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| **Repairing Gelcoat**  Fixing Old Scars on Canoe and Kayak Hulls  by Wes Kisting  If you own a composite kayak, you're probably no stranger to the fragile properties of gelcoat. Like me, you probably cringe every time an unseen rock or stick grates against the hull. Perhaps you've even reached the point where you can't look at the scratches, gouges, streaks, or cracks in your hull without feeling a swell of disgust. Well, no more worries! Although gelcoat is unnervingly easy to take off, it's also relatively easy to put back on. And I'm going to teach you how.  **Gathering the Supplies**  To do a professional-quality repair-job on your kayak's gelcoat, you're going to need a number of important things. Here's a list and explanation of everything you should need to fix all but the most disastrous cracks and gouges in your gelcoat.   * **Polyester Gelcoat** - Sold by many marine supply shops, this is raw gelcoat in a can. Do not confuse it with epoxy, bondo, or other substances. Even though other products may work, polyester gelcoat is what you need. Epoxy is tougher and bonds more tenaciously, but it fades and discolors more easily, making it a poor choice for making any visible repairs to your hull. Epoxy also poses certain problems for future repairs. Use polyester gelcoat to repair your kayak's gelcoat. Before visiting the marine supply store, you may wish to contact your kayak's manufacturer to see if you can obtain a batch of original, color-matched gelcoat. If not, I recommend Evercoat's "Marine Polyester Gel-Paste." Its paste-like thickness makes it easier to work with than other, runny resins, and it doesn't need to be sealed off from the air to cure. * **Liquid Hardener** - Usually included free when you purchase polyester gelcoat, the liquid hardener is the stuff you add to make the polyester paste harden into true, finished gelcoat. Be sure your order includes a tube of liquid hardener; if not, you will need to purchase some before you can begin any repairs. * **Acetate Film or Wax Paper** (if required) - Some polyester gelcoat resins will not cure fully or properly if not sealed off from the air during the drying process. Check the instructions on your can of gelcoat to see if sealing is required. If so, you'll need to keep some acetate film or wax paper close at hand. * **Resin Coloring Agent/Pigment** - A tube of colored paste or liquid that is mixed with the polyester gelcoat to help match the color of your kayak's existing gelcoat. For most kayaks, white will be required. However, if your hull is a different color, be sure to obtain a tube of the coloring agent which most closely matches your hull's original color. Often a very close color match can be obtained by carefully mixing in small quantities of coloring agent at a time; however, if you want a near-perfect color match, you may also try contacting your kayak's manufacturer to request a batch of original, color-matched polyester gelcoat. * **Disposable Mixing Dish and Popsicle Sticks** - Used to mix and apply the gelcoat, these will be virtually impossible to clean, and therefore should be disposable. Do not use perfectly good dishes or utensils as they will almost certainly be wrecked. Use an empty butter tub or the bottom half of a soda can as a mixing dish, and use popsicle sticks to stir and apply the resin. * **Plastic Spreaders** - Used to scrape, smooth, and spread the gelcoat over the cracks and scratches, the plastic kind are the handiest tools to use. They should be obtainable from virtually any retailer who sells polyester gelcoat. A pack of two or three should be sufficient. * **Rubber Gloves** - The thin type of latex gloves used by surgeons are perfect, but any protective rubber gloves will do, so long as they do not inhibit your dexterity. Be sure you wear them at all times—even during clean-up. Otherwise, your fingers will end up sticking together like super-glue for a long, long time. * **Acetone** - An evaporative cleaner used to cleanse the repair area of debris, dirt, wax, and anything else which might prevent the new gelcoat from bonding to the old surface. Acetone should be available at most hardware stores. * **Respirator** - Used to protect against breathing the powerful and dangerous fumes produced by the polyester gelcoat and the acetone. A good respirator may save you from brain-damage or death, so don't neglect to buy one. Trust me, you'll need much more than a simple paper dust mask—even if you're working outside or in a well-ventilated area. Be sure you get a true respirator with a good filtering system to protect your lungs and brain. * **Wet/Dry Sandpaper** - Different than standard sandpaper, wet/dry sandpaper typically sands more delicately and produces a smoother, finer finish. By dipping wet/dry sandpaper repeatedly in water or running a steady stream of water over the sanded surface, the sandpaper will cut more smoothly and be less likely to clog from residual gelcoat. Although you may not end up using them all, you should obtain at least one sheet of each of the following grits: 80, 150, 220, 400, 600, 800, and 1000-grit. * **Rubbing Compound** - Used to restore a glossy, finished surface to the gelcoat, this is the stuff that you buff in to erase the tiny scratches and blotches left behind by spot sanding. Consider obtaining an electric buffer to help apply the rubbing compound evenly and effectively; however, it can be applied by hand with reasonable success. I recommend 3M Super Duty Rubbing Compound. * **Sanding Block** - A 5-inch long piece of 1" x 1" works well, or you can cut a 5-inch long piece off the handle of a standard wooden paint stick. Wrapping the sandpaper over a small, flat block of wood in this manner will produce a hard flat sanding surface that abrades the gelcoat evenly, instead of digging indentations from your fingers. * **Masking Tape** - Used to mask and protect the gelcoat surrounding the area to be repaired, almost any masking tape will do. Don't use highly-adhesive tapes (such as duct tape) as they may damage or mark the gelcoat. * **Disposable Rags** - Used to prepare the repair surface and to clean up any accidental spills or smudges, these rags will almost certainly be wrecked. Don't expect to wash them. Just use something you can throw away. Also, don't use paper towels which can tear or leave behind paper residue that may get stuck in the gelcoat. * **Plastic Bucket, Garden Hose, or Watering Can** - A bucket may be used to provide water for dipping wet/dry sandpaper and rinsing away sanded debris during wet-sanding. Better yet, you can rig a garden hose to pour a constant trickle of water across the repair surface. A garden hose works better to prevent clogged sandpaper, but some garden hoses don't seem to have a "trickle" setting and only seem able to deliver a torrent of water, or a tediously ineffective slow drip. If your garden hose can deliver a steady, moderate flow of water, you're one of the lucky ones. Otherwise, if you have an exceptionally patient friend, you can enlist him or her to stand over you with a watering can, pouring a nice even trickle of water across the repair surface as you sand. * **Sawhorses or Blankets** - You're going to need somewhere to set your kayak while you work on it. Sawhorses fitted with pads and straps to hold the kayak typically work best as they hold the kayak upside down at a nice, knee-saving, waist-high level. However, if you don't own sawhorses and don't want to buy them, you can also lay blankets on the floor and use a board or a piece of foam to tilt the kayak at the desired angle for working. Just keep in mind that, when you get to applying gelcoat, you'll want the repair area to be as level as possible.   **Preparing to Repair: Wash, Wash, Wash Your Boat**  Okay, you've collected all the supplies and now you're ready to start your repairs, right? Wrong. Before you even think about making any repairs, be sure to wash your kayak's hull thoroughly with soap, water, and determination. Wash like you've never washed before. Try diligently to remove every smudge, smear, or streak that you see. This will help ensure all the scratches are readily visible. More importantly, it will also remove some stubborn marks which you might otherwise have sanded unnecessarily. Remember, the less sanding you need to do, the better, so make sure the "damage" you set out to repair really is damage and not just stubborn smudges or blemishes that a little elbow grease could have cured.  **Identifying the Damage: All Scratches Are Not Alike**  Okay, so your hull is squeaky clean. Now it's time to identify the different types of damage in your gelcoat. Why? Because different degrees of damage should be repaired in different ways. Why mix, pour, and sand a whole new batch of gelcoat if a little careful sanding will do? It will save you a lot of time and heartache if you first identify different types of damage and fix one type of damage at a time. Fortunately, I've subdivided my do-it-yourself instructions according to different degrees of damage. Just match your scratches and gouges to the definitions below and follow the instructions to repair that particular type of damage.  **Superficial Scratches and Abrasions**  This kind of damage includes any marks which are visible on the gelcoat, but not especially deep. More specifically, it refers to marks and abrasions which are no wider or deeper than the thickness of your fingernail and which feel only mildly rough to the touch. This is the easiest type of damage to fix as it only requires a little careful sanding.   1. If possible, set up a hose to create a gentle, steady flow of water across the repair area. Otherwise, wet the repair area thoroughly with a sponge and rinse repeatedly during the rest of the repair process. 2. Wrap a piece of 600-grit wet/dry sandpaper around a small sanding block and gently sand the scratch or abrasion until it disappears and blends smoothly with the surrounding gelcoat. If the 600-grit paper does not remove the scratch, try switching to courser, 400-grit sandpaper. If 400-grit sandpaper does not work, you can try switching to 220-grit, but you should also consider the possibility that the scratch is too deep to be fixed by sanding alone. As you sand, be sure to rinse the sandpaper and the repair area frequently in order to prevent the sandpaper from clogging with residual gelcoat.   **IMPORTANT**: Never sand any deeper than necessary, never sand more than 1/4" outside of the repair area, and never try to sand out deep scratches. If you do, you risk exposing the laminate, creating a bowl-shaped depression in the gelcoat, or wearing the gelcoat unnecessarily thin.   1. Wipe and rinse the repair area thoroughly. 2. Wrap a piece of 1000-grit wet/dry sandpaper around a small sanding block and go back over the sanded area until the gelcoat is restored to a smooth, even finish. 3. Wipe and rinse the repair area thoroughly. 4. Buff the repair area with 3M Super Duty Rubbing Compound or a similar finishing compound to produce a glossy, finished surface.   **Scratches, Gouges, and Chips**  This kind of damage includes any damage which is more than superficial but does not go all the way through the gelcoat into the laminate. In other words, they are deeper than the thickness of your fingernail, but there is no visible patch of fiberglass or kevlar showing through.   1. Trace around the perimeter of the scratch, gouge, or chip with masking tape, leaving approximately 1/4" of space all the way around the damage area. 2. In the case of scratches, carefully drag a sharp nail or flat-head screwdriver through the entire scratch to widen it (Figure 1). This will ensure the polyester gelcoat paste fills it thoroughly and forms a lasting bond. Gouges or chips should already be sufficiently wide, but scratching the chipped area with a nail will yield a better mechanical bond for the repair (Figure 2).   http://www.roguepaddler.com/image/gelcoat2.jpg  Figure 1: Widening and cleaning a long crack in the gelcoat   1. Clean the scratch, gouge, or chip thoroughly with acetone to remove any dirt or debris.   http://www.roguepaddler.com/image/gelcoat1.jpg  Figure 2: Scratching and prepping a chipped area of gelcoat   1. If you haven't already, position the kayak so that the area to be repaired is as flat and level as possible. 2. Measure out the approximate amount of polyester gelcoat you expect to need to complete all repairs. If your kayak's hull needs extensive gelcoat repair, consider doing a small portion at a time (particularly if it's your first time working with gelcoat). The results are almost always much better when working with small quantities of polyester gelcoat paste (two to six teaspoons) at a time. 3. Mix in the resin coloring agent in small quantities until the paste matches the color of your kayak's gelcoat as closely as possible. 4. Add the necessary amount of liquid hardener to begin the gelcoat hardening process. Ideally, mix just enough to achieve an approximate working time of 15 minutes to a half hour, which should be sufficient time to effect all but the most extensive repairs.   **IMPORTANT:** Be sure to mix in the liquid hardener *thoroughly*. It must get distributed throughout all of the polyster gelcoat paste. Otherwise, some of the paste may fail to cure fully, leaving behind soft blisters or bubbles of uncured gelcoat and, eventually, serious flaws in the repaired area of your hull.   I recommend experimenting with the liquid hardener and a small amount of gelcoat paste in order to determine the approximate ratio of hardener-to-paste necessary to achieve an ideal working time of 15 minutes to a half hour. If the gelcoat begins to harden any sooner than this, it may ruin your repairs. On the other hand, if it hardens much slower, it will unnecessarily delay the repair process.   1. Apply a thin, but generous coat of polyester gelcoat paste over the scratch, gouge, or chip. Gelcoat tends to shrink when it cures, so it tends to be easiest if you "overfill" the damage slightly and sand it down later, after it hardens. The thickness of the masking tape alone should be more than sufficient to contain a thin layer of superfluous gelcoat over the scratch, gouge, or chip. However, if you're having serious trouble getting the gelcoat to stay where you put it, you can mix in a small amount of talc to thicken it. 2. Using a plastic spreader, press and scrape the polyester gelcoat back and forth across the scratch, gouge, or chip to ensure it is filled thoroughly. Take care not to spread the gelcoat beyond the masked off area. If you accidentally "sling" gelcoat elsewhere onto the hull, wipe it off promptly with a dampened rag. 3. Let the gelcoat cure for at least one full hour, preferably two. Better yet, keep an eye on the gelcoat residue in your mixing tray. When it hardens thoroughly, it's probably a safe bet that your repair job has hardened thoroughly as well. If you have any doubts about whether the repaired gelcoat is fully cured, wait longer. Never begin sanding the repaired area unless you are entirely certain the repair has had sufficient time to cure. On the other hand, if five hours later the repair still isn't dry, you probably didn't add enough liquid hardener to cure the paste completely, and now you have a disastrous bit of clean-up and re-repairing to do.   **IMPORTANT:** Some polyester gelcoat pastes must be sealed off from the air in order to cure fully. Refer to the manufacturer's instructions on the gelcoat can. If sealing is required, use acetate film or wax paper.   1. When the repaired gelcoat is no longer tacky or soft to the touch, and appears to be fully hardened, remove the masking tape from around the scratch, gouge, or chip. A raised band of hard new gelcoat will remain. Congratulations, you have filled the scratch, gouge, or chip! Now it's time to sand the new gelcoat smooth with the old. 2. If possible, set up a hose to create a gentle, steady flow of water across the repair area. Otherwise, wet the repair area thoroughly with a sponge and rinse repeatedly during the rest of the repair process. 3. Wrap a piece of 80-grit wet/dry sandpaper around a small sanding block and sand the repaired area until the new gelcoat is nearly even with the surrounding original gelcoat. 4. Wipe and rinse the repair area thoroughly. 5. Wrap a piece of 600-grit wet/dry sandpaper around a small sanding block and continue sanding the repaired area until the new gelcoat is perfectly even with the surrounding original gelcoat. 6. Wipe and rinse the repair area thoroughly. 7. Wrap a piece of 1000-grit wet/dry sandpaper around a small sanding block and go back over the sanded area until the gelcoat is restored to a smooth, even finish. 8. Wipe and rinse the repair area thoroughly. 9. Buff the repair area with 3M Super Duty Rubbing Compound or a similar finishing compound to produce a glossy, finished surface.   **Star Cracks and Small Stress Cracks**  This kind of damage includes damage which is not only deep, but wider than the typical scratch or gouge. Typically produced wherever a hard impact occurs, they include small circles or "rings" of stress cracks radiating out from a small impact area, or lightning-bolt shaped cracks less than three inches in length. These can be repaired by yourself, but they require a bit more creativity and skill than the types of damage described above. The same repair principles apply.  **Severe Stress Cracks and Structural Damage**  This kind of damage is the most extensive, excluding a full-blown hole in your boat. It includes the kind of severe stress cracks and damage to the structural layers (fiberglass or aramid/kevlar) which occur whenever sufficient stress is exerted to bend the hull beyond what the gelcoat can flex to accommodate. Typically, this type of damage is caused by one of two things: (1) a poorly-designed or over-tightened roof rack system, or (2) severe stresses exerted on the boat during rough-water rescue techniques or violent collisions. Virtually any hard impact or sudden weight applied to the kayak can produce such damage. In cases where the structural layers are visibly damaged, enlist the help of an expert in fiberglass and aramid/kevlar repair. This level of damage is well beyond the scope of basic maintenance and mistakes in the repair work could produce disastrous results. | This article courtesy of:  [RoguePaddler](http://www.roguepaddler.com/index.htm)  **Terms of Use**  All content on this site is the property of [RoguePaddler](mailto:%20editor@roguepaddler.com). Do not reproduce or distribute our materials without our [editor's](mailto:%20editor@roguepaddler.com) written permission. |

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