

Gordy's Travels #3

A Return to the Land of Trim and Balance

In my previous trip to the land of trim and balance I talked about the fact that terms like 'CG' are the arch enemy to getting our planes optimized.

As I have said many times in my column, I am fortunate because I get to meet and discuss stuff like this with guys who really know things, recently I chatted with one of the youngest, foremost brilliant free flight modelers (and RC Sailplaner) Russ Whitford of the Slopeflyer.com Whitfords in Milwaukee, Wisconsin.

Russ and I go way back, and while we seldom see each other or even talk, when we do, its like we were just together yesterday.

Russ had read my article on trim and balance, and pointed out that where I stated that Rudder Elevator ships of the past were always balanced at 30% with lots of up decalage in the horizontal stablizer, because the kits were designed by ex-free flight guys who had added radio control to their planes, in fact the opposite was true. That free flight planes were actually balanced way back to sometimes 50% of root chord.

So as we discussed that line, an epiphany came to me as to why poly ships had evolved in such a goofy manner.

It was actually something Russ said as he was discussing the rationale of free flight trim and balance, where he used the phrase, "trimmed for a particular speed".

And THAT was it, whether consciously or unconsciously or maybe as a result of 'task', kits prior to full house planes (lets say pre-1980ish) were (for the most part) all set up with some decalage and lead in the nose to 'balance' the crookedness of the wing to stab alignment.

Setting those planes up like that made them very difficult to fly fast for one thing, plus pilots learned which speed was optimum for their setup. Diving them down from a thermal caused their destruction. Often when at cloud base it's near impossible to tell if your plane is flying across the sky or speeding down from the sky, down being the bad thing ☺.

Keep in mind, that very few modelers alive actually 'know' why they did what they did in designing a model for Thermal Duration flying, mostly they did what was the norm for the day. We actually still see it in many of the Euro-Moldy Vtails (fixed stabs), which if balanced like a full flying stab plane, have to be either flown

with 1/16" down elevator trim or have the stab assemblies leading edge shimmed up that amount.

Try to forget applying judgement terms like 'good thing or bad thing'. There are lots of ways to skin a cat but there are some that are faster than others....the cat is skinned in the end in either case.

Now here's the reason's its been a dumb idea for years!

With mass quantities of lead in the nose of a sailplane, once airspeed is lost, so is the stab's ability to support the nose against gravity. That's why on a hand toss sailplanes set up crooked first balloon, then drop their noses like javelins...with a really nice glide in the middle.

It's why so many newbies end up in trees or watch their planes heal over on launch, crashing into ground and shredding their way to the turnaround. It explains the REALITY of the what some call the 'deadly down wind turn'.

A sailplane balanced at 30% of root chord, has lots of lead in the nose. Only the elevator can make that nose lift. The more lead, the more strength (or authority) the elevator needs to get that nose to come up in a turn.

So when newbie gets down low and slow, then decides to try to bring his plane around in that down wind turn, but since his airspeed is reduced, his sailplane's elevator has lost its strength to pull the nose through the turn. Centrifugal force, mass and inertial come into play, forcing the nose to drop or fade down, away from the turn. Same as a piece of lead swung at the end of a string wants to fly away from the center, the lead in a sailplanes nose wants to fly out and away from the direction of the turn!

When a newbie sees his plane is not responding (coming around),he pulls more elevator. Since there was barely enough air on the elevator as it was, raising it more causes the air that was passing over it, to 'baffle' against it, rendering the elevator 'gone'...and a SNAP ROLL results -- NOT A *TIP STALL*, (don't get me started on that topic!!) that lead in the nose rushes toward the earthAnd we have planes in trees, or with a crumbled wing tip first into Terra-firma.

So why don't poly ship guys 'get it'?

Because they don't understand what 'IT' is. When they see a newbies plane porpoising, they advise him to, "Add some lead to the nose!"...Not taking into account that it takes real thumb experience to 'learn to fly' a crooked airplane. If the newbie had mastered flying his crooked airplane at it's specific speed, it wouldn't be porpoising in the first place.

AND THAT'S WHY... poly flyers have so much trouble transitioning to full house planes. Any one who flies full house will always argue that they are sooo much easier to fly, 'fly' being the operative word. As in the pilot controls every movement of the ship, every attitude change, where the crooked planes resist most input control and hate to the point of getting crazy, speed request changes.

Poly guys are told, by other poly guys, that full house ships are 'for experts thumbs'. So they 'learn' to fly their particular crooked-unbalanced polyships. Since no other model flies like their personalized speed-specific polyships, they have lots of trouble flying anyone else's sailplanes, crooked poly or full house balanced ships.

When asked to help a newbie with his poly ship, that guy will always start adding lead to get the newbie's ship to fly *like* the plane he is used to... his own.

Now the same is true for a full house sailplaner who understands trim and balance. He will always start pulling lead and adjusting the full flying stab till all the decalage is out, so that at any speed, the plane flies the same attitude. That way it allows the pilot to be able to range further away and not wonder what his plane is doing. It allows him to spend more time reading air, and less correcting attitude for speed.

Too often, those club experts, flying crooked-unbalanced planes will hold their trophies up, or proclaim their hours long flights, as a justification of their set up. In spite of the fact that houses fly in the right air.

That they have mastered *their* model well enough to beat guys with full house ships, is a testament to their skills, but also a condemnation to only being able to enjoy that particular model.

A balanced plane doesn't need lots of elevator in that low, slow downwind turn, to get it's nose to come around, so you seldom see them tip first into the ground (don't confuse balanced and trimmed with full house, a crooked-unbalanced model still has to fight the same physical forces). Its why so many of the 'pros' are seen hand tossing 120"+ full house composite models, circling and catching, or putting them up into the clouds from the same toss. A trimmed and balanced plane doesn't waste what little energy is available. They land slower, not because of flaps, or computer radios, but rather because they are not following the masses of lead found in unbalanced models noses. They need less of all control surfaces to make them do what we want and are 'set-up' to fly the same at any speed, under any pilots thumb.

Our sailplanes have to fall forward to fly right, Trim & Balance is a trip that is tremendously interesting once you get your head beyond the aerodynamic jargon that causes us to dismiss the common sense factors. I'll be on this road for a while, hope you can come along! Gordy