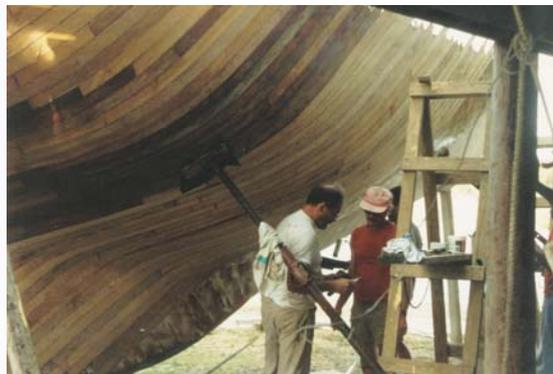


In theory the cold moulding process is quite simple. Provide a clean dry hull and glue on strips of thin epoxy saturated veneer. When the epoxy is set, fair the resulting new hull surface, paint, and launch. Right... It sounded so easy I even told the marina manager that I would only be out of the water for six months! I only forgot to factor in my job, the weather, the girl friends, and so on, into the equation.



I hauled *VIXEN* on December 19, 1992. It was a relief just not to worry about her going down again. After a month or so of drying out, I began grinding the hull down to bare mahogany. This took several long weekends. Following the grinding, I removed all of the caulking. I started stripping the putty and cotton using the traditional sharpened hoof pick and bent screwdrivers method. This was time consuming and tedious. At this point, I still thought that I was in for about six months of work. In order to accelerate the process, I tried several things but finally settled on using a small high-speed 4" circular electric saw. The blade of the saw was set fairly wide and was corundum tipped. This saw literally ripped the cotton and putty out. This still took a while to complete. I soon found out why she had leaked all these years. Some of the

seams showed more than 3/8ths to 1/2 inches of daylight. *VIXEN* had been in the water continuously for nearly twenty years and the hull was thoroughly saturated. *VIXEN* had to completely dry out. (A process recommended for wooden boats and men in the tropics.) This drying took the best part of a year. Moisture meters became the bane of my existence. I learned to hate rain. The tropical sun was my only friend. I tried to maintain rain tarps over the boat but the trade winds made my efforts laughable. Did you ever try spinnaker flying on land?

While the boat was drying, there were a variety of other things to be accomplished. The auxiliary two-cylinder diesel was removed and delivered to the mechanic for a re-build. All of the bronze thru-hull fittings were removed. The rudder was removed. (I had to dig a trench under the boat some six feet deep in order to facilitate this and, of course, the underlying material was mostly granite. My father once told me, "Son, get a degree and you'll never dig ditches!") The toe rail was removed. I generally took everything else off the boat and kept her open as possible.

. As she dried, some of the wood bungs covering the fastenings began to fall out as they shrank. Being curious, I pulled a few of the fastenings to check their quality. As you might guess, they were a bit electrolyzed. I determined to replace them. I also noted with some disappointment that water began to drain out of the newly exposed screw holes. At this juncture, a new element was added to the project; the complete refastening of the hull. I decided to replace all of the silicon bronze with stainless steel. I removed the fastenings from a complete frame station and allowed a week or two for additional drying. I replaced each screw into the same hole with an oversized stainless steel wood screw (2 1/2 inch by # 14) after first injecting each hole with a juicy mixture of West System epoxy mixed with milled cotton fibre. As I tightened each, I could see the planking set hard against the frame, possibly for the first time in twenty years. This squirt of epoxy also glued the planking to the frame at the same time. Some one thousand four hundred screws later, I filled over the exposed screw heads with an epoxy mixture rather than going back to the wood bungs. After replacing all of the fastenings from the water line down, the boat would resonate from a blow from a hammer. This was decision time. I could have 'simply' re-caulked the boat, painted her and sailed away. I really thought about it. Doing that would have saved much work and heartache. The boat had now been out of the water for nearly two years. Girlfriend number one had departed for younger, blonder fields.

Following the refastening, my next step was to re-caulk the seams. I used 3M 5200 without driving in cotton. I wanted nothing that would attract or hold moisture of any kind. (5200 is an excellent product, but very messy. I think the stuff is alive.) I employed a pneumatic caulking gun for the re-caulking. These guns are perfect for the job. Trying to do this with a hand-caulking gun would have been physically painful. I used about twenty-four tubes of 5200. I did add some splines to the extra wide seams in order to fill the gap. Following the re-caulk, the hull was given a final pre-moulding fairing; taking care that there was no bumps or uneven spots that would interfere with the surface interface during the application of the moulding veneers.

It's the other things that go wrong while you are working on a project like this that can lead you to insanity. Even before beginning the rebuilding, I had noticed that at least two of the deck beams under the starboard cockpit seats had begun to weaken and fall away. I thought the fastenings had failed and I wasn't overly concerned. I did want to repair the problem, but I had no time. Along comes an Englishman with a Master Shipwrights Certificate who says it is an easy fix for a journeyman like him and so I contracted with him to perform the work. Ten days later I found him gone from the area, the entire cockpit removed down to the bare hull, and the scrap pieces lying about. There wasn't enough left to even make a pattern. Previously, I hadn't realized that the chain saw was a woodworking tool. Of course, this exposed areas of the transom that hadn't seen light since the original construction back in 1946. Now enter Hurricane Marylyn, which drove 120 mph rainwater into the farthest corners of the white oak framing. In six months, the transom framing had rotted away. So now I had a boat with what looked like a live fish well and an empty space for a stern. The hurricane left the island without electric power for almost three months and so little was accomplished

through the end of the year. Without saying much, Girlfriend number two said, “farewell.” Little by little, while watching epoxy harden, I rebuilt the stern and cockpit. I finished the cockpit off with 3/8ths inch teak. It looks very nice. I replaced the outer skin of the transom with mahogany and varnished it. Did I mention that the hurricane also blew away the diesel mechanics shop along with my auxiliary, new parts, and motor manuals? So *VIXEN* eventually received a new Yanmar 3GM-30F. A much nicer motor.

Now into the third year of the job, the actual construction phase finally began. I first epoxy glued 18 inch wide 18-ounce biaxial fibreglass tape around and under the hull from the stem to the counter. This taping completely encapsulated the keel up past the garboards.



With the taping finished; the cold moulding could finally begin. Mahogany veneers were not readily available on the east coast of the USA. Limited quantities were located, but not in sufficient amounts or lengths. I decided to use 1/8th inch mahogany (luan) door skin plys. They were available in Florida and not overly expensive. I ripped each sheet into three-inch wide strips. In the end, I used circa 95 sheets of the door skin ply. Beginning on the starboard side amidships, I laid out the baseline for the first layer at 45 degrees to the line of the planking. Each veneer was saturated with a slurry of West System epoxy and milled cotton fibre. The hull in the immediate working area was also coated. The veneer strip was then stapled to the hull using a pneumatic staple gun with the pressure regulated to just bury the head of the staple. There was a bit of a learning curve to laying up the veneers. I first attempted to fit each piece to the next while maintaining the 45 degree angle and this required extensive spiling with multiple fittings. This was very time consuming and with the setting time of the epoxy glue factored in, almost undoable. I found that letting the strips “run out” normally worked well. The resulting gaps between the veneer strips occurred about every three or four runs and could be easily filled in. This back fitting was just as strong and gave the same result. I used 1/2 inch crown stainless steel staples with 1/2 inch depth. The virtue of using stainless steel staples was that I did not have to remove them after the epoxy had set. I just left them there... all 87,000 of them. I found that the staple had to be placed near the edge of the veneer or else cupping would occur. Laying up the veneer strips requires speed and a one-time application. Even with the extra slow Tropical catalyst, epoxy in the tropics does not wait for dithering. The moulding process was slower than I anticipated. I found that I could reasonably expect to lay up about 24 eight foot strips in a six to eight hour day. This equated to

approximately three linear feet of hull per day. In other words, about thirteen weeks per layer per side. (Those were the sunny days. Rainy season just added to the time. I won't even talk about Hurricane Hortense...) I tried to get four or five boat workers to assist me one day, but made the mistake of having Girlfriend number three deliver the ice chest of cold ones too early in the day. They didn't seem to understand that I wanted the boat plastered before they got plastered. I found that it was necessary to sand and fair the entire hull between the application of layer one and layer two. The total lay-up time took just over a year as I only had weekends, vacation, and holidays. I completed two diagonal layers per side. Upon finishing the lay-up, the overruns both top and bottom were trimmed. The bottom of the runs were shaped and feathered into the hull with an angle grinder. In order to seal the veneers from any possible water intrusion, I applied another layer of the 18-ounce biaxial tape under the hull from one side of the boat the to other. This sealed the veneers and also provided a very tough skin that protects the veneers from my inevitable groundings. Older boats just love a good sandbar, now and then.



Following the lay-up, I had to sand and fair the hull again. Even though it seems like a lot of fairing, the more you keep things smooth and fair, the better the resulting product, and, the easier the next stage will be. When the fairing was complete, I applied a single layer of 10-ounce glass-glass cloth. I applied this layer from one side of the hull to the other and over the edge of gunwale. (That's why I removed the toe rails.) By starting the glass on the deck I effectively sealed the exposed tops of the veneers. This glass cloth layer provides no real strength, but rather provides for a final fairing and painting surface. The fibreglass cloth weave was filled with an epoxy/micro balloon mixture. This mixture was glopped on and tight pulled with a series of drywall putty knives. The largest knife was 24 inches wide. When the "pull" was set, the entire hull was faired using flat sanding boards and dual action automotive sanders. The "tight pull" process was repeated three times. It was just about this time when Girlfriend number three departed for "anywhere, where they don't talk about boats." I moved back on the boat. Living on the hard really stimulates you to get the work done.

Reconstruction of the waterline proved to be more difficult than I had anticipated but it was eventually created with the use of a surveying instrument. Having copies of the original drawings would have been very helpful, but they were destroyed when she sank. I painted the bottom with two coats of Interlux 2001 epoxy barrier coat before applying the anti-fouling. The topsides were finished with a two-part urethane similar to Awlgrip

or Imron. This product is marketed by Tom Fabula, Inc. of Stuart, FL. Signature Paints, as it is called, is a very forgiving and easily applied paint. It can be rolled on without fuss and flows out nicely. The mast was also refinished bright using the same system.



Would I do it again? The answer has to be yes. But if I had to do it again; I would want to have her stored indoors so the weather would not continually do more damage. I would have a real shop rather than work out of the trunk of my car. I would not have left as much gear lying around for unintended public distribution. Given it all, I like the cold moulding system and the result. There are any number of sound older wooden boats around that have the grace and charm of their age and can be purchased relatively inexpensively. The cold moulding process is not that costly or difficult, just a lot of work. The marina storage costs accounted for most of the cost. You need to begin with a reasonably good boat. This is not the cure for old rotten wrecks.

VIXEN was launched with little fanfare but very excellent champagne in November of 1997. A splash for the boat and the rest applied internally. There were no girlfriends present. The Virgin Island ‘yachting guides’ were dismayed as they could no longer give directions into the Salt River Marina which read “turn into the marina when the derelict boat on the beach bears 220 magnetic.” We have sailed more miles since than in all the preceding years. *VIXEN* sails as well as ever and is slightly better on a starboard tack.



Vixen relaunched

Do I still have a wooden boat? Some purists would say no. Do I really care? Not in the least. I have a much stronger vessel and a dry bilge. *VIXEN* is usually the most admired hull in any harbour. Girlfriend number four is still hanging in and actually enjoys the cruising life. We are looking forward to sailing away forever next year. It’s about time.

*Editor's Note: The above article was due to be published in **The Wave** but was deemed to long to fit. In view of the fact that this method of restoration has been successfully used in several occasions, not least on the NY 32 **Mustang** it was though that publication would interest members. The Mackinack class first saw light of say as the Brazil Class and proved a very successful ocean racer though the slenderness of the bow profile could mean that hard driven in steep seas she could bury the bow. Later designs were given greater buoyancy forward. Accommodation would today be considered pretty basic for a 40 footer. However these were simple boats designed for real sailors and not for our generation used to electronics, hot and cold pressure water, refrigeration, showers and microwaves. Although maybe not quite as fast as the slightly lighter contemporary Owens cutters these boats had countless wins to their credit both in the Great lakes and in the Atlantic starting with the Buenos Aires-Rio race in which they took all the first places. On the next page I publish images of a number of Brazil/mMackinacks starting with the immaculately restored **White Swan**.*

P.M



Wild Swan



Brazil Class

