As a result of our stopping in at Grass Valley, CA, on our way to Chino, for a photo shoot, Norm Goyer wrote a very nice article on the Cozy Mark IV which was published in July '96 Sport Pilot magazine.

'so, the Oct.'96 issue of U. S. Aviator featured the Mark IV on ..e cover and Jim Campbell commented on his flight at Arlington with our new Franklin installation, and printed a few pictures.

FIRST FLIGHTS

Cozy builder Clyde Rutledge called to report that Randy Schoonover, Gaithersburg MD, completed his 3-place Cozy and his first flight was on 8/26/96. Brian Heinitz, in Citrus Heights, CA, has completed his Cozy and it is at the airport, ready to fly. We also understand that both Val DeOliveira, in S. Floral Park, NY, and Pat Young, in Pueblo, CO have completed their Cozy Mark IVs, and they are at their respective airports, ready to fly.

PEEL STRENGTH

The peel strength of a cured fiberglass matrix is the amount of force required to delaminate a layer of fiberglass from the layer below or the substrate below. It is the measure of the internal strength of the cured epoxy or its adhesion or mechanical bond to the substrate. It is a very important property, because the peel strength of the epoxy is literally what is holding your airplane together.

It should be obvious that when you are making a layup over a dry, previously cured surface, the peel strength will be either the strength of the mechanical bond, or else the internal strength of the epoxy, which ever is weaker. It is important, therefore, in making a wet layup over a dry surface to properly prepare the dry surface so the mechanical bond to the surface will not be the ..akest link. There are two methods of preparing a fiberglass surface for the maximum strength mechanical bond. The first is to sand a previously cured fiberglass surface dull with 36 grit sandpaper. The disadvantage of this method is that if the surface is not absolutely flat, it is nearly impossible to remove all of the shine without sanding through some of the glass filaments, weakening the substrate. The second method is to squeegee peel-ply over a fiberglass substrate before it cures, and strip it off after cure. The advantage of using peel ply is that the shiny surface (which might also be waxy) is stripped off with the peel-ply, and the surface remaining is flat but fractured and rough. Sanding this surface is a wise, extra precaution to maximize the mechanical bond.

It is normally assumed that maximum peel strength is obtained by making a wet-on-wet layup, because then there is no mechanical bond involved. There may be an exception, or at least a reservation to this rule. We recently received a call from a builder in the state of Washington who said that he was using Epolite 2427 resin, and he noticed after glassing the inside of his fuselage sides, that the peel strength of the second layer was poor, and he could peel off the second layer rather easily. After discussing his technique with him, we think we know why this happened. Very often, first-time builders are too meticulous, and take a long time to squeegee each layer of glass to remove all of the excess epoxy before laying down the next layer of cloth. The ..selage sides have a lot of area so this could take quite a long ..me. If, as has been alledged, 2427 is more susceptible to contamination by humidity (and/or carbon dioxide) in the atmosphere, and it is exposed to the atmosphere for a long period of time before the next layer of glass is applied, there could be a contaminated surface between the two layers of glass which would reduce the internal strength of the epoxy at the worst possible location--between the glass layers.

Experienced builders have learned that it is much faster, and results in better layups, to wet out the first layer of glass, squeegee the air our, but leave an excess of epoxy and then lay down the next layer of cloth on top to soak up the excess. This wets out the second layer faster, because the excess epoxy from underneath pushes the air out ahead of it. This saves much time, results in less air in the layup, requires less squeegeeing, and, if the epoxy is susceptible to contamination from the atmosphere, there is much less exposure to the atmosphere, and any contaminated surface epoxy does not end up being between two layers of glass. The same considerations apply also and argue for the use of peel-ply over the top layer.

We have tested the peel strength of Epolite 2427, and haven't found it to be any different from the several other epoxy systems we have used. It is true that we have low humidities in Arizona most of the year (not during the monsoon season, however), but it is also true we follow the procedure for faster and better layups recommended above.

HARD SHELLING

We understand that one of the hot subjects on Internet lately has been "hard shelling". Some builders think this is a new idea, and the best one since "sliced bread". They say you should micro the wing cores, let the micro cure, and then spline sand the cores before glassing. They claim this is the best and fastest way to get perfectly straight wings.

Actually, this is not a new idea. I can remember it being discussed in the late '70s, by Varieze builders, and as I recall, Burt Rutan thought it was a **very bad idea**, with which I happen to concur. First of all, if you do a good job of cutting the cores, or purchase professionally cut cores from Featherlite, very little sanding should be required--just enough to remove the hairs which result from hot wire cutting. Even if you have to do some straightening, it is a lot easier to sand plain styrofoam than a cured, microed surface. Of course, you need to avoid hard glue joints, or undercut any which would interfere with sanding. Secondly, "hard shelling" takes more time, because you have to sand and vacuum the cores first anyway, before applying micro, and then wait a day or more for it to cure, and then you would have to sand and vacuum them again, before glassing. The second sanding is bound to take a lot more time, because the surface is harder, and there will probably be excess micro that has to be removed. Thirdly, and worst, you will end up with **poorer peel strength**, because you will be relying on a mechanical bond to a flat, cured micro surface, rather than a chemical/mechanical bond of epoxy to foam, involving a lot more surface area, as with a wet layup over wet micro, as specified in the construction manual. Why do you need peel strength in your wings? Because the top skin is in compression, and the thing that keeps it from buckling is the **peel strength!** Burt Rutan had a hard and fast rule not to glass over a cured, microed surface, if structural strength was required, because the mechanical bond to micro is poor and the internal strength of micro is poor (That is why you use flox for outside corners).