LARRABEE PROPS

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Editors Note: This scheme does not determine the P/D or the chord of the prop you wish to use. It only determines the plan form. In the few instances I've used it, and observed it in use by others, it appears to result in a very efficient prop.

For those that prefer the Larrabee type propellers, Reg Boor has written an interesting article in Aeromodellers, October 1990, describing a method of simplifying the complex system of calculation of these propellers. They are designed to have a minimum induced drag and have shown to be very efficient in many applications. Boor actually provides in that article a short computer program in Basic for the computation of the propeller platform.

John Barker wrote in a BMFA Forum a further paper about five years later, illustrating the exact shape for many P/D ratios. An interpretation of these calculations that can serve as a simplified method for tracing the exact Boor/Barker platform is suggested here. It uses as a basis the computations of Boor and Barker, defining from them the location of the maximum chord of the blade (Fig. 1), then in Fig. 2 an approximate method of drawing the blade outline is offered. Step 1 : The maximum chord of the propeller is selected, say 40 mm for a Jumbo scale propeller of diameter 254 mm Step 2: The P/D of the propeller is chosen, for example the common value P/D =1.25 Step 3: Using Fig. 1 below, it is found (follow broken line in "example") that for P/D =1.25 the maximum chord is located at r/R =0.43 approx. (r = local radius of Cmax, R= total Radius of propeller = 127 mm in this case) Step 4: Draw a line representing the C/L of the blade, with a length of 127 mm, locate the maximum chord, as calculated in Step 3. Here r = 0.43 X 127 mm = 55 mm. Step 5 On that point draw a distance of 20 mm on either side of the line, defining the location and length of the maximum chord. And now draw three circles, with the radius and centers shown in Fig 2, Cmax/2 = 20 mm at the start of the line and at the location of the max chord and a further one at the tip with radius Cmax/6= 7 mm. Using now a suitable French curve connect the circles as shown in Fig. 2, drawing a couple of curves tangent each to two of the circles.

I believe the resulting outline is a reasonable approximation to the shape calculated in Reg Boor's program, and should be of help for those wanting to use the Larrabee platform but are deterred by the mathematical complexities. It goes without saying that those lucky ones to have access to John Barker's paper should prefer the exact outline defined there. I started by saying.... for those that prefer the Larrabee-type propeller. There is no definitive proof that this is significantly better than other platforms, although many Coupe flyers attest to the efficiency of these propellers.