TRIMMING A TRIPLANE OR TAMING THE STALL

By Doug McHard

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Editor's note: The late Doug McHard was perhaps the finest builder and flyer of scale models in England

The Fokker Triplane has a bad reputation as a free flight model, being reputedly almost impossible to trim. One of the oldest myths in scale modeling circles is that the Fokker Triplane tailplane is mounted at a positive (lifting) angle. It certainly appears to be so in scale drawings of the machine, but look again!

The tailplane is mounted at a positive angle in relation to the datum line, but not in relation to the wings. The wings have a thick, heavily under cambered section, and the zero-lift line runs through the section at an angle to the datum greater that of the tailplane. Thus, the tailplane actually has a slight negative aerodynamic angle of incidence in relation to the wing! Please leave it that way. If the tailplane angle is reduced, the resulting excessive down-load from the large area and long moment arm, produces a stalling trim that is generally impossible to iron out.

The design has two other features that contribute to its bad stalling reputation. The height of the top wing above the thrust line produces a lot of drag high up, and this gives a strong nose-up force. In addition, the closeness of the big propeller to the short-span wings produces a disproportionate lift increase from the slipstream when under power.

The high angle of incidence of the wings presents a lot of undersurface to the slip stream, and if any attempt is made to correct a power stall by adding down thrust, the immediate effect is to blow even more high speed air across the wings and thus counteract the intended effect of the down thrust! The greater the power needed for flight, the greater is this effect.

A Fokker Triplane must be built light to be successful. The balance point should be well forward; no more than 50% of the top wing centre-section chord. Avoid over-size propellers, and ensure that no more than 2 degrees of decalage is used (the difference between the wing zero-lift line and the tailplane). All three wings should be mounted at the same angle of incidence. Reducing the angle of the lower wing(s) increases the stalling tendency.

The little 12-inch span Megows 10¢ model is a perfectly practical demonstration piece. Build it exactly to the plan and notice the tailplane setting - slightly positive to the datum line. My experience is that this little model flies quite well, but I do build with 1/20 inch square (not 1/16 in sq) and I do add a spar (1/20 inch square) to the wings on the top surface. If you can build and cover it without warps with out the spars - so much the better.

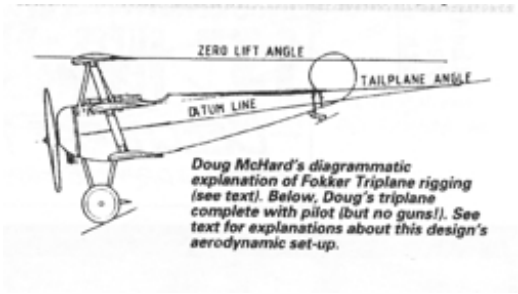
I have managed to trim out 'heavy' triplanes, but beyond a certain wing loading it becomes necessary to cross aileron, elevator and rudder controls to achieve stable power flight, and this results in zero glide! One final point - the use of minimum decalage means that you must be careful not to incorporate too tight a power turn(right), otherwise there is insufficient elevator correction to prevent the nose from dropping. Much of the above also applies to the Fokker D.VII and the Fokker D.VIII.

The above article is from Alex Imrie's Vintage Comer in the June 1994 Aero Modeler

Stew Meyers adds:

Doug used the original version of the [Megow] plan with Latin crosses and no guns. Penn Valley Hobbies has a kit with the plans modified by Scale Flight with Maltese crosses and inked in guns.

Be forewarned the span of the Penn Valley plan has increased from 12 to 12-3/8 inches. The print wood doesn't match the plan. I did not notice this while building the fuselage or tail, but it was obvious when I tried to build the wing. I ended up making print wood from the plan; quite often the best thing to do with old plans.



Doug McHard's diagrammatic explanation of Fokker Triplane rigging (see text). Below, Doug's triplane complete with pilot (but no guns!). See text for explanations about this design's aerodynamic set-up.