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A Contact/Pressure Mounting System (1986)

For the preservation of a specific type of thin, fragile and deteriorating textiles, which constitute part of the most important group of textiles in the museum, we consider the contact/pressure mounting system used in the past as preferable when compared to other preservation methods such as stitch-mounting and the use of adhesive.

The conventional contact/pressure mounting system was usually composed of two sheets of soda/lime glass holding the textile in-between with the edges taped. The rigidity and non-porous surface of the glass acted to inhibit physical movement and reduced the exposure to oxygen and its contaminants while permitting the textile to be exhibited, studied, and handled.

Using the best materials available at the time, these early examples have doubtlessly preserved many fragile textiles from destructive elements, which inevitably exist within the museum. In order to continue the application of the fundamentals of this basically effective system while addressing its shortcomings, the results of the early contact/pressure mounting system have been assessed, and since 1972, this system has undergone a series of changes. The format of our revised system, the details of which will be discussed later, were conceived after observing varied examples of contact/pressure mounting systems applied in the late 19th century through the early 1950s. Although it has only been fifteen years since the initiation of the revised method, we

NOBUKO KAJITANI and ELENA PHIPPS, "A Contact/Pressure Mounting System." Unpublished paper, consisting of a version of the paper presented at the Harpers Ferry Regional Textile Group Meeting, in Washington, D.C., 1986, with minor revisions by Nobuko Kajitani. Reprinted by permission of Nobuko Kajitani.

now are confident in it as a recommendable system, provided that not only the principles and characteristics of conservation materials and techniques are understood but also conscientious long-range preservation maintenance will be carried out.

First, this contact/pressure mounting system is intended for textiles, which have reached a specific state of deterioration. The state can be described where:

1. Some or all structural elements of the textile would break through stress from movement caused by sewing and handling, but
2. have not yet reached the point at which the elements would decompose by simple air-movement over its surface, and that
3. in the interim, by giving a mechanical stability of moderate contact pressure with a rigid support system, the textiles will be sustained without breaking.

Before we discuss the contact/pressure mounting system, we would like to review some other mounting systems that have been used to preserve textiles of similar condition. Because of the time limit, we must emphasize only the problems as they have occurred within the scope of our museum activities in the ten to eighty years since these systems were applied.

Stitched on a stretcher: silk and linen, Egypt, 10th–12th century

In this system, the textile, in the past thirty years, has been sewn onto a mounting fabric, which is stretched on a stretcher frame. It is neither supported by a solid board from behind nor protected by a Plexiglas box at the front. Since the condition of some areas no longer sustains the stress of the stitches or the surface contact with wrapping papers, they have broken away so that only the stitches left behind indicate there was once a textile.

Held by overlaid crepeline: silk, Seljuk, 10th century

The textile is covered with a layer of crepeline, which is stitched onto a mounting fabric to hold the textile in place. In this method, the crepeline not only obscures the essential surface detail of the textile but also disguises its deteriorated condition. By using the crepeline, the condition of the textile, which actually remains the same, can be falsely taken as if it had been returned to a better state. Thus the textile will subsequently be unfairly exposed to rougher handling only to be damaged more than before the conservation work.

To view the textile at its best, we avoid covering the textile with crepeline; if it had to be covered, we stitch the textile with crepeline onto a stretcher-frame, and protect it with a Plexiglas box, never leaving it loose and exposed to air and handling.

Glued and in-painted: silk, Sicily, 13th century

Mounted in 1907, the object has been glued to paper, in-painted to suggest the complete design, and matted. Although the mat has soiled and torn, the textile has been well-preserved by the rigidity of the paper combined with the adhesive force of glue. The condition, however, had not yet reached the stage, which would require the textile to be adhered in this manner. Today, the adhesive is still stronger than the textile, so that the textile cannot be removed from the mount without causing damage. As the early twentieth century adhesive, paint, and paper used for this conservation work will not adversely damage the textile, it will probably remain in this way permanently.

Stitched on ragboard: silk and linen, Egypt, 10th–11th century

On a sheet of ragboard, the textiles have been sporadically stitched, and covered with an acetate sheet during the 1950s. After thirty years, the fragile textiles are breaking away in the semi-loose mount, and the acetate sheet has deteriorated, yellowed, and emits an acidic odor. This suggests that the acetate needs to be changed approximately every ten years dependent on the environment in which it is stored, long before it breaks down. Today, a polyester film is available which is inert and has a longer life. The surface of both acetate and polyester films are, however, readily scratched so that with this example, now the scratch marks obscure the view of the textile underneath. Also, as the absorbent, light-colored ragboard soils easily by oils and from hands and airborne dust, it is these conservation materials and their assemblage, rather than reasons related to the textile itself, which force us to change the mount at the risk of the textile.

To avoid the problems that have occurred with the mounting systems for fragile textiles discussed, we chose to use a contact/pressure mounting system using Plexiglas. The points of comparison in selecting the surface glazing which will come in direct contact with the textile, whether glass or Plexiglas, should first be reviewed. The decision to use these conservation materials, as usual, was made by sorting out the positive and negative aspects of the materials in relation to our needs. There are some compromising points but the nature of the negative aspects involved should not be detrimental to the textile and could be alleviated or compensated for by the aids of extrinsic technical work.

Rigidity:
Glass is rigid by itself, while
Plexiglas requires a support to create its rigidity.

Weight:
Glass is very heavy, while
Plexiglas is ca. 50% lighter.

Surface hardness:
Glass surface is hard, and will not scratch, while
Plexiglas scratches easily. When used, it needs protective covering, directed maintenance, and possible future renewal.

Surface compactness:
Glass is non-porous which contributes to a strong physical adhesion of the textile to its surface under the conditions of the micro-environment created in the contact/pressure mounting system.
Plexiglas is slightly porous, thereby somewhat permeable. The surface does not allow the adhesion of the textile.

Static electricity:
Glass is a receptor for electricity, but has a minimal charge. If charged, it is negative like all natural matter which includes dust and soot, so that they will not attract each other.
Plexiglas, with its positive charge, attracts matter including textiles and dust. The positive charge, therefore, must be eliminated with the use of an anti-static agent. (The attraction of plastic material's static electrical force to the textile should not be confused with the vacuum phenomenon which occurs when two rigid materials are pulled apart from each other.)

Chemical state:
Glass, because its components include soda and lime, can produce an alkaline state in the presence of moisture. A certain amount of moisture is always present in a contact/pressure mount.
Plexiglas, methyl methacrylate resin, is relatively inert and stable in the long range of time.

Visible light transmission:

Glass transmits ca. 89% visible light, when no coloring matter is present.

Plexiglas transmits more, ca. 93%, making the mounted textile underneath more clearly visible than glass, at the same time exposing it to more potential damage by visible light.

UV-ray transmission:

Glass transmits ca. 90% of the UV-rays.

Plexiglas, if the regular type, transmits ca. 40% and if the "UV-filtering" type, transmits only 7–10%, a considerable reduction.

Thermal transmission:

Glass is sensitive to temperature change reacting fast.

Plexiglas is slower.

Inherent color:

Glass can be clear to greenish in color.

Plexiglas can be clear but UV-filtering type is yellowish.

Breakage:

Glass shatters under stress.

Plexiglas may crack under a concentrated stress, but does not shatter.

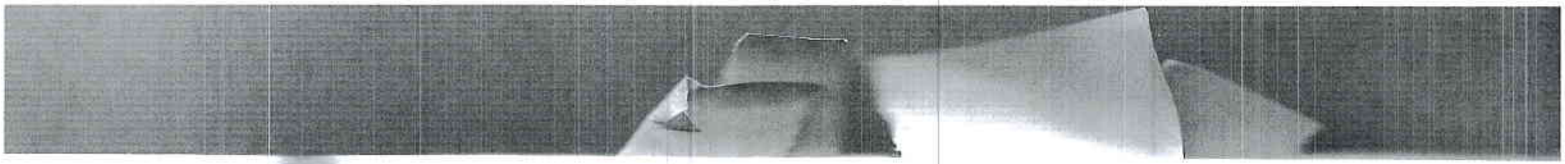
Crafting possibility:

Glass is cut in straight alignment only, leaving a sharp edge.

Plexiglas can be crafted virtually in any form by a specialized craftsman.

Let us examine a few variations of the early soda/lime glass and later Plexiglas mountings, in order to present how we came about revising the system. They have been mounted since the 1890s through the 1950s so that we will be able to see the system's thirty- to eighty-year long-range effects.

Fibers always retain some amount of moisture in direct relation to the relative humidity and temperature of the environment. Because of this, when the textile is placed between two mounting sheets, a certain amount of moisture is trapped with the textile within the near-vacuum micro-environmental interior. As glass is non-porous, non-absorbent, and quick to react to temperature changes, if the temperature decreases for a period of time, the interior humidity increases because of the moisture present in the



fiber. The increased humidity in turn dissolves alkaline components from the soda/lime glass causing an alkaline interior and will affect already deteriorated fibers. As a result, a cloudy effect could appear in the interior of the mount.

Whereas all the same type of glass mounts show moisture marks, we noticed some without the marks. These mounts are identical in their use of soda/lime glass but in addition, a piece of cotton-fiber paper had been placed along with the textiles. After fifty years, it finally became evident, that the addition of the paper prevented the occurrence of the visible moisture marks. As the newer fibrous materials respond to climate changes more actively than the old ones, in the micro-environment, they have acted as a buffer for the humidity change. This example suggested that with the presence of buffering conservation materials in the mount, micro-environment will be maintained at a more stable level than without them.

In contrast, in the mounts made of Plexiglas during the 1950s, where the textile was placed alone even without a buffering conservation material, the moisture markings did not occur.

Between the two smooth sheets of non-porous glass, the mounted fragments have sometimes slipped. The inclusion of a conservation material to buffer the moisture differential could dually serve to prevent the slippage: not only [can it] create the surface-to-surface resistance between them, one of the ways to prevent the slippage, but [it] also provide[s] an exhibition background for the textile. In this manner, however, the back of the textile cannot be seen, a shortcoming in using this mounting system. A viewing window could be made through all the conservation materials which come underneath the textile but this is not possible with all the cases, as the cutout area must then be substituted with some transparent material to compensate for the lost thickness. Otherwise, photographic documentation and technical analysis should suffice in order to preserve the textiles without moisture marks and slippage.

[One of the several types of reused systems is described, with reference to] an 18th century Indian floor-covering [measuring 10′ × 7′]. In the mount, the textile must be completely and evenly in contact with all the conservation materials. Dependent on the size and proportion, the Plexiglas flexes, and the larger the size the more it flexes, so that it needs to be securely fastened onto the sturdily constructed structure. In addition, space fillers must be prepared for the estimated flexed space and for the compensation of the dimensional variation in the depth of the textile.

The construction of the stretcher-frame consists of a poplar wood, cross-barred frame to which a sheet of Masonite board is screwed. The whole assemblage receives two coats of polyurethane. To this, later, the surface-contacting Plexiglas will be screwed on.

In the mounting process, the first layer placed on the stretcher-frame is a buffered acid-free paper. Then layers of cushioning polyester felt are laid. The cushioning layers fill the space created by the flexing Plexiglas as well as compensate for the thickness-differential of the textile being mounted. In this case, the latter was considered nominal so that the cushioning felt was calculated only to fill the center bow of the flexed Plexiglas.

The background fabric is then laid.

The textile is positioned on the background fabric.

A new sheet of Plexiglas, as it is peeled off fits protective paper, is coated with an anti-static agent, placed on the textile, and screwed onto the stretcher through the layers of background fabric and cushioning materials.

Structurally, the outside frame may be placed at this point, and used to assemble the contacting Plexiglas onto the stretcher-frame. This, however, is not our method.

Considering the purpose of applying the contact/pressure mounting system is to preserve textiles, which have reached a physically crumbling condition, it is essential to virtually avoid removal of the surface-contacting glazing. Although the system itself is reversible, in its concept, once placed over the textile, the removal of the contacting Plexiglas could often be considered almost destructive to the textile. This crucial layer of Plexiglas should, therefore, be protected by an exterior covering the second sheet, so that in case of accidental scratching or marring, these marks will be on the exterior covering which can then be changed without disturbing the textile.

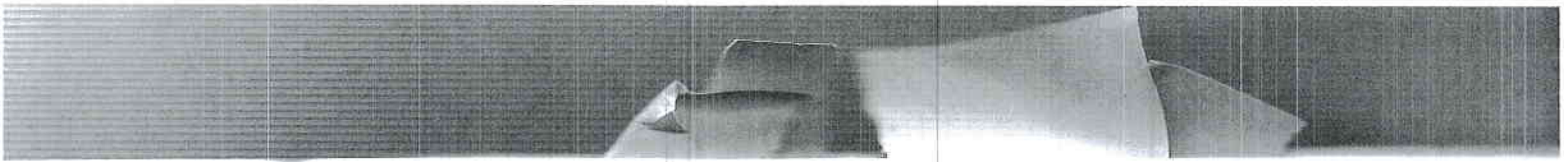
Before placing the exterior Plexiglas, we place a fabric-covered mat which covers the screw heads seen beside the textile, and when finished, presents the textile within a mat. An extended portion of the fabric which is covering the mat is brought from the face to the back of the stretcher-frame covering up the exposed side edge of the layers of conservation materials, and is fastened.

The exterior Plexiglas is cleaned and placed on the mat.

The outside frame is placed and screwed to the stretcher, holding the outer Plexiglas sheet in place.

Finally, a cover, made of blackout-curtain fabric sewn to fit the mount, concludes our laboratory work.

A tedious, monotonous, long-range maintenance work, the core of conservation work for museum conservators, then begins. Our goal is to maintain the textile environment in one confined area isolated from objects of other media, in order to achieve a specific climate required, steady temperature between 68–70 degrees F and RH 45–50%. Generally, museum scientists recommend the tactic to maintain the steady RH percentage by adjusting the temperature, regardless of its level. We are, however, also concerned about the permissible higher temperature range which we consider as



ca. 72 degrees F. Since the oxidation rate of fibers seems to be directly related to temperature, not only the relative humidity: the lower the temperature, the slower rate of oxidation, even if the textile is submerged in non-circulating water or contained ice.

Air cleanliness, air velocity, and the hours of illumination need our constant attention in the galleries, workrooms, and storerooms. We prefer metal furniture to wood ones for storage. For the non-buffering metal furniture, we use disposable and washable fiber-made storage preparation materials for their buffering effects. As much as it is permitted, the contact/pressure mounts are stored flat, large ones on shelves and small ones in boxes. To study the small mounted pieces on a table in the study room, the table should be prepared to be shock-retardant by padding with an ironing board padding, and to maintain a clean surface, a cotton cover is changed often. In the gallery, lights are turned on only during visiting hours, and the level is kept between 3–8 fc [foot candles] depending on the type of dyes used in the textile.

The textiles mounted within the contact/pressure mounting system have come through hundreds of years already, and will go on, longer than our lifetime, hopefully forever. We are looking after them within our seemingly "long" professional career of perhaps forty or fifty years at the longest, which is only a fraction of time of their perpetual existence. Yet, our every small casual or serious, bold or cautious encounter with them in the laboratory, galleries, and storeroom, is acutely counted. The irony is that we are unable to witness which of our work will contribute to their well-being or detriment by our very own eyes, when its result finally becomes apparent, a few hundred years from now.

Note

Kajitani, N., Phipps, E., "Pressure Mounting—Our fifteen years experience in interim treatment between stitch-mounting and consolidation." *Textile Treatments Revisited*, Harpers Ferry Regional Textile Group Meeting in the National Museum of American History, Smithsonian Institution, Washington DC, November 1986, 67–69.