THE RIGHT-RIGHT VS. THE RIGHT- LEFT TRIM

By Jim 'O'Reilly

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The tradeoffs of the right-right vs. the right-left climb are well understood. Basically, climbing against a deflected rudder tab (RH climb, LH tab) is very safe because the effectiveness of a tab goes up with the square of the airspeed. (You double the speed and the tab gets four times as strong.) In a RH climb with RH thrust and against LH tab, if a gust gets it at launch and lays it over to the right, the high airspeed pulls the nose back up to the left. Conversely, if the nose gets too high, the speed drops off reducing the effectiveness ot the tab and the right thrust takes over. So the basic R-L pattern is very safe.

Its drawbacks are two: First. that "S" turn transition can take you out of a thermal or take you further downwind. Secondly, the LH tab, for all its benefits in a RH climb. can be dangerous. If the model is carrying too much tab in the same direction it is turning in a thermal, it can spiral in. For that reason. I have backed off a little and have been mixing stab tilt and rudder tab in the R-L pattern the last several years. The hope is to get the benefits of the R-L climb without the risk. There is another way that LH tab can be dangerous: I have a Lamb Climber Rubber Stick that is a climbing dude. I mean. the bystanders all gasp and marvel when it goes up.....except when I fly it in a big contest! In a big contest the adrenaline gets to pumping and I forget myself and give it a big heave. Twice it has gone in to the left! It has too much LH tab and it is on my list to reduce it before it is fired in anger the next time. I'm sure that I've gotten careless as to wind dIrection and that, plus the high velocIty of the big heave makes the LH tab spiral it in.

Note that a little tab in the same direction the model is gliding makes it tighten its turn in a thermal. You want a little of this....makes it center in the thermal. But when it has too much. it can spiral in to the left.

I feel that the best compromise in a simple ship is the R-L climb with half and half, stab tilt and rudder tab. If you have the weight to spare and the rules permit, an auto rudder which gives you a climb like the R-L ship but a glide to the right is the ultimate way to go. You can carry as much or as little LH rudder in the climb as you wish. Same for the RH rudder in the glide.

If you fly the RR pattern, you will be okay until the wind gets up. Then, you run the risk of a wingover to the right when the wind comes up and you get careless and launch too far to the right of the wind. If the ship in question is an OT ignition gas job, the same principles apply but the emphasis is different. The first risk encountered is the take off on the OT job. Whereas the rubber job is launched quite steeply at a lower velocity, the OT gas job is ROG'd (conditions permitting). and builds up a relatively high airspeed which decreases as it enters its climb. If the ship is launched to the left of the wind, the LH tab forces it to turn left and it spirals into the ground. Therefore, it is crucial that R-L gas jobs take off to the right of the wind.

I am convinced that there are OT gas models which will fly on the R-L trim and on no other. Most of the pylon models are flown RR because they can often be made to transition into the glide by simply tightening the RH turn as the engine (with its left thrust) cuts. I flew a Playboy Jr. RR (for as long as it survived) at the 1988. SAM Champs. It would tolerate a 5-sec. engine run but no longer. A longer run would result in it dropping its right wing and spiraling in with increasing airspeed and tightening spiral. I

now feel that it is probable that the ship could have been made to fly R-L. (I do not feel so confident that I am building another, however!)

What adjustments are needed for RR and R-L trim systems? In both cases, the glide is determined first and then the thrust line is altered as required to achieve the desired climb.

The RR ship glides to the right with about 3-4º of stab tilt. RH tip high. It will also need about 30 of wash-in (leading edge high) in the RH inboard wing panel. The tips are generally symmetrically washed out. A field adjustment is the use of trailing edge stock under the RH polyhedral joint with the blunt edge aft and the sharp edge forward. This gives the same effect as a drooped aileron in helping to keep the RH wing up. The RR ship generally needs only a slight amount of thrust offset to turn it right in the climb. If it is a pylon ship, the RH-turning effect of the propwash on the pylon may be so strong that it will require some LH thrust!

The RL ship glides to the left with either LH tab or a combination of LH tab and LH tilt 0.5-2º). It carries no warps other than symmetrical washout in both tips if desired. I recommend a couple of degrees,) As a general rule, it will require something like twice the right thrust offset to get it to climb to the right in opposition to that LH rudder.

Note that stab tilt works through tilting the stab's lift vector to the sIde, using some of that lift to push the tail around. Its effectiveness is independent of airspeed. It depends on only two things: The magnitude of the lift on the stab and the distance that lift is located aft of the CG. This means that stab tilt may not work or may work only marginally on some OT gas jobs. Many of the earlier cabin jobs had a somewhat forward CG (and therefore little lift from the stab) and a short moment arm to boot. On such a ship, stab tilt may not be effective.

One last adjustment trick needs to be mentioned: It is the so-called "drag flap". This is a hinged flap installed aft of the trailing edge of the wing and weighted so that it will droop at low airspeeds, like in the glide. Its purpose is to get R-L ships to turn left in the glide without affecting the climb. Supposedly, at high speed, the airstream keeps it faired while, at low speed, it droops, "dragging" the LH wing into the LH turn. This device is of occasional benefit when used as described. I am astonished at the number of times I have seen it misapplied on OT gas Jobs. A flier will have trouble with a ship trying to drop its RH wing in the climb and he will stick one of these things on it, almost as a standard fix. It will tend to have little or no effect when he wants it (in the climb) and maximum effect when he doesn't, (in the glide). I consider it obsolete in those cases where stab tilt will work. In the misapplied mode (to counter a dropping wing) the flier is better off just sticking on some of the trailing edge stock mentioned above.

As a summary here, I will add the LH climb to the puzzle: High Thrust Line (HTL) AMA gas jobs fly LL. Not unexpectedly, there are parallels in rubber power and in OT gas: Some cabin designs (e.g. the Taibi Powerhouse) also climb best to the left. If you look at the profile of the Powerhouse you, will note the height of its thrust line. Similarly, low wing scale rubber jobs such as WWII fighters are best flown to the left in the climb. Most all high-wing rubber jobs and gas jobs which have the necessary lateral stability to fly can be flown safely m the R-L , pattern. Most pylon gas jobs will handle the RR pattern and even flourish on it due to the elimination af the' "S" turn transition and a transition into the glide which entails the least loss of altitude