

# Ch 1 - Introduction

## Building the St Ayles Skiff kit.

The kit for the St Ayles Skiff has been designed to make it as easy as is reasonably possible to build. However, it is not something that can be done in a few days or weeks. The builds completed so far have taken anything between two months by two retired professional boatbuilders working more or less full time to seven months taken by a group with no boat building experience working evenings and weekends only.

It is intended that the boat builders will try different things. Once the hull planking and gunwales are complete, you are encouraged to use your imagination and skills to try different layouts in the boat, and it is not expected that you will follow the construction drawing in every detail.

Talk to other groups who have built the skiffs, go and see their boats if possible, look at photos, and find out what is thought to be the current best practice. Some Groups have recorded their build on the Web, this can be a useful reference if you get stuck.

### **Materials**

Use the best materials that you can reasonably afford. While the ethos of the project is that the boats are built at a very low cost, there are some areas where you should not skimp. You will want the boat to last for many years, and the initial choice of materials will impact on its longevity.

#### **Timber**

In general, it is recommended that larch is used for nearly all of the timber work, except where there will be considerable wear - mainly around the oarlocks. For these areas, the hardest hardwood you can find should be used.

The timber needs to be of a good quality, and knots should be avoided. The timber list tells you where knots are acceptable.

Douglas Fir is a good substitute for Larch, though a little denser. It is also stiffer, and is good for the oars.

#### **Glues**

Use good quality Marine Glues. For most of the work, you should use epoxy resin, thickened as necessary to fill gaps. For certain tasks, notably laminating the stems and fixing the gunwales, you may use marine polyurethane glue. This can be used where there are no gaps to fill and the timber has a relatively high moisture content. PU glues have poor gap-filling qualities.

#### **Paints**

Marine Paints (as anything with "Marine" in the name) are expensive, and you will need a considerable amount of it. It will probably be one of the most expensive single items after the kit. However, a good paint system, applied as per the manufacturers instructions, will last for many years, and protect the boat from the elements.

We do not recommend two-pack paint as there is a certain amount of flexing in the hull in use which is likely to crack the paint surface.

### **Fixings & fittings**

All fixings left in the boat after completion should be marine standard, either A4/316 stainless steel or silicon bronze. Do not be tempted to use stainless steel screws from your local DIY store as these are generally manufactured to a much lower corrosion resistance. Likewise, brass screws corrode quite quickly and lose strength in seawater. Temporary screws used to hold parts together while the glue sets and then removed may be any available, but they **MUST** be removed and the holes filled before finishing.

### ***Where to build?***

The skiffs have already been built in many different kinds of places, from cowsheds to industrial units, and in one case, actually in a boatyard!

The absolute minimum area you should be thinking about is 25ft long and 10ft wide. Working in an area this small will be very uncomfortable and will only be possible if there are full doors so that long pieces can be taken outside to be swung around if necessary. Nearly all preparatory work will have to take place in another area.

The ideal minimum will be approximately 30ft by 20ft. If this is what you can find, you will want to position your building frame to one side so that there will be about 30" from the building frame to the wall. This will give sufficient space to work in, and leave a larger area to work on the other side of the boat.

The workspace needs to be well lit, and preferably have a power supply for the power tools.

### ***Tools***

You will not need a huge array of tools to build the boat, and most of them can be found in a keen DIYer's tool box.

This list is not exhaustive, but covers the main tools required or desirable.

#### **First Aid kit**

The most common injuries that are likely to happen are small cuts from tools and handling wood. Make sure that you have a good supply of plasters.

There will also be many times when splinters need to be removed, so include a good pair of tweezers.

You should also keep larger wound dressings in case a more serious accident occurs. Take advice on the contents of the kit if necessary.

#### **Craft Knife**

These will always be useful for trimming, carving etc. Make sure you use one with a retractable blade as this is probably the most dangerous tool in the box.

#### **Planes**

Block planes are the most heavily used. For preference, you should use one with screw adjustment which allows you to make the fine changes required.

The cheaper ones with a top screw adjustment are difficult to set to the right cut.

You may want to purchase a Rebate plane for cutting the gains or geraldts in the planking, but they are expensive and the job can be done quite adequately with chisels.

### **Chisels**

Use a good set, and keep them sharp.

### **Sharpening Stones**

A very important investment to keep the tools sharp and safe. Diamond sharpening stones are recommended. Learn how to use them properly; sharper tools are safer tools.

### **Saws**

You will need a rip saw for rough cutting, and a good fine toothed saw for the fine detail cuts. Japanese Pull Saws are now very popular, and the replacement blades are not expensive.

### **Drill**

A battery drill is necessary, and especially useful with a screwdriver bit.

### **Sanders**

Electric Sanders are very useful, but be very careful with belt sanders. These are very aggressive and can strip the outer veneer off plywood in seconds. Random Orbital Sanders are a lot safer to use in this respect, and are easier to control.

### **Electric Planers**

Worth having, but not worth paying for specially. They are also very aggressive, and should be used with extreme care. Unless you are an expert with them, use them for doing stock removal on the hog, but finish the job with the hand planes to get it right.

### **Hot Air gun and Scrapers**

When it comes to cleaning up the hull, the best method of removing excess epoxy is a hot air gun and scrapers. More detail in the chapter regarding this stage - beware of scorching the timber!

### **Jigsaw**

Always useful for cutting out the planks and rough shaping.

The big power tools that can be invaluable. When it comes to these power tools, it is best to make sure that you have a joiner or carpenter who has these tools on the building team.

### **Bandsaw**

#### **Table or Circular Saw & Planer Thicknesser**

These two tools if available will save a huge amount of money in preparing the timbers required for building the boat. With these, you can buy in boards and cut them to the required size, rather than having to pay someone else to cut and dress them to size.

## ***Some general notes about the build...***

- Most of the time, only a limited number of people can actually be involved “on the boat”. For instance, when planking, 3 people is probably about the optimum - with 4, one is going to start getting in the way. Fortunately, the bit which needs the most hands to get an unpleasant job done quickly can have the most involvement - scraping and sanding!
- Think ahead - what is going to be required later, and you can get other people involved - kabes, thwarts, rudder, and especially the oars. In some of these cases, measurements can be taken off the boat and the work done elsewhere if the building space is restricted.
- Almost all operations in building the boat are more easily done on a flat surface, e.g. gluing up the frames. If it can be done away from trying to do things in three dimensions, do so. Anything that has occurred to me that can be done in this manner will be flagged up in the Build Instructions as we come to it.

## ***A Short Primer on using Epoxy Resin***

This is by no means definitive, and you should read and understand the Safety and Usage guides supplied with your epoxy. If they are not supplied with the package, insist that your supplier sends them on.

Epoxy Resin Glue is the magic ingredient in making the St Ayles Skiff buildable by amateurs. It is incredibly strong, it is fairly easy to use, and it is great for filling the gaps when your joinery skills are not quite up to the mark. Even better, when it sets, it does not shrink or expand, so when you pack it into the gap and leave it to set overnight, the gap will stay filled when you come back in the morning.

However...

Epoxy resin can be dangerous; many people become easily sensitized after only a few exposures. Always wear gloves (preferably nitrile rather than latex) when handling wet epoxy and avoid any skin contact. Provide good ventilation. Always wear a good dust mask when sanding. Epoxy that is hard (less than 48 hour old), but not fully cured (up to 5 days old) is especially dangerous to breathe. Read and understand the Safety Leaflets included with your epoxy.

Epoxy resin is supplied as two components - the resin and the hardener. Different brands of epoxy are mixed in different ratios, and it is strongly recommended that you stick to one brand the whole way through your build so that there is no confusion.

It is normally supplied with pumps that will supposedly dispense the fluid in the correct ratio. However, pumps can malfunction. I therefore recommend that mixing is done by weight which is more reliable. An electronic scale will cost a little money, but will guarantee that you mix the correct quantities (providing that your arithmetic is right!). Using a scale also means that when necessary, you can mix smaller quantities than the pumps will dispense, therefore saving epoxy.

Epoxy is expensive, so waste is undesirable. When you are started learning how to use it, mix smaller amounts than larger - you can always make up another pot - but you cannot put unused epoxy back in the can! Use any excess to fill in gaps from earlier operations.

To be fully effective, the epoxy will almost always need some kind of additive to help it do the job intended. There are three main additives that you will require:

**Microfibres.** These are a general purpose gluing additive - tiny fibres that mixed together increase the strength of the cured epoxy.

**Filleting blend.** These are used to run fillets between parts at angles to increase the strength of the joint, e.g. between the frames and the planking. It is also good for forcing into the small gaps which are most likely to happen when gluing the garboard to the hog.

**Fairing compound.** Used to fill in gaps where there is no structural strength required - probably will be used much more later when your boat will gather the odd dent or two in use. The fairing compound is much easier to sand than a pure microfibre mix.

Epoxy requires a certain amount of warmth to set properly. The warmer the ambient temperature, the quicker the epoxy will cure. As a general rule, do not try to glue if the temperature in the workshop is below 5C. Read the instruction leaflets for the brand of epoxy that you are using as the minimum temperature varies. Local heating can be used with care.

If in doubt, leave the mixing pots out overnight and check on your following work session that the pots have cured properly.

Hardener is usually obtainable as "Standard" or "Fast". If you are working in an unheated shed in winter, it may be advisable to use the fast hardener. When the weather warms up, you will want to revert to the standard or slow hardener.

Some brands of epoxy, when curing, will exude a slightly greasy feeling compound known as *Amine Blush*. This is particularly evident when curing at low temperatures. When this occurs, the amine blush must be removed by washing with slightly soapy water, the material allowed to dry, then sanded with fine grit paper before more epoxy can be applied.

The epoxy curing process is *exothermic* - it gives off heat as the resin & hardener react. This heat will further increase the speed of the reaction, and it is therefore important that when mixing large quantities of epoxy a large pot is used and that it is applied as quickly as possible. If your epoxy starts its self-sustaining reaction, get it outside and preferably into a bucket of water as quickly as possible. This is not a regular occurrence in the middle of a Scottish winter! Try not to hold the mixing pot in a full hand grip as the warmth from your hand will also speed up the reaction.

Stir the resin and hardener for at least two minutes before adding any additives.

Before applying any epoxy to glue parts, it is necessary to wet out the areas to be glued. This is especially important when gluing end-grain on the plywood, which is very porous.

When epoxy is applied to wood, the porosity of the wood will soak some of the epoxy into its fibres, particularly on end grain. If the wood is not pre-treated this way, the epoxy can be absorbed into the end-grain so that there is very little actually left in the joint.

The epoxy glue is mixed from the resin and hardener at the correct ratio, and applied to the area to be glued with a cheap brush, cut so that it is short and stiff. The epoxy is then left for at least half an hour - more in cold temperatures, so that it will be absorbed by the wood fibre and start curing before the main bonding epoxy is applied.

Finally, a small warning on a "feature" of using epoxy that I have not seen in any manual. When epoxy sets, it sets very hard and in some cases where it has run over plastic protection (when gluing scarf joints) or dripped (like a stalactite),

the edges and points can be extremely sharp. When inspecting joints after epoxy has set, be very careful and sand or plane any of these sharp projections as soon as possible to keep a safe working environment.