Scale Pursuit Models E-Newsletter **Volume 1**

Thank You!

Thank you for your interest in SPM and your subscription to our E-Newsletter. This is the first in a series of newsletters that we hope you will find interesting and informative. Since our materials and construction processes are different from other models you may have completed we will begin our E-Newsletter series covering these areas.

EPP?

Let's start with the basic airframe - EPP, or technically, expanded polypropylene. *What is this stuff?* Well, it's definitely not polystyrene, the "coffee cup" material. EPP is primarily a package industry material. This foam is used as a multiple impact cushion for expensive or fragile electronic equipment. Your HD TV probably was protected by it in the box. EPP is also growing in the automotive industry as bumper reinforcements and the computer industry as molded fames for internal PC components.

EPP has its origins in model aviation in the mid 1990's when Pat Bowman of Bowman Hobbies crafted a tough little slope combat model called the Roughneck. With its rectangular EPP fuselage, wire cut EPP wings and coroplast tail pieces, it set the stage for EPP to emerge as the material of choice for the growing combat glider market. The purely utilitarian form of the EPP combat glider evolved to more familiar shapes in the form of durable combat warbirds and soon thereafter a whole host of companies were offering good-looking, non-combat, EPP gliders and electric powered models. EPP's durability and ease of manufacturing brought EPP into the consciousness of modelers in the late 1990s.

Compared to polystyrene, EPP has a greater range of flexibility before it will show signs of stress and cracking. Polystyrene has been used as wing cores for

a long time, primarily due to its ease of cutting via a hotwire. However, polystyrene wings do little structurally for the model other than provide an airfoil shape for sheeted balsa and fiberglass to be applied to. Because polystyrene (usually 1 lb./cu.ft.) is easy to damage, it needs the balsa/fiberglass exo-skeleton to resist dents and provide sufficient stiffness.

EPP by comparison brings much more structural integrity to the airframe than polystyrene. At 1.3 lbs./cu.ft., EPP does not require an exo-skeleton. In fact you *could* fly an EPP model with no skin or covering, provided its spars are installed. The reason EPP is covered is to provide a cosmetic surface, however, EPP benefits from the application of a covering or skin just as any structure's integrity improves with a stressed skin.

Now How About Those Polycarbonate Skins?

Why Polycarbonate? You probably heard of polycarbonate or GE's trade name Lexan® and might know that it is used in applications requiring high impact resistance such as safety glasses. Polycarbonate is comprised of a tight cellular structure that makes it very dense yet capable of flexing. In the model industry, R/C car bodies quickly adopted this material over other formable plastics due to its ruggedness and clarity. Another key characteristic of polycarbonate is its resistance to high temperatures. Virtually all hobby plastics (ABS, polystyrene,

PVC, PETG, etc.) will begin to deform at surface temperatures over 150˚ F. Because a black painted plastic skin will reach surface temperatures close to 200˚ F, only polycarbonate can resist warping under these conditions at thicknesses of .010” to .020” that we use.

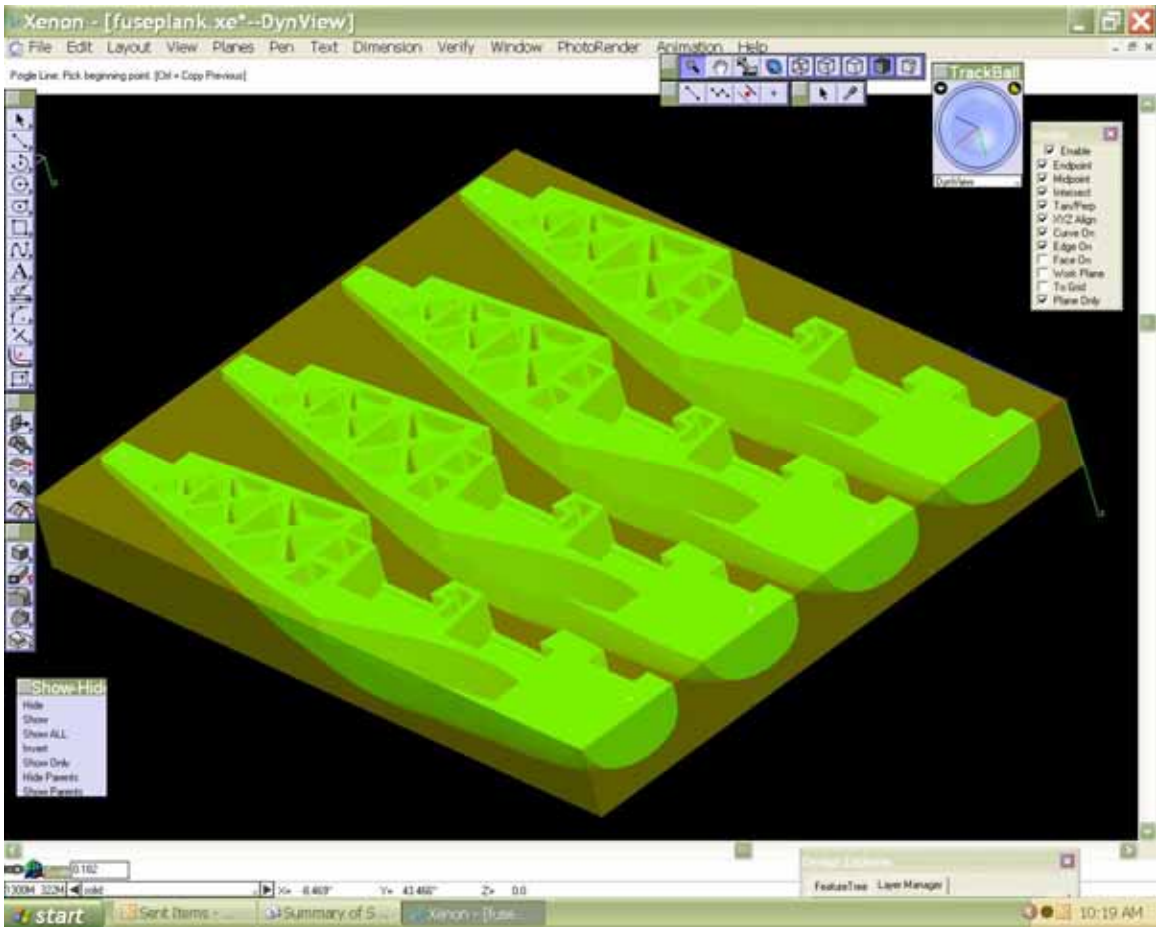
Putting It All Together

A dent resistant EPP airframe and flexible polycarbonate skins are not much good unless they can be stuck together. For this we utilize a rather uncommon choice for glue - BUT IT WORKS! A polyurethane sealant found in home improvement stores fits our application perfectly. Again, we are looking for high temperature resistance, flexibility and just the right amount of adhesion. The specific brand of glue that we include with our kits is PL Door, Window & Siding Sealant. Meant for outdoor applications, this 50 year warranted glue can handle the heat while still providing a good and flexible bond. Another nice characteristic of this glue is its workability. It spreads easy over the foam, has low odor and has a long working time. After about a 24-48 hour cure time the skins are nicely adhered to the foam, yet, if needed, a damaged skin can be delaminated and removed for repairs with about 10 lbs. of pull force. Some glues worked too well and removed chunks of foam when the skin was removed, but this glue mostly sticks to the underside of the skin and this leaves the foam smooth for skin reapplication.

So that's the material introduction. Now let's discuss the model's structure. Our goal was to leverage the durability and flexibility of these materials with an equally coherent structure.

And Oh What A Structure It Is

Lets start with the fuselage. We machine an ISO grid pattern into the aft fuselage halves in an effort to not only lighten the airframe but also increase the flexibility of the fuse. We've talked about the flexibility of the construction materials and the airframe - now lets talk stiffness. Two areas in particular have been weak spots in some foam models, the firewall and wing attachment.



The firewall obviously needs to be a solid unit and we ensure the 1/4” ply firewall stays attached to the fuse with the incorporation of four 3/16” plywood keys that extend back into the fuse and grip onto the firewall.

The wing bolt’s ply plates are securely wedged between two 1/4” ply stanchions that are embedded 2-3” into the fuse. This provides an immoveable base for the wing bolts so that when a crash occurs, the 1/4” 20 nylon bolts will shear but the attachment structure will remain in tact.

Another vital component to the models structure is the wing spar. We wanted to make transporting our big models as easy as possible and a two piece wing makes this much easier. With our two-piece wing we incorporate a removable 3/8” ply joiner spar. This 34” long spar gets inserted into each wing’s spar sleeve for a combined spar width 5/8” of plywood. If you can handle a one-piece wing then you can always choose to glue in the joiner spar. To further aid in transportation of the model, the horizontal stabilizer can be removed as well.

Flying Report!

Our second prototype had its maiden flight at Warbirds Over Denver! At 6000’ ASL the Moki 2.10 just did not perform well, but despite being underpowered the model was stable and easy to handle. In fact, a dead stick landing on its second

flight proved that with partial flaps the 30 lbs. model demonstrated a longer than expected glide ratio. We attribute this to its airfoil, the Selig S8036-37. The same airfoil developed specifically for the TopFlite P-47. With almost 3˚ of washout at the wing tip, tip stalls are virtually non-existent. We are in the process of replacing the Moki with a Revolution 50 gas engine – so we will report on this in future newsletters.

Above photo by Bruce Ream

Crash testing comes early than expected….
Yea, we say the model is durable but just how durable is it? You have got to watch this video, it will amaze you. Our above mentioned dead stick flight ended with a surprise. One Rough Landing Video

T-34C Instruction Manual

We are currently involved with creating the instruction manual for the T-34C. We plan to document the installation of a gas engine as most modelers would probably choose this option. We plan to have generous photos to help illustrate the construction methods. We would like to have our customers consider our instruction manual as among the best in the industry and to that end, we would like to hear from you. What have you liked in other manuals and what was missing?

What's Next?

How about a Warbird? Yeah, we thought you'd like that. Which one? We've considered this question long and hard *and* changed our minds more than a few times. As a young business, Scale Pursuit Models needs to create kits that sell well, therefore we will look to the more popular subjects early in our development. Clearly, the P-51 Mustang is a warbird icon and it would sell well. We know everybody and their brother is putting out Mustangs – is one more really needed? Probably not – unless it was a quick-build, EPP airframe with molded polycarbonate skin.