Learning To Fibreglass At Home

with Tony Ravenscroft

Do It Yourself -with F&B !

Re-introducing Tony Ravenscroft's popular series all about fibreglassing at home, first published back in 1995 - and in constant demand ever since. DIY fbreglassing is not a difficult process once you've got the hang of it - and armed with that knowledge, there is then no reason why you can't do fully professional repairs; make your own moulds, design and build a hardtop, ice-chest, or fishbox - or build your own fibreglass boat. Tony has done a marvellous job of taking a very technical subject and putting it into language we ordinary folk can understand. He's been assisted by some of the industry's top fibreglass specialists who tipped all the high tech words back in - forcing Tony to re-write the piece several times. But as technical guru Brian Edwards said to F&B "Sure, keep it simple by all means, but let's get it right." What we have here, then, is one of the best reports we've ever read on this subject, and although it is still - of necessity - a bit heavy in parts, if you take the time to read it through a couple of times, it will provide the basic understanding and know-how that you need to go to the next square. Our thanks to all the people who so willingly contributed their time and expertise to this series - we've all learned a great deal in the process. Next month Tony puts it into practice - building a complete GRP ice chest.

The technology used by the boatbuilding industry to build fibreglass boats is known by many names.

The general "fibreglass" is the most common and the most obvious. However it is also known as FRP - Fibreglass Reinforced Plastic and GRP - Glass Reinforced Plastic. If I thought a little longer I could probably think of a few more as well, but it doesn't matter what you call it. The point being that all these terms refer to the same thing; there is no difference.

I think GRP - Glass Reinforced Plastic, is the best of the two names I mentioned here, because that is what it is - plastic reinforced with glass. I really like working with the stuff; you can make almost anything with it, and what's more, with only a bit of knowledge what you make can look as good as the proverbial 'bought one'.

Without that knowledge . . . well, the disasters can range from the simply annoying to monumentally expensive.

Do you know what it is like to have a pot of resin turn into a smoking, rock hard block right before your eyes? Or have the seat you 'glassed to the deck tear away after you hit the first decent wave *("but I thought this stuff was meant to be strong?").*

Well, I know what it's like - I've done all that and more! For me, the key to overcoming all of these mistakes was not so much learning how to use fibreglass, but in learning what it is and how it works. So don't look upon this piece as an *"interesting load of technical stuff - but I want to learn how to make an icebox . .!"*

This **is** your first lesson on how to make that icebox.

I'm going to break this initial report into four main topics

1. Resin - that's the plastic part.

2. Glass - that's the reinforcement part, although reinforcements don't always have to be glass, so it will probably be better to consider our second topic to be "reinforcements".

3. Gelcoat and moulds and

4. How to put all this together and actually make something. There will be a big sub-topic here, **adhesion**, or how to get that chair to stick to the deck and stay there.

First, Topic One: Resin.

When thinking about fibreglass, people tend to talk about "fibreglass" resin. Technically there is no such thing. I have varying degrees of experience with three different types of resin:

Polyester, Vinyl Ester and Epoxy. This piece refers only to polyester resin however lately I have been using a lot of Vinyl Ester resin. Without question it has better adhesion, meaning it sticks really well, and is suitable for use in situations such as fuel tanks where polyester is not. I do find it more difficult to use so I have decided not to include specific details on its use here. If you want to know more about it ask your fibreglass materials supplier for some information.

The resins that we are interested in are all however a type of plastic. On a technical note, plastics can be categorised into one of two groups. **Thermoplastics,** which can be formed and shaped by heat, you can therefore re-shape them by heat again and again. Second are **thermosetting plastics** which, when formed, cannot be reformed, it's a one shot thing.

Polyesters are the latter: thermosetting.

(I am going to jump forward for a second here, and get to the point, then come back and explain it all - bear with me)

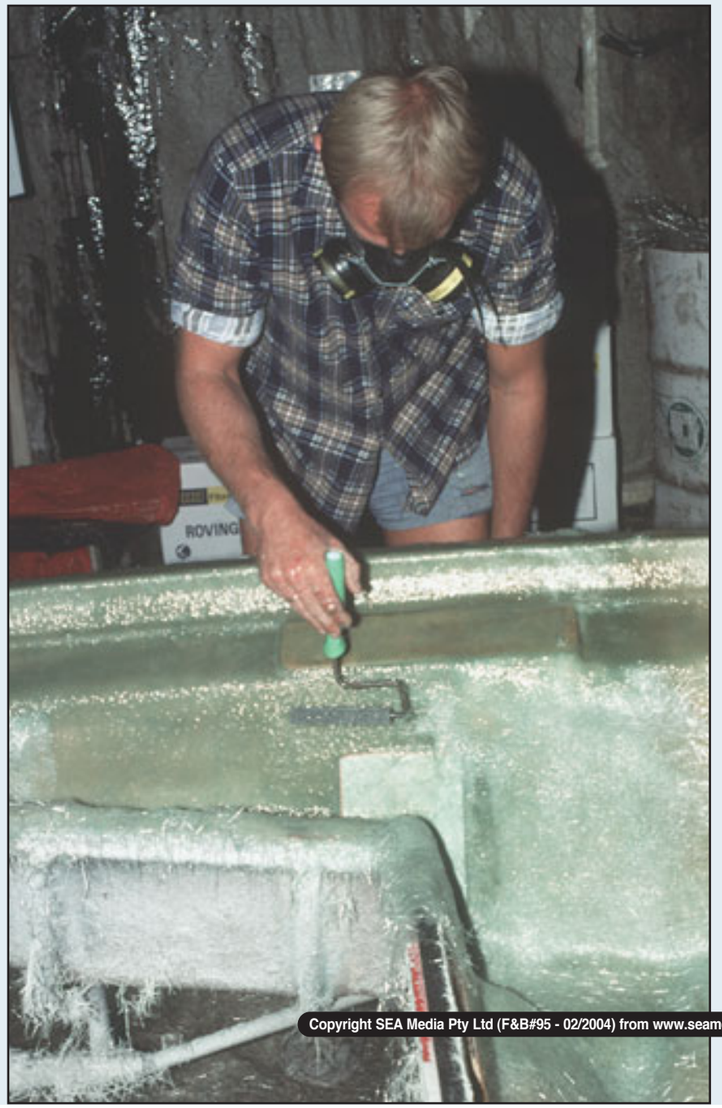
Into the resin you add catalyst, that is how you make the liquid resin become solid or cure. More precisely put, it causes the thermosetting reaction to occur. Most fibreglassing disasters are caused by putting too much or too little catalyst into the resin. This article aims to tell you how to work out how much catalyst to put into the resin, and why.

I believe in order to know how much catalyst to add, you need to know why you add it at all. So here it is:

Once manufactured, the resin is dissolved in, or more accurately, thinned with, another chemical called styrene monomer. The styrene monomer later reacts with the resin when the catalyst is added.

To be semi-technical for a second, what happens is this: the actual resin is referred to as the base resin, and is only part of the final mix that we in general tend to call 'resin'. When the base resin and the styrene monomer react together following the addition of a catalyst, the resulting process is called a *cross linking reaction.*

Put in the simplest terms, the polyester resin molecules are joined together in short chains of molecules. The cross linking reaction causes the chains to join, or link and then crosslink, together to form one single, solid mass, or one huge block of molecules. In doing so, the resin will change from liquid to solid, and thus the resin is said to cure.



Above: The professionals have the advantage of space and time, but there is nothing in the fibreglassing process that a home handyman can't do very well - especially when it comes to the "slushies" job!

*(Wow - that's pretty heavy, so take a break for a sec, pour another drop of your favourite brew, and re-read the last three paragraphs - **Ed**)*

Also mixed in with the resin solution is the accelerator. In case you ever wondered like I once did, 'pre-accelerated' resin has the accelerator already mixed in.

There is not a lot of accelerator needed - only about 0.3% of the weight of the resin. The accelerator is another chemical that can be of a number of different compounds, however I believe that the one most commonly used is Cobalt Octoate. Whatever the actual compound when you want to cure the resin you add a small amount of a catalyst. Once again, this can be a number of different chemicals. However, in practice I think you will only ever see Methyl Ethyl Ketone Peroxide - M.E.K.P. But don't worry about the length of the name (it's just a