

## **Eco-Paste: An Alternative Clay-Based Medium for Screen-Printing**

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**Abstract:** This presentation will demonstrate the making process of ‘Eco-Paste’ as an alternative medium that utilizes the natural clay and recycle material into useful water-based screen-printing medium. It will then present ways to form the basis for researching ideas through the concept of combining natural and recycle material to develop an alternative medium which is flexible, inexpensive, environmental friendly and user friendly. A survey of researches by other researches is an invaluable method for learning about my project and how I am going to locate and lead the project in its context. This experimental studio practice study is conducted by using ‘jigsaw puzzle’ technique to explore different types of print characteristics which are consistency, textural effects, colour densities and impression qualities. Composition analysis and heavy metal test were conducted for toxicity and eco-friendly concern. The presentation will be delivered as a narrative of critical and creative process that includes the journals and images of specific periods and will make significant links between ideas, forms and contexts and also the creative possibilities that result in the finished research.

**Key words:** Screen-printing, impression, alternative, eco-friendly, water-based

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### **INTRODUCTION**

Screen printing creates prints by using a fabric stencil technique which ink is simply pushed through the stencil against the surface by using the aid of a squeegee. Screen printing may be adapted to printing on variety of surfaces or material by which the artists have explored the technique to print on variety of material such as on bottles, directly onto walls, on textiles and also experiment with the printing processes, techniques and mediums especially water-based pigments which would recreate new method of mark making, effect variation and image distortion. Adam and Robertson (2003) noted that “many approaches to image-making can now be explored by professionals and novices alike and fine art screen-prints no longer needs to be characterized by a particular range of marks”.

In recent decades, a number of radical approaches (continues exploration and experimentation) within the context of the development of contemporary printmaking by artists have certainly created a new form of visual aesthetic (surface tactility and impression). Karim and Mohamed (2011) state “artists have allowed themselves to leave the conventions of printmaking behind and have dared to do the unthinkable to prints or to use other mediums which have resulted in their work developing in different ways”. The flexibility of screen printing towards any technological changes allows the new forms of critical discourse that embraced the print’s specific

attributes and characteristics, including its repositioning as part of an expended field of the visual arts.

Artists constantly explored and cross-referenced with other visual aesthetic innovation to emphasize the migration of ideas and the adaptability of approaches to printmaking and its possibility. Carroll (1999) notes, “Form changes because content changes where new content requires unprecedented, yet suitable modes of presentation. Artistic style is always transforming because new contents impels the search for new forms of articulation”.

### **PROJECT OUTLINE**

This research used a studio practice research approach in the form of experiments to investigate and explore the potential of the natural clay as a medium suitable for screen printing process. The investigation will include the print characteristics which are consistency, textural effects, colour densities and impression qualities and technical aspect of medium which are composition analysis and heavy metal test for toxicity and eco-friendly concern in this concept, “eco” is drawn from the idea that the material should be both economical as well as ecological (Said *et al.*, 2014). This research aimed to produce an alternative medium for screen printing process by investigating and exploring various possibilities through the “jigsaw puzzle” technique.

The project is concerned specifically with the idea of the aesthetic representation as follows:

- What are the suitable process, method and technique for a clay-based medium for screen printing?
- How to formulate a clay-based medium technically for screen printing that is versatile in usability?
- How to manipulate a clay-based medium aesthetically for screen printing?

### THE CONTEXT

**Experimenting with mediums and techniques:** Water-based screen printing medium lends itself particularly well to art projects that cross media boundaries. Despite its long Eastern history in the West silkscreen is more associated with pop art, appropriation and the use of photography and reproduction in art making. Water-based silkscreen facilitates printing on all kinds of papers as well as on a wide variety of unusual substrates such as plastics, wood or metal. The medium seamlessly combines the expressive vocabulary of the artists hand-made gesture with the world of reproduction and full colour printing. This idea generates the element of an integrity within the aspect of process and materials which express the subjective emotional states through personnel style, uniqueness and differences.

For instance, artist like Warhol always experimented and combined various water-based mediums, materials and techniques to create identical or mass-produced images in variations of bright colour combination that each print a different configuration. Crone (1970) stated, "He changed the definition of creativity from that which is possible for the "gifted" individual to anyone's choice from among available images." The experimentation and innovation of his screen-printing process created an opportunity that offered a possibility of a new material and technique. Exploration through experiments is a way of creating something different or new ideas from "re-contextualizing objects or sensibilities or from making unlikely combinations or associations" (Dietrich, 2009).

Through, the use of silk screen and Warhol sought to make art of mass produced items and to mass-produce the art itself. Mass production became the most dominant aspect in Warhol's art, a concept extended to his studio which he called the factory. He embraces the methodology 'like factories with many hands producing work that would appear under a single signature' (Mercurio and Morera, 2004).

Sameness and similarity, difference and uniqueness are the characteristics of mass culture that Warhol forces us to confront. These ideas are encapsulated in a formal



Fig. 1: Flowers in 1964 (installation view and detail)

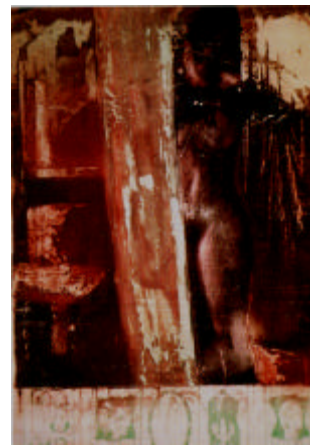


Fig. 2: Chewing the Facewasher in 1994

grid layout as seen in his works flowers (Fig. 1). In the former, he enlarges the flower images to oversize and repeatedly prints them in different colours and medium. All images are printed in square form and arranged in different parallel compositions. Along with his work with the images, Warhol has produced hundreds series of flowers in different sizes and colour combinations. The combination of manual and mechanical screen printing techniques allowed him to readily copy and create different look of multiple images in which "the abolition of the hierarchy of subjects worthwhile representing" (Mattick, 2003).

By combining several printing techniques, mediums and methods in the process of constructing the images, enable to open up new areas of creativity and possibility in mark-making which different combinations will react and perform in a different way and create a variety of effects (Fig. 2). For example, Adam and Robertson (2003) explained about the physical nature the mediums where "opaque colours can be printed to produce a rich, solid deposit. Translucent mixes dry to a pure, clear colour without any chalkiness and transparent layers dry crystal clear whether matt or glossy". Rebeca Mayo in her research entitled *Chewing the Facewasher* in 1994, use the combination of water-based screen-printing medium and

acrylic-resist etching. In this research, Rebecca explored with photographic positive images by adding autographic marks. She printed the stencil images by using transparent Lascaux while the etching plate was created by using the combination of photographic positives, photopolymer film and burnishing.

In addition of Rebecca Chewing the Facewasher in 1994, the combination and exploration of different techniques, mediums and methods create a unique mark-making effect through variations of opacity and luminosity of different images where “the volume of the transfer ink has significantly influence on changes in surface roughness of substrates” (Kasikovic *et al.*, 2013). The translucent printing layers from variation of mediums create complex colour and tonal structure that diffuse sufficiently which produce different textural of illusive effects and images. The idea of combining manual and photographic techniques conveying a different aesthetic context where Tallman (1996) suggested “the interleaving of printed and hand-applied marks as a working method is at its most refined in the prints” which the images and colours diffuse chromatically within the composition (Fig. 3).

The exploration and combination of several mediums and techniques in Ruth Pelzer-Montado work entitled Underwired in 1995 is a water-based screen-print where positive effects were drawn with conte crayon on grained film which was moistened with spray window clear-cleaner. Other dry drawings were made on tracing paper. The resulting photostencils were freely registered and printed using pale, translucent mixtures which representing process of the image from plate to paper.

In this research, the multi-layered of mark markings create multiple illusion of images through variations in tone and intensity. The complexity created by the layering was diffused by the use of translucent effect from different mediums and techniques. The use of lascaux thickener enable the printed layers interacting to create new colour and effect which enrich the composition.



Fig. 3: Underwired in 1995

## THE STUDIO INVESTIGATION

The project started with the idea to create a kind of water-based medium (paste) for screen printing from natural clay that can be combined with any water-based pigments or natural colours. In this context, the aspect of consistency is the most important element in which the reproduction is concern despite creating an interesting surface characteristics. Other considering aspects are economical and inexpensive, flexible, eco-friendly and simple working processes.

Being working with screen printing for >20 years give me an idea to create and explore a new kind of medium which enable to produce different aesthetics and characteristics. For this project, the experiment started with different exploration on combination of the medium (paste) which are clay, recycle Plaster of Paris (POP), paper pulp and glue to find the right combination that worked perfectly for screen printing, especially in terms of consistency. Table 1 shows the configuration of material mixture ratio which each of combination creates slightly different textual quality as well as the consistency values.

Basically, the “paste” is very flexible and can be mixed with any water-based medium such as water colour, fabric dye, poster colour, acrylic and food colouring as well as colour from natural sources for example flowers, spices and leaves. Through, a few experiments, the clay paste (medium) can be intermixed to obtain desired properties which in essence the medium provides an opportunity to create various effects on the luminosity and opacity depending on the properties of the colour mixtures. The medium also use a small amount of colour pigments to create any colour which the ratio ia about 1:10. In this context, the medium is very economical and inexpensive compared to any commercial printing ink. At this stage, I started to experiment on the possibilities of the medium by using different medium on variety of material and surfaces as well as to explore the printing effects and characteristics (Fig. 4).

As one of the main objective of the project is to formulate the eco-medium in the context of environmental friendly and easy cleaning. The composition analysis was conducted through microstructural and chemical composition analysis using Scanning Electron Microscope-Energy Dispersive Spectrometer (SEM-EDS) to determine the component of the medium. The result as given in Table 2.

Table 1: Materials mixture ratio

Composition	Clay (%)	POP (%)	Paper pulp (%)	Others (%)
A	80	10	5	5
B	70	15	10	5
C	70	20	5	5
D	60	30	5	5
E	50	35	10	5

Table 2: EDS result in elemental form

Elements	Weight (%)
Oxygen (O)	57.0
Magnesium (Mg)	4.6
Aluminium (Al)	5.9
Silicon (Si)	15.0
Sulphur (S)	7.2
Potassium (K)	0.4
Calcium (Ca)	9.1
Titanium (Ti)	0.4
Iron (Fe)	0.5

Table 3: ICP-OES analysis

Tests (ppm)	Results
Cadmium (Cd)	Not detected
Chromium (Cr)	6.63
Cobalt (Co)	0.70
Copper (Cu)	Not detected
Manganese (Mn)	10.24
Nickel (Ni)	3.04
Lead (Pb)	2.21
Zinc (Zn)	2.34
Arsenic (As)	Not detected
Antimony (Sb)	Not detected
Mercury (Hg)	Not detected
Selenium (Se)	9.19
Aluminium (Al)	1.88
Boron (B)	Not detected
Barium (Ba)	11.72

ppm = part per million



Fig. 4: Clay paste

The medium also has been tested for toxicity analysis using Inductively Coupled Plasma Optimal Emission Spectrometer (ICP-OES) (Fig. 5). The analysis shown that the medium contain un-sufficient heavy metals component which the medium is safe and can be used to anyone. The result of the heavy metal test as given in Table 3.

I have experimented on different surfaces quality such as plywood, plastic, perspex, paper, screen mesh, canvas and plaster of paris by using and combining different colour mixture. Aesthetically, the colour reacts differently depending to the colour mixture and printing layers, materials and surface characters which create variation of textural effects, colour densities and impression qualities. For example, poster colour mixtures on paper creates more

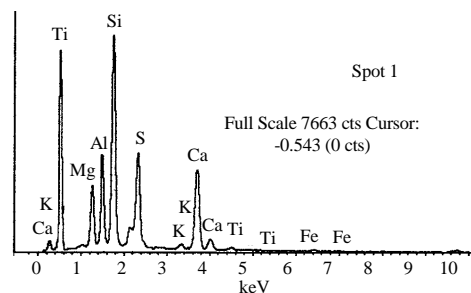


Fig. 5: EDS spectrum

opaque which produce more brilliant and thick colours impression. While the food colouring or water colour on screen mesh creates a kind of subtle effect. The other unique character of the mixtures “paste” is the textural quality of the printed surfaces which is created by the physical properties of the mediums especially the clay and POP. The water colour mixtures creates more translucent quality but the opacity can be found in poster colour mixtures. Surprisingly, the medium is capable to work on smooth surfaces like plastic and perspex which work perfectly as any other commercial printing mediums (Fig. 6).

After experimenting with various mediums and materials, I decided to create an image by composing and combining various medium in order to refine the effects and colour characteristic more aesthetically. The first work was using combination of poster colour and water colour on canvas. The combination of opacity and luminosity, bright and dull effects, created an interesting impression within the composition which the colour pop up in variation of intensity and created rhythmic optical vibration. Basically, the first panel used a food colouring while the other panel is printed with poster colour mixtures. The textural characteristic of the canvas surface heighten the effect of “posterised” printed images where the overlapping layers created various brightness and impression that strongly modified and stimulated visual sensations (Fig. 7-9).

In another context, I wanted the medium to be able to achieve the standard realistic artistic impression as good as any commercial colours. Flowers # part I constructed through variation colours of poster mixtures printed on canvas while in Flowers # part II, I used a combination of poster and water colours printed on paper. By changing the ratio mixtures proportion between colours and medium (“paste”) around 20-30%: 70-80% will produce stronger and more brilliant colour that are capable to construct solid and clear images. Figure 10 illustrates the correlation between the effect of strong opaque poster/water colours mixture and the way in which these mixtures appear when



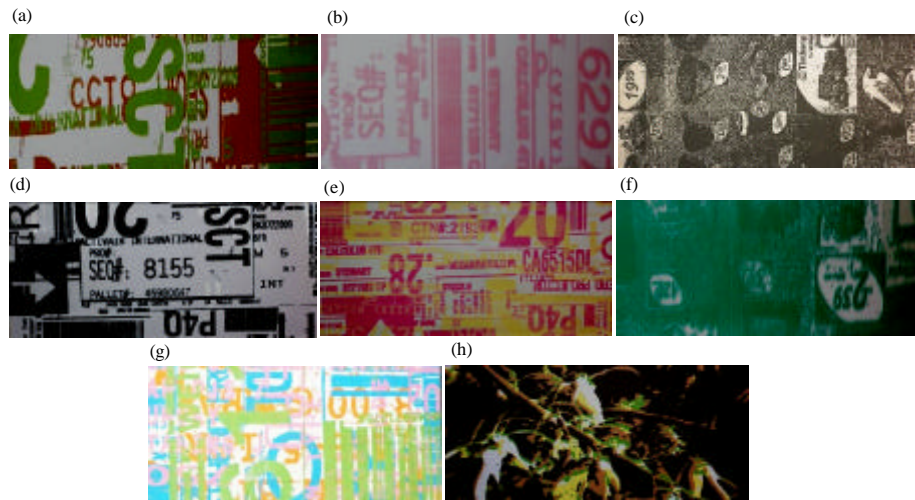


Fig. 6: Materials and mediums experiments; a) Poster colour on paper; b) Food colouring on screen mesh; c) Poster colour on plywood; d) Poster colour on plastic film; e) Water colour and food colouring on canvas; f) Water colour on Perspex; g) Water colour on Plaster of Paris; h) Poster colour on paper



Fig. 7: Untitled, 2014



Fig. 9: Flowers #part II, 2014

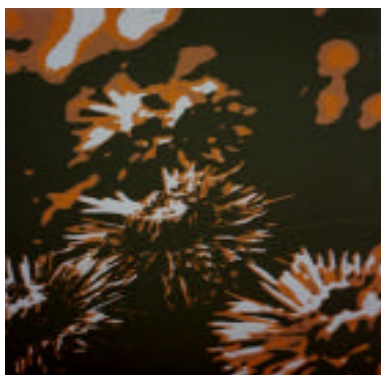


Fig. 8: Flowers #part I, 2014



Fig. 10: Price tag, 2014

printed on overlapping layers from light to dark. By reconfiguring the colours composition and

combination, the combined mediums performed perfectly and are compatible in building the constructed images.

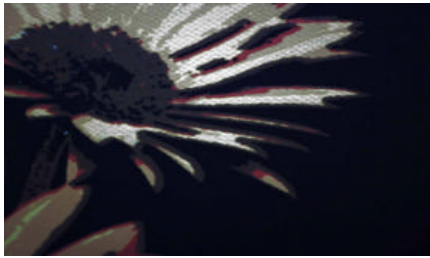


Fig. 11: Textural effect (detail)

The rough textural quality of the medium has significantly given the image different aesthetic quality and characteristic surfaces.

From working with conventional material such as paper and canvas, I wanted to try the effects on translucent material like perspex through several layers of abstract composition by combining different manipulative techniques and mediums such as photocopy machine, computer generated images and manual drawing. Price Tag in 2014, the work comprises of four overlapping layers that are printed over two layers of 10 mm perspex by using poster colour, water colour and food colouring mixtures. The use of different colours and text characters in this research, produced the illusion of tactile surfaces while the bright colours both on bottom and top images strongly modified viewer perception and created a rhythmic balance illusion that create variation of visual qualities. The bottom text is applied with black colour from poster pigments while the second layer of text is applied with bright green of water colour.

The density of the textual text composition in translucent effect through combination of different colours pigment creates an interesting effect through the contrast of light and dark values that create variation of tactual impressions. The bright images harmoniously blend with the chromatic composition where the density of the codes' composition on the background and variation of images that are arranged in grid formation stimulates an active visual experience between positives and negatives spaces. Through, its variation of printing characteristics, there is no doubt that the medium (paste) works perfectly and suitable for screen printing process (Fig. 11).

The most unique character of the medium is the textural quality where the roughness of the printed surface creates an interesting effect that is totally different from any conventional printing ink or medium. This characteristic enable a new kind of aesthetic values to be explored and discovered.

## CONCLUSION

This project has been exploring various combinations that is significant within the formulated clay-based

medium as an alternative medium for screen-printing. Besides being very flexible and easy cleaning, the water-based medium is also inexpensive and economical. The physical properties of the medium allow a new form of aesthetic value which can be explored and developed. In general, this medium provides an opportunity to create a variety of effects on the luminosity and opacity that allows different types of texture and printing quality. This project is significant to the field of creative arts by creating an alternative medium that allows exploration of printing with the unique characteristics which has a huge potential for artists, designers, decorators and printmakers for aesthetic construction or commercial purposes in building and developing ideas in the context of the concept and creativity.

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