

Feedback and Reflection:

I realized that if I want to use laser printing more iteratively, I need to understand more about the characteristics of positional deviation in RISO printing. Therefore, I need to learn more about RISO printing.

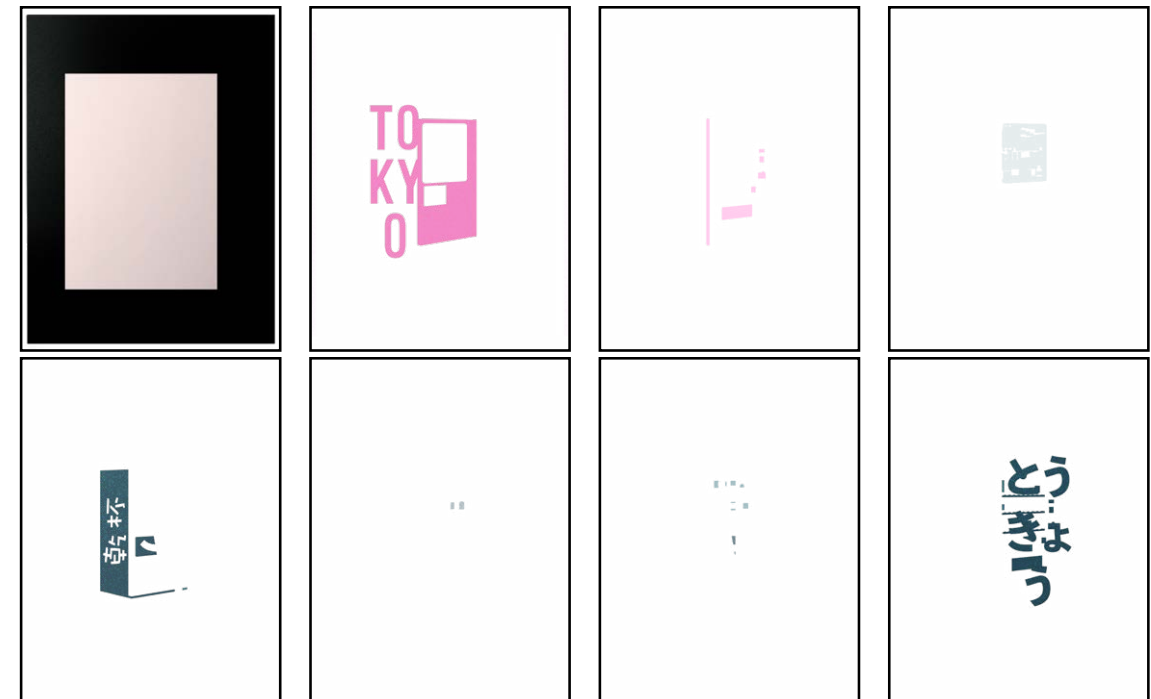
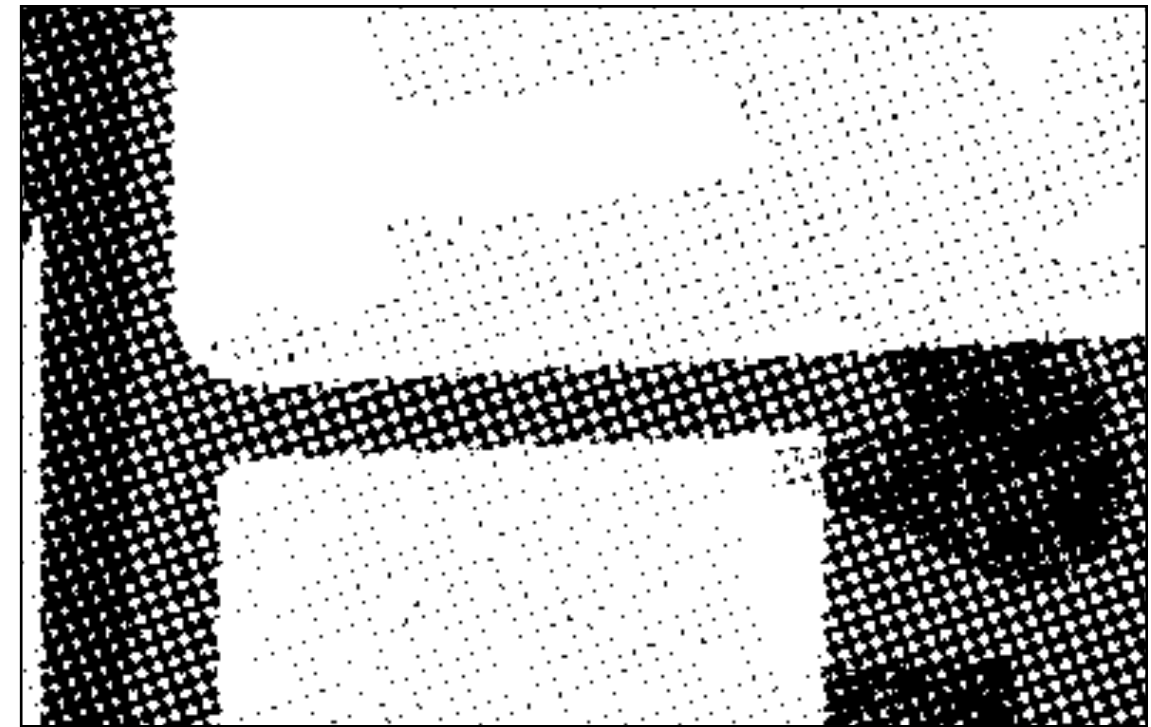
So this week I learned about and experienced RISO printing induction.



I understand that Riso printing has two printing methods: one is a dense, chaotic ink flow, and the other is image printing composed of small dots (as shown in the image). In this week's laser printing experiment, I also tried separating documents into pure gradient and dot matrix formats for comparison.

The Riso machine can only print a maximum of two colors at a time, and it's more commonly used in single-pass printing. Because more colors and more printing passes result in a more pronounced, albeit imprecise, misregistration effect.

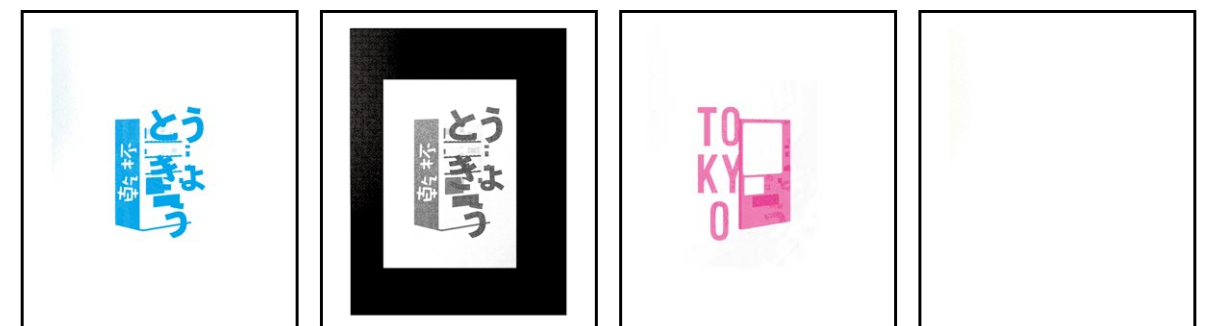
Therefore, I also separated laser-printed documents into three-layer, four-layer, and eight-layer plates to compare the misregistration differences between Riso and laser printing.

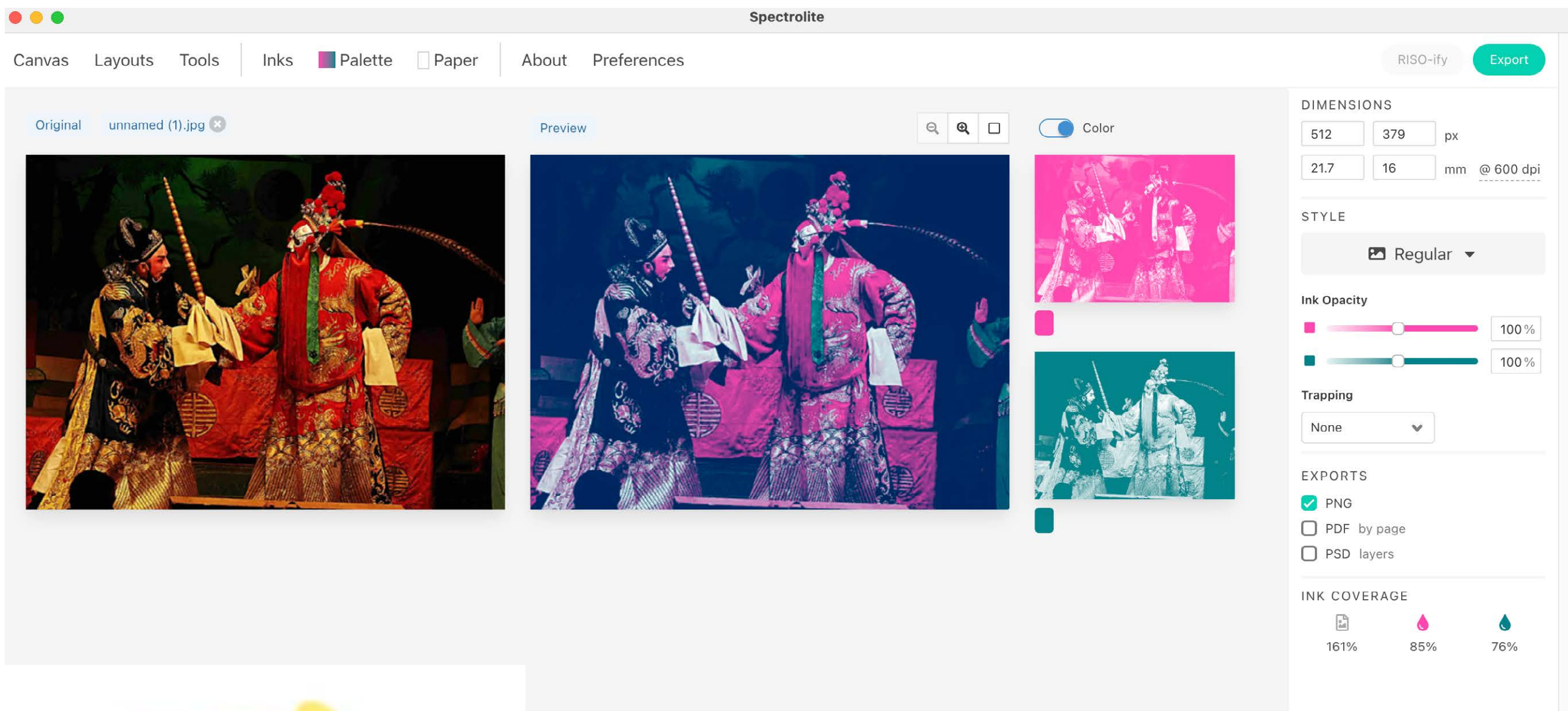


渐变板本四层激光文件



点阵板本四层激光文件

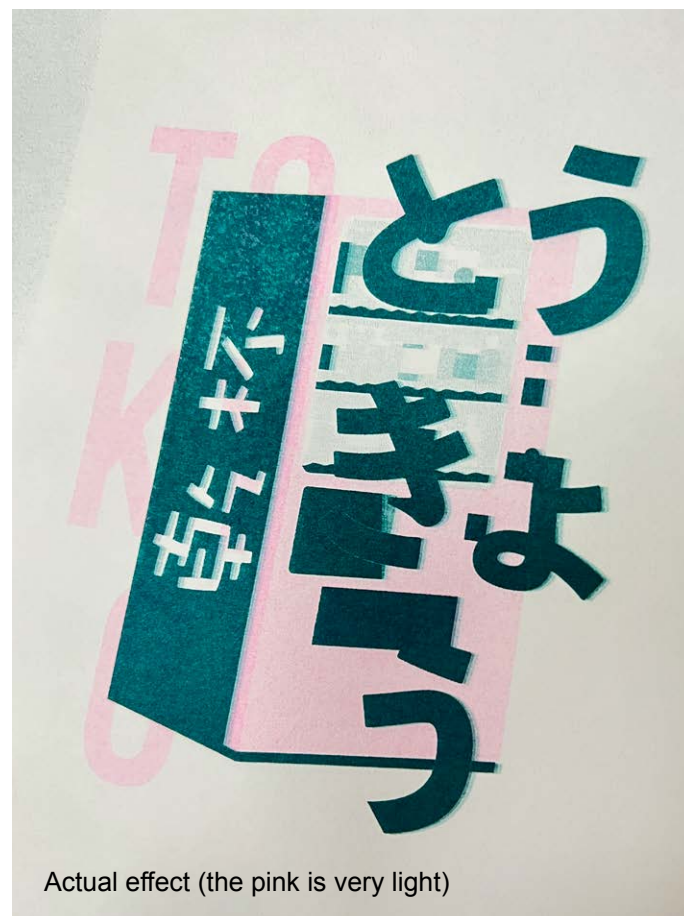




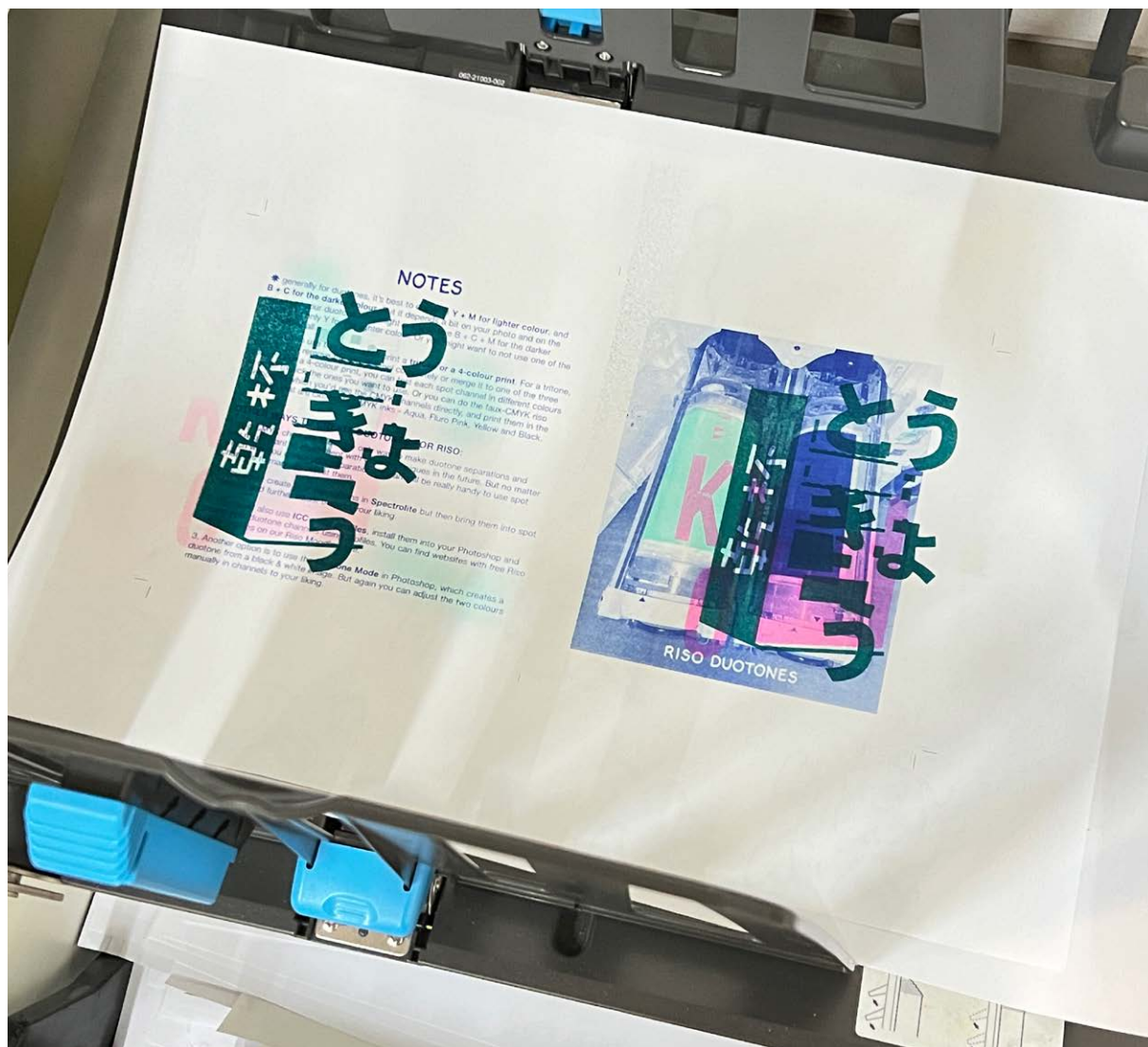
Spectrolite

For Riso printing, the file needs to be converted to a completely black and white grayscale version. For printed illustrations, a convenient approach is to manually create the layers from the beginning and then convert them to black and white. For photographs, software can be used to assist in color separation.

Using software like this allows for a quick preview of the approximate printing effect of the selected colors and also enables the rapid export of separate black and white grayscale versions of both colors. I also use it to adjust my laser printing files.



I also tested separating the colors myself before printing, but it failed. After comparing and trying different methods, I found that using software significantly reduced the probability of errors in Riso printing, and the likelihood of needing to adjust colors was very low. The software greatly helps in previewing the final result.

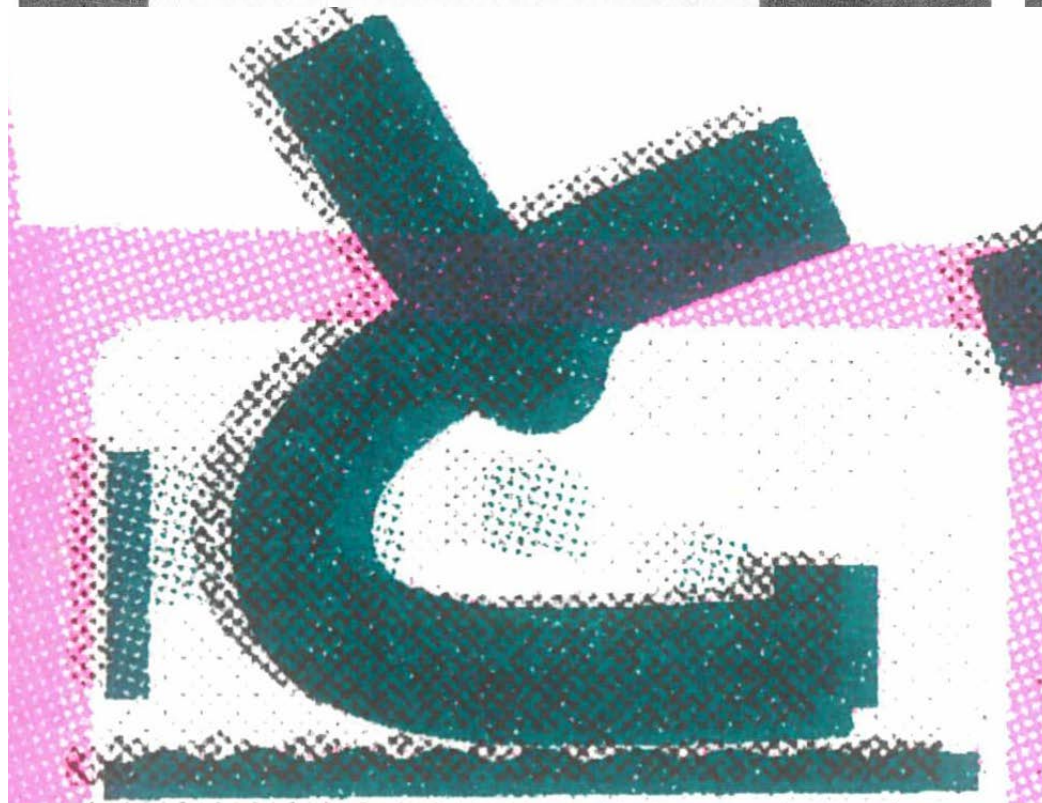


Through printing, I understood the principle behind the blurring effect of Riso printing. The instructor at the studio called it a "ghost," a very apt description. It's caused by adjusting the color position using the Riso machine; it's the ghost of the "previous position." When the machine moves, the ink left over from the previous position isn't completely used, so it remains during printing. The instructor explained that several rounds of printing with scrap paper are needed to consume the ink, and the blurring will disappear.

Understanding the principle of blurring, I believe the blurring effect of Riso and laser printing is different. If you want to imitate Riso blurring using laser printing, you need to print the blurring area separately. The burning effect that appears when laser colors overlap over a large area is different from the blurring effect of Riso—it's a machine error.



点点分层



I chose three colors for Riso printing tests. Before printing, my instructor told me that when printing large areas near the edges, like the black areas in my image, using 100% transparency might cause paper jams. Therefore, the file was adjusted before printing, which is why the printed result differs from the preview.

The green and black printing areas overlap, so they can be used as a reference for alignment. During the Riso printing instructions, the instructor mentioned that to reduce such misalignment, Riso files manually remove overlapping areas of lines or text during creation, keeping only one color. This processed file will have a better appearance of misalignment and overprinting during printing.



自分层



两次是偏移

点点分层

Because I retained the overlapping areas and repeated the black printing to enhance the black areas, positional changes after each printing can be observed. This is the case where both black prints deviate from the expected position. If we assume the green is the expected position, then the position deviates from the expected position in both the first and second black prints.





自分層



2次打印了大範圍印刷

点点分层



I tried printing black three times on the same sheet of paper. Without adjusting the position, it's clear that the three prints of black are basically in the same spot, but each is slightly off-center from the initial teal color. I speculate this is because there were no reference images for the pink and teal prints during the initial single print run. We don't know how much the overall image deviated from its intended position when printed on the paper. Adjusting the left and right positions of the colors in the machine only changes the relationship between them, but it doesn't reveal where the colors actually land on the paper. Therefore, even with position adjustments, precise alignment couldn't be achieved during the second print run.



自分層



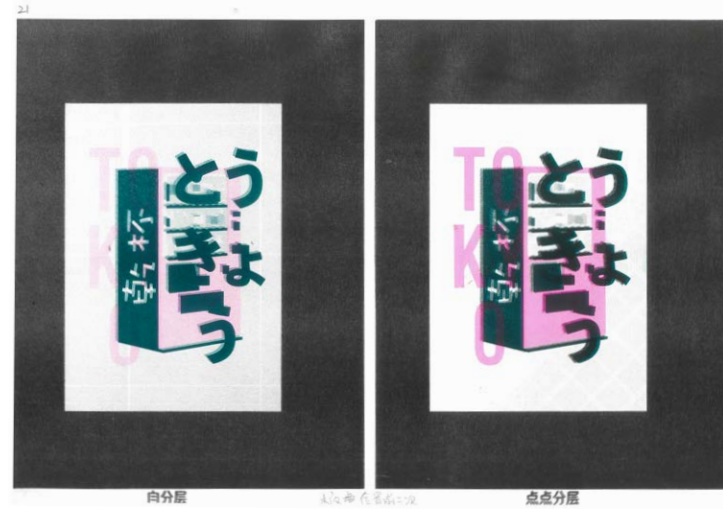
点点分层



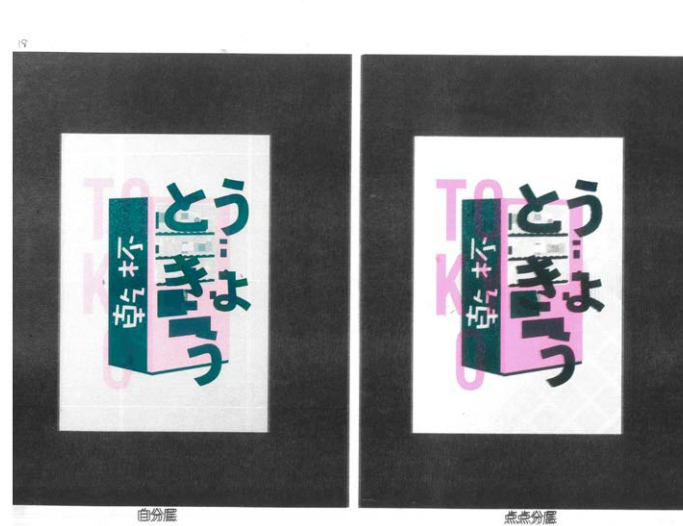
Achieving perfect overlap is incredibly difficult, almost a miracle. But can miracles be created? Can they be replicated? If we make the paper feed of the Riso machine more fixed, like a laser, could the color positions be locked more precisely? If we cut paper to perfectly uniform sizes, mark the feed positions, and then print, and use a transparency plate to align the two prints before reprinting, could we create a miracle that can be replicated?

If miracles can be replicated, then does the misalignment in Riso printing transform from a random machine error into a selectable Riso printing effect?

未改位置的前三次



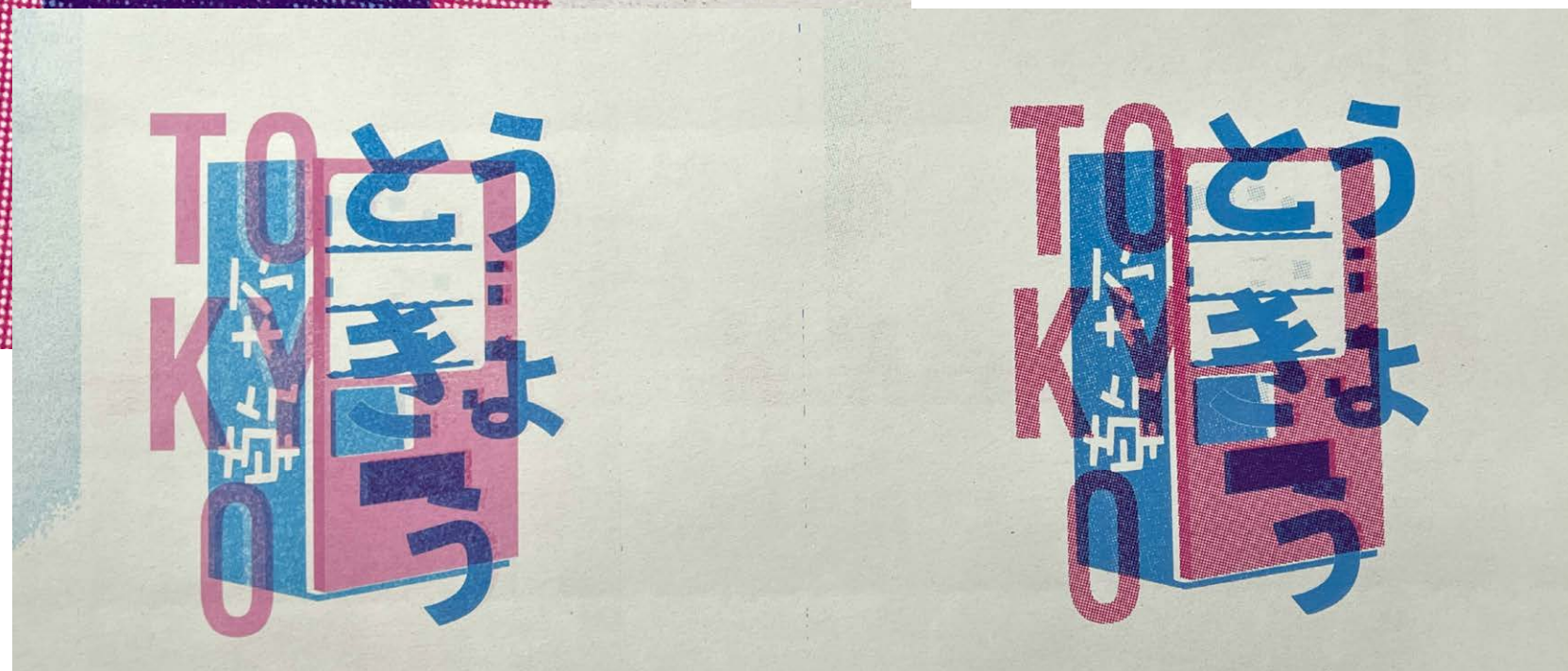
未改位置的后三次



This is a six-pass Riso printing test. I conducted a control experiment using three sheets of paper per pass. The sheets were fed into the machine in three-pass batches. The overlap on the left and right sides differed significantly. However, the three offsets on the left side were relatively similar. The three offsets on the right side were also quite similar. When printing in the same pass, the printed positions tend to be closer. However, if printing in large batches, such as 10 or 20 sheets, the offset becomes uncontrollable because the Riso printer feeds paper very quickly, sometimes even sucking in two sheets at once.



I tried applying my Riso printing experience to laser printing. Laser printing doesn't offer the same rich color selection as Riso. If you want to use only one color at a time, like Riso, you can divide the document into four pure colors: red, blue, yellow, and black, each corresponding to a single CMYK value, since laser printing only uses four types of toner. Using other colors is equivalent to importing multiple colors at once during printing. After adjustments, laser printing achieved a bright, saturated color result.



cmyk四层打印

网点



However, laser printing does not allow for adjustment of color positions, which results in truly random and unadjustable overlapping effects.

When black is the last layer

同时八层打印，背景+纸的印刷（全面覆盖）在最后一层

顺序差别实验 Sequential difference experiment

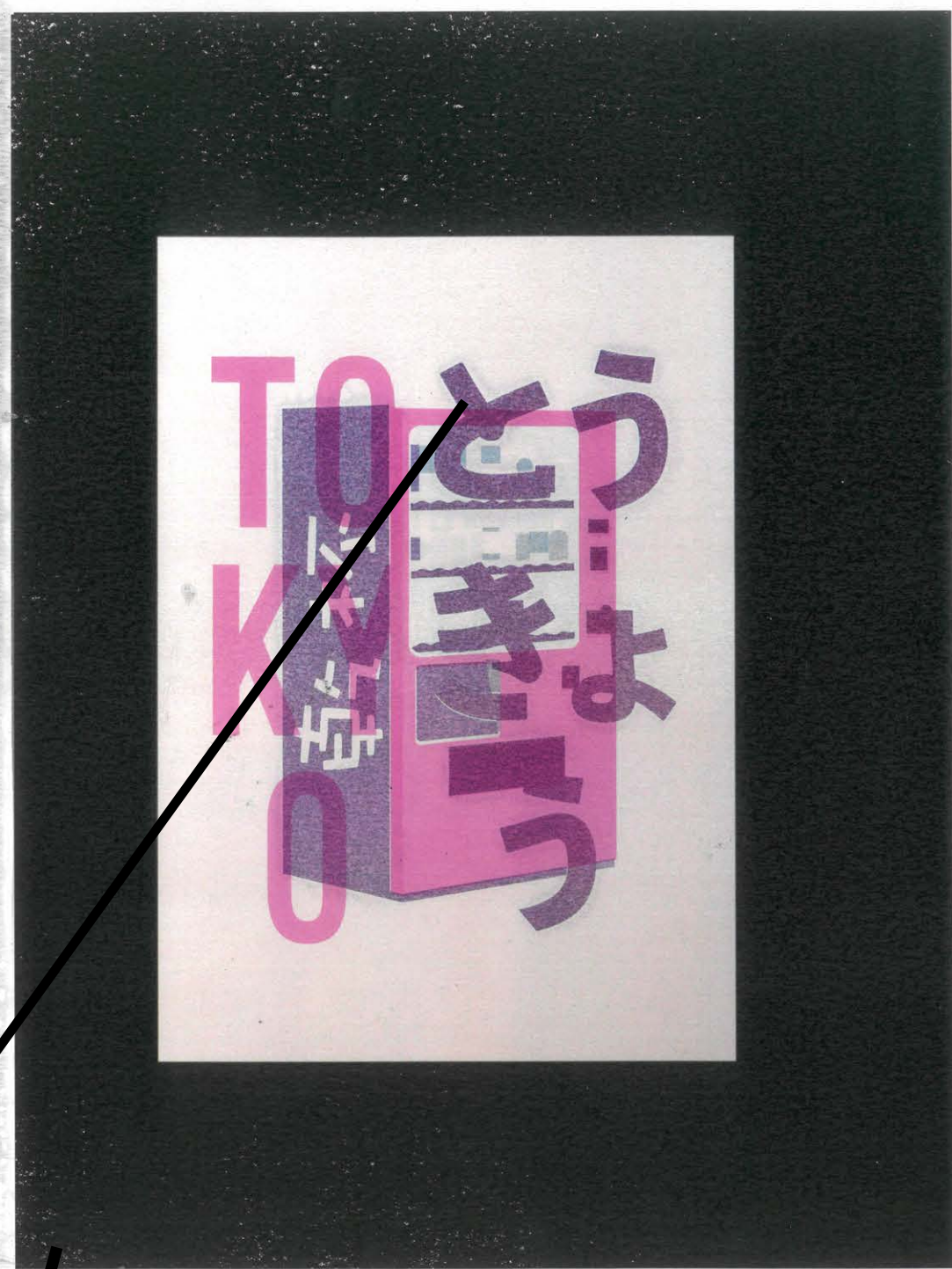
同时八层打印，背景+纸的印刷（全面覆盖）在第一层

When black is the first layer

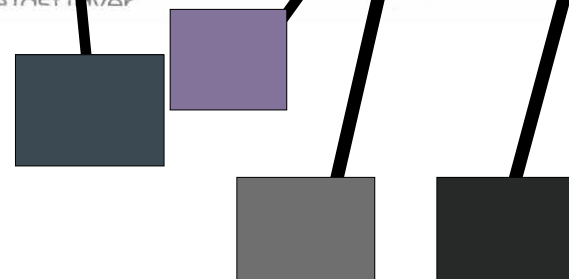
同时八层打印，背景+纸的印刷（全面覆盖）在第一层



Simultaneous eight-layer printing, with background and paper printing (full coverage) on the last layer



Simultaneous eight-layer printing, with background and paper printing (full coverage) on the first layer



The printing order was tested using laser printing. With the same file, both sides were printed simultaneously, eight times. The only difference was placing the full-coverage print on the first and last layers for comparison. It's noticeable that there are some color changes; green and black are no longer the same.

Adjusting the printing order results in different colors and different printing effects. The first layer's colors are more accurate than the others.

同时三层打印，背景+纸的印刷（全面覆盖）在第一层



如果在第一层的情况，会卡纸，但不会影响纸进入打印机。



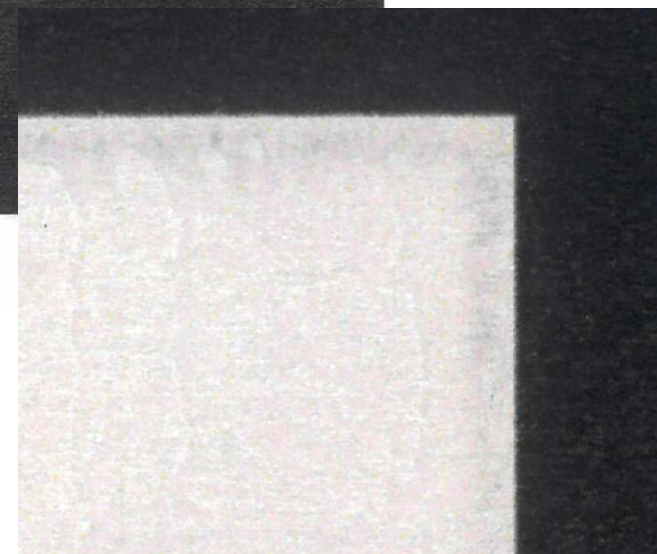
不会出现折纸现象。

This set was printed three times in the same order, with the entire sheet printed on the first layer. The color difference between the two sets was minimal. No edge burning effect was observed during printing. However, it was observed that when the paper with a large area printed entered the machine, there was some paper jamming; the paper did not enter the machine smoothly.

同时多层打印，背景+纸的印刷（全面覆盖）在最后一层 | |



同时打印两张 偏移更明显，不同纸质 最后全印的扩散效果不同



This time, we tried using different types of paper. We placed the full-sheet printing as the last layer and the green color as the first layer. It's noticeable that compared to the previous printing, the first-printed color is more faithful to the original. Also, the burning effect was slightly reduced after choosing different paper. However, there were no significant differences between different groups.



RISO



In terms of printing speed, Riso is faster than laser printing, which requires four separate passes.

Riso also has a significant price advantage for mass production. Even when laser printing produces an image in a single pass, it's still more expensive than Riso.

Riso allows adjustment of the ink output and residence time of individual colors on the paper, something laser printing cannot do.

However, large areas of dark color, especially near the edges, are prone to paper jams, preventing single-pass printing. Riso also requires more drying time.

Laser printing can print dark colors near the edges, but there's a chance of some toner leakage.

Original



LASER



Electronic replicas

