



Article: Paintbrush and airbrush: A reconsideration of filling and inpainting techniques for ancient ceramics

Author(s): Tony Sigel

Source: *Objects Specialty Group Postprints, Volume Ten, 2003*

Pages: 138-157

Compilers: Virginia Greene, David Harvey, and Patricia Griffin

© 2004 by The American Institute for Conservation of Historic & Artistic Works, 1156 15th Street NW, Suite 320, Washington, DC 20005. (202) 452-9545

www.conservation-us.org

Under a licensing agreement, individual authors retain copyright to their work and extend publications rights to the American Institute for Conservation.

Objects Specialty Group Postprints is published annually by the Objects Specialty Group (OSG) of the American Institute for Conservation of Historic & Artistic Works (AIC). A membership benefit of the Objects Specialty Group, *Objects Specialty Group Postprints* is mainly comprised of papers presented at OSG sessions at AIC Annual Meetings and is intended to inform and educate conservation-related disciplines.

Papers presented in *Objects Specialty Group Postprints, Volume Ten, 2003* have been edited for clarity and content but have not undergone a formal process of peer review. This publication is primarily intended for the members of the Objects Specialty Group of the American Institute for Conservation of Historic & Artistic Works. Responsibility for the methods and materials described herein rests solely with the authors, whose articles should not be considered official statements of the OSG or the AIC. The OSG is an approved division of the AIC but does not necessarily represent the AIC policy or opinions.

PAINTBRUSH AND AIRBRUSH: A RECONSIDERATION OF FILLING AND INPAINTING TECHNIQUES FOR ANCIENT CERAMICS

Tony Sigel

This paper will discuss some different approaches to the restorative treatment of archaeological ceramic vessels, although these methods will no doubt have application to works in other media as well. The author will critique some of his past projects with results that, over time, he has come to question. These include issues of style and the internal (within an individual work) and external (within a group or collection) consistency of the level of restoration to be attempted. After years of trying to find a methodological/ethical aesthetic framework to impose on each category of object, each culture, type of ware, etc. in an effort to form a consistent approach, the author has come to feel that individual objects come with their own, complex practical, ethical, intellectual, and stylistic treatment needs that can only be determined on a case by case basis. One treatment choice or style, even within a single genre, does not and can not fit all.

A critical look at some earlier treatments

At the OSG session at the AIC annual meeting in San Diego in 1997, Stephen Koob and the author presented techniques used in the field at The Archaeological Exploration at Sardis, Turkey, including leaving break-lines unfilled, incising the edges of fills and brush applied inpainting (Koob and Sigel 1997). These techniques have since been used successfully by the author on many other archaeological vessels, including the a Late Helladic Stirrup Jar (Fig. 1). Such a conservative, archaeological approach proved well suited to the character of this vessel.

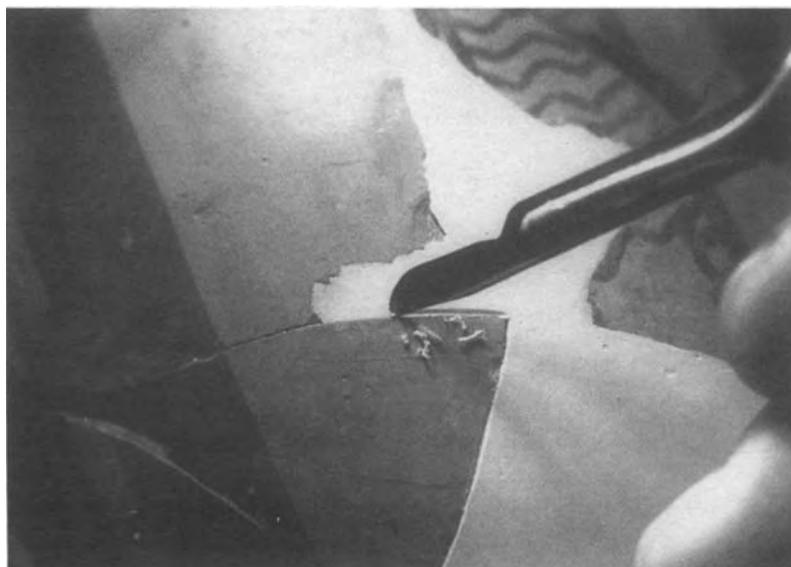


Figure 1. Incising the fill edges creates a consistent shadow line with the adjacent unfilled join lines.

The author also treated a large Attic hydria by the Berlin Painter (Fig. 2). It suffered from the vices found in many older restorations of ancient vessels: contamination with soluble salts, unstable hide glue and shellac joins, sherd misalignment with projecting surfaces and raised edges mercilessly ground away with a rasp, poorly shaped and adhered fills, and extensive deceptive overpaint (including design areas). After overpaint removal, the extent of the damage, losses, and over-fill on the surface was revealed (Fig. 3).



Figure 2. Berlin Hydria, before treatment. The amount of overfill and overpaint was difficult to determine at this stage.



Figure 3. Berlin Hydria, during treatment. Light colored areas are overfill. The original surface with black slip-glaze has been ground off.

Disassembly, cleaning, desalination, and reconstruction left the vessel with substantial losses from missing sherds as well as the poor restoration techniques employed earlier (Fig. 4). Figure 5 shows the hydria after filling the losses with Plaster of Paris, and consolidating with 10% Acryloid B-72 in acetone.

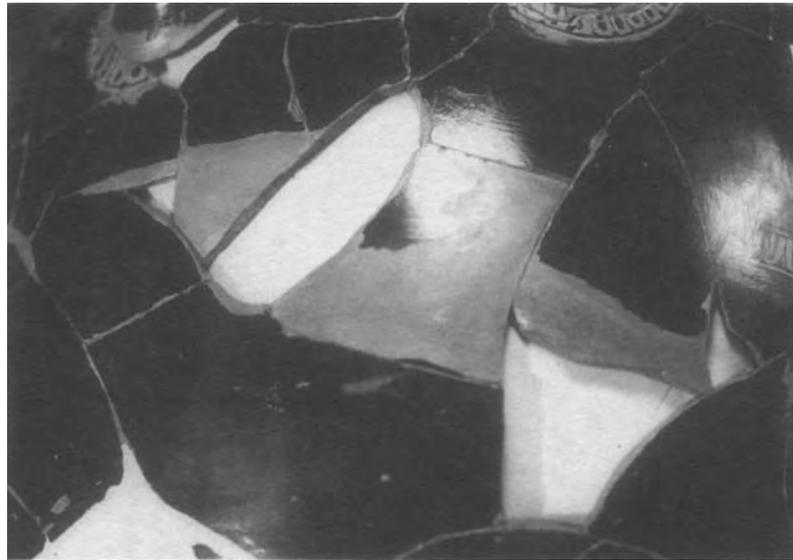


Figure 4. Berlin Hydria. Detail after reconstruction showing sherd and surface losses, and the degree of slip-glaze loss on break edges.



Figure 5. Berlin Hydria. After infilling, before painting.

Figures 6 and 7 show the completed hydria after inpainting, and in close-up. The break line losses were left unfilled, and the fill edges incised as with the Stirrup Jar. At the time, this approach seemed like a reasonable choice. It saved considerable time, which was an issue, and was arguably “more conservative.” In the years since however, the author has come to consider this an unsuccessful treatment for these reasons: The red-buff color of the unfilled break lines contrast strongly with the black surface, forming a distracting pattern that disrupts both the continuity of the dominant black glaze and the linear decoration. Instead of highlighting the extraordinary achievement of the vase painter, the conservation treatment draws excessive attention to itself at the expense of the artifact. Along with its value as archaeological and cultural ‘information,’ this hydria also represents a pinnacle of refinement of the decorative arts of the period. The treatment style diminishes this aspect unnecessarily. The author has come to understand that the level of refinement and quality of the restoration techniques must reflect the level of refinement and quality of the artifact to which they are being applied.



Figure 6. Berlin Hydria, after treatment.

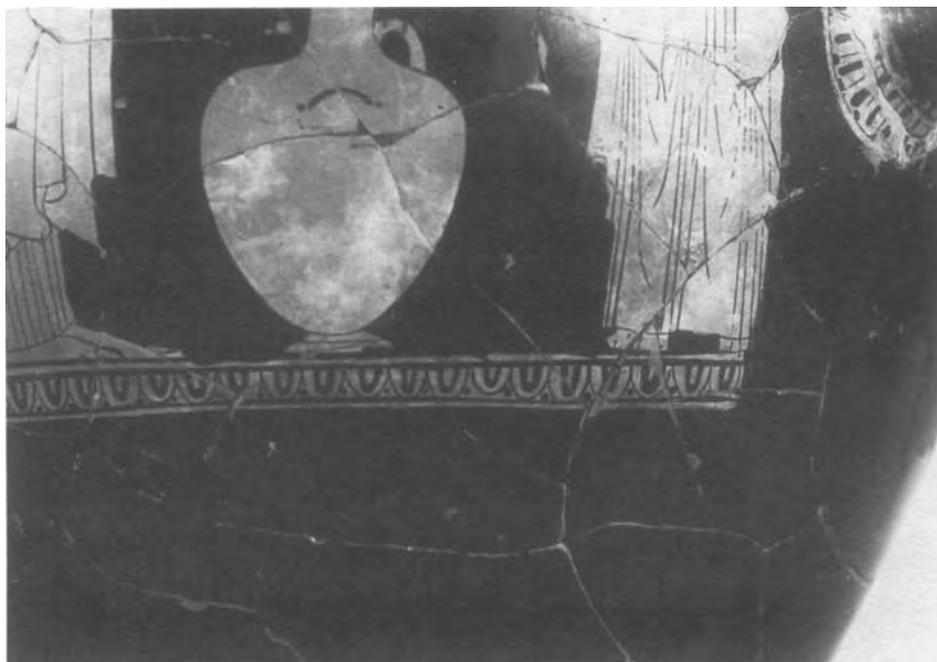


Figure 7. Berlin Hydria, after treatment. The visible break edge lines appear distracting and unpleasant, leading to the conclusion that such a conservative treatment is not appropriate for this vessel.

Use of the airbrush with archaeological ceramics

A black slip Lydian amphora from Sardis (Fig. 8) was one of the first ancient vessels the author inpainted principally with the airbrush. The airbrush is a tool for paint application primarily thought of when one approaches the perfect, glossy surfaces of porcelain and glazed wares, but not generally within the context of ancient ceramics. However, one of its principal benefits is the ability to rapidly create thin, smooth layers of opaque or transparent color. Utilizing masking techniques to limit over-spray, and other techniques that will be discussed, the airbrush can be an effective tool for use on ancient ceramics.

The extensive losses to both the body and the slip glaze of the Amphora made a conservative approach of incised fill edges and unfilled break lines appropriate. The airbrush was used to achieve a rapid, even application of water-based acrylic emulsion paint over the broad areas of fill. While using the airbrush was a great time saver given the magnitude of the losses, and produced a smooth, uniform application of paint, in retrospect the final appearance is somewhat problematic (Fig. 9). The fills have an “airbrushed” look- too smooth and modern. While this appearance could arguably be considered an aesthetic 'strategy', It is not one that the author feels completely comfortable with. To achieve a result more sympathetic to the artifact, considerable work after airbrushing to refine the painted surface is necessary.



Figure 8. Lydian amphora, during treatment.
Note extensive fills before inpainting.

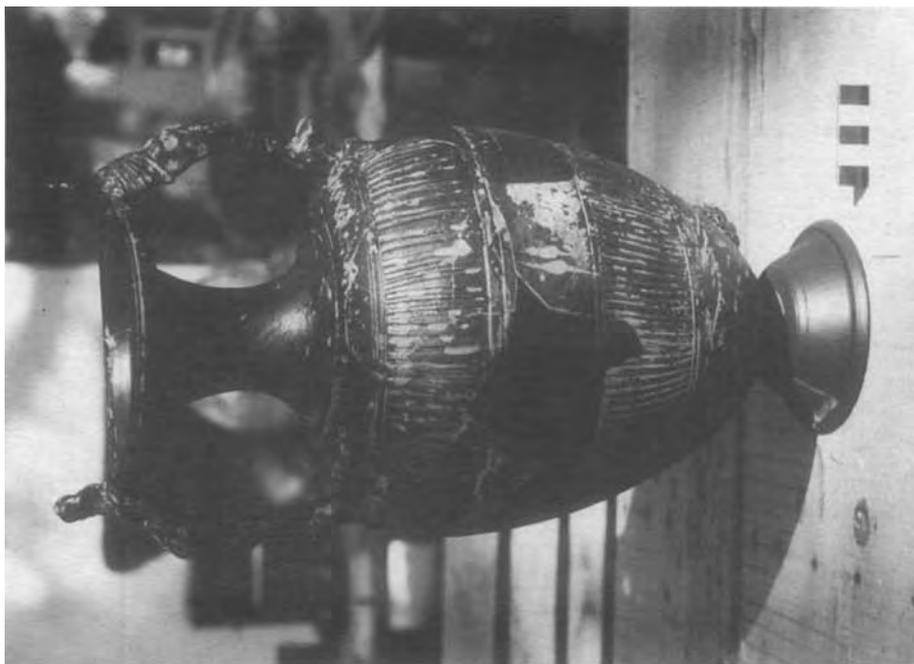


Figure 9. Lydian amphora, after treatment.
Note the unsympathetic modern look of the
paint on the foot.

During the recent treatment of an 6th century BC Attic Amphora, depicting the story of Herakles and the Erymanthian Boar, some of these issues were resolved (Fig. 10). Privately owned at the time of this treatment, the owner desired a high level of “aesthetic reintegration”. This involved filling and inpainting the break lines and filling losses completely, without incised edges. The inpainting was brought to a slightly lighter overall color value to differentiate inpainted fills from the surrounding original surfaces, and some distracting losses in the design areas were completed where there was adequate evidence to do so.

The vessel was disassembled and cleaned of old adhesives and overpaints. Reconstruction and loss filling were conducted with Acryloid B-72 and Plaster of Paris using techniques described in the article mentioned earlier (Koob and Sigel, 1997). Earlier treatments of the authors that included filling break lines with a white fill material, leveling and smoothing with sandpaper, then inpainting the white break-lines had left something to be desired. Dressing the fills with metal tools and sandpaper posed risks to the ceramic, paint applied with a brush often had a raised, lumpy appearance, and it was difficult to produce an elegant, unobtrusive result in character with the qualities of the vessel. A virtually non-abrasive technique using a tinted fill material was kindly suggested to the author by Asaf Oron, an objects conservator then working at the Metropolitan Museum of Art, who was treating the Attic pottery collection. The author is grateful to Asaf, and other conservators who through their articles, talks, and private communications have shared their approaches to these problems.



Figure 10. Attic amphora during treatment. The fills are completed. In the foreground are matboard templates made with a circle cutting compass to measure and correct the neck and rim fills.

Materials and preparation

Modostuc, a proprietary fill material available in several basic earth colors, was used for this project. Flugger Acryl, DAP, and others are also excellent fills, however for very fine edge losses Modostuc seems better suited as it has a small particle size- more of a cream consistency than a putty. It can be tinted further with dry pigments or liquid acrylic colors. A drop or two of Golden acrylic medium helps maintain color intensity from its wet appearance through drying. Such modifications will affect the handling, drying, aqueous re-solubility, as well as color intensity of the mixture, so experiment and test first. As with the paint, the fill color was mixed to dry slightly lighter in tone than the lightest original surface areas. It helps to mix up several slightly graduated tones of fill ahead of time, and store them in small polyethylene containers.(Fig. 11) Different consistencies may also be prepared: diluting the mix with a few drops of water to an even creamier consistency, which is suitable for finer scratches, air bubbles, break lines, etc. A stiffer mixture that will shrink less in larger lacunae can also be prepared.

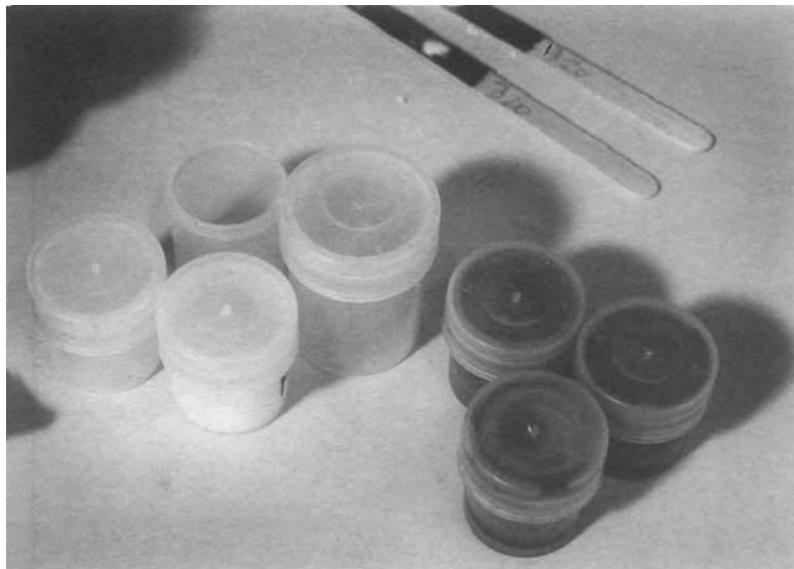


Figure 11. Polyethylene sample vials with paint and fill mixtures. Micromesh sanding sticks are in the background.

Polyethylene and plastic squeegees and scrapers are made from container lids, charge cards, and other sheet plastics (Fig. 12). These tools are softer than the ceramic and can be used safely against many surfaces without fear of scratching. Cut a fresh edge in the polyethylene squeegee with a scalpel as it becomes dulled; and re-sharpen the harder Styrene plastic scraper on sandpaper as needed. Care must be taken however, as many fill materials contain constituents that are themselves abrasive enough, even when used with soft tools, to cause damage when pulled across some ceramic surfaces.

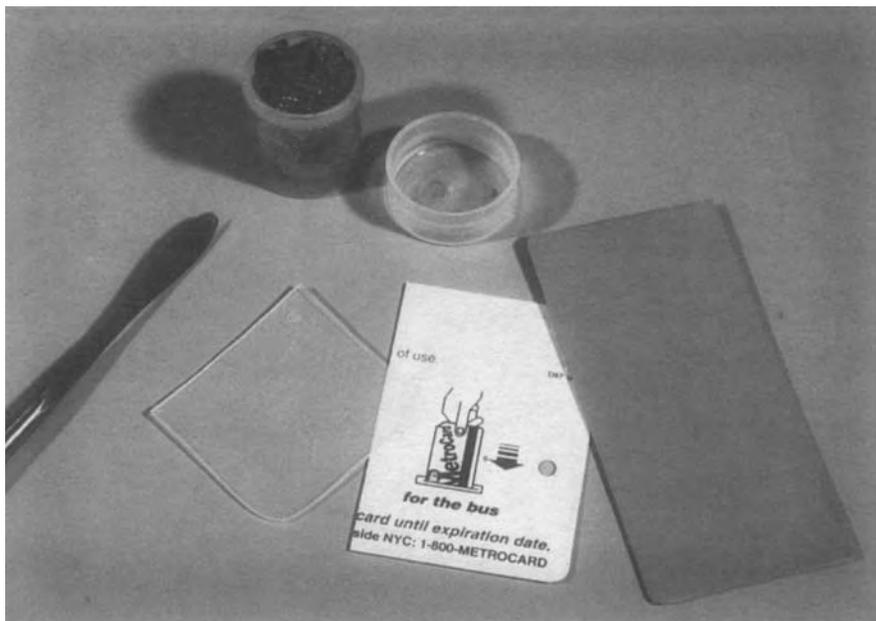


Figure 12. A selection of scrapers.

Filling break-edge losses

Particularly absorbent, friable ceramic surfaces adjacent to the loss areas can be temporarily isolated beforehand with 10-20% B-72 in acetone if there is the possibility of physical damage, contamination or staining during treatment. The larger plaster fills and the unfilled break-edge losses should be consolidated with a 5-10% B-72 solution in acetone before filling. Then, a thinned mixture of the fill material is spread with a polyethylene spatula to fill small imperfections in the otherwise completed and consolidated plaster fills. The darker color of the fill highlights these problem areas, also visible in a strong raking light (Fig. 13). To fill the break-edge losses, a blob of the fill material is transferred to the edge of a polyethylene spatula (Fig. 14), then forced into the crack and leveled at the same time (Fig. 15). This process may have to be repeated several times as the fill material will shrink while drying. The fill remains water soluble when dry, and any excess can be cleaned up with swabs moistened with water. A stiffer plastic scraper can be used to level and remove excess material. Further leveling and smoothing can be done with a dampened square of fine silk, either used over a fingertip, or wrapped around a small rubber block. Actual 'sanding' with abrasives or working with tools of any kind may be kept to a minimum. An agate or other burnisher, used over a silicone release Mylar barrier, can also effectively compact and smooth the tinted break-line fills while still at the 'leather-hard' drying stage. After completion the fills can be sealed with a 3-5% solution of B-72. This may darken the color somewhat, for which allowances should be made in the color mixing stage. Those areas that appear too light can be toned down slightly with tinted acrylic washes.

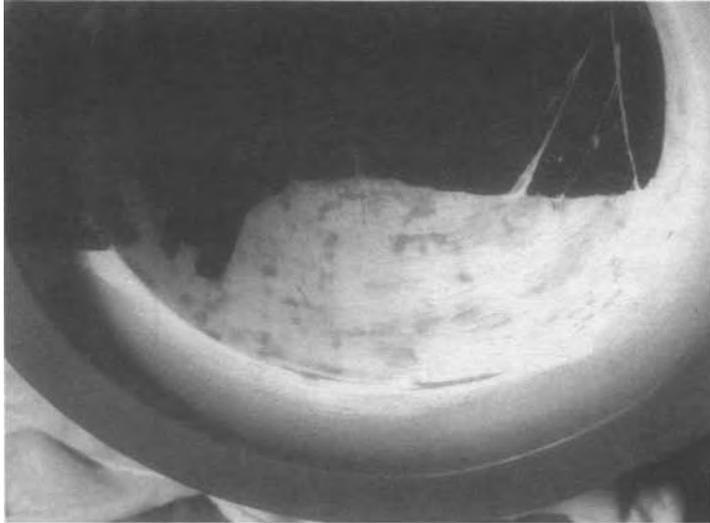


Figure 13. Small scratches and imperfections in the neck area are filled with thinned tinted fill mixture. The rim top edge has received its 'red' body color. This will be masked when the black areas are painted.

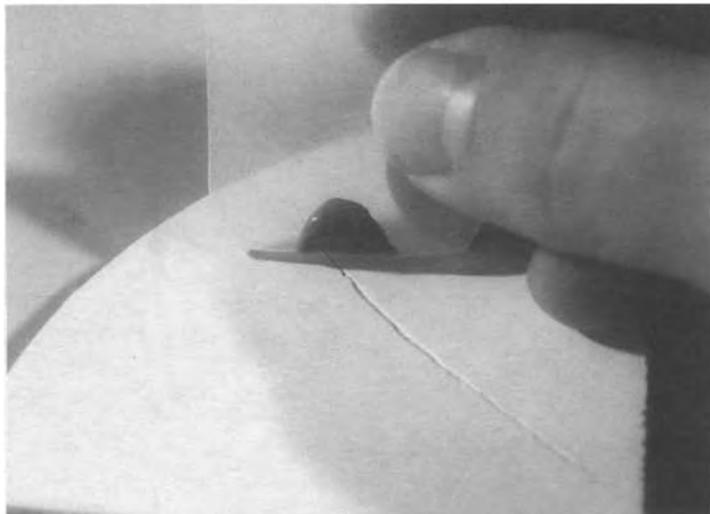


Figure 14. Preparing to fill.

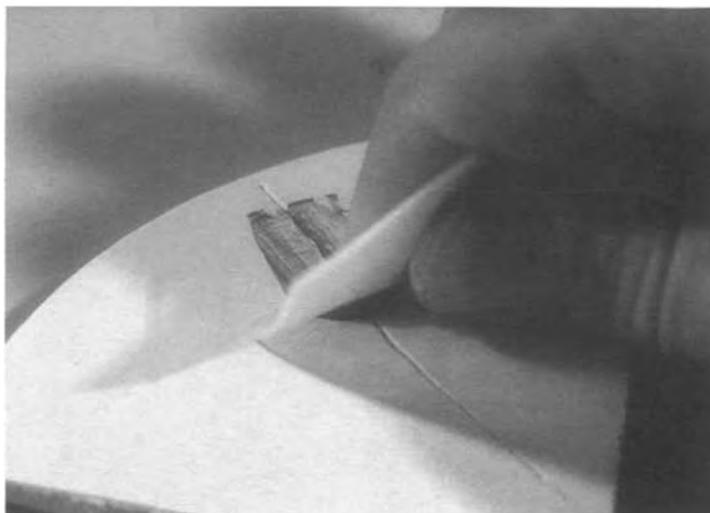


Figure 15. Filling the join line. This technique is also used to fill small imperfections on broader fill surfaces.

Masking techniques

Airbrushing requires the use of a masking medium to create the stencil. Parafilm is a translucent, thin, elastic wax-based material used in scientific laboratories to seal beakers and other containers. Parafilm can be made to cling to various surfaces with gentle heat and pressure. Unlike 'frisket film' and tapes sold for graphic arts masking, it easily conforms to compound curves, and can be made even thinner and more flexible by stretching. The film can also be used for general protection against over-spray while airbrushing, avoiding problems associated with the use of pressure sensitive tape which can leave adhesive residues, and possibly lift friable surfaces.

The Parafilm is stretched over a fill area (Fig. 16A), using finger pressure and warmth to smooth and adhere it in place (Fig. 16A). A rubber brayer can also be used to apply an even pressure, using a hair dryer to soften the film. Burnishing with a plastic or Teflon tool will ensure adhesion of the film in critical areas, as can a swab wetted with saliva.



Figure 16a. The Parafilm can be used as is, or prestretched to over twice its normal size. This makes a much thinner, conformable film.



Figure 16b. Pressure and heat from the fingers is often adequate to attach the film. A hairdryer can further soften the film.

Once the film has been attached, the area to be painted is removed with a scalpel (Fig. 17A), or an X-acto swivel knife (Fig 17B). This is the most exacting part of the job, and a magnifying Optivisor can help. It requires an exceedingly light touch to avoid scratching the ceramic surface. You may want to spend some time practicing and refining your technique. Create a mock up surface with plaster cast in a rubber or poly mixing bowl. Consolidate the plaster to approximate the hardness of your ceramic, and draw a fill outline on the surface. Cover with Parafilm, and practice cutting. If you are unsure of your ability, or have a rather soft ceramic that could be too easily damaged by the scalpel blade, use an alternative technique. One possibility is cutting slightly inside the line, on the fill surface, then repositioning the film outward to the fill edge. Areas where too much film is removed can be extended with small scraps of Parafilm, cyclododecane or latex masking fluid.



Figure 17a. Cutting the film with a No. 15 scalpel blade.

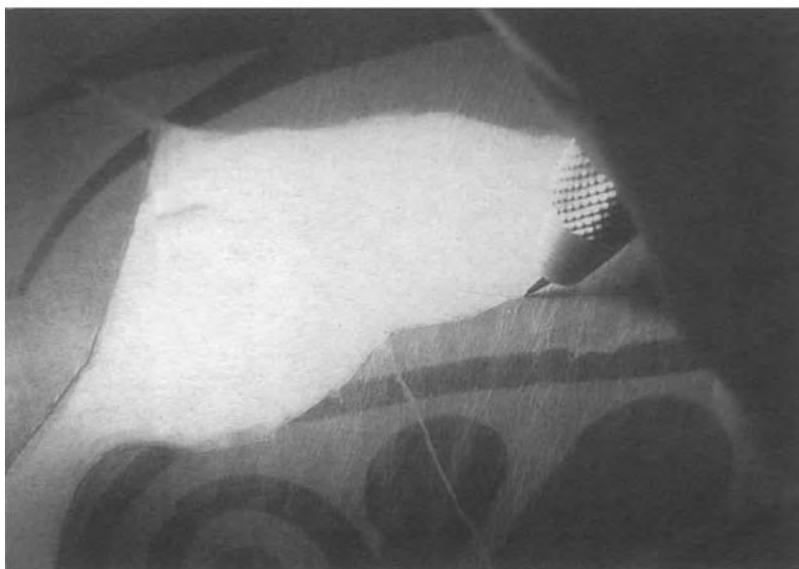


Figure 17b. Cutting the film with an X-acto Swivel-knife.

Another technique is to cut strips of Parafilm into thin, tape-like ribbons, which are then stretched and applied along the fill edge as one would use a conventional masking tape. Once the outlines are in place, the whole area is covered by a sheet of film as described above. The sheet is then cut out, but without penetrating the first strips of film. As Parafilm is a wax based material, I have experimented with using a somewhat dulled but heated scalpel blade to trim the film. The idea is promising, but so far has not worked well in practice. The soldering iron-type device was unwieldy and hard to control, and the heated blade tended to deform the edges of the cut Parafilm.

When removing the interior of the stencil or film mask, it is important not to stretch the stencil out of shape at sections where it is not completely cut through, but work slowly to free these areas with the scalpel (Fig.18).

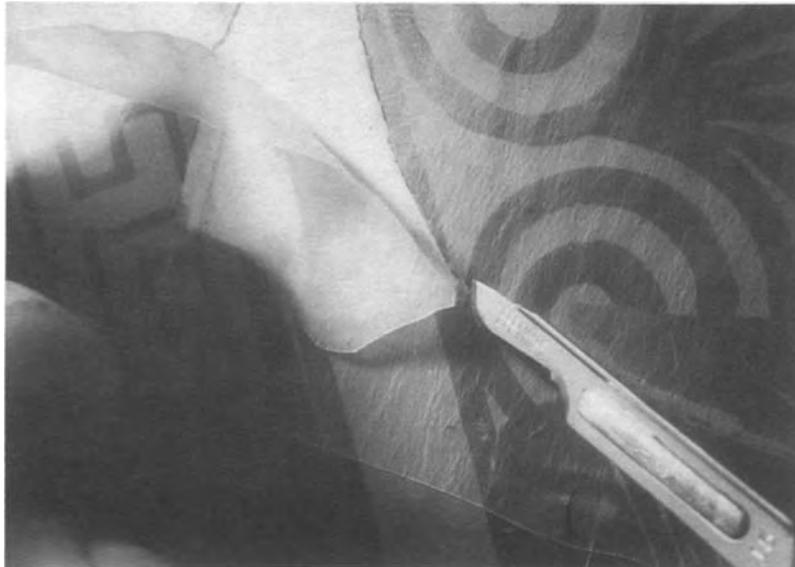


Figure 18. Removing the Parafil cutout.

Painting materials and techniques

The author currently uses water based acrylic emulsion paints almost exclusively. The flexibility, characteristics and convenience of Golden acrylics, and their range of media, are well suited to this work (Fig. 19). The 'Fluid Acrylics' in one ounce dropper bottles are very convenient to dispense and contain finely ground pigments that cover well.

For mixing enough paint of a particular color and keeping it fresh, small Polyethylene sample vials are ideal - the largest shown here is about a third the size of a film container. The basic color is mixed up in the largest vial, and decanted into the smaller containers, creating variant tones as needed. Further refinement of these mixtures can be done on the palette. The 'Sta-Wet' Palette by Masterson, which maintains colors in a useable state for up to several weeks is one of several water media palettes that use a sponge reservoir which feeds moisture up through a membrane paper as it evaporates from the surface of the paint.



Figure 19. A typical painting setup.

The Aztek airbrush (Fig. 20), shown during the application of the first coat, is relatively inexpensive, easy to clean and has removable paint cups in several useful sizes; with lids which prevent the paint from drying out. While not a superb instrument, it is adequate to the task once you learn it and is one of many airbrushes that can be used for this work.



Figure 20. Applying the first color coat. The thin coat dries rapidly.

An important attribute is that paint within the body of the airbrush can be “blown back” into the cup when a color mixture needs to be adjusted, by placing a finger over the tip with the trigger depressed. It is also robust and can survive hard use. Most air brushes will quickly collect acrylic paint on the needle tip, clogging and distorting the spray pattern. Keep a small (No. 2) paint brush, with the hairs cut two to three mm. long, nearby when spraying. Clean the needle tip and nozzle frequently with the brush and acetone to remove the build-up.

Thin the paint mixture to a milk-like consistency. Test the airbrush first to establish correct paint viscosity, spray pressure and speed. Apply several light coats, sanding lightly in between them as necessary. Lay down a heavier final coat, using somewhat thinner paint to promote drying to a smooth, satiny layer (Fig. 21). When recreating multiple color areas, always lay down the lightest colors first, then mask and move on to the apply the darker colors.

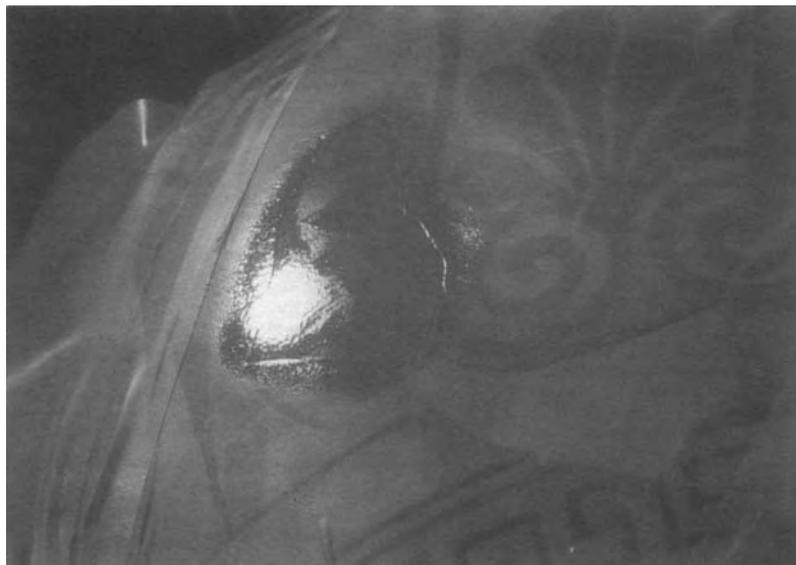


Figure 21. Applying the final heavier ‘wet’ coat.

Once the paint has dried somewhat lightly sand through the paint covering the raised edge of the Parafilm (Fig. 22) This will “break” the attachment of the still tender paint at the edge of the Parafilm mask and allow the film to be removed without lifting or tearing the paint from the fill. Remove the film as soon as possible after the paint no longer appears wet, either by peeling it slowly back on itself to minimize lifting, or by pushing the film edge away from the fill with a scalpel, cutting, or ‘breaking’ the paint line. Try to preserve the stencils as they can be saved and reused several times on the same fill when further applications of color are necessary (Fig. 23).

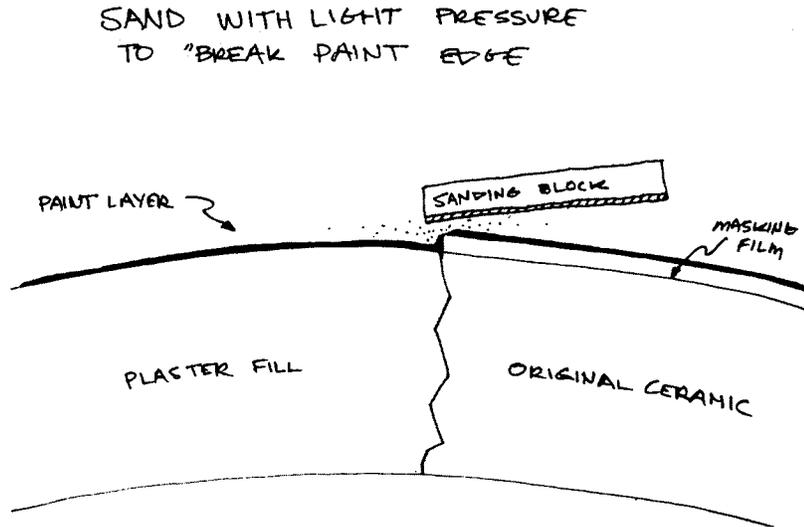


Figure 22. Abrading paint from the upper edge of the Parafilm will assist in clean removal of the mask.



Figure 23. Stencils used on the Attic amphora.

The completed inpainting now has an artificial sprayed texture, or 'airbrushed' look (Fig. 24). This can be remedied in several ways, including sanding, polishing, burnishing, brush-applied gloss, satin or matte coatings and waxing. After sanding, which produces a very matte appearance, a quick brushstroke of acetone can increase gloss to some extent by 're-forming' the

surface. In Figure 25 the still tender paint is burnished with a spoon through a sheet of silicone release Mylar. An agate burnisher can also be used, working in a linear direction that echoes the existing fine wheel thrown burnishing of the original ceramic surfaces. Burnishing both serves to 'humanize' an otherwise cold, mechanical surface, and to flatten and smooth paint edges that were slightly lifted during the removal of the masking material. It can also flatten ridges formed by the meniscus of paint formed against the mask edges.



Figure 24. Painted surface of a fill. Note the artificial 'airbrushed' appearance, and the lifted paint on the fill edges.



Figure 25. Burnishing the paint through the silicone release Mylar. If allowed to dry completely, the paint may be difficult to burnish.

The completed inpainted and burnished neck fills are shown in specular light (Fig 26). and the overall after treatment appearance is indicated in Figure 27.



Figure 26. The complete inpainted and burnished neck fill.

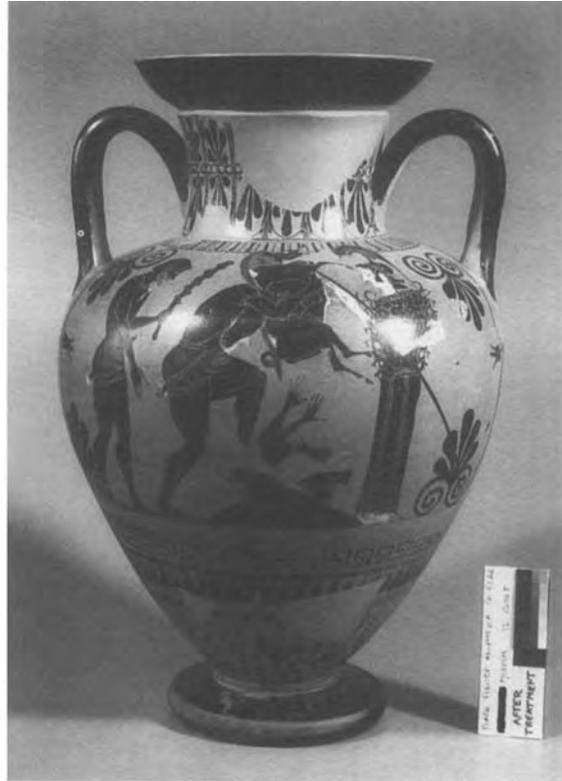


Figure 27. Attic amphora, after treatment

The techniques presented above are just a few possible ways to reach a similar goal. There are without doubt many techniques employed by conservators to carry out such treatments. This article was written principally because it is the kind of information the author would have liked to have read years ago. The objects specialty group tips sessions, talks and papers are an important vehicle for the development and transmission of our collective techniques, materials and the rationale for using them.

Acknowledgements:

I would like to thank my colleagues and friends in this profession who have generously shared their skills, ideas, and enthusiasm with me over the years. I am also grateful to my fellow staff members at the Straus Center who were instrumental in preparing my talk, and this paper.

Suppliers

Acrylic emulsion paints. 100% acrylic polymer emulsion, pigments
Fluid Matte Medium #03520. 100% acrylic polymer emulsion. matting agent
GAC 200 acrylic polymer emulsion
Polymer Varnish with UVLS (gloss with UV filter)

Golden Artists Colors, Inc. New Berlin, NY. (www.goldenartistcolors.com). Available from art supply stores and conservation suppliers.

Micromesh fine finishing abrasives. Micro Surface Finishing Products, Inc. Available from Micromark Inc. 800-225-1066, (www.micromark.com); Conservation Resources International, LLC. (conservationresources.com); and wood finishing and plastics suppliers.

Plaster of Paris. Hydrated calcium sulfate. Diamond P. Samuel H. French & Co. Philadelphia, PA. 215-482-6770

Parafilm "M" Laboratory Film, 4"x125' roll. American National Can, Greenwich, CT 06836. Available from laboratory suppliers such as Fischer Scientific, VWR, and others.

Dap Interior Vinyl Spackle(calcium carbonate filler). DAP Inc., Dayton, OH 45401. Widely available from home centers and hardware stores.

Flugger Acryl. Acrylic spackle. Flugger A/S, Denmark. Available from Conservation Resources International, LLC. (www.conservationresources.com)

Acryloid B-72 Acrylic resin. 70/30 Poly ethyl methacrylate/ poly ethyl acrylate copolymer. Tg 40° C. (Rohm & Haas Co.) Available from conservation suppliers.

Cyclododecane, cyclic hydrocarbon solid. Available from Kremer Pigment. 500g for \$25, 1 kg for \$45 . 228 Elizabeth Street, New York, NY 10012; tel: 800-995-5501, 212-219-2394, fax 212-219-2395, (www.kremer-pigmente.de)

Aerosil R974 hydrophilic fumed silica. DeGussa Corp., Pigments Division, PO Box 2004, Teterborough, NJ 07608. This and other hydrophilic fumed silicas available from conservation suppliers.

Cabosil fumed silica. Conservators Emporium, 100 standing Rock Circle, Reno, NV 89511. 702-852-0404, (www.consemp.com)

Optivisor. Available from Micromark Inc. 800-225-1066, (www.micromark.com), and conservation suppliers.

Polyethylene containers: Nalge Nunc International. Sample vials #6250-0012 (12 mL), 6250-0005 (2 mL). Available from laboratory suppliers such as Fischer Scientific, VWR, and others.