THE WIND UP

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When you wind a rubber motor, it is constantly trying to redistribute the winds and knots into a minimum energy state. You can think of Hungorilla hanging in there to enforce this law of physics. There is a continual trade off going on between the basic twist and the knots. Tension plays a big role in this. When you stretch a motor and wind you are usually just putting in pure twist. As you relax tension knots form. That's the reason for stretching the motor as much a possible when winding. The release of energy during the unwind can be rather chaotic as the motor relaxes and tries to maintain a minimum energy condition while twisting the prop. Here Hungorilla is most active and may poke a hole through the side of you model with a knot.

Watching the dial on a wire torque meter gives you some clues as to what is happening when you wind a motor. That slow, even rise is what you should be looking for. Tension is the other key variable. The preferred procedure seems to be stretch it out to five times the relaxed length and then try to wind at constant tension. With heavily braided motors you may notice a drop in tension as you start to wind. Extend the motor to return to the initial tension. I think this is the braiding turns rearranging themselves. At about 50% winds, start moving in while maintaining tension. You will notice a gradual increase in torque. Above 80% winds you may notice that more rapid increase in torque that warns you to stop before burst.

Watching the slope of the winding curve in real time on a *P/C* attached to the Recording Torque Meter gives one a much better feel as to what is going on. That critical change in slope above 80% is rather more distinct. The drop in torque as the winder is removed and the nose block is inserted into the rig is readily apparent. I have to run some more tests to see if a few hand winds just increases the starting torque point or pulls up the entire stored energy curve. My suspicion is that since we aren't packing in the extra turns with tension we are just redistributing some knots not really adding much energy.

Ideally you want a motor with the knots as evenly distributed as possible. By all means you don't want a bunch of knots climbing the prop hook or rear peg. Sometimes pulling the wound motor out and slowly reinserting it will help redistribute knots to a more benign lower energy state.