



## Conservation Problems Remedial Measures of Lord Jagannath Temple, Puri - An over view

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The state of Orissa is a great repository of art and architecture. These historical edifices or cultural wealth have hoary antiquity datable from 3rd century B.C. to 16th/17th century A.D. Since these monuments are diverse in nature, the conservation problems too vary from one to the other.

One of such outstanding monuments of Orissa is the Jagannath Temple, Puri (19°56'.30"-85°59') is located near the sea shore. The stupendous Vaishnava Temple is dedicated to the trinity viz, Jagannath, Balabhadra and Devi Subhadra. But popularly it is known as Jagannath Temple. The Temple was constructed probably by Ananta Varman Chodaganga Deva, the illustrious king of the Ganga Dynasty in 12th century A.D. Presently, this temple is a centrally protected monument under Archeological Survey of India, Bhubaneswar Circle, since 1975 who is responsible for its upkeep, maintainance and preservation etc.

The edifice is not only the grandest but also a soaring surviving shrine of Orissa (Approx. 66m). This gigantic structure along with other subsidiary shrines were covered with coats of heavy lime plaster many times, thereby obscured the beauty of pristine carvings of the monument. This heavy plastering applied to the monument with the purpose to protect from saline breeze or salt-laden wind of the sea, served the purpose no

more and caused the condition of the monuments precarious ; this had made the structures vulnerable to damage. The plaster of lime coat had become spongy and porous, that it developed the profuse leakage, The Temple complex being in the proximity of sea, had suffered extensive erosion and corrosion. Co-mingled with these factors, lime plaster applied over the structures over the years has lost its inherent strength and during the rainy season water penetration became more to the entire fabric of the structure. This wet condition had accelerated the rusting of iron clamps and dowels & increased their volumes thus resulted in cracks and structural damage to the stones. Monuments in one part of the structure may have also affected the other integrated parts of the structure, gradually created tension through out. The pressure exerted by the heavy weight of lime plaster has added to the structural damage & weakened the stone underneath.

In addition to these, it may be reiterated with other deleterious factors that the monument being in the proximity of sea and almost in the heavy rain fall zone, (Orissa coast), the monument is susceptible to heavy penetration of rain water into its body fabric.

As observed from the study, perhaps the most ingenious and least understood form of decay in stone is that caused by the migration and



crystallization of soluble salts. The progression of salt migration depends on the cycles of wet and dry phases. Since the Temple had been covered with plaster many years after construction, the salt-encrusted stones had not been removed before plastering and subsequently the applied coat of lime plaster itself might have been contaminated with salt. Thus the double action of salt on stone as well as on plaster continued to migrate as long as moisture is present. Accordingly, the salt themselves, change the chemical balance of stone they inhabit by absorbing moisture and accelerated the decay of the structure.

So with a view to examine the weakness and consolidation of the shrines of the monumental complex, an expert committee was constituted under the Chairmanship of Sri M.N. Deshpande, the-then Director General, Archeological Survey India in 1973. Subsequently, Archeological Survey of India undertook its conservation in 1975 with the main objective to strengthen and consolidate the grandest edifice by adopting conservation measures as per archeological norms and to remove the unnecessary huge load of dead plaster which is no larger serving its purpose for which it was intended. The deplastering and simultaneous conservation work which started from 1975 ended in 1992. Thickness of the lime plaster over the sanctum sanctorum was maximum 45 cms. The same coat of lime plaster was also applied to other subsidiary shrines of the complex. Other important shrines having the plaster were Lakshmi Temple, Narasimha Temple, Surya Temple, Vimala Temple, Ganesha Temple etc. Apart from the deplastering of the main sanctum of

Jagannath Temple, the shrines mentioned above were prioritised for deplastering and subsequent consolidation one after another. The removal of plaster was carried out by the traditional method of breaking the plaster from the wall with the help of chisel and wooden hammer. Further to protect the architectural beauty and fine carvings due precautions were taken. Before reaching very close to the stone surface, hammering was stopped and the rest of the plaster was removed by hard pressure by the chisel.

The deplastered surface of Jagannath Temple has brought to light rich sculptural and architectural wealth as those of other temples of Kalingan order. Most noteworthy discovery has been the 24 forms of Vishnu carved on either side of pilasters of the Parsva devatas shrines being represented standing on lotuses each with 4 arms equipped with attributes viz. Sankha (Conch), Chakra (Disc), Gada (Mace) and Padma (Lotus).

Side by side with the deplastering and conservation of Jagannath Temple, similar operations were undertaken in Narasimha, Surya, Ganesha and Vimala temples in the complex.

The conservation measures after removal of lime plaster were carried out in 2 stages (i) Structural Conservation and (ii) Chemical preservation.

**(i) Structural Conservation :-** The techniques involved in structural conservation start from resetting of the old stones by means of proper documentation of large stone members. The small architectural pieces were reset using cement, lime and sand mortar in the ratio of 1:1:3. To reset the bigger ones, non-corroding stainless steel dowels/clamps



were used. Finally the consolidation of core masonry was done with epoxy mortar and all cracks were stitched thereby. Renewal of the missing and wornout stones were done by obtaining new khondalite stone from Tapang quarry. They were cut, dressed and finished into shape to be fixed properly in place. Epoxy resin was used in the resetting process of stone members. Again replacement of deteriorated portion of stone were done, while its architectural originality was maintained as far as possible. The old rusted iron dowels/clamps responsible for cracks and damage to the stone members were replaced by stainless dowels wherever possible.

Hard grouting, gravity grouting as per requirement, were executed in order to fill the vertical cracks and voids with a mixture of Portland cement and water. After that pointing with epoxy putty was followed. Corbelled were to be anchored with stainless steel rods by drilling 1.5 to 2 metre holes and sealing with epoxy pointing. To arrest further falling of corbell stones in garbhagriha, it was decided to provide a second line of defence by resting a stainless steel truss or space frame below the corbells.

**(ii) Chemical preservation :-** After removal of lime plaster, the exposed surface had mainly hardened lime accretion. The lime accretions were removed by 2% dilute acetic acid followed by careful paper pulp treatment for desalination on stones. In order to prevent biological growth on the stone surface 2% zinc silica fluoride solution was applied. Again with the recommendation of expert committee, one coat of 2% methyl Methacrylate solution in toluene to slow down the weathering of exposed stone

surface was also applied which would have a life of at least one decade.

To sum up, the responsibility of the Archeological survey of India is not over, it has been closely maintaining as well as executing conservation works of Lord Jagannath Temple as and when required. The works of conservation is on going since some of the problems are perpetual in nature.



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