

Sanding fiberglass

Experience the joyful Zen of boat restoration

by David Goldsmith

It's a good idea to begin a major fiberglass boat restoration project by starting each morning in front of the mirror repeating, "I love to sand ... I am one with my sander ... abrasive grit is my friend ... sanding is my life." After a few weeks of this, you'll start to believe it, and at that point the project should really take off. Chances are you're going to spend far more time on sanding than on any other operation in the entire project, so you might as well tell yourself you enjoy it.

Proper use of abrasives and abrasive tools is a test of a boatowner's skill. The finest teak, the closest joinery, and the clearest varnish will only emphasize poor sanding if the wrong grit or sander is used.

Tools

There are four power sanders in my boat-work toolbox: a random-orbit finish sander; a dual-action sander; a triangular detail sander; and a 4½-inch grinder with a sanding disc. There are those who would add a belt sander or a quarter-sheet sander to the list, but I haven't found anything the belt sander does that the dual-action can't also do (we're talking about projects and restoration, not a complete build). Even my vibrating quarter-sheet sander doesn't get used much since it's so easy to change paper on the disc sanders.

Grinders

An angle grinder is the tool for the most aggressive removal of material. Removing old non-skid on deck or loose flaking paint down below requires the grunt of a grinder spinning a very rough disc. You can spend a week with even the most powerful sander and rough paper but you can get farther in a few hours with a grinder. Of course, the finish left by the grinder will be gouged and rough and will require further sanding to get to an acceptable level for finish.

Grinders come in several sizes, based on the size of the implements they swing. The most common small grinders are 4½ inches in size and the large grinders are 7 inches. I have used a 7-inch



grinder to take off a dozen layers of bottom paint in one go and it was quite an experience. I can't imagine using such a beast on the interior or decks, although the 4½-inch size is ideal for cutting tabbing, grinding glass, taking off paint, and removing non-skid and gelcoat.

A grinder spins a disc that is attached to its spindle. I highly recommend a grinder with a 5⁄8-inch x 11-inch spindle. That is the *de facto* standard and what most accessories fit. Most grinders you buy stateside will be of this type. Occasionally I see one with a metric spindle, and I owned a Chinese-made generic one with a spindle thread that defied description.

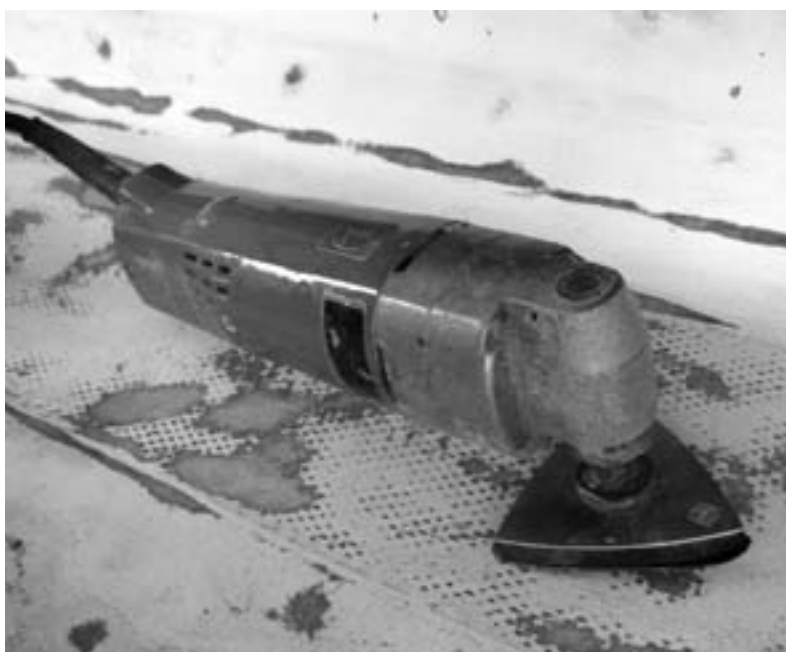
Useless for glasswork

The typical grinding disc that comes with grinders is great for taking off stubborn nuts or other intransigent metals, but is pretty useless for glasswork. For the latter job, two accessories are essential: a diamond continuous-rimmed blade (this looks like a solid disc with grooves radiating out along the plane of the disc over the outer half inch of diameter) and a sandpaper backing disc.

You use the edge of the disc to cut tabbing and you use the disc at an angle to grind down the ridges left after tabbing is cut. It simply blew me away how quickly and easily these blades go through fiberglass — it was like cutting butter with a hot knife. I'm nearly finished with a major renovation project on a 32-footer, and I'm still on my first blade.

Cutting would be sufficient reason to keep a grinder around, but the sanding power of an angle grinder is essential for just any major restoration project. You can't just put sanding discs on a grinder, however; you'll need a backing pad. A backing

Meet your new best friend, the work-horse Porter-Cable 7335 right-angle sander. These can be used for all but the finest sanding.



Random-orbit sanders, top. Be sure to check the dust collection and the paper-hole pattern before buying abrasives. The older-model Fein detail sander, bottom, is expensive but very effective in corners.

pad is a semi-rigid disc on the spindle of the grinder that supports the sanding disc as it spins.

Another nice disc to have around is a thin metal-cutting disc. This looks similar to the grinding disc that probably came with your grinder, but it's much thinner. It quickly cuts through bolts and old life-lines. There are masonry-cutting blades that look similar, so make sure yours says that it is for metal.

Sanders

Sanders are the tools we're all probably more familiar with from woodworking or furniture work. They range from triangular detail sanders to grinder-like right-angle dual-action sanders. Low-power finish tools are not the right choice for sanding fiberglass. I have two sanders in constant use: a random-orbit sander that takes 5-inch discs and a right-angle, dual-action sander, also in the

5-inch size, that takes the same discs. If you have access to a very large air compressor, then an air dual-action sander might be the best option of all; they are light, powerful, and inexpensive, but you need a lot of air to run one.

Random-orbit and dual-action electric sanders are most often available in 5-inch and 6-inch sizes, using either hook-and-loop pads or pressure-sensitive adhesive (PSA) pads for attaching sandpaper. The argument for the 6-inch one is simply that having a larger pad means that it swings a larger disc and sands a larger area more quickly. On the negative side, particularly for boat work, is the fact that the larger disc is harder to fit into lockers, corners, and other odd-shaped parts of a boat. Additionally, the old standard Porter Cable right-angle sanders in 5 and 6 inches are the same sander except for the pad and counterbalance. They can be converted from one size to the other with a few parts from Porter Cable. Having the same motor and gears turning the smaller 5-inch pad means that there is more power being applied per surface area of the smaller pad. Having more power per area should reduce bogging down and permit more aggressive sanding.

Nearly dustless

I've been happy with a pair of Porter Cable model 333 sanders for finish sanding. With a Shop-Vac hooked up to the dust port, this sander is very nearly dustless. I've used a similar DeWalt that was just as nice. These sanders are simple tools; pick a color you like and run with it.

The tool of choice in big dual-action sanders is the Porter Cable 7335 (5-inch) or 7336 (6-inch). The body of this tool can be a little large for some users, and the ergonomics could use some tweaking. Nevertheless, this is a well-built tool that can remove material very aggressively. The current model has a variable-speed feature; so far, I haven't turned mine down from "Full."

Finally, I also have an older Fein detail sander. This is an odd little duck that doesn't get used even a fraction as much as the Porter Cable sanders but, when needed, it's the only tool that can do the job. Boats have small corners, odd shapes, and small crevices. In these tight spots, this tool makes the difference between an OK job marred by a few oversights and a great finish that makes people look closely in an attempt to find a defect. The Fein sanders, and some other similar triangular detail sanders, vibrate in a very small area, allowing you to sand right up against edges and into corners in ways that quarter-sheet sanders cannot. The paper is expensive, and I have worn out a few of the backing plates, which are also expensive, but it is all very high quality and does a simply amazing job. When taking old finish off interior moldings and woodwork crevices, it feels like an eraser: just rub it back and forth a bit and you've got bare wood.

Minimum of hand-sanding

I'm not much of a perfectionist and, having experienced my worst trip to the emergency room after an injury related to hand-sanding, I do as little hand-sanding as possible. That said, there will invariably be an instance or two where there simply isn't any choice but to take a gritty disc in hand and go to it. In these cases, the finish can almost always be improved by adding a backer to the disc. A thin piece of closed-cell foam or some neoprene from an old wetsuit work well. For contour sanding, you can cut any shape you can think of out of scrap wood and wrap the sandpaper around it. The outside edges of molding or any radiused corner should be hand sanded, because even the lightest touch with a power sander will leave an uneven flat on the surface. If you're good, you can get away with a really soft pad and fine grit on the sander, but why risk it?

It's difficult to describe sanding technique. You want to apply some pressure, but not too much, and to tilt the sander at just a bit of an angle while keeping as much of the disc as possible on the surface. You'll develop a feel for it. Just make sure you create a balance between how much pressure you apply and the fatigue it creates. You want to exert some pressure while holding the sandpaper to the material but not enough to tire yourself out, overload the motor, dig into the material, or vibrate the substrate in such a way as to reduce sanding effectiveness. The sander should do the work; if you're quickly tiring from sanding, chances are it's because you're applying too much pressure. After a few hours of constant sanding you'll start fancying yourself something of a sanding artist: taking off a few layers of uneven paint here, smoothing some varnish there . . . OK, maybe I'm going too far in glorifying grunt work.

Abrasives

Sanding begins with coarse sandpaper (the low numbers, such as 24-, 32-, and 50-grit) and works down through steps to ever-finer papers (120- and 220-grit or higher). I have been astounded that I have ground the entire interior of our 32-footer with just two 24-grit discs that still have some life left in them. At this writing, the cockpit has been ground and the decks will follow, all with 50-grit, and after a day of grinding I'm still going strong on my first disc. I was concerned when I saw that the grinder sanding discs came in three-packs, particularly when compared to the 50- or 100-packs of sandpaper I had been buying for the dual-action sander.

I've found that 24-grit is about right for removing flaking gelcoat or paint on the rough side of a molding and that 50-grit has been perfect for taking off old non-skid on deck where the 24-grit was too aggressive. After using the 24-grit discs on the interior, I stepped through 80- and 120-grit. Going much smoother isn't really essential

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if you're going to use a high-build primer or if the area is in a locker or other inaccessible spot. I only went as far as 80-grit in the quarter berth areas, for example. For the smooth areas of the overhead I used 220-grit, but that may have been excessive. I'll re-assess that choice once the finish is complete. On deck, I wouldn't go further than 120-grit on the areas to be smooth, and going finer than 80-grit on areas to be non-skid is superfluous.

Removing the finish

Preparing woodwork such as bulkheads and built-ins for a full restoration can be accomplished by using 80-grit paper in a dual-action sander to completely remove the finish from the wood. One advantage of owning an older boat is that the surface veneer is thick enough to sand to raw wood without sanding through. Using 120-grit paper followed by 220-grit paper will prepare the wood for varnish, with 320-grit paper used between coats.

However you buy your sandpaper, buy lots of it, and change it often. In large quantities it isn't terribly expensive, and having lots of it around means you'll always have a fresh disc available. Even if a disc still feels rough to the hand, it may still need to be changed, since going through a few discs an hour is perfectly normal. PSA discs cannot be put back on once they've been peeled off, so use them up before changing grits. Once they come off, fold them in half, as these “tacos”

Having a few 4½-inch grinders around saves time spent changing wheels. These are set up for sanding, cutting, and grinding.





The Bosch 4½-inch grinder with sanding pad and 36-grit disc is a good choice for removing very heavy material.

can be used for hand sanding and touch-ups. Keep a few such tacos of each grit on hand.

People have personal preferences for different brands and types of sandpaper. I've tried all of them and, to tell the truth, I've found so much variation from one batch to the next of the same type that I hesitate to recommend any brand over the others. I heartily recommend buying your paper in bulk online from a company specializing in abrasives, since even the generic stuff from that source will be better than that from the local hardware store.

Like most things, the less pretentious the company, the fewer marketing claims about the product, and the less branding, the better. If you have a local abrasives supplier or an industrial supplier that sells directly to the public, it may be a good source, although these sources can be expensive. I buy most of my paper online from Industrial Abrasives, Inc., of Reading, Pennsylvania. A box of 50 discs of 5-inch 5-hole hook-and-loop runs about \$12. I have also found that McMaster Carr also carries very good abrasives and just about anything else you could possibly want. This company is an excellent resource for all kinds of things and you can spend an afternoon exploring their online catalog.

Protective equipment

Personal protective equipment is essential when using grinders and sanders. While fiberglass isn't as scary as asbestos, it still isn't something you want to breathe for any length of time. A respirator is essential; dust masks won't cut it. Eye protection is also essential and goes beyond safety glasses; goggles are better. Even with tight-fitting eye protection, it is simply amazing where glass grit can go. Grinders, in particular, and sanders, if they are used for more than a few minutes, are incredibly loud, particularly in the reverberative confines of a plastic hull. Ear protection in the

form of over-the-ear muffs keeps grit out of your ears as well as protecting them from noise.

Thick gloves are a good idea too. A grinder is a dangerous tool, so the user must remain aware of his hand positions relative to the disc. You don't want this tool to graze your leg or nick your finger. The protective guard is there for a reason; I have never encountered a situation in which removing it would have made things easier. It provides an essential safety function by keeping fingers off the spinning disc and it directs dust one way, rather than all over the place. Leave the guard in place!

Skin irritation is par for the course when working with fiberglass. When every surface and the air itself is full of glass dust, your skin will itch. A cold shower helps, but the truth is that after grinding fiberglass, you're going to itch. I've seen the moon suits that are supposed to help, but I haven't tried one. (**Note:** Like eye and ear protection, these suits are clumsy, uncomfortable, and unventilated. Wear them anyway. —Eds.)

The Zen of sanding

In contemplating a major restoration project, the moments we probably anticipate involve lovingly flowing fresh varnish onto original woodwork, hooking up new electronic doodads, the crackle of new sails, or maybe an engine that will finally start each and every time.

The truth of the matter is you're going to spend countless hours leaning on a little buzzing sander and wondering if the new batch of 120-grit discs is less aggressive than the last batch. I won't tell you to learn to relish sanding, but you might as well spend some of that time becoming one with the electricity, the motor, the sanding pad, the paper of the disc, the grit of the surface, and your yacht that's underneath it all.

Remember that it's your sailboat that you're shaping, ever so slightly, with each tilt of the sander and each swipe of the grinder. Take some pride in the buckets of sanding dust that accumulate and the bags of spent discs. A few extra hours sanding can mean a lot to the finished product and the pride you'll always enjoy in the coming years of sailing. *✍*

David Goldsmith sails his Flying Scot, Anhinga, on the waters of Florida, toils on his Islander 32 restoration, and works on a Ph.D. at the University of Florida.

Resources

Industrial Abrasives, Inc.

<<http://www.riverweb.com:8002/index.html>>

McMaster Carr

<<http://www.mcmaster.com>>