



A Review Paper on “Conservation and reinforcement of Age Long monuments”

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Abstract: -

India is a country of cultures and heritage. Culture of India is defined as a system or the ways the Indian people live their livelihood. Life style, languages and cultural activities of the people living here in India differs from place to place. In the recent years Indian religions, philosophy and cuisine have found an impressive impact across the world. Here various empires have ruled for long years and have left their cultures and monuments which they built at the time of their ruling period. These monuments are also the great example of Indian heritage and art. One can easily visualize the real art from the paintings and writings imposed on the walls and columns of these monuments. In India Archaeological survey of India is central government body looking after these monuments for the maintenance and conservation. It is very essential to conserve these age long monuments to maintain them in good shape as they are very much affected by various climatic conditions. So in this review paper a study of various literatures of different monuments is done to come up with the scope of work to conserve the monuments with the advance and modern techniques which are environment friendly and at the same time are also pollution free.



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Introduction: -

The history of archaeology in India started in the early sixteenth century and this history involves three groups of people, namely Portuguese residents of Goa, European sailors and occasional travellers. Principally, two categories of monuments are coped with during this phase: the rock-cut caves of west India and the south Indian temples. The formal beginning of Indian archaeology started in middle of the eighteenth century, when academic interest in the Indian antiquities began.

In India each state has its own tourism and archaeological department which looks after the monuments and tourism promotional activities. The monuments present in India are a great source of income to the country as they attract foreign peoples and domestic peoples to visit and see the culture of India. Most of the foreigners visit India to study the culture and heritage of India. In India Archaeological survey of India is a government body which looks after the preservation of monuments present in state region. Some of the monuments in India are under continuous deteriorating stage which requires maintenance and preservation.

India has a rich culture and heritage which constitutes as repository in archaeological treasures and incredible monuments. This cultural history belonging to India has witnessed of



heritage monuments stem and root from an ancient past of unique civilization. The TajMahal, Agra Fort and the Konark Sun Temple, Fatehpur Sikri in Agra, Mahabalipuram Monuments, Khajuraho Temples, Thanjavur, as well as the caves of Elephanta, Ellora and Ajanta are some of the monuments which are officially declared as World Heritage Monuments. This monument enables us to be the part of ancient history by going through their literatures and creativity they have with them. An architectural monument demonstrates the culture and heritage of the nation which belongs to it from the past years making us uniquely different from the other countries of the world. In this various techniques and methods were studied which were used in the past times for the conservation of monument. Here for the study and reference Malik Mughith Mosques is considered which is also in the deteriorating stage and requires maintenance and conservation. So for the conservation of Malik Mughith Mosques study of modern techniques which are environment friendly and pollution free is done.

Literature Review: -

“Conservation is the action taken to prevent decay. It embraces all acts that prolong the life of our cultural and natural heritage, the object being to present to those who use and look at historic buildings with wonder the artistic and human messages that such buildings possess. The Minimum effective action is always the best; if possible, the action should be reversible and not prejudice possible future interventions” (Fielden 1982).

Lal (1985)[1] studied the weathering of some stone monuments in basalt, tuff, khondalite and granite by determining the leaching index and suggested that chemical weathering takes place due to colonisation of feldspars, limonitisation of garnets and desilicification of silicates as well as alkalis followed by accumulation of sesqui-oxides. The conservation status of the TajMahal, one of the World Heritage monuments in India, has been the subject of several studies. Studies were conducted to examine the deterioration of the TajMahal marble because of air pollution and subsequently a number of steps were taken to reduce the pollution around the TajMahal (Agarwal 1986; Agarwal et al 1988). The decay of the TajMahal due to pollution has not been found true but the study has acted as a catalyst to raise the issue of the deterioration of cultural heritages on account of air pollution.

Agarwal (1986)[2] studied the deterioration of marble used in the Victoria Memorial, Kolkata. He reported that the corrosion of copper iron clamps is responsible for the presence of green and reddish – brown patches over the marble and its consequent decay. The discoloration of the TajMahal marble was studied by Agarwal and co-workers (1987) who observed the presence of calcium oxalate in the crust. Sharma (1993, 1996) studied the discoloration of the TajMahal marble and concluded that a patina of oxalic acid over marble is protective in nature and the metasomatic action of ammonium oxalate on marble surfaces could help in stopping further dissolution of eroded surfaces.

Tandon (1989)[3] analysed weathered and un-weathered stone samples from the Khajuraho temples. He also measured metrological parameters and studied the biological growths found



on the stone surface and observed that the acids produced by lichens were the reasons for the bio deterioration of the stones used in these temples.

Jain et al (1989)[4] studied the effects of biogenic acids on marble, sandstone, khondalite and coral stones, and concluded that calcareous stones are more susceptible to damage by biogenic acids and the damage is also directly proportionate to the available surface area. Over the years, the use of synthetic polymers has increased globally for the conservation of stone. Varieties of these polymers are available in India and have been used for different purposes like consolidation and water repellency.

Based on laboratory studies, **Singh et al (1995)[5]** concluded that organo-silanes gave a better account of themselves as consolidants for khondalite stone among a group of polymers used in the study. In India, the application of lime wash on stone surfaces as a protective layer is followed as a regular practice.

Kamalakar and SreelathaRao (1996)[6] suggested that the ritual of applying lime wash on the granite walls of temples resulted in their deterioration through the formation of gypsum leading ultimately to pitting of surface. The gypsum content increases in the rock and the crystal growth permeates into the depths of the stone due to its porous nature. The susceptibility of increased sulphate is the very factor which causes the widening of pores. The water gets into the stone and causes the transportation of gypsum back to the surface, from where it is washed away. When lime wash is applied afresh, a new chain of reactions commences, causing the widening of an already widened pore; so, it can be concluded that the hydration and dehydration of gypsum with temperature and moisture, causes the decay of the stone surface in the long run. The presence of gypsum in large quantities gives rise to significantly increased surface areas, modifying the pore system of the granite.

Mishra et al (1991)[7] made a study on the micro and macro organisms responsible for stone deterioration and described the various steps involved in the identification of the bio-deteriogens. They generally concluded that in order to combat the threat posed by the bio-deteriogens, it is important to carry out regular surveys for qualitative and quantitative data for each monument at regular intervals and the changes in the eco-system should be recorded which may help in the eradication of biological growth from the monuments.

Agarwal (1991)[8] studied the different materials used in the construction of the Victoria Memorial, Kolkata. Detailed petrographic and x-ray analyses were carried out on the stone and encrustations. This monument is made of brick and clad with white marble. The petrographic report confirms that no weathering had taken place on the marble but the encrustation on the marble is only the thin superficial deposition on the surface. The chemical analysis gives the high value of lead in superficial disposition and is considered to be derived from the atmosphere and leads to a slight discolouration of marble.

Sharma et al (1997)[10] reported that the conservation problems faced by three world heritage monuments, viz., the Sun temple, Konark, the Kandariya temple and the TajMahal mausoleum were the result of building design and functional environment. They conclude in general that the conservation problems of these monuments arose mainly because of the



ingression of water and suggested measures to arrest the ingress of water to solve the problems.

Bhargava et al (1997)[11] carried out petrology, x-ray diffraction and chemical analyses of stone samples from monuments at Bhuvaneswar and compared the results with quarry samples. They observed that the sandstone used in the monuments is fine to medium grained. The sandstone had undergone physical and chemical weathering. It was observed that there was no correlation between the age of the monument and the degree of weathering.

Kasturba (2006)[12] had done a comprehensive investigation for laterite samples from four different quarries of the Malabar region, Kerala, India. An extensive study on physical, chemical and mechanical properties of laterite was conducted. Weathering studies done by in situation investigation, laboratory tests in simulated conditions, field exposure trials in selected natural environments and sheltered exposures were carried out to understand the weathering mechanisms of laterite blocks. The results of the study reveal that properties of laterite are dependent on the location of the quarries and the depth within the quarry. The strength and durability of laterite depends on the relative proportions of iron and clay in the laterite and on the distribution of the iron rich components within the structure of laterite. The primary cause of damage in real life situations is the occurrence of dampness and any treatment that prevents the ingress of moisture into laterite helps in prolonging the life of laterite monuments.

Conclusion: -

From the above literature study various methods and techniques were studied to conserve the Monuments in an environment friendly and pollution free way. Various techniques studies can be the part in conservation of Malik Mughith Mosque. Further Modern techniques can also be studied and with the help of structural studies Malik Mughith Mosque can be conserved and cultural heritage monument of Mandu can be preserved.

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