

GOOD RUBBER INFO

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The FFQ <http://freeflightquarterly.com/> is an excellent journal that features in depth articles on various items of interest to the free flight world. (You Ludites out there can write Chris Stoddart 8400 Woodbrook Drive Knoxville TN 37919 USA for information on how to subscribe to print editions without using the internet.) The latest issue, #52, contains two articles on rubber power that intrigued me. "Twist and Writhe" by Bob Morris, mathematically analyzing the process of knotting, and "Rubber Myths and Realities" by Paul Rossiter which brings up seven interesting and maybe somewhat counter intuitive observations that are of real practical use.

"Ask any serious rubber flier about how best to select and prepare rubber motors and you will almost certainly get a list of do's and don'ts, some of which are recited as if written in stone. However, different fliers will often have a different set of rules! So in order to help navigate through this morass of information, let me state up front what, to within a percent certainty, my latest round of rubber testing has found in relation to rubber motors used in flying model aircraft:

- Lube type doesn't affect significantly the energy recovered.
 - Washing the rubber doesn't affect significantly the energy recovered.
 - A few broken strands don't significantly affect the energy recovered.
 - The energy recovered is very temperature dependent.
 - Breaking-in has no significant beneficial effect on the energy recovered.
 - Ageing the rubber can either increase or decrease the rebound energy.
 - Figure of Merit (FOM) testing should ideally be made at constant stress rather than constant load (or extension) and care is required in extrapolating the results to real flying conditions."
- First let me say, Paul Rossiter made up Coupe motors -10 grams of 1/8" rubber 120 inches long configured as 12 strands 10 inches long for his tests. Now 10 grams or 120 inches of 1/8" rubber is quite often used for FAC flying, but as 4 strands 30 inches long. That and the fact that the coupe motor is used with a ratio of rubber length to hook length of 1 and FAC use may have this ratio up to 3 and use braiding.

None the less these observations are relevant to FAC flying. Let examine them in turn.

- 1.- Lube type doesn't affect significantly the energy recovered. Dan Driscoll ran some tests that confirm this observation. Silicon grease adds a little more weight which is a slight penalty for events with motor weight restrictions although it best preserves the motor. The liquid lubes may splash and coat the fuselage.
- 2.- Washing the rubber doesn't affect significantly the energy recovered. No, but some rubber seems to have more than just talc on it. When you look at some of the particles washed out of rubber before making up a motor, you can't help but wonder if they might initiate nicks.
- 3.- A few broken strands don't significantly affect the energy recovered.

Not on a 12 strand Coupe motor maybe, but they sure do on lower strand count motors. What this really says is the lubes don't work that well and the broken strand can't slip from the bundle.

- 4.- The energy recovered is very temperature dependent. I'll say. Warm motors can store and release more energy. Very cold motors can be stiff enough not to release all the winds. On cold days your motor will break at what you considered to be well below it's peak.
- 5.- Breaking-in has no significant beneficial effect on the energy recovered. No, it's just another wind. If you wind close to max you can only do it so many times before nicks appear, why waste a wind or two.
- 6.- Ageing the rubber can either increase or decrease the rebound energy. Rubber is a polymer that can lose plasticisers over time. Links may relax and align to produce more power. The real problem is elevated temperature storage will increase plasticiser loss.
- 7.- Figure of Merit (FOM) testing should ideally be made at constant stress rather than constant load (or extension) and care is required in extrapolating the results to real flying conditions.