

On the quest for total registration with multi-colour intaglio printing by Robin Eliovson – December 2005

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This article includes:

A personal experience and investigation in establishing multi-colour print registration
Some reference information at the end of this article.

Introduction

During my second term of printmaking, I decided to produce a photopolymer intaglio multicolour design. It was an image of a saddle billed stork which I had painted in acrylics on paper.

Photo below, against wood panel.



Digitally altering image colours

Initially I scanned the image and in my PC digitally manipulated the colour channels in by altering the primary 4 process colours (CMYK) into 3 specific Pantone (PMS) colours.



Images above "altered PMS colours"

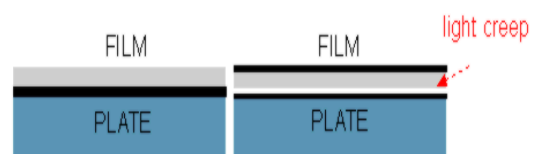
Film positives

I then purchased a set of colour separated positives of the "stork" image incorporating a random dot structure (stochastic screen), from a repro company.

Exposure

I was aware that when exposing the film on the plate it should be film emulsion against plate emulsion so that no light is allowed to creep around the sides of the emulsion.

Expose in a vacuum frame or between a solid surface and glass firmly held in place.



Making plate

My next step was to make the plates. I cut large photo polymer plates down to approximately the size I was going to use and I then exposed the images (PMS: Blue, Red & Yellow) on the photopolymer plate and completed the developing and fixing process. The plate thickness of 0.95 mm was a limiting factor (as explained later).

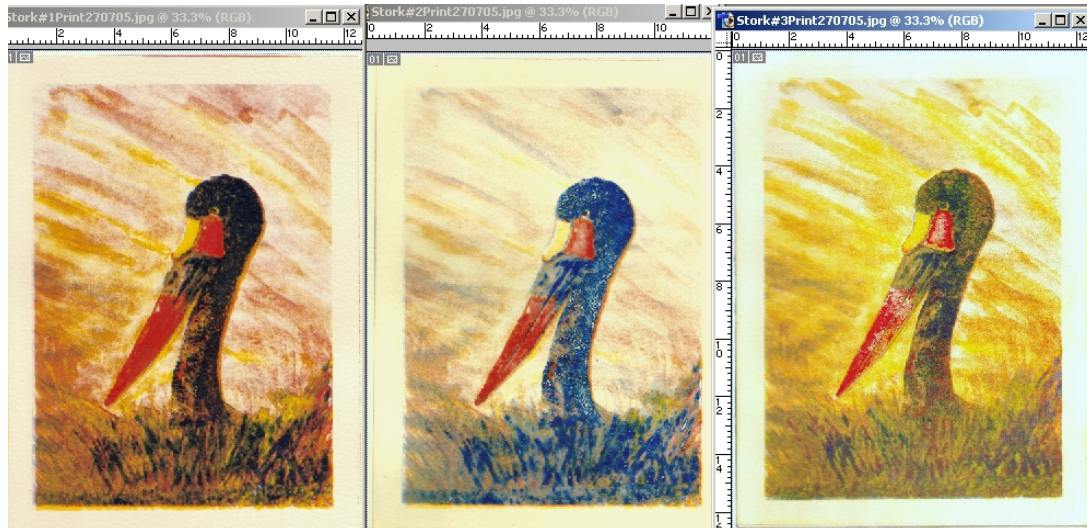
(Not realising at the time my error) I then cut the plates down with a hand/foot assisted guillotine to the registration marks on the corners of the image. Once completed, I inked up the plates and started to print.

I then found that I had to “fiddle” the position of the plate to try and obtain registration. On closer inspection I found that each of the plates varied marginally in size and the location of the image on the plate also varied from plate to plate.

Ink saturation and sequence

In the following photos, the difference in colours between each print was as a result of varying the sequence of colours printed as well as the density of ink at the time of printing.

Left to right: Red last, Blue last, Yellow last.



HOW CAN I FIX THE REGISTRATION? I wondered.

I thought of a hand operated letterpress proofing press that had a paper side and front registration lay to accurately re-position the paper and an adjustable image system. These machines were used to produce letterpress block colour progressive proofs. On the internet I started searching for a Van Der Cook proofing press. I remembered using a similar one during my apprenticeship days as a compositor (metal typesetter) back in the period 1960-65. I also went to visit the Penrith Printing Museum in Penrith (NSW) where they had a Van Der Cook and soon realised it would do the job of registration, but could NOT get the pressure needed for intaglio printing.



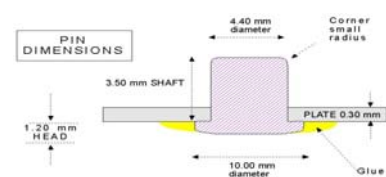
I initially attempted “pinching” the paper in the proof press travel after each colour which made locating the paper easier, but there was the location of the plate that varied. One could get reasonably accurate, but not **totally** as I was attempting to do.

Plate punch

I purchased a paper plate, multi-punch unit that was no longer in use (discontinued model) as it was a series of “odd” imperial size punch holes. They were originally used by the offset printers who pre-punched paper plates to register with the pins on the small offset presses.

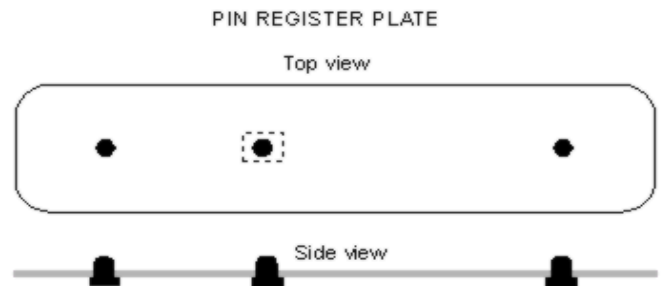
Pin bar register plate

I now needed a pin bar register system to marry with the plate punch. I drew up a profile of what the pins size and shape should be (a circular dowel with a shallow head) and had an engineering shop turn them on a CNC lathe.



I then cut down a piece of recycled litho plate (thin aluminium) to a size of about 50 x 250 mm and punched it with the paper plate punch.

The pins were located with hot melt glue in the "pin bar" one each at the extreme ends of the bar and one off centre. I now had a pin bar. The off centre was an aid to assist with incorrectly placing the "clear base" (a transparent, tough, stable film) the wrong way around in the press (in the litho plate industry the method used normally had a "square" pin offset from the centre).



Grid layout

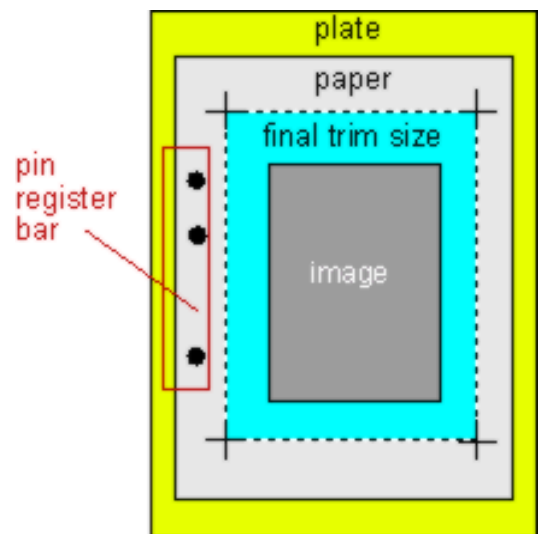
I then drew out a detailed grid of paper size, plate size and image location to assist me in locating the plate accurately and punched the grid.

I purchased some clear base, cut 5 pieces to size and pre-punched them with the pin bar holes, I also pre-punched the paper I was going to print on. The five pieces were used as follows: one each for the three colour plates, one for a layout grid and one as an overlay mask to stop the transfer of excess ink (that has been not fully wiped back on the plate areas) to the paper.

It was unfortunate that I had previously removed the film registration marks from the plate and I now had to use the image as reference points.

Locating the plate

I taped the pin bar down onto a fixed surface and then the first piece of clear base on top of the grid. Loosely locating the plate on the clear base, I then overlaid the grid and accurately located the plate into position. Using some double-sided self adhesive tape I fixed the plate to the clear base. I repeated this process for all three colours.



Paper fibres

I now had a method of registering the different colours, but I encountered another problem. The paper, prior to printing intaglio, needs to be damp. If I dampened the sheet the paper fibres swelled and the holes in the paper moved apart and would not allow the pin bar to locate. To overcome this, when I soaked the paper I kept the punched area out of the water by locating it with a clothes peg on the side of the water tray.

Pre-stretch paper

Some additional hurdles were; the paper should be pre-stretched on the press, about 2 or 3 rolls under pressure and the edge where the wet paper met the dry paper usually showed some buckling. I solved this by printing on a larger piece of paper and cutting or tearing the problem area which also got rid of the register punch holes.

Plate thickness

Another problem the photopolymer plate previously used it is 0.95 mm thick which is too thick to punch with the plate punch. Repatching the plates by sight on the image was not a good approach in the long term.

Light sensitive film

I then used Imago Ultra™* a light sensitive emulsion film/system which I applied to the unprinted side of the recycled litho plates (0.34 mm thick). The plates were pre-punched with my system.

Results



Left - first attempt (poor registration)



Right - after experiment (good registration)

Tests

In tests I patched the film positives to register with a layout paper/image grid onto pre-punched clear base. These are then exposed onto the light sensitive emulsion which is located on the plate with generous overlap areas of the image. This method has turned out to be ideal for my requirements and relatively inexpensive.

Web links to some information

* Information and general processing guide on this product can be found at <http://www.praga.com/ulpro.htm>

I have also found a lot of useful information at <http://www.Keith Howard.org>