Composite Techniques Part 1 - Material Identification, Repair and Changes on a Cowling

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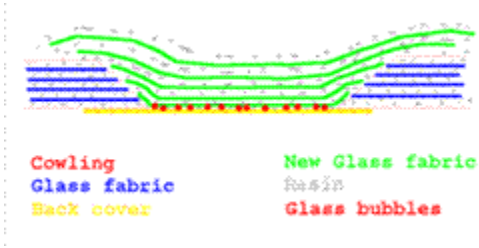
Sonerai.net is happy to present this short article on composite techniques. The article was inspired by questions that have been asked on the forum. Juergen is an electronic engineer who resides in Jossa, Germany. Juergen owns and actively flies a Sonerai I.

Generally speaking, there are two types of resin used today; epoxy and polyester. Epoxy is mainly used on parts where static function is important such as in aircraft wings and fuselages. Polyester resin on the other hand is mainly used on parts where there is no static function like cowlings and wheelpants.

Before making any fiberglass alterations or repairs to your cowling you must determine what type of resin was used in its manufacturing. This is important since using epoxy on polyester results in poor adhesion. Polyester on epoxy provides better adhesion but is still not as optimal as using polyester on polyester or epoxy on epoxy.

A simple test to determine what type of resin is used on your cowl is heat the material with a hot-air gun, soldering iron or lighter. When the temperature reaches about 400° F it will emit a typical smell. For Epoxy, the smell is minimal but for polyester there is a stronger unmistakable odor. If you are uncertain of this odor, visit your local home improvement center, open the cap on a can of polyester resin and note the distinctive smell.

The first step in modifying or repairing the cowling is to properly prepare the old part. You must clean all dust, oils and other contaminants using water and alcohol. The next step is to make a bevel for the bond seam. To do this, sand the edge of the original part to an angle of about 45 degrees as depicted in the following images:



A temporary backing cover can now be placed on the outside surface to serve as a mold. The backing material can be a thin sheet of plastic held in position with tape. To aid in removal after the resin cures, you can apply a coat of mold release wax.

Once all the preparation work is complete, it's time to begin the lay-up. For the first layer, prepare a resin mixture that contains 10 to 20 percent glass bubbles (micro-balloons.) This will help fill small air voids that often occur in the seam area. Subsequent layers can be applied with resin containing glass bubbles or not but if glass bubbles are added, finish-sanding will be easier.

After the resin has hardened, clean the surface with alcohol to remove the wax. The final steps are to apply filler, wet sand, prime and paint.

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