

Primitive_Windmill_Blades_Out_Of_Plastic_Bucket_Or_Barrell_1999.txt

From: randy
Received: Wed Sep 01, 1999 8:20 PM
Subject: [a-w-h] cheap, easy blades

Marty,

Like most tinkerers, I wanted to get something going cheaply and quickly (mutually exclusive?). I made (and continue to make...) every mistake everyone else made! I found out that there were no readily available adaptable blades. They needed to be tough, weather proof, easily shaped, and cheap. I'm not much of a woodworker or fiberglasser.

I tried sailwings but never got one finished. I just wanted a 5 ft. blade spinning in the wind, especially if it actually made power! One day I got to thinking how I could make something with twist, taper, etc without actually carving or forming it. i thought about some sort of "self forming" brake-bent sheetmetal and experimented some but the results were heavy.

EXPERIMENT 1

I finally noticed the blue (also sometimes black or white) plastic food and chemical barrels. I did some calculating and measuring and found that I could cut them easily with a circular saw into 36" long pie shapes. You will find that by adjusting the shape you can put any twist into the blade you need.

Begin by using the parting line on one side of the barrel as a center line. Think before you lay out the cuts so that the blade twists the correct direction and is set to rotate the right direction, as well. As I said, this is much easier to show than to tell...

I get the width of the root set up first, say 8" total width. Then I mark the root about 2" to the right of the line looking from the root and 6" to

the left. Then I go to the tip and measure about 1 1/2" on each side of the line. connect the lines and cut the blade out. Carefully lay that blade on another section of the barrel and cut another 2 blades using the first as a template (or one if you are building a 2 blade prop).

Now lay the blade down on a flat surface and locate a point where you can drill a hole the size of your generator or shaft mount (my generator had a threaded shaft) in the root towards the right hand side of the blade that will give you the correct angle of attack without putting the tips into a negative angle. You can even put several holes across the root while you're experimenting so the angle of attack is adjustable.

Again, using the original, conform the other blades. round off the leading edge with a grinder, sandpaper, rasp, or plane. Sharpen the trailing edge by flattening the concave edge parallel to the angle of attack

Drill 2 or three holes (depending on blade number) equally spaced through two large O.D. washers that fit your threaded shaft. Now mount the blades to the threaded shaft with a washer front of the last one. Snug the nut down on the stack and adjust the washer, and blade to achieve balance. I just spun the blades lightly and kept adjusting the three blades until they appeared to balance. Same for the two blade, but You might have to trim some material from the end of one blade.

When everything looks OK, run a small drill bit through the small holes in the washer and two of the blades (you did adjust the washer so that you could intersect two blades didn't you?)

Mark the blades so you can reassemble them correctly. Place the other washer on the back of the stack, reassemble, and put some small screws, washers, and lock washers through the holes to tie everything together.

It may take you a couple of attempts to get the hang of the twist angle-of-attack, taper relationship, but barrels can usually be had for 0 to

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\$5 each (makes about 6-8 blades). If everything is done right, the blades may even tend to flatten at higher winds to help the design efficiency at high speeds, or to stall to limit rpm.

EXPERIMENT 2

After building about 12 sets of blades of every shape and size, I decided to try a larger diameter. There was no way to use the plastic barrels (this length taxed their stiffness already). In searching my scraps, I came across a piece of 6" PVC Pipe. Using the same principles, I cut one blade and used it for a template to cut two ends of a prop. I cut a hole in the middle, ground the edges as above, and balanced it. It's survived spinning on an unloaded truck alternator for 2 months with no control, including two Texas thunder storms. I don't know how long it will last, if it will be efficient enough to make any power, etc.

When I get that "servo" motor, I'll find out.

Obviously, I'm no engineer, just a backyard tinkerer, but I'd like to get an easily built, cheap way to build an intro generator to learn principles while lighting up a bulb or two. I hope my questions are not too elementary and my ideas too full of problems. I really appreciate all the help from you "veterans".

Randy
