Flying on Partial Motors

By
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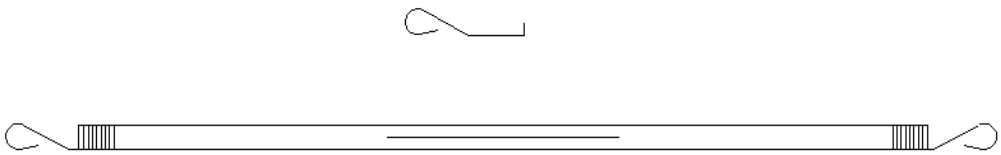
If your school gym has a lower ceiling than the site for a regional or state tournament, you can practice flying to a height that is 1/2, 1/3, or 1/4 as high by using a neat trick. Then, when you go to the tournament, you will be better prepared to fine tune your model while many others are struggling to figure out how many turns and what launch torque to use. The trick is to make motors only a fraction of the length of a normal motor and use a stick with hooks at each end to substitute for the missing part of the motor.

For example, if your model flies well on a 2-gram loop that is 14” long, make a motor of the same cross section that is 7” long. Use only one O ring. It should weigh one gram. Make a stick from 1/8” square hard balsa as shown below. The one shown is about right for a half motor (total length is 1/2 of the distance between the prop and rear hooks). Make two hooks from .020 music wire, as shown, and put the short ends into the stick. Wrap the wires and stick with thread and glue them all around with model airplane cement. Weigh it and add a piece of wire to make the assembly weigh 1 gram when it is glued in the center of the stick.



You can also use 1/3 and 1/4 motors, but you will need additional motor substitutes. The length for a 1/3 motor would be 2/3 of the distance between hooks and it should weigh 1.33 grams. The length for a 1/4 motor would be 3/4 of the distance between hooks and it should weigh 1.5 grams.

By flying on short motors, you can learn model behavior under higher launch torque conditions than would otherwise be possible under a low ceiling. You also can practice flying to a particular altitude, say, 1/2 the ceiling height for the state meet. Raise a Mylar balloon up to that height and let the model fly around the string. Find the launch torque that allows the model to just get to the balloon and record it in your flight log. Then, when you get to the meet, you can start near that torque with a full motor (and twice the turns) and expect the model to come close to the ceiling. It is best to be a little conservative and not try to get the first flight all the way up. Air conditions may be different and the model could climb too high. In general, there is a pretty good correlation between percentage of motor and percentage of peak altitude reached (half motor, half height; quarter motor, quarter height), but the shorter the motor, the poorer the correlation. Don’t try to fly on a 1/8 motor in the cafeteria and expect it to predict performance in a 90 foot site.