COVERING UP A STICKY SITUATION

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ABSTRACT—Of the many ways that textile conservators are tasked with treating textiles, adhesive linings are sometimes the best course of action. They provide overall support for otherwise irreparable fabrics, permitting continued study and occasional display. Many times, shiny and tacky unspent adhesive on the carrier fabric is left visible in areas where no original textile material remains. Unspent adhesive is not only distracting but also collects particulate matter and remains vulnerable to adhesion, posing a risk to the artifact over time. This article offers one solution for cutting down the sheen of unspent adhesive on carrier fabric, in turn, limiting its negative long-term effects. Museum Textile Services conservators adhered powdered silk and paper pulp to exposed areas of adhesive linings, resulting in low-sheen and nontacky surfaces on a Shirley Temple costume; on the remains of a christening bottle from the Intrepid Sea, Air & Space Museum in New York; and on the classroom charts of Orra White Hitchcock. This article concludes with a summary of the treatment method and continued experimentation.

OCULTANDO UN PROBLEMA PEGAJOSO

RESUMEN—De las múltiples opciones con que cuentan los conservadores para intervenir obras textiles, los soportes adhesivos son la mejor opción en algunas ocasiones. Proporcionan refuerzo general a las telas que de otra manera serían irreparables y permiten el estudio continuo y la exhibición ocasional de las piezas. Sin embargo, muchas veces queda expuesto el adhesivo brillante y pegajoso del soporte adhesivo en las áreas de faltantes del textil original. Estas zonas expuestas no solo distraen, sino que también acumulan partículas y permanecen vulnerables a la adhesión, lo que representa un riesgo para el artefacto con el tiempo. Este trabajo ofrece una solución para reducir el brillo del adhesivo no utilizado en el soporte, limitando a su vez sus efectos negativos a largo plazo. Las conservadoras de Museum Textile Services (MTS) adhirieron seda en polvo y pulpa de papel a las áreas expuestas de los soportes adhesivos, lo que derivó en la disminución del brillo y en una superficie no pegajosa: esta mezcla se aplicó en un traje de Shirley Temple; en los restos de una botella de bautizo del Intrepid Sea, Air & Space Museum y en diagramas didácticos de Orra White Hitchcock. Este artículo concluye con un resumen del método de tratamiento y su experimentación continua.

1. INTRODUCTION

Textiles often challenge conservators to push the boundaries of treatment. Conservators at Museum Textile Services (MTS) have been tasked with performing full adhesive linings to shattering silk and sized cotton artifacts riddled with holes for which less invasive treatment options were not available. While often considered controversial, these treatments allow continued study and display of textiles that are reaching the end of their lifetime. The fragile and fragmented nature of these objects make it nearly impossible to create a stencil for voiding the adhesive on a carrier fabric, a method that had been used with very limited success in the past on silk flags (Breeze and Carbone 2017). Conservators at MTS have developed a method for adhering powdered silk and paper pulp to exposed areas of adhesive linings, resulting in a low-sheen and nontacky surface. Conservators first used this method in 2016 while conserving a costume worn by Shirley Temple in the 1935 film

The Little Colonel. Silk fragments were collected from the artifact itself to mask the exposed unspent adhesive after it received a full adhesive lining. Conservators were again challenged with large areas of unspent adhesive when treating the mesh bag, ribbons, and remaining glass from the *USS Intrepid* christening bottle, this time needing to source an appropriately colored silk infill. Last, conservators adapted the infill material used to paper pulp in order to coordinate with the basic pH of heavily sized cotton classroom charts by Orra White Hitchcock.

2. SHIRLEY TEMPLE COSTUME

MTS was asked to conserve an 1860s-inspired silk dress worn by child star Shirley Temple in the 1935 film *The Little Colonel* (fig. 1). *The Little Colonel* is best known for the first interracial dance scene on screen, in which Shirley Temple as Little Lloyd tap dances with Bill "Bojangles" Robinson on a staircase. In the scene in which Shirley Temple wears the dress that MTS treated, she sings "Love's Young Dream" while promenading around a parlor. While not quite a dance, she swings her hoop skirt and holds her arms behind her back throughout the song. When viewing the footage online, it was evident that this choreography was already damaging the costume (Fox Films 1935).

The costume is composed of an ecru silk taffeta skirt with two stiff tiers of flounces adorned with pink and green silk flowers. The bodice is made of the same silk and has a cotton lining. There are silk flounces on the shoulders sewn to elastic. The elastic is disguised with pink and green silk flowers. There is a ruffle at the center front of the dress with a faux–Peter Pan collar at the front and back neckline. A third flounce is sewn to the hem of the bodice. The costume also includes a cotton hoop skirt with feather boning, cotton bloomers with lace accents, and a blue silk bonnet with ostrich feathers and silk flowers.

The dress had been displayed as part of a traveling exhibit called "Love, Shirley Temple" over the course of four months in 2015. Hundreds of costumes, accessories, and dolls were subsequently auctioned through Theriault's. This dress was purchased by another auctioneer and resold to the client. The costume's constant display

Fig. 1. Overall front of Shirley Temple costume, before treatment.

and changing of hands had resulted in its extremely deteriorated condition. The cotton undergarments and bonnet were in relatively good condition, but the silk taffeta was shattering so severely that the dress was very difficult to handle. It was the prerogative of the current owner to have the dress in restored condition so that she could continue to display it and contribute to the story of Shirley Temple. The client and conservators came to the solution to completely deconstruct the dress, support each component with adhesive, and reconstruct it.

2.1 TESTING

A 16-mm habotai silk from Dharma Trading Co. was custom dyed with Jacquard acid dyes to match the color of the shattering ecru silk. This weight of habotai silk most closely matched the weight and drape of the silk costume, providing the stability that the heavily degraded original silk no longer possessed. Habotai silk also allows for adhesive treatments with minimal to no bleed through, such as can occur with sheer fabric carriers. When displayed over its stiff cotton underskirt, the silk of the dress is fully supported, with no drape and little movement. To find the most suitable adhesive, silk fragments from the costume were adhered to different concentrations of BEVA D8 dispersion in water, Plextol B-500 in water, and 1-mil and 2.5-mil BEVA 371 film on the habotai silk carrier fabric. These three adhesive options were chosen for their range of application concentrations and suitability to thermosetting. The shattering silk had optimal adhesion to 1-mil BEVA film when thermoset. The color of the shattering silk did not change significantly in comparison to the darkening of the sample when adhered to 2.5-mil BEVA film and could be manipulated without separating from the carrier fabric. The silk fragment would not adhere to any concentration of Plextol B-500 for an extended period with manipulation. None of the BEVA solutions when diluted with water adequately adhered the silk to the carrier fabric with manipulation. BEVA D8 at 100% concentration did adhere the shattering silk to the carrier fabric, but the adhesive was difficult to dispense evenly onto the carrier fabric without ridges from the brushstrokes being visible.

2.2 TREATMENT AND SILK INFILL

The dress was disassembled so that each component could be safely flattened with humidification to allow better contact with the adhesive-coated carrier fabric. The components of the dress were arranged on top of the carrier fabric with the adhesive exposed, thermoset with a 150° tacking iron, and put under weights until cool to the touch, at least 10 minutes. After this, the shattering silk was stable, but shiny adhesive was still blaringly visible through the fractures in the silk and areas where the shattering silk was no longer extant. These areas were visibly distracting and, therefore, infringing on the client's goal to have the costume fully restored. Additionally, the exposed adhesive would be a major risk to the textile itself. The adhesive could stick to other parts of the dress, especially the gathered silk panels, possibly continuing to stress the shattering silk after treatment. As the client planned to display the costume in the future, this tacky unspent adhesive could limit the costume's display potential, as it could accumulate dust and foreign particulate matter.

The conservators attempted various methods to remediate the unspent adhesive. They found that they could not safely reduce the adhesive using isopropyl alcohol or acetone without harming the artifact or destroying the adhesive bond of the artifact to the carrier. Conservators toyed with the idea of using pastel to cover the adhesive but were concerned about introducing a pH basic fill into a naturally acidic textile. Meanwhile, silk powder from the dress itself covered the tables, tissue, and support boards. It was feasible to cover the unspent adhesive with silk fragments that conservators could not replace and powder that had been collected. Using fragments and particles of the original material meant that the color would not have to be altered and the conservators would not have to worry about introducing yet another foreign material into the

Fig. 2. Detail of skirt before infill treatment and after infill treatment.

dress. As the resulting texture would be different than the original silk, this treatment could not be confused for original construction in the future.

Silk powder was collected and dispensed on top of the unspent adhesive in a thick layer with a stainless-steel bead scoop. The powder was set to the adhesive with a warm tacking iron, 55°C, through a piece of silicone-release Mylar. After thermosetting, the top layer of the powder was brushed off the textile and collected for reuse. The area was then thermoset with the tacking iron again and remaining powder was brushed away with a soft brush. The shiny unspent adhesive now had a matte finish and was not tacky to the touch (fig. 2). Conservators were pleased with the results and continued to collect powder and unplaceable silk shards. The larger pieces of silk shards were ground into a fine powder with a mortar and pestle.

The treatment to the adhesive on the carrier fabric proved to be successful (fig. 3). After the infilling treatment, the silk taffeta looked relatively seamless, even when back lit for photography. Conservators felt more at

Fig. 3. Overall front of Shirley Temple costume, after treatment.

ease knowing that the adhesive was deactivated and would not collect as much particulate matter during exhibition and was less likely to harm the artifact itself when in storage.

3. INTREPID CHRISTENING BOTTLE

Conservators again had the opportunity to work with ground silk powder when treating the remains of the christening bottle from the rechristening of the *USS Intrepid* on April 26, 1943 (fig. 4). Red, white, and blue silk ribbons were tied around the broken neck of a glass champagne bottle that had been covered with rayon crocheted netting. Additional red and white ribbons were embroidered with silk thread and tied around the bottle's neck. These silk ribbons were shattering, and one of the blue ribbons is no longer extant. All of the components were suffering from oxidative staining due to their exposure to champagne.

3.1 TREATMENT AND SILK INFILL

First, each of the components underwent aqueous cleaning with deionized water and blotter paper. The silk was aligned and allowed to air dry. The ribbon reading "USS Intrepid" was in the worst condition. It had been previously attached to the artifact with clear adhesive tape. Prior to introducing deionized water to the ribbon, it was humidified with cool water vapor using a preservation pencil and an ultrasonic humidifier. This allowed the tape to come off, after which conservators corrected distortions and aligned the shattering silk

Fig. 4. Overall front of christening bottle from the Intrepid Sea, Air & Space Museum, before treatment.

Fig. 5. Detail of one ribbon after it was adhered to an adhesive-coated polyester organza lining. The carrier fabric was cut to the approximate shape of a complete ribbon.

elements. The blue and red shattering silk ribbons were adhered to blue and red polyester organza from Testfabrics that had been coated with 1-mil BEVA film. The institution requested that the underlay complete the appearance of the shattering ribbons; thus, the adhesive-coated polyester organza was cut to the approximate shape of the complete white ribbons (fig. 5). Again, large areas of unspent adhesive were left exposed. Conservators were concerned about the hydroscopic nature of the silk ribbons, especially since water had already been introduced into the textile, and chose to proceed with the silk infill method rather than attempt adhesive reduction methods.

This treatment was distinct from the treatment of the Shirley Temple costume because silk could not be salvaged from the artifact itself to use for the infill. However, MTS has a large study collection of shattered silk fragments from historic artifacts. Similar colors of blue and red shattering silk fragments from Grand Army of the Republic flags dating to the late 19th century were used as the infill source.

The silk fragments were ground into a fine powder using a mortar and pestle. The powder was dispensed on top of the exposed adhesive using a stainless-steel bead scoop and distributed across the surface using a small but firm bristled brush. Conservators distributed the powdered silk across this large area using a tamping method in which the powder was pressed into the surface of the adhesive-coated carrier fabric and gradually dispensed over the area. After dispensing the powder, a piece of silicone-release Mylar was placed on top of the treatment site and thermoset using a warm tacking iron, 55°C to 60°C. The powder thermoset to the adhesive best when the iron plate was flat on the surface with even pressure applied throughout (fig. 6). In figure 7, there is an area where the silk infill did not adhere to the carrier fabric. The adhesive had melted through the carrier fabric in that area when the ribbon was initially adhered to the polyester organza; thus, there was insufficient adhesive for the powder to stick to. After weighing the pros and cons of filling the area with new adhesive or redoing the treatment altogether, it was decided to keep the treatment as it was. The flaw also blended in with other silk fractures along the edges of the ribbon.

Fig. 6. A conservator thermosets the silk infill using a warm tacking iron.

The unadhered elements of the thick layer of silk powder were collected for reuse, the area was thermoset again, and the final layer of unadhered powder was brushed away with a firm bristled brush. It was extremely important that all loose powder was removed from the artifact because it was going to be displayed on a white fabric-covered mount board. The treatment area was gently abraded with a fingertip to check for color transfer and conservators continued to brush the powder away from the carrier fabric until the fingertip was clean after abrasion (fig. 8).

Fig. 7. Detail of flaw to adhesive on the carrier fabric.

Fig. 8. Overall front of christening bottle from the Intrepid Sea, Air & Space Museum, after conservation.

4. ORRA WHITE HITCHCOCK CLASSROOM CHARTS

The last example of using the infill method is from the treatment of 19th century classroom charts made by Orra White Hitchcock (1796–1863). Orra White Hitchcock was one of the earliest documented female botanical and scientific illustrators in the United States. She created painted cotton textiles depicting geological and zoological subjects starting in the 1820s (fig. 9). The classroom charts were used by her husband, Edward Hitchcock (1793–1864), and his colleagues at Amherst College as teaching tools. Sixty-one of the classroom charts survive in the Amherst College Archives and Special Collections. Their materials vary, but include ink, ink wash, pencil, watercolor, and gum arabic on heavily sized cotton.

Fig. 9. Several Orra White Hitchcock classroom charts on display at "Charting the Divine Plan: The Art of Orra White Hitchcock" at the American Folk Art Museum in New York.

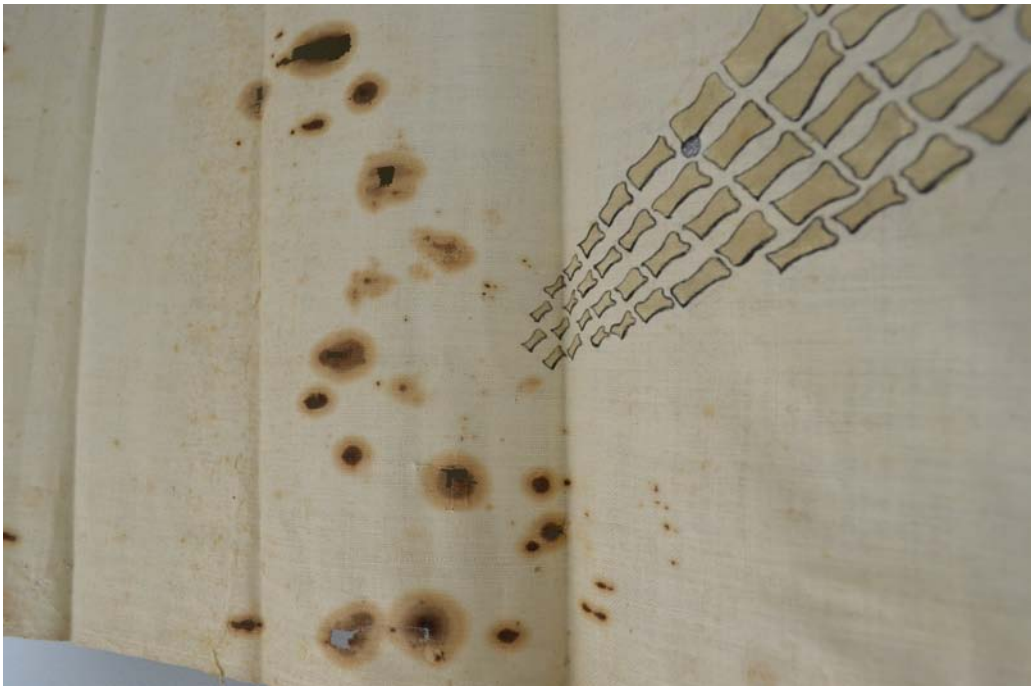

Fig. 10. Detail of discolorations and associated losses, before conservation.

4.1 TREATMENT AND PAPER PULP INFILL

Five of the classroom charts had substantial holes, tears, or splits requiring full linings of the entire chart to enable their exhibition (fig. 10). The lining material found most compatible was Holytex—an acid-free, nonwoven polyester—which resembles the classroom charts in its slightly papery behavior. Conservators cast 1-mil BEVA film onto the Holytex in custom lengths for each of the charts. Again, there would be areas of shiny, tacky, unspent adhesive that had the potential to collect foreign particulate matter while exhibited. There was the added factor that four of the five classroom charts needed to be rolled for storage and even the most carefully placed silicone-release Mylar pieces to protect these areas could move.

Inspired by the papery texture of the classroom charts and the basic nature of the sized cotton, conservators experimented with paper pulp infills to protect the artifacts from the exposed adhesive [1]. The treatment of these areas was generally the same as the silk treatments. A thick layer of paper pulp was dispensed onto the unspent adhesive and tamped in place. The pulp was then thermoset to the adhesive with a warm tacking iron, 55°C to 60°C. The thick paper pulp layer was more difficult to remove from the surface of the textile after heat setting; thus, a stainless-steel bead scoop was used to help dislodge the paper pulp followed by a firm bristled brush to remove the remainder of the paper pulp. The area was then vacuumed with a bristled micro attachment brush (fig. 11).

The infill treatment proved to be important for the textiles considering their display in the exhibit "Charting the Devine Plan: The Art of Orra White Hitchcock." Two of the pieces that received the infill were hung with rare-earth magnets on transparent acrylic sheeting with low lighting illuminating the textiles. These areas would not only have been distracting with the reflective sheen of adhesive but also could have negatively interacted with the magnet display (fig. 12).

Fig. 11. A conservator dispenses paper pulp on top of the exposed adhesive (left) and surface cleans the treatment site after thermosetting (right).

Fig. 12. Detail of classroom chart with infill treatment while on display at the American Folk Art Museum.

5. CONCLUSIONS

The use of silk particulate or paper pulp infills proved to be successful when attempting to reduce the sheen and tackiness of exposed, unspent adhesive resulting from adhesive linings. MTS conservators found this method to be a quick and aesthetically pleasing alternative to other adhesive reduction methods while not requiring higher technology tools. A summary of the treatment is as follows: source an appropriate infill, grind into fine powder, dispense powder on top of exposed adhesive in a thick layer, tamp the infill material into and across the adhesive to evenly distribute, thermoset with a warm tacking iron, collect infill material for reuse, thermoset again with warm tacking iron, and brush remaining powder away and surface clean infill site with abrasion.

The authors had a few important take-aways from these three case studies. First, powdered weighted silk is hard on the respiratory system. It is important to wear a respirator or a dust mask while performing this treatment. Second, the powdered silk will not adhere very well to areas where the adhesive appeared to have burned away or singed. Silicone-release Mylar will, in fact, collect adhesive when used for an extended period over a lot of unspent adhesive. This can result in some of the adhesive on the carrier fabric having a bubbly or singed appearance, making the silk powder look different than other areas with pristine or "virgin" adhesive. "Virgin" unspent adhesive is the most receptive and gives the best-appearing results when using the infill method.

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NOTE

[1] Conservators made their own paper pulp using a metal nail file and archival acid-free rag board in different colors to achieve the color of the classroom charts. The handmade pulp always appeared white, even when the boards were shades of cream. Since performing this treatment, the authors read a *JAIC* article by Paula Artal-Isbrand about using paper pulp as an infill method for treatment of objects. The authors will experiment with toasting the paper pulp to change its color in the future.

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Fox Films. Shirley Temple in *The Little Colonel*, singing Love's Young Dream. 1935. YouTube. Posted May 3, 2014. Accessed February 14, 2020. https://www.youtube.com/watch?v=h4I2n0-FpAI/

SOURCES OF MATERIALS

Silk Habotai and Jacquard Acid Dye

Dharma Trading Co.
1805 South McDowell Boulevard Ext.
Petaluma, CA 94954
Tel: 800-542-5227
Fax: 707-283-0379
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BEVA Film and BEVA D8

Conservator's Products Company
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