Sample projects

The repairs described on this page are just a sample of the potential uses for G/flex® 655 Epoxy Adhesive. Products not included in the kit can be found in the *WEST SYSTEM® User Manual & Product Guide* and are available at WEST SYSTEM dealers.

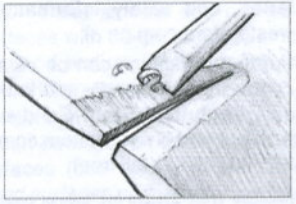
Be sure to read *Handling epoxy* and *Basic techniques* on the reverse side of this guide before beginning these repairs. For additional information on WEST SYSTEM products or techniques, visit westsystem.com or call 866-937-8797 (toll free).

Plastic canoe & kayak repairs

Plastic canoes and kayaks are often made with thermoformed plastics like HDPE (high-density polyethylene), ABS, and occasionally PVC. G/flex adheres to these materials if specific surface preparations are followed. Refer to the *Surface Preparation* chart on the reverse of this page.

Split and crack repair

Open up cracks and splits with a saber saw or hacksaw blade to create a slight gap in the break. Bevel the edges of the crack with a sharp scraper like the end of a sharp chisel or with a cabinet scraper to create a 3/8" to 1/2" long bevel on both sides of the split and on both sides of the hull (1). Sand the beveled surfaces to round the edges and create more taper with 80-grit sandpaper (2).



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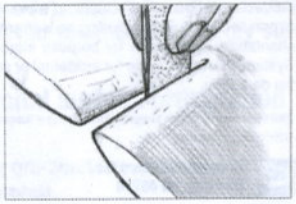

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Flame treat HDPE and LDPE (high-density and low-density polyethylene) plastic with a propane torch to oxidize the repair surfaces. See *Special surface preparation* on the reverse of this page.

Mix an appropriately sized batch of G/flex 655 Epoxy Adhesive. Apply a bead of the adhesive to the beveled joint, overfilling it slightly.

Cover the adhesive filled joint with 2" wide cellophane packaging tape while forcing the excess (overfill) epoxy through to the other side of the joint. Avoid using too much force, which could leave the taped side under filled.

Spread out the adhesive on the opposite side to fill in the beveled seam. Add or remove epoxy to fill the bevel flush.

Allow to cure 7–10 hours before removing tape. Use a scraper or sandpaper to remove high spots and smooth the surface. Paint the area with plastic-compatible paint like Krylon™ Fusion.

Small hole repair

Canoes and kayaks are often dragged over sand and rocks, resulting in worn off ends and eventual leaks near the bow and stern.

Clean the area being repaired with a mild solvent like rubbing alcohol and paper towels. Sand with 80-grit sandpaper to create a slight taper around the perimeter of the repair. Flame treat the repair surfaces of HDPE and LDPE plastics.

If the worn section has a gap that is too wide to bridge with G/flex 655 Epoxy Adhesive, say 1/4" to 3/8" across, cover the back of the hole with a temporary backer to support the epoxy while it cures. The backer can be a wad of plastic wrap, piece of polystyrene foam, or any appropriately shaped material covered with plastic wrap. The plastic wrap will allow for easy removal after the epoxy cures.

Mix an appropriately sized batch of G/flex 655 Epoxy Adhesive.

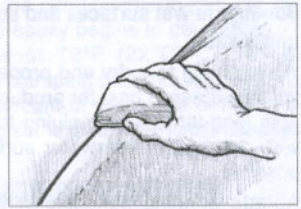
Apply the adhesive to the area with a mixing stick or plastic spreader. Apply enough epoxy to fill the hole and build up low areas to match the original thickness. Apply additional epoxy, if necessary, while previous applications are still tacky.

Allow to cure 7–10 hours before removing excess cured epoxy and shaping the surface with a cabinet scraper, file, or sandpaper. Paint the area with a plastic-compatible paint like Krylon Fusion™.

Create skid plates / repair larger holes

Avoid wearing holes on the keels and ends of canoes and kayaks by applying an abrasion resistant fiberglass strip on the wear areas. Fiberglass or Kevlar™ reinforcement can also be used to patch larger holes (over 3/8").

Clean the surface with a mild solvent like rubbing alcohol and paper towels. Sand the end of the canoe along the bottom and up the sides a few inches with 80-grit (3). This area will define the size of the skid plate. Flame treat HDPE or LDPE plastics. If you are patching a hole, cover the back with a temporary backer as described earlier.



3

Cut three or four layers of light fiberglass cloth (4–6 oz fabric) to cover the sanded area. Cut the bottom piece of fiberglass to fit to the sanded/flame-treated boundary. Trim each successive layer an inch or two narrower and shorter than the previous. This tapers the thickness of the fiberglass skid plate/patch toward the edges so it will easily deflect and cling to the hull as it flexes.

Mix enough G/flex 655 Epoxy Adhesive to wet out and apply one or two layers of fabric.

4

Apply a coat of epoxy to the sanded/treated area. Lay the largest piece of fiberglass onto the adhesive. Apply more adhesive to wet out the fiberglass cloth. If necessary, a heat gun can be used to warm the epoxy and improve wet out in cooler temperatures. Use a spreader to smooth the fabric and remove excess epoxy (4).

Repeat the fiberglass application with the remaining piece(s). Center each smaller layer on the one before it. Wet out the fabric, and then use a spreader to smooth the fabric and remove excess epoxy.

Apply a coat of adhesive to fill and smooth the edges of the fabric if desired while the fiberglass application is still tacky.

Allow to cure 7–10 hours before removing any rough edges or excess cured epoxy with a cabinet scraper, file or sandpaper. Paint the area with a plastic compatible paint like Krylon Fusion™. ■

Wood construction and repair

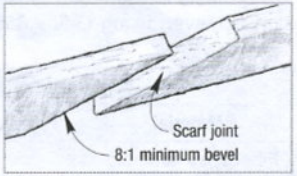
G/flex 655 is an excellent adhesive for wood. It is especially good for gluing native hardwoods like white oak and for tropical woods like teak and purpleheart. There are many uses for G/flex Epoxy Adhesive in building and repairing boats, indoor and outdoor furniture, cabinetry, and trim.

Refer to *Special surface preparation* and *Bonding* on the reverse page for basic gluing information. Here are some additional wood bonding applications that extend the uses of G/flex 655 Epoxy Adhesive.

Joining wood

BUTT JOINTS are used to edge glue lumber to create wider boards. Edges are typically square cut at 90° and simply butted up to one another when gluing. This joint is used for edge gluing lumber; it is not recommended for end gluing, or lengthening boards parallel to the grain. Avoid excess clamping pressure.

SCARF JOINTS are used to join two pieces of wood together along their length. The ends of lumber are machined with an 8:1 to 12:1 bevel angle (5). Longer bevels create more gluing surface and potentially stronger joints. Scarf joints are often used to replace damaged sections of frames and ribs in traditionally built wooden boats.



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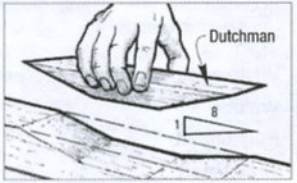
A DUTCHMAN is a wood splice used to repair damaged sections of wood timbers. We recommend creating an 8:1 bevel (6) on each end of the joint to provide adequate gluing area to maintain structural integrity.



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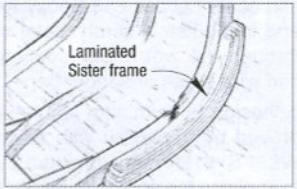
SISTER PLANKS are used to build up the strength of the lumber by gluing additional pieces or sister planks on one or both sides.



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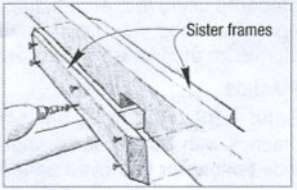

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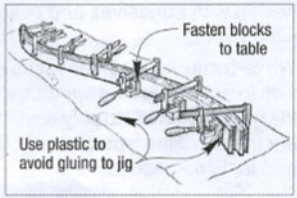
Bond sister planks where structural members have been damaged by rot (7) or weakened by cutouts for plumbing or drain holes (8). They are useful where weight or appearance is not a factor.

LAMINATING multiple layers of wood strips is a great way to create custom-shaped lumber for frames, sister frames, legs, arches, railings, and trim. Laminated lumber is stronger and more stable than steambent or sawn lumber. Glue strips using the preparation and bonding techniques on the reverse page. Use a jig or mold to clamp strips to the desired shape (9). Jigs should be strong enough to provide even clamping pressure and prevent springback until the epoxy cures. ■



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Repairing splits, cracks and delaminations

Paddles, oars, garden tool handles, and sports equipment made with wood or laminated materials can split or crack under normal use or abuse. G/flex 655 Epoxy Adhesive's tenacious adhesion and ability to resist shock loads make it a good choice for these kinds of repairs.

Insert a wedge into the crack(s) to expose as much bonding area as possible without increasing the damage. Mix a small batch of G/flex 655. Work epoxy into the crack with the mixing stick or a small brush, or inject epoxy with an 807 Syringe. Use a fine blade or stick to push epoxy as far down into the crack as possible.

Wait a few minutes for absorption to take place before removing wedge and clamping the crack(s) closed. Allow to cure 7–10 hours before removing clamps and sanding away epoxy squeeze-out. Wait 24 hours before using.

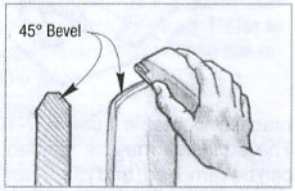
A layer or two of light-weight fiberglass fabric (4–6 oz) can be applied for additional reinforcing. Refer to *Fiberglassing* on the reverse page.

Use G/flex 655 Epoxy Adhesive to fill cracks and voids in masonry and tile. Fill cracks in damp and wet basement walls. Scrape out loose material and force 655 into cracks with a plastic spreader. ■

Create durable tips on wooden paddles and oars

The tips of canoe and kayak paddles take lots of abuse from scraping bottom, pushing off rocks, and fending off debris. Use G/flex 655 Epoxy Adhesive to produce a durable edge to protect tips from damage.

Sand varnish or paint from the tip of the paddle to expose fresh wood. Use sandpaper on a hard sanding block to create a slight bevel around the edge of the paddle tip (10).



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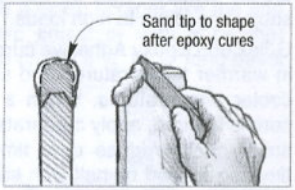


11

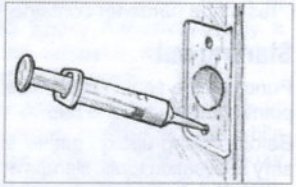
Mix an appropriate amount of G/flex 655. Apply a thick bead of the thickened mixture around the edge of the paddle blade (11). Apply additional 655 to extend the tip, if desired, after the initial application has gelled and will support the additional weight.

Allow to cure 7–10 hours. Wash with water before shaping the tip with a file or sandpaper. Apply paint or varnish if desired. ■

Bonding fasteners

Installing screws and other threaded fasteners with G/flex 655 dramatically improves load carrying capacity and is especially useful when fasteners are subject to shock or vibration.

Use G/flex 655 Epoxy Adhesive to install new fasteners and hardware, repair stripped screw holes and replace missing wood around fasteners. When cured, G/flex 655 can be sanded, sawn, nailed and screwed. Small screws, nails, and tacks can be driven into it without pre-drilling. Larger fasteners may require a pilot hole. Experiment for best results.



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The easiest method is to fill pilot holes (or stripped fastener holes) (12) with G/flex 655 Epoxy Adhesive prior to installing the screws. The epoxy will bond to the exposed end grain on the inside of the hole, effectively increasing fastener diameter. This results in more holding power, and seals water out so the wood stays drier. Drier wood is stronger than damp wood.

For even greater strength and stability, drill oversized holes 2/3 the depth of the fastener, then fill the hole with G/flex 655. Install the fasteners with just enough force to hold the hardware in place until the epoxy cures. ■

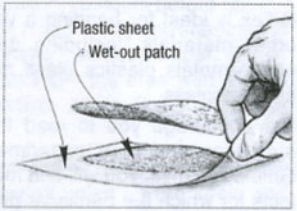
Underwater fiberglass patching

Intended for small repairs, fiberglass patches should be small enough for one person to carry and apply underwater, limiting the size to about 12 inches square. The water must be fairly still so the patch is undisturbed during the cure.

Clean the surface to be patched and abrade the area of the patch with sandpaper to remove bottom paint.

Cut multiple layers of fiberglass cloth, with the first layer sized to fit the abraded area and successive layers ½" smaller on each side than the previous one.

Apply G/flex 655 to a piece of sturdy plastic film (like freezer bag plastic), cut larger than the patch. One by one, wet out the fiberglass plies onto the plastic starting with the smallest piece and ending with the largest (13). Compress the patch by squeezing out excess epoxy between layers with a spreader. Spread a uniform $\frac{1}{16}$" thick layer of 655 to the compressed fiberglass stack.



13

Position the fiberglass patch over the abraded area underwater, making sure that the plastic covering stays in position on the outside of the patch. (Be sure to wear protective gloves.)

Apply pressure with a plastic spreader starting in the middle of the patch and work toward the edges to squeegee the 655/fiberglass patch against the hull and to displace water at the repair surface. Repeat the process in all directions to displace all of the water under the patch and push excess 655 Adhesive toward the edges of the patch.

Allow 24 hours to cure before removing plastic. Inspect repair at first opportunity (preferably with the hull out of the water) and rework as needed for structural integrity.

Blending epoxies

Advanced users can blend G/flex 655 Epoxy Adhesive with WEST SYSTEM 105 Resin-based epoxy combinations to modify toughness, flexibility, cure speed, viscosity, strength, and elongation. The epoxy blend will have properties/characteristics derived from both epoxy systems, roughly in proportion to the percentage of each epoxy in the blend.

Blending WEST SYSTEM 105/205 with G/flex 655 will speed up the cure of G/flex, lower its mixed viscosity and increase rigidity of the cured epoxy, compared to using G/flex 655 alone.

To blend G/flex 655 Epoxy Adhesive with 105 Resin-based epoxies, you must meter the appropriate resin to hardener mix ratio of each epoxy prior to blending the two combinations together.

Visit westsystem.com or call the WEST SYSTEM Technical Staff at 866-937-8797 (toll free) for more information. ■