LOST TURNS FROM BRAIDING

by Bill Henn

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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; the point when the braiding turns* are *all unwound and the strands* are *straight albeit with the tensioning turns clearly visible. 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: wind without counting until the braiding turns disappear and then start counting from there.*