

An Experimental "One-Blade"

By Dan Driscoll

Published in the November 2013 Issue of MaxFax. Stew Meyers. Editor

I've built a number of Old Time models for both FAC and SAM competition, but I've always avoided designs with one-bladed props. I'd always heard that one-bladed props were difficult to properly balance, and that two-bladed props worked better. However, there are a lot of nifty Old Time model designs with one-bladed props, so I decided to try one. I selected "An Experimental 'One-Blade'" by William Kay in the November 1938 *Aeromodeller*. The design was presented in the original magazine as a 1/3 size full page plan with no accompanying article or photos. I like simple models, and with a constant chord wing, flat bottom airfoil, and box fuselage, this model seemed perfect. The 36" span model meets FAC rules and is approved for SAM competition.

I started the project by enlarging the plan by 300% to bring it up to full size. This immediately showed some problems. The wingspan did not come out to 'the specified 36" and the wing center section was narrower than the top of the fuselage. Also, the fuselage length, and tail dimensions were a little off. I widened the wing center section to make the wing 36", and this worked out to make it equal to the fuselage top. I fudged around with the other components to make them agree with the dimensions on the plan. I also found that the wing leading and trailing edges weren't parallel and fixed that.

Actual construction went smoothly. I beefed up the area around the landing gear and the wing dihedral joints. The joint where the fin attached to the stab also needed to be strengthened, and the tail was easily modified for a pop-up DT. A 1/4" X 3/32" top wing spar was added 1 1/8" back from the leading edge. The SWG 18 wire specified for the landing gear equates to .048", and I used .047" wire. The gear proved to be pretty flimsy due to the long length, and requires a light touch for ROG's. The prop was counterbalanced with a 1/16" wire about 4" long with solder wrapped at the end. Completed weight with carved prop shown on plan was 80 grams. CG was set at 50% of wing chord.



Photo by Pat daily.

I started test flights with 300" of 3/16" rubber in eight strands braided. It flew right off the board, but not particularly well. The prop was too large, and by trial and error, was eventually cut down to 13" diameter and slightly reshaped. A formed blade of two layers of 1/16" balsa about the same diameter, but with a little more pitch, works better. At 1200 turns with the formed prop, the model struggles to get off a card table, but then flies quite well. On its first official flight at the 2013 Non-Nats, it maxed but went out of sight. A friendly farmer and Wally Farrell got it back to me a couple of weeks later. At the FAC Outdoor Champs, it maxed the first flight, but broke off about one inch of the prop tip on landing. I couldn't find the missing tip and completed the last two flights with the broken prop and finished out of the money. I like this model, and I plan to build a one-bladed stick model next.

(As a side note, I put a 12" two bladed prop on the model, and it flew much better. SAM and the new FAC rules don't allow this for competition.)

Editor's note: Dan didn't say so, but early on the model suffered from extreme vibration problems. You could see that wimpy undercarriage vibrate to almost a blur. This was blamed on the one blader prop and considerable time was spent trying to balance it to mitigate the problem. While holding for Dan I noticed the S-Hook looked a little askew. Sure enough it was off center and causing the rubber to bunch up on one side. When the S-Hook was replaced with a more symmetric one, things improved considerably.

More notes: The fuselage is covered with Poly Span, the wings and tail with jap tissue. That long gear presents a very high angle of attack for a ROG launch, meaning the wing is just about stalled. If the tail is held up off the table at launch, it climbs out better with out a dropping down below table level to pick up speed.