

Ajanta caves: Deterioration and Conservation Problems (A Case Study)

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Abstract- Since millennia India has been the land of Cultural tradition and religious value, which spreads rich and varied cultural heritage. This heritage have scattered all over the India in the form of Archaeological Monuments and sites of various type like Temples, Mosques, Churches, Monasteries, Stupas, Step Wells, Megalithic Pillars, Kos Minar, Mausoleums, Forts and Fortification, Tombs and ancient sites belonging to Pre-historic, historical and Medieval period. Among all these monuments Ajanta caves (which are located in Maharashtra state) are one of the most significant examples of Buddhist site and has been the proud of our cultural history related to 2 century B.C. to 4 century A.D. Not only its structure, painting, carving, stone work, sculptures are peculiar but also its paintings which are related to Buddhist are the most authentic example of our Buddhist Indian History. They have its own identity which told the story of its magnificent past. Yet Ajanta caves are in deterioration process but there are so many conservation work is being conducted by chemical branch of Archaeological Survey of India which are very laudable. So the main aspect of my paper is to throw some light on deterioration and conservation problems related to Ajanta caves.

Index Terms- Peculiar location of Ajanta cave and its History, Paintings of Ajanta caves, Structural work of Ajanta, Conservation work of Ajanta.

I. INTRODUCTION

Heritage presents the prominence culture of any country. They reflect the individuality of any monument. Among all those, Ajanta caves are one of them, which indicate history of 2 B.C. to 4 A.D. These caves were made during VAKATAKAS period and are related with Buddhist religion. These caves are built in basalt stone of Western Ghats. Ajanta caves tucks a lot of peculiarity in it like structural and sculpture, and painting related to Buddha, Bodhisattva, Buddhist deities and specially Jataka stories which are related to Buddha's birth. From a long time these caves were negligible Heritage of our Country before in 1819 AD it has been discovered by John Smith (Officer of British battalion). At that time condition of Ajanta caves were very wretched after which a lots of work have been done to conserve these cave but most prominent work have been done by Archaeological survey of India after Independence which is very laudable. So in this case study paper I would like to discuss some aspects of deterioration and conservation problems related to Ajanta caves.

The main theme of my paper is:

- Abstract
- Introduction
- Peculiar location of Ajanta caves
- Deterioration causes of caves
- Conservation work related to cave
- Conclusions

II. PECULIAR LOCATION OF AJANTA CAVES

The Ajanta caves are located about 8 to 10 km of Faradapur town about 110 km of Aurangabad district of Maharashtra. The caves have been carved on the vertical and conclave slopes of the basalt plateau of Deccan trap which is one of the great volcanic formations, known in Indian geology. The term trap is a vague general term which denotes many igneous rocks of widely different nature but here it is used not in that sense but in Swedish meaning of stairs or steps like aspect of the weathered flat topped hills of basalt which are common features in the scenery of Deccan. Ajanta caves are the series of 29 cave related with Buddhist. It was carved in 2 century B.C. out of horseshoe shaped cliff along with Waghora River which streamed directly to caves. The Ajanta caves are situated at the head of one of the Ghats that lead down from the Indhyadri Hills, dividing the tableland of the Deccan Trap in the Tapi Valley.

III. DETERIORATION CAUSES OF CAVES

The survey of environment conditions around these caves brought into light different kind of deteriorations. Since the caves are located in the valley, the calamities of this area is reported to be arid or semiarid having little climatic fluctuations.

Biological effects

Roots of vegetation growth such as trees, weeds, bushes, cause disruption to the rock, but fortunately in this case the vegetation growth of plants is not very deep except the shallow root which too because of the nature of rock having less deposit of soil.

Micro organism

The insect activities in this caves is one of the most effecting process, as the several of these bacteria draw the energy which is necessary for this vital activities, from inorganic chemical reactions of reduction or oxidation that they have ability to produce, such reactions results in humid condition. Most algae need the energy of light to carry out their living

function, so in these caves they have been developed on the illuminated surfaces. The excreta of bats infesting the caves have stained the rock tremendously.

Physical

The presence of Chlorophate in basalt rock has the tendency to absorb moisture in humid condition. In summer, thin scales developed on the rock surface and thus have disfigured the carving and sculpture. This is found more pronounced on the facade of the rock. In some other caves, in the past, the seepage of water has been noticed from the top of the rock to the inner region which has been clogged now as a result of conservation measures taken.

Geological factors (Inherent Weaknesses)

The massive amygdaloidal and vesicular basalt of about 10-20 meters thick deposit have been laid with a layer of fine and course grained basalt of dark, grey color and is jointed. It is seen that more weathering has taken place in vertical joint resulting separation or flecking from the body of the main rock whereas the horizontal planes shows no sign of weathering.

Temperature variation

On test performed on this stone, it has been noticed that if salt are present, temperature and moisture change can initiate disruptive forces associated with the crystallization and hydration of the salts. These changes can also set up different sheer stresses in the stone which cause a breakdown of weathered material close to the surface of masonry.

Deterioration of paintings

From the fragments of the remains of the painting, it is observed that all caves at Ajanta were originally adorned with painting of tempera technique. These painting were executed over mud mortar plaster laid in two layers. The first one is ground layer is of ferruginous earth and second one is on a clay strengthened with cow dung and rice husk overlaid with a thin coat of fine clay. This was further smoothed and covered with a coating of grounded colors mixed with binding material on which the design were then drawn and painted. The paintings have been smoked and covered with dust dirt and insect nests. The flaking and peeling of painted surface is common. There is damage due to human vandalism like scratches and greasiness on the painting. The insect activities which is more pronounced has created the hole and weakened the caves and the presence of organic matters admixed with the mud plaster has proved to be a good breeding place for insects. The bats are the other form of nuisance in these caves as their excreta has not only disfigured the painting but the surface of the rock also.

Conservation work related to caves

A lot of conservation works have been done by chemical branch of Archaeological Survey of India and some conservation activities are still in process.

Conservation Measure of Painting:

The studies are being made to monitor the relative humidity and maximum minimum temperature. The studies so far indicated that there is not much of fluctuation in the temperature

and it varies generally between 20 deg to 28 deg whereas there is a great change in relative humidity and the humid condition have given rise to the insect activity and microbiological growth.

The works being attended are spraying of insecticides and repellants, consolidation of weak and loose plaster, fixing of bulging and filleting and chemical treatment for the removal of superficial accretions and removing old preservative coat followed by applications of fresh/preservative coat and to make the color look bright and details more visible which is a continuous process being carried out every year.

General Conservation Measures:

These rock cut caves though no doubt are achievements but they counteract no trust. Thus on the whole no structural ability is required except the knowledge of geology of the rock of which the caves are hewn. Some of the portions of facade have fallen. The columns which gave away leaving the basis as indication for the pillars, have to be restored by the reinforced cement concrete work in order to support the decayed hanging porting and to maintain the aesthetic harmony and the unity of structure so that the replaced ones integrate harmoniously with the adjacent rock. It becomes essential to adopt artificial means of toning and staining the new work while the shaping of molded architecture, cornices, broken corners, broken parts of the facade, pillars and beams. To drain out water from top of the caves the concealed drain and drip courses were provided, the trees roots were uprooted and poisoned and the opened joints and crakes were consolidated by grouting. The preservative coat to the stone surface was applied after chemical cleaning. Being a continuous process, this work is continued to be attended.

Conservation of Rock

To conserve rock following factors to be kept in mind:

1. The weathered stone surface should be treated for restoration with a similar or chemically related material.
2. The restoration material must be able to react chemically with the original rock surface, but also with weathering products being above and within the surface, only a chemically bond ensure longevity, however it is too kept in mind that total elimination and cleaning of weathering product is impossible.
3. The restoration materials have the same or smaller modulus of elasticity than the material being restored. It should also have the capacity to penetrate into the pores of the natural stone. The diffusion resistance of the restoration material must be extremely low against water.
4. To check the erosion, it is necessary to grow the type of plants over the bare rock which will not only check the ingress of water into the cave but will also give protection against heat, cold, rain, wind, pests, etc. and shall also maintain the ecology of the area.

IV. CONCLUSION

In nutshell, the heritage is the mirror of any culture and it reflects the story of its past, but it is our responsibility to conserve it. It is also very true that conserving monument is not

an easy task because we have to first identify that what is the quality of the monument, its architecture, various material used for construction and causes of its deterioration. Only then we have to think on how we can conserve it. So all these aspects are very important not only to know but are also for perseverance of these Monuments. The chemical branch of Archaeological Survey of India is doing an incredible work to conserve and preserve Ajanta cave.

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