THE FREE FLIGHT CLIMB PATTERN: A CRITIQUE OF JOHN LORBIECKI'S ARTICLE, POWER FLYING—RIGHT TURN, LEFT ROLL, OR BOTH

By Jerome W. Klingaman

If I could give a young person just one piece of paper to read before he/she begins a free-flight career, it would be John Lorbiecki's article entitled Power Flying--Right Turn, Left Roll or Both, which was published in the March/April 2010 Issue of the Pensacola Free Flight Thermalier. This article is important enough to take a hard look at what he has to say because his argument lies at the heart of what makes free flight birds perform successfully in the climb.

Lorbiecki lays out his thesis with the straight-forward statement that all of us who believe our models are turning right in the power climb are wrong, and that "models in power, do not turn right." He also says that he knows there will be skeptics who think he has lost his mind.

Indeed, many FF guys reading his description of what goes on during locked-up, high-angle climb will probably say it's wrong because the description does not match what they think they see after the launch. They need to read the article again, five times if necessary, because he is exactly on the mark. What we always call a "right turn" in the climb is actually a left roll. I was taught that by some free flight guys in the model airplane club at Williams AFB, AZ, when I was a twenty-year-old aviation cadet. Jeepers, that was a long time ago.

Lorbiecki's description of the power climb is a bit difficult to grasp because the text is somewhat confusing, and one of the two critical dynamics is missing; i.e., he does not describe, and incorporate into the description, the inherent looping tendency of an aircraft moving at speeds considerably above a trimmed-out glide. The other critical dynamic, of course, is the left roll itself.

With increased power and airspeed, a bird trimmed for straight and level flight will go nose up to the point of entering a loop. In a climb configuration, as the bird continuously tries to loop, the left roll continuously prevents it from happening. The left roll simply counters, or kills, the loop. It is the combination of the loop and the roll that produces the spiral climb. Without the roll, the spiral climb does not make much sense.

It is important to realize that this spiral climb does not necessarily have to be the classic vertical ascent. It can be accomplished at lower climb angles. Moreover, the lower the climb angle and the looser the spiral, the more it looks like a climbing turn to the right until there is no more climb at all, and then it is simply a right turn. So, is there such a thing as a climbing turn to the right? Of course there is, but a model airplane still requires some roll to the left to keep the nose up.

If you go through the climb maneuver with your hand, or with a small model held in your hand, make it loop and roll left at the same time. When you do this looking up at the spiral maneuver, you will see what appears to be a "right turn." What you are actually seeing is the left roll making the model spiral counterclockwise, as viewed from the ground.

Lorbiecki's perspective is (apparently) from above the maneuver, so he has the spiral going clockwise. That's one of the confusing things about his article. You will also see that this spiral maneuver can be accomplished without bringing the rudder into play. That's why Lorbiecki states that "adding rudder may not be what you really need to do . . ." when trimming for the climb. In fact, moving the rudder to "adjust the climb pattern" can get you into more trouble than you can get out of in a month of Sundays. I suspect, however, that the more shallow the spiral climb, and the less roll involved, the more the rudder will come into play to bring the aircraft around in the desired direction of the climb, but only as long as some left roll is maintained with right wing wash-in to keep the nose up.

My Brooklyn Dodger with an Ed Shilen Torpedo .29 will fly this spiral climb pattern, and it will do it with neutral rudder. So will my fully-wound 54-gram Gollywock and my Ed Lamb Climber with 70 grams of Tan II or Super Sport. My Miss Fortune X with a Cameron .23 will not convincingly fly this pattern, or at least fly what one would confidently refer to as a spiral climb, certainly not a vertical spiral. Why? Because Miss Fortune X does not have enough power or enough airspeed to pull herself up into a loop and roll left at the same time. This is probably why, regarding the use of right wash-in to trim the climb, Lorbiecki states that ""this may not have the same effect on an old timer or sport model."

The Miss Fortune will probably assume something closer to a "climbing turn to the right," but there still has to be some left roll to it; otherwise the aircraft will hit the ground when it comes around on the opposite side of the climb circle. Try this with your hand-held model. Put your "bird" into a shallow climbing turn to the right and keep it going without allowing any left roll (concentrate on not rolling) and see what happens. The real-life outcome of this experience is that you go back to the shop and do some heavy airframe repairs or, if you are lucky, simply add some wash-in to the right wing panel; i.e., right inboard wing panel on a polyhedral wing.

The funny thing is that out on the field, I still call the Gollywock's vertical spiral a "climb to the right." We all do. People would think we were daft if we said: "Look at that left roll." An interesting point surfaces here with the Gollywock. There is no wash in, or wash out, anywhere on the airplane; the glide is rock solid without any of that stuff. So where is the left roll coming from? Well, the combination of a large prop and 35 grams of rubber wound tighter than Dick's hat band produces a lot of left torque that requires 4 1/2 degrees of right thrust offset and which also rolls the aircraft to the left since there is no one inside standing on the right rudder pedal and compensating with some aileron. I have never known anyone to advance this specific notion before, so if

you have a better way of explaining the left roll with zero wash-in/wash-out, I will gladly listen. By the way, this effect is not nearly so prominent in a power model with its smaller prop.

Speaking of rudder--and I would rather not, because it starts getting complicated at this point?how do we get the glide turn we want if the bird can do the spiral climb with neutral rudder? If the bird is a freewheeling rubber job, I usually get away with neutral, or near-neutral, rudder and let the adverse torque from the free wheeling prop bring the aircraft around to the right in the glide.

With a folder, a little bit of left rudder (1/16" or less with each of nine Gollywocks I've built over the years) coupled with the right thrust offset more or less locks the bird into a stable spiral climb. That's the way we get the "climb right, glide left" pattern. Incidentally, when someone says that they "torqued in" to the right by over winding (adding too much power), I would attribute that deadly wing-over to more right thrust offset than the bird is trimmed for at that level of increased power; torque rolls the bird left. Big old-time Class D sticks and cabin birds with vertical fins cambered on the left side often "climb right"-glide right with little thrust offset, but they still do a left spiral assent of some kind, even if they are "climbing out on the wing" as they say.

My Brooklyn Dodger has 1/8" wash-in on the right inboard wing panel. It also has a free-swinging (hinged) 2" by 1" by 1/8" thick plywood gurney flap out on the end of the right inboard wing panel, something Sal Taibi told me to do at the 1996 SAM Champs. Come to think of it, even that was a long time ago. The Dodger's modest amount of wash-in keeps the right wing up in the glide, and the slight drag from the flap brings the aircraft around, albeit slowly, to the right. A little bit of right rudder on the Miss Fortune X should not get in the way of the climb pattern and the little bit of right wing wash-in keeps the right wing up in the right glide. The model doesn't do anything fast. The same should be true of the So Long and Comet Clipper I want to build, although trim changes will be a lot more critical with those birds because they are going to be adequately powered. Still, the game is "climb right, glide right. And so it is with old-time cabin aircraft.

Now, with locked up AMA power machines, the rudder can be adjusted to . . . Nope, I'm not going to go there. Those guys are bigger and tougher than I am and a whole lot smarter about the use of rudder in their game. To go beyond this critique of Lorbiecki's article on roll versus turn in the climb would risk getting me beaten up and left on the field for dead. I'm probably almost at that point already. To avoid such an end, I need to stop here. Alternatively, I would have to do a lot of research and interview a lot of guys who have patiently worked it out over the years. I'm just not prepared to do that during this life time. Anyway, this is all good stuff to think about when one needs an aerodynamics fix.