

Conservation of a silk map of 'England & Wales': the challenge of using an adhesive technique and a padded support for preservation and study purposes

Rita Machado Maltieira de Almeida Morais

Resumen: Este trabajo se deriva de un proyecto de investigación de conservación como estudiante de Master en Conservación de Textiles, en el Centro de Conservación de Textiles (TCC) de la Universidad de Southampton, Inglaterra.

El documento destaca los desafíos técnicos y las soluciones llevadas a cabo en un mapa de seda de Inglaterra y Gales que se requerían para su almacenamiento y estudio. Los objetivos del tratamiento fueron mejorar la conservación a largo plazo, conseguir una presentación estéticamente aceptable, permitir ser examinados ambos lados del documento y protegerlo frente a su manipulación. El uso de adhesivos para la consolidación de este textil frágil fue una opción válida para su conservación, ya que no podría ser consolidado por los medios tradicionales. Además, es importante observar la utilización de un soporte acolchado como parte fundamental del tratamiento de conservación.

Palabras clave: Mapa; Consolidación; Adhesivos; Soporte Acolchado.

Resumo: Este trabalho resulta de um projecto de investigação em conservação como estudante de mestrado em Conservação de Têxteis, no Centro de Conservação de Têxteis (TCC), na Universidade de Southampton, Inglaterra.

O documento destaca os desafios técnicos e as soluções levadas a cabo num mapa de seda de Inglaterra e Gales, necessárias ao seu armazenamento e estudo. Os objectivos do tratamento foram melhorar a conservação a longo prazo, conseguir uma apresentação, esteticamente, aceitável, permitir que ambos os lados do documento fossem examinados e protegê-lo quando tivesse que ser manipulado. A utilização de adesivos para a consolidação deste têxtil frágil foi uma opção válida para a sua conservação, já que não podia ser consolidado através dos meios tradicionais. Para além disso, é importante verificar a utilização de um suporte acolchoado como parte fundamental do tratamento de conservação.

Palavras-chave: Mapa, consolidação, adesivos, suporte acolchoado.

Abstract: This paper stems from a conservation research project of a Masters Degree Student in Textile Conservation at the Textile Conservation Centre (TCC), University of Southampton, England.

The paper highlights technical challenges and solutions carried out in a silk map of England & Wales which was required for storage and study. The aims of treatment were to enhance the long-term preservation, while presenting it with an aesthetically acceptable form and allowing both sides of the textile to be examined and to be protected from damage through mishandling. The use of adhesives for consolidation of this fragile textile was a valid choice for its conservation since it could not be supported by traditional means. Moreover, it is important to consider an effective padded support as a fundamental part of the conservation treatment.

Key words: Map; Consolidation; Adhesives; Padded Support.

1. Introduction

Textiles exist in many different forms, materials, methods of production and decoration. Together with their vulnerability, they present a challenge to those concerned with the preservation of textile objects. Thus, textile conservation is a practice of investigation, preservation and presentation (Eastop and Gill 2001) hence they can pose a variety of technical and ethical challenges for the conservator (Rivers and Umney 2003).

The use of adhesive techniques for the support of fragile textiles continues to present complex issues for the textile conservator. Basic questions of reversibility, the long term performance of synthetic polymers and the compatibility of modern synthetic materials with degraded fibres are major concerns when applying adhesives techniques in textile conservation. However, collective experiences have led to a more informed exchange between conservators. Thus, the use of adhesives for the support of fragile textiles can be a valid choice for the conservation of certain textiles which cannot be supported by traditional means (Kareem *et al.* 2008).

Moreover, the support and protection of fragile textiles in storage can also pose practical challenges for the conservator. Key issues are identified and discussed with this case study concerning a silk map of England & Wales. They include the design and fabrication of a padded rigid support and the importance of considering mounts as an integral part of the conservation treatment for textiles in storage with investigation purposes.

In fact, the mount and the object are no longer always viewed as separate operations in the conservation process. The importance of considering a textile support as an important part of the conservation treatment is fundamental for objects long-term preservation (Tímar-Balázs and Eastop 1998).

2. The silk map of England & Wales

2.1. The Object

The silk map was part of a conservation research project as a Masters Degree Student in Textile Conservation (2007/2009), at the Textile Conservation Centre (TCC), University of Southampton, England.

The map (470 mm height x 400 mm width) was worked on a cream balanced plain weave ground fabric over an undyed plain weave lining fabric. It was hand made embroidered with polychrome threads, outlining the England & Wales counties, and with very fine black threads for the lettering [Figure 1].

The map had also an embroidered oval frame and satin stitch naturalistic floral spays in polychrome threads. The whole embroidery was worked through both layers. Thus, both supports edges were loose as they were only attached by the embroidered oval frame.

Originally the map had been tacked to a wooden stretcher around all edges as strips were perceptible from the nails holes and from wood frame mark in the back.

Although the map was not dated, according to Brooke (1992) it can be traced back to the late eighteenth century as it was revealed through England & Wales counties and also 'embroidered maps are commonly found in the last three decades of the eighteenth century, when they were a particularly favoured method of children's schooling'.



Figure 1. The silk map of England & Wales before treatment. Reproduced by permission of The Textile Conservation Centre, University of Southampton, and of The Bristol Museums, Galleries and Archives, England.

2.2. Materials identification: fibres identification and weave structure

The fibres were identified under Axiolab Polarized Light Microscope PM2 with x10 magnification. In the cream plain weave ground and overall embroidery, silk was identified by the presence of elliptical shape and fine and lustrous filaments. In the undyed plain weave lining, linen was recognized by the presence of transverse dislocations marks at frequent intervals along each fibre, often in the form of an X.

The weave structure was observed by a thread counter : silk cream plain weave (tabby) 1/1, count of warp threads: 42 per cm² ; count of weft threads: 42 cm² ; - undyed plain weave lining (tabby) 1/1, count of warp threads: 22 cm²; count of weft threads: 24 cm².

2.3. pH Measurement

Surface pH tests were performed using Fisherbrand® colour-fixed pH indicator sticks held against a small area previously wetted with de-ionized water. The results indicated pH 6 to both fabric supports. This acidity may be due to photo-deterioration of the silk and linen fabrics and to migration of acids from the wood frame that was used to support both plain weaves.

3. Condition Assessment

The embroidery and the linen lining support were generally in good condition, but the silk support was in poor condition.

The silk support was light-damaged giving it a different colour from the original, as it was perceptible from the reverse. Probably due to photo-deterioration and its pH6, it was also extremely brittle, torn, split in some areas, with areas missing and some misplaced. The silk was stained, mainly in the bottom, indicating water staining.

The ground silk fabric and the linen lining were badly creased in places, mainly on top and bottom areas as result of bad display or storage. At some time in the past, the map had been attached to a frame by metal elements. Thus, areas of loss and rust stains could also been seen around the edges.

4. Treatment of the object

The silk map of England & Wales is part of the Bristol Museums, Galleries and Archives collection.

The museum staff wanted to enhance the long-preservation of the map, to make it suitable for storage and study. In this case, 'suitable for storage and study' meant the front, the loose area between the two supports and back of the map should be accessible for investigation purposes, as a document of textile history.

Thereby, to achieve stabilisation of the object, the treatment included: surface cleaning, humidification, reinforcement of both supports and suitable mount for storage and study.

4.1. Surface cleaning

Surface cleaning was undertaken with soft brush and vacuum cleaner, to remove loose particulate dirt, which could be a source of further degradation.

4.2. Humidification

Humidification was carried out to reduce distortions and relax creases of the overall object.

Due to embroidery, dye fastness tests were carried out. Dye bleeding was observable in the black silk thread, thus the object was humidified in a humidification tent made with polyethylene piping and sheets. Three glass cups with deionised water and a hair hygrometer were placed inside the chamber and the object was left there for 8 hours until 60% HR.

After that and in order to reduce the sharply creased areas on both ground fabrics edges, a contact humidification was carried out, for 6 minutes, with glass weights, blotting paper and Sympatex®.

The treatment was successful in flattening the edges, but all the creasing was not removed as dislocations probably have occurred in the fibres over time. However, it improved the appearance of the object and reduced the risk of damage due to weakening of the silk fibres.

4.3. Reinforcement of both supports

Nevertheless, for the map long-preservation and for its role as an object for study, the ground silk fabric proved to be too fragile to be treated by conservation stitch techniques. The missing areas on the bottom and the split areas randomly outside the oval embroidery work needed to be consolidated with an adhesive method. The aim of this reinforcement was to hold together deteriorated fabric and thereby impart physical strength to the silk support.

Although the adhesive-coated support is usually applied to the underside of the weak textile, in this case, the treatment applied should be an adhesive-coated fabric overlay. This was due to the fact that both silk and linen supports had their centre attached by the embroidery work; the silk fabric was too fragile to be handled; and the front, between the two supports and back of the map, should be accessible for investigation purposes.

Therefore, adhesive tests were carried out to choose the appropriate adhesive (Pretzel 1997).

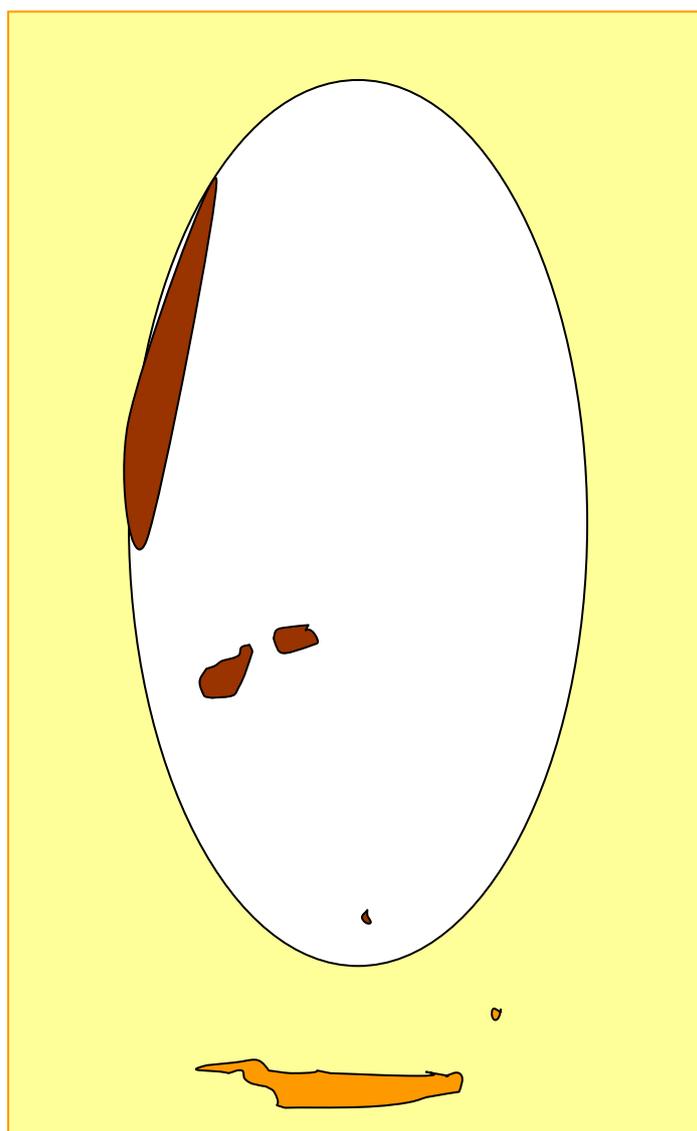
Silk crepline was coated in 12%, 15% and 20% with two different adhesives current in use in deteriorated silk, where pressure has to be reduced (Hillyer *et al.* 1997): Vinamul 3252™ (thermoplastic vinyl acetate-ethylene copolymer) and Lascaux 360HV with Lascaux 498HV in 1:2 (thermoplastic copolymer butyl-methacrylate dispersion thickened with acrylic butyl-ester) in deionised water.

The samples of silk crepline (approximately 15 cm²) were sprayed with deionised water on a polythene or poly(methylene) sheet. Then, they were aligned and coated with the different adhesive percentages. It was applied once with a soft brush and allowed to set and left to dry overnight. After that, the adhesive-coated support fabric was peeled from the polythene sheet and applied over a weak silk fabric. It was reactivated using silicone release paper and a heated spatula (65°C) to be sealed in place for 1 minute. Then, it was reactivated with solvent (acetone) for 6 minutes, in a ‘sandwich method’ using glass weight, blotting paper and Sympatex® (polyester non-porous membrane), to reinforce the bond between the silk crepline and the silk support.

For all the tests, 12 % of Lascaux 360HV and 498HV(1:2) in deionised water had the best results as it offered good bond, better flexibility, lower tackiness, *matte* appearance and ease of use than Vinamul 3252™ [Table I].

Table I - Adhesive tests

	Vinamul™ 12%	Lascaux 12%	Vinamul™ 15%	Lascaux 15%	Vinamul™ 20%	Lascaux 20%
Good Bond	xx xx	xxxx	xxxx	xxxx	xxxxxx	xxxx
Flexibility	xxxx	xxxxxx	xxx	xxx	xx	xx
Tackiness	xxxx	xx	xxxx	xxx	xxxxxx	xxxxxx
Matte Appearance	xxxx	xxxxxx	xxxx	xxxx	xx	xx
Ease of use	xxxx	xxxxxx	xxxx	xxxx	xxx	xxx



-  Silk crepeline cut to match and placed over the area outside the oval embroidery.
-  Small patches of suitable dyed silk fabric were inserted into the bottom missing areas that were to be distractive.
-  Silk crepeline was cut to match and placed over the area inside the oval embroidery.

Figure 3. Support and stabilization of the silk ground fabric. Graphic made by author.

The edges of the silk crepeline were folded to the back of the silk ground fabric. This allowed additional support to the edges and nail holes.

This was also carried out in the linen lining support. The fabric was damaged by nail holes, thus it was reinforced by encasing the edges with mono-filament nylon net coated with 12 % of Lascaux 360HV and 498HV (1:2) in deionised water. The same adhesive treatment process was carried out.

The silk map's fragile and vulnerable areas were successfully stabilised, and the treatment retained its textile-like quality [Figure 4].



Figure 4. The silk map of England and Wales front, after treatment. Reproduced by permission of The Textile Conservation Centre, University of Southampton, and of The Bristol Museums, Galleries and Archives, England.

4.4. Suitable mount

A suitable mount was carried out with archival materials. The protection was required during storage to minimize handling while maximizing its accessibility as a study object. In this way, the mount should protect the map surface and back, though allowing their examination. Therefore, the map was protected by placing it between two rigid and acid-free Correx® (corrugated plastic)

boards. By cutting one layer of the plastic parallel to the ridges, the Correx® sheet of 6mm was folded into a three-dimensional book shape.

All the cut edges were covered with Tyvek® [polyethene or poly(methylene)] tape. Afterwards, the inside was padded with polyester wadding, a non-woven material, which was set with acid-free double side tape. Then, it was covered with silk light habutai. In this way, the map was ‘sandwiched’ between two smooth padded boards, with the polyester wadding able to adapt to the uneven embroidered map. A distance of 5 cm from the edges was left around the map.

Outside, the silk light habutai edges were set with 3M acid-free double coated acid-free tape. Then, an acid-free card was used to cover them on support’s front and reverse. On top of that, map images were placed to allow easy reading of the respective sides of the silk map.

On the right front side, a cotton ribbon with Velcro stitched on it was also attached, to close the padded ‘book’. This allowed protection to the object from risk factors, such as dust and light, without attaching it to the padded support. Also it could be examined and documented with minimum handling by simply turning the support and opening it on the side (that the picture on the top is showing) [Figures 5].



a) The silk map was ‘sandwiched’ between two smooth padded boards, made with suitable archival materials.



b) The inside of the padded ‘book’.

c) The back of the padded ‘book’.

Silk Map Padded Support:

- 1- Acid free card with silk map’s picture
- 2- Silk light habutai
- 3- Correx®
- 4- Polyester wadding
- 5- Silk Map
- 6- Cotton Ribbon
- 7- Velcro®

Figure 5. The padded ‘book’.

The flattened map structure is always kept, front and back sides can be analysed without handling it and weak and vulnerable aspects of the object are protected.

The map is now safely supported but it still remains a fragile object.

Conclusion

The long-term preservation of the silk map of England & Wales was successfully achieved and the map is now suitable for storage and study as a document of textile history.

As the case study showed, the silk map was too fragile to be supported by traditional means, since stitching was not felt to be appropriate. Based on evaluation of use of adhesives in textile conservation, the consolidation of the silk and linen supports with silk crepeline coated with 12% of Lascaux 360HV and 498HV (1:2) was a valid choice.

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Correx®	Antalis Ltd
Blotting paper	Conservation by Design Ltd
pH indicator sticks	Fisher Scientific Ltd
Lascaux 360HV & Lascaux 498 HV	APFitzpatrick Ltd
Nylon net mono-filament	Dukeries Textiles & Fancy Goods Ltd
Polywadding	John Lewis Southampton
Silk Crepeline	Whaleys Bradford Ltd
Silk Habutay Light	Whaleys Bradford Ltd
Sympatex®	Preservation Equipment Ltd
Tape 3M Double Coated	Preservation Equipment Ltd
Tyveck® tape	Preservation Equipment Ltd
Vinamul 3252™	Celanese Emulsions GmbH

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R. Maltieira Morais
rmamorais@porto.ucp.pt

Rita Maltieira Morais, in 2006 finished the conservation degree at the Universidade Católica Portuguesa. During 2007/2009, after doing an internship at the textile conservation studio in the Museums and Conservation Institute and in the Costume Museum, both in Lisbon, did a Master in textile Conservation, at the Textile Conservation Centre, in the University of Southampton, in England.

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