

Minimal Intervention Approach in Textile Conservation Practice at the Department of Textile Conservation, The Metropolitan Museum of Art

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Această lucrare prezintă practicile conservării și preservării textilelor, cu accent pe principiul intervenției minime, la Muzeul Metropolitan (MMA). Lucrarea prezintă în special metodele dezvoltate în departamentul de conservare a textilelor (DTC) de la începutul formării departamentului, în anul 1973 până în prezent. Văzute prin informațiile păstrate în arhivele muzeului de peste 100 de ani, o succintă istorie a acestor practici dezvăluie evoluția lor și atenția acordată preservării colecției textile. Lucrarea reflectă multiplele contribuții aduse de conservatorii departamentului în domeniul conservării textilelor.

Principiul intervenției minime va fi prezentat în contextul a trei grupe textile majore (materiale arheologice, tapiserii, covoare) și va include metodele de tratament, expunere și depozitare. Metodele de montare a textilelor practicate pe durata de patruzeci de ani de existență a departamentului sunt de mare importanță și vor fi de asemenea aduse în discuție.

Principiul minimei intervenții în practicile de conservare a textilelor în muzeu este un subiect complex care poate fi înțeles nu numai în contextul tratamentului de conservare a unui obiect textil, dar și din perspectiva practicilor de preservare. Un tratament agresiv și ireversibil, folosirea materialelor de conservare necorespunzătoare, o mănuire neatență, expunerea și depozitarea neadecvată, într-un mediu necontrolat adesea rezultă într-o degradare ireversibilă și pierderea evidențelor istorice și a patinei caracteristice.

Acumulată pe durata mai multor decade, experiența conservatorilor și a cercetătorilor științifici a contribuit la profunda înțelegere a trăsăturilor chimice și fizice a textilelor și ca urmare a necesităților de preservare.

Acești factori au determinat practicile profesionale specifice, care au fost implementate progresiv, la fel ca și implementarea principiului minimei intervenții. Tehnicile inovative s-au dezvoltat și au avansat paralel cu creșterea profesiei și au inclus tratamentul de conservare și metodologia de montare, materialele de conservare, îngrijirea și manipulearea, conservarea preventivă și condițiile de mediu.

În colecția Muzeului Metropolitan, din fericire avem exemple de textile care reflectă varietatea tratamentelor și a strategiilor de preservare folosite de-a lungul istoriei muzeului. În multe cazuri, condiția aceluiași obiect a fost periodic consemnată. În concluzie, evaluarea practicilor de conservare a textilelor consemnată în arhivele de imagine ale muzeului și în dosarul obiectului, ne permite evaluarea acestor practici și a impactului lor asupra condiției colecției de-a lungul anilor.

Cuvinte cheie: preservare, intervenție minimă, tratament de conservare, montare, materiale de conservare, îngrijire și manipulare, conservare preventivă

Keywords: preservation, minimal intervention, conservation treatment, mounting, conservation materials, care and handling, preventive conservation

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Textile conservation practices at The Metropolitan Museum of Art - a short history

There were a few defining moments in the evolution of textile conservation and preservation practice at the Museum.

Many practices recorded during the first half of the twentieth century were invasive, having as their primary goal the enhanced appearance of an artifact, rather than consideration of long-term effects on its preservation. One example is the display of the Cloisters' *Unicorn Tapestries* and *The Nine Heroes of Tapestries* series in a setting where indoor/outdoor ambiance prevailed, and there was little, if any, evaluation of the effects of such an uncontrolled environment¹. Because of this, losses and accelerated degradation occurred. However, due to the high quality of the weaving and materials of these tapestries and the low light level within their well-maintained galleries, the tapestries still exhibit their outstanding beauty and integrity.

A significant example of invasive treatment conducted in the early twentieth century was performed on an undetermined number of banners of the Museum's Arms and Armor collection. Extreme deterioration of some banners was noticed recently during a collection survey performed by Department conservators². Written information kept in one of the object's files revealed a harmful treatment performed in 1934, involving the use of Duroprene (chlorinated rubber)³. This treatment is irreversible and the banners' integrity has been permanently lost.

Happily, however, there are examples of good conservation practice performed during this same time period that did help to preserve the collection for many decades. One of these was conservation of *The Nine Heroes of Tapestries* series by re-integration of tapestry fragments within newly-woven tapestry fabric⁴. The treatment helped to reduce stress during their long-term display.

Records show some positive display techniques used with the Museum's carpet collection during installations. Visual records demonstrate the attention given to such installation in order to avoid the stress and potential damage that might otherwise have occurred during display in the galleries⁵.

Later, in the 1960s decade, we see the first Museum staff member, Murray Pease, hold the title of 'Conservator,' and the early stages of establishing professional standards, ethics, and practices. During that period, the "Principle of Reversibility" was stated, accepted, and implemented.

In 1973, we see the formation of the Department of Textile Conservation, a clear indication of dedicated interest in improved practices and ethical issues of textile conservation at MMA⁶.

¹ See Kathrin Colburn, "Conserving the Cloisters' Tapestries." YouTube video, 18:33. Posted by The Metropolitan Museum of Art, January 28, 2010. <http://www.youtube.com/watch?v=0jHidnz4ZdQ>.

² Ongoing survey of the Arms and Armor Department's banner collection under the coordination of Olha Yarema-Wynar.

³ In the object file, acc. no. 20.262.2, see "Examination Survey Form," dated 2/14/2014, by Olha Yarema-Wynar; and restoration record dated 4/10/34, including "Banner repaired by "net system"..... Also sprayed with Duroprene by L. Heinrich."

⁴ See Adolfo Salvatore Cavallo, *Medieval Tapestries in The Metropolitan Museum of Art*. The Metropolitan Museum of Art, New York, 1993. Pp 94-99.

⁵ See Rebecca Meriwether Lindsey, "A Century of Installations: A Photo Essay" in *Masterpieces from the Department of Islamic Art in The Metropolitan Museum of Art, 2011*, pp 2-17; and, see Note 1.

⁶ See Florica Zaharia, "The Department of Textile Conservation at The Metropolitan Museum of Art." *Post-prints of American Institute for Conservation of Historic & Artistic Works 37th Annual Meeting*, The Textile Specialty Group, Volume 19 (2009), pp 66-76. CD-ROM.

Nobuko Kajitani, whose title was Associate Conservator, became the first head of the Department, and remained in charge until 2003. Her contributions to the general field of textile studies and specifically to the implementation of advanced conservation and preservation techniques used with Museum textiles were significant⁷.

In that era, conservation and preservation methodologies were impacted by the scientific interest and research generated in many countries worldwide, and by the Museum's major plan of redesigning and increasing its own gallery space⁸. Among the most important projects were the openings of the Islamic Art galleries in 1975 and the Egyptian Art galleries in 1983; the beginning of the *Christ Is Born as Man's Redeemer* Tapestry conservation project, in 1974; the creation of new storage facilities for the American Decorative Arts textile collection in the 1980s.

The preparation for display of archeological textiles belonging to the Egyptian Art department gave conservators an early opportunity for the minimal intervention approach. During the project, respect for an object's archeological information was considered as important as the textile's preservation needs. For installation of the Islamic galleries in 1975, the flat textiles and carpets being prepared for display demonstrated a considerable range of treatments and mounting methods used in that time period. Acute awareness of the minimal intervention concept is evident, especially for fragile textiles, many of which were pressure mounted.

Special attention was given to conservation of the Museum's tapestry collection. The most important restoration project of the 1970s was the *Christ Is Born as Man's Redeemer* Tapestry⁹. The search for materials and methodology instituted at that time created the basis of tapestry conservation philosophy and practice that continues today.

Consideration given to preservation of the collection during storage periods rose to a new level in the early 1980s, when enhanced storage conditions were designed and implemented, in particular for the American Decorative Arts textiles. (In 1909, the Museum established a Textile Study Room, where the collection was studied and partially stored. A majority of textile artifacts were also stored within individual curatorial departments under varied conditions)¹⁰.

The initiation of the next phase of development in textile conservation practices at the Museum corresponded to the design and creation of new facilities for the collection's conservation, study, and storage. First planned in 1989, was a project to incorporate all aspects of textile management into a single department. Six years later, a decision was made to instead group these related activities into two distinct departments/facilities: the Antonio Ratti Textile Conservation Laboratory (the DTC) and the Antonio Ratti Textile Center¹¹.

⁷ See Nobuko Kajitani, "Care of the Fabrics in the Museum." *Preservation of Paper and Textiles of Historic and Artistic Value*, Advances in Chemistry Series 164, pp 161-180, American Chemical Society, Washington, D.C., 1977; and, "Indonesian Textiles," Edited by Mattiebel Gittinger with the assistance of Nina Gwatkin and Patricia Fiske. *Irene Emery Roundtable on Museum Textiles*, 1979, Proceedings. The Textile Museum, Washington, D.C.

⁸ See Philippe de Montebello *The Met and the New Millennium*, The Metropolitan Museum of Art Bulletin (Summer 1994).

⁹ See *Redemption: Tapestry Preservation Past and Present*, a symposium in honor of the restoration of the tapestry *Christ Is Born as Man's Redeemer* in the Collection of The Cloisters. New York, December 6-8, 2009. <http://www.youtube.com/watch?v=uoxvJBV3M30>.

¹⁰ See Philippe de Montebello, "Director's Foreword: Antonio Ratti Textile Center" in *Textiles in The Metropolitan Museum of Art*, The Metropolitan Museum of Art Bulletin (Winter 1995/96). pp 5-9.

¹¹ See note 6; and, Elena Phipps, "The Design, Planning and Implementation of the Antonio Ratti Textile Center Textile Study and Storage Facility at The Metropolitan Museum of Art." *Post-prints of American Institute for Conservation of Historic & Artistic Works 25th Annual Meeting*, The Textile Specialty Group, Volume 7 (1997), pp 87-89.

Based on previous professional experience and technological advances during this phase, the concept of minimal intervention was applied across the spectrum of practices throughout the Museum's entire textile collection divided as it is among several curatorial departments. Treatment requirements, the need for a collection database and preservation standards including controlled environment, minimal handling, and storage format, were considered with specific attention given to each object. Rotating textiles at relevant intervals became an intrinsic part of Museum practice. The methodology of displaying textiles within specifically constructed mounts also evolved and improved. In particular, the pressure mounting method continued to develop and to be increasingly used.

Having begun during the last decade, another important phase in the evolution of textile conservation practices at the DTC continues to unfold at the present time. It has been greatly impacted by the MMA's new focus on presenting and sharing collections with the public in re-designed galleries and its website, as well as by the behind-the-scenes attention given to in-depth technical study performed with state-of-the-art analytical equipment. The augmenting of the textile collection's use in MMA galleries, at major temporary exhibitions, and for loans, expanded our professional practices, and resulted in an increase of Department staff and its qualifications, and the use of the latest sophisticated equipment in the improved facilities. During this time, interest in the concept of minimal intervention increased and moved in a new direction, to include acceptance of an artifact's known history, its imperfect (although perhaps stable) condition, and provision of protective display in less intrusive format in a controlled environment.

Incorporating all of the above, a major project of the last decade was the redesign/transformation of the Islamic Art galleries into the new galleries: Art of the Arab Lands, Turkey, Iran, Central Asia, and Later South Asia (ALTICALSA). That project and three major exhibitions: *Tapestry in the Renaissance: Art and Magnificence*; *Tapestry in the Baroque: Threads of Splendor*, and *Interwoven Globe: The Worldwide Textile Trade, 1500-1800* gave the DTC many opportunities to study, conserve, prepare for display and storage, and to coordinate installation of more than 1000 pieces. It provided a great platform for the Department to review both past and current methodology/practice and to advance creatively in new directions.

We will now discuss the evolution of the minimal intervention approach and relevant methodologies within the conservation practices of the DTC's history: treatment and preparation for display of the three major textile groups---archeological material, tapestries, and carpets. Lastly, but of great significance, the topic of textile mounting methodology will be addressed.

ARCHEOLOGICAL TEXTILES

One eloquent example of minimum intervention practice in the MMA's history is related to its archeological material. The most important excavation work, in which the Museum has been involved for more than a century, has taken place in Egypt. Linen sheets from a group of Egyptian artifacts belonging to the Burial Chamber of Hatnofer and Ramose¹² are among artifacts that best exemplify the minimal intervention methodology used continuously for their ongoing preservation, study, and display. This group of linens was installed within a vitrine in the Museum's Egyptian Art galleries opened in 1983¹³. Original folds were retained during display and remain exhibited in the same format to the present time.

¹² See Catharine H. Roehrig, *Sheet of "Royal Linen"* in *Textiles in The Metropolitan Museum of Art*, The Metropolitan Museum of Art Bulletin (Winter 1995/96), p 22

¹³ See Bill Barrette. "Climate Control, Active and Passive. The Egyptian Galleries at the Metropolitan Museum of Art." In *Museum*, no.146, 1985. Published by Unesco; Christine Lilyquist. "The installation of the Egyptian Collection at the Metropolitan Museum of Art." In *Museum*, no.142, 1984. Published by Unesco.

Exhibited as a group, each piece rests on its own Plexiglas® shelf, one above the other, preventing direct contact and pressure. Important information relating to the original storage of these artifacts was kept intact, yet preservation was assured by their individual display. (figs.1, 2)

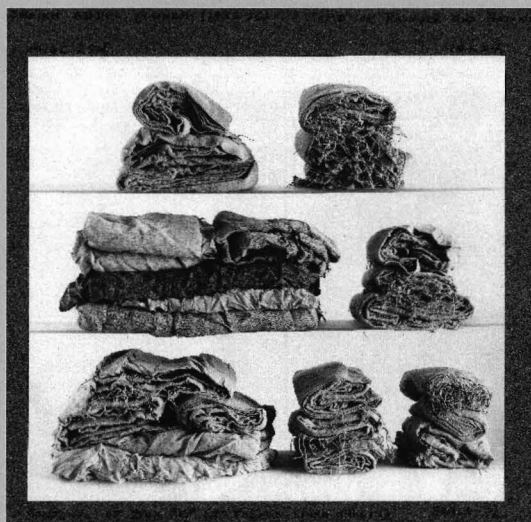


Fig. 1 - Linen from the tomb of Hatnefer and Ramose, Dynasty 18, ca. 1473. Photograph by Harry Burton, Egyptian Expedition, 1935-1936.
Image © The Metropolitan Museum of Art.

Fig. 1 - Inuri din mormântul lui Hatnefer și Ramose, Dinastia 18, cca.1473
Fotografie de Harry Burton, Expediția Egipt, 1935-1936.
Imagine © The Metropolitan Museum of Art



Fig. 2 - Linen from the tomb of Hatnefer and Ramose, Dynasty 18, ca. 1473, displayed in the Egyptian Art galleries since 1983.
Photograph by Florica Zaharia, Textile Conservation Department, The Metropolitan Museum of Art.
Image © The Metropolitan Museum of Art.

Fig. 2 - Inuri din mormântul lui Hatnefer și Ramose, Dinastia 18, cca.1473
Fotografie de Florica Zaharia, Textile Conservation Department, The Metropolitan Museum of Art.
Imagine © The Metropolitan Museum of Art

Another example of minimal intervention for preservation of archeological material is the group of Shahr-i Qumis textiles¹⁵. Only a few pieces of this group have been selected for treatment and mounting for display. The majority, however, are preserved with their full archeological information intact. Special storage/preservation formats were designed to preserve them in stable condition, to accommodate their unique shapes, and to retain all associated archeological material without contaminating other pieces in the surrounding storage area (fig. 3). This minimum intervention allows for future study of an object and its cultural context.

¹⁴ See Prudence O. Harper. "Ancient Near Eastern" in Textiles in *The Metropolitan Museum of Art*, The Metropolitan Museum of Art Bulletin (Winter 1995/96). pp 20-21.



Fig. 3 - 4-components storage mount for the textile fragments belonging to the Sharh-I Qumis group, constructed in 2014. Closed storage mount (left); the four components separated (right). Photograph by Florica Zaharia, Textile Conservation Department, The Metropolitan Museum of Art. Image © The Metropolitan Museum of Art.

Fig. 3 - Montaj format din patru componente, construit în 2014 pentru depozitarea fragmentelor textile aparținând grupului Sharh-I Qumis. Montajul închis (stânga); cele patru componente separate (dreapta). Fotografie de Florica Zaharia, Textile Conservation Department, The Metropolitan Museum of Art. Imagine © the Metropolitan Museum of Art

Although conservators are interested in understanding the original shape of a fragmentary piece, attempts at full reconstruction are rarely performed; there are only diagrammatic drawings illustrating how they might have been originally constructed. An exception was the reconstruction of a Caucasian caftan acquired in 1996 as part of a group of artifacts from the Moshchevaja Balka site¹⁵. Although missing most of its upper section, this piece was in an excellent state of preservation. Reconstruction was based on the remnant's evidence itself and on similar pieces of the same period¹⁶.

Whenever possible, we prefer to do minimum intervention treatment and leave a textile un-mounted. In recent years, we perfected the display/storage solution for textiles displayed in case-free layout, either flat or at a low angle on a support board covered with Pima cotton fabric¹⁷. When stored, the textile remains on the same board which is then enclosed in a storage mount to assure its protection and safe handling. If vertical display is imperative, and the typology and condition of the piece allow it, the fragment might be pressure mounted instead¹⁸.

¹⁵ See Prudence O. Harper, Nobuko Kajitani, Elfriede R. Kanuer. "A Man's Caftan and Leggings from the North Caucasus of the Eighth to Tenth Century." *The Metropolitan Museum of Art Journal*, No. 36/2001. pp 83-154.

¹⁶ See note 15.

¹⁷ See Florica Zaharia, "Islamic Textiles and Carpets from the Met's Collection: Conservation and Display" in *Sunday at the Met: Behind the Scenes Conserving Islamic Art*, April 7, 2013. <http://www.metmuseum.org/metmedia/video/collections/isl/islamic-textiles-and-carpets?chanID=5d3462d5-2fda-4eb6-8428-432030ca70a5>

¹⁸ Florica Zaharia, "Pressure mounting textiles methodology used in the Department of Textile Conservation at The Metropolitan Museum of Art." In *Matter and Materials in/for Heritage Conservation. MATCONS 2013. Book of Abstracts*. pp 13-14.

Tapestries

The MMA's Western European tapestry collection is among its best treasures. Many of the tapestries have been in the Museum for more than a century. During that time, their conservation, storage, display methodology, and environments have varied a great deal.

The collection's highlights include the *Unicorn Tapestry* series, *The Nine Heroes of Tapestries* series, the *Figures in a Rose Garden* series, the *Christ Is Born as Man's Redeemer Tapestry*, and *The Last Supper Tapestry*.

As early as 1928, restoration of Museum tapestries was photographically documented. Judging by the amount of yarn the restorer in the image has around her, most likely she was reweaving¹⁹.

Later records show a group of restorers at the Cloisters in 1947 working to consolidate the many distinct fragments of *The Nine Heroes of Tapestries* into four larger pieces²⁰. The method used was the integration of original fragments within the large tapestry hand-woven areas using neutral beige or dark blue wool. After 1974, conservation of the *Christ Is Born as Man's Redeemer Tapestry*, known as the *Burgos Tapestry*, began. Reconstruction by reweaving was the chosen treatment²¹.

There are three major tapestry conservation techniques developed and used in the Department from the time of its formation:

1. Reconstruction by reweaving.

This method has been used in the Department for tapestries having particular structural characteristics that permit the insertion of new warp and weft without disruption of the original. In these tapestries, warp and weft have a relatively low density, 4-6 warps per centimeter. The yarn used for reweaving is specifically made to be approximately three times thinner than the original. It is usually dyed in the DTC with Ciba Geigy Metal Complex dyes to assure color preservation within the Museum environment; such recipe formulae can be repeated as needed. The yarn is used in various combinations and lengths. The reweaving technique developed in the DTC has the warp ends cut and secured only by their length of insertion, in contrast to the old technique used by restorers where the warp yarn continues from one warp to another²². The reweaving is dense but never reaches the original density. Remains of original warp and weft are preserved by integration into reweaving. Particularly in the areas of dark brown wool, the abrasion effect is matched in reweaving by partial exposure of warps²³ (fig. 4). In order to recreate the pictorial effect of the original natural colors, reweaving is done with various color combinations either in the same needle or distributed with multiple needles. This type of reweaving does not need further consolidation to a support fabric. The reweaving is easily identifiable on the back of the tapestry, but may also be detected by a trained eye on the tapestry's front.

¹⁹ See "Textile Conservation" at <http://www.metmuseum.org/en/research/conservation-and-scientific-research/textile-conservation>.

²⁰ See James J. Rorimer and Margaret B. Freeman, *The Nine Heroes of Tapestries at The Cloisters*, The Metropolitan Museum of Art, New York, 1960 (reprinted from the 1953 edition).

²¹ See "The Burgos Tapestry: A Study in Conservation" at <http://www.metmuseum.org/metmedia/video/conservation-and-scientific-research/burgos-tapestry-study-in-conservation>.

²² Barnett, Ronnee, and Alice Blohm, Kathrin Colburn, Tina Kane, Midori Sato, and Florica Zaharia. "Tapestry Conservation at The Metropolitan Museum of Art." In *Tapestry Conservation Principles and Practice*, edited by Frances Lennard and Maria Hayward, pp 155–62. Amsterdam: Elsevier Butterworth-Heinemann, 2006.

²³ To my knowledge, this technique was introduced in 1989. Prior to that, the effect of exposed warp that would blend with the visible warp under the abraded brown weft was simulated by the effect of the open weave. See Florica Zaharia, Review of *'Wrought in Gold and Silk': Preserving the Art of Historic Tapestries*, edited by Anita Quye, Kathryn Hallett, and Concha Herrero Carretero (Edinburgh, 2009). *Studies in Conservation* 58, no. 2 (April 2013), pp. 148-149.



Fig. 4 - Brown wool weft area: before reweaving (left), and after reweaving (right). Detail from the Courtiers in the Rose Garden Tapestry, acc. no. 09.137.3. Photograph by Florica Zaharia, Textile Conservation Department, The Metropolitan Museum of Art. Image © The Metropolitan Museum of Art.

Fig. 4 - Arie reprezentând băutura țesută cu lână maro: înainte de rețesere (stânga), și după rețesere (dreapta). Detaliu din tapiseria Courtiers in the Rose Garden, număr de inventar 09.137.3. Fotografie de Florica Zaharia, Textile Conservation Department, The Metropolitan Museum of Art. Imagine © the Metropolitan Museum of Art

Reweaving requires specially qualified conservators, is time-consuming, costly, and not appropriate for every type of tapestry. It could be invasive for tapestries with high warp density. For these reasons, reweaving is not an option frequently chosen; however, it would possibly be performed when clearly necessary and appropriate.

2. Consolidation of damages with an open tabby weaving. From 1999 to 2001, we treated *The Last Supper* Tapestry²⁴ with this method. Large areas of damaged silk weft were first first rewoven and then further supported by Pima cotton fabric. In comparison with the method of reconstruction by full reweaving, this method is less time consuming and can be used for densely woven tapestries. A negative aspect is that the treated areas of the tapestry's back are completely covered and the treatment involves a combination of methods which is not always desirable.

3. Consolidation to a hand-woven tapestry support made to match the original weaving's density and/or appearance.

This method of consolidation is used for fragmentary pieces which cannot by themselves withstand the stress of display. Their weight is taken over by the support fabric. During 2006-2008, for the first time in the Department this method was used to conserve the fragments belonging to the *Mystic Capture of the Unicorn* Tapestry of the *Unicorn* series²⁵. The hand-woven tapestry fabric was woven at the conservator's specification. In preparation, the wool was dyed at the lab in several slightly different beige colors, which in the weaving, blended and assured a pictorial effect that matched the natural dye effect of the original tapestry. For display, the stabilized and consolidated pieces were mounted to a stretcher frame with solid support.

The method produces a great appearance and supports original fragments because the new hand-woven wool fabric connects and blends perfectly with the original. It is costly, but is otherwise a straightforward method. Close communication with the weaver and specifications for the hand-woven fabric are crucial to assuring the best results. For a similar type of treatment, a back support made of machine-woven woolen fabric could be used instead²⁶.

²⁴ The Last Supper, Designed by Bernard van Orley (Netherlandish, Brussels ca. 1492–1541/42 Brussels). See <http://www.metmuseum.org/collections/search-the-collections/459205>.

²⁵ See Kathrin Colburn, "Three Fragments of the *Mystic Capture of the Unicorn* Tapestry." *Metropolitan Museum Journal* 45 (2010): 97–106.

²⁶ See Giulia Chiostrini, "The Hunt of the Frail Stag: Analysis, Conservation, and Display of Five Medieval Tapestry Fragments." In *Multidisciplinary Conservation: A Holistic View for Historic Interiors. ICOM-CC Joint Interim Meeting*. Rome: ICOM-CC, 2010. Accessed 3/21/13. <http://www.icom-cc.org/54/document/the-hunt-of-the-frail-stag-analysis-conservation-and-display-of-five-medieval-tapestry-fragments/?id=878>.

Most tapestries treated with any one of the three methods described above, require hanging support. Hanging methodology developed in the DTC consists of a strap support system covered with header at the top, dust cover at the bottom, a full lining attached at the top and both sides, but open at the bottom. For hanging, a webbing/Velcro/slat system is used. The weight of the tapestry is supported with cotton fabric straps 15-25 cm wide, distributed in the vertical direction at the tapestry's center, at both sides, and at other areas where support is needed. The fabric's slight excess in the vertical direction and attaching stitches were planned to allow adjustment between tapestry and straps during hanging. The widths of the header and dust cover vary accordingly with a tapestry's condition, materials, and size²⁷

Again, the minimal intervention approach methodology has been developed and used whenever possible, especially for small sized or fragmented tapestries. The tapestry is displayed, either horizontally on an installation board, or on the slanted deck surface inside a Plexiglas® case. The installation board permanently supports the piece when on display or within its storage mount, and allows handling of the tapestry without direct contact.

Other methods that observe minimal intervention approach to the Museum's tapestry collection relate to our environmental conditions, and include a program of regular rotations²⁸. Tapestries are never displayed under natural light, and most are displayed under ambient light rather than a spotlight; light level is maintained at 3-5 foot candles. The Museum environment is carefully controlled and maintained at set parameters²⁹; air vents are located at a distance from tapestries.

Carpets

From the beginning of its formation, the MMA's carpet collection has been displayed either vertically on walls or flat on specially constructed platforms in the galleries and in special exhibitions³⁰.

Conservation treatment and preparation for display methodology included consolidation with adhesive, a treatment most probably performed in the first half of the twentieth century. The condition of one of the Museum's carpets was particularly compromised due to this invasive and irreversible treatment which poses considerable problems for a carpet's handling and storage³¹. Because this piece cannot be stored flat, it is rolled onto a 51 cm. diameter tube³². Although it has been hung before, in the future the carpet will always be displayed entirely flat on a platform.

Other types of treatment---crude repairs, re-weavings, and insertions from other carpets, can also be recognized as turn-of-the-20th century or earlier, work. In most cases these repairs created distortions which in time damaged the piece. Dyes used for restoration materials were unstable and faded over time.

²⁷ Florica Zaharia, "Installing Tapestry Exhibitions at The Met." YouTube video, 25:08. Posted by The Metropolitan Museum of Art, 1/28/10. <http://www.youtube.com/watch?v=3RVxgwbRDlo>.

²⁸ Depending on the tapestries' conditions and specific materials, the majority of our tapestries are on display for only 6 to 24 months. Between displays, they are in storage for at least 4 years. At the Cloisters section of The Metropolitan Museum of Art, outstanding tapestries—e.g. *Unicorn* and the *Nine Heroes* series—are on long-term display. The implementation, in 1974, of the stretcher frame/stretched canvas fabric support system meant detaching the tapestries from direct contact with the walls and giving them extra support and protection.

²⁹ 45% +/- 5 RH, and 68-70° F (18-22°C) temperature.

³⁰ See note 5; and Florica Zaharia, "Safavid Carpets from The Metropolitan Museum of Art Collection: Conservation and Display," from "Discoveries: New Research on the Collections of the Department of Islamic Art at the Metropolitan Museum, Part 3." The Metropolitan Museum of Art video, 2:15:02. April 14, 2012. <http://www.metmuseum.org/metmedia/video/collections/isl/discoveries-symposium-part-3>.

³¹ There are no records proving that this irreversible treatment was done in the Museum. Carpet acc. no. 1910.61.3 See Daniel Walker. "179. Carpet with a Compartment Design." In *Masterpieces from the Department of Islamic Art in The Metropolitan Museum of Art*, 2011, p 257.

³² The customary diameter used in the Museum is 20 - 25.5 cm.

The carpet reweaving technique is not among the currently used DTC treatment methods except on rare occasions and only for very small areas. This technique is so rarely used because the tightness of a carpet's weaving and its pile often shortened by abrasion, makes the insertion of new warps, wefts and pile difficult and possibly damaging to the original³³.

An important direction in carpet conservation was the development of the stitched consolidation method to a full support fabric. This method has improved over the years and continues in use today. Consolidation treatment to a full support is appropriate for fragile pieces that can no longer be stable on their own. The weight is transferred entirely to a strong new fabric. In the 1970s and 1980s, cotton duck was the support to which a carpet was consolidated by laid-and-couched stitching methods. Later, in the 1990s, wool fabric complementing the carpet's original color was introduced as support attached to the cotton duck.

Perhaps one of the most challenging projects of carpet conservation was the conservation of the *Emperor's Carpet*³⁴. It was the first time in the DTC that consolidation treatment was done to a soft wool fabric without the usual firm support of cotton duck. This helped with the flat display, and especially with its storage. The carpet was strong enough to support its own weight. We decided on this type of treatment because in the future this carpet will never be hung.

The treatment of this exceptional piece had been planned repeatedly during the last two decades³⁵, but until the ALTICALSA project, it was never possible---the reasons being: the carpet's enormous size, its substantial damage (although not disturbing much of its overall exceptional aspect), and the high cost required for such a capital project. The goal was to free the carpet of two old linings, four generations of patches (700 plus), distortions created by inappropriate past restorations, and lastly to stabilize its condition through consolidation and preparation for flat display.

The 2002-2011 ALTICALSA project was of great significance in the evolution of the DTC's professional practices of carpet conservation and preservation. The progress was impacted by our state-of-the-art lab facilities and analytical equipment, increasing variety of conservation materials, and a large team of highly qualified conservators. The carpet collection was subjected to in-depth review and evaluation by both textile conservators and curatorial staff. Selections for three consecutive rotations were based on artistic and historic qualities of the pieces, their condition, and the extent of treatment and preparation which would be required for display.

Types of display were chosen and included: horizontal display on a recently designed modular platform; vertical display hanging on the wall or in a mount; and, for oversize carpets---hanging on the wall with the excess on a special new type of platform designed to provide partial support (fig. 5), with or without a drop storage space. Hanging display was avoided for fragile carpets. The duration of display was established in relation to each piece's condition and sensitivity. Handling during installation and de-installation was carefully considered and worked out in detail.

³³ See note 17.

³⁴ Poskrobko, Janina, Yael Rosenfield and Florica Zaharia. "Conserving the Emperor's Carpet." YouTube video, 8:33. Posted by The Metropolitan Museum of Art, April 24, 2013. <https://www.youtube.com/watch?v=Cw30IAkS7Fs>. And, Daniel Walker, Florica Zaharia. "The Emperor's Carpet." In *Masterpieces from the Department of Islamic Art in The Metropolitan Museum of Art*, 2011, pp 259-260.

³⁵ Records kept in the object's file, acc. no. 43.121.1.



Fig. 5 - A large Mughal carpet displayed hanging on the wall and partially resting on the platform. A large size pressure mounted “Palampore” textile is displayed on the right side of the back wall. 2011. Photograph by Florica Zaharia, Textile Conservation Department, The Metropolitan Museum of Art.

Image © The Metropolitan Museum of Art.

Fig. 5 - Un covor Mughal de dimensiuni mari este expus vertical și parțial pe platformă. O textilă „Palempore” de dimensiuni mari în montură cu presiune este expusă în partea dreaptă a peretelui din fundalul galeriei. 2011.

Fotografie de Florica Zaharia, Textile Conservation Department, The Metropolitan Museum of Art.

Imagine © the Metropolitan Museum of Art

Textile mounting

At the present time, our approach towards treatment and display of flat textiles is, whenever possible, to prepare a textile for flat display or at a low angle of inclination positioned on a fabric-covered board within a vitrine. This minimum intervention method does not require mounting or treatment that would allow for vertical display. However, constraint of space and the visual advantages of displaying a textile vertically on a wall make conservators continue to think creatively about improving mounting types and treatment, while at the same time maintaining minimal intervention.

Most types of mounting developed at the DTC are permanent, having the function of preserving textiles during both display and storage periods. In this way, a textile's handling is considerably minimized. The mounting methodology developed under the leadership of Nobuko Kajitani in the 1970s and 1980s formed the basis of methodology used today.

The majority of earlier mounts identified in our collection are of the woven textiles, embroideries, and velvets belonging to the Islamic Art collection. During preparation for the opening of the ALTICALSA galleries, the Department conservators had the opportunity to survey the entire Islamic textile collection and to assess its needs for treatment and display. The old mounts had been stored or displayed in the Museum's environment for 30-40 years, but were relatively stable. However, close examination did show weariness in their mounting materials. Some of the materials, such as the Masonite boards used for the early mounts' solid supports, are no longer the best in our practice. In the last decade, these have been replaced with sheets of Plexiglas® or aluminum honeycomb.

With rare exceptions, neutral beige Pima cotton is used as background and support fabric for all mounts made in the DTC. This choice of fabric was established in the 1970s and has continued since then, assuring a harmonious display throughout the Museum.

Two main categories of mounting methodology were developed: stitched mounting and pressure mounting, each with some variation in visual appearance, mount stability, and in the practicality and ease of the process. Textiles in all types of mounts are protected with Plexiglas® glazing³⁶.

The main types of stitched mounts are: transferred mounting, stitched mounting to a double stretcher frame, and mounting to an indented stretcher frame/mat.

Transferred mounting, the lightest of the stitched mounts, is a clean-looking mount although not recommended for fragile pieces. It requires experience for transferring the mounted art from its temporary frame to the permanent mount.

The method of stitched mounting to a double stretcher frame continues to be preferred today because the piece is stitched to supporting materials permanently stretched to the mount, and does not require a transfer. The disadvantages are that the mount is heavier than normal, and the inner frame must be constructed to fit perfectly within the outer frame.

For the 1975 Islamic Art installation, many textiles were stitched mounted to an indented stretcher frame/mat. The advantage of this method is that the art is stitched to a permanently stretched support fabric on a stretcher frame and does not require a transfer. However, a disadvantage is that the fabric-covered stretcher becomes a mat with a considerable thickness which creates a shadow over the art. Also, the mount is less solidly constructed in comparison to either the double stretcher frame or the single stretcher with solid support. Thus this method is now rarely used.

Pressure mounting is a non-invasive method of mounting in which the textile can be displayed vertically without any stitches, and which assures an internal microclimate appropriate for preservation. The textile is simply positioned on a solid support mount, cushioned with layers of paper, polyester felt or batting, and Pima cotton fabric----then held with light pressure by a Plexiglas® sheet or box³⁷.

There are two types of pressure mounting developed and used in the DTC: the single pressured mounting within a Plexiglas® box and the double pressure mounting with Plexiglas® sheet, mat, and Plexiglas® box. The single pressure mounting type with its variations is predominantly used today and during the past decade because of its reversibility and simple, clean appearance. In the past, the double pressure mount had been preferred because it was considered safer for the textile. However, a disadvantage of using two Plexiglas® layers is that it diminishes one's view of the textile; and in the eventuality that the mount needs to be reversed, the mat is compromised.

During its history, the methods of pressure mounting were constantly being improved, and a few variations of the single pressure mounting developed: the single pressured mounting with a Plexiglas® sheet and a wooden frame; pressure mount with a single Plexiglas® box; and the pressure mount with a single Plexiglas® box and added edge support.

³⁶ See note 18.

³⁷ Nobuko Kajitani, Elena Phipps, 'Pressure Mounting – Our fifteen year experience in interim treatment between stitch-mounting and consolidation, Textile Treatment Revisited,' Harpers Ferry Regional Textile Group Meeting in the Nation Museum of American History, Smithsonian Institution, Washington DC, November, 1986. pp 67-69. Florica Zaharia, Midori Sato, "Pressure Mounting Textiles (abstract)." In *Upholstery +: Abstracts of an Interim Conference Organized by ICOM-Poland, ICOM-CC Leather, Textiles and Wood, Furniture and Lacquer Working Groups and the National Museum, Cracow*, 37-38. Cracow: Jagiellonian University, 2007; and see note 19.

Fragile and large textiles can be displayed using this minimal intervention method. In 2011, we made the largest pressure mount ever created at the DTC, 272 cm. x 196 cm. We undertook this challenge because of the necessity of a noninvasive treatment for a fragile piece of the Islamic Art collection, an 18th-century Indian Cover (Palampore)³⁸ needing to be prepared for vertical display. (fig.5) The most challenging part of the process was to pressure the piece evenly throughout the mount. After the pressure was assured by screwing the Plexiglas® to the stretcher frame, the screws were covered and the entire mount enclosed within a wooden frame.

Conclusions

Evolving through the last century, the minimal intervention approach to conservation and preservation of the Museum's textile collection is now acknowledged as a basic goal and a firmly established practice of the DTC. As documented, at the beginning of the 20th century flat display of carpets on specifically constructed platforms protected with stanchions, hanging carpets, and tapestry restorations, demonstrate the devoted care taken of its collection by the Museum during this early period. Since then however, conservators' and scientists' achievements in regard to the attention paid to an artifact's original intrinsic qualities and historical markers have immeasurably increased. The clear focus of today's practice is minimizing the intervention we need to perform in order to achieve an artifact's condition stabilization and preparation for safe, efficient display and storage. Most of the challenges we now encounter often relate to space restrictions which involve oversized mounted pieces, their treatment preparation for vertical display, and on occasion, vertical storage on racks.

Conservators are constantly learning from previous practices. Having access to past methodologies and collecting related data wherever possible are invaluable assets for future progress in our field.

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³⁸ See Marica Sardar, "281. Cover (Palampore)" In *Masterpieces from the Department of Islamic Art in The Metropolitan Museum of Art*, 2011, pp 396–397; see note 18.

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