

Compound Hinge Angles for Folding Props

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The question of whether to use a simple hinge angle or a compound angle on the hinge of a prop is one of those questions that a lot of builders love to hate.

In the first place, why use a compound angle? Well, if you don't, your folded prop blades look funny. And if the fuselage is flat sided, the blades hang out in the breeze adding drag. I've had a number of guys tell me that "with my round motor tube it doesn't matter!" Well, it may not but it looks funny to me! It will look neater and may well be cleaner if the fat part of the blade is oriented vertically.

Assuming you've made the decision to go with a compound fold angle, how do you choose that angle? Note that statement above about the fat part of the blade being oriented vertically: To get that to happen, you want to roll the blade by the amount of its blade angle. In other words if the wide part of the blade is at the 70% radius, you can calculate or measure the blade angle at 70% to get the angle by which the blade should roll. This angle is the same for all props of the same pitch-to-diameter ratio regardless of the prop diameter. For props with P/D ratios of 1.0, 1.2 and 1.4, this angle is approximately 24°, 28° and 32° respectively. See Fig. 1. If the blade angle (B) is 28°, the compound angles should be 14° because the two angles as seen in the front view and in the end view of the hub add together. They should also be equal-- as nearly equal as you can make them. The penalty for not making them equal is also a funny fold! One blade can fold high with the other low, or both somewhat high. Note that as the angles add together, so do any inaccuracies.

How does one go about getting accurate angles? After trying to warn you off with all of the above potential problems, I can assure you that there are reasonable ways to achieve accurate hinge angles. My method needs one pass of a table saw but demands the use of a drill press to drill the hinge holes. Even the cheap drill-motor style of drill press will work but your eyeball won't!

My drill jig (shown in Fig. 2) is simply a wedge of 12°, 14 or 16° (depending on the P/D ratio involved) and a locating strip which positions your prop hub at 45° to the edge of the wedge. Don't get it backwards! The penalty for doing so is 6 to 12 months at carving left-handed props!

Good luck with your compound fold angles.

