The Use of Printing Techniques in Ceramics

Leman Kalay describes her personal research with various printing methods

The word 'printing' used in paintings, graphics and ceramics among all the other art areas means taking a copy of any sort of image, writing or picture and transferring it to another surface in any desired shape or number by using printing techniques. Almost all of the printing techniques used in the field of painting and graphics are usable upon ceramic surfaces.

To implement these techniques to ceramic surfaces, the use of ceramic colours is enough, along with subsidiary materials. Another definition of the word 'printing' in the dictionary is to print. In this context, many ceramic surfaces from past to present were decorated by using prints that were formed by hand, along with stamps on the forms that were shaped by hand or lathe.

The method of transferring any image from a surface to another has found wide acceptance through improvements with basic, easy and repeatable implementations. Aside from their use in artistic works, the printing techniques used in industry can be carried out more easily and faster today than in the past. Printing on ceramic surfaces has become an integral technique widely used by ceramists.

Printing Techniques Used in Ceramics

In the early stages of transferring ceramic colour from one surface to another, the first use of printing was encountered in the Cretan (Minoan) ceramics and Greek (Mycenaean) ceramics that were decorated with natural sponges. The first examples of stamping, stencilling and relief printing can often be seen in old ceramic pieces, tiles and bricks used in architecture. Relief printing and intaglio are the first printing techniques to be used among all the transfer methods. Stamping is one of the oldest ceramic printing techniques. It has been used by ceramists

Professor Güngör Güner. ***Photocopy Age (Detail)****. 2006. Lithography (photocopy printing) on paperclay surface, 1100˚C. 80 x 80 x 0.5 cm.*

and sculptors to give their works a unique signature or to create an image. For centuries, some decorations made out of wood, clay or other materials were applied by using stamps that were manufactured naturally or belatedly.

With the development of printing techniques on paper, metal engraved plates were passed through cylinder presses and press printing was discovered. Engraving made it possible to make prints with more details than the printing made out of wood. Thanks to engraving and etching, art itself was able to develop progressively in the early portions of the 17th century. Since the colours used on paper did not stay during the firing, ceramists began to use oxides as colorants. With the invention of paperclay, this technique is widely used in ceramics today.

After the invention of engraving, three different printing methods altered the printing process. These are lithography, photoprint and serigraphy. Lithography is the method of reproducing a decoration drawn on limestone with oil and ink via printing. The use of lithographic printing on ceramics is done by painting photocopied images with a mixture of pigment and adhesive.

Stencilling, a transfer technique dating back thousands of years, can also be defined as the first form of serigraphy. In the 20th century, rapid development was observed in serigraphy, making multi-coloured printing possible and so it is one of the mostly preferred techniques.

The transferring of photographic images onto ceramics by using the gum bichromate system began in the 19th century. This is carried out based on the light sensitive chemical, potassium bichromate.

Monotype printing is a unique combination of the picture and printing technique. It is achieved by making drawings on a flat plate with oil or water-based colours and then transferring them to another

Above: Paul Andrew Wandless. ***The Potter and the Blacksmith****. 2013. Clay monoprint screened images, sprigged objects, low temp clay, watercolour underglaze, underglaze, glaze and metallic glaze. 12 x 13 x 1.25 in. Below: Justin Rothshank.* ***5 Bottles****. 2014. Earthenware with matte glazes and custom decals. Decals are custom gold, white, platinum, and iron and red poppy decals. Fired four times at cone 04–018. 12 x 4 in.*

surface. This technique can be applied to ceramics with plaster or paper, slip and underglazes.

Printing with decals became popular in contemporary ceramic works in the 1960s and 1970s and ceramists began to transfer photographic images on decals by using overglaze colours. As in today, decals are one of the most widely used printing materials as it makes it possible for an image to be transferred to other surfaces rather easily.

Many different methods began taking major steps along with developments in the digital printing techniques and, among these, the laser printing technique has improved the most. Laser printing is done by transferring images taken from laser printers to ceramic surfaces.

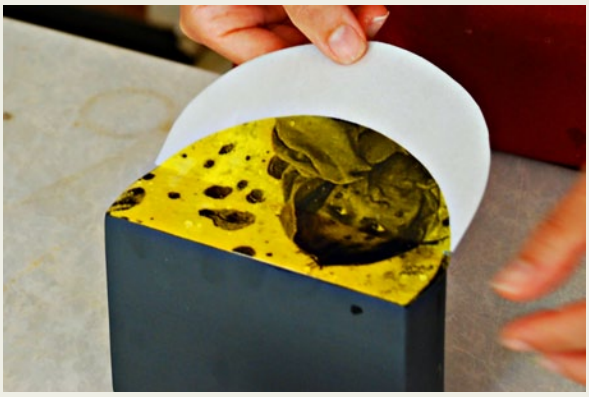
Personal Applications

Monoprint is based on the principal of uniform printing and, in ceramics, is done by making drawings or designing pictures on a flat surface such as on paper or plaster by using slip and underglaze colours. The image is transferred to the clay, with the clay slab being pressed into this painted surface. As well, the image can also be transferred on to the plaster by casting. Plaster is a material used widely by ceramists for monoprint since it is ideal for uniform printing. In monoprint the clay slab can be used as the finished product or it can also be converted into various forms through the help of a mould or with handbuilding. In personal applications, this technique was applied by drawing the image with black slip within the plaster mould and finished with casting.

Lithography is one of the chemical printing methods based upon the principal of water and oil not dissolving within one another. Basically it follows the basis of making a drawing or a picture on the plates prepared specifically with oil mediums. Photocopying and laser printings go well with the lithographic printing principle.

Black and white photocopy machines use a heating system that renders permanent the plastic materials within the toner by melting them. Thus the black part of photocopies is nonporous. If an application is carried out on a photocopy with a colour including an amount of adhesive, it is observable that the colour gathers on the black areas and is saturated by paper in the white, empty areas.

Above: Leman Kalay. ***Implementation of monoprinting with a plaster mould****.*
Below: Leman Kalay. ***Hope (Installation)****. 2010. Casting, monoprinting, black slip fired at 1050˚C. 40 x 60 x 13 cm.*



The black ceramic colour to be used in printing was mixed with a sum of water into which a small amount of wallpaper adhesive was added. The prepared colour was drawn on the photocopy with a brush and the drawn photocopies were left to dry. Images were then placed on the leather-hard form in a certain fashion so that the coloured area would be facing below. The paper was rubbed from its back after being wetted lightly, thus the image passed onto the clay surface. After the completion of this process, the paper was removed from the clay surface and the printing process completed.

Laser printing is the process in which images are taken from laser toner printers and from the laser toner photocopy machines, including rich iron amounts allowing for the acquiring of prints that range from black to sepia. In the images with good contrast, this method provides relatively good results. Different brands of printers and photocopy machines include iron oxide in different densities. Iron oxide is known to exist in the toners of some Canon and Hewlett-Packard brand printers.

So that the image is transferred to the ceramic surface, decal papers, which are used on glaze and require lacquer, can be used in this technique. Laser toner decal paper, however, does not require lacquer. The toner sticks itself on this special decal paper and is ready to use after the printing process. With this two-type decal paper, it is possible to make prints on bright or semi-matt fired glaze surfaces or unglazed high fired porcelain surfaces.

To transfer the decal to a ceramic surface, first the paper is put into a pot filled with warm water and kept that way so that it can absorb the water. Afterwards, the support paper is removed from the image and the image is transferred to the fired, glazed ceramic surface. Possible air bubbles, excessive water and wrinkles are fixed with cotton or another soft material.

Laser firing needs to be done at the last phase. The firing degree of toner decals is equivalent or close to the glaze existing below it

Top: Leman Kalay. ***Implementation of Laser Printing****.*
Above: Leman Kalay. ***Invisibles (Detail)****. 2013. Casting, laser printing on leather-hard clay surface, fired at 1070˚C. 12 x 100 cm.*
Below: Leman Kalay. ***Childhood III (Installation)****. 2010. Casting, laser printing on glazed surface, black slip, fired to 1050˚C. 8 x 39 x 8.5 cm.*

(though it may vary for toner decals). The most convenient method is to carry out the decal firing at a lower temperature than glaze firing. If the glaze can reach a softness level in that it could transfer the iron oxide to the upper layer and be a permanent part of the surface, then it is sufficient. Bright surfaces yield the best results. Though some little mistakes may be encountered in matt, textured or biscuit surfaces when firing at a temperature where fusion is due, the desired results are still obtainable. Since the image is generally sepia toned, laser decals are to be placed on light coloured surfaces.

Another way to use laser printers and photocopy machines is to use the print of a normal paper and then to apply it on a leather-hard clay surface. As the desired image is being printed from the printer and before the phase of anchoring is completed by the hot cylinder, the printer is shut down and the paper is taken out carefully. At this phase, ink stays as dust, as it is not anchored on the paper. Afterwards the paper is placed on the clay slab and the transfer is completed by applying pressure from its back with a rolling pin or scraper.

Whether it is done with coloured glazes, with hand drawing or with printing, decoration has been an indispensable part of ceramics since its founding. Rapid changes and steps taken in the plastic arts field of today affect the art of ceramics both morphologically and in terms of techniques.

Highly sophisticated machines and equipment provide the possibility of realising large-scaled productions with difficult colour match-ups. Rich coloured dyes make all colours printable on ceramics. With the coming of microprocessors and the beginning of the computer era, new developments in the image transfer were seen from an industrial viewpoint. Actually, in this era where technological advancements take place, all methods are still based in the techniques of old ones.

Technology continues to set motion to the new image transfer techniques. Each year, new computer and ceramic materials, printers and decal papers come out. In the older days, the carrying out these processes was not so rapidly done. Dark rooms, photocopy machines and other subsidiary forms used in creating images changed places with this new technology. New and developed commercial materials

Above: Leman Kalay. ***Implementation of Photocopy Printing****.*
Below: Leman Kalay. ***You Know My Murderers (Installation)****. 2014. Porcelain paperclay, casting, lithography (photocopy printing) and black pigment fired to 1250˚C. 7 x 55 cm.*
Facing page, below: Leman Kalay. ***You Know My Murderers (Detail)****.*
Facing page, above: ***Leman Kalay****.*

for ceramic printing/transfer cost less, are environmentally friendly and more easily accessible. Combining clay and print has never been more fun and simple as it is today.

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