Dimond TrimSaw 2 Training SOP

Last edited: Furst (10/30/20)

Instructor:

Date:

Attendees:

	Name	Group or Company	Signature
1			
2			
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Overview:

- This training provides an introduction to using and operating the TrimSaw 2 diamond cutting saw including:
  - Blade Types
    - Metal cutting blades
    - Glass cutting blades
  - Fixtures
  - Safety
    - PPE for saw
    - Hazards
  - Saw use
  - Saw Maintenance
    - Coolant tank cleaning/refill
    - Blade Replacement
- The Trimsaw 2 uses 6 inch diamond blades to make fine cuts in metals, glass, ceramics and PCBs. Specific blades for each material are available and should be changed before cutting new material. A variety of fixtures and guides are available with custom fixtures available for specific jobs (contact Dave Bothman or a Workshop Wizard for custom tooling). Spinning up to 3000 RPM the bottom of the blade is submerged in coolant to lubricate and cool the blade while in the cut. A blade splash guard and plexiglass cover reduce the amount of lubricant thrown by the blade.

Safety

- Eye protection should be warn at all times while operating the saw
- All guards and shields should be in place before turning the saw on
- Hands should be kept free and out of the way of the blade at all times
- Nitral (NOT RUBBER OR CLOTH) gloves should be warn when cutting specific composites including carbon fiber and fiberglass

Job Setup

Switching Blades

- Remove the table to expose the reservoir and the saw blade arbor
- Insert the two pins into the saw arbor and blade retaining nut normal to the surface of the arbor
- Using the leverage on the pins, loosen the blade retaining nut to free the blade
- Carefully remove the blade from its arbor and replace with the blade matching the material you intend to cut (blades should be inspected for ware and cracks, damaged blades should be disposed of in the broken glass box)
- Lightly LUBRICATE the threads on the end of the blade arbor with a grease to prevent thread galling.
- Tighten the blade retaining nut HAND TIGHT (no need to go crazy on this one down)
- Insure the coolant level is in contact with the bottom of the blade and filled to the fill line
- Replace the table

Part fixturing
Several fixtures are available:

- Push Sled
- Clamp sled
- Custom fixturing
- fence

Using the TrimSaw 2:

- Check the blade installed, coolant levels and part material
- Select an appropriate fixturing jig to insure part remains securely held and square to the saw blade
- Adjust the blade splash guard so that it just clears the fixture and workpiece but catches as much coolant as possible
- Replace the plexiglass cover
- Turn on the TrimSaw and using the arrow buttons select the appropriate speed
- Slowly and gently feed the workpiece into the blade, allow the blade to cut without force feeding
- When cut is complete leave fixture and workpiece cut in place until saw completely stops spinning (do NOT attempt to clear workpiece while saw is in motion)
- Using paper towels wipe the Trimsaw down and clear any dust particulates from cutting

Post Processing:

- Use snips or tweezers to break support material off of the part. Be careful when finishing delicate parts to avoid breaking off small features.
- Use abrasives such as sandpaper and files to remove marks left by touchpoints until the surface

is satisfactory.

Replacing an empty resin cartridge with a full one of the same type:
More information on the resin system and changing a cartridge can be found on the webpage "Formlabs Resin Tank Information" through the Formlabs website.

1. Remove the empty resin cartridge:
    1. Close the vent cap at the top right of the resin cartridge to prevent resin from spilling out once removed
    2. Hold the cartridge handle and lift to remove from the Form 2. Store the cartridge upright with the valve cover installed to protect storage surfaces from resin.
2. Insert a new resin cartridge:
    1. Shake and rotate the new resin cartridge to ensure that the resin is mixed thoroughly.
    2. Align the cartridge with the opening at the back of the printer. Push down on the cartridge handle until the top of the cartridge is level with the printer.
    3. Press open the vent cap to ensure the resin tank can fill correctly

Switching a printer from one type of resin to another

More information on the resin system and changing a cartridge can be found on the webpage "Formlabs Resin Tank Information" through the Formlabs website. This includes videos and animations.

1. Remove the build platform - this prevents resin from dripping onto the glass
2. Remove resin cartridge:
    1. Close the vent cap at the top right of the resin cartridge to prevent resin from spilling out once removed.
    2. Hold the cartridge handle and lift to remove from the Form 2. Store the cartridge upright with the valve cover installed to protect storage surfaces from resin.
3. Remove the resin tank
    1. Hold the front tabs of the resin tank
    2. Gently pull the front tabs of the resin tank to release the tank feet from the tank carrier. The Resin Tank LT wiper ejects during removal.
4. Cover the resin tank and store on the left side of the fume hood
5. Insert the resin tank for the resin that you plan to use
    1. Lift the Form 2 orange cover. Use the tank grips to hold the Resin Tank LT, with the wiper resting inside the tank. If the tank contains resin, cover the tank with the plastic lid to align the wiper and minimize the risk of spills during insertion.
    2. Align and insert the four small feet of the resin tank into the corresponding slots in the tank carrier on the printer.
    3. Hold the front tabs and carefully push the tank until the tank feet lock into the slots on the tank carrier. Check the touchscreen display to confirm that the Form 2 detects the tank. The Form 2 will only detect the tank when the tank is fully inserted.
6. Lock the wiper blade
    1. Align and insert the wiper foot into the wiper mount.
    2. Push the wiper toward the tank.
    3. Ensure the wiper foot is securely locked into the wiper mount.
7. Insert resin cartridge:
    1. Shake and rotate the new resin cartridge to ensure that the resin is mixed thoroughly.
    2. Remove the protective valve cover from the underside of the cartridge. Use the cover to

protect the bite valve during storage.
3. Align the cartridge with the opening at the back of the printer. Push down on the cartridge handle until the top of the cartridge is level with the printer.
4. Press open the vent cap to ensure the resin tank can fill correctly.

8. Replace build platform
9. Make sure that all of the resin tanks are correctly labeled.

Maintenance

- Cleaning resin tank interior
  - Use the scraper from the finish kit to inspect the resin and the elastic layer. Starting from the top corner, gently scrape from top to bottom across the elastic layer.
  - Check for the following issues that may lead to print failures or any excessive wear that requires replacing the tank:
    - cured resin on the elastic layer
    - debris or failed prints in the resin
    - settled pigment on the elastic layer
    - punctures, cuts, or gouges in the elastic layer
    - excessive “clouding” or wear in the elastic layer
- Filtering Resin
  - Use a filter to remove any debris or small bits of cured resin floating in the tank. Clean, debris-free resin helps avoid print failures, which may damage the tank.
- Cleaning the tank window
  - Never use IPA on the acrylic tank window (it will cause cracks).
  - If dust, fingerprints, and/or contamination are present, clean the clear acrylic tank window with NOVUS No. 1 and a clean microfiber cloth. The clear acrylic tank window is located on the underside of the resin tank. Apply 1-2 full sprays of NOVUS No. 1, and wipe using long, sweeping strokes top to bottom and across the tank window. Fold the microfiber cloth after each swipe to prevent dust and debris from scratching the acrylic.

Form 2 Quick Review

Tool Lead:
Contact: andrewfurst@ucsb.edu

Safety Concern

- Lab coat and gloves must me used when handling resin
- Anything with uncured resin must be transported within a container to avoid spilling

Safe Operation Procedures Review

1. Check resin cartridge and tank, make sure build material matches and is desired material.
2. If resin is not desired material, disconnect wiper at build tank, remove build plate by sliding towards front of fume hood. Remove cartridge, cap valve on bottom and close valve on top of cartridge. Replace build tank, wiper, and cartridge with desired material.

3. Launch Preform on Ultimaker computer
4. Import desired STL
5. Select “one click print” in the top left corner menu, change position, orientation, resolution and support as desired (note: that Preform will report on print ability of model, changing part rotation can affect print ability.
6. Select print (orange button) from top left menu
7. Select desired printer
8. Press button on Formlabs printer to start print

Post Processing

1. Excess resin should be removed from the build tray and part with IPA over a waste container.
2. Place build tray and part in the Form Wash for 20 to 30 minuets (part can be placed individually within basket if necessary
3. Allow 30 minuets for IPA to evaporate before placing part in Form Cure
4. Set Form Cure time and temperature based on resin type, place part within form cure, wait for time to elapse

Maintenance

- Switching resin types
  - Close breather valve on resin cartridge
  - Remove the resin cartridge by pulling straight up on the handle behind the form labs printers
  - Cap the cartridge valve using the included orange tap and cap
  - Remove the wiper by pulling straight out towards the front of the fume hood.
  - Pull the resin tray out of the printer by pulling firmly straight out toward you
  - Lift the wiper and resin tray out simultaneously, and carefully place on resin shelf within fume hood.
  - Cover resin tray with black plastic cover and label
  - Replace resin tray with clean or desired resin tank. Push tank and wiper firmly back toward the Form 2 until it clicks into place
  - Replace resin cartridge and open valve