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Conservation Treatment Procedure Of Ancient Textiles Artifact (Shawl) In Bangladesh National Museum

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ABSTRACT:

The present study was conducted to assess the conservation treatment procedure of ancient shawl object in Bangladesh National Museum. In the present study, character of Shawl has been evaluated and assessed the suitability of prevention purposes. The environmental impact of shawl has been discussed. The assessment can be increased the awareness of the people of the risk and affected the Shawl so that they could ready to face the disaster due to climate change, from the investigation it can be concluded that the Shawl is being affected by environmental hazard. The strength of colors were studies of their lowest values such as blue, red and yellow were founds in variation from 1.470998(N), 0.588399(N) and 0.392266(N) respectively. The strength of lowest value of different yarn studied was found lower hose of the new yarn value. The delay of the application of the legal frame work as well as people's awareness aggravates the situation by continually reducing the longevity of ancient Shawl in Bangladesh National Museum.

KEY WORDS: Shawl, Conservation, Bangladesh National Museum, Ancient, Environmental, Hazard, Reducing, Longevity.

1.1 General Introduction:

Bangladesh is located in the north eastern part of south Asia. The country shares its eastern, western northern borders with India. Its south eastern border with Myanmar and its southern border with Bay of Bengal. The climate in Bangladesh is a sub-tropical monsoon climate with a hot, humid summer from March to June, wet season from July to August, its winter spans from November to February. The average annual temperature of Bangladesh in winter is 20^0C (11^0C-29^0C) and 36^0C (21^0C-38^0C) in summer[1] [1]. Cotton is the major textile fibre used by man in the world and playing a key role in economic and social welfare. Bangladesh is also the 2nd raw cotton importer of the world. Cotton has huge prospect in our county. The Mughal rulers valued India's rich artistic heritage and its sophisticated textile culture and promoted the skills of the large population of textile artisans and craftspeople; amongst the skilled were weavers, dyers, embroiderers and printers. Bangladesh is also known for its highly developed cotton industry. Bangladesh was the number 1 exporter of muslin in the 17th century. During the 17th and 18th centuries, Mughal Bengal emerged as the foremost muslin exporter in the world, with Mughal Dhaka as capital of the worldwide muslin trade. However, Bengali exports declined over the course of the early 19th century, as British imports to Bengal increased, from 25% in 1811 to 93% in 1840[2],[3] [2, 3]. All materials have a finite life expectancy and natural organic materials such as historic textile fibers are particularly susceptible to a range of

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deterioration processes. The role of preventive conservation is to extend the useful life of artifacts by as great an amount as possible, consistent with competing demands such as access study and sometimes also use. The exhibition of textiles on open display and particularly in their original contexts in historic houses has sometimes been criticized on the grounds that the conditions for preservation are indigenous inferior to those afforded by conventional museum displays. But it is probably true to say that with care many textiles should have a useful lifetime exceeding one thousand years[4] [4]. From time immemorial, fabrics have been used as everyday articles for protecting human being heat and cold. They were mad of animal materials like wool and silk as well as vegetable fibers like linen and cotton using wide variety of technique. When textiles first started to come into the newly founded museum of the nineteenth century, the questions arose of how they were to the care for not with a view of using them again, but of preserving them for future generation in 1920. At first, museum textiles were stored in cupboards for protection, in Sweden some sixty years ago it was realized that it was not enough just to store soiled or brittle textiles. The Swedes began to care for their collected pieces in the usual household way-they cleaned from this experience, limited as it was systematic conservation methods developed in the Nordic museum. Textiles cultural heritage serves as important data to understand the living cultural and cultural exchange of a country and its people[5] [5]. Our experimental Shawl was gifted by landholder of Dinajpur district in 1961. The assessment was carried out for shawls in Bangladesh National Museum and accession number 01.02.065.0000.00911.

1.2 Light:

Light is in quantitative terms, the best understood cause of deterioration of textiles and its effects are not completely avoidable if the textiles are to be made available for display or study. Although the damaging effects of light have long been recognized, it was only 1970s, as a result of the work by Garry Thomson (1978) at the National Gallery[6] [6], that a strategy for the control of light damage to historic objects and works of art was formulated. This approach has subsequently been adopted by museums worldwide. As is well known light damage results from both the invisible ultraviolet component of daylight and artificial light sources and from the blue end of the visible part of the spectrum. The under their own weight, Indeed, the provision of the use of ultraviolet filters on windows and adequate support can be considered to be an fluorescent tubes allows the almost complete aspect of preventive conservation for textiles elimination of ultraviolet light from museum displays and is equally effective if properly applied to rooms in historic houses containing light-sensitive objects. The damaging effects of damage of objects in display cases in museums visible light are more problematic, as it is not acceptable to filter out that part of the visible spectrum which is most damaging i.e. the violet and blue components as objects would then be viewed with a yellowish cast[7] [7]. While the lower numbered standards with poor light fastness are faded by both visible and UV, the higher number standards are only faded by shorter wavelengths, with standards 6 and 7 shown to be unreliable when UV was excluded[8] [8]. Since most museum lighting is UV filtered, blue wool standards may not provide an accurate measure of the damage occurring. Feller (2002) observed that the ideal relationship, whereby each standard should fade at half the rate of the preceding one, does not hold true, since the rate of fading does not adhere to a strict linear relationship[9] [9]. Lighting plays a vital role in guiding visitors through their museum or gallery experience. The lighting challenge faced in today's museums and galleries is to achieve a balance between the quality of the lit environment, no matter what is being displayed and the level of energy used during the life of the installation. Textiles object are high sensitive its Recommended Lux level 50 Lux. Museums are facing difficulties with textile objects as they begin implementing LEDs into galleries. The damage caused by light is aesthetically and physically damaging to artifacts, and is almost completely irreversible.

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1.3 Relative humidity:

With the possible exception of the limiting of light damage more effort has gone into the control of relative humidity than any other aspect of environmental control. By the 1970s, stringent upper and lower limits for relative humidity were being widely applied in the museum world, often without any understanding of the effects of humidity on the collections concerned[10] [10]. The other potentially most damaging environmental effect is from RH. Changes in RH have a significant impact on fibre mechanical properties since fluctuations cause changes in fibre dimensions. While this is also dependent upon the moisture regain of the fibre, these changes can generate microscopic flaws in the textile fibres if repeated over a number of cycles. This becomes of greater concern as the textile ages and the fibres become more fragile. There is evidence that micro-flaws may propagate planes of weakness for fibre fracturing. This strongly supports the recommendation that RH should be maintained at a constant level. Gamez-Garcia (1999)[11][11] repeated small surface mechanical deformations in keratin fibres with surface strains of 0.2% and observed the creation of micro- voids and axial cracking from these small strains. Experiments with RH cycling were undertaken to assess these effects on photo-aged wool. This cycling to create regain changes of 106 demonstrated a minimal effect on the fibre strain but a marked decrease in the extensibility of photo-aged wool[12] [12]. Aged textile fibres also show micro-fracturing consistent with RH-induced dimensional changes. It is generally agreed that relative humidity's above 75 per cent for other than short periods of time (of the order of a few days) are highly damaging to a wide range of types of object, promoting mould growth on organic materials and providing optimum conditions for insect infestation. Many chemical deterioration processes also progress more rapidly as the humidity increases. The rate of mould growth depends on the availability of nutrients and parchment is probably the most vulnerable of organic materials and sound cellulosic materials such as cotton or linen the real least at risk. Because dirty or partially degraded textiles are likely to be richer in nutrients, they will fare worse than those which are properly cared for and clean. The effect of low relative humidity or large or rapid fluctuations in relative humidity is largely physical in nature, causing dimensional changes to occur. If these are uneven or rapid and if the object is rigid or constrained, stresses will be setup which will cause damage to individual fibers or to the structure as a whole. For textiles which are unconstrained or only lightly constrained, the risks of mechanical damage are small, and a considerable fall in relative humidity is likely to prove more beneficial than otherwise as it will reduce the rate of other deterioration processes [7].

1.4 Temperature:

Temperature is one of the main causes of deterioration of organic objects in museums. High temperature makes the objects to disfigure and increase the speed of chemical reaction and low temperature accelerates the biological growth of museum objects.

The humidity of the air depends on the temperature. Where one cubic metre of air holds 10g of waterat 10℃, the same volume can hold over 30g when the air is heated up to 30℃. So much attention has been given to light and relative humidity control that the effect of ambient temperature on most types of object has been somewhat overlooked. Obviously, very high temperatures are rapidly damaging to a wide range of materials as a result of drying out or softening, but temperatures not exceeding about 25℃ are generally tolerated for the majority of museum exhibits. Depending on the material, the objects expand when they warm up and shrink when they cool down. No change of their chemical structure. High temperatures increase the speed of chemical reactions. Change of chemical composition. Certain temperature levels can lead to growth of living organisms (insects, fungi) and cause damage of organic materials[13][13]. Temperature is not usually an important issue compared with the more severe

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effects of other environmental parameter; its main effect being the changes it causes in RH. If there are significant changes in the levels of serine (-CH_2-OH) and thre-onine (-CH(OH)-CH_3), the temperature-sensitive hydroxyl amino acids, this may be regarded as proof that there has been no thermal component in the ageing of a textile, and temperature can be excluded as the main source of degradation. Archaeological textiles may have faced lengthy exposure to variable and extremely low temperatures that could have caused a loss in moisture regain ability[14] [14] (Pool 1997). Temperatures in excess of 100 °C are required to remove strongly bound water from the fibre structure, and it is generally unlikely that most historic textiles have undergone this extreme in high temperature. In terms of temperature, the basis for distinguishing between photochemical and thermal effects. The distinction between light and thermal reactions is highlighted by the example of a bond-breaking reaction requiring energy of 250 kJ/mol, typical of many covalent bonds in wool fibres. The excitation energy to break this bond can be induced photo-chemically by a single quantum of light of about 450 nm (i.e. green light). In contrast, at ambient temperatures, the thermal energy available for bond cleavage is essentially zero[15] [15].

1.5 Atmospheric pollution:

Atmospheric pollution poses a threat to the contents of museums and historic houses alike, although those in urban areas and near industrial installations are at significantly greater risk. Much of the damage caused by atmospheric pollutants is historic and results from coal tires and gas lighting, a phenomenon which has been recognized since the 1830s. Historic houses, on the other hand are frequently in areas where pollution levels are generally lower, and the particulates are of a less harmful type, being derived from the natural environment rather than from 1ndustrial processes. While it is true that textiles on open display are more vulnerable to dust and dirt, and may therefore need more frequent washing, this may not necessarily be a wholly bad state of affairs. The decomposition products of both cellulosic and proteinaceous textile fibres are excellent nutrients, and make the textiles more attractive to a range of organisms with the result that infestation will be more likely, and damage more rapid. These decomposition products are relatively soluble in water, and will be removed to a large extent during washing, thus stabilizing the textile.

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2.1 Sampling Collection Areas

Bangladesh is rich Shawl (textiles) objects. Bangladesh national museum is one of biggest collector of old shawl for Bangladesh. I collect the old shawl object from department of ethnography and decorative art in Bangladesh national museum. Shawl was gifted by landholder of Dinajpur district in 1961.

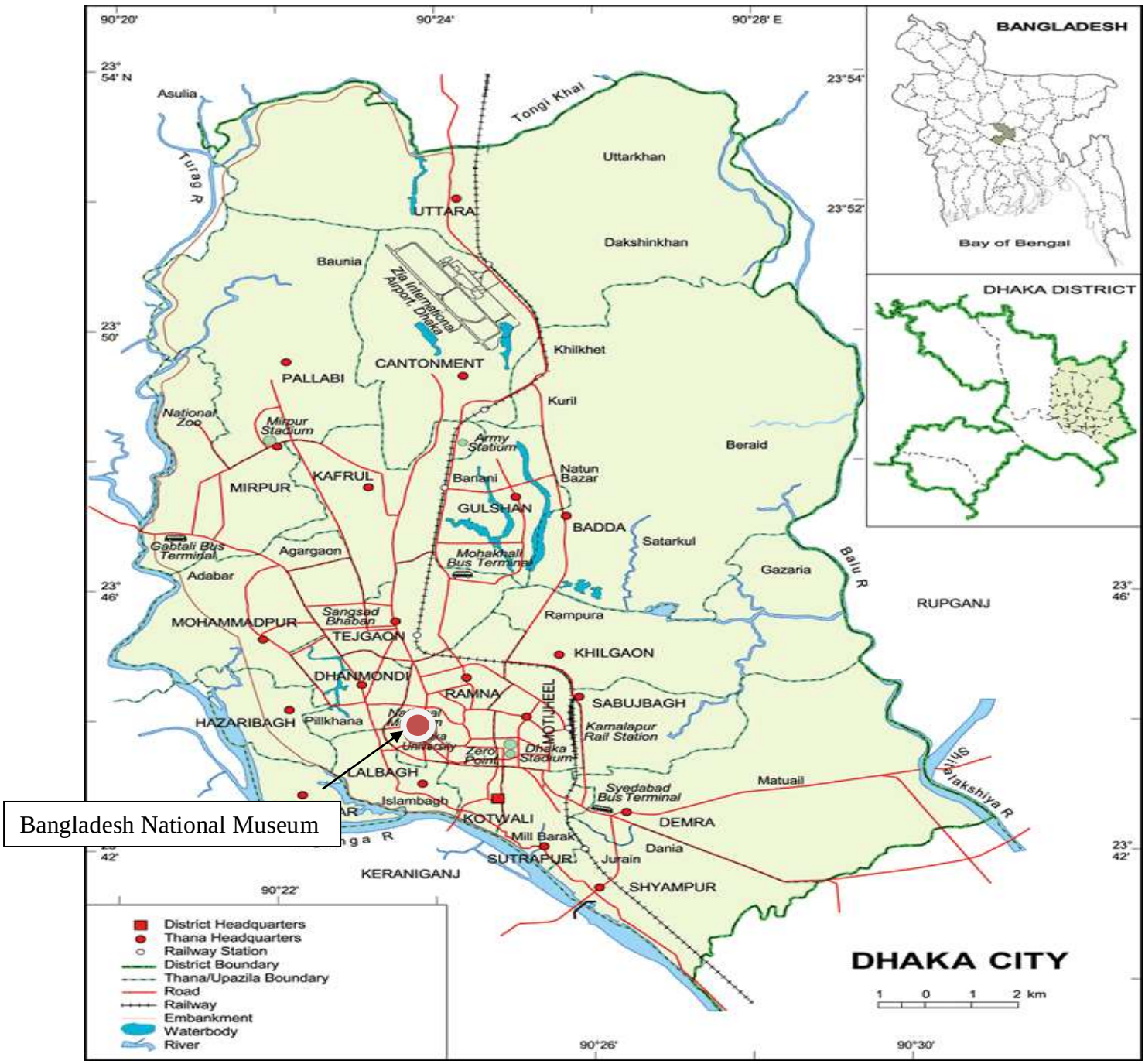

Figure 1. Dhaka city map contains Bangladesh National Museum.

3.1 Description and Condition:

Historical Context

The object was stored in the Bangladesh National Museum under Accession number 01.02.065.0000.00911. The object was red color Shawl. It was collected in Bangladesh National Museum in 1961 from Dinajpur.

Figure 2. picture showing the Shawl before conservation in Bangladesh National Museum.

3.2 Technical Investigation:

The object is very distinctive of its color and structure. It is an old Shawl for Bangladesh National Museum. The decoration is consisting of geometric shapes decoration and overlapping together with undyed linen yarn which was embroidered with stem stitch above the red waved Shawl. The length of this object is 515cm and width of this object is 111cm.

3.4 Visual Investigation:

The initial visual examination showed the object suffered from many signs of damage (fig: 03.) such as many separated parts, missing area, missing weft threads, separated threads, discoloration of many parts of the red Shawl.

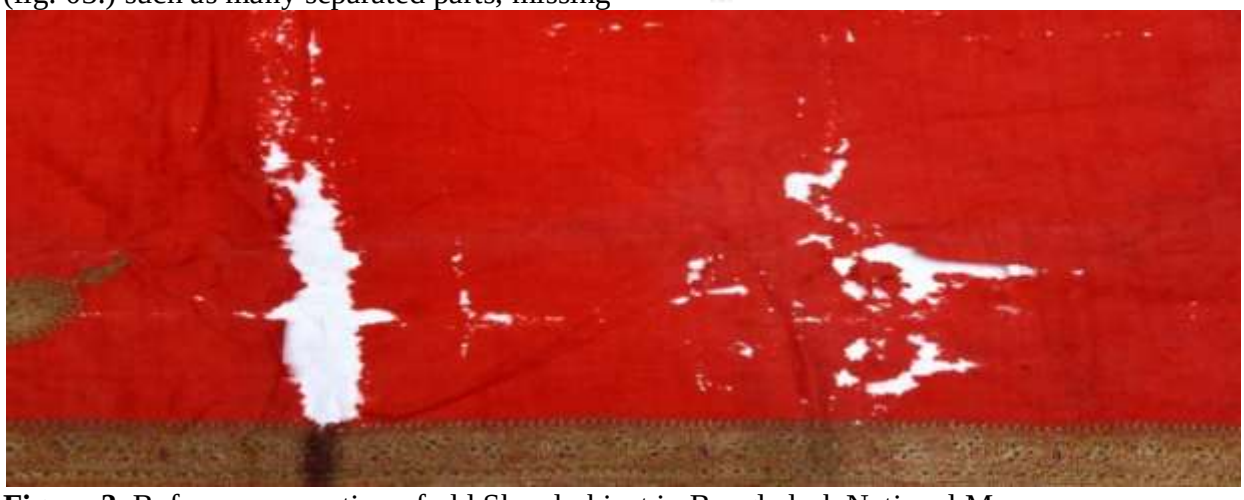

Figure 3. Before conservation of old Shawl object in Bangladesh National Museum.

Figure 4. Before conservation of old Shawl object in Bangladesh National Museum.

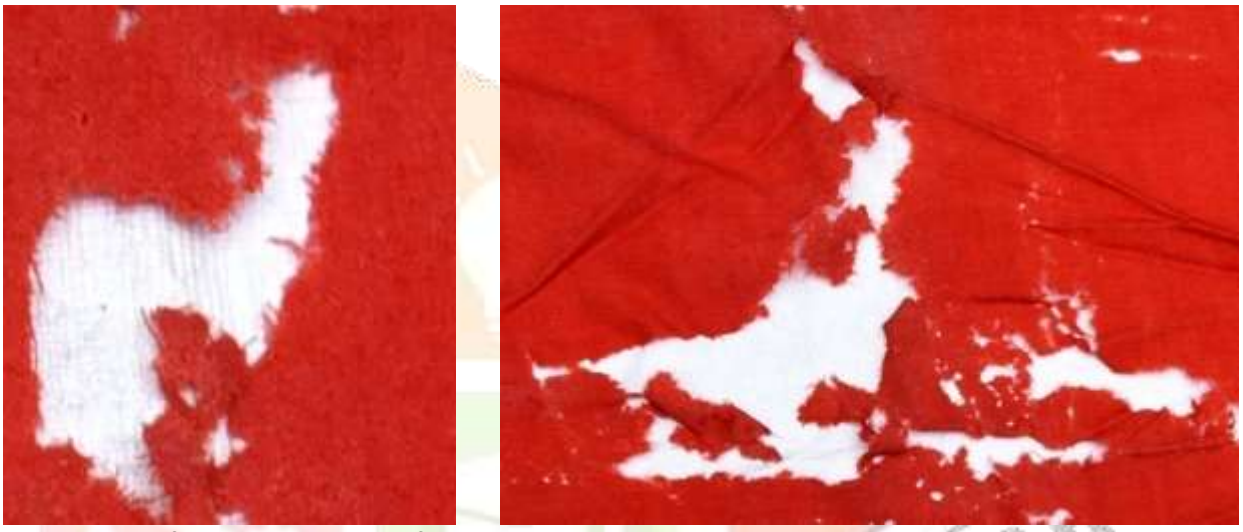

Figure 5. Before conservation of old Shawl object in Bangladesh National Museum

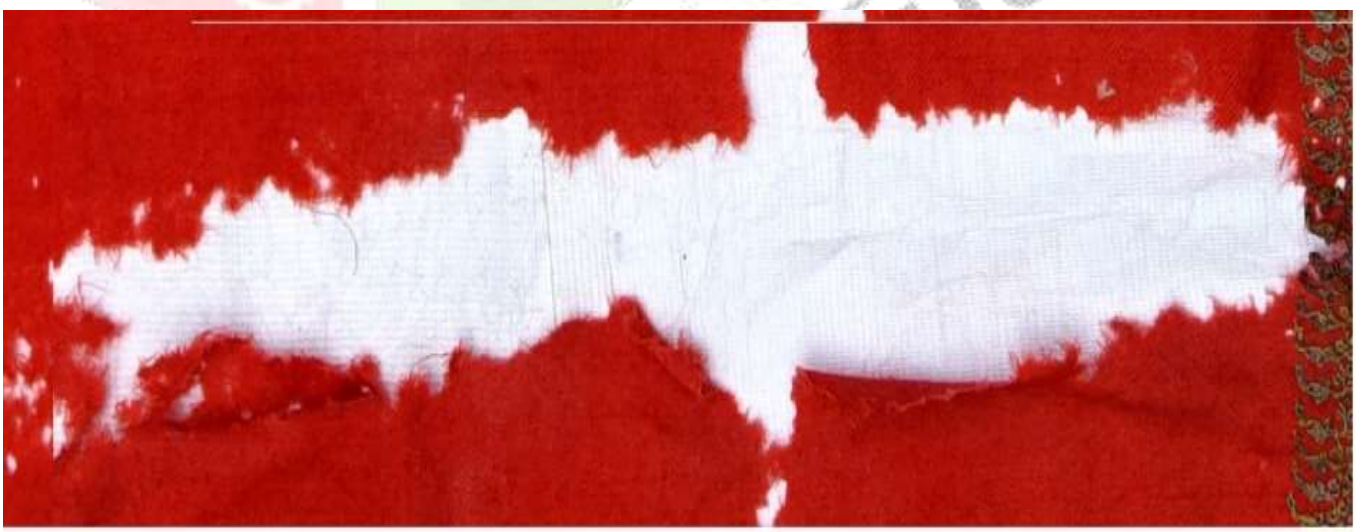

Figure 6. Before conservation of old Shawl object in Bangladesh National Museum

Figure 7. Before conservation of old Shawl object in Bangladesh National Museum.

Figure 8. Before conservation of old Shawl object in Bangladesh National Museum.

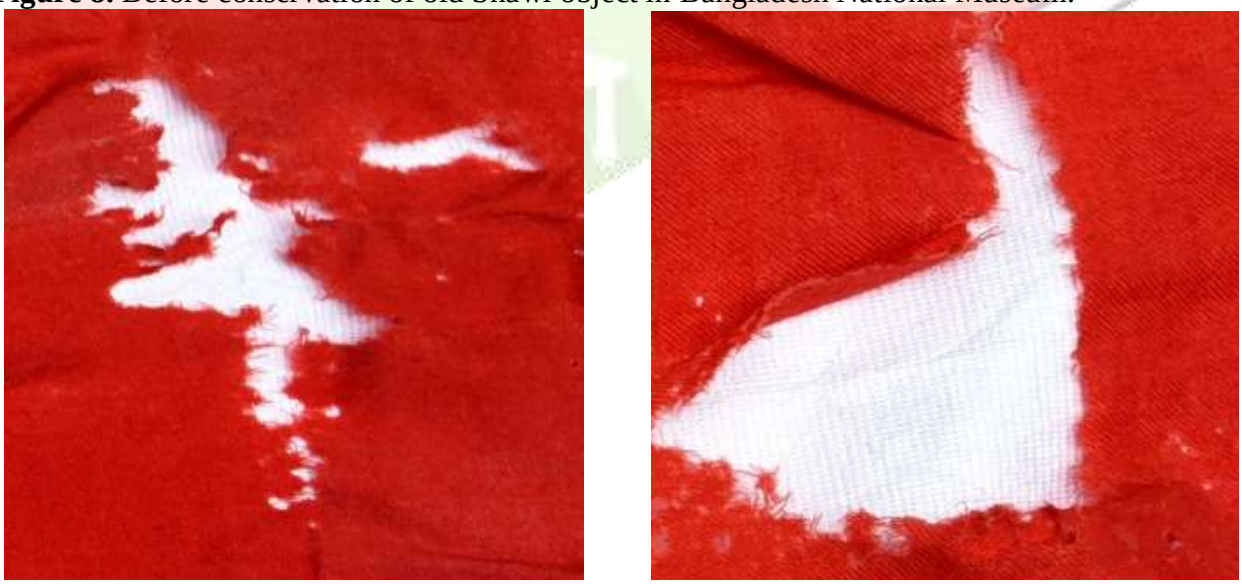

Figure 9. Before conservation of old Shawl object in Bangladesh National Museum

Figure **(01-09)** . Many seperated parts on the objects, Missing area, Missing weft threads, Seperated threads.

4. Materials and Methodology:

The samples were analyzed by force gauge machine model HSV-500, China and colorimeter machine model SM-245. Shawl samples from Bangladesh National Museum collected for this study. For conservation and preservation treatment commonly used are

summarized in below[16], [17],[18], [19], [20][16, 17, 18, 19, 20]

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Table 1. Analytical Methods for the old shawl Bangladesh National Museum using different methods.

Name of process	Using of Chemical/solvent/materials	Remarks
Cleaning	Soft brush	
Washing	De-ionized water	
Organic materials	Drying should be carried out in a warm, well-ventilated room, and may be facilitated by using a hot-air blower.	
Use of detergents.	These are of two kinds, ionic and non-ionic, the latter type being the safer for textiles.	
Dry-cleaning	anhydrous solvents (trichloroethane, dichloroethylene)	
Steam cleaning	Soft water like as Hydrogen peroxide	
Embroidered Textiles	Permanent supporting, After completion of the object treatment	
Strength of Shawl	force gauge machine model HSV-500	
Matching color	colorimeter machine model SM-245	

5. Results:

Old shawl in Bangladesh National Museum strength of yarn parameter for different yarns old Shawl is shown in **Table (2.1)**. Old shawl in Bangladesh National Museum at different yarns of Shawl parameters.

Table2.1. Strength of yarn for different colors of yarn of an old Shawl under the accession number 01.02.065.0000.00911.

Accession number	Color of yarn	Strength of yarn (N)	Maximum (N)	Minimum (N)	Mean (N)
	Blue	0.686466	1.470998	0.686466	0.947977 ± 0.025
		1.470998			
		0.882599			
		1.274865			
	Red	0.392266	0.588399	0.392266	0.457644 ± 0.015
		0.490333			
		0.588399			
		0.588399			
	Yellow	0.196133	0.392266	0.196133	0.261511 ± 0.012
		0.098067			
		0.2942			
		0.392266			

1kgf = 9.80665N , N = newton

Figure10. Showing the graphically Strength of yarn values of old Shawl accession number -911 (**Table no. 2.1**)

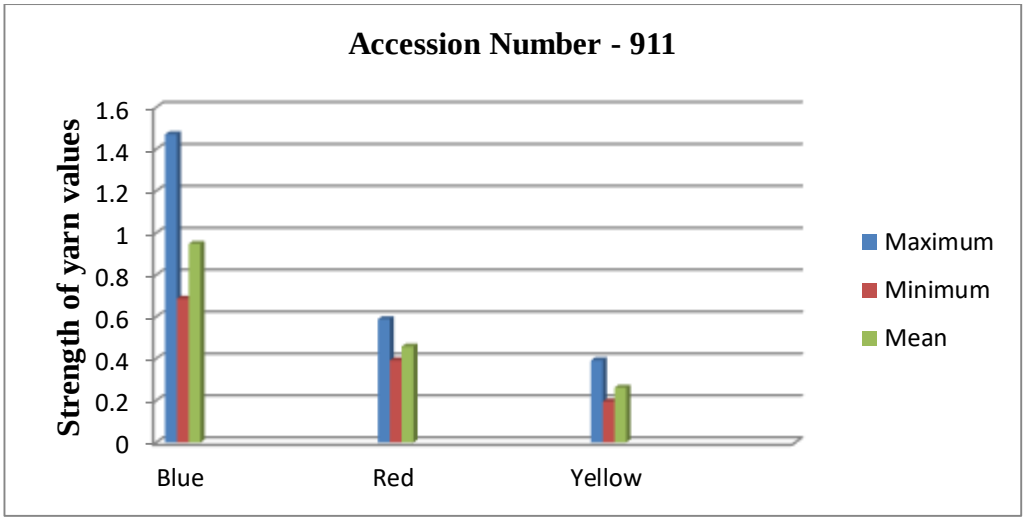

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Table 3.1. Comparison study of old Shawl accession number -911strength of yarn values with Blue, Red and Yellow colors Strength of yarn values.

Colors	Strength of yarn for present object (N)	New yarn (N)
Blue	0.947977 ± 0.025	8.65
Red	0.457644 ± 0.015	8.12
Yellow	0.261511 ± 0.012	7.65

N= newton

Figure 11. After conservation treatment of old object in Bangladesh National Museum.

6.1 Discussion:

Strength of yarn for different color of yarn old Shawl accession number 911 shows **Table (2.1).** Lowest value of Strength of a yarn (0.098067 N) was found for the accession number -911 and highest value of Strength of a yarn (1.470998 N) for the accession number -911.

6.3 Recommendations on Preventive conservation and disaster planning:

Since the first survey at a monastery or a museum, months or even years may pass until the realization of a conservation project. As the main deterioration factor for textiles he storage or display environment, it is essential to perform Preventive conservation and create a disaster plan for these collections as soon as possible. Selected cadre of conservators with their essential equipment travel to the place where the textiles collection is kept or displayed, and perform first –aid measurement. Particularly attention is paid to controlling the environment, the material in contract with the objects and pest controls.

The object suffers from fiber damage, many separated parts, missing area, missing weft threads, separated threads; discoloration of a part of the red weaved wool, inflexibility of some warp and weft threads and red of the lower part of the object. The object made stronger by supporting of other red color textile with lining by red color yarn. The object was analyses by using force gauge machine model HSV-500 and colorimeter machine model SM-245. The object surface is very weak and brittle. Due to the cleaning the shawl, the Shawl wasn't cleaned to avoid the increasing damage of weakened parts of whole object. For this reason supporting the Shawl made stronger by supporting of other red color textile with lining by red color yarn.

So it is very much necessary for more research for different Shawl object in Bangladesh national museum and increase people awareness about the effect and remedies of damage. Result from this study conservation and the management process of old shawl in Bangladesh National Museum shows that the accession number 01.02.065.0000.00911 object increasing the damaging percent day-by-day. This damages not only the Bangladesh National Museum but also whole nations of Bangladesh. For this reason, other Shawl in Bangladesh National Museum From present study it is found that the Shawl in Bangladesh National Museum becomes damaged from Light, Relative humidity, temperature and atmospheric pollution sources. To obtained acceptable evidence from this study, the following recommendation is to be taken into consideration

- Temperature and relative humidity under controlled. The ideal temperature for textile objects will be 15 ℃ to 25℃. It is very important that the museum staff should know how to manage the temperature inside.
- For textile objects the relative humidity should be in between 40% to 45%.
- For textile objects the Intensity of light up to 50 lux.
- Use of humidifier and dehumidifier is very important in the context of humidity. High humidity could also be minimized by the use of dehydrating agents like silica gel.
- To clean dust and dirt the best way is to use a vacuum cleaner it sucks the dust and cannot resettle on the surface
- Object store room and gallery must be welled ventilation.
- Avoid excessive heating of objects.
- Trolleys should be used to carry large no of organic objects.

Above all, the Bangladesh National Museum should make new legislation on saving the organic objects (shawl) and it should also take step to apply the law, because the damaged Shawl not only affects Bangladesh National Museum, but also endangers the whole organic object (textiles) in Bangladesh which is collected in different area.

6.2 Conclusions:

This practical study included conservation treatment and preservation of an old Shawl object of Bangladesh national museum. The object was stored in Bangladesh national museum, It is a red color shawl and length of this object is 515cm and width of this object is 111cm, it's had a decoration of geometric together with undyed linen yarn shapes decoration overlapping which was and embroidered with stem stitch above the red weaved wool.

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