

INDOOR TRIM

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Published in the October 1987 Issue of The Hangar Pilot, Dr.

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My indoor flying scale models have been very successful in the past, mainly due I think, to my previous freeflight duration experience. Other contributory factors are flying competitively in the United States, membership of the Flying Aces Club, and letters to and fro across the "pond" to my bosom pal Doc Martin of the Miami Indoor Modelers Association. Of course, watching and listening to other scale modelers is also a superb pastime for furthering one's information and experience libraries.

I should stress that the following is **my** way of trimming and flying. You may have other ideas, but I can guarantee that my way will get your models flying satisfactorily, and that's what it's all about.

The main difference between indoor and outdoor flying is that indoor we don't glide! The whole flight is "power on", although towards the end of the flight the propeller is in a "no-man's land" condition; that is to say that thrust and drag just about cancel each other out, so a "powered glide" may be the correct phraseology. Another factor to be considered is that in calm indoor conditions the model does not become unstabilised by changes in air speed, as can happen outdoors with gusts and general turbulence, so that generally a scale-sized stab will suffice. To overcome the small stab syndrome I usually locate my C.G.s far further forward than usual. This effectively lengthens the tail moment and makes the stab more effective. I use this technique on all my models, both rubber and CO-2 and have found it to be safe and pretty-well foolproof.

My high-wing types (rubber) are flown either left or right depending on the type of competition entered! If the model is to be judged for "SMAE flight" then I fly right. This involves a straight take-off, and as the torque dies off, the model settles into a right-hand cruise and eventual descent. The model's trim is as follows:

1. Slight wash-in (1 deg.) , right-hand wingtip.
2. 2 - 3 deg. downthrust.
3. Right rudder, 2 - 3 deg.
4. Slight up-elevator to counter (6).
5. Corresponding wash-out, left-hand wingtip.
6. C.G. position approximately 10 - 15% from L.E.

Incidentally, most of my models are built with separate elevators and rudders. The weight penalty is negligible, but the control that can be effected on the model is immeasurable. I don't like Sellotape or masking tape trim tabs.

Flying high-wing models left is very exciting. Take-off is usually followed by a very tight left-hand turn, gradually widening out until the model assumes circles of wall-banging proportions: OK outdoors, but frowned upon indoors.

High-wing rubber: FLY SAFE, FLY RIGHT!

My low-wing rubber ships, on the other hand, always fly left. Flying right against the torque is suicidal and should be avoided at all costs. My current stable of low-wingers includes a Heinkel HE 100 V8 (the 1939 world speed record holder), a Mew Gull, and Howard Hughes's H.I. in short-wing configuration. All utilise the same trim and all fly really well (all are Peanuts). The set-up is:

1. 1/8" - 3/16". wash-in, left-hand wingtip.
2. 1/16" - 1/8". wash-out, right-hand wingtip.
3. 2 - 3 deg. left rudder.
4. Forward C.G. (10 - 12%).
5. Up elevator (1/16" - 3/32").
6. 3/32" - 1/8" downthrust.
7. Some models may need 1 deg. left thrust.

If you examine the above you will see that virtually every "tweak" works in opposition, resulting in a constant diameter left circle under full power, and approximately the same diameter circle under cruise and approach conditions. Very Safe and predictable. Using this trim is for power-on complete flight only. If your motor becomes non-productive at altitude (above ground!), then your model will spiral to the right, coupled with deep stalls. I cannot comment on low-wing CO-2 as yet because I haven't built one. However, high -wing and bipes I have.

Always turn left with CO-2. Trying to fly right, fighting all that torque from a relatively high-pitched prop, is a tremendous waste of energy. I still use the forward C.G. coupled with up-elevator configuration on CO-2, once again because it is so safe. This set-up was discovered accidentally when I built a Sig. Mr . Mulligan with standard Telco power. What used to be a fairly willowy flight pattern was transformed after the model hit the wall. The CO-2 bottle on board moved forward about two inches due to the impact and was (of course!) inaccessible. To offset this change in C.G.—now about 10%—the elevators were adjusted up about 1/8", and the model flew great, indoors or out. It has now worn out two Telcos, and is flying as well as ever .

As there is no power burst with CO-2, trimming is less tricky than with rubber models, but unfortunately nearly every charge differs, changing power **and** weight. However, my models seem to cope with these changes, and provided that you gas cylinder is on or near the C.G., no significant flight changes should occur. My high-wing CO-2 models have the following trim:

1. Slight wash-in, left-hand wing.
2. Slight wash-out, right-hand wing.
3. Forward C.G., 10 - 15%.
4. Up elevator to counteract (3).
5. 2 deg. right thrust - to counteract torque.
6. 1 - 2 deg. downthrust.
7. Straight, or slightly left rudder.

This trim gives constant diameter left-hand circles on power and "flight idle" .

My rubber biplanes are trimmed in a similar fashion except that wash-in and wash-out are applied to the lower wings only. When setting biplane rigging angles I use the American method. Only the leading wing has incidence; the trailing

wing is set at zero. This method and a forward C.G., coupled with up elevator, will cure the average biplane's tendency to be over-elevated and fly crazy.

Do not forget to charge your gas cylinder, or to put enough turns on your rubber motor to make it taut, before you adjust for C.G. position. A charge can weigh up to 6gm (Brown twin, 6cc tank) which in my Lacey's case is 20% of the model's weight, and I should think that rubber is comparable. Keep sparklet cylinders in your pocket to generate some heat for they dispense gas much more efficient when warm. Use no other method, though, to warm cylinders.

Use as long a rubber motor as is practicable. This minimises high initial power bursts, gives a more even power curve, and allows many more turns for longer flights. My Peanut Lacey uses a 24" loop of .083" rubber and takes 2,100 turns, resulting usually in a 60 - 10 second flight. My Heinkel He100 (with 6in. Peck Polymer propeller trimmed to 5 1/2") flies about 45 seconds on a loop of .110" rubber. The Mew Gull is similar. As a comparison inch-to-the-foot Lacey with dual noseblocks (rubber and CO-2) uses four strands of .100" in a 36" loop and flies for 10 seconds, while the Brown twin with a 6cc tank has flown 2min. 24sec. in the Lacey at West Baden, Indiana, in 1980. The Sig. Mr. Mulligan flies about 1 minute with the standard Telco. .

I hope that this information has given food for thought and in clubroom discussions and that should you use any of my methods that they will work as well for you as they have for me. I would welcome any comments or hints.

Have fun, and good, safe flying ...
Butch Hadland