## LOST TURNS FROM BRAIDING

by Bill Henn

As published in the May/June 2006 Issue of Tailspin, the New England Flying Aces News, Mike Nassise, Editor

This piece is based on a letter received from Bill Henn concerning the results of a query he put out on FFML concerning the loss of turns that result when a rubber motor is braided (Tailspin Editor).

Hi,Mike,

I have always wondered how much energy is wasted, and how many turns are lost when a motor is braided. Needless to say, I have not bothered to check by breaking a few motors testing. Of course, the losses in a braided motor are directly related to how tight it has been braided. I put out the question on the Free Flight Mailing List (FFML). I received several replies, but the one below from John Barker seems to answer the question best. John is a very smart FAI flyer from England and one of the most knowledge able guys on the FFML. I believe it is well worth printing in *Tailspin*.

I have avoided braided motors as far as possible since I discovered folding props, but every time I am forced into using them I wonder, as Bill Henn does, how many turns are lost. Like many aeromodellers, I find it more natural to spend several years theorizing about what might happen than performing a simple ten minute test. However, the theory seemed so simple that at last I managed to find ten minutes to prove it.

I made two loops from four strands of 1/4 flat rubber about 8" long and wound 10 tensioning turns on each loop (clockwise looking from front to back of the motor), brought the loops together on the prop hook, and let the motor unwind (anticlockwise) and braid in the usual manner. I then counted the anticlockwise braiding turns and found that there were 5. This is what I expected because the 10 tensioning turns on each loop oppose each other and come to a balance when there are 5 turns left on each loop.

Now, like Bill, I think that when you have wound on those tensioning turns you have lost them they come straight off the maximum turns figure. They may have other effects on the motor torque, but that is another matter. However, there is the question of the braiding turns; these keep the propeller turning, according to my test and common sense, for half the number of tensioning turns. From this argument, the number of turns that can be put on the motor is the theoretical max turns from the usual tables less the tensioning turns plus half the tensioning turns.

From observation, motors, particularly ones that are quite long relative to fuselage length, do not braid up nice and tidy as in my simple test. However, one point in the winding is apparent; <u>the</u> <u>point when the braiding turns are all unwound and the strands are straight albeit with the</u> <u>tensioning turns clearly visible.</u> I would recommend that one starts counting the rubber, turns from that point and use the table max turns less the tensioning turns as the maximum for the *braided motor.* To *repeat:* <u>wind without counting until the braiding turns disappear and then start</u> <u>counting from there.</u>