June 1987 R/C Modeler
Vol. 24 No. 6 Pg. 104
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Column Article

FLYING LOWE

By
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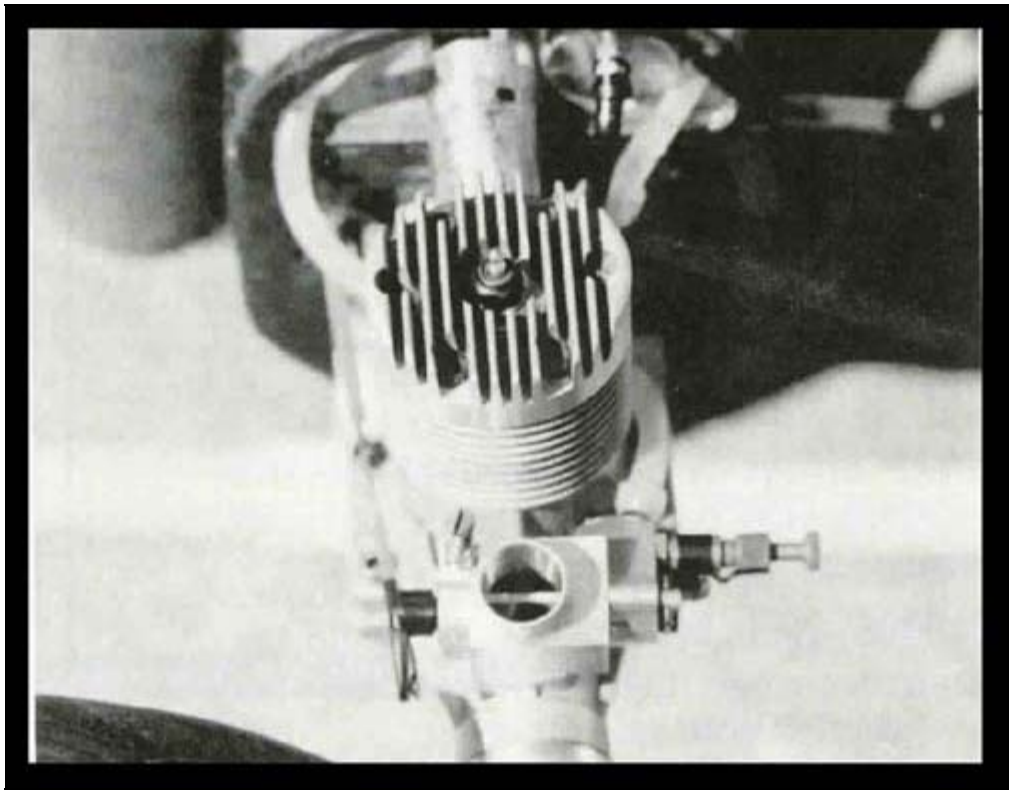
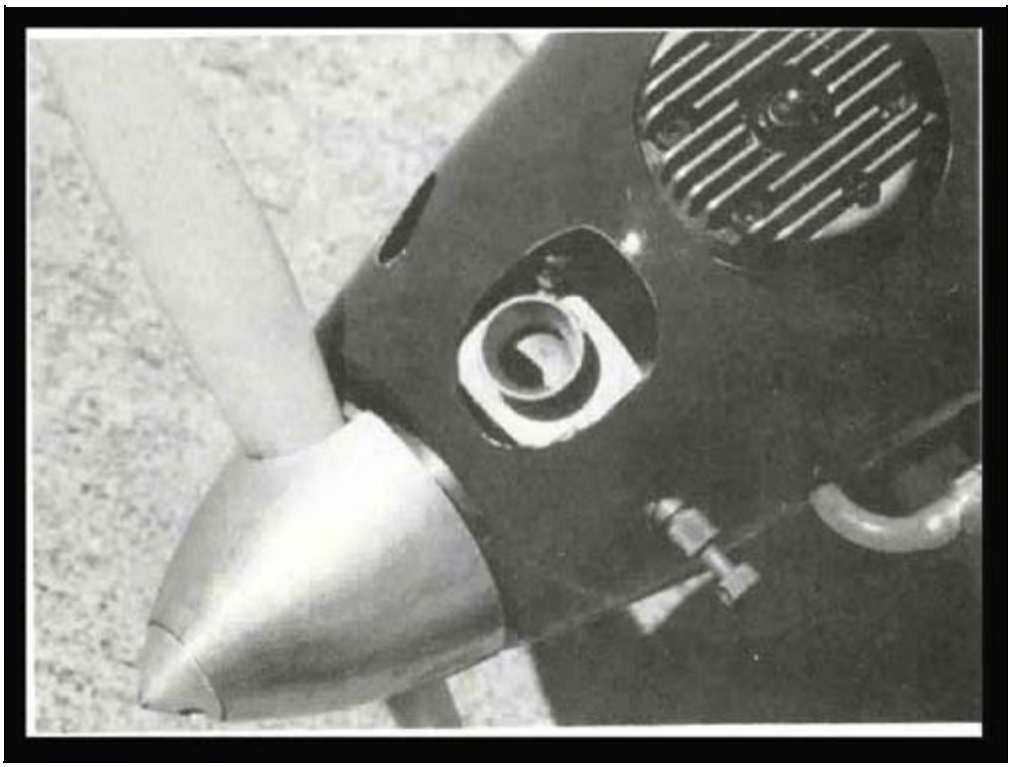
Recently, friend Billy Girod and I have been working with the new O.S. .61 long stroke (his) and the older O.S. .61 FSR (mine) engines to get increased horsepower out of them. Both engines are ABC types. We are both flying fairly identical Phoenix 9's so our comparisons have been made both on the ground (static rpm) and in the air. Identical props (German Bartel 11-1/4" diameter x 10" pitch, glass/epoxy), Hatori tuned pipes, and fuel (Cool Power, 15% nitro) were used for the test. Initially we ran suction feed carburetors; I ran the Super Tigre .60 carb and he ran the standard suction carb supplied with the long stroke O.S. We found that our static rpms on the ground were in the neighborhood of 11,000 to 11,200 (both engines). In the air the engines ran nice and steady but not spectacular; so, we started changing things.



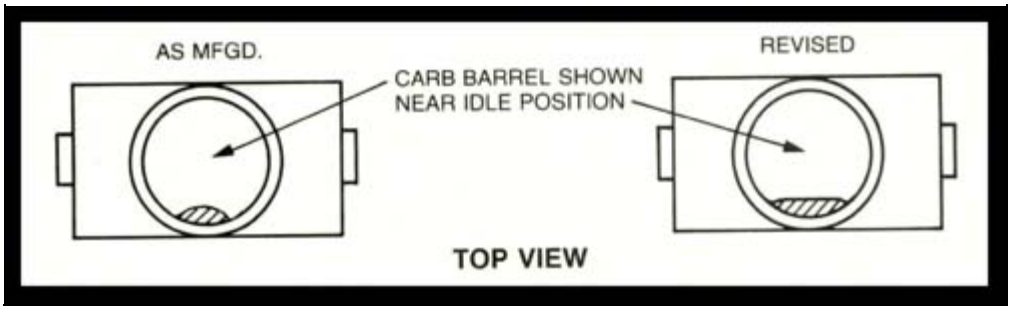
Girod's O.S. pump carburetor - BIG hole!



My O.S. .61 FSR with modified O.S. .90 carb, see text.

First, we both installed O.S. .90 carbs with the new Perry (P-30) pump. We immediately saw an increase in static rpm to approximately 11,300-11,400 rpm. The real difference was seen (and heard) in the air, since both engines “unloaded” better. Mine (FSR) seemed to turn a bit faster, but that could be due to some small difference in pipe tuning. In any event, both airplanes flew better and maneuvers “cleaned up” due to plenty of available power, especially on the vertical lines. Unfortunately, we don’t have an audio tach so I can’t say what we were turning in the air. Since that time Billy has installed the new 0.5. long stroke pump carburetor, still using the Perry pump. His static rpm has increased up to about 11,600 and in-flight performance is superb. It is really remarkable how excess horsepower makes the maneuvers much better. Incidentally, measurement of the carb bore shows the O.S. pump carb to be 1mm larger in diameter (bore) than the O.S. .90 (12mm vs. 11mm). The improved performance on the ground surprised me since I thought that I was running the engine at an internally limited flow condition with an adequately sized carb; not so, and I will eat humble pie. The bigger the carb, the more rpm, especially in the air. I wasn’t surprised at improved flight rpm since I figured the engine would “unload” better with a bigger carb. In any event, as one gains rpm on the ground, slight adjustments of the pipe (shorter) are necessary to take advantage of the bigger carb.

It’s also evident that one must use a pump when running the oversized carbs since they will not suction feed properly and tend to lean in flight. With the pump, however, the engine runs very steady throughout the flight, idles very well, and really “digs in” on the vertical lines. I have also found the new Perry pump better than the old backplate mounted variety that I ran years ago, in that it doesn’t flood the engine as easily and the engine transitions better. I did make a slight modification on the O.S. .90 carb like we used to do in the old days prior to the advent of “auto mix” carburetors. In order to further lean the idle and transition, I “manicured” the carb barrel as shown:



This change in the carburetor barrel admits more air at the inlet side and prevents "choking" which enriches the mixture. Theoretically, proper taper of the inlet side of the barrel would assure a proper fuel/air mix throughout the range. I found with this modification that I could set the carb idle adjustment (fuel) at about center of the range.

Our test results so far indicate that the old O.S. FSR is about equal in performance with the new long stroke when fitted with similar carburetors and pipe set-ups.

Both engines still meet the FAI noise criteria (98 D.B. @ 3 M) --- just barely.

I must say that the Bartel prop is a very good one and about the best that I have tried so far. Although both of our P-9's are turning faster and flying faster, the sound is still pleasant and not like the old screaming 18-20,000 rpm days!

One More Time:

I'm still getting inquiries in regard to why models pitch (up or down) with application of rudder, such as in knife-edge flight. Most pattern fliers have wrestled with this since it makes all maneuvers more difficult which require rudder application. First of all, over the years I have been unable to find a sound aerodynamic explanation; however, testing has turned up imperical results which allows us a cut and try cure.

Generally, we have found that the vertical placement relationship between the wing and tail is very important. Apparently what is happening when the model is yawed, is a change in the flow off the wing and onto the tail causing a change in the apparent angle of attack of the tail. In general, as the tail is lowered, pitch-down diminishes and a pitch-up will occur if lowered far enough. We have found in modern pattern aircraft designs that a good set-up places the stab on the thrust line and the wing slightly below (1" - 2"). From this starting point, minor adjustments may be made by adjusting wing and stab incidence and movement of the C.G. forward or aft. Generally, a trim change which moves the elevator to an up or down (slightly) trim condition will cause the ship to pitch up or down. It's very important to have provisions in the airplane design to permit wing and stab trimming. Only a small change in wing or stab incidence is required. When flying knife-edge and holding elevator to prevent pitching, it seems as though we are holding lots of elevator. Actually it's very little in a well-designed airplane. You can check this by entering knife-edge with a little up or down elevator trim to see the amount required. You will be surprised at how little is required. Over the years I have flown models where half stick (elevator) was required to hold the ship straight in knife-edge. No amount of minor trimming will fix that kind of problem; redesign is necessary.

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