

## F2D News - June 2014

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We just hit the solstice and the summer is sizzling. In fact, the F2D Summer Sizzler is running right now at the Wingbusters' site in Middleboro, MA. I'm looking forward to hearing the results, but meanwhile will write a bit about what's been going on over here in Scandinavia recently.

At the moment, there's one particular issue about our sport which is weighing on my mind: streamers. A few years back, two main types of streamer material were commonly used in F2D. First was the traditional double-weight crepe paper, which would work reasonably well in dry conditions, but became very problematic in the wet. As an alternative, many contests used plastic streamers, typically made by cutting up cheap plastic party tablecloths.

Problems with weather conditions aside, crepe paper streamers had some interesting features. When good quality paper was used, the only real ways to cut it were with the propeller, or perhaps with the lines. Hitting the paper with the wing typically wouldn't result in a cut. However, when particularly dry, the paper could become a bit brittle. In this case, a really hard wing slap at the end of the streamer could send some small flakes flying off. This added some undesirable randomness in the scoring, since a) the conditions for a cut weren't always the same, and b) depending on where the flakes came off relative to the positions of the judges (and the acuity of the judges' vision), these tiny flakes seen by the pilots may or may not have been counted by the judges (or vice-versa).

Plastic streamers had their own special features. Perhaps the biggest downside to plastic streamers was that scraps from cuts were prone to causing all kinds of strange problems. A perfect prop-streamer hit could end with a piece of plastic covering up the venturi (thus stopping the engine), getting wrapped up around the thrust washer, thus painfully slowing down the engine, or even staying wrapped around a propeller blade, again slamming the brakes on an otherwise perfectly running engine. An even worse result was that a piece of plastic could get sucked into the venturi, and consequently melt into the engine's bearings. That, well, sucked. Any of these streamer fails could be quite frustrating, as the tide of a match could be turned against oneself in an instant, as a result of doing exactly what one was supposed to do: hitting the streamer with the prop.

Finally, along came the biodegradable flagging tape (sometimes also known as forestry tape). It appeared to be a cure-all material: soft, flexible, and cut-able like paper, with no flaking/shredding, and water-resistant enough to remain functional even in heavy rain. In addition, tests by the Brits indicated that streamers made from flagging tape tracked the model better than those made of crepe paper or plastic, indirectly indicating that these new streamers created less drag than either of the previous two. A good streamer is one that cuts when it should, and doesn't when it shouldn't. By this measure, the flagging tape is quite good.

The move towards flagging tape was thus a great step forward. However, a streamer is not made of paper alone. Another important quality of an F2D streamer is that the string should not break except when it is directly cut. Weak string leads to a lot of one-cut matches, which are frustrating for pilots and also less interesting to watch. If you give a streamer a nice wing slap 2/3 of the way out on the paper and the whole thing comes off, you'll be stuck on the run for the rest of the match. Again it introduces some undesirable randomness and detracts from the excitement of the sport. For this reason, it is important to consider the total package of the streamer: the strength of the paper and the string must be matched, in such a way that the paper will break before the string if it is hit (but not so flimsy that it will shred, or break any time another plane gets close to it).

For the last few seasons, flagging tape streamers have been used extensively in the US and Europe, including at recent European and World Championships. However, the European flagging tape is somewhat different from that being used in the US. The European version is a little bit thicker, with some small parallel grooves running all along it, while the American version is essentially homogeneous and isotropic. Importantly, the European version is also tougher than the American one (don't worry, I'm just talking about streamer material, not people). The string which is commonly paired with this material is too weak, leading to many prematurely terminated matches due to strings being yanked off by hits on the paper.

What should be done? In the US, I think the situation is in relatively good shape. For Europe, I hope that

a solution can be found, particularly for the upcoming World Championships. Either a stronger string material needs to be identified, or the paper changed out for something softer, like that available from Ben Meadows in the US. The issue of string strength is a subtle one, though. Static loading limits are one thing, but the crucial parameter that we're interested in is jerk-resistance. Some types of string may be extremely hard to break by gradually applying more and more tension, yet snap like nothing under a quick hard yank. The latter is exactly what the string experiences during a hard wing slap, and thus it is crucially important to pay attention to this aspect of the string's qualities.

My personal feeling is that it may be easier to change out the paper than to find a suitable string for the tougher paper, but I'm open to any solution. All I ask is that we don't freeze the development where it is now, but continue trying to improve the quality of streamers, which play such a fundamental role at the core of our sport. If anybody has any leads on new materials to try, or a source for softer flagging tape in Europe, please drop me a line and let me know. I'll be very curious to try it out!