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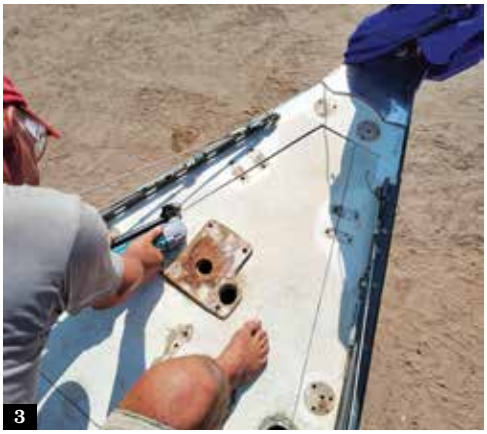
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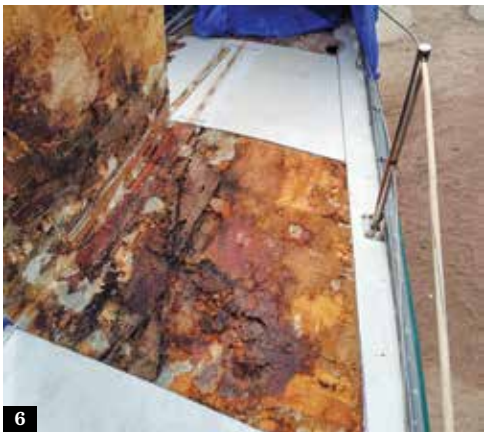
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Projects & Ideas

DIY DECK RESTO-RATION

When soft spots spread across our foredeck, we cut deep into the balsa core to get to the root of the problem. Then we rebuilt the deck stronger. By Heather Francis

Having a few soft spots in the balsa-cored deck of your 50-plus-year-old sailboat is neither uncommon nor all that concerning. However, last season I noticed a not-to-subtle flex in the foredeck of our Newport 41 when I was retrieving the anchor from particularly sticky mud. We'd had the foredeck reinforced from below in 2008, when we'd upgraded our anchor windlass after buying *Kate*, but now there were spongy areas underfoot.

We decided to tackle the project ourselves. We bought an oscillating saw, a circular saw and a wet-dry vacuum. Then we booked a haul out at Penuwasa Shipyard in Kudat, Borneo, Malaysia. We took a deep breath, and we opened a proverbial can of worms.

DEMO DAY

Balsa wood has been the preferred material for cored deck construction for decades. It's

***Kate*, hauled out in Kudat, Borneo, begins a major deck repair project (1, 2). The first cut into the foredeck is always the deepest, revealing what lies beneath (3). With the deck opened up (4), old electrical wiring embedded in the balsa core comes to light (5). The crew then opens a second section of the foredeck to investigate further and assess the extent of the problem (6). Steve grinds away the original fiberglass deck pieces in preparation for rebuilding (7). By the end, the original deck skins are clean and ready for the next stage of the refit (8).**

HEATHER FRANCIS (8)


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light, but extremely strong. It can be laid as small tiles adhered to a scrim (an open-weave material) and can serve as a sandwich between layers of fiberglass, with the grain running perpendicular to the outer skin. The 2-inch balsa tiles are flexible enough to conform to the gentle radius of the deck, and the end-grain application provides superior compression strength because forces are exerted down the length of the grain rather than across it.

The downfall of balsa-cored decks is when water finds it way below the fiberglass skin. Most commonly, this happens when deck hardware is improperly sealed, or the sealant breaks down. Balsa can absorb a lot of water before it begins to rot, resulting in a soft spot. It can be years before damage is noticed, making it difficult to pinpoint how the water ingress occurred.

We first had to determine how much of our deck was affected. We tapped on the deck with a hammer and heard a dead hollow sound, rather than a solid *thud*. My husband decided that most of the foredeck sounded suspicious. Our problem was larger than we'd first thought.

To preserve enough structural strength to support the weight of two people while working, we had to open the deck in sections. We removed the anchor windlass, deck hardware and pulpit, and then we marked out our cuts.

Steve used the oscillating saw to cut through the top layer of the deck. He started with a

Rotten balsa core exposed during the foredeck rebuild shows the extent of the damage (9). New plywood blocks are cut to size (10), then carefully dry-fitted until the fit is perfect (11). Once satisfied, the blocks are left to dry on baking paper to keep them clean and flat (12). Fresh batches of resin are mixed and prepped for the day's work (13), coating the foredeck section and preparing it to be glued down (14). With the new material secured, the foredeck emerges fully reconstructed (15), before the team moves on to tackle the coach house (16).

HEATHER FRANCIS (8)

large triangle section that extended from the bow roller to behind the windlass. Then he pulled the crust off the sandwich, removing the fiberglass with as little damage as possible; we wanted to reuse the piece during reconstruction. Our original fiberglass had no major imperfections and fit the cutout perfectly.

With the top skin removed, we got a look not only at the balsa, but also into the history of our boat. We discovered that a piece of marine plywood ran down the middle of the foredeck under the sail track. Curiously, we found a pair of wires running through the balsa core on the starboard side of the plywood. The boat's electrical system had been updated long before we took ownership, so we had no idea that the original wiring had been concealed within the deck. Now, the defunct wire provided a conduit for moisture to flow through the balsa.

We needed to follow the trail, to see how far the wires and the rot went. Steve cut a larger section that covered the starboard side of the foredeck from the toe rail to the centerline, ending about 20 inches from the first cutout. Not only had the wires funneled the water ingress down the starboard side, but we also found a mass of what looked and smelled like tar. The sticky puddle had been injected through holes drilled in the deck. A shortcut solution by a previous owner that disguised the soft spot.

Next was the dirty task of removing the rotten balsa. Armed with a scrapper, a chisel and a lot of determination, Steve spent several hours filling buckets with bits of soggy wood. Some areas peeled away in chunks that resembled canned tuna, juice and all. Others crumbled into a paste and easily scraped away. A few balsa tiles on the outboard edge were dry, so we left them intact.

The injected areas were difficult to move and worrisome. We'd seen injection holes peppered across other parts of the deck when we'd had the boat painted in Fiji several years before. How much of a mess had the earlier DIYer left in his wake?

With rot removed, we sanded the areas to fair the surface, and left it open to the blistering tropical sun to dry any remaining moisture. Steve cleaned the bottom of the fiberglass skin using a flap disc grinding wheel, removing any stuck-on resin and leveling out the surface.

THE NEW CORE

In an ideal world, we would have used end-grain balsa tiles to reconstruct the deck. That wasn't really an option because importing balsa was difficult and costly. However, because of a nearby wooden-boat fishing fleet, good-quality marine plywood was readily available.

Marine plywood is strong, but there are trade-offs. Because of the multilayer construction of plywood, the grain runs horizontally. This makes it prone to wicking moisture across the layers if it's exposed to water. To achieve the correct curve across the deck, the plywood needs to be cut into several small pieces, with each piece coated in resin for waterproofing before installation. This adds time to the project. And, since plywood is heavier than balsa, there will be weight gain.

We figured a few extra pounds and a little more work were better than a rotten deck. Using the fiberglass as a template, we patterned the plywood by tracing each skin, then divided that shape into rough 4-by-4-inch blocks. We labeled each column and row before making any cuts. I sanded the edges of each block, removing any rough spots.

Then it was time for a dry fit, which is essential. Blocks can be modified to work around any obstructions or high spots. Believe me, when working with a handlaid fiberglass boat, there will be a few irregularities.

With the dry fit done, we marked a border with a red line that we could match up during the final installation. Some of our edge blocks fit under the existing deck, and the red line let us know exactly how far to knock the blocks into the void.

I sealed the blocks with a coat of polyester resin on all sides. Many boaters go with epoxy, but we were working on the cusp of the rainy season, when midday temperatures stretched towards 95 degrees Fahrenheit and rain clouds hung on the horizon. It is possible to slightly adjust the amount of catalyst added to extend the cure time of polyester, which is also advantageous the tropics. Epoxy, on the other hand, requires precise measuring, mixing and temperatures. Epoxy is also less UV-stable, more prone to develop hairline cracks under stress, and cannot be covered with gelcoat.

And our boat was hand laid in 1973. It is totally constructed with polyester. We figured if the stuff endured the past 53 years, then it is strong enough to use for a few repairs.

We dried the wet plywood blocks on sheets of baking paper, whose nonslip properties don't just apply in galley. Dried resin lifts right off it, making it easy to clean up and move the dry, but still tacky blocks. I simply stacked the sheets like a layer cake.

RECONSTRUCTION

With more than 100 plywood blocks to organize, pots of resin to mix, and a growing pile of spent gloves and sticky brushes to keep tidy, the process of putting the deck back together was a two-person job. My role was to mix the polyester resin in batches and hand the blocks to Steve. He put them in place, making sure everything was level, sealed and properly fitted.

First, we used resin on the deck cavities and the underside of the original pieces of deck that we had removed. This sealed the surfaces and provided a sticky canvas. The "glue" we used to adhere the blocks in place was polyester resin thickened with fumed silica. It's a food-grade fine powder that adjusts the viscosity of paints and polyester resin to prevent sagging. I mixed each batch to the consistency of a stiff peak meringue; it needed a little encouragement to plop off the brush. Working in small batches meant we avoided resin setting up before we were able to use it.

When all the blocks were in place, I mixed larger batches to act as a filler and as an adhesive for the top pieces. This layer was thick enough that it smooshed out of the seams just slightly when we laid the original fiberglass deck pieces back down. Using jerry cans and buckets filled with water, dive weights and heavy pieces of timber, we weighted down the two top pieces, making sure the cut seams were as even as possible and there was no buckling or gaps.

All we had left to do was clean up, cross our fingers and wait. Forty-eight hours later, we removed the weights, and we were delighted that the deck felt more solid underfoot than it had in years.

The next step would be to grind down the seams and reseal the cuts with a few layers of fiberglass mat and more polyester, before a final fairing—but all of that would have to wait. Instead, over the next several weeks, we replaced almost all the balsa core in the foredeck. We also found soft spots farther aft on the starboard side deck, and repaired those as well.

With each section, our confidence in our abilities solidified, and we thought about all those injection holes we'd seen.

As the rainy season loomed, we bought a tarp to drape over the boom, grabbed the saw and prepared to open the next can of worms.

Heather Francis is originally from Nova Scotia, Canada. She and her Aussie husband, Steve, have been living and sailing on their 1973 Newport 41, Kate, *since 2008.*

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