PROPS ON OUTDOOR RUBBER MODELS

bv Dave Stott

Steve Griebling's article (in the Crosswinds NL) on his experiences with props on outdoor rubber jobs has driven me to write this bit concerning my own experiences over the years, for what it may be worth.

High Pitch. Low Pitch

A low P/D ratio prop gives a model a higher rate of climb, but a shorter motor run for a given cross section of rubber and number of turns. The high P/D ratio prop gives a lower rate of climb, and a longer motor run for the same cross section of rubber and number of turns. The high P/D prop also causes more reaction to torque, making the model more difficult to trim.

Blade Area

The model with high drag (multi-planes, dummy motors with free wheeling props, etc.) needs more blade area. This usually requires more rubber cross section, which is. necessary to handle the higher drag. Whether the greater blade area is accomplished through a lower aspect ratio blade or increased diameter effects only the difficulty in trimming the model.

Plastic Props, Carved Props

Plastic Props work well. By heating them over a soldering iron some pitch change can made to them. One reason they work well may be caused by the thin blade cross section they possess. If you are willing to spend the time, a carved prop offers many more options in design. True helical pitch, desired pitch, blade area, and diameter can be yours.

Over the years, a carved prop with thin blade cross section, under cambered slightly from 1/2, the radius inward, and flat bottomed from 1/2, the radius to the tip have worked very well. The cross section has been kept at 1/16 the blade width. The tip shape has been a full radius. They take time to carve and are more fragile, but are worth the effort. And, in these days of Hot Stuff and Zap, field repairs are easy.

Prop Selection

The ancient rule of selecting a prop of 33% to 40% of the wingspan is pretty broad. Models with a high aspect ratio wing certainly do not need a prop this big. The 15% motor weight rule has caused some experiments in the use of props smaller than 33% of the span. Some of us are now accessing the wing loading and drag of a model, then calculating how much cross section of rubber the model might require. We then choose a prop diameter that will handle this motor efficiently. In many cases, the prop as ended up being only 25% of thevwing span. In short, let the power required select the prop, ratherthan the prop driving the power requirement. The end result is a model that is easier to trim and has a better flight path.

Originally published in issue No. 120 of Crosswinds, edited by Russ Brown