52 holes in the wings alone, however, take your time and look on it as therapeutic, like saying a mantra, or knitting socks! Of course if your attention wanders, give it a rest and do something else for a while.
4. The time that you attach the lower wing to the fuselage will be governed by where the rigging holes near or in the fuselage at the wing root actually lie. Usually with a slab sided fuselage it is easy enough to fit the drill where it has to go, but a round fuselage may prevent easy access and the wing root holes at least may have to be drilled before fitting the wing. Refer to my first statement "plan ahead".
5. When all holes are drilled, including those required for control wires (that is a problem area that I will discuss later) the final assembly can take place, i.e. upper wing, undercarriage etc. Leave to dry thoroughly overnight.
6. It may be expedient with some aircraft, the Nieuport once again springs to mind, to actually thread the wires that go through the cabane struts before the upper wing is fitted, however this is not a common method.
7. Refer again to 1. Where it says "plan ahead" thread lengths of fishing line through the holes to enable the hard to get to items to be done first, i.e. between the interplane and cabane struts, then attend to the longer flying and landing wires after. Most interplane and cabane strut arrangements consist of two parallel struts with a cross bracing of two wires. Cut a piece of line long enough for both wires, plus a bit extra (practice will tell how much) thread through the holes and fix one end of each with a drop of thin super-glue applied to the hole on the end of a piece of wire or a pointed scalpel as an applicator. If one end is a blind hole in the fuselage (in other words, you can't see the end of the line) glue that first.
8. After an hour or two to make sure joints are firm, pull the wires taut and glue the other end, keeping them taut while the glue sets, not very long usually. One thing that you should be aware of is the alignment of the wings to the fuselage and each other, before the rigging goes on the structure can be a little wobbly so too much tension in one direction can easily distort the whole thing, so don't apply too much pressure, just enough to straighten the wires and if necessary do two sets at once in opposition to keep a balance.
9. Now proceed to the landing and flying wires (the long ones) and repeat the process. It should be possible to run all the wires using only two to four pieces of line, just leave a small loop on the outer surfaces of the wings between holes, then once again, glue one end of each "wire", blind holes first again of course. If using a continuous run, with loops, it makes it easier and quicker if alternate ends are glued, so that one "loop" is fixed and the next is still loose, then when ready to glue the second set of ends, the loops can be used to tension the "wires" by jamming tweezers or clothes pegs in.

10. When all joints are firm, trim off excess line with a sharp preferably new, blade, then check that all holes are filled, if necessary add a drop more glue, then when satisfied, the wing outer surfaces can be cleaned of excess glue and painted.

11. A refinement preferred by some modellers is to only drill holes part way through the underside of the upper wing, thus leaving "blind" holes, only the lower wing having holes all the way through. Thus there is less damage to the more visible upper surface of the top wing after trimming. Unfortunately there are many instances where this is not possible such as the wire that comes from a "blind" hole in the fuselage, usually in the centre section and sometimes main flying wires, back to the Nieuport. Having made the suggestion I have to admit that I very rarely choose that method, "blind" holes are sometimes tricky to glue.

CONTROL WIRES



As I previously mentioned, control wires can be a problem if using fishing wire, the line can be fixed in the blind hole where it enters the fuselage or wing, but when trying to attach the other end to the control horn, a problem arises, Cyano-acrylate glues do not set very quickly when exposed to air and it can be very frustrating waiting for the joint to set while keeping tension on the wire. I have a couple of alternatives to this problem; the first is to return to thin wire, such as fuse wire.

If the wire is pretensioned with a sharp pull, it stays reasonably straight and if the control wires are short, there is no problem with sagging. Alternatively, using fishing line, glue the wire to the control horn first, you will have to leave it for a considerable time to set, and then glue the blind end. But how do I get tension in the wire? Back to the planning stage, when drilling holes for the control runs to exit from the fuselage etc, note that on the real aircraft, these are generally fairly large holes, sometimes reinforced with leather surrounds, so drill them large enough, then after gluing the wires to the control horns, pass them both in opposite directions through the fuselage, then carefully glue them to the edge of the hole, then when dry, the opposite side lengths can be cut off and the excess poked into the hole. Another method depends on obtaining a supply of Lycra thread, commonly available in the UK from haberdashery shops under the name of "knitting in elastic". It is a thin, flat off white stretchable thread that glues almost instantaneously with a drop of super-glue and it can be easily dyed as it is actually stranded; I have dyed my supply black. Unfortunately as well as being as far as I know unobtainable in Australia, it has a tendency to perish in hot weather so is not 100% reliable.



If I found a source of non-furry stranded thread, like I used to use, I would return to using it in a flash, the main disadvantage of fishing line, especially the thicker gauges is that a fair bit of tension is needed to get the line to lie straight, where it exits the hole at right angles and then needs to go at an angle to the next hole. In a perfect World, we would drill all the holes at an angle wouldn't we?

In conclusion, I consider the advantage of using my method is greater strength; I can usually strum the wires with a finger nail, to the horror of spectators as they go plink, plink! And furthermore, if you are careful, it adds strength to the whole wing structure, when scale thickness struts are supplied in kits, the resulting wing module can be decidedly rickety, but after rigging, being careful of course to tension wires opposite each other to avoid distortion, the result is usually quite solid.

All photos courtesy of Peter Williams.