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COMPENSATING FOR LOSSES IN DESIGN WITH DECALS

Gregory S. Byrne

Ceramics have been decorated by transferring an image to the surface of the ware for more than two hundred years. In the process known as transfer printing, an image is captured from an engraved copper plate onto a sheet of paper and then pressed onto the unglazed surface of the ceramic. After the color is fixed, the paper is peeled away and the piece fired. Pieces decorated in this fashion became known as transferware. The transfer of multiple colors, decalcomania, was introduced about 1860. In this method the full color design is printed on paper and transferred to the glazed ceramic surface. Transfer printing and decalcomania, now called decals, were very popular in the mid-nineteenth century and often featured historic figures, scenes, and events. Today, the method of transferring an image to the surface of a ceramic includes photographically generated decals. Photo imaging techniques are also being used in furniture conservation treatment to compensate for losses in design and fabric (Sheetz 1984).

The decal technique presented here is derived from the popular decoupage craft revival of the late 1960s and early 1970s. One craft technique removes an image from its paper support by applying an emulsion coating over the image and transferring it to another surface. Once dry, the coated image is placed in water to soften and swell the paper. The image can then be transferred to another surface. This simple method of creating a decal has been adapted to use conservation materials with color laser imaging techniques to replicate lost designs.

In 1985, our conservation labs received dozens of decorative arts objects and historic furnishings from the Augustus St. Gaudens National Historic Site in Cornish, New Hampshire, which preserves the artistic legacy of this noted sculptor. Some artifacts were severely damaged, with major portions missing. This was the case with an Imari porcelain in the form of a stylized coy or carp, a good candidate for the development of a new treatment technique (Figure 1).

A photographically generated decal begins with a photocopy produced with a color laser copier. A Canon Color Laser Copier, the CCLC 500(CCLC) is used to produce a print from a 1:1 ratio, 4"x 5" color photo transparency. The CCLC can also produce a usable image from a 35 mm slide or photographic print if the quality and resolution are acceptable. One advantage of using the CCLC is that the color and size of the image can be adjusted to meet the requirements of a particular application (Figure 2).
Figure 1: Imari porcelain selected for developmental treatment.

Figure 2: The color, size, and content of images can be digitally manipulated.
The CCLC's computer system can scan an image digitally, allowing the user to manipulate the content of the image. Once an acceptable laser image is printed, it is secured to a section of corrugated blueboard in preparation for the application of the coating transfer medium. The image is given a brief, mist-like spray coating of a dilute solution of water-borne urethane using a Devilbiss, Type FBA, Series 502, spray gun. In this case, 50 ml of Polyglaze, a water-borne polyurethane, is diluted by the addition of 50 ml of deionized water. A few drops of M-Pyrol (N-Methyl-2-pyrolidone) are added to aid leveling and flow. The air pressure for the spray gun is set at approximately 15-20 psi. If the first spray application of medium is more than a light mist coating, the paper becomes saturated and bonded to the dyes and dye binder, which makes it impossible to separate the two. Once dry, the process is repeated and again allowed to dry. Spray coatings are repeatedly applied until a readily visible, clear, uniform coating forms upon the surface (Figures 3, 4).

Figure 3: A mist coating is applied to the image.

Actual practice reveals that evaluating results are more important than following a prescribed three, four, or five spray application. Spray equipment manufacturers also generally recommend that repeated light spray applications will generate more satisfactory results and avoid drips, puddling, solvent and dust entrapment, and other problems that plague air brush and spray gun-applied finishes.
Figure 4: Coatings are applied until a uniform coating is achieved.

The dry coated image is then released from its support with a scalpel and placed in water for twenty minutes (Figure 5).

Figure 5: Immersion in water swells the paper fibers.
Wetting the paper swells the fibers, diminishing its cohesive strength. The paper is removed from the image by lightly rubbing away the cellulose fibers (Figure 6). Through trial and error, it was discovered that the paper was most easily removed from the image if it was placed face down upon a resilient cushioned surface of ¼" Volara polyethylene foam, to which a 3 mil polyethylene sheet was attached with double sided tape.

Once the paper is removed, all that remains is the decal image contained in the transparent medium. The decal is then positioned over the fill or area of loss and taped on one side so it can be flipped back and forth (Figure 7). This allows for final surface preparation of the glazed porcelain. A final coating of Hxtal NYL-1 epoxy serves as the mordant to secure the decal. Once it is at full tack, or almost dry, the decal is repositioned upon the epoxy and left to complete its cure. The decal is finished by trimming with a scalpel and solvents and applying additional coats of epoxy to approximate a porcelain glaze (Figure 8).
Figure 7: The untrimmed decal is positioned in place.

Figure 8: The positioned decal is finished by additional coatings.
The purpose of this exercise was to develop a process by which a decal could be generated. More recently, resins more familiar to conservation treatment have been employed. Experiments using Acryloid B-72 and B-48N solvent acrylics have also successfully produced decals with a modified technique. The CCLC image has a thermoplastic binder that is quite sensitive to non-polar solvents, making it difficult to apply a coating solvent in anything other than water, ethanol, or mixtures of the two. A dilute (sprayable) solution of B-72 in acetone can be sprayed over a CCLC image if the brief spray application is immediately followed by heat. A TORCHLAMP, held approximately 30 cm from the image surface, quickly drives off the solvent before it disturbs the image. As previously described, the process is repeated until a uniform coating is achieved. The difficulty encountered with this technique is that there is an inherent fire risk involved when using a TORCHLAMP with volatile, highly flammable, and potentially explosive materials. It should not be tried in anything other than a self-contained, industrial spray booth capable of moving large quantities of air per minute.

Epoxy systems are attractive candidates for use as a medium in creating decals. However, Hxtal NYL-1, and Epotek 301-1, both optical grade epoxies, did not produce satisfactory results. These epoxy systems tended to saturate both the image and the paper and bead up upon the image surface rather than form a uniform coating.

Color stability and the long term aging characteristics are critical factors to consider in the selection of conservation materials and were unknowns in this experimental technique. Little information was available about the fading characteristics of the dyes used in the Canon system and prompted the following rudimentary test to evaluate color permanence. A CCLC image was placed in a south facing window for six months with half the image screened from light exposure. The print was exposed to approximately 7000 foot candles a day for six months. Although the color shifted, the stability of the print was impressive. The print was not periodically evaluated, so no information was gained about the rate of fading compared with the duration of light exposure. Subsequent to this work, and based upon light exposures in accelerated tests at 21.5 lux (2000 fc) 75°F (24°C) and 60% RH, CCLC printer color prints protected by a UF-3 ultraviolet filter will last about 40 years (H. Wilhelm 1993). The completed fish platter is exhibited at 5 fc in a UF-3 vitrine that will significantly increase its useful life.

Many recent developments, which include the availability of high-resolution film scanners, increasingly powerful and affordable desktop computers, high capacity data storage, sophisticated software, and high resolution ink jet printers with corresponding improvements in printer inks, all combine to challenge the traditional ways we think about photographic documentation and compensation techniques. The method and means by which compensation for loss on many types of objects, especially art on paper, could change dramatically in the next few years. Conceivably a conservator, curator, and art historian could gather round a high resolution monitor and make inpainting and
compensation decisions while viewing the screen.

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References
