

A GIANT PETRI DISH
Restoring a neglected Macgregor 22
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At one time I owned and lived aboard a Catalina 27. I loved that boat, but finally decided it was time to return to school, so I sold the boat, moved inland, got married and received my Graduate degree. But I had no sooner sold the boat before I started thinking about another boat... one that would fit my newfound domestic lifestyle.

After eight years, there was still no boat. We had moved inland where sailboats are rare and sell for a premium. And then I heard about an old Macgregor Venture 222. When I first went out to look at it, I found a sad sight. The boat had been left on the owners wooded property for a number of years, and was totally neglected. About two feet of stagnant rainwater had collected in the cabin, the boat was foul with rot and mildew, the keel was damaged and badly rusting. Although the deck and hull were still solid, it was basically little more than a giant fiber-glass petri dish.

Macgregors aren't necessarily the best boats in the world for restoring...they were lightly built and designed for sales as opposed to longevity. But this boat had a few strong points. One, it was close to our home town and came with the original trailer. The alternative, trucking a boat up from Florida, would cost a minimum of \$1200, which for us was a nearly impossible sum to come up with in addition to the purchase price for a boat. Two, since Macgregors were so inexpensive, a large number were sold, leaving a strong network of owners, parts sources, and possibly buyers when it comes time to sell. Macgregor owners are very passionate about their boats, and it's rare for an owner to say that their boats are less than wonderful. Being so light, they are reported to have great sailing qualities. Third, the low original selling price and sheer number of these boats keeps the price down, giving a low BUC value for me to bargain with.

Well, some decisions are made with the heart and not with the head, and I must admit that I used a bit too much heart in making my decision. I desperately wanted to go sailing again, and this, I thought, would be a cheap way to do it. Low cost up front, and we can pay for the restoration as we go. The next stop for this boat, if I didn't rescue it, was definitely the dump, and it would be neat to turn it into something useful again. I wanted to show my wife and son how much fun sailing can be, spend some time on the water, enjoy a cup of coffee as the mist rises, etc., etc. Then there's the equity in the finished project...I figured I could sell the boat for maybe 3-5 thousand dollars in top, perfect condition, and use the money to get into a larger boat when the time comes. And besides, I really do enjoy boat work for some

strange reason. (Good thing, because there would be plenty of work to come!) I offered \$400, the owner countered with \$500, and I accepted. The price even included delivery to my house.

The Demolition

The restoration of my old boat started in July of 2000, and for a long time, it looked like a demolition, not a restoration. Everything that was rotted, rusted or mildewed had to go, and I attacked with a vengeance. At one point I even resorted to using a crowbar to rip out some cabinetry. The deeper I dug, the more damage I found, and thoughts of sailing that season faded quickly. The past owner was a skilled cabinetmaker, but unfortunately knew little about marine carpentry. He had made several "improvements" that, due to neglect, were now worthless and had to be removed. I found extensive use of mild steel fasteners, now dissolved into rusty barbs, and interior grade plywood, hopelessly delaminated. It was all torn out. There was even a pair of pine grubs happily munching their way through a winch support post that some past owner had built.

As the cleanup progressed, I began to formulate a loose restoration plan. I would try to get the boat back to stock as much as possible, just to get it back on the water. After a few sails, I would have a much better idea of what "improvements" I would want...it seemed pointless to build a lot of custom cabinetry now, only to discover later that it wasn't needed. I would invest money in materials for the labor-intensive jobs first, like paint, and hold purchases for, say, rigging hardware for last. That way, I wouldn't have capital tied up in blocks while I waited to save up for a gallon of epoxy resin. And I decided to try to get the exterior paint finished up in the warmer summer and autumn months, and work on the interior during the winter.

I developed a "philosophy" about paying for this project as well. The BUC value for this boat, in mint/bristol condition, is \$1700 to \$2,050, not including the motor. No amount of work on my part would be able to change that number. Anything over about \$1500 spent in the restoration would be money pretty much lost, so I tried to take my time and find the best deals on equipment, picking up on every sale and bargain I could get. I bought a lot of used and occasionally new equipment through eBay, including a vhf radio, jib sheetlead blocks, fiberglass cloth, a vhf antenna, a new Harken traveller car, 5hp Tohatsu longshaft outboard, and more. I have been a member of Boat/US in the past, and they were the lowest price catalog supplier I found, especially when I used their member's discount. Some prices were high, though...for example I could get better prices on some smaller parts and rigging supplies from a smaller company called Rigging Only. I located a company called Raka Epoxy in Florida to have super prices on epoxy and lam-

inating products.

After a while, the number of trashcan loads of rotten wood, carpet, etc. tapered off, and I had a fairly clean hull to work with. Many of the rotten pieces were photographed before removal, measured, and saved for patterns. The '72 model did not have a fiberglass liner...instead, major sections of the interior were pieced together from plywood that was bonded directly to the hull. In a few small areas, this plywood was rotted. For example, condensation formed underneath the front opening icebox the previous owner had bolted to a berth top, rotting out the area where the mounting holes were. The easiest fix was to expand the berth locker opening to cut out the rotten areas, and make new covers for the lockers. This allowed me to fit locker covers with rounded corners, rather than the sharp, square cutouts done at the factory.

It was obvious from the beginning that the boat would need a complete paint job, both inside and out. To do it right, I would have to remove just about every fitting from the boat, paint, and then reassemble. Cutting corners by trying to paint around fittings always shows, and besides, everything needed rebedding anyway. That became the ultimate goal...to strip it down to the basic fiberglass and plywood structure, make the necessary repairs, paint, and reassemble, using new equipment if required, used or original equipment if possible.

Painting the Exterior

The exterior paint job was the first major job to be tackled. The boat had two coats of paint on it already...a yellow automotive paint over a chalky pale blue. The auto paint was in fair condition, except for a few large bubbles where it was peeling away from the hull. A little poking with a scraper showed that the bond between the first coat and the hull was failing, so it all had to go. The entire hull had to be scraped, as well as the topsides. I tried several different methods, but found a razor blade scraper to be the most effective. Lead contamination was a concern, and scraping produced large, manageable chips as opposed to dust. The chips were collected by taping a drop cloth to the hull and scraping five foot sections at a time. Then I gathered the chips, bagged them, and took them to a hazardous materials collection site. Escaped chips were rounded up with a vacuum cleaner.

I didn't try to scrape the hull all at once. I'd work on a section for an hour or two, until my arms got sore, and then switch to a different project. This way, I always had several jobs going at once, and could work on any of them that struck my fancy on a particular day. I'm sure that working this way would drive some folks crazy, but it suited my right-brained personality, even if it isn't the most efficient way to work.

After about two months of on-again, off-again scraping, the hull was finally clean. I sanded the entire thing with a palm sander, and the surface looked good and smooth. I spot primed several places on the hull that had pinholes in the original laminate, and sanded these areas out. I then rolled on two coats of Petit's Easyepoxy in a deep forest green. This paint is really nothing short of amazing. (I understand that Interlux products give similar results, but I haven't tried them... maybe on the next boat...) I rolled on about three feet or so with a special foam roller cover (some cheap roller covers have been known to disintegrate from the solvents in the paint) and then went back over the painted area with a fine, dry brush to smooth out the bubbles. While the finished result isn't as glossy as a spray job, it's amazingly close. Considering the age of the hull, it is a phenomenal improvement. I do wish, though, that I had gone over the entire hull with a thin coat of primer and sanded it out...the hull would look even better.

A couple of thoughts if you're considering painting your own boat. When you buy your paint, stick with one brand for everything... thinner, primer, and color. Petit made a special brushing thinner which works great with their formulation of paint, but who knows how it would work with another manufacturer's products? It's a good idea to gain experience by painting something small, like a hatch. When it's finished, you'll know exactly what to expect, and if the results are less than what you want, you can adjust your preparation or technique accordingly. A good brush will help with the finished paint job, but it isn't as critical as you would think... I even got away with using a disposable chip brush in places with excellent results, but I had to be more careful. One of my biggest mistakes and a constant source of headaches was not having a shelter for the boat. I was in the shade, under a maple tree, but there was no end of leaves, seeds, and dirt that fell onto my new paint job. Despite a cover, the boat was constantly getting flooded and dirty, inside and out. I lost a great deal of time just cleaning up because I didn't have shelter. In the end, I bought one of those 10 by 20 portable carports, and I really wish I had done this first thing.

Don't use your expensive brushing thinner to clean your brushes. In fact, you can clean your brushes hundreds of times using a quart of hardware-store mineral spirits and a settling jar. Using a small amount of thinner...say, three tablespoons...rinse the brush. You'll never get it clean on the first rinse. Don't throw the spent thinner away, but toss it in the settling jar, which is any glass container with a tight-fitting lid. Repeat the rinsing process three more times. By the fourth rinse, your brush will be fairly clean, and you'll have about a half cup of dirty thinner in the jar. Seal the jar with the lid. After four or five days, nearly all the paint solids will have settled out, leaving clear thinner that can be re-

used. The only loss of thinner is by evaporation. If you need to clean brushes more frequently, simply start a second settling jar. When the paint job is finished, open up the jars and let the excess thinner evaporate. The resulting solid can be disposed in the regular trash system. If it's still liquid, then it's classified as hazardous waste(at least in Tennessee), and requires special handling for disposal.

Nearly every piece of hardware was removed before painting, both inside and out. I was able to clean and reuse some of the fittings, but much needed to be replaced. For example, none of the mooring cleats matched. Little expenses like these can really add up, so I went with nylon cleats for now, and will replace with stainless or bronze if necessary. All mild steel fasteners were replaced with stainless. Water infiltration into the plywood deck core was an obvious problem, as I could see rotten wood where fittings passed through the deck. All the old mounting holes were filled with epoxy. Where a fitting was to be mounted to a cored section of the deck, I drilled the hole oversized through the top skin and core, but not through the inner skin. This little "well" was filled with acetone and allowed to dry, then filled with epoxy mixed with colloidal silica and microballoons. After it cured, the mounting hole was re-drilled to the correct size. This method gives fittings that are strongly mounted and watertight to the core of the boat.

The Interior

The interior surface of the boat was a real mess. While the outside was fairly straightforward, the inside was a peeling jumble of old carpet adhesive, peeling paint, and cracking gelcoat, all on very irregular surfaces. The smoother and more accessible surfaces responded well to disc sanding with a "boat eater", a term coined by my sailing neighbor Larry Lee during my liveaboard days. Mine is an inexpensive 4 1/2 inch sidegrinder, made in China. I have two... each one cost less than \$15. The abrasive dust produced by grinding fiberglass is quite bad for the motors, so it doesn't make sense to use an expensive tool for this application. I adapted a soft backed sanding pad to the sidegrinder by epoxing a large bolt to the pad's canter. It isn't as true as I'd like, but it's pretty close.

Sanding didn't fix everything, though. The compound curves of the overhead and under the cockpit were a challenge. Too much to remove by hand, and the side grinder was too big to get into the corners. I finally bit the bullet and bought a sandblaster from Harbor Freight. The blaster was fairly inexpensive at about \$80 and was the pressurized type. Suction blasters are too small to be much use, while an industrial sand pot would be much more likely to damage the laminate. My weak link was the compressor. I was able to borrow a 220v unit, and I had a smaller 110 as well, but they were both fairly

old. Even linked together, they were unable to keep up with the air demand. I blasted most of the peeling paint from the interior surfaces, and it did work well back in "the cave"... the area under the cockpit. But I spent a good deal of time waiting for the pressure to run up, and I had to sift all the sand through a screen, as the small unit clogged easily. On the whole, I think I made the right choice, but I'll definitely find a big compressor before I try to blast the trailer.

As the layers of old paint came off, I began making several structural repairs and improvements to the boat. It always surprises me that there are many well-meaning boat restorers who use polyester resin for their repairs. There are some situations where polyester is a good choice, but it just isn't strong enough to bond to fiberglass that's already cured. It doesn't have the adhesive strength. It looks good when first applied, but over time, the bond fails.

The answer is epoxy. Though more expensive than polyester, it has much greater strength. Repairs made with fiberglass and epoxy become permanent structural additions to the boat, and when applied to a clean base surface, are as strong as the original laminate. Like polyester, it's toxic, and I wore an organic vapor mask when working inside the hull. Drips in the eyes could mean a trip to the hospital, so a full face mask in addition to safety glasses isn't overkill in my opinion. Old coveralls, rubber gloves, and a rag tied around my head completed my protective clothing ensemble...it was an interesting fashion statement.

Polyester repairs were a problem in several places on my old boat. The worst was where the previous owner had "improved" the original design by raising the foredeck several inches, supporting the underside with a web of wooden stringers. This work was all done with polyester, and it was all cracked and leaking.

This fix was probably the biggest compromise repair that I made. Though the foredeck was leaking and the plywood core was wet, it was still reasonably solid. I dug out the cracked areas on top, well into the core, and poured acetone into the groove. This along with some mild heat from a lamp dried the core somewhat. Acetone is highly flammable, so I couldn't get it anything more than warm. I then filled the trenches with a mixture of thickened epoxy and glass. Inside the boat, the underside of the foredeck was sanded, and loose, poorly fitted glasswork removed. I trowelled epoxy thickened with glass microballoons into the corners of the stringers, smoothing the whole area. The stringers themselves got a coat of epoxy brushed on, which penetrated into the wood and old glass. Relaminating this area turned out to be impossible, as I had to work upside down, and the fiberglass wouldn't hold on the sharp corners. The epoxy fillets gave the underside considerable strength, and I

decided that it would be enough. The whole area would be covered with a padded panel to add insulation and ease those late-night cracks to the head as one crawled into and out of the v-berth.

I bought a quart of interlux epoxy to get myself started, but then found Raka Epoxy and Fiberglass Supplies through the internet. I bought a 1 1/2 gallon kit, a gallon of microballoons, and three dispensing pumps for \$95, more than enough to do the whole boat. Armed with this and 10 yards of fiberglass (\$16, purchased through eBay) I found all sorts of places that needed attention.

For example, several joints on the boat ended in sharp corners... most notably, where the centerboard case met the bottom of the hull. The layup in these areas was quite rough, and while the strength was probably OK, it could be improved with a little reinforcement. Besides, the sharp, rough corners were difficult to clean. A nice, smooth radius would improve the looks, hold paint better, make cleaning easier, and add to the strength considerably. I sanded away most of the old and flaking paint, and applied the epoxy compound using pieces of stiff cardboard cut to a radius. Scraped across the epoxy, these radius paddles left a nice, smooth, and strong joint. Just for giggles, I put three extra layers of glass at the chainplate mounts, and four layers at the centerboard mounting holes. A gallon of epoxy can be great fun... you can easily add to the strength of the basic structure of your boat.

I used epoxy all over the boat. Take the bridgedeck, for example. The keel winch mount had failed years ago, cracking the original laminate and damaging the four mounting holes. A previous owner had attempted a repair with polyester, which was also cracking and failing. It needed a more permanent repair and reinforcement.

The winch was removed and the original mounting holes filled with epoxy resin. (This was easily done by taping the bottom of the holes with masking tape, then filling with catalyzed resin.) The old polyester repair was ground off with a side grinder and a coarse sanding disk. This roughened the surface of the original cracked laminate and helps the epoxy get a good mechanical bond. The entire bridgedeck was relayered with a few pieces of glass cloth. Drilled and painted over, the strength of the repair is probably stronger than the original bridgedeck. For cosmetics, a piece of varnished Ipe (with nonskid added, of course) was lightly glued over the top of the bolts with silicone. This should look great and be pretty leak-resistant.

I also rebuilt the keel lockdown hole with epoxy filler and fiberglass, and reinforced the keel pivot hole. Some of these efforts may not have been absolutely necessary, but I figured the extra weight was minimal and low down

in the boat. The time to do this kind of work is while the interior was stripped out completely. I'd hate to get the boat reassembled and think, "Gee, I wish I'd made that a bit stronger."

Another repair that was made to the basic boat was the addition of drains to prevent the pooling of water. After cleaning out the outboard and anchor well, it became quickly apparent where these drains were needed. The secret ingredients here are brass hose barbs and epoxy, and you can get both from a hardware supplier. It's a simple matter to drill a hole, slightly screw in the hose barb, and seal the whole area with a generous fillet of epoxy. Two-part epoxy in handy tubes is usually thick enough to do the job without a filler, but adding a little silica to the epoxy can help it stay where you want it. Sand the brass lip off the top side if necessary. Painted over, the repair looks like it was a factory job. Hose barbs that are too small are likely to clog, though... I used 3/8" barbs, but larger would be better.

Once the interior reinforcing and repairs were complete, the entire boat was primed. I used household-grade Kilz primer. It worked well, even helping to bond areas of loose paint that I missed with the sander/sandblaster. Most areas were rolled on, and then brushed over areas that the roller missed.

For the interior paint, I used a commonly available oil-based polyurethane paint by Red Devil. I managed to find three quart cans that were dented and got them for two bucks apiece. Normally the price isn't that bad, around \$8 per quart. I also used a low VOC latex enamel over the plywood berth tops, reasoning that the more flexible latex would work better over the wood. In retrospect, though, I wish I'd used the polyurethane throughout, as it seems to be a much tougher finish.

Now that the interior was painted, I could finally start putting the thing back together. I had taken lots of photographs along the way, for this article and for the scrapbook. I found them really handy for jogging my memory as to just how things went back together. To be honest, though, there were so many changes in the boat that these photos weren't as useful as they might have been.

I replaced several of the rotten plywood panels in the boat with a product called Dura-Ply. It's a product that sign painters use to build signs with, and they last outdoors for many years. They are a resorcinol-glued plywood with a phenolic paper surface on one side that takes paint really well. The laminates are a touch softer and have more voids than true marine ply, but it's considerably cheaper. In my area, I paid about \$35 per sheet, where true marine plywood was going to cost \$120 per sheet.

Since I had saved the original panels, reproducing them

went pretty quickly. Stainless steel screws and water-proof glue were used to assemble them, and they were primed and painted on all sides (especially the end grain) before installation. It should last another twenty or thirty years.

The electrical system was rebuilt from scratch to ABYC standards. A separate bonding system was installed, along with a new switch panel that was hinged to make repairs easier. The system is very basic, providing 12V power for nav lights, interior lighting, and a vhf radio. I'll add a solar panel and depth sounder next year.

As I write this, I'm in the process of installing new sailing hardware. New sheets and halyards, a Harken traveller, and genoa sheet lead tracks with dual sheet blocks were a considerable upgrade over the original. The extra expense slowed my progress quite a bit... remember, I'm paying for this as I go... but investments here should pay off by making the boat much more enjoyable to use.

All told, the "good cleaning" that the seller kept referring to has taken over a year and a half of part-time work. It could have been done much faster, but I value my time with my family as much as time on the boat. Still, it took much longer than I had originally estimated, and there's more left to do (such as building a removable galley "module," rebuilding the trailer, new sails, recovering the cushions, etc.) but at some time you have to call it restored. As I write this, I still haven't had much time to sail the boat... which we renamed "Fluke," by the way... but I think we can call it a success.

TIME BREAKDOWN TO DATE (There's always more to do)

Interior preparation	12 hrs
Interior painting	16 hrs
Exterior preparation	66 hrs
Exterior painting	30 hrs
Interior repairs	68 hrs (includes rewiring)
Exterior repairs	69 hrs (includes re-rigging)
Keel repairs	22 hrs
Other misc work	14 hrs
Total hours	297

EXPENSES TO DATE (There's always more to buy)

Boat and trailer	\$500 (includes delivery)
Motor	\$450 (ebay, shipped by Greyhound bus)
VHF & Antenna	\$85.50 (ebay, but I wish I'd bought the radio new)
Tools & Consumables	\$748.90 (Includes \$205 for a cover and \$140 for a sandblaster)
Fiberglass & epoxy	\$155
Duraply	\$56 (2 sheets)
Stainless fasteners	\$189.68
Rigging	\$285.33

Electrical	\$324
Misc	\$252.17

Total investment 3,046.58

NOTE: Work remaining is to make some new interior cushions and build a small cabinet, plus some misc interior finishing. Trailer is unrestored.