Cleaning Of Metal Threads In Brocade Artifacts

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Abstract

Cleaning of historical textiles is a field which is under constant research and development. Cleaning is an irreversible process as one cannot put back something that has been brushed or dissolved away. The decision about cleaning an artifact is not easy and many issues need to be addressed before proceeding further. Textiles with metal threads or zari are the most common and most difficult artifacts that a conservator has to clean. The established methods of cleaning metal objects, such as the use of polishing powders or the chemical removal of stains or corrosion from the surface, in most cases cannot be applied to textiles containing metal threads. Corrosion and tarnishing of metal threads are caused mainly due to the presence of moisture in the air, which is why Indian brocades present in museum collections are more prone to damage. The zari used in these artifacts undergoes tarnishing and corrosion which leads to deterioration of the metal thread as well as the surrounding fabric. The present paper gives an exhaustive list of possible chemicals which can be used for the purpose of removing corrosion and tarnishing from brocade artifacts. These chemicals have been shortlisted based on a review of the literature as well as interviews with the professionals in this field. In the present paper, the researcher has attempted to summarize the different treatments employed for metal threads and the challenges faced by the conservators in this process.

Keywords: Brocade, zari, mechanical cleaning, aqueous cleaning, solvent cleaning, tarnishing, corrosion

Introduction

India is well known for its diverse and intricately patterned historical textiles all over the world. It is an accepted fact that the Indian artisans were highly skilled since the ancient times. Brocade fabrics are one such example of their craftsmanship. In India, brocade weaving is a living craft, i.e. it is still woven in many parts of the country but the technique and materials have undergone many changes over the past century. One can still find some old pieces in the rich museum collections of our country. India is a tropical country and the weather conditions here make preservation of textile artifacts in the museum collections quite difficult. Brocade fabric is made by incorporating a metal thread or zari into the base fabric, thus, making it a composite material. The hot, humid and polluted air of the surrounding environment dulls the lustre of these heirlooms. The zari undergoes tarnishing and corrosion, thus, furthering the damage to the artifact.

The role of a textile conservator in a museum is quite challenging as textiles being organic in nature undergo deterioration and do not last forever. The conservator aims at minimising the adverse effect of various factors to slow down the ageing process of the artifact. He/she is responsible for carrying out preventive as well as curative conservation of an artifact. Cleaning an artifact is a form of curative conservation which refers to the action(s) taken to treat the defects that are already present in the object in order to prevent it from further damage. The present paper discusses the various cleaning approaches used for brocade artifacts and the challenges faced during this process.

Methodology

The main objective of the study to list out different methods used for cleaning zari and to test the efficacy of these methods. The methodology followed for achieving these objectives has been discussed below:

Review of Literature: A detailed literature survey was conducted to collect secondary data about different types of cleaning methods attempted on zari yarns. The data was collected through various
published and unpublished works from libraries of National Museum, Crafts Museum, Indira Gandhi National Centre for Arts (IGNCA), and Lady Irwin College, New Delhi. Online resources were also used for the same.

**Interview with experts:** Interviews of museum officials and conservators were conducted in order to gain an understanding of the present conservation practices followed for brocade artifacts.

a. **Locale:** Delhi
b. **Sample Selection:** Two museums of Delhi were selected, i.e., National Museum and Crafts Museum. Both the museums have a vast textile collection that truly depicts the rich textile tradition of the country. Both the museums have conservation laboratory that is involved in the upkeep of the artifacts. The officials of these selected museums served as the sample for this part of the study. The other experts interviewed included freelance conservators, curator, academicians and conservation experts.

c. **Tools and techniques:** The data was collected through interview schedule which aimed at gathering information about the processes followed for preservation and conservation of brocade artifacts.
d. **Data analysis:** The data collected through interviews was qualitatively assessed using content analysis and summarised. The suggestions given by the experts were incorporated in the study.

**Sample preparation for experiments:** Sourcing of ten different types of *zari* samples from Banaras was done. About 1000 meters of each type of *zari* yarn was bought. The samples included pure silver *zari*, gold plated *zari*, copper imitation *zari* and metallic *zari*. Four *zari* samples were selected for making the brocade samples based on the composition of metals and their popularity of use in weaving. This fabric served as the sample for artificial tarnishing and corrosion experiments carried out further in the study. For the construction of brocade samples, a small *booti* was selected as the motif and the layout was designed in a manner that each sample of 15 cm × 10 cm had two *zaribootis*. Brocade samples were woven on handlooms in Banaras. Silk used was unbleached and undyed. 1.5 meter fabric was woven with each *zari* sample.

**Artificial tarnishing and corrosion:** The prepared brocade samples were artificially tarnished and artificially corroded using the below mentioned experiments:

a. **Salt solution test:** A solution having 5% NaCl in distilled water was prepared in order to conduct the experiment. The samples were immersed in this solution for half an hour after which the samples were left for drying and aged for 60 days before cleaning. This ageing time was required for the corrosion reaction to take place.

b. **Exposure to sulphur environment:** It is known that sulphur causes tarnishing of silver, thus, the samples were kept in a sulphur rich environment. For this purpose, a cotton fabric was dyed in black colour using sulphur dyes and the experimental samples were kept in this fabric. Moisture was introduced in the form of water spray which was done every day. The samples were assessed at regular intervals to keep a track of tarnishing which occurred. Finally, a period of 45 days was found sufficient enough to artificially tarnish the samples.

c. **Artificial soiling:** It was decided that a set of samples would be artificially soiled so that the effect of various cleaning measures on these samples could be studied. The reason for conducting this experiment was underlined by the fact that most of the times the artifacts in museums are just soiled and the study provided an opportunity to assess the effect of the selected cleaning procedures on these samples. This experiment was conducted as per the IS: 5785 (PART IV)-2005 standard. After soiling the samples were given an ageing time of 30 days before carrying out the cleaning experiments.

**Cleaning experiments:** The various chemicals used for cleaning experiments have been listed in table no. 1. The experiments were carried out in the laboratory of Lady Irwin College. Observations were recorded with the help of a digital camera (photographically) and a digital microscope. Images were taken before and after the treatment to note any changes in the appearance. Any physical test to analyse the before and after effect of these experiments was not be done because the samples prepared are representative of museum artifacts. The data thus collected was tabulated and visually assessed.
Results And Discussion

Selection of chemicals: Based on an exhaustive literature survey and interview with professionals, a list of different chemicals used for textile artifacts with metal threads was prepared (Table 1).

Table 1- Different chemicals selected for study

<table>
<thead>
<tr>
<th>S. No.</th>
<th>CHEMICAL/ REAGENT</th>
<th>METHOD</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Magnesium Carbonate</td>
<td>Mechanical cleaning (works as an abrasive)</td>
<td>Sipos &amp; Gondar in 1989</td>
</tr>
<tr>
<td>2.</td>
<td>Glass bristle brush</td>
<td>Mechanical cleaning (works as an abrasive)</td>
<td>Crawer Withers <em>et al</em> in 1964  &amp; Landi in 1992</td>
</tr>
<tr>
<td>3.</td>
<td>Sodium bicarbonate with water</td>
<td>Mechanical and chemical cleaning (The crystalline particles of NaHCO₃ act as an abrasive as well as they react with water to form NaOH which in turn saponifies the fatty dirt)</td>
<td>Sipos &amp; Gondar in 1989</td>
</tr>
<tr>
<td>4.</td>
<td>Natural eraser &amp; smoked sponge</td>
<td>Mechanical cleaning</td>
<td>Interview with professionals</td>
</tr>
<tr>
<td>5.</td>
<td>Water (Filtered, distilled, warm)</td>
<td>Aqueous cleaning</td>
<td>References can also be found in books by Sheila Landi &amp; Timar-Balazy.</td>
</tr>
<tr>
<td>7.</td>
<td>Organic solvents</td>
<td>Solvent cleaning (Dry cleaning)</td>
<td>Timar-Balazy &amp; Eastop</td>
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<tr>
<td></td>
<td>- Ethanol</td>
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<td></td>
<td>- Acetone</td>
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<td></td>
<td>- Xylene</td>
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<td></td>
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<td></td>
<td>- Toluene</td>
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<tr>
<td></td>
<td>- Petroleum ether</td>
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<td></td>
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<tr>
<td></td>
<td>- Carbon Tetrachloride</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Ammonia</td>
<td>Aqueous cleaning (used as a solution with water and ethanol)</td>
<td>Interview with professionals</td>
</tr>
<tr>
<td>9.</td>
<td>EDTA</td>
<td>Aqueous cleaning (used as a solution with water)</td>
<td>Farke in 1992. Suggested by some experts also.</td>
</tr>
<tr>
<td>10.</td>
<td>Formic acid</td>
<td>Aqueous cleaning (used as a solution with water)</td>
<td>Sipos &amp; Gondar in 1989</td>
</tr>
<tr>
<td>11.</td>
<td>Silver dip (Acidified solution of thiourea)</td>
<td>Aqueous cleaning (used as a solution with water and HCl or Formic acid)</td>
<td>Landi in 1992, Dore in 1978 &amp; Howell in 1989</td>
</tr>
</tbody>
</table>
The present paper focusses only on the chemicals used for cleaning, i.e., various aqueous and solvent cleaning methods. Mechanical methods have not been included in the same. The observations of the cleaning experiments were tabulated and visually assessed. It was noticed that the efficacy of a method depends upon the type of zari and the kind of damage it has undergone. For instance, the organic solvents were very effective in removal of soiling from the samples but not as effective in cleaning corrosion or tarnishing of the zari. Some chemicals act effectively on removing copper corrosion products whereas some other chemicals are good for cleaning tarnished silver. Some examples of these experimental observations have been discussed here.
Figure 1 depicts the cleaning efficacy of an organic solvent (petroleum ether) on a soiled sample. It implies that if an artifact is to be treated only for the dirt present in it, then, choosing any dry cleaning solvent is the best option. Figure 2 is the microscopic image of a sample having copper imitation zari which was artificially corroded in salt solution. The effect of cleaning with sodium bicarbonate solution can be observed here. This method is efficient in removing corrosion products from the sample but, on the other hand, it might harm the base fabric. Thus, this method should be employed very cautiously. Figure 3 shows that the solution of ethanol and water (water 80% & ethanol 20%) was not suitable for a tarnished zari sample. But this is a comparatively safer method as the solution would evaporate leaving no residue on the base fabric.

CONCLUSION

The results of the above experiments indicate that there is no ‘universal’ method for cleaning of brocade artifacts. Decision about the method and the chemical to be used have to be taken cautiously. Following are the significant points which need to be kept in mind before cleaning of a brocade artifact:

- Textiles with metal threads are the most complicated objects to be handled while restoration. The reason for this is their composite nature. The material is neither purely textile nor purely metal; it is a mixture of the two. Thus, any established method to clean either textile or metal cannot be directly applied on a brocade artifact.
- The decision about cleaning a brocade object should be taken judiciously after weighing out all the pros and cons of the process.
- Generally, the cleaning of brocades is done to improve their appearance. Sometimes, the reason for cleaning is to remove the harmful corrosion products which damage the artifact and degrade it faster.
- Care should be taken while deciding the procedure for cleaning of a brocade artifact. One should identify and note the type of metal thread used, its composition, type of deterioration present and the base material. This helps in choosing a suitable chemical for the restoration process.
- Any residue of the chemical used for cleaning should be completely removed from the artifact.
- Cleaning the artifact is not the final step. One has to store the artifact with care and precautions need to be taken to prevent further damage. In some cases, coating the metal threads with a resin can also be done.
REFERENCES


WEBSITE VISITED

- http://www.bcin.ca