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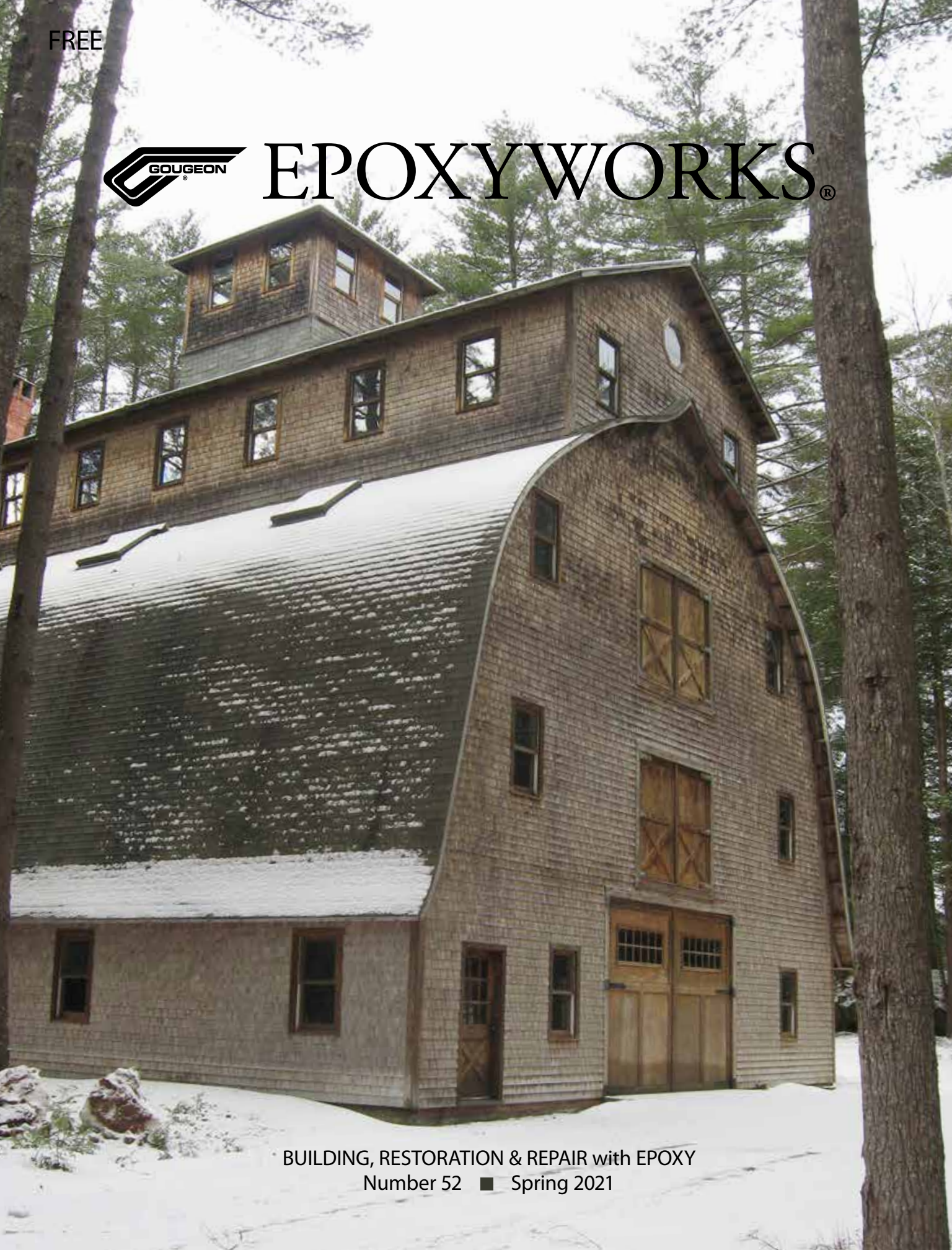

BUILDING, RESTORATION & REPAIR with EPOXY

Number 52 ■ Spring 2021

EPOXYWORKS®

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Big, Beautiful Barn

By Robert Garrison

I designed and, with the help of others, built my barn many years ago. While we didn't use epoxy in the construction, I've used WEST SYSTEM® many times to make repairs and modifications. Much of this was needed because the construction crew didn't follow the design instructions.

The fourth floor of the building is a 24' wide by 60' long clear-span room. The weight of the roof, cupola, and sometimes a lot of snow, are held up by six trusses. I strengthened the trusses by adding the missing gussets, adding additional lumber to some parts, and strengthening weak spots in the grade F lumber I'd used.

I designed and had made some steel supports that could be attached to the lower ends of the top beams. The steel plate is ⅛" thick and the threaded bolt attachment block is welded in place. The back of the plates were all sandblasted just before installation.

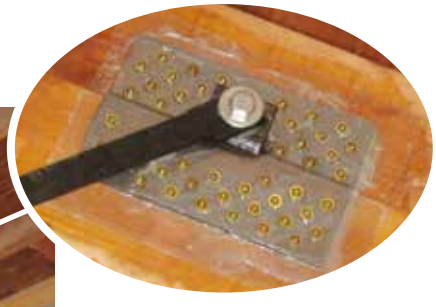
The plates were attached by coating the beam with epoxy, adding a 4" x 12" piece of fiberglass tape to the top and bottom and then bonding the metal plate to the roof beam with WEST SYSTEM 105 Epoxy Resin® and 209 Extra Slow Hardener thickened with 404 High-Density Adhesive Filler.

A 1.25"-long #8 screw was put through each hole and into the roof beam while the epoxy was still wet. The 4" glass tape was added to help spread the load on the wood. There is another identical plate on the opposite side of the beam. There are four plates used on each truss assembly, two per side. Attached to each plate is a ¼" x 1" steel bar which in turn is attached to a ¾" diameter steel tensioning rod and assembly. The tensioning assemblies are epoxy-bonded to wooden blocks. These wooden blocks are free to slide on the bottom of the horizontal truss beams during tensioning. The sliding blocks push up on the roof above and pull the walls together at the same time.

Cover Photo: Robert Garrison's barn. The trusses were reinforced with WEST SYSTEM Epoxy.

The trusses were strengthened by adding the missing gussets, additional lumber, and strengthening weak spots in the grade F lumber used.

A close-up of one of the sliding blocks that connect it all together. The sliding blocks push up on the roof above and pull the walls together at the same time.



An ⅛" custom steel support. The back was sandblasted before installation for better adhesion to the fiberglass.

The tensioning assembly.

Unfortunately, the top beams and the bottom beams of the trusses running all the way across the room were assembled by just nailing the parts of the trusses together. All of that was supposed to be screwed and glued. I am not sure why it didn't fall down. The main weak link was the joint at each end of the horizontal tie beam from one side to the other and the top beams that go up to the peak. There can be many tons of force trying to push the walls apart. The rest of this tale is about what I did, with the help of WEST SYSTEM Epoxy, to hold the walls together and help hold up the roof.

Now the weak link in all of this is the wooden purlins but since they survived for over 25 years without much assistance, I think I don't have to worry anymore.

Something to consider when combining wood and steel in a structure is that steel has about twice as much thermal expansion as wood. You have to make the steel thin enough so that when it gets cold the shrinking steel doesn't crush the wood or break things. Luckily, steel makes a good spring if you don't make it too thick.

Coating Small Parts

By Russell Brown

There are many ways to support small parts for coating. The most important aspect is to allow good access to all the surfaces that need to be coated.

Pre-finishing parts with WEST SYSTEM® Epoxy before installation is a technique that was popularized by guess who? The Gougeon brothers. It can save time and increase the quality of the finish. Coating small parts can also be a challenge, but it's much easier if the parts are held in a way that provides good access for roller and brush coating.

Our Port Townsend Watercraft dinghy kits have a lot of small parts; foot braces, oarlock riser blocks, alignment clips, daggerboard trunk cap, etc. Some of these parts must be pre-finished before installation, but I find that even parts that could be done later are often easier to finish before installing.

When fixturing (holding) the parts for coating, allow good access to the surfaces that need coating and provide a base that can hold the part upright and be used as a handle. There are many ways to do this, but I often use a hot melt glue gun, scrap plywood, nails, screws, and dowels to make bases for the parts.

Some of the parts shown are affixed to a base (a strip of scrap plywood) with nails. The nails were tapped into pre-drilled holes in the bottom of the parts and then the heads of the nails were bonded to the base with hot-melt glue.

Small sticks and hot-melt glue could be used instead of nails, but good access to the surfaces and the ability to get the surfaces clean, especially before the final coat, is important.

Why use a roller for such little parts? Because the roller can apply a very even coating of epoxy

quickly. The roller must be evenly saturated with an appropriate amount of epoxy to achieve a consistent film thickness. Using a palette made from scrap plywood (instead of a roller pan) for wetting the roller allows the most control and limits waste. The palette can be "nurtured" by rolling the remaining epoxy all the way to the edges every time it is used. To get even saturation, pour a puddle of epoxy on the palette, 105 Epoxy Resin® with 207 Special Clear Hardener™ for a clear finish, and then pull epoxy from the edge of the puddle with the roller to form a "ramp" of wet epoxy on the palette.

Using a roller cover that's just wide enough for the job can reduce waste of epoxy and covers. Roller covers can be cut to different lengths using a bandsaw, fine-tooth pull-saw, or even a sharp knife if you are brave. A roller frame without the cage is necessary for narrow roller covers.

How much epoxy should you apply? Too much and it will run, forming drips or a bead along the lower edge of the part. Too little and it won't add much film thickness and won't flow out to a glossy surface.

For the epoxy to flow to a shiny, varnish-like surface it must be tipped. Foam brushes work well for tipping. I wet both sides of the end of the brush lightly (on the palette) before use and brush from the middle toward the ends to maintain film thickness on the ends of the part.

Wooden parts that are meant to look good need to have all scratches removed with fine sandpaper before the first coat and should be sanded between coats as well. Using fine (180-220 grit) sandpaper between coats helps prevent sanding through the coating. (Note: 80-grit sandpaper is recommended when preparing surfaces for structural bonds.) Edges and corners should be sanded very lightly or prepared with small pieces of maroon-colored abrasive pad (made by either 3M® or Mirka®). When coating wood, the first coat will raise the grain, meaning the surface will be a bit rough and require some sanding before you apply the second coat. I usually plan on three coats, but prep for the final coat should require only very light sanding, or even just removing the gloss with an abrasive pad.

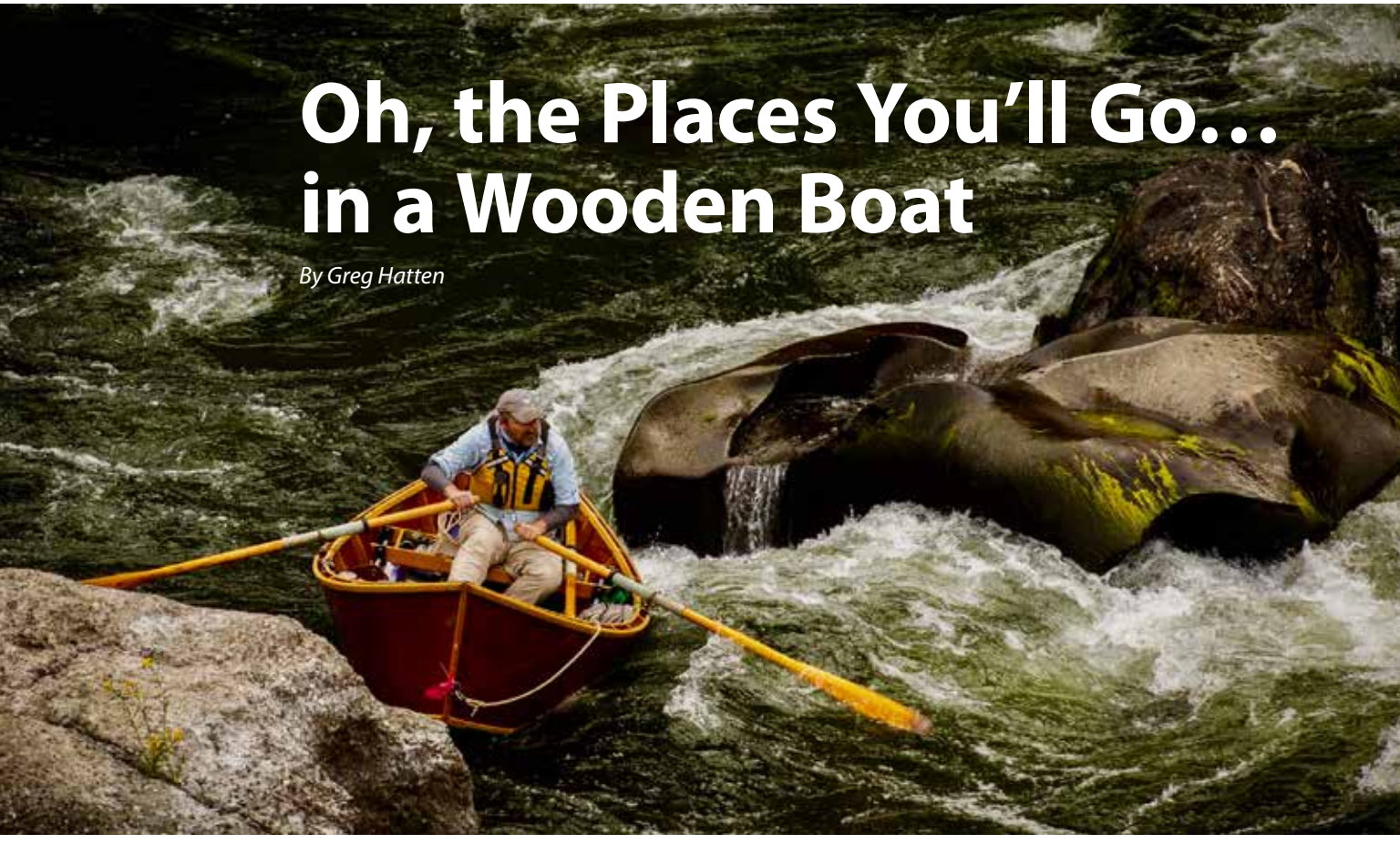
Techniques that I use for bonding these small parts in place will be the focus of my next submission to *Epoxyworks*.

Left: To limit waste, use a scrap of plywood, and cut the roller down to the size you need. Middle: The support screws were hot glued on top of the plywood base giving maximum height for coating. Right: This small part was hot glued to a small support block.

Left: The part is sanded between coats of 105/207 with a fine grit sandpaper for a smoother finish. Middle: The roller provides the most even film thickness. Supports need to be tall enough so all sides can be coated. Right: Once the epoxy is rolled on, it should be tipped with a foam brush for a smooth finish.

Oh, the Places You'll Go… in a Wooden Boat

By Greg Hatten



Obsession fulfilling its purpose, charging down the rapids.

I was anxious the first time I took my handcrafted McKenzie-style drift boat to The Wooden Boat Festival in Port Townsend, Washington. Realizing that boat builders and woodworkers with discerning eyes would be inspecting the construction details of my boat over the course of four days was almost reason enough for me to create a "change of plans" and not go.

Almost.

After completing the construction of my mahogany drift boat with WEST SYSTEM® Epoxy several years ago, I placed a call to the director of the Port Townsend Festival, Kaci Cronkite, to see if there was a spot to display a 16' riverboat at the festival. The Wooden Boat Festival is one of the biggest festivals of this type in the United States. I hoped there would be a place for my river dory among the sea of saltwater wooden boats participating in the water and on the wharf. Kaci's enthusiasm for wooden boat diversity was contagious. I signed up without thinking of the potential ego-bruising that might accompany my participation.

As the date neared, my anxiety grew. I obsessed over all the small things I couldn't possibly correct or do-over before the event. I finally resigned myself to a "come as you are" strategy and hoped they would extend a little grace to a first-time boat builder.

Turns out, I was anxious for nothing… I was welcomed warmly by a great community of wooden boat enthusiasts who enjoyed seeing a boat that was unique and slightly out of context with the big beautiful saltwater boats surrounding it.

That was the beginning of a long-standing relationship with Port Townsend. I fell in love with the festival, the town, the people, the culture,

Festival goers admiring the craftsmanship.

the boat builders, the craft, the performers, the volunteers, the food, the singalong shanties... everything! It's quite something really. Each year at the festival, I gave presentations on wild and scenic rivers, treacherous rapids, and the remote adventures to explore in a handcrafted wooden boat.

While those freshwater adventures in a riverboat are very different from sailing in the vastness of the salty sea, the common thread is wooden boats and the art of building them. Whether rowing through the chaos of the Grand Canyon on the Colorado River or sailing through Cook's Strait between the North and South Islands of New Zealand—if you were the builder of the wooden boat you command—there is a special connection to the past, the environment, the art of navigation, the water, and the boat itself. It's said that wooden boats have a soul shaped by the builder and forged by the water. I totally believe that. Freshwater or saltwater makes no difference. The builder and the boat are connected in a very intimate way.

In 2019, I was invited to give my Wild and Scenic presentation on the Adventure Stage at the Australian Wooden Boat Festival in Hobart. It's one of the world's largest wooden boat festivals, with a bunch of American wooden boat builders. I jumped at the opportunity. And when the festival director asked if they could ship my handcrafted boat in a container all the way to Hobart, Tasmania so the folks there could see the heart and soul of a McKenzie-style drift boat, I said yes before he finished the request.

The estimated crowd for that festival was over 300,000 but I had less anxiety than I'd had fifteen years earlier in Port Townsend for a crowd of 30,000. There are many similarities between the festivals—mostly the warmth of the people we met. Every day of the festival, I stood beside my boat in the U.S. Pavilion, pointing out the features of the drift boat and describing how it moves like a sports car in whitewater. I let them sit in the rower's seat, grip the oars, and helped them imagine leveraging the power of the river to turn the boat on a dime and avoid disaster.

I told them what it's like to row a wooden boat on our wild and scenic rivers and how the rivers are as fragile as the wooden boats we row. Take your eye off the ball for one second and you could lose your boat to a river rock or boulder. Take your eye off the wild rivers and risk losing them to a dam, tram, casino or any number of things that threaten our greatest natural resources.

In turn, they told me about the Huon pine tree that grows wild only in the wet temperate rain forests of southwest Tasmania. It's a slow-growth tree prized among boat builders because it is impervious to insects and highly waterproof. The 16th through 19th centuries were the "Age of Sail" when many wooden sailboats were built. During that time, Huon pine trees were harvested to near extinction. They are now protected from any harvesting. Ironically, about the only way to obtain Huon pine today is from the bottom of Lake Gordon where tons of ancient logs were buried when the Gordon Dam was built in 1974.

Interior view of the river dory Obsession.

Table made out of Huon pine from the forests of southwest Tasmania.

In remembrance of the Australian Wooden Boat Festival and Tasmania, I was given a small slab of Huon pine that had been recovered from the bottom of Lake Gordon. The little side table I built from it is a prized possession and a constant reminder of how fragile our natural resources are around the world.

I will continue to row with passion and write with purpose about our wooden boats on wild and scenic rivers. Perhaps one day I'll return to the Australian Wooden Boat Festival. One thing is for sure: Every September you will find me and my riverboats in Port Townsend, most likely on the Adventure Stage showing videos and photographs of the amazing places a wooden boat can take you.

Profile of Obsession.

The Restoration of a 1957 Fiberglass Runabout

By Bill Bauer

I acquired this 1957 MFG 15 fiberglass runabout in 2017. The previous owner had started to restore it but did not finish. When I first got the boat it was just a hull and a bunch of parts. A neighbor, Kami, and I work on it on weekends at Black River Boat Shop when we both are available.

Many of the ribs had separated from the hull. We reattached them with Six10® Thickened Epoxy Adhesive and some creative clamping. This, along with the outside coating of epoxy, stiffened the hull considerably.

We hope to finish this project before Kami is out of college (2028).

Applying three coats of WEST SYSTEM® 105 Epoxy Resin®/205 Fast Hardener.

After applying the first coat of George Kirby Jr. #33 Dark Blue® paint to the boat's exterior.

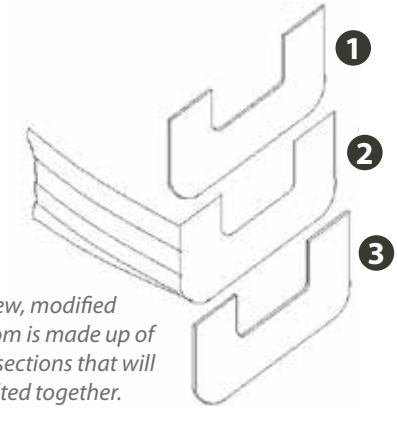
The inside of the boat cleaned, sanded, and ready for paint.

The new teak and holly foredeck with three coats of WEST SYSTEM 105 Resin/207 Special Clear Hardener® and seven coats of Captain's Varnish 1015.

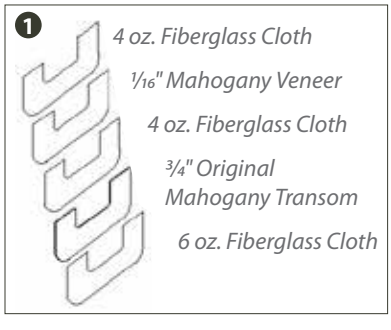
Repairing and glassing of the transom. The original transom was made up of two mahogany sections bolted onto the thin fiberglass hull's transom.

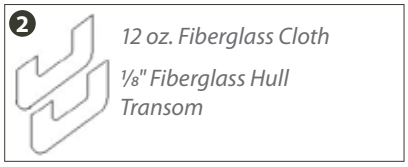
The cockpit dashboard with three coats of WEST SYSTEM 105/207 and seven coats of varnish.

Prepping the gunwales and stringers for epoxy and varnish.



The new, modified transom is made up of three sections that will be bolted together.





Stormy Weather

By Lorraine Murray, ATL Composites

Denman Marine in Kettering, Tasmania built and recently launched *Stormy Weather*, an East Coast 32. Renowned naval architect Andy Dovell designed the boat primarily as a day boat but included accommodations for overnights at harbor or short coastal cruising in good weather. She features traditional styling including a plumb stem and curved, raked transom. The Western Red Cedar strip hull is constructed with modern materials including multiaxial E-glass and WEST SYSTEM® Epoxy, resulting in a strong, lightweight, and easily handled boat.

The cabin has an open flow and uncluttered interior, especially between the cockpit and forward cabin area. The low-maintenance exterior finish incorporates Awlcraft® 2000, a two-part premium acrylic urethane finish, and Awlwood Primer/Clear Finish for beautiful, high-gloss brightwork.

A 150 hp six-cylinder Steyr turbo diesel coupled with a 5-blade CNC milled propeller power *Stormy Weather* to a top speed of just under 20 kts, and allow for comfortable cruising in the mid-teens. The flare and extension of the forward chine keep the boat dry in choppy conditions and her fine entry ensures no pounding. Her initial delivery to Sydney across the Bass Strait in rough conditions proved she is a dry and capable sea boat.

The main cabin area has two helm seats, a settee/daybed to port, and a small galley to starboard with plenty of storage. There are two good-sized berths in the forward cabin, as well as an enclosed head. Hot water is available for the galley and stern shower.

For overnighting, the saloon area can be isolated from the aft cockpit with the removable partition. A transom door provides access to the large teak swim platform and boarding ladder, making it easy to get back aboard after a swim.

Stormy Weather is a beautiful vessel—perfect for day trips while offering comfortable accommodations and practical living spaces for the occasional weekend away.

Stormy Weather, an East Coast 32 designed by Dovell Naval Architects and built by Denman Marine.

SPECIFICATIONS

- **LOA** – 10.8 m (35')
- **LWL** – 9.51 m (31')
- **Beam** – 3.065 m (10')
- **Draft** – 0.75 m (2.5')
- **Engine** – Steyr SE156E26, six-cylinder 150 hp turbo diesel

Dovell Naval Architects - dovellnavalarchitects.com.au
Denman Marine - denmanmarine.com.au

Repairing Gelcoat Cracks

By Terry Monville - GBI Technical Advisor

Knowing how or why your boat's gelcoat cracks occurred in the first place is the key to a successful repair. For example, if hitting a seawall or dropping a champagne bottle on deck is what caused the cracks, after fixing them you will know how to prevent them in the future: Don't drink the champagne causing you to hit the seawall and drop the bottle.

Then there are those cracks that seem to appear in the gelcoat from nowhere: in cabin and cockpit corners, around screw holes, or in the middle of the deck. It can be difficult to figure out what caused them.

So, what is gelcoat?

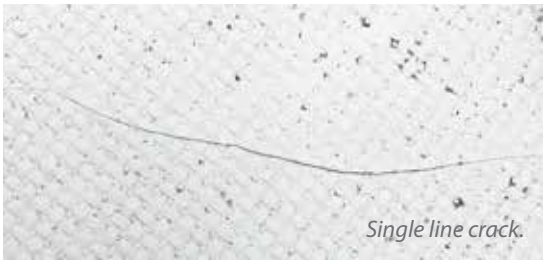
Gelcoat is a pigmented, high-quality polyester resin used as the finish on fiberglass boats. Like any other polyester resin, it has good points and bad. Let's look at some of the bad points that lead to cracking.

After it's applied, gelcoat shrinks 4 to 7 percent during the cure and can have less than 1 percent elongation. This contributes to gelcoat's nice hard finish which we like, but also makes gelcoat brittle, particularly if it was applied thicker than recommended.

Gelcoat should be about 20 mils (.020 of an inch) thick when the manufacturer properly applies it to the mold. But when the builder sprays gelcoat on the mold of a boat deck with cabin top corners and seat backs, the edges tend to get more than needed. Or the gelcoat runs down and builds up in an inside corner, or too much or too little gelcoat gets sprayed on the whole mold.

Minor Single Line Cracks

Thick areas of gelcoat don't have reinforcing fabric to help hold it together. The stress is relieved in the form of a crack. This can happen when the part is pulled from the mold or years down the road, where a little more stress is introduced from the part flexing. Generally, these cracks will appear as single line cracks in the cabin or cockpit. This type of cracking is hard to avoid and is part of boat ownership. Luckily, the repair is simple and straightforward, as I'll explain later.



Single line crack.

Another common crack is a screw hole crack: a hairline crack or two coming from a piece of deck hardware. This can happen after a self-tapping or sheet metal screw is used to add a piece of hardware, even if you've used a proper pilot hole for the screw. The threads on the screw create pressure on the gelcoat causing it to crack. Not using a pilot hole, or using one that is too small, will create even more of an issue. They are often seen around snaps for canvas and beverage holders. When mounting hardware with self-tapping screws, you should drill the pilot hole and then countersink to remove the gel-coat to the threads' diameter. This will prevent the threads from creating pressure on the gelcoat and make a small pocket for sealant to help seal the screw.

Repairing Minor Cracks

1. Use a rotary tool or scraping tool to open the crack into a "V" shape. You will need to go through the gelcoat to the fiberglass and open the full length of the crack. Next, use 80-grit sandpaper to scuff up the opening you created. Fold the sandpaper so you can get a corner of it into the opened crack.

2. After removing the dust, you can fill the crack with G/flex® 655, Six10® or WEST SYSTEM 105 Epoxy Resin®/20X Hardener thickened with 406 Colloidal Silica Adhesive Filler.

3. After the epoxy has fully cured, wash it with water to remove any amine blush. The blush is water-soluble, which means water is the best option to remove it. You can now sand and apply a color matching gelcoat to the area.

If the cracks were caused by fiberglass flexing, add some fiberglass reinforcement to the backside to help prevent future cracks.

If a screw hole repair has a fiberglass core behind it, seal the core with epoxy. With balsa or foam core, use a bent nail to remove a small amount of core from behind the fiberglass, then fill the area with 105/20X thickened with 404 High-Density Adhesive Filler. For plywood or other wood core, make an oversized hole and fill it with 105/20X and 404 High-Density filler. Both methods provide a good seal on the core and more holding strength for

Stress crack at the corner of a companionway.

the fasteners. For greater detail on fastener bonding, read the *Fiberglass Boat Repair & Maintenance* manual's section on hardware bonding or visit westsystem.com/hardware-bonding.

Stress Cracking

A concentrated group of cracks generally running in the same direction indicates a more severe problem. This is often found on the leading edge of the cabin top where it meets the deck. This can be the result of a high flex area enduring heavy seas, or too much load on the boat. Cracks may also form at a bulkhead or other hard spots behind the fiberglass when the boat flexes, creating pressure.

To repair this type of cracking, remove the gelcoat from the area and inspect the fiberglass for deeper cracks. Simply wipe the area with a wet cloth so the cracks or fractured fiberglass will appear as white lines in the laminate.

Continue until the fractured laminate is removed, then do a traditional fiberglass repair following these steps:

1. Grind out the area to a taper of 12 to 1 from the deepest point.

2. Cut fiberglass patches starting with the largest first, working your way smaller to fill the area that has been ground away.

3. Using WEST SYSTEM Epoxy, wet out the fiberglass pieces and apply them to the repair area, starting with the largest patch first and working your way to the smallest. Let the epoxy cure.

4. Wash the area with water and a nylon scrub pad to remove any amine blush, and sand the repair fair with the surrounding area. If there are low spots, thicken WEST SYSTEM Epoxy with 407 Low-Density Fairing Filler and use it as a fairing compound to fill in low areas. Let the epoxy cure, wash it, and sand it to shape.

5. After final fairing, apply two coats of unthickened WEST SYSTEM Epoxy to seal the repair area.

6. Wash and sand the cured seal coat of epoxy then apply a topcoat of paint or gelcoat. See *Fiberglass Boat Repair & Maintenance*, pages 19-25 for detailed instructions.

Thermal Fatigue Cracks

The environment can dramatically affect gelcoat. Wax can protect it from fading but there is no way to protect gelcoat against the repetitive expansion and contraction of temperature change. This movement can cause cracking, which may appear in a parallel or a random pattern.

Parallel patterned cracks will vary in length from short to several inches and are a few to several inches apart. I have heard them referred to as old age cracks. Often these are caused by an expansion of the deck laminate, making the gelcoat more susceptible to flexural stress.

Short, random cracks are also referred to as gelcoat crazing. Crazing can be localized to a small area or completely cover a deck. I have seen cockpit soles that remind me of a shattered car window. Crazing is caused by the gelcoat expanding and contracting over a given area.

We get customer calls asking if sanding the gelcoat and rolling epoxy over it will fill the cracks and prevent them from returning. Sadly, the answer is no. Cracked gelcoat should be removed. After gelcoat removal, sand the fiberglass laminate with 80-grit sandpaper. After sanding, make any needed repairs to the area. Roll on a minimum of three coats of WEST SYSTEM® Epoxy to seal the fiberglass before applying a finish coat of paint or gelcoat.

Crazing

When gelcoat cracking is a symptom of another problem, repairing the crack and not repairing the underlying cause could lead to repeated cracking. In the case of a thick gelcoat, thinning the gelcoat is not practical.

After the repairs are completed, some boats remain crack-free for years. Taking your time and doing the job right will pay dividends in time and money.

Our *Fiberglass Boat Repair & Maintenance* manual has illustrated instructions on many aspects of fiberglass boat repair, including gelcoat repairs. It's available for free download in the instruction section on westsystem.com.

Boat in a Box

By ATL Composites

The compact offshore racing boat known as the Globe Mini 5.80 is the brainchild of adventurer and sailing legend, Don McIntyre. This boat design is taking off all over the world in the form of a DIY kit constructed with plywood and WEST SYSTEM® Epoxy.

The new International One Design Class of plywood Mini 5.8-meter (19') yachts is aimed at "home builders and adventurous racing sailors," according to McIntyre. "The Mini 5.80 is for all sailors, young and old, who have a dream to sail oceans in small, fun, affordable, and proven-safe, ocean-going yachts," he says.

"Simple plywood construction means anyone can build this Mini in a few months, or your local shipwright can do it for you. It all fits inside a 20-foot container for shipping to or from international events. The mast has a sleeve to allow two-piece shipping and removing the keel and rudder is simple. It can be taken home on a trailer by an ordinary family car."

Less than four months after its official launch in April of 2020, eighty sailors have signed up to build one in twenty-three countries. Conceived by McIntyre, founder of the 2018 Golden Globe Race as an affordable "People's Mini" for amateur construction, this solo ocean and offshore racing yacht is proving popular.

Globe Mini 5.80

A whole new segment of sailors is embracing the benefits of a simpler and more sustainable challenge, says McIntyre. "The idea of an affordable wholesome, back to basics, non-foiling and safe mini yacht, able to sail anywhere, has great appeal. Being easy to build, own and maintain, then offering fun yet serious one-design sailing, seems to have hit the spot. Adventurous solo sailors are excited, but there are plenty of club racers who see this as an opportunity for some fun."

International

TECHNICAL DATA

- **Length Overall** – 5.80 m (19')
- **Hull Length** – 5.70 m (18.7')
- **Width** – 2.27 m (7.4')
- **Draft** – 1.40 m (4.6')
- **Weight** – 700 kg (1,543 lb)
- **Keel Ballast** – 220 kg (485 lb)
- **Deck** – 8 mm Plywood (0.3")
- **Hull** – 20 mm & 10 mm Plywood (8.0" & 0.4")
- **Twin Running Dagger-boards**
- **Mainsail** – 12.5 m^2 / 9.9 m^2 / 7.2 m^2 / 4.4 m^2 (134.5 ft^2 / 106.5 ft^2 / 77.5 ft^2 / 47.4 ft^2)
- **Jib** – 7.6 m^2 / 4.7 m^2 (82 ft^2 / 51 ft^2)
- **Storm Jib** – 1.6 m^2 / 0.9 m^2 (17 ft^2 / 10 ft^2)
- **Gennaker** – 25 m^2 (269 ft^2)

All kits are cut using a CNC machine.

fleets are expected to appear over the next few years. "The yacht is creating real interest and new opportunities traveling to Europe for the 2021 Globe 5.80 Transat and Mini Globe Race in 2024," he adds.

The concept is simple: "Building plans (Euro $300), hand tools, plywood, WEST SYSTEM® Epoxy, then clear out the garage and start building your Globe 5.80. Build time is approximately 500 to 600 hours."

Ten sailmakers are currently under review to select an exclusive one design sail supplier to the 5.80 Class for the next five years. This will deliver identical high-quality racing sails at a realistic price to all sailors through economies of scale. It also caps cost, leveling the playing field and ensuring even competition, whether sponsored or unsponsored.

CNC kit suppliers have been established in 15

CNC cutting the kit pieces.

countries, including Australia.

Andrew Denman of Denman Marine in Kettering, Tasmania, has been appointed the Australian kit agent and is CNC-cutting kits and keel bulbs for the fast-growing fleet.

"We have supplied two kits so far and have another one in the pipeline."

According to the founder of the Class 5.80, Don McIntyre, the boat was designed as an offshore-capable mini which will appeal to many, including the hardcore single-handed enthusiast.

"Class racing in small boats like this has proved very popular internationally but the types of hi-tech vessels used would normally be out of reach budget-wise for most people," adds Andrew. "The use of plywood, fiberglass and WEST SYSTEM Epoxy in a simple but strong structure brings the costs within reach of many more people."

Andrew is supplying the kits and recommending WEST SYSTEM Epoxy, which he says is the ideal base for structural bonding, coving applications, and for coating and sheathing the plywood.

Internationally regarded as the leading marine epoxy, WEST SYSTEM is easy for the amateur builder to work with. The *WEST SYSTEM User Manual* provides basic epoxy techniques to help ensure user success.

The boats are made of Lloyd's certified marine plywood, solid timber cleating and stringers, sheathed in fiberglass and epoxy. They are solid, sturdy and strong. The result should be a durable, low-maintenance watercraft.

The Solo Globe 5.80 Transat is the first major event for the 5.80 Class. Host port partners are expected to be announced in the next few months and already there are thirteen expressions of interest from around the world. "There's an ambitious calendar of events for this little boat," says Andrew. "If anybody's going to pull it off, it's Don."

CNC cutting the keel bulb.

Since 1969 Gougeon Brothers, Inc., manufacturers of WEST SYSTEM Epoxy, have guided amateur boat builders through their wood and WEST SYSTEM Epoxy projects. Have questions? Call our Technical Department at 866-937-8797.

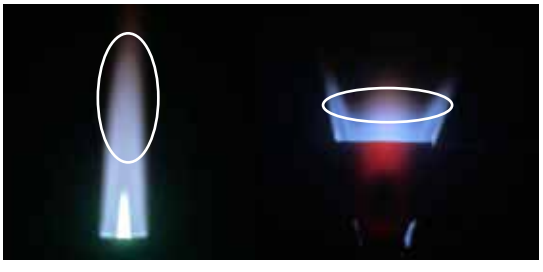
Flame Treating Plastics

By Terry Monville - GBI Technical Advisor

It's no secret that bonding to plastic can be a challenge. Identifying what type of plastic you are working with—ABS, PVC, HDPE, LDPE, UHMWPE, and this list goes on—is your first step.

When bonding to plastic (we recommend G/flex Epoxy) surface preparation is the key. With most plastics, you achieve a higher bond strength with just an alcohol wipe and flame treatment than you would with the typical solvent wipe and sanding method required for most substrates. For example, PVC allows for an acceptable bond with a suitable solvent wipe and sanding with 80-grit sandpaper, but adhesion can be improved with flame treating. Plastics such as ABS greatly benefit from flame treating. And, for HDPE, flame treating is required, otherwise could peel the epoxy off with your fingers.

The directions that come with G/flex list how to prepare the surface for different plastics and other hard to bond materials. If you are in doubt about what type of plastic you are working with, sand, alcohol wipe, and flame treat for surface prep. The bond will not be impaired by the flame treatment for the plastics that do not need it.



On the left is a typical propane torch flame. On the right is one with a flame spreader attachment. The highlighted sections indicated the optimal zone for flame treating plastics.

Flame Treating Plastic to Improve Adhesion

Flame treatment is applying the exhaust from a gas flame to the surface of a material to improve adhesion.

To flame treat a plastic surface, hold a propane torch so the flame just touches the surface and move it across the surface at a rate of 12 to 16 inches per second. Keep the torch moving and overlap the previous pass slightly. Make two or three passes over the bonding area with the flame for a total of one second of exposure. When done correctly, the surface will not discolor or burn. This technique oxidizes the surface, improving adhesion without a visible change in the surface. For the best adhesion, apply the epoxy to the surface within 30 minutes of the flame treatment. The surface oxidation from the flame treatment does dissipate over time.

The flame treatment needs to be done with a flame; a heat gun will not work. At GBI we do all our characterization using a propane torch, but you can also use butane, M.A.A.P, or natural gas. Use the tip of the flame when flame treating. You can use a flame spreader to help cover more area. The flame spreader that I used created a "W" shape to the flame. Ensure the torch is close enough that the low part of the flame touches the plastic surface.

Water Break Test

The best way to test if the flame treatment was effective is with a water break test.

Oxidizing the plastic surface with a flame changes the surface from a low-energy surface to a high-energy surface. An excellent example of a low-energy surface is a waxed hood of a car. Water beads up and rolls off. An unwaxed hood would be a high-energy surface. Water sheets out, wetting the surface.

In the images below, I used blue dye in the water to make the effect on the surface before and after flame treating more obvious.

Our best product for adhering to plastics is our G/Flex Epoxy. Available in both liquid (G/flex 650) and thickened (G/flex 655), it's a great solution to many repairs and projects with plastics.

This article is focused on bonding to solid plastic materials. When bonding a plastic fabric like Hypalon or PVC, we do not recommend flame treating the fabric surface. A simple solvent wipe and sanding with 80-grit will be the most effective on these fabric surfaces.

You can have confidence in your plastic repair or project when flame treating the surface and using our G/Flex adhesive. Flame treating solid plastic surfaces will improve the adhesion of epoxy, paint and more.

Top: One half of a plastic board was flame treated and the other half was left natural. Water, with blue dye added for contrast, was applied. The natural side beads up ; the flame treated side sheets out.

Bottom: The same board from above was wiped clean and left for an hour. The dyed water was then reapplied. The flame treatment is wearing off; the water beads up on both sides.

New!

G/flex® 655 Epoxy Now in a Convenient Dual-Syringe

Versatile G/flex Thickened Epoxy Adhesive is now available in a convenient dispensing syringe. The G/flex 655-1 syringe contains 0.42 oz. of resin and 0.42 oz. of hardener, the perfect amount to keep on hand for small repair jobs. Depressing the plunger on the dual syringe dispenses the proper 1:1 ratio of G/flex resin and hardener.

This new product became available through West System® retailers January 1, 2021.

G/flex 655 is a 2-part, pre-thickened epoxy system that bonds tenaciously to plastics including HDPE, LDPE, ABS, PVC, Polycarbonate, and Hypalon. Its viscosity is similar to gel toothpaste so it won't run or sag, even on vertical surfaces. The G/flex 655-1 syringe allows users to dispense the epoxy in very small quantities, providing big strength for little repairs.

This toughened epoxy makes permanent, waterproof structural bonds. It absorbs the stresses of expansion, contraction, shock, and vibration. In addition to its effectiveness in adhering to plastics, this formulation is also excellent for bonding metal, glass, masonry, and fiberglass. It even works great on typically hard-to-bond substrates including dense, oily or damp wood varieties.

We introduced G/flex in our West System product line in 2008 and this versatile epoxy has been popular among epoxy users ever since. G/flex 655 comes in a wide variety of sizes; the 655-1 syringe is the smallest. To learn more about G/flex epoxy, visit westsystem.com.

Go with the *Faux*

By Julie Jezowski - GBI Technical Department

River tables? Love them! Think they're cool… know I'd never have the patience to make one… too cheap to buy one.

Lately, I've been on a refurbish/re-do jag and am obsessed with Facebook Marketplace. Things I never even knew I needed I can find everywhere! It really is a curse (for my family) and a blessing (to me!).

After weeks of searching I found and bought a sweet sectional. I started visualizing the new living room layout and quickly was in search of a cool looking, round coffee table. It didn't take me long to score an outdated, glass-topped baby for $25! I figured, at that price I could not go wrong—but then something did.

As I was coming down from my bargain score high, it dawned on me….I cannot stand glass-topped coffee tables. No offense to all of the glass table lovers out there. They are beautiful. But apparently, my lifestyle is not conducive to maintaining a shiny, smudge-free tabletop. What to do? My brain immediately fired up in high gear on how to right this wrong. After the initial smoke cleared, I thought, how cool would it be to make this into a faux river table?

Research time! I didn't find a whole lot out there when I hit the internet for ideas such as mine, but had a plan in my head: veneer, colorants, and epoxy. I found inspiration in my beverage coasters, which then led me in the direction I wanted to go. I was excited to share my idea with my colleagues; they're all so knowledgeable and creative. I knew they would kindly let me know what was wrong with my idea and what I really should do. Here is what went down (literally):

I made a template for the veneers out of cardboard.

Prep and Templates

- I cleaned the glass with water then used 80-grit sandpaper to sand the shine off.
- In order to make templates for the veneer, I traced the glass on a piece of cardboard and cut out the shape.
- On the cardboard, I drew some random lines where I wanted the veneer to lay. This definitely was not an attempt at some amazing display of artistic talent. I have none, so I just winged it.
- With utility knife in hand, I cut the shapes out to create my templates.
- Using the cardboard templates as my guide, I then cut my veneer to shape. After a few failed attempts at using the same old blade that was in the knife, I switched it out for a brand spanking new blade. I'm telling you, sharp is definitely the key when cutting veneer. It made this process go soooo much easier. Live and learn!

I placed the veneers on the glass top to test placement.

Staging Area

- Once I had all of the veneer cut out, I did a dry run on the glass to see if I liked it. It was a bit tough for me to visualize the outcome of the final product. Yes, I could have spent some extra time creating a table "stunt double" in order to mess around with the design but that's just not my style. I opted for the crapshoot approach instead.
- This seemed like a good time to weigh down the veneer. Mine came on a roll and actually could've used a full day of being weighed down to keep it from rolling back up. But that would've meant waiting, and I was too excited to do such a silly thing.

The River of Chrome

- For the first layer, I mixed WEST SYSTEM® 105 Epoxy Resin® with 207 Special Clear Hardener® and then added a couple of colored powdered pigments of my liking. I realize colors in river tables are typically bright, most times translucent,

I poured 105/207 with pigments on the glass table top.

and look like a river. I was going more for an opaque, stone/chrome-type look to match my décor and the "river" is more of a tributary.

- After properly mixing the resin and hardener, I poured it over the glass and troweled it to ensure that the entire surface was sufficiently coated.
- I then "torched" the tabletop to alleviate any air bubbles that had formed (following the directions in *Epoxyworks 49*, "Casting Epoxy").
- At this time the veneer was still not lying flat (yes... I know why). I let the epoxy gel for approximately two hours so it would be nice and tacky and would grab ahold of the veneer better.

With the epoxy still tacky, I applied the veneers.

Get'cher Veneer On

- Time for the veneer! It's not like you can pick it up and keep moving it all over the place if you don't like the placement, so this was one of the most stressful parts for me. At some point, you just have to go for it and hope it's not another one of those "live and learn" experiences.
- As I put the veneer into place, I used blocks of wood to clamp around the outside area and placed weights (and other heavy things) on top of the veneer to keep it from rolling and lifting up.
- Once the veneer was in place, and the epoxy set up a little more, I removed the weights and poured the final coat of 105/207, tilting the glass to allow the epoxy to flow evenly to the edges.
- Just as with the initial coat, this coat was also followed by a nice, hot bath of fire with the propane torch to rid the epoxy of any bubbles that had formed.

After sanding to 320-grit, I applied polyurethane over top.

Grand Finale!

- After letting the epoxy cure over the weekend, I sanded the crap out of it with an orbital sander. First I used 100-grit to get the rough patches out, then 320-grit to smooth it out and to help hide all the scratches I'd made with the 100-grit (doh!). Note to self: keep the sander level and do not go all balls-to-the-wall in one spot. Yet another one of those annoying, yet informative, "live and learn" moments.
- To remove the sanding residue, I wiped the surface down with a plain paper towel and a tack cloth.
- Last but not least, I applied two thin coats of polyurethane over the top, sanding with a 3M Scotch-Brite™ General Purpose Hand Pad in between coats.

Bam! Is it perfect? Well, of course not. This is my first crack at anything like this and there are definitely things I'd change, but it was fun to make! If you have a glass table and find yourself cleaning it more than enjoying it, you can do this too. Just let your imagination lead you to your inspiration.

The final table perfectly matches my decor.

Swirl patterns in the cured epoxy.

The Art of Choosing a Topcoat

By Rachael Geerts - GBI Composites Materials Engineer

You've just finished your epoxy project and it looks great! But you don't want the sun's UV rays to start degrading the epoxy. So, like the smart individual you are, you look into applying a UV stable topcoat over the epoxy so your project will last for years to come. You look at your options, go down a few rabbit holes, and come out much later asking why is it so difficult to select a UV stable topcoat for my epoxy project?

The answer: because so many options are compatible with WEST SYSTEM® Epoxy. We've had success in applying everything from latex paint and oil-based varnish to two-part polyurethanes and polyester gelcoats. But some key points need to be addressed before you start applying a UV stable topcoat over WEST SYSTEM Epoxy.

Application Tips

First, we recommend allowing our epoxy to cure fully before applying your topcoat (we'll go over how to select one later). Some people have successfully applied various topcoats over our epoxy before it has cured to a solid state. This is risky and we don't recommend it because we haven't been able to get consistent results when testing it ourselves. The topcoat may contain solvents or other chemicals that could interfere with the epoxy's curing reaction or affect the finish's performance. Our goal is to help you succeed, so we recommend allowing the epoxy to cure fully before you apply a UV protective topcoat.

Once the epoxy is cured, you will need to remove any amine blush. Amine blush is an oily or waxy film that forms on the epoxy's surface as a byproduct of the curing reaction. If you used 105 Epoxy Resin® with 207 Special Clear Hardener®, you can skip this step because this combination is blush-free. One-part polyurethanes tend to be particularly sensitive to amine blush, so make sure to wash the cured epoxy surface thoroughly or use 105/207.

Amine blush is water-soluble and can be removed from the surface with plain water and an abrasive pad (we use red 3M Scotch-Brite™ pads). The use of an abrasive pad will leave a matte finish when the blush is removed.

Always wash a newly cured epoxy surface before dry sanding. If you like, you can wet sand to remove the blush. Dry sanding without first cleaning the surface with water and an abrasive pad of some sort may sand the blush into the surface and cause adhesion failure for subsequent epoxy coats or UV-protective topcoats.

With the epoxy cured, and the amine blush removed, you can start on other surface prep.

Follow the cleaning, sanding, and priming recommendations in the topcoat manufacturer's instructions. They know what's needed for their product to perform best (e.g. adhere well and fill in sanding scratches). They should provide instructions on how to apply their product to a hard plastic or a fiberglass reinforced plastic (FRP) surface. At this stage in the project, that is what the epoxy is—a hard, inert plastic coating (and a very fine one at that).

Okay, so now you know what needs to happen before applying the UV stable topcoat, but continue reading if you still don't know which topcoat to apply.

Topcoat Selection

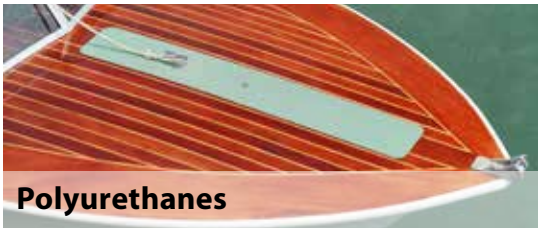
The good news is there are lots of options when selecting a UV stable topcoat to apply over your WEST SYSTEM Epoxy. As we cover the types of topcoats out there, keep in mind that we don't recommend any particular brand and have not tested every single brand in every shade/color and in every category. Therefore, this will be an overview of the different types of UV topcoats. We recommend coating a test piece or a test area before committing to applying your chosen UV stable topcoat to the whole project.

Water-Based Finishes

Some of the most common and easiest to use topcoats are water-based. As the name suggests, they use water as the carrier for dyes and pigments. The majority of house paints (think latex and acrylic paints) are water-based. These topcoats offer low-odor and safe solutions when working in confined or poorly ventilated spaces. They generally have good durability and are suitable if there isn't frequent water contact once the part is put in use. Another common water-based topcoat is water-based varnish, which is good for showing off the wood grain in your project.

Alkyd Finishes

The second type of UV stable topcoat available is alkyd finishes. More commonly known as oil-based finishes, this type includes oil-based varnishes, marine enamels, lacquers, and more. Similar to water-based products, oil-based products are named after the carrier of the dye or pigment which in this case is either a natural or a synthetic oil. Alkyd finishes generally are more durable, more resistant to moisture, have high gloss, and are cheaper than water-based finishes, but they also generally contain more solvent. Because of the solvents, you should make sure you only use them where you can maintain appropriate ventilation. As with water-based topcoats, there are options for opaque and transparent color.



Polyurethanes

Polyurethanes are an increasingly popular option for a UV stable topcoat. They are available in one-part and two-parts. Often, polyurethanes are more durable than the other topcoats discussed so far and resist UV better than other transparent or translucent topcoats.

Unlike the previous topcoats, polyurethanes don't get their name from the carrier. The term polyurethane actually refers to the polymer coating that forms when the material cures/dries on the surface. One-part polys have the advantages of being easier to use and are usually less expensive than two-part polys. However, two-part polyurethanes generally last longer and have better final high-gloss finishes than one-part polyurethanes.

Bottom Paints

Bottom paints also provide a UV barrier for cured epoxy. Now you may be thinking, "It's the bottom of the boat; it will be in the water so it won't see sunlight and it won't need a topcoat." Are you ever planning to take the boat out of the water? Bottom paints do more than just provide a

Fiberglass boats often have a wide variety of topcoats. From polyurethanes on the teak woodwork to gelcoat and bottom paint on the hull.

UV barrier for the epoxy, they provide additional important benefits such as color, antifouling, etc.

There are plenty of bottom paints to choose from that can give you the antifouling properties you need and provide the UV barrier the epoxy needs. All common bottom paints work well with WEST SYSTEM products when applied following the application tips previously mentioned along with those provided by the paint manufacturer.

Polyester Gelcoats

Finally, there are polyester gelcoats. There have been many debates whether polyester gelcoats can go over epoxy, but we have found, if the epoxy is fully cured, it can. Gelcoats are so popular because production boat manufacturers can make perfect Class A molds, spray gelcoat in the mold, laminate or infuse the boat and pull it out of the mold. When they pull the boat out of the mold there is no finish work to do. That works well when you have a lot of boats to make, as finish work can take a lot of time. They use in-mold gelcoats because they can laminate with polyester resin behind the gelcoat allowing it to cure properly. You see, in-mold gelcoats need a certain amount of additional heat and the absence of air to cure properly. It is important to note that there are in-mold gelcoats (without wax) and repair gelcoats (with wax or patch booster). Repair gelcoats don't need the reaction heat that the in-mold gel coats do. This works in your favor when applying it over your cured epoxy repair.

Epoxies and polyesters don't like each other in the uncured phase. Once the epoxy is cured and the surface preparation instructions are followed, then (and only then) a repair gelcoat can be used over the epoxy. As with any other topcoat, we still recommend starting with a test piece. Many people have successfully gelcoated over their epoxy repair with a polyester gelcoat that contains wax.

All that being said, if you have a boat that has gelcoat on it and needs to be repaired with epoxy, you do not have to apply gelcoat over the repair. In many cases, especially above the waterline, it may be easier to find a marine grade paint that matches the color of the original gelcoat and paint the entire area.

There are many types of UV stable topcoats available to choose from. We have just scratched the surface of their strengths and weaknesses. But this should give you some direction when choosing among various UV-stable topcoats. And remember, with any topcoat, follow the steps listed in the manufacturer's application instructions.

Buster Welch of Clandeboye, Manitoba, Canada has had extensive experience with epoxy. He began with building a cedar strip canoe in 1973 after seeing one of Ted Moores's (Bear Mountain Boatworks) on display at the Toronto Boat Show. Since then, he has built or supervised the construction of another two dozen strip canoes. In the beginning, he fiberglassed with polyester but switched to WEST SYSTEM® Epoxy because it is much better at adhering to cedar. Welch has also built a 22' Bartender using stitch and glue construction with 24' long, scarfed plywood sheets.

Early on, Welch was taken with the idea of laminating to create unique and functional furniture. He's especially proud of his chair design that has proven surprisingly strong. At least eighteen of his chairs have been used heavily over the last 40 years, and only three of them have had minor failures. He has also used epoxy to coat eight tabletops for durability.

David S. Wilburn of Providence, Rhode Island was hired by a friend to laminate these hardwood surfaces. He used epoxy to fill the little voids and blemishes prior to wide-belt sanding. He'll be installing all ten of these surfaces in his friend's high-end butcher shop/restaurant in the near future.

Unlimited Canoe

By Donald Weir

Most of the projects featured in *Epoxyworks* are neat and have a high level of finish. For a creation that will be put in the ocean and beat on with sticks, that seemed too high of a standard. When building the Unlimited Canoe, we instead opted for durability and fast construction, not to mention cheap.

The bulk of the canoe is made from cedar strips, resawn from siding boards taken from my house during a remodeling project about 20 years ago. The plywood for the stations was from a crate that had contained two surf skis from Italy (almost a full ¾" thick and very flat). We built it on a strongback that was also used in the construction of four previous canoes, although none was a full 45' like the Unlimited Canoe. The expanded size of this canoe called for an additional 4'x8' sheet of ½" plywood and two additional legs.

My partner in the construction project provided the workspace and sprung for the carbon fiber cloth, which adds to the boat's strength. I bought the 7.5 oz glass cloth to cover the carbon fiber and provide a protective layer. We both contributed to the epoxy supplies: two containers of WEST SYSTEM® 105-C Epoxy Resin with 207-SC Special Clear Hardener and 209-SC Extra Slow Hardener. The initial build—from beginning to first water test—took us from June 2018 to Feb 2019. All the glue up was with WEST SYSTEM Epoxy which we mixed in a very few plastic cups (once the epoxy is cured it releases easily from the plastic so the cup can be reused). We added symmetrical strips of wood at both keel and gunwales to even out any stresses that might occur if it was built one side at a time. Each station had the edges covered with masking tape and a strip of 1" carbon tape stretched along it. My feeling is that this helps maintain the shape before the interior is covered with fiberglass fabric.

Top Left: Templates for the strongback cut out of remnants of a packing crate.

Above: The strongback had previously been used to build four other canoes, however stations were added to expand it to build the unlimited canoe.

Left: Laying up the keel.

Top Left: Inside of the canoe showing the cedar strip.

Bottom Left: The canoe was covered with a layer of carbon fiber to help give it rigidity, followed by a layer of fiberglass for protection.

Above: The inside of the canoe also had some carbon fiber reinforcement covered with a layer of fiberglass.

We also reused our plastic cups and disposable brushes to mix quantities of epoxy for wetting out the wood structure before applying the fiberglass. After draping the dry fabric over the surface, we poured liquid epoxy over it and used a plastic spreader to saturate the cloth, with one person mixing the resin and hardener, and another doing the spreading. It may be as solid as a vacuum-bagged hull.

The good thing about epoxy is that someone can mix quantities of 4 or 5 pump strokes while someone else applies the epoxy. A bit of moisture clouding (Hilo, Hawaii is seriously tropical) can occur as the epoxy cures, but it's not a problem for strength or cure time. For filler, we mixed sanding dust from the 120-grit belt sander as needed.

We used a lot of 2" blue Styrofoam in the seats and decks as well as in the ends for flotation in case the canoe capsizes

Initially, we had the ama at the very front of the canoe until torsional rigidity proved a problem and we've since moved it back. But, the ama is still forward of a typical six-person outrigger. Currently, we are playing with a hydrofoil on the ama and we have considered mounting a sail rig.

The Unlimited Canoe has been used regularly in practice with paddlers 10 to 14 years old who tend to beat on the watercraft a bit. There are seven seats because no one had a good concept of the balance for six paddlers. The seventh seat allows an adult to coach the six-person crew.

The boat is named *'Alala* after the Hawaiian crow, which is also very black. All-up weight is about 320 lbs., which is about 80 lbs. less than the 400 lbs. typical for a Hawaiian outrigger canoe.

The final canoe with ama attachment.

The completed Little Green Library on Green.

Weatherproofing my Little Free Library

By Grace Ombry

As a novelist and an avid reader, I was captivated by the Little Free Library® (LFL) movement from the moment I learned about it. In the summer of 2019, we set up one of our own and used WEST SYSTEM® Epoxy extensively to ensure that it would remain sturdy while keeping the elements out and the library books dry.

My original plan was to build my own LFL from scratch. Unfortunately, some health issues prevented me from tackling that project. Then, for my birthday, my husband ordered LFL's Book Dynasty model from littlefreelibrary.org. This unfinished pine and plywood library is styled like a simple house with a gabled metal roof, and is sold with the suggestion of applying an annual coat of paint or stain. Understanding as much as I do about epoxy coatings, I knew we could do better by my LFL than mere paint.

The first step was temporarily removing the metal roof to prevent it from getting dented or stained as we worked. We filleted all of the seams of the preassembled library with Six10® Thickened Epoxy Adhesive. The point-and-shoot convenience of Six10, dispensed through a standard caulking gun, made filleting a snap. These Six10 epoxy fillets have kept Michigan's rain, snow, and rampant seasonal earwigs (known to be voracious readers) from finding their way inside the library.

The next step was applying two coats of WEST

SYSTEM 105 Epoxy Resin®/207 Special Clear Hardener as a moisture barrier and to provide a stable base for the exterior paint. Using an epoxy coating to stabilize wood's moisture content before painting is a great way to prevent paint cracking, checking, and peeling. This approach allows coatings of good quality exterior paint to last for years, or even decades.

I have no plans to slop an annual paint coat on my LFL as the owner's manual suggests. See my article "A Pine & Epoxy Fence, Age 20" in *Epoxyworks 47* for more on the practicality of epoxy under paint for protecting pine outdoors.

To save on sanding, we made sure to add the second coat of epoxy when the first was partially cured but still tacky. We also used Six10 for bonding the hinge and door latch hardware. This will prevent moisture from getting in through the exposed endgrain where the hardware is installed.

front walk and set the post in an annulus of concrete. We used a level to make sure everything was plumb.

The bracket, which is constructed of two 4x4s cut at 45° angles, was then affixed to the post using bolts bonded into their pilot holes with epoxy. A 1x6 board across the angled bracket pieces is where the library itself is affixed (with bonded screws) through the library floor.

The final touches were adding the Little Free Library plaque, putting some books inside, and registering our library at littlefreelibrary.org. Since our library is painted green and we live on Green Avenue, we named our LFL The Little Green Library on Green. It's been a hit with the neighbors. We recently dressed it up with colorful solar string lights, and added a dog leash hook for the convenience of our library patrons who stop by while walking their pups.




Far Left: The natural wood of the library. The roof has been removed for easier application of the epoxy. Left: The library and the post have both had multiple coats of epoxy applied to protect the wood from moisture. Right: The epoxy stabilizes the wood's moisture content providing for a more stable base for the exterior paint. Far Right: The post is set in an annulus of concrete to counteract the weight of the library once it is filled with books.

Once the epoxy had cured completely, we painted our LFL pale green with cream trim using a high-quality exterior paint. We then reinstalled the metal roof piece.

With the library box itself ready to install, we again used epoxy for the pine post and bracket it would sit on. One important consideration when installing a LFL is that books are really heavy. What's in the box on any given day is likely to far outweigh the stuff that goes into a mailbox. It was really important to us that our LFL, heavy with books, would stand straight and true. To achieve this, we first coated the post with epoxy. When the epoxy cured, we dug a hole near our

Little Free Libraries are voluntary book exchanges placed in neighborhoods and public places. They come in different styles, shapes and sizes, but are most commonly a small, wooden box with a hinged door. Anyone may take a book or leave a book to share. It's the job of an individual library's steward or primary caretaker to maintain the reading material offered. While LFL's can never replace the tremendous resources available through traditional public libraries, they enhance neighborhoods, parks and other gathering places as a place where community members can easily exchange books.

High-Tech Composites Will Revive Champion Keelboat

By ATL Composites

Bill Wright, Ian Wright and Tony Riek, Norman R Wright with the hull of Saltash (Left to Right).

The nifty keelboat *Saltash*—an eight-time winner of Australia's Brisbane to Gladstone Race—is getting a new lease on life from the craftspeople at Norman R. Wright & Sons using WEST SYSTEM® Epoxy and carbon fiber. Currently upturned in the yard at Norman R. Wright & Sons (and dwarfed by the carbon fiber bulk of the supermaxi *Comanche*) at the Rivergate complex, the hull and skeletal superstructure of *Saltash* belie her glorious past and pedigree.

Built in 1966, *Saltash* is a 30' Yachting World Diamond keelboat by designer Jack Holt. The editors of *Yachting World* commissioned Holt to create a one-design, affordable open keelboat to dispel the perceived elitism around the sport in those optimistic post-war years. He conceived the Diamond as a simple, stitch-and-glue "build-her-yourself"sailboat. The Wright family bought *Saltash* in 1981 for $2,800, intending to enjoy this compact cruiser on Moreton Bay.

The Diamond was the first keelboat ever designed to plane. Ian Wright explains: "She was a very fast yacht back in the day. She only weighs 1,500 kg (3,300 lbs)—the same as an Etchells racing sloop—and she easily jumps up on the plane."

Ian Wright and his brother Bill modified *Saltash* by adding a cabin, cockpit, inboard engine, and safety features to suit Category 3 ocean racing standards. They raced her in the 1985 Brisbane to Gladstone Easter Classic and over the next two decades, *Saltash* would win eight times. This boat was widely referred to as "the freak" for her ability to nimbly pass yachts many times her size.

"We did twenty Gladstone Races, then we decided that was enough and we would have Easter at home."

Not that Ian has been idle since then. Norman R. Wright & Sons has a proud 110-year history of boat building—commercial, recreational, and custom. Renowned for their timber vessels, their craftspeople moved into and mastered fiberglass and more recently, carbon fiber. "In the eighties, we pioneered several techniques of wrapping timber in layers of different types of glass or carbon fiber," Ian said. He explained that the advantages are reduced maintenance, greater strength, lighter weight, and imperviousness to water.

Saltash is now poised to undergo a total overhaul that will see her revived to the pinnacle of her prowess. "We have a long history with ATL Composites, and they're the first people we consulted when we took on the rebuild," said Ian. "We want her to be the best quality, to make her as good as she can be, beautiful, and yes, still competitive."

ATL Composites is supplying WEST SYSTEM Epoxy products for bonding, laminating, and filleting applications along with a lightweight carbon plain-weave fabric to laminate the hull. This will provide strength and stiffness while retaining *Saltash's* light racing weight.

"For over thirty years we have been working with Ian, Bill, and the team at Norman R. Wright and Sons," said Lorraine Murray at ATL Composites. "Ian, Bill, Tony Riek, Dave Kircher, Dave Fussell, and Alistair Harvey joined, co-exhibited, with us at the Australian Wooden Boat Festival in Hobart, Tasmania, and Dave Kircher gave a practical demonstration using WEST SYSTEM products."

"We have supplied materials for the construction of multiple timber-boat projects from medium and large bay cruisers, to repair and maintenance projects, to commercial pilot boats for the Brisbane City Council. More recently we have collaborated on a multitude of composite projects, like the recently launched *Aura*, a 60' Sportfisher designed in-house by Bill Wright."

"We are certainly proud to have a hand in restoring *Saltash* and can't wait to see her back in the water and racing, or cruising, again," Murray said.

For more information visit atlcomposites.com

For information about WEST SYSTEM® products or technical information for a building or repair project, Gougeon Brothers offers a range of detailed publications that can help you get started. These publications are available at your local WEST SYSTEM dealer or by contacting Gougeon Brothers. They are also available as **free downloadable PDFs at westsystem.com.**

How-to Publications

002 **The Gougeon Brothers on Boat Construction**—A must for anyone building a wooden boat or working with wood and WEST SYSTEM Epoxy. Fully illustrated composite construction techniques, materials, lofting, safety and tools. 5th Edition, revised in 2005.

002-970 **Wooden Boat Restoration & Repair**—Illustrated guide to restore the structure, improve the appearance, reduce the maintenance and prolong the life of wooden boats with WEST SYSTEM Epoxy. Includes dry rot repair, structural framework repair, hull and deck planking repair, and hardware installation with epoxy.

002-550 **Fiberglass Boat Repair & Maintenance**—Illustrated guide to repair fiberglass boats with WEST SYSTEM Epoxy. Procedures for structural reinforcement, deck and hull repair, hardware installation, keel repair and teak deck installation. Also, procedures for gelcoat blister diagnosis, prevention and repair and final fairing and finishing.

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