Assessing the Challenge
The first step in preparing to perform boat repair is to analyze the nature of the damage. Damage to a hull will usually come in two forms or a combination of both: puncture or fracture and abrasion. Most of the time, you’re aware (but perhaps unwilling to admit) when the damage occurred. It is also possible for a hull to degrade over time and use aging as evidence of aging on a specific side of the hull. Often careful inspection on the interior of the hull will reveal white lines in the lay-up indicating resin fractures (when bond between fabric and resin has been broken.)

Abrasions are a cosmetic issue as long as confined to the gel coat. The gel coat is a thin outer layer of the hull. Gel coat is designed to protect the hull from abrasion and flex. If gel coat has been worn off or chipped away, inspect the fabric layers underneath for damage. If the gel coat is broken, repair may be necessary. Restoration of the gel coat is required to cure the resin from a liquid to a solid.

Reparations
Prior to repair, the repair materials can be applied. All resin is somewhat hazardous. Catalysts are designed to work with specific resins and mixtures vary. It’s best to obtain the same brand of resin, catalyst and mix only the amount of resin you can anticipate using.

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slide. A sharp knife and pro tool such as a fine edged screwdriver are helpful in removing damaged material.

**Interior Preparation**

If you’re dealing with a fracture, grind or sand away a gentle “U” shaped groove along the fracture to provide sufficient surface area for bonding repair materials to original hull.

Once damaged materials are removed it’ll be necessary to sand the interior surface with 80 grit paper to remove any contamination or soil. If the interior of your hull is painted it will essential to sand away all paint traces before proceeding. Sand approximately 4 to 6” out from damaged area, depending on size and extent of damage. The greater the extent of the damage the larger the area to be involved in the repair. Continue to sand surface until surface is slightly textured. You’ll be applying multiple layers of fabric to restore the hull integrity, the larger the damage the more layers of reinforcement that will be required. Immediately prior to applying resin to interior surface, wipe surface clean with solvent such as denatured alcohol to remove sanding residue or other contaminants.

Once surface is prepared, it will be necessary to align the edges of the repair to ensure conformity. In most cases, a “jig” can be fashioned to align the sides of the repair using cardboard and duct tape. Place a piece of plastic wrap between the hull and cardboard at any point where the jig or supporting structure may be exposed to resin. If you’re dealing with a puncture resulting in missing material, cut a cardboard disk larger than the hole, cover it with a quality plastic wrap and tape disk to exterior of the hull so that it conforms to hull. This will provide a surface to align repair with hull.

Cut a piece of repair fabric that fits damaged area. If you’re dealing with a thick laminate or deep damage that needs to be filled, cut small pieces and bits of fabric to lay directly in the damaged area underneath piece of fabric sized to cover damage.

Cut additional pieces of fabric in successively increasing sizes, each about ½” inch larger than the previous piece. In most cases, a minimum of 4 layers will be required. For more extensive damage, figure on 6 layers as necessary.

**TIP:** To avoid patch edges being filled after installation, cut fabric with a radius or curved edge rather than straight sides with sharp corners.

**TIP:** For strongest repair, rotate cloth when cutting patches so that fabric weave runs in different directions from patch to patch.

**Interior Repair Procedure:**

Following manufacturer’s instructions carefully mix resin and catalyst, limiting quantity to what can be used within the working time specified. (Don’t forget to take temperature into consideration.)

Using brush coat on a light coat of catalyzed resin onto interior Repair. If employing filler pieces place them in position and tamp in place with brush. Keep tamping until fabric changes color, indicating saturation.

Next wet out surface to correspond with patch sized to fit damage. Place this patch over hull and tamp in place. Use additional resin, tamp patch starting from center towards edges. Once patch is in place, proceed with successive patches until all are in place and fully saturated with resin.

Use resin sparingly. If working on curved surface with vertical panels, resin will tend to run or drip. Any runs must be cleaned up immediately using a scraper and or sponge. Additional resin leaves only weight, not strength. Use only enough resin to wet out fabric patches. Excessive resin can also result in a layer of resin between patches, preventing patch to patch bonding and resulting in a weak repair and even allowing patch to float out of position.

**TIP:** If you’re repairing a curved section of the hull it’s important to make sure that cloth is held firmly in contact with hull surface. During curing process the patching cloth will try to return to a flat profile. You can keep it in position by tamping it with your brush or by laying a layer of quality plastic wrap over repair and using a flexible weight to press patch into position. Water or sand bags work well as flexible weights, draped over repaired area.

Remove any plastic wrap used during repair once the resin has started to set up, approximately 30 minutes after resin is mixed. Actual time will vary depending on temperature and resin factors.

Allow repair to cure completely before use. This will be a minimum of 24 hours from start of repair. Resin cures quickly at first and then cure proceeds more slowly. It usually takes about 24 hours to reach maximum strength.

If desired, you can paint the repair to match existing hull finish after cure is complete.

**Exterior Hull Preparation**

You now have the basic hull area for exterior repair work as the primary focus will be cosmetic, this is the side of the work most people will see. Depending upon the nature of the damage, a gel coat repair kit may be adequate or your hull may require some additional finishing work.

Remove the alignment jig (if used). Check out how “fair” (smooth) the hull surface is. If only uneven portion of surface is due to missing gel coat, the kit may be all that is required for repair. If the damage penetrated into underlying areas you will need to first fill the gouge and then finish with gel coat kit.

If you’re dealing with a fracture, you’ll need to grind or gouge a “V” or “U” shaped groove on the fracture line. This can be accomplished with a Dremel® type tool or even a sharp edge screwdriver held at an angle. Do not try to go too deep. It’s better to sand away gel coat further from the fracture to provide create “V” shaped area.

Tape hull around damage, approximately ½” out from edge of damage. This will limit area to be sanded. Lightly sand gel coat within tape with extra fine sandpaper. Wipe clean with solvent.

**Exterior Hull Repair**

Fill gouge with a 2 part epoxy paste adhesive, readily available at hardware and marine stores. Mix parts equally and spread into gouge. Make sure final surface is lower than surrounding gel coat to allow installment of layer of gel coat over repaired surface. Allow adequate time for putty to cure as specified by manufacturer’s instructions.

**Gel Coat Repair**

Rough up top surface of filler with extra fine grit paper. Mix small amount of gel coat with catalyst as specified by manufacturer. Multiple thin layers of gel coat are better than one thick layer. Stir thoroughly.

Apply catalyzed gel coat to damaged area spreading thinly. As first layer of gel coat cures it will lose its shine. Once layer is dull, apply second layer. Make sure there are no air bubbles in new gel coat.

When gel coat is level with original gel coat, spread a thin edge onto existing gel coat to cover scratches from sanding. A flexible spreader works well to feather new gel coat with old.

**TIP:** To reduce finish sanding, take plastic wrap and spread smoothly over final gel coat layer, pressing gently with fingers to smooth gel coat. Tape plastic tight over gel coat and allow gel coat to cure. Remove wrap before sanding.

To bring up gloss in gel coat, wet sand surface starting with 220 grit and proceeding to 400 to 600. You can use too much water. Sand with a light hand and in a circular motion. The more you sand the shinier the finish and the more durable the repair. If a “factory-quality” final appearance is desired, finish with rubbing and then polishing compound. Allow gel coat to cure for 24 hours before use.

**Clean Up**

Please properly dispose of all used materials. Resin is potentially flammable and should be handled with care. Please respect and abide by local disposal regulations.