STATE PARTY'S REPORT ON THE STATE OF CONSERVATION OF HISTORICAL MONUMENTS AT MAKLI, THATTA (PAKISTAN) (C-143)

Due to its Outstanding Universal Value, the Historical monuments at Makli, Thatta, Pakistan was inscribed on the World Heritage List of UNESCO under criterion iii during 5th Session of the World Heritage Committee meeting held in 1981 (C 143).

Historical Monuments at Makli situated at a distance of 100 km from Karachi in Thatta District of Sindh province of Pakistan. It contains millions of graves and numerous standing monuments from a range of 14th to 18th centuries. The vast necropolis of Makli is among the largest in the world. Kings, queens, governors, saints, scholars, and philosophers are buried here in brick, or stone monuments, some of which are sumptuously adorned with glazed tiles. Among the outstanding monuments build by stone are the mausoleums of Jam Nizamuddin, who regained from 1461 to 1509, and of Isa Khan Takhan II and his father, Jan Baba, both of whose tombs were build before 1644. The most colourful is that that of Deewan Shurfa Khan (died 1638). The distinctive assemblage of enormous presents an inspiring order of monumental buildings in various architectural styles.

The management control of Historical Monuments at Makli Hill has been taken over by the Culture, Tourism & Antiquities Department, Government of Sindh from the Federal Department of Archaeology and Museums in 2011.

STATE OF CONSERVATION OF THE MONUMENTS

The overall condition and state of conservation of the monuments were not satisfactory. Due to ravages of time and nature it sustained many structural problems which are narrated as below:

(a) GENERAL PROBLEMS EFFECTING THE MONUMENTS

The monuments at Makli, located on the brow of the hill, are exposed to many hazards, both natural as well as man mad.

The agencies of decay active on this site have generated problems ranging from general states of disrepair to conditions verging on collapse. Brick structures are in

an advanced stage of decay and disintegration whilst many of the stone structures are in urgent need of repair and consolidation.

The situation concerning the uncovered graves is exacerbated by their easy accessibility whereby damage ad loss by pilferage has assumed colossal proportions.

The ubiquitous symptoms of weathering, decay and deterioration in the masonry structures along with their causes and effects are summarized below:

- Cracking due to structural movements and settlements of large areas of some buildings.
- Cracking due to unequal settlement of elements poorly bonded to each other.
- Cracking due to poor detailing and construction such as thin stone facings to poor quality core filling.
- Spelling, splitting and lifting due to the volume increases resulting from embedded ferrous material.
- Staining, decay and open joints due to neglect of joint condition. The same neglected joints have become conduits for the free access if water and dust particles.
- Roughened surfaces on stone where washed and 'etched' by rain especially as a result of accelerated weathering out of weaker areas of pockets of soft sand or clay beds.
- Cracking, splitting and spelling of stone surfaces where normally sheltered from direct rain. This may be due to the formation of crystalline sulphate skins, which are prone to failure ultimately.
- 'Contour scaling' or uniform thickness scales separating from stones following the profile of the surface. This effect is normally associated with wetting and drying cycles, followed by migration of natural cementing matrices, exacerbated by the blocking of surface pores with materials deposited from the atmosphere.
- Scaling and powdering of stone surfaces linked with efflorescence and due to soluble salt crystallization damage.

(b) PRESENCE OF HARMFUL SALTS IN THE STRUCTURES

The incidence of sulphate attack and salt action appears to be widespread on the site. The level at which the resultant damage is visible, i.e. near the tops of the walls or within the domes, combined with the fact that the water table on the Hill is very low suggest that:

- Deposition of salts in the fabric is occurring through the salt-laden moist air to which the monuments have continuous exposure all the year round.
- Presence of calcium sulphate is a very distinct possibility for which the laboratory testing of bricks and mortars needs to be commissioned. It is possible that impurities were present in the original building materials and may have been re-introduced unwittingly in materials used for repair and restoration work in more recent times.

The severe disintegration of many brick structures would therefore suggest the strong possibility of the presence of contaminated original material alongwith continued exposure to a salt laden moist atmosphere.

(c) THE ACTION OF WIND

Thatto falls within a zone of high wind velocity. The velocity at times can reach 30 miles per hour, which, normally, is limited to a few hours annually. The average is about 10-12 miles per hour.

Exposure to winds at these velocities, besides their saline nature, has other implications for the monuments at Makli. It is worth considering these to form the overall view of cause and effect in the general condition of the monuments.

Cracks and fissures abound in the structures on site. Penetration of these by rain, driven by wind pressure, is bringing about the most harmful effects of the combination, causing serious internal decay after saturation of the external surfaces.

(d) PROBLEMS OF RAIN WATER DISPOSAL AND ORGANIC GROWTH

A qualitative appraisal of the pattern, direction and intensity of precipitation is of crucial importance in the maintenance and preservation of historic buildings.

On the whole, Sindh suffers from paucity of rainfall. In addition to being precarious and scanty, its incidence is highly variable. The little precipitation it gets is almost invariably due to cyclonic storms. In lower Sindh the average rainfall is about 7 inches with only about 8 rainy days in the whole year. July is the wettest month.

There is a peculiarity about the rainfall pattern. There are gaps of anything up to six or seven years of scarcity followed by peaks of good and, at times, heavy rainfall.

Geologically, ground movements occur all the time. The rainfall quirks described above would abnormally accentuate such movements during and after the peculiar spells of heavy rainfall. Of these movements those that induce differential settlements are of particular interest. **Investigations of suspected foundation trouble would therefore be necessary where indications of differential settlement such as cracking and consequential damage have manifested.**

Rain damage to the masonry above ground will occur in several ways. Penetration of rain to the interior of building will cause several types of decay.

After saturation of the brick or stone surfaces, water will stream down vertical surfaces and wind pressure will force these through cracks or even through the material itself because of its high porosity.

Rain penetration can cause internal decay in stonewalls, forming voids which could be as large as one-fortieth of the wall's volume in a period of about four to five centuries.

(e) THERMAL EXPANSION

Thermal movement is a well known cause of decay in buildings. Exposure of the monuments to a high diurnal range of temperature could not indefinitely postpone the effects of repeated heating and cooling of the outer skins of masonry.

Despite the differential has been the core and the enclosing skins, the walls by natural their assembly are capable of absorbing many stresses remarkable degree. The absorption of stresses occurs in the following pattern:

- Compression of mortar
- Absorption of internal stresses
- Friction between blocks of stones

And the whole is aided by the plasticity of the lime mortar, the serious decay or disintegration of which will adversely affect the entire process.

(f) THE EFFECTS OF CONDENSATION AND AEROSOLS

The effects of rain penetration and exposure to a moisture laden atmosphere, with particular reference to salt crystallization, Water can also gain access to masonry materials through the agencies of condensation and aerosols-both of which are likely to be active on this site.

(g) THE EFFECTS OF EARTHQUAKES

Earthquake shocks consist of direct primary waves, secondary waves, and surface ripples of Raleigh waves. The resultant violent earth-shaking shocks induce dynamic movements in all three dimensions of a building.

Serious damage can occur from major tremors. Minor tremors, consisting of smaller relative movements and energy releases, nevertheless, adversely affect the stability

of the structures by accelerating the processes of decay due to instability brought about by other forces.

The extent of earthquake damage depends upon the interplay of many complex factors and usually becomes apparent by symptoms such as:

i. Cracking at the corners in walls
ii. Cracking where stresses concentrate around door openings and in arches
iii. Downward slippage of the center portion of an arch
iv. Falling in of portions of domes
v. Vibration and the consequent cracking of columns
vi. Damage to badly bonded elements. This usually takes place during severe earthquakes when the elements in question batter each other due to variable rates of oscillation
vii. Disintegration of well-built structure into large lumps
viii. Disintegration of poorly-built structures into rubble

(h) WEAR AND TEAR CAUSED BY VISITORS

Despite lack of facilities, in hospitability of weather and an almost desolate environment, the number of visitors to the monuments is quite impressive. The numbers are bound to increase as consciousness of the country's heritage grows and as the Makli Monuments become more firmly established on the international tourist map.

The impact on the fabric of the monuments, quite distinct from vandalism, resulting from wear and tear is already meriting serious attention.

(i) ENVIRONMENTAL PROBLEMS

- **Lack of Vegetation:** To walk the entire length of the site and back is quite demanding considering the distances involved. The route,

unrelieved by any shade or tree becomes even more taxing in the unremitting heat and glare of the sun.

- **Road access:** A narrow metalled road takes off from the Karachi-Thatta road, past the first group of Monuments to the second group. From the second to the third groups there is a stony carriageway, hardly tolerable in vehicle, let alone on foot or bicycle.

- **Electricity supply:** A supply exists to the Department's Rest House and offices and to the tomb of Abdullah Shah Ashabi.

- **Water supply:** This is a major problem on the site. There is, at best, a primitive and by no means certain, water supply to the Rest House and Offices. Any additional demands from the current source cannot be met.

- **Sewage:** The present arrangement caters for the needs of the Rest House and Department's Offices.

(j) ARCHAEOLOGICAL PROBLEMS

The problems of pilferage are all the apparent. An almost unguarded and a very extensive site with a large number of ruins on it presents itself as in easy target for an unending source of good quality building material. The pilfering has been prevalent since long. Apparently, in pre-partition times an appropriate fee could produce many willing hands that would remove cartloads of material from the site.

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An aspect of vandalism is the growing incidence of graffiti. The use of a variety of writing implements is current. Regrettably incisions into the surface of masonry with sharp implement it also now visible.

There are problems associated with food consumption. May a picnic unfold itself within the confines of the monument where shade and coolness are readily

available. Spillage of liquid and general litter from food consumption is not an uncommon sight. Pan spit is indiscriminately lodged on masonry surfaces.

There are instances of incense and oil lamp burning on some of the graves. This is not only disfiguring but is also adding to the decay of the surfaces concerned.

In order to overcome the above narrated situation the Culture, Tourism & Antiquities department, Government of Sindh has prepared and got approved a development scheme namely " PROTECTION, PRESERVATION, PROMOTION & DEVELOPMENT OF WORLD HERITAGE SITE OF MAKLI HILL MONUMENTS, THATTA" in 2012 with an estimated cost of Pak. Rs. 471.882 million.

The main objectives of the scheme are:

- To prepare a Master Plan for the Monuments.
- To project the historical importance and significance.
- To identify the issues relating to the Conservation, Preservation and Restoration of the monuments.
- Study of weathering effects (rain water and moisture action, atmospheric effect and cause of crystallization of salt on monuments.)
- To prepare comprehensive strategy and action plan for emergency work, stabilization work, preventive work, conservation and maintenance.
- Mortar and construction material analysis.
- Detailed investigation of effected monuments such as suspected foundation trouble where indications of differential settlement like cracking consequential damage manifested.
- Action for quality capacity building of the technical and curative staff.
- Establishment of documentation centre.
- Landscaping, Plantation and Development of Site.
- Proposal for open Museum at Site to display the scattered objects.
- Creation of infrastructure.
- Marketing strategy for the promotion of cultural tourism.
- Detail drawings.
- Analysis of material and replication.
- Proposal for functioning of Kashi workshop.
- Documentation / Photographs before, during and after conservation work.
- Maintenance study.

The Master Plan

For the Preparation of Master Plan a Consultant company has been hired who actively involved in preparation of Master Plan in consultation with the experts of the department. The overview of the scope of work is given in the below table:

S. NO.	COMPONENTS OF MASTER PLAN	PRESENT STATUS
1.	Environmental impact assessment	Underway
2.	Identify the boundaries of the Inscribed and its Buffer Zone and develop adequate regulatory measures to ensure its adequate protection and management	Completed
3.	Carry out a comprehensive Inventory of all monuments	Completed
4.	Environmental Monitoring and Diagnosis of problems and determination to solve consequential damage, thermal expansion, effect of condensation and aerosols, earthquakes, wear and tear by visitors and archaeological problems contributing to its deterioration	Underway
5.	Comprehensive strategy for emergency work, stabilization work, conservation and maintenance work taking in hand on short, mid and long term basis	Completed
6.	Develop the specific damage assessment and define treatment plan for the Tomb of Jam Nizamuddin	Underway
7.	Topographic, plan table, contour and condition survey	Completed
8.	Satellite images of site	Completed
9.	Visitor amenities	Underway
10.	Proposal to stop of trespassing, encroachment and animal entrance to the site	Underway
11.	Planning to formulate a Management Plan for the property, including Conservation Action, Public use and Disaster Risk Management Plan	Underway
12.	Action for quality capacity building of the technical and curative staff	An action plan has been prepared jointly by the Department, Heritage Foundation and Aachen University, Germany
13.	Establishment of documentation centre	Under Planning
14.	Landscaping, plantation and development of site	Underway

15.	Proposal for open museum at site to display the scattered objects	Under planning
16.	Creation of infrastructure	Under planning
17.	Marketing strategy for the promotion of culture tourism	Underway
18.	Detail drawings (X-section, L-section, Architectural, structural and 3D animation)	Completed
19.	Detail construction drawings where necessary	Under Planning
20.	Analysis of material and replication	Under Progress
21.	Proposal for functioning of Kashi workshop	Workshop started working
22.	Documentation / photographs before, during and after conservation work	Before documentation has been completed remaining will be done during the course of work
23.	Maintenance study	Study is underway
24.	Detail work plan	Part of final Master Plan

As per promise the Consultant will provide final Master Plan draft in the end of May, 2015 which will be shared with World Heritage Committee, accordingly.

In order to unwanted entry of people into the protected land, the Culture Department has started construction of boundary wall around the monuments.

In order to stabilize the Tomb of Jam Nizamuddin the Geo Technical Studies about the Monument have already been carried out by the Heritage Foundation with the financial assistance of UNESCO. The same was also shown to the visiting Mission. The ***Documentation and Condition Survey of the Tomb of Jam Nizam Al Din*** has already done by the Heritage Foundation.

The Damage assessment of the Makli Monuments has been completed by the Heritage Foundation in collaboration of the department with the financial assistance of Prince Clause Funds for Cultural and Development. The damage assessment and first aid at **Summa Noble I** Tomb has been initially carried out.

In order to define core and buffer zone of the World Heritage Property, the task has been completed and already submitted to World Heritage Centre.

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The Department has carried out First Aid Conservation at unknown tomb in front of the Tomb of Sultan Ibrahim.

Under the USA Ambassador Fund the Heritage Foundation has been entrusted the Conservation Work of Sultan Ibrahim Tomb at Makli where comprehensive study is underway.

The all relevant documents and work will be shown to the visiting ICOMOS/ICCROM Advisory Mission to Makli.

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