

## POLYCHROME SCULPTURES OF ST. FRANCIS OF ASSISI CHURCH, OLD GOA: A CHALLENGE IN SCIENTIFIC CONSERVATION

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### *Abstract*

*The wooden polychrome sculptures of a saint from the church of St. Francis of Assisi were in multiple pieces. Insect activity was also noticed at some points of wooden polychrome. The broken pieces of polychrome figure was joined with copper nails followed by filling of the voids with teak wood saw dust mixed with Aralite Carpenter. Anti termite solution was injected in many parts of the polychrome figure to arrest the insect activity. Minimal colour re-integration was carried out at the joints. Finally the sculpture was chemically cleaned with the mixture of organic solvents such as Toluene, n-butane, 2-ethoxy ethanol. The wooden polychrome sculptures are in good state of preservation and has now been displayed in Goa churches. The environmental parameters were also studied and some precautionary measures to prevent the deterioration of wooden fabric by the relative humidity have also been recommended.*

**Keywords:** *Polychrome Sculpture; Anti termite solution; Colour re-integration; Environmental parameters.*

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### **Introduction**

The Churches and Convents at Velha (Old) Goa owe their existence to the Portuguese rule in this part of the western coast of India. The most comprehensive group of churches and cathedrals built during 16th to 17th century AD at Old Goa comprise of the following: Se' Cathedral, Church and Convent of St. Francis of Assisi, Chapel of St. Catherine, Basilica of Bom Jesus; Church of Lady of Rosary; Church of St. Augustine. The Chapel of St Catherine dating from 1510, the Church and Convent of Saint Francis of Assisi (which now houses the Archaeological Museum), and the Church of Bom Jesus where the mortal remains of St Francis Xavier rest, are some of the best in terms of design and style.

The Church of Goa was built by Portuguese in the Portuguese Viceroyalty of India in 1661. Polychrome wooden sculptures are unique artifacts in the church of St. Francis of Assisi that combine a wide range of artistic, technical and material expression. Given their composition, function, and its nature in physical and cultural contexts, altarpieces comprise a very distinct category of cultural heritage.

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Created to transmit a religious message and cherished by churchgoers, these objects of devotion are now seen to embody a multiplicity of values. Their artistic and historic values have long been acknowledged.

Conservation and restoration are necessary interventions to conserve and enhance the values of a cultural object and recover lapsed functions through the process. When defining a methodology for the intervention, one must “evaluate the alterations present, determining whether they consist of a simple patina or true disfigurements or destruction. This diagnosis must be based both on an objective knowledge of the evolution of the materials and upon an idea we form about their original appearance, which in turn rests upon experience of works of art in their material and aesthetic reality” [1, 2].

A regular inspection for insect attack is of paramount importance [3]. Restoration and stabilization of polychrome sculptures may range from the simple repair of a small crack or lost area of gilding to stabilization of a major joint, complete reupholstering, refinishing, or the design and manufacture of alternate structural supports [4-6].

Whatever the degree of intervention, the conservator increasingly seeks out materials and methodologies that both respect the original material and condition of the piece of furniture and ensure reversibility of the added materials [4, 7-10].

There is numerous numbers of the publications in conservation of polychrome sculptures [11-15].

### **Examination of Polychrome sculpture**

Any of the polychrome sculpture has to be thoroughly examined before its scientific conservation and a detailed examination report needs to be prepared.

The general information such as date, artist, culture and dimensions and identification marks of the sculptures were recorded. Then detailed photography was also carried out to study the condition of the polychrome sculptures. Visual as well as microscopic examination was carried out. The details of wood, texture, ground, hardware used in original polychromy was also studied. Temperature and relative humidity inside and outside of the church were recorded in the regular interval of once in four hours a day for the period of one week.

### ***Conservation issues***

The polychrome wooden sculptures/ relics on much the same techniques as panel paintings, therefore their conservation issues are often very similar to problems encountered with panel paintings. Over centuries, many wooden polychrome sculptures fell victim to unprofessional treatments such as primitive repairs, alterations, over-painting, and over-gilding or were simply stripped of their decoration to reveal the bare wood.

Polychrome sculptures, in addition to paint, very often contain gilding. Such complex, multilayered surfaces are extremely delicate and sensitive to many of the cleaning agents; therefore prior to any conservation treatment a comprehensive technical examination of wooden material, paint and gilded surfaces are necessary.

As wood takes up water from humidity, it swells. As it loses water, it will shrink, sometimes dramatically. Both actions induce considerable stresses on the structure of the wood, resulting in irreversible warping or complete splitting of the wood section. Additionally, the physical strain placed on the structure by continual expansion and contraction, weakens the wood or may cause further serious damage to wood already weakened by insect attack or age. When decorated with paint, wood will respond to heat and moisture with greater movement, destroying the bond between the wood and the less elastic paint and ground preparation, resulting in the painted decoration's flaking away from the surface.

The two polychrome sculptures before preservation and restoration interventions are shown in figure 1.

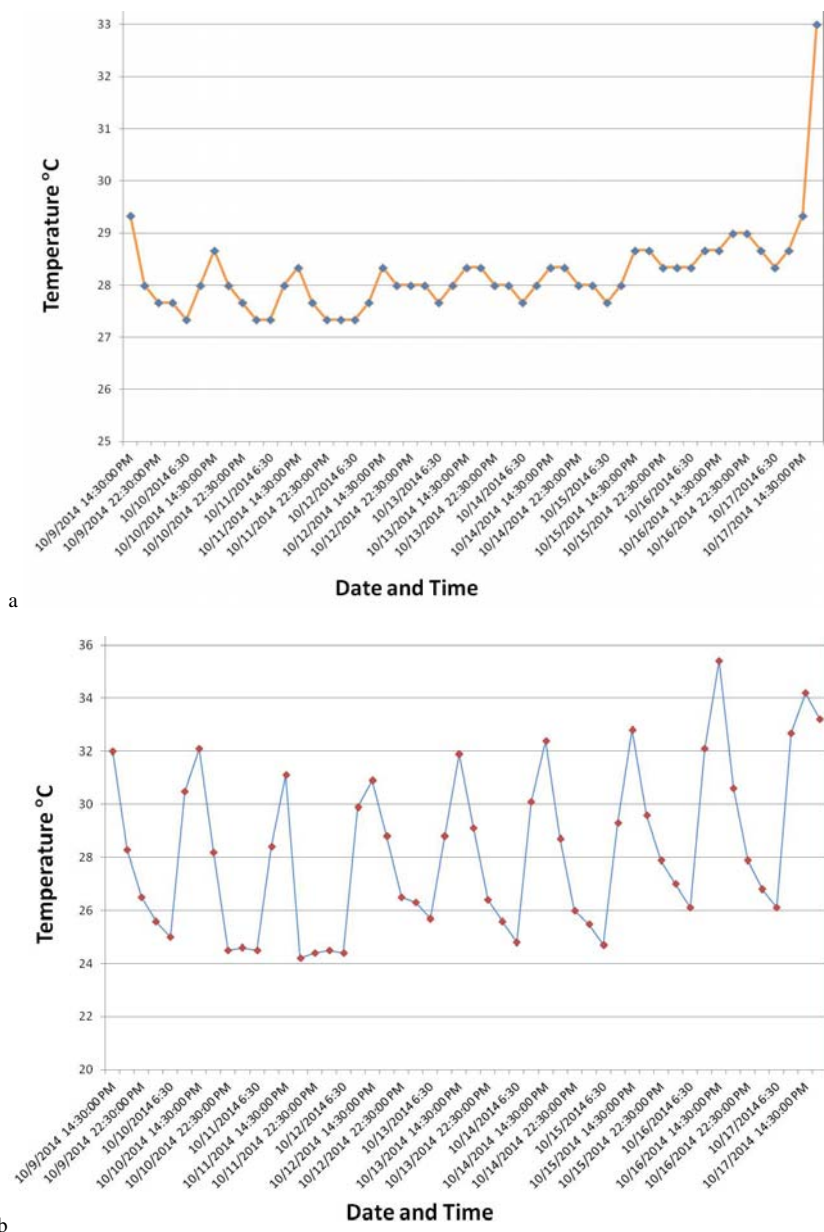


**Fig. 1.** The two polychrome sculptures before preservation and restoration interventions

The conservation problems further noticed to the polychrome sculptures are its breaking into multiple pieces. Insect activity was also noticed in some parts of the sculptures. Placing the sculpture in an open shrine with only roofing exposed to threatening environmental condition caused complete deterioration of its polychrome. Consecutive action of rain, with its high humidity led parching of the glue priming which resulted in its flaking and eventual loss, followed by cracking and degradation of the wood.

The condition of the sculpture testified to its exposure to long lasting humidity during the autumn and winter seasons alternating with the dehydrating influence of the sun during the summer months. The humidified wood swelled, and then contracted as it dried which caused cracking. This process, at first only concerning the external layers, in time penetrated deeper into the wood. Water which saturated the wood during the rainy season caused expanding in volume, and causing further cracking and delaminating. All the above mentioned processes have contributed to destruction of the sculpture. The humidity level of Goa also threatened the broken pieces of the wooden sculptures.

The temperature recorded inside St. Francis Church and outside the church is shown in Figure 2. From the figures it can be seen that the temperature range inside is 27°C to 29°C, which is almost 2 to 3°C lesser that of the outside temperature. The temperature may not be affecting the polychrome figures. The architecture of the church may be the reason for the difference in inside and outside temperature.

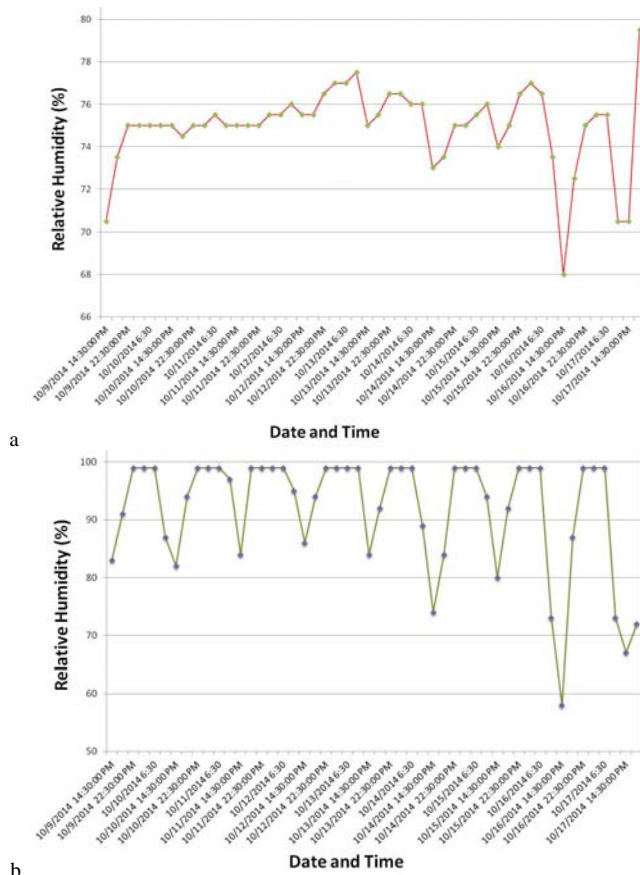


**Fig. 2.** Temperature data recorded of St. Francis of Assisi Church, Goa: a – inside, b - outside

Figure 3 shows the relative humidity recorded inside St. Francis Church and outside the church respectively.

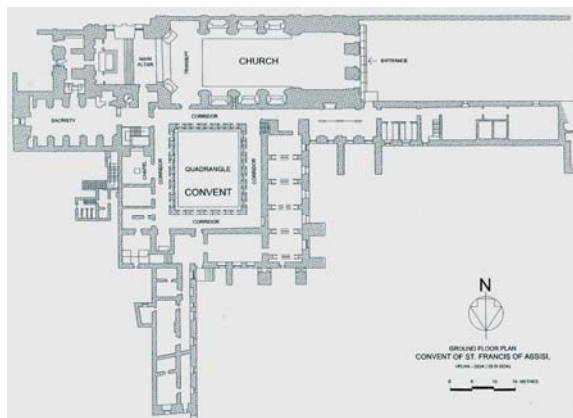
The humidity recorded outside the church is in the range of 80 to 100% where as inside in the range of 70 to 80%. The difference in inside and outside humidity is due to the architecture of the church by laterite stone blocks. Still, the inside relative humidity is so high that of the recommended value of 50 – 55 %.

The high humidity may be one of the factors for the deterioration of the wooden fabrics.



**Fig. 3.** Relative humidity data recorded of St. Francis of Assisi Church, Goa:  
a – inside, b - outside

The layout plan of the St. Francis of Assisi is shown in Figure 4. The Church is facing west and having three doors. The windows and the doors of the north side are permanently closed. So, it is recommended to fit exhauster fans in the three windows of the south side wall to control the humidity. All three main doors of west side have to be opened during day time for air flow. These are some measures to control the relative humidity level inside the church.



**Fig. 4.** Layout plans of St. Francis of Assisi Church, Goa

### *Conservation of Polychrome Sculptures*

The scientific conservation of polychrome sculptures was carried out as follows.

At first, the broken pieces of polychrome figure were joined by mending process with copper nails (Fig. 5) by exactly matching its proper adherence placement. Subsequently, filling of the voids with teak wood saw dust mixed with Araldite carpenter was carried out. As some of the pieces were very delicate, the work was carried out with taking most care. Anti termite solution was injected using syringes in many parts of the polychrome figure to arrest further insect activity.



**Fig. 5.** Polychrome sculpture during scientific conservation

Then the sculptures were allowed to dry for some days in shadow. The condition of the sculptures was monitored at regular intervals during drying. After confirming that there are no cracks in the joined area, the minimal colour re-integration was carried out at the joints by using acrylic colour in oil medium. Finally, the sculptures were chemically cleaned with the mixture of organic solvents such as ethanol, Toluene, n-butane, 2-ethoxy ethanol. The photographs for two sculptures after preservation and restoration interventions are shown in figure 6.



**Fig. 6.** The two polychrome sculptures after preservation and restoration interventions

## Conclusion

The temperature and relative humidity inside and outside the church was recorded and studied. The relative humidity level inside the church is higher than the recommended level of 50–55% that may be the one of the factors for the deterioration of the wood. The measures for controlling inside the church have also recommended.

As the work was very delicate, utmost care was taken to execute the scientific conservation of the polychrome sculptures. The wooden polychrome sculptures are in good state of preservation and has now been displayed in Goa churches.

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