Following is a "Powered Flight Trouble Shooting Chart" which summarizes the causes and adjustments for most types of powered flight troubles. The gliding flight is easier to trouble shoot. One usually needs only to adjust the vertical tail (or its tab) incidence to control the turn and the horizontal tail (or its tab) incidence to control the gliding speed (Fig.3-1). Any "wandering about" as to direction means the vertical tail is a bit too small and needs a slight enlargement. Bunching troubles, (2) and (6) in chart, also ruin the glide. For best gliding duration a slightly more forward C.G. and a slightly faster gliding speed are needed for gusty air than for calm air, item (23) in chart, and too little wing dihedral will also cause a lesser gliding duration in gusty air. A slow recovery from a stall, items (9) and (10), also require a slight C.G. adjustment.

| Trouble (glide being O.K.) | Probable Cause | Suggested Adjustments |
|---|---|---|
| 1.Model stalls or loops repeatedly (see 7 below) | Not enough downtrim due to power | More downthrust or less upthrust (a little sidethrust to give some turn can also help here) |
| 2.Model stalls as motor unwinds | Bunching of knots at rear | Non-climbing hook and/or less slack in motor *** |
| 3.Model dives in fairly straight flight | Too much downtrim due to power | Less downthrust or more upthrust |
| | Longitud. instability, Fig.6-1 | Move C.G. forward a bit (ballast) and retrim glide * |
| 4.Model flies fast,little climb | Too much downtrim due to power | Less downthrust or more upthrust |
| 5.Model stalls once then dives | Longitud. instability, Fig.6-1 | Move C.G. forward a bit (ballast) and retrim glide * |
| 6.Model dives as motor unwinds | Bunching of knots at front | Non-climbing hook and/or less slack in motor *** |
| 7.Large downthrust needed to trim away stalling or looping | Too much longitud. stability | Move C.G. aft a bit (ballast) and retrim glide ** |
| | Too little wing incidence | Increase wing incidence and retrim glide ** |
| | Very small horizontal tail | Make tail 1/4 to 1/2 larger and retrim glide ** |
| 8.Flight very sensitive to small downthrust changes | Too little longitud. stability | Move C.G. forward a bit (ballast) and retrim glide * |
| 9.Very slow stall recovery with much lost altitude | Too little longitud. stability | Move C.G. forward a bit (ballast) and retrim glide * |
| 10.Too many "dips" recovering from stall, much lost altitude | Too much longitud. stability | Move C.G. aft a bit and retrim glide ** |
| 11.Model dives in, spiralling to the left, Fig.6-3 (Or, model will not climb adequately because of too much banking) | Too much left trim (too tight a turn) | Less left sidethrust or more right sidethrust (less downthrust or more upthrust can also help here) |
| | Too much left banking (tight turn desired) | Washin left wing or washout right wing, or do a lesser amount of both and retrim glide **,* |
| | Spiral instability (if above trim changes won't correct) | More wing dihedral and/or smaller vert. tail and/or larger prop diam. and/or pitch, and retrim glide |
| 12.Same as (11) but to the right | Same as (11) but right for left | Same as (11) above but switch right and left |
| 13.Turning and banking flight very sensitive to sidethrust | Too little spiral stability | Same as for spiral instability in (11) above |
| 14.Tail swinging in flight | Dutch roll | Increase vertical tail size slightly |
| 15.Tail swings forward causing violent roll or tailspin, crash | Violent Dutch roll | Increase vertical tail size as needed (considerably) |
| 16.Wandering flight (direction) | Slightly too small vert. tail | Increase vertical tail size slightly |
| 17.Turn opens up too much as rubber motor unwinds | Turn depends too much upon sidethrust | Use less sidethrust but more "rudder" to get same turning circle |
| 18.Turn tightens too much as rubber motor unwinds | Turn depends too much upon rudder setting | Use more sidethrust but less rudder to get same turning circle |
| 19.Must fly fast to stay aloft | Model too heavy | Rebuild lighter, eliminate any heavy items |
| 20.Model lacks power to climb, and rubber model lands with many winds left in motor | Engine too weak or its prop diam. and/or pitch too large | Use larger engine if smaller prop pitch and/or diameter won't provide adequate climb |
| | Rubber motor too weak | Use "stronger" motor, more strands or width |
| | Rubber motor too long | Use shorter motor (less slack), check C.G. location |
| | Prop pitch too large | Use smaller pitch prop |
| | Model too heavy | Rebuild lighter, eliminate any heavy items |
| 21.Model flies too fast (short prop run for rubber model, or for indoor model flying hits ceiling too soon) | Engine too powerful | Use larger diameter prop, or smaller engine |
| | Motor too strong (too thick) | Use weaker motor (fewer strands), check C.G. |
| | Prop too small | Larger prop diam. if possible, and/or larger pitch |
| | Motor too short | Use longer motor (more slack), check C.G. location |
| 22.Difficult to make model fly in one direction, left or right | Warps and misalignments, or one wing panel too heavy | Fly in other direction, or correct warps and misalignments or add weight to other wing (undesirable) |
| 23.Model's gliding duration much less in moderately gusty air than in calm air, gusty air requirements slightly different | Too little wing dihedral | Increase wing dihedral a few degrees |
| | Too little longitud. stability | Move C.G. forward 10-20% and retrim glide * |
| | Gliding speed a bit too slow | Trim glide to be a bit faster in gusty air than calm |
| 24.Very poor duration in spite of careful adjustments and changes as suggested above | Very poorly made prop | Use good prop, reasonably thin blades and sharp L.E. |
| | "Bad" wing airfoil | Rebuild wing with good airfoil, p.4.6 and Chapter 16 |
| | Poor quality or "tired" rubber | Use good quality fresh rubber (see Fig.11-12 notes) |
| | Too much drag | Eliminate unneeded struts, wires and protruberances |

* up-elevator as needed ** down-elevator as needed *** see p. 15.11, items (3) and (4)

Note that the C.G. is not moved (ballast) to trim the flight; it is moved only to change the longitudinal stability as needed. Also the horizontal tail incidence ("elevator") is changed only to trim the glide, not powered flight. The powered flight trim is controlled by downthrust and sidethrust incidence changes (p.3.1 and 8.1).

P... p.6.2 moving the wing forward has the same effects as moving the c.g. aft the same amount (if the wing incidence ...t changed in doing this) and vice-versa. Of course, FFS models, and most others, do not have movable wings.