



Stern Makeover

When *Persistence's* 25-year-old transom began showing wear, its owner turned to the latest gels and penetrating epoxies for a fix.

By Marlin Bree

The signs were unmistakable and ominous: Beneath the all-bright finish of *Persistence's* scoop-shaped transom, the beautiful western red cedar had begun to delaminate.

I stepped closer to the small boat resting on its trailer. Pressing my weight down on the transom, I felt a slight spongy feel under my thumbs and heard a sloshing sound—water inside the hull.

While no boat is upkeep free, I'd never been faced with a major rebuilding project like this one. Normally, I'm fearless in working on *Persistence*, and some boaters slyly suggest that my usual late launchings mean that I like working on my boat more than sailing it.

I'd built my 20-foot custom wood/epoxy sloop from the keel up nearly 25 years ago. I'd selected every piece of wood and shaped every plank using hand tools. When people ask me how long it took to build, I answer, "Seven years, and she's not finished yet."

My beautiful little wooden boat has worked hard over the years, plying a trade in Lake Superior's wild waters. It has been aground on reefs several times and hit docks and posts more times than I care to remember. It even survived 130-mph downbursts in Lake Superior's infamous "Green Storm" on 4 July 1999. (See my *A Sailor Meets His Storm of the Century* in the June 2003 issue of *The Ensign*.) *Persistence* has been the subject of magazine articles and several books, including *Wake of the Green Storm*. It's a famous boat that someday may end up in a museum.

But now age and wear were taking their toll.

Decades ago, I built *Persistence* using old-fashioned slow-drying epoxies. Today, I don't have time to wait 24 hours for one of several dozen glued pieces of wood to harden before I can proceed; I'd miss the major part of an all-too-short Minnesota sailing season.

I found a solution at a USPS District 10 meeting in St. Paul, Minn., where I met Mike Beckmann, of Milwaukee Sail & Power Squadron. Mike, an epoxy engineer and chemist who designs his own epoxies, owns NautiKing Professional Marine Products, an epoxy manufacturing company.

Mike sent me a sample of his NautiPoxy NP Gel Epoxy in a new cartridge system. You place the cartridge into a standard-size caulking gun and open the tip. The gel and hardener come out pre-mixed. The gel sticks to vertical surfaces and doesn't run.

With this new glue, I was ready to begin working on the transom. In boat repair, as in taking a long cruise, getting under way is the most difficult part. Once you launch yourself into a voyage or a project, there's a certain momentum that takes hold. But first you have to get going.

With a fresh blade in my reciprocating saw, I took a few deep breaths. I watched the vibrating saw blade touch the join of the two last planks about two inches from the aft section. It began to bite into the wood. Slowly, I followed the plank join line toward midships. First the portside and then the starboard sections, with their blackened parts, fell off. These had been the unkindest cuts of all.

It hurt me just to look at them, but I was committed. What if I couldn't get it back together the way I wanted it? With *Persistence's* all-bright finish, you can't just lay up some filler and paint over it. Everything shows under the varnish.

Long ago, I'd rationalized that as a working, sporting machine, my sailboat was bound to pick up a few nicks and dings that would give it character. Even so, this rebuild would give me the opportunity to make *Persistence* better and the transom stronger.

I looked down again at my handiwork. With the scoop transom's end tips whacked off, I reached down to feel the wood. It was dark and damp: The whole section had moisture in it.

I drilled a three-eighths-inch pilot hole into the aft section and was rewarded by a piddling stream of amber-colored water. With a hammer and chisel, I enlarged the holes to access the air chambers, and when I felt inside, the air chambers were also wet.

Fortunately, the oily western red cedar, though saturated with moisture, was not rotten.

I drilled several more holes for air circulation and put a handheld hair dryer into a

hole in the aft section and let the fan run on low heat. I was glad the transom was facing south so the spring breezes and sunlight could help dry out the wood.

After several days, I could begin the rebuilding process. I decided to lengthen the transom by about 4 inches, which would give me a slightly longer waterline for better water flow and more speed. My only limitation would be that the outboard had to swing down without hitting the scoop's outermost edge.

I drilled stainless steel rod holes into the old scoop to serve as my jig. Here I offered up my first cedar plank, drilling a hole where the rod was and fitting the plank into the hole. I scribed the plank with the outline of the outer transom and cut it about a quarter-inch larger. Then I added a rough radius with the help of my coarse disk grinder.

I added more planks and roughly radiused them. The trick was keeping the original shape of the bottom and sides but angling them slightly inward and upward toward the waterline exit. When I had several planks cut roughly to shape, I started working with the new epoxy gel—a product that hadn't been around when I'd built *Persistence*.

In the old days of epoxy boatbuilding, when you needed to fill between slightly uneven surfaces, you used your basic all-purpose epoxy and sloshed in a filler such as asbestos to thicken the glue. If you used filler, you had to be careful not to create lumps, which would prevent a good glue join.

The new gel went on smooth like peanut butter. I could easily spread it on the two wooden halves and get a consistent, smooth surface. Unlike with other woodworking glues, you don't need clamps or weights to apply pressure. I simply stuck the pieces together on a flat surface, pressed down and then let the wood flatten out the gel. Some gel oozed out the sides, but this would be ground off during the final shaping.

After the glued sections had set, I fit them easily to the transom onto the stainless steel rods. I could now slide the newly glued wood up to the old transom, check out the fit and slide the new piece off for further shaping. On again, off again: I was working for as near a final shape as I could get, but I left a little margin to await the final project. At the join area, I also allowed a little extra room for fiberglass.

I delayed the final gluing process until I finished the side additions, which would give me a pleasing but functional shape. It turned out to be one of the most difficult parts of the stern makeover. Just adding a piece of wood wouldn't give me the continuous bend that I wanted, so I began experimenting with numerous small pieces of cedar.

My work was saved by the new quickset epoxies. Rather than wait at least 12 hours to get an initial strength, the NautiPoxy ExpressII has an initial setup time of about 15 minutes. I set up an assembly line: While one piece was kicking off on one side, I could work on another piece on the other side.

Next I took the transom addition pieces off and again began working with them on my workbench. With my grinder and sanders, I sculpted the tops a little more. Then I epoxied the transom bottom with NautiPoxy Penetrating Epoxy, which penetrates the wood pores, soaks into minute cracks to seal the wood and greatly strengthens it in the process. As the epoxy soaked into the pores, I noted that the surface did not bubble up the way some of the older formulations did, which used to create problems as they formed an irregular surface when they dried.

I applied this penetrating epoxy over a 6-ounce piece of fiberglass. I laid on more coatings as the epoxy penetrated the wood. The fiberglass acted as a screed; its tiny weave holes held in the epoxy and helped wet everything out, including minute imperfections and slight cracks in the wood. As it dried, I layered several more coats and finished with a coat of NautiPoxy Penetrating with a 30 percent addition of graphite powder for extra toughness. I have used an epoxy-graphite coating on the

bottom of *Persistence* for about 25 years, and it has withstood a number of rubbings and even bashing from rocks with only slight, easily repaired scrapes.

On the final day of assembly, I slipped nitrile gloves over my cotton work gloves. I wore old clothes, including a long-sleeve shirt, in case of epoxy drips. Then, I simply inserted a tube of NautiPoxy Clear Gel into my caulking gun, walked up to the transom's vertical surface, took off the cap (after marking it so I could reinstall it the way it came off) and squeezed off a line of epoxy. The gel hung on the vertical surface without running.

I quickly laid down glue on one side of the transom rebuild and came back with a thin-bladed spreader to spread the epoxy, taking care to keep a fair thickness. The gel didn't run as I bolted the pieces down onto the old scoop transom. I cleaned up the excess with a swipe of my spatula. On the bottom, I shaped the join a bit so that the edges came together seamlessly.

When I was finished with my gel tube, I merely stuck the cap back in, and it was ready for next time.

I sculpted and faired the sidepieces a bit more to get the final shape I wanted, adding small pieces of wood using the quickset epoxy gel. I finished everything with another layer of fiberglass, overlapping the previous glass that had been roughed up with sandpaper. As I added the penetrating epoxy, both the old and the new went transparent, and it would be difficult to tell which was which.

To celebrate my transom's entry into its second quarter century, I added some stars on its aft edge; nautical stars have always meant luck. I cut through the tough glass and epoxy with my new razor knife.

With a few whacks of my woodcarver's mallet on the razor knife, the sharp blade sliced clean lines for the stars. I carved with my hefty razor knife and scooped out some wood between the star's inner lines with a wood chisel. Now I had a hollowed-out star with an eighth-inch indent. I carved four stars, two large and two small. Cedar is golden-colored, so I needed a darker wood to make the stars stand out. I cut some dark mahogany shavings from my wood box and ground them into a fine powder in my coffee grinder. For fun, I made a second darker filler by adding some dried espresso.

I took a spatula and added quickset gel into a mix of fine-whipped espresso and mahogany to give me a dark surface in the small stars. I stuffed the larger stars with mahogany and penetrating epoxy. After the well-filled stars had dried, I used a medium power sander to level the protruding surfaces, and I finished them with a couple of epoxy layers.

Now came the real payoff: restoring the pristine final surface. For the past 25 years, *Persistence* has been bright finished with varnish-fortified UV filters, and I thought the little boat was ready for something new. I turned to a newer finish, NautiThane, a two-part high-gloss clear polyurethane with UV filters.

I sanded the hull with my power sander using a fine grit overall. This gave both the old and new finishes a slight tooth to help the new finish grip and create a refractory surface underneath. I wiped the sanded surface with a clean cloth lightly moistened with thinner, turning the cloth often. It's important to keep your cloth clean or else you muddy the surface with old varnish dust.

For my expensive two-part finish, I bought inexpensive bristle brushes by the bag so I could throw them away after use. For the most pleasurable and rewarding part of the restoration, I began on a clear day without much wind. I chose a new brush and began laying on the expensive two-part polyurethane coating. With each stroke, the gleaming clear finish brought the wood to life, and the entire boat seemed to glisten.

The newly coated surface looked so good that I began refinishing the old portion of the transom, up to the cockpit. That left the hull sides looking a little shabby, and I ended up refinishing the entire hull and both sides of the cabin top as well as the deck. In the late spring sunlight, the wood sparkled, and *Persistence* shone as never before.

Although I didn't get *Persistence* into the water until later in the season, I didn't hear any remarks about the late launching. With its shiny hull and newly rebuilt transom, *Persistence* has truly gotten better with age.

Marlin Bree (www.marlinbree.com) has written often about his homebuilt epoxy/wood boat, Persistence, in magazine articles and books, including Wake of the Green Storm and Broken Seas. His article in The Ensign about his sail in Persistence during Superior's infamous "Green Storm" won the top boating writer's award in 2004. He is an honorary member of St. Paul Sail & Power Squadron.

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