

1. SAFETY

Consult FlowCast SPR Safety Data Sheet (SDS) before use. Wear protective gloves, clothing, and eye/face protection. Use only in well ventilated areas. Avoid contact with the skin and eyes. Take off contaminated clothing and wash before reuse. Keep containers tightly sealed when not in use. Avoid breathing vapors and fumes. Wash hands thoroughly after handling. During finishing operations wear proper PPE and avoid dust. When fully cured, FlowCast SPR is an inert plastic.

2. PREPARATION

Supplies and Materials

- FlowCast SPR resin and hardener
- EcoPoxy Liquid Color Pigments and / or Metallic Color Pigments
- Epoxy casting mold
- Prepared wood slabs, or tools for wood slab prep (hammer, chisel, draw knife, die grinder with 80 grit pad, or power drill with wire brush attachment)
- Containers and / or pour pails for mixing resin (multiple sizes with volume markings)
- Worktable
- Plastic drop sheet for worktable
- Paper towel
- Mixing sticks
- Weights or clamps and spacers
- Denatured/isopropyl alcohol or warm soapy water
- Tools for finishing (router and sled, table saw, track saw, miter saw, orbital sander and sandpaper)
- Finishing product (UVPoxy or hardwax oil)
- Putty knife
- Plastic wedges
- Rubber mallet
- Nitrile gloves
- Safety glasses
- Work apron or shop coat
- Scale (optional)
- Torch (optional)
- Infrared temperature gun (optional)
- Shore D durometer (optional)

Work Area

The ideal temperature for working with FlowCast SPR is 22°C (72°F), with a recommended range of 20-25°C (68-77°F). The work area, resin, and work piece should be at the recommended temperature prior to starting your project. This can be confirmed by using an infrared temperature gun. Best results will be obtained in a clean, dry, and dust-free environment. Set up a work area and table where you can mix and pour FlowCast SPR. The worktable should have a protective cover for easy cleanup (sheet of polyethylene, vapor barrier, garbage bags, etc.).

Epoxy Casting Mold

The mold should be leveled on the worktable and checked for leaks before pouring FlowCast SPR.

If you have assembled your own mold, a simple way to check for leaks is to fill your mold with water to the depth planned for your project. Leaks can then be easily identified and properly sealed. The mold should be emptied and completely dried before use with FlowCast SPR.

Please see “How To Build An Epoxy Casting Mold” on EcoPoxy’s website for full detail on mold building.

Resin

Calculate the amount of FlowCast SPR needed for your project. Multiply the length, average width, and depth of your pour in inches, then divide by 61.024 to obtain the volume in liters. Ensure you add at least 5-10% to your volume calculation to accommodate any cracks, voids, or holes in the wood slab. Alternatively, use the FlowCast Volume Calculator located on the EcoPoxy website:

<https://www.ecopoxy.com/products/flowcast/>.

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Note that FlowCast SPR can be poured up to 1" thick per layer, up to a volume of 2L. For thicknesses greater than 1", multiple layers are suggested.

Always familiarize yourself with the product on a test piece or in a test mold. This way you will prevent costly mistakes on your actual pour.

Wood Slabs

Wood slabs should be purchased dried and ready for use, ideally with a moisture content between 6% and 12% (depending on the humidity of your environment).

The slab thickness should be slightly over 1" to account for resin shrinkage during cure, and to allow for pouring up to 1" without covering the top of the slab.

Determine the layout of the wood slab(s) in your mold and cut them to size with a track saw, circular saw or miter saw. If your slab came with bark attached, remove it from the slab to expose the live edge. This can be done with a hammer and chisel, draw knife, die grinder with an 80 grit pad, or a power drill with a wire brush attachment. Be sure to clean any dust or debris off the surface after removing the bark.

Live edges should be sealed with a coating of UVPoxy or FlowCast SPR. This will prevent bubbles from forming as the FlowCast SPR cures, which can be caused by air migrating out of the wood. UVPoxy is recommended if you are planning to cast on the same day as your preparation. FlowCast SPR is recommended if you intend to cast the day after your preparation. To ensure a proper bond between the sealing resin and wood, use 220 grit sandpaper to scuff all the surfaces of the wood slabs that will be seal coated with resin, making sure to clean off the dust before application.

For best adhesion, pour FlowCast SPR while the seal coat is still tacky. Otherwise, wait until the seal coat is set to touch, then scuff the sealed surface with 220 grit sandpaper. Remove excess dust with compressed air, then wipe clean with denatured or isopropyl alcohol before pouring FlowCast SPR.

There are two other methods for live edge preparation: sealing the entire wood slab(s) with epoxy (by painting/brushing it on) then waiting until it is in a tacky state to pour or using the live edge without any additional prep after removing the bark.

After the wood slabs are prepared, they should be secured in the mold using clamps and spacers or suitable weights.

3. MIXING

In a clean, dry container combine (by volume) 2 parts resin with 1 part hardener and mix thoroughly for 4-5 minutes. Mixing the resin and hardener will make the resin cloudy and visible streaks will be present. Continue mixing until all streaks disappear. The bottom and sides of the container should be periodically scraped to ensure all material is mixed. Not doing so could result in unmixed resin being present in your pour, creating wet or sticky areas of uncured resin.

A small scale can be used for mixing resin and hardener by weight. The weight ratio is 2.5 parts resin to 1 part hardener.

Pigments

Add Metallic Color Pigments and mix until evenly dispersed (typically 2-3 minutes). Use the following guidelines to achieve your desired look:

- Opaque = 2 grams (1 tsp) per liter
- Translucent = 1 gram (1/2 tsp) per liter
- Transparent = ¼ gram (1/8 tsp) per liter

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Experienced FlowCast users may notice that the amount of Metallic Color Pigment recommended for FlowCast SPR is greater than that recommended for FlowCast. The additional pigment is required to provide a similar effect to FlowCast because FlowCast SPR is used for thinner pours.

For Liquid Color Pigments, add one drop at a time until desired opacity is achieved. It is recommended not to use more than 3% of total volume or approximately 4% of total weight.

4. POURING

Carefully pour the mixed FlowCast SPR into the mold. Continue pouring until the intended depth for the project is reached. Have a few pieces of paper towel on hand to wipe drips from the container after pouring.

During the pour, it's best not to pour resin over the top of the slab or allow resin to flood the top of the slab. This is because thin layers of resin take more time to cure, which results in a longer wait before you can demold your project and begin finishing work. This is also why we recommend starting with a slightly thicker slab and having your mold leveled.

When pouring, do not scrape the sides or bottom of the container to get every drop. This will most likely result in unmixed resin or hardener contaminating your pour.

FlowCast SPR may slowly fill cracks and voids in your slabs, causing the resin level to drop over time. Be prepared to add more FlowCast SPR as needed. Air bubbles will rise to the surface and pop during cure. If desired, a quick pass over the surface with a torch or heat gun will pop the bubbles (though these will pop on their own over time).

When using Metallic Color Pigments to achieve a patterned effect, any desired swirl patterns should be added after the working time of FlowCast SPR. This is typically 6-7 hours after mixing. Swirling too early in the curing process will result in the pattern disappearing or changing its look. Do not attempt to swirl the resin after it has begun to gel. Doing so may result in undesirable patterns, an uneven cured surface, or air entrapped in your project.

Multiple Pours

Additional pours should be done when the previous layer has reached set to touch. This is typically 18 hours after pouring the previous layer. To prepare the epoxy surface for an additional pour, scuff the surface with 220 grit sandpaper. Remove excess dust and debris with compressed air, then wipe clean with denatured or isopropyl alcohol before pouring the next layer.

5. CLEAN UP

Using a clean rag, wipe tools and spills with denatured alcohol or isopropyl alcohol. Warm soapy water can be used for cleanup, but it is less effective. Resin that has dripped on plastic sheeting can be left to cure, and then can be easily removed with a putty knife. Cured resin may have sharp edges; use caution when handling these pieces.

6. CURE MONITORING

As your project begins to cure, you should monitor it for tacky to touch, set to touch, demolding time, and time to finishing. Definitions are as follows:

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Tacky to Touch is the period where an additional pour can be done without the need to abrade the surface of the previous layer. During this period, the project will need to be protected from contaminants that can adhere to the surface. To determine tacky to touch, wear gloves and lightly touch the surface of the casting. No resin will stick to the glove's surface, but tackiness between the glove and surface will be apparent. The onset of tacky to touch has not been reached if the surface significantly deforms in this process.

***Important Note:** Processing characteristics vary significantly based on the thermal mass of the casting. Castings with a thickness of 1" have double the thermal mass of ½" castings and generate heat in the center of the casting during cure. Use caution, as significant heat is generated by the casting during peak exotherm. These castings transition from tacky to touch to set to touch while the casting temperature is at its peak (peak exotherm temperature). It is NOT recommended to pour a second layer while the casting is still at an elevated temperature. It is recommended that you wait for the casting to reach set to touch and abrade the surface before pouring a second layer.*

Set to Touch is the point in time immediately after the tacky to touch period, where the surface of the casting is tack-free. An additional layer is not recommended without first abrading the surface of the previous layer. Determine if set to touch has been reached using the same method as tacky to touch. There is no observable tackiness between the glove and the surface.

Demolding Time is the point in time at which the casting has cured sufficiently such that it can be carefully removed from the mold without causing damage to the epoxy. Castings can be demolded when a wedge can be inserted under one corner of the casting with no observable deformation or bending. Although the casting is solid, it is not fully cured and may sag under its own weight. The casting should be supported until it reaches a fully cured state.

Time to Finishing is the time at which a casting has reached sufficient hardness such that it can be machined or finished successfully. Working with castings that are too soft will gum up sandpaper and tools, and may result in "smearing" of the resin, rather than abrasive removal. To check if the casting is ready for finishing, the hardness of the casting should be measured using a Shore D durometer. A Shore D hardness of 70 or greater indicates that the casting is ready for finishing. Take measurements in an area of your project that is inconspicuous, or where resin will be removed during finishing. It's best to take a measurement within 0.5" of an edge or corner, as these areas take longer to achieve sufficient hardness.

Full Cure is the point in time when the casting achieves full mechanical properties.

While curing, your pour should be kept in a dust-free environment or covered to prevent contamination of the surface.

7. DEMOLDING

When FlowCast SPR is poured at 1" thickness, maximum volume, and under recommended conditions, you can expect your projects to be ready to demold within 24 hours.

If a fabricated mold was used, begin the demolding process by first removing the screws from the base and walls of your mold. Use a rubber mallet to dislodge the walls by gently hitting them away from the casting. Once the walls are removed, place a plastic wedge underneath one of the corners of the casting and use a rubber mallet to drive it in further. Repeat for all the corners. If the casting has still not released from the mold base, use the wedge to work around all edges until the casting can be removed easily.

If a reusable or "no-seal" form was used, hit the walls of the form using a rubber mallet to free the casting from the sides. Flip the form over and hit the surface multiple times with a rubber mallet. The casting should drop out of the mold.

8. FINISHING

Note that this section only covers the basics of finishing operations.

Trimming

If necessary, trim the work piece to the desired length and width using a table saw, circular saw with a guide, track saw, or miter saw.

Machining/Flattening

There are several ways to remove excess material. This includes an orbital sander, router sled, drum sander, benchtop planer, or CNC router. The final thickness will vary depending on the project and the desired look. For example, serving trays are typically between ½ and 1" thick. Ideally, material removal from both sides should be completed within the same day to reduce the chance of project warping.

Sanding

Start with 80 grit to remove any machining marks. If machining marks are deep, 60 grit can be used to make faster progress. Travel in smooth motions on the work surface, along the length then the width. There should be a 50% overlap on each pass. Repeat this process with 100 to 220 grit, taking the time to remove sanding marks left from the previous grit. When checking your progress and moving to higher grits, wipe the surface clean with water and allow to air dry. Wiping with water raises the grain and allows the surface to be sanded smooth. At this stage, you can use a router on the edges to create a round over or chamfer. Depending on the final look and finish requirements, sanding can be continued with finer grits.

Filling

During the sanding process, pinholes or voids may be exposed. These can be filled with resin. Before filling, open these areas up using a chisel or rotary tool. This allows the resin to fill all parts of the void without trapping air bubbles. Small imperfections can be filled with super glue and activator for faster curing. Larger repair areas can be filled with UVPoxy but will take longer to cure (see the UVPoxy TDS for additional details). FlowCast SPR can also be used to fill repair areas though you may need to wait 48 hours or more before sanding (depending on the size of repair).

Finish Application

There are many options for finishes depending on your desired look. These include using UVPoxy for a high-gloss finish, or any of the variety of hardwax oils available on the market. Always follow the manufacturer's instructions when using finishing products. The bottom and top surface should be finished consecutively to prevent warping.

Another option, especially for clear, colorless pours, is to polish the epoxy river portion of your project and then apply a hardwax oil finish to the entire surface.

CASE STUDY - MAKING A SERVING TRAY

The following project was completed in two days and one evening to simulate a weekend project. Final cure of the finishing product lasted beyond the weekend timeframe. The process is shown in the table below for planning purposes.

Day	Task
Friday Evening	Prep slab(s)
	Build mold
Saturday	Prep for pour
	Mix and pour
	Monitor pour
Sunday	Demold
	Trim to size
	Flatten
	Finish sanding
	Finishing product application

PREPARATION

The work area was prepped, and supplies were gathered. This included the worktable, mold, slab, resin, hardener, pigments, and stir stick as shown in Figure 1. The worktable was large enough to support the mold and was easily accessible from all sides with an appropriate work height. The mold we used was assembled from a 5/8" thick MDF sheet, covered with EcoPoxy Mold Release Tape.



Figure 1: Work area and supplies for pouring

For this build, we chose a black walnut slab (kiln-dried) with a thickness of approximately 1". The slab was cut to size, debarked, then test fit in the mold. The debarking tools are shown in Figure 2, and the debarked slab is shown in Figure 3. This piece required minimal preparation.

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Figure 2: Slab and debarking tools



Figure 3: Slab debarked

If you are using a mold that requires sealing with silicone, it's best to keep the slab flat on the mold and away from the edges. Cut the length and width of the slab as needed. An example is shown in Figure 4.



Figure 4: Edge of slab away from silicone

Once we confirmed the final size through test fitting, the live edges were sealed with FlowCast SPR to prevent bubbles from forming during cure, as shown in Figure 5 and Figure 6.

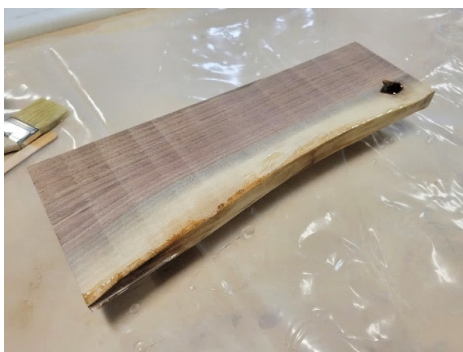


Figure 5: Live edge sealed with FlowCast SPR



Figure 6: Closer look at the live edge

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We also covered a knot in the slab with a small amount of FlowCast SPR, shown in Figure 7.



Figure 7: Knot in wood covered with FlowCast SPR

Before leaving your work area for the day or evening, scrape off the excess FlowCast SPR drips that accumulate on the underside of the slab. This removes the risk of these drips curing and having to be sanded off before pouring.

Once the seal coat was tacky to touch, the slab was clamped down to the mold using clamps and spacers. The setup is shown in Figure 8.

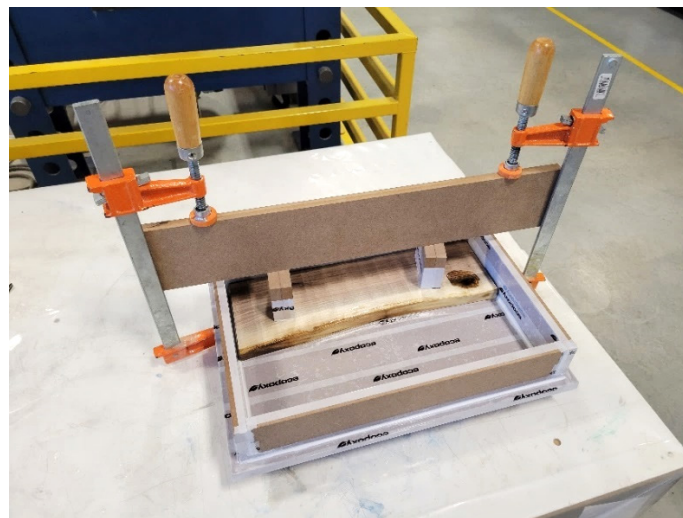


Figure 8: Slab held down in the mold with clamps and spacers

The mold was raised from the worktable using MDF offcuts. Stacks of MDF were used to provide room for clamping, shown in Figure 9. The spacers were also made using MDF offcuts. Two pieces were taped together using mold release tape, shown in Figure 10.

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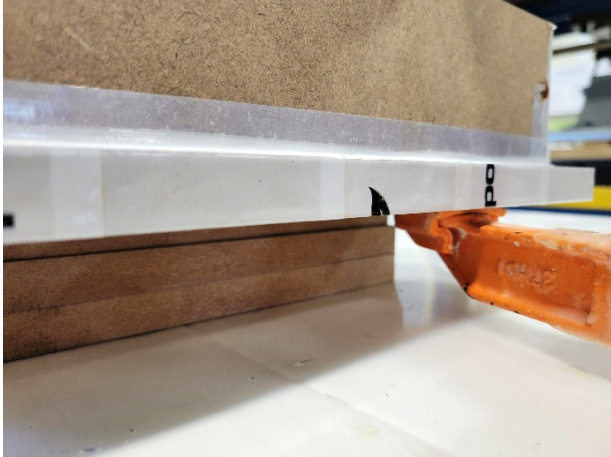


Figure 9: Mold raised from the worktable with spacers



Figure 10: MDF blocks taped together for clamping

This pour required 1.92L of FlowCast SPR. To calculate the amount of resin needed, we started by taking the average of 3 width measurements of the casting area (one at each end, one at the center) then multiplying by the length and depth of the pour. We added an extra 10% to make sure we wouldn't run out of resin while pouring.

Once you've calculated your volume, it helps to round up to a number that is easily divisible by 3. In this example, 1.92 is divisible by 3, which gives 640 mL (0.64 L) of Part B and 1280 mL (1.28 L) of Part A. Taking this a step further, the containers we used had 50 mL markings, so we rounded the Part B up to 650 mL, which meant we needed 1300 mL of Part A. This gave us 1950 mL (1.95L) of mixed resin to work with.

MIXING

We used 2 different sized containers, one for Part A and one for Part B. To start, we decanted 1.3L of FlowCast SPR Part A into the larger container, followed by 650 mL of FlowCast SPR Part B into the smaller container. Remember that FlowCast SPR is a 2:1 ratio by volume of Part A to Part B. Volume markings on the containers made it easy to measure the required amounts. To add color to the pour, we used a few of EcoPoxy's metallic pigments – Pineapple, Copper, and Dolphin. The resin, hardener, and pigments are shown in Figure 11.



Figure 11: Preparing to add color to FlowCast SPR

The mixed resin and hardener will cure water clear if you choose not to add metallic or liquid pigments. We poured the Part B into the mixing container with Part A and mixed with a stir stick. Mixing in progress is shown in Figure 12 and Figure 13.

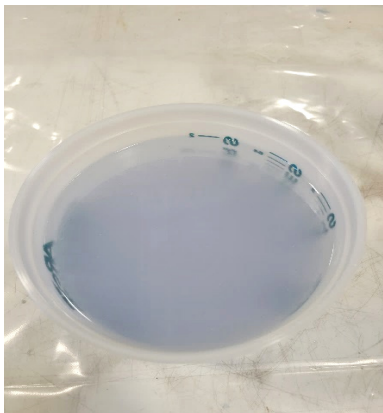


Figure 12: Hardener just added to resin

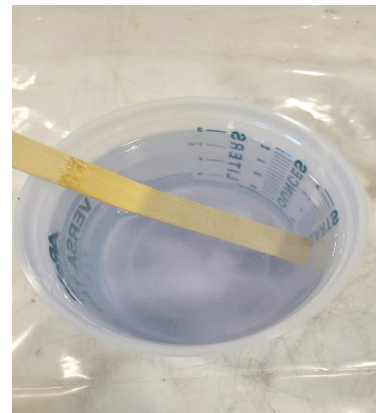


Figure 13: After mixing for 5 minutes

After mixing for approximately 5 minutes, the metallic pigments were added, and the resin was mixed for another 3 minutes, until the metallic pigments were evenly dispersed. Mixing progress is shown in Figure 14, Figure 15, and Figure 16.

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Figure 14: Adding Pineapple metallic pigment



Figure 15: Adding Copper metallic pigment



Figure 16: Adding Dolphin metallic pigment

The result of mixing all three pigments is shown in Figure 17.



Figure 17: Selected pigments fully mixed

POURING

With the metallic pigments thoroughly mixed into the resin, the mixture was poured into the mold. The pour is shown in progress in Figure 18 . We made sure not to scrape the sides or bottom of the containers. Resin was poured up to the top edge of the slab only as shown in Figure 19. We wanted to avoid having a thin layer of resin on top of the slab, as it would take too long to cure and push the project time outside of our weekend timeframe.

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Figure 18: Pouring resin into the mold



Figure 19: Resin poured up to top edge of slab

After 15 minutes, we used a torch to pop the bubbles at the surface of the casting.

CURE MONITORING

During the cure, the metallic pigments will move and create a natural pattern as shown in Figure 20.

Note: this isn't the final look, just a pattern that has formed after about 2 hours.



Figure 20: Pattern forming during cure

You can choose to leave the natural pattern or create your own by swirling the resin, 6-7 hours after pouring. Swirls can be created with a toothpick or craft stick. You should swirl a pattern slowly to avoid introducing air bubbles. The resin will be noticeably thicker around this time. An example pattern is shown in Figure 21.



Figure 21: Swirl pattern created with a toothpick

DEMOLDING

At approximately 24 hours after pouring, we demolded the casting. To start the demolding process, we removed the screws holding the mold together. The walls were removed by gently hitting them with a rubber mallet, directing the strikes away from the casting.

A plastic wedge was placed in one corner to help lift the casting away from the base. Once it was started, the rest of the casting released easily. Demolding is shown in Figure 22.



Figure 22: Demolding in progress

You may notice that some smaller areas of resin beside the slab and mold walls are still tacky. This is not a cause for worry, as these sections will be trimmed off during finishing.

FINISHING

Trimming

We used our sliding miter saw to cut off excess material as shown in Figure 23. Small areas of resin beside the slab were cut off, along with a small amount of the slab to square off the edges. Approximately ¼" was cut off from each side.

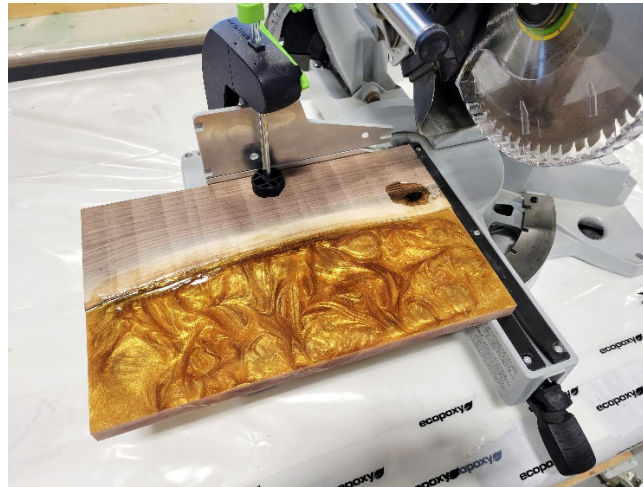


Figure 23: Edges cut with a miter saw

Flattening

We used our Festool Rotex RO 150 sander, in coarse material removal mode, with 80 grit sandpaper to flatten our serving tray. This process took about 15 minutes to remove 0.08" on the top side and about 5 minutes to remove 0.03" on the bottom side. It's easy to remove too much material in one area so you must keep the sander moving and check the flatness often with a straight edge. Flattening progress is shown in Figure 24.



Figure 24: Sanding high spots on the serving tray

If you're not comfortable using a sander for heavy material removal, you can use a router sled or benchtop planer. A typical setup for a router sled is shown in Figure 25.

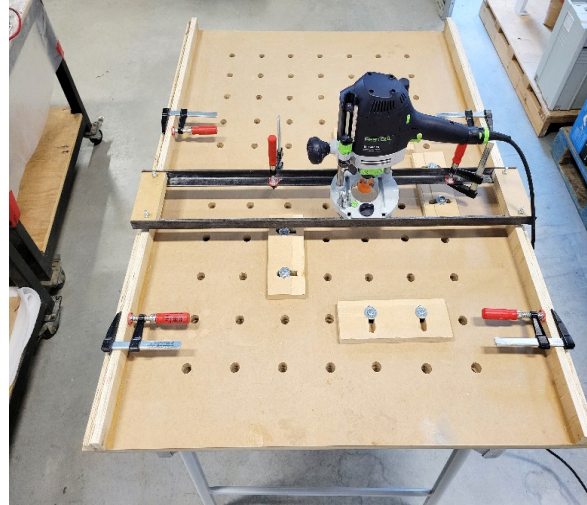


Figure 25: Router sled setup

Sanding

After flattening the surfaces with 80 grit, finishing continued with 100, 120, 150, 180, and 220 grit sandpaper. Voids and cracks in the wood were filled with super glue and spray activator for fast curing of the repair area. Color matching with pigment is much easier if your color is opaque, versus transparent or translucent. Consider using FlowCast SPR or UVPoxy for better color matching of repair areas if you have the time available to wait for the resin to cure.

Progress is shown in Figure 26 and Figure 27 after sanding 100 grit and wiping the surface down with water. Deep scratches from sanding are still on the wood and resin at this point.



Figure 26: After sanding with 100 grit



Figure 27: After wiping the surface with water

With the void and crack filling complete and cured, each side of the serving tray was finished to 400 grit (320 grit was used as the previous step). We made sure to wipe with water and air dry between grits to raise the wood grain. This prevented raised grain on the finished surfaces. As a final touch, we sanded the edges of this serving tray by hand with 400 grit sandpaper. All faces of the serving tray were then wiped with denatured alcohol.

Handle Installation - Drilling Holes

Before applying the finishing product, clearance holes were drilled and countersunk on the bottom of the serving tray. To start, we measured and marked with pencil the attachment locations for the handles. The handles were centered along the width and 1/2" from the ends along the length. The serving tray with clearance holes drilled are shown in Figure 28.



Figure 28: Clearance holes for serving tray bolts

Finish Application

We performed a final check for voids in the slab and resin before applying the finishing product. This was done carefully by eye, using a bright light source. A second set of eyes also helps with this step. You can fill and sand any small imperfections that are found.

For this serving tray, we chose to use Walrus Oil Cutting Board Oil (2 coats) followed by Walrus Oil Wood Wax (1 coat).

To start, oil was poured onto the bottom side of the serving tray then evenly distributed and worked into the surface by hand. It's a good idea to leave excess oil on the surface as it will soak into the wood over time. Oil was then applied to the top side of the serving tray, using the same method as the bottom side. The serving tray was set on wooden spacers so that it was lifted off the worktable. The serving tray with oil applied is shown in Figure 29.

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Figure 29: Oil applied to surface

After 14 hours, excess oil was buffed away using a clean microfiber cloth. A second coat was applied in the same manner.

Wood wax was applied evenly and on all surfaces of the serving tray to provide the final layer of protection. The tray was allowed to sit for 15 minutes then buffed with a clean microfiber cloth.

The final product with handles installed is shown in Figure 30.



Figure 30: Serving tray with handles installed