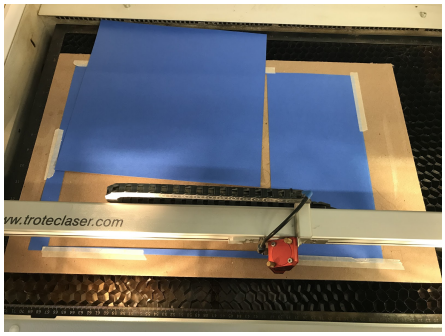
Papercutting Tips for the Trotec Laser

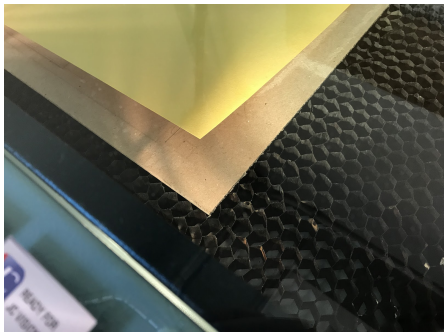
Review the vocabulary words for this section: ***raster/bitmap vs. vector image, CMYK vs. RGB color-space.***
https://docs.google.com/document/d/159qWlTNXdo6wXtaCTpJtQV7dVNJpkSxH7z7KmXu6ISA/edit?usp=sharing

See the MTC tutorial for basic laser cutting instructions: https://pnca.edu/pdf/Laser_Cutter.pdf
This tutorial assumes you have basic knowledge and have competed the safety training. Below are specific tips for troubleshooting paper on the laser cutter.

I. The Challenge of Paper: Weight, Flexibility, and Combustibility

Paper is one of the more challenging materials to cut on a laser due to its lightness, flexibility, and its combustibility. We keep the ***air-assist function*** on due to its combustibility (to protect the lens), but this also causes the paper to blow away (both chads and the sheet itself).

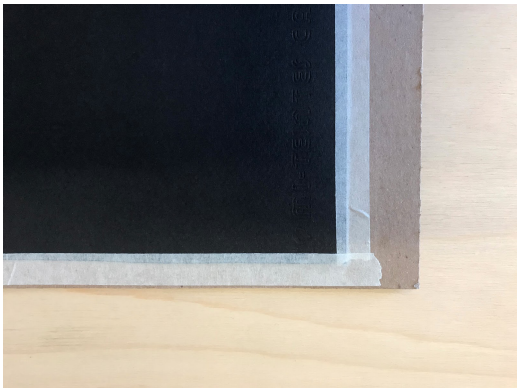
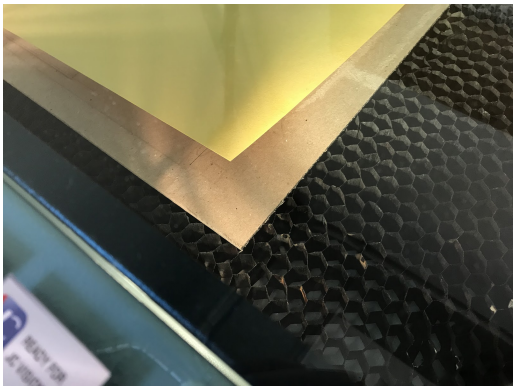




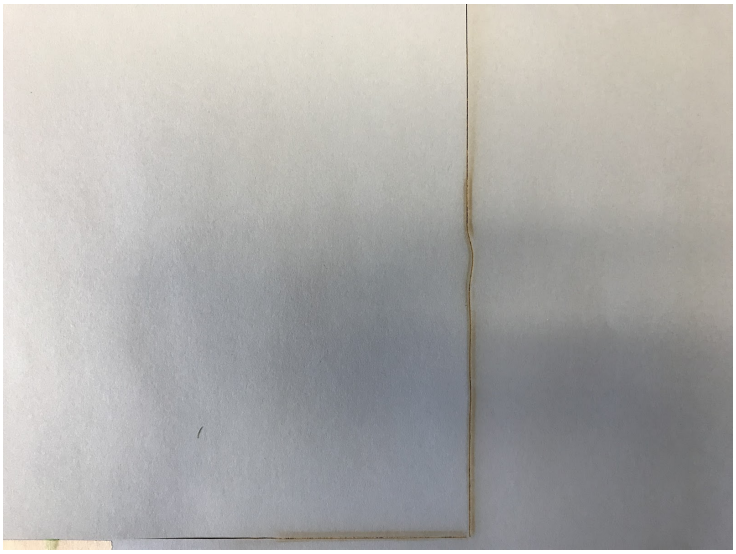
The image above (L) show the cut paper blown away by air-assist. The (R) shows the paper being lifted at an untaped edge.

- You'll have the most success with heavier weight papers and stiffer cardstocks.
    - We are using thicker art papers: ***Canson MiTeintes*** (colored) and ***Strathmore 300 Series 100lb Bristol Board*** (white).
    - Do not use thin paper. This will make these problems worse.
        - Paper curls when exposed to heat; the thinner the paper, the more it will curl.
- Always do your border cut (outside edge) last; this keeps the paper in place while the design is still cutting. Our template is designed this way. When creating your own designs, make sure your border is the top-most layer or turn on "***cut inside geometries first***" feature in the Trotec software.
- A work-around is to add weight and stiffness to the cut surface:
    - One technique used by professionals is to build a jig out of 2 sheets of wood or masonite to sandwich the paper in. This is ideal for a technique like the Digital Lace that has many small chads that blow everywhere with air-assist.
        - The jig lifts the paper off the surface and the chads fall through. This cuts down on the amount of debris on the surface.
        - White paper suffers from soot stains and flashback marks and a jig is helpful to lift the back surface slightly to limit this issue.

        - This is more effort and cost, so only reasonable for bigger projects.
    - A simpler solution that works “well-enough” is to tape the paper to a piece of stiff book-board. This is what we will do in this workshop.

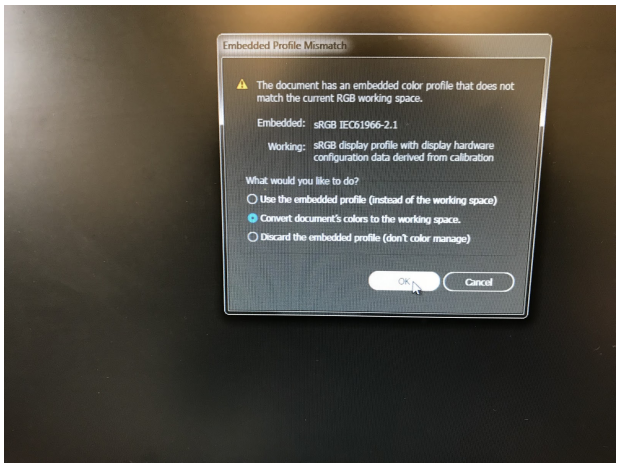
        - All the edges of the paper (in your design area) and every corner of the sheet must be taped to prevent the sheet lifting and forcing the laser out of focus. The below example shows what happens when the lifted paper forces an out-of-focus cut.



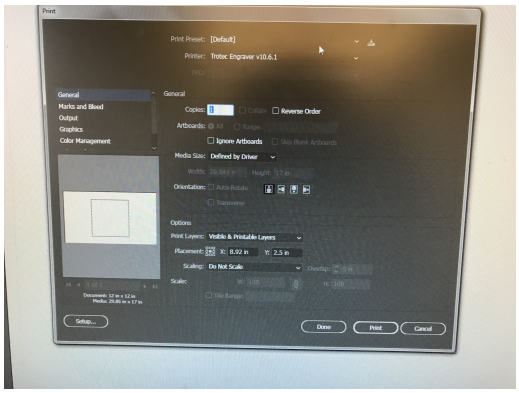
        - This doesn’t solve all the issues in a detailed cut like in Digital Lace. See other work-arounds in ***Tips for Digital Lace***.

II. Issues to watch for on the Trotec

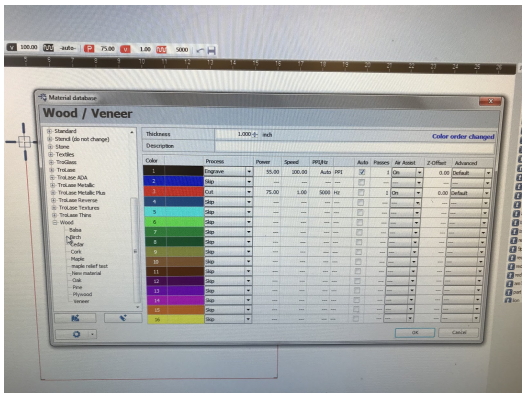
- An error that sometimes shows up when you print from Illustrator is related to a mismatch in the RGB color profile of your file and the native workspace. To be safe, since the Trotec is fussy about color-space, if you get this error, select “convert document’s color to the working space.”



- Sometimes the ***print preset*** will show a custom setting that is strange. Make sure the ***print preset*** is set to the ***default***.

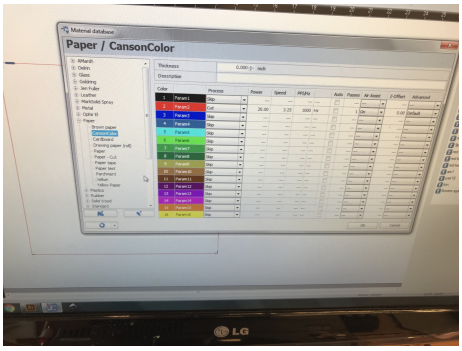


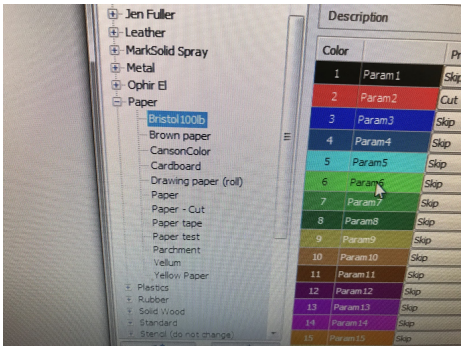
- The Trotec Job Control software will default to the material setting for wood for every new job!



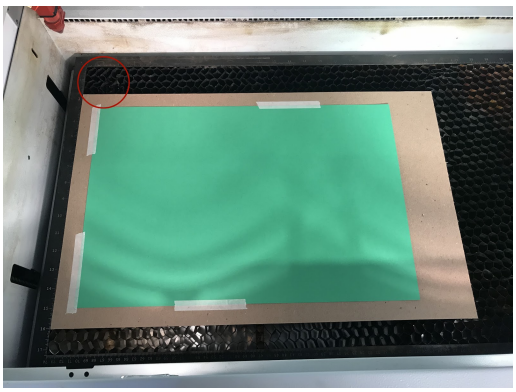
Always check your ***material settings*** with each job and change it to the correct material:

- For colored paper it should be ***Paper > CansonColor***
- For the bristol board (white) it should be ***Paper > Bristol100lb***

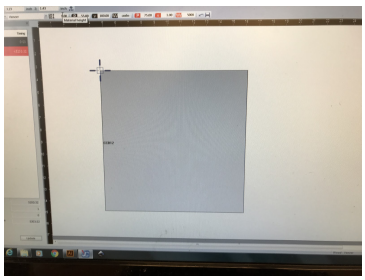


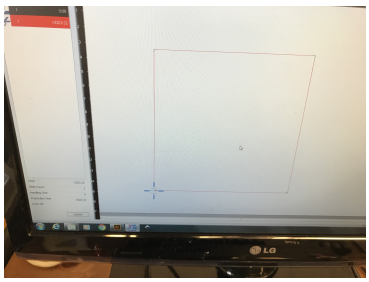


- For clean cuts, the board+paper needs to be level. The honeycomb bed in the Trotec has some damaged/warped areas (especially bad is the upper-left corner).
  - Avoid this area (***see example circled***) and set the board lower.

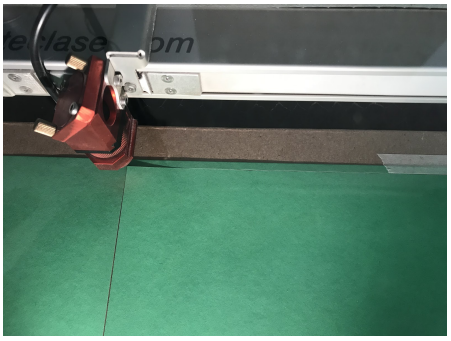


- Use the cross-hair and the arrow controls to check the four corners of your design.

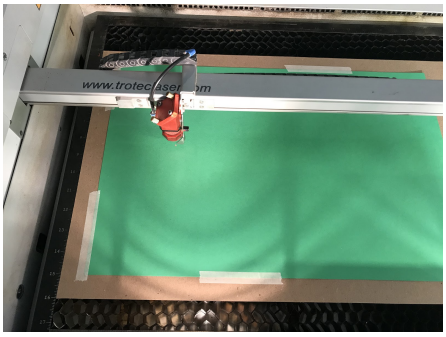




- Avoid cutting any of the masking tape.

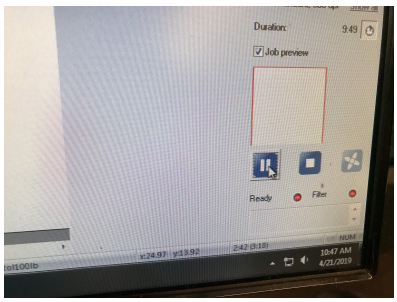


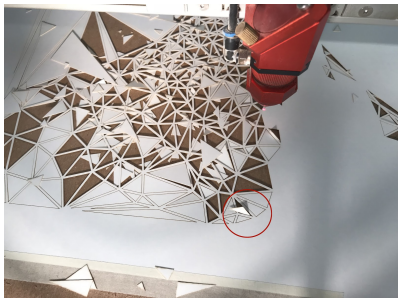
- Make sure to recalibrate (using the hand tool) if you change between the colored paper and the bristol board (the thickness is different).
    - Calibrate towards the center of the board; there's a tendency for a slight warp in the materials in the corners/edges.



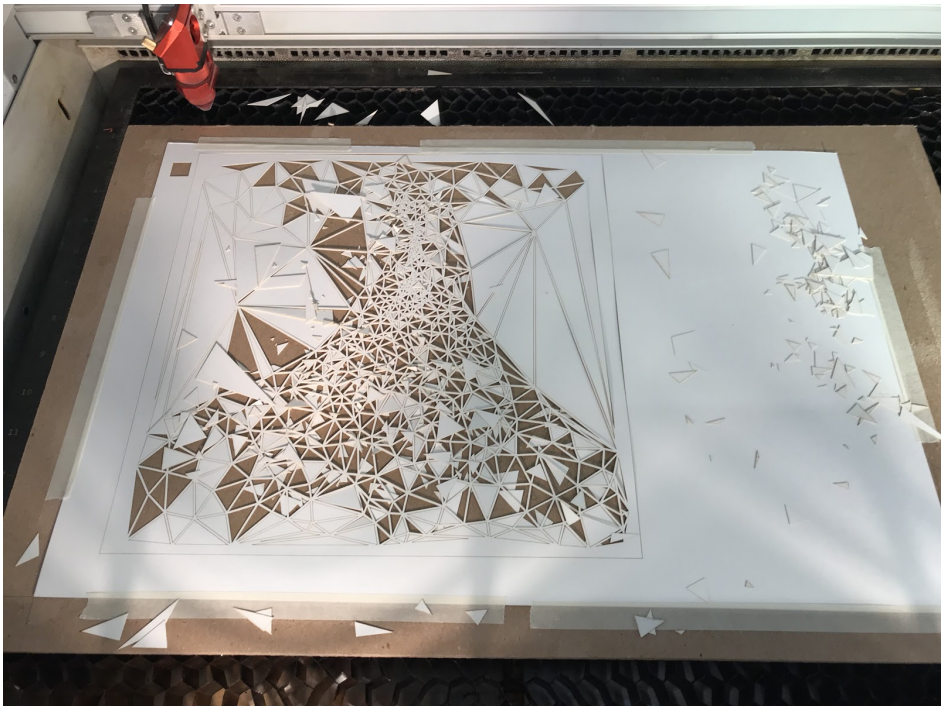
III. Specific Tips for Digital Lace

- Monitor the cutting carefully and ***Pause*** the cut whenever you see one of 3 conditions:
    - A chad is lifted up on an upright angle and stuck (in area still to be cut): this can cause the laser beam to deflect in strange ways. ***See the example circled***.
    - A very large piece has been cut: its size, if blown over, will block out large segments of your design.
    - There is a build-up of a pile of chads on the blank paper surface to be cut.





- There is a delay after you hit pause, so you'll need to anticipate the timing.
    - ***Do not open*** the safety glass cover until the laser has come to ***a full stop***!
    - Carefully brush the chads safely to the edge out of the way of the design



    - Avoid touching the laser head directly under it or moving your board.
    - To continue your job, close the cover and hit the ***Pause*** button again.
    - Don't worry about pausing for most cases, the flying chads are unavoidable.
- After you have finished your cut, you will need to hand-cut some areas with an x-acto knife. There will always be pieces not fully cut due to all the blowing chads that get in the way of the laser. ***See example circled***.