

Federal Republic of Germany

Tomb of Jan Baba at WHS Makli, Thatta

Progress Report No - 2015/001



January, 2015

- Heritage Foundation of Pakistan had requested permission from the Department of Culture, Government of Sindh, to begin work at the tomb of Jan Baba. The formal written permission was received on 21st January, 2015. Up until the date, non-intrusive activities such as photographic documentation and consultants' visits could be undertaken.
- In the middle of January, 2015, during a scheduled visit by Heritage Foundation personnel, it was observed that some visitors had vandalized the historic property. The vandal had scaled the periphery wall of the tomb causing a few stones to dislodge and collapse. It was decided that upon receiving permission to work at site, the first task would be to limit the number of visitors to the site by blocking all entries and openings of the tomb.
- Heritage Foundation Artisans fabricated free standing bamboo barriers that would fill the openings. These barriers were manufactured with care, so as not to harm any of the carved stone or ornamentation of the tomb.
- Once permission was received, Consolidated Engineering Services (CES), was sent a work order to begin geotechnical studies on site. It takes the company 10 working days to mobilize team to begin work at site.
- Heritage Foundation personnel also began the physical survey and a pictorial documentation of the tomb.
- The surrounding area of the tomb was cleaned and all loose stone and other historic material was stacked neatly in corners for later use.



Collapsed stones from enclosure wall



Fabrication of free standing bamboo barriers



Installed bamboo barriers



Barriers do not damage historic materials



Signage at site



Verification of measurements by HF personnel

February, 2015

- All bamboo barriers fabricated were installed by the first week of February. This installation has not only reduced the number of visitors to the site but has also minimized the instances of vandalism.
- The Geotechnical Study by Consolidated Engineering Services (CES) was begun on the 10th of February, 2015. 4 Boreholes were dug till 25 feet depth, and various analyses were undertaken. The result of the survey was to be received in the beginning of March, 2015.
- Heritage Foundation personnel undertook the physical survey of the monument and regular visits were made to the site for verification through measurements and photographs.



Borehole Machine installed at site



4" Borehole at site



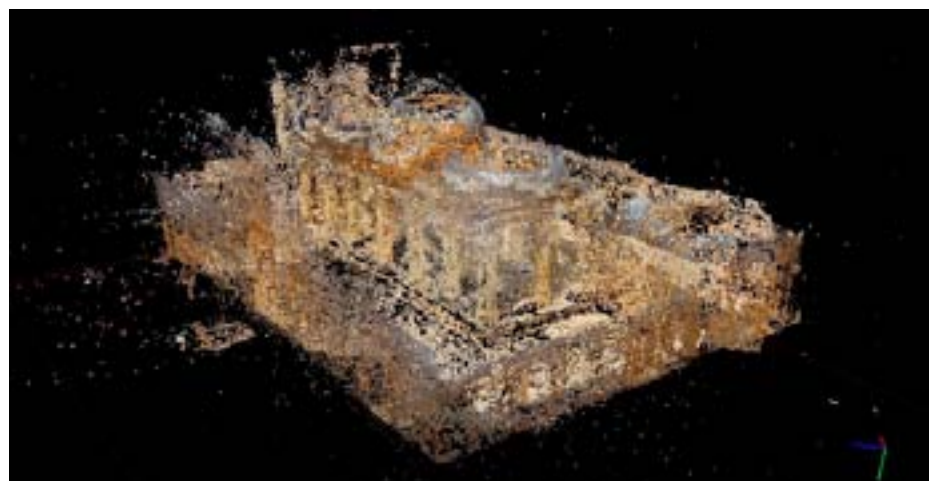
Borehole Machine installed at site



Soil Samples for Study



Photogrammetric Study of the Tomb



Photogrammetric Study of Tomb undertaken

Federal Republic of Germany

Tomb of Jan Baba at WHS Makli, Thatta

Progress Report No - 2015/003



March, 2015

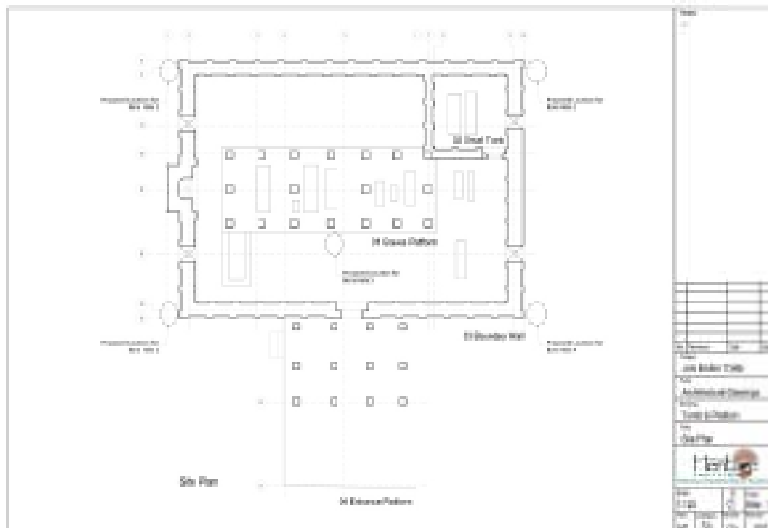
- An observation visit to prepare a preliminary reports was undertaken by Structural Engineer Amin Tariq & M. Saleem ul Haq in March, 2015.
- Results of the Geotechnical Study were received and sent to the Structural Engineer for further evaluation.
- Upon studying all material and from initial observations undertaken on site, Engr. Tariq suggested further work to be undertaken by the Geotechnical Consultants. These included a further investigation of the settlement of columns within the enclosure and additional soil analysis. Additional requirements from the structural consultant were forwarded to CES who are set to take up the activity in the month of April, 2015.
- A detailed consultant's assessment will be completed by the end of April, 2015.
- Heritage Foundation personnel completed the physical survey of the monument in March and began further study of the monument, including developing a numbering system and preparing the super imposition drawings for a condition survey.
- The detailed studies by HF are due to complete in the month of April, in time for the Consultative Committee meeting to be held in May, 2015.



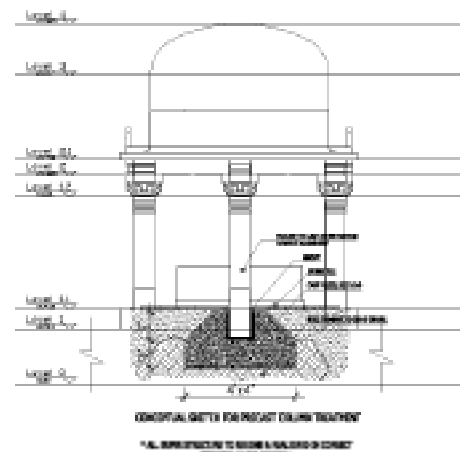
Visit by Amin Tariq



Structural engineer makes initial observations



Recommendations for further sub-soil investigation at Site by Amin Tariq



Conceptual Sketch for treatment of settlement



Photogrammetric Study of the exterior of the tomb

Federal Republic of Germany

Tomb of Jan Baba at WHS Makli, Thatta

Progress Report No - 2015/004



April, 2015

After the completion of various studies for the tomb, it was decided to undertake the basic work of cleaning of the monument. For this purpose a 3-member team was trained to carry out cleaning in the tomb.

The cleaning consists of dry cleaning of domes, dry cleaning of internal and external surfaces of enclosure walls from dust that has been accumulating. After dry cleaning the process of gentle wet cleaning was undertaken to remove the soiling that had stuck to the surfaces over a long time. The work was started from the south side of the enclosure wall, which also carries intricately carved motifs.

Since the soiling blackens the carved elements particularly, special cleaning activity was undertaken by using tooth brushes to gently rub and clean the blackened surfaces. This is a time consuming task since harsh measures cannot be taken and many a time requires soaking for some time to remove the dirt. A study was made of the water ingress within and from the entrance canopy.

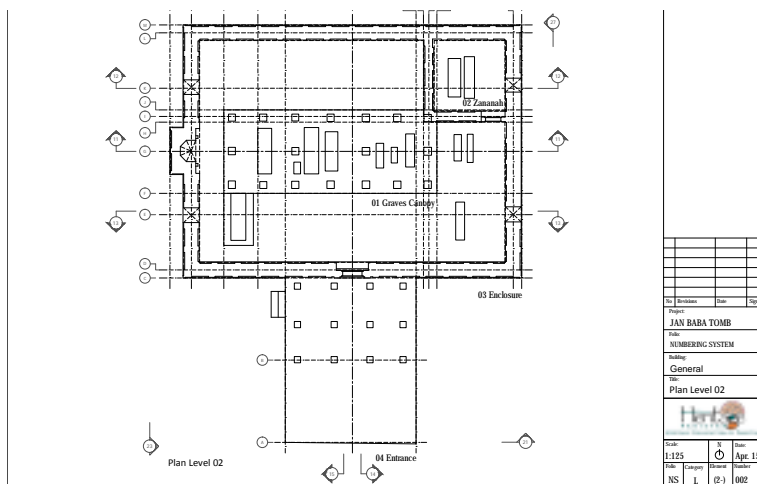
For this purpose levels of the roof were determined by taking water levels. It appeared that the not only water was dripping through due to holes in the top



Artisan, dry clean the walls of the enclosure



Dry cleaning through careful light brushing



Recommendations for further sub-soil investigation at Site by Amin Tariq



Documenting wall heights



Documenting the roof of the Entrance veranda



Checking the floor levels with a water-level

surface, the water was being discharged in the space between the enclosure wall and the canopy edge, which could not easily be drained, while some rain-water would be lodged in the canopy roof due to lack of drainage.. An alternative arrangement for discharging water from the canopy has been worked out in order to provide effective disposal of rain water.

The month of April also saw the completion of all graphic and photographic documentation as well as condition surveys in the form of 10 folios incorporating all studies and base line information. These have been prepared in order to be presented to the consultative committee scheduled to be held in June 2015.

Soft copies of the folios was submitted to the Consulate General of Germany.

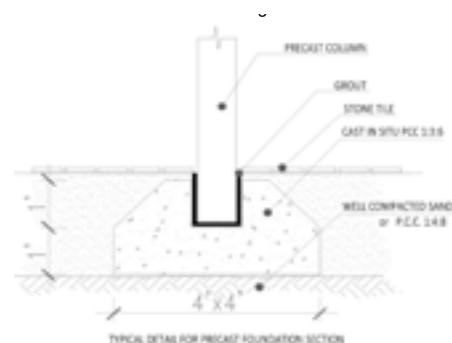
PRESERVATION OF
TOMB OF JAN BABA, WHS MAKLI

1ST CONSULTATIVE COMMITTEE MEETING

Folio I – Introduction to Makli



Consultative Committee Meeting Presentation



Consultants' Assessment Folio

MONUMENT SIGNIFICANCE – DESIGN VALUE I

- The proximity of the tomb to the grand tomb of Isa Khan Tarkhan II, constructed with stone building tradition provides its contextual setting.
- The formation of enclosure for keeping the graves away from strangers eyes of strangers, provides heightened privacy and seclusion. Where other enclosures are entered directly, the portico arcade provides a greater emphasis and formality to the ensemble.
- The entire ensemble, is placed on a raised plinth providing a grand sense of entry. The giant size doorway reinforces the importance of enclosure with its hushed tones. The 3-dome arcade for grave arcade provides a heightened significance; while the zenana enclosure, once carrying a dome shows utmost respect for the royal females.
- The intricacy of carving embellishing all stone elements is composed of highest artisanship, in the tradition of devotional carving executed in the Samma tour de force Tomb of Jam Nizam al Din.



Significance & Value Folio

03 ENCLOSURE



Photographic Documentation Folio

03 ENCLOSURE: EXTERNAL ELEVATION 22 (WEST)

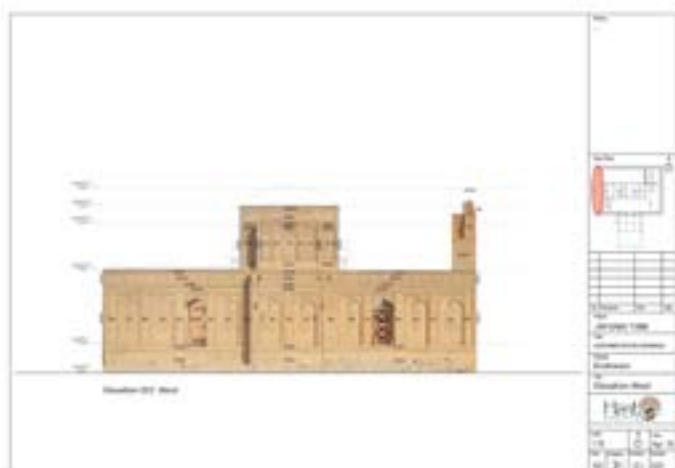
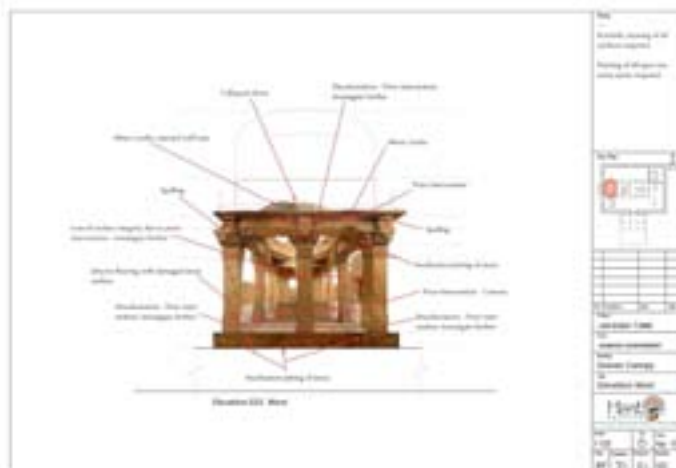


Image Superimposition Folio

01 GRAVES CANOPY: ELEVATION 022 (WEST)



Condition Survey & Damage Assessment Folio

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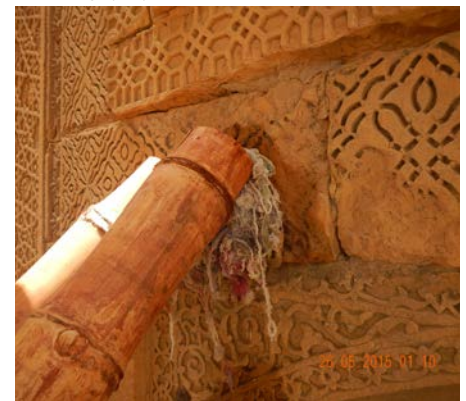
May, 2015

The cleaning phase of the tomb of Jan Baba has continued during the month of May. Both dry and wet cleaning has been done with great care, so as to not damage the stone. Following tasks were undertaken in May.

- Dry and wet cleaning of internal Enclosure walls and the Zenanah walls.
- During the cleaning tasks, some problem areas were taken note of. The carvings in the stones have accumulation in them, it was advised that the method of poulticing. This method involves using soft cotton soaked in warm water, and left on the surface to be soaked for at least 2 hours. Once soaked, a soft brush was used to clean. This method did not provide satisfactory results, and further inquiry is required.
- The levels of the building were measured in reference to the road. The levels were measured from the road to Isa Khan Tarkhan II, and then following the pathway to tomb of Jan Baba. Drawings were prepared with the updated information.
- Test patches were applied for the pointing of mortar joints in stone. The sample will be approved once the curing process is completed.



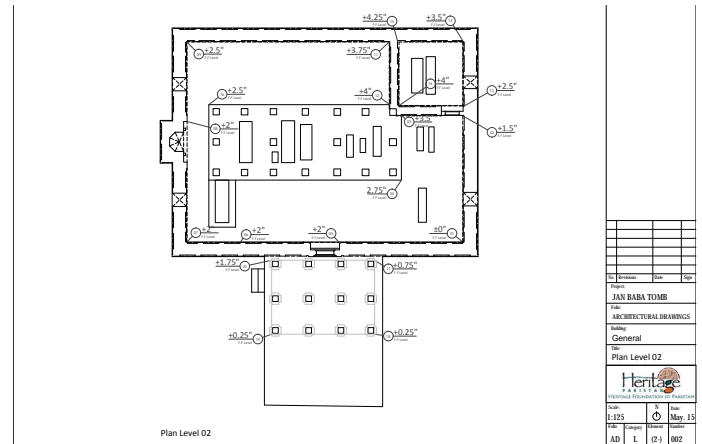
Cleaning of difficult areas in stone.



Poulticing method with warm water.



Checking the building levels in reference with the road.



Daily record of tasks under taken for reports.



Dry cleaning with soft brushes.



Documenting wall heights

Federal Republic of Germany

Tomb of Jan Baba at WHS Makli, Thatta

Progress Report No - 2015/006



June, 2015

The conservation phase of the project starts as the cleaning is near completion. Following milestones were achieved during the month of June.

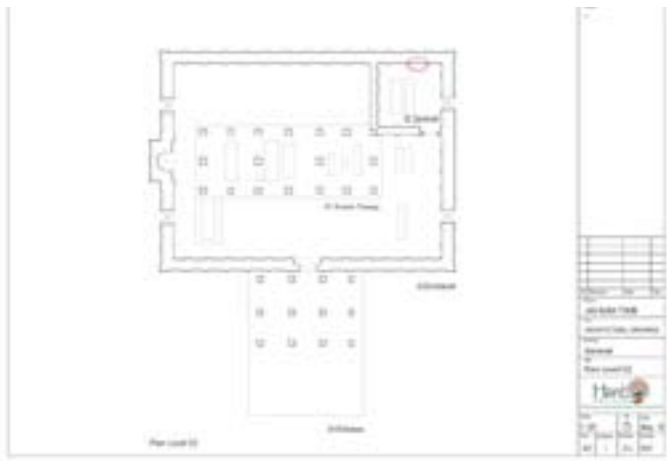
- The base or foundation stone of the plinth have become exposed in some areas, a sample was prepared for plinth protection. Two samples will be prepared, the selection will be based on the decision of the Consultative Committee.
- The cleaning of the problem areas with stone carvings with the poulticing method did not prove 100% effective, however, when combined with a small scratching tool. It was made sure that great care is taken in both soaking the stone and then lighting scratching the dirt away, that became soft after 2 hours of soaking with the poulticing method.
- A sample for Kangura has been carved out of stone. The sample needs slight improvements and then can be placed on the structure, to assess the quality and resemblance to the original.



Exposed plinth stone of Entrance platform.



Sample 1 for Plinth Protection.



Area marking the sample patch for poulticing and scratching method.



Scratching after soaking for 2 hours. Satisfactory results.



Sample for Kanguras for Jan Baba.



Wet cleaning of graves.

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Tomb of Jan Baba at WHS Makli, Thatta

Progress Report No - 2015/007-1



July, 2015

The conservation phase of the project starts as the cleaning is near completion. Following works were carried out during the month of July.

- The fallen stones from the pathway leading from Isa Khan Tarkhan II to the Tomb of Jan Baba, have been gathered and placed back in their places. The stones so far have been placed without the use of any mortar. This placing of stones is just preparatory work for the next phase when these stones will be fixed in their place.
- The Experts' Meeting for the Tomb of Jan Baba was held on 22nd & 23rd July, at Makli and Karachi respectively. The Experts' panel included renowned scholars and conservationists like, Prof. Dr. Michael Jansen - RWTH Aachen University; Mr. David Punzelt, Consular Attache, Consulate General of Germany; Mr. Saleem- Ul Haq, Director, Culture Department Punjab; Engr. Amin Tariq, Amin Tariq Associates (ATA); Engr. Jamshed Danish, CEO, Consolidated Engineering Services (CES), chaired by Ar. Yasmeen Lari, CEO, Heritage Foundation of Pakistan (HF). Regrests were received from Mr. Qasim Ali Qasim. The meeting was also attended by HF's Ar. Ashfaq Ahmed, Heritage Architect and Ar. Saba Samee, Heritage Consultant. The Committee discussed various issues regarding the conservation processes and recommendations were noted down and finalised on the second day of the meeting.
- The exterior pointing of stone joints was started after approval of the sample by the Experts Committee based on the test patches that had been prepared for this purpose. The ratio of the mortar being used is 1:1:1:2 (lime, sand, chirol, yellow stone dust)



Deep struck pointing of stone.



Placing fallen stones along the pathway.



Pointing on the exterior facade of the Tomb.



Day 1 of Experts' Committee Meeting at Makli.



Experts' discussing the critical issues in the conservation work.



REPORT

The Experts' Committee Meeting for the project of Preservation of Tomb of Jan Baba, was held on 22nd and 23rd July, 2015. The first day's deliberations were held at WH Makli, while the second day discussions took place at HF's Karachi Centre for finalizing the recommendations. The Experts' Committee consisted of Prof. Dr. Michael Jansen - RWTH Aachen University; Mr. David Punzelt, Consular Attache, Consulate General of Germany; Mr. Saleem- Ul Haq, Director, Culture Department Punjab; Engr. Amin Tariq, Amin Tariq Associates (ATA); Engr. Jamshed Danish, CEO, Consolidated Engineering Services (CES), chaired by Ar. Yasmeen Lari, CEO, Heritage Foundation of Pakistan (HF). Regrets were received from Mr. Qasim Ali Qasim, Director Sindh Archaeology. Ar. Ashfaq Ahmed, Heritage Coordinator, HF, Ar. Saba Samee, Heritage Architect, and Engr. Rabbiya Mukhtar were in attendance.

Day 1 of the Committee Meeting took place at the WHS Makli, the meeting started with a welcome by Ar. Yasmeen Lari and briefing about World Heritage Makli Site and the project of tomb of Jan Baba being funded by the Consulate General of Germany. The briefing was followed by presentations by Ar. Saba Samee and Ar. Ashfaq Ahmed. The presentations comprised 12 folios that included description of applicable Values, Architectural Drawings, Numbering



Tomb of Jan Baba with bamboo barriers and temporary roof providing protection.



Experts' Committee at WHS Makli.



Architect Yasmeen Lari chairing the Experts' Committee Meeting..



Prof. Dr. Michael Jansen, discussing the usage of types of stone in walls.



Discussion on treatment of damaged stone steps.



Examining the settlement of columns and central dome.

Systems, Photographic Documentation, Superimposition Drawings, Damage Assessment, Consultants' Assessments, Stone Damage types, and Area-wise Damage details. During discussion on values applicable to the site, Dr. Michael Jansen pointed out that as a living site, Criteria No. 6 for World heritage nomination could be applicable and Pakistan should try and take this matter up with the World Heritage Centre. Additionally, due to large number of devotees that visited the site, it was important that any tourism master plan should be sensitive to religious, social, commemorative and communal values. As spiritual rituals were very much part of many of the shrines and tombs these needed to be carefully safeguarded in order that associated religious and spiritual rituals are not disrupted. In order to create greater relevance of identified values, it was important to contextualize specific values.

Dr. Jansen suggested that graphic scale be added to the detailed drawings that had been prepared, and drawings showing joints, their numbering and differentiation of kinds of damage may be incorporated (as had been done earlier for the Tomb of Jam Nizam al Din), along with a study of stone to identify different kinds of stone types. He also advised that the sequence of construction should be studied and marked on the drawings and the principle of minimum intervention be followed and damaged stones should be retained without resorting to any replacements.

Subsequent to the presentations, the committee members visited the tomb of Jan Baba. On site various issues came under discussion and methodology of conservation was discussed. The test patches of various items that had been prepared were also examined. Considerable time was spent in working out ways to handle various issues related to damages that were identified. Detailed examination was carried out of the graves canopy and especially where due to settlement, the joints of the dome stones have opened up and clear deflection of the stone beams is visible. Mr. Saleem ul Haq pointed out the need for careful handling and the importance of providing pointing to the joints of stones in the dome that would be applied through and through. Engr. Amin Tariq and Engr. Danish pointed out that the settlement was not due to the soil conditions, but because of excavation and filling with loose soil which had been exposed to rains etc. It was decided that monitoring must be carried out in order to determine if there was any further movement in the structure. For this purpose HF will arrange for periodic readings.



Group photo at the Archaeological Bungalow.



The condition of graves under discussion.



Experts discussing conservation procedures.



Discussion regarding identification of stone types.



Damaged floor stones under discussion.

On Day 2, 23rd July the meeting was reconvened at HF Centre in Karachi to finalize the recommendations in order to proceed with the work at site.

MONITORING ARRANGEMENTS

- Atmospheric data regarding rain, wind velocity & humidity to be collected.
- Surface temperature to be monitored.
- Wind directions to be recorded using weather station.
- Monitoring to be carried out for internal graves canopy for movement in the stone structure.
- Tell tales to be fixed in order to calculate the movement of stone structure at the settlement areas. The levels of the settled columns and their verticality tilts to be recorded for development and final rehabilitation treatment recommendations by geo technical engineer.
- The movement in the central dome above the grave canopy to be monitored by periodic examination and joints to be filled with matching grouting.

SITE WORKS

- Sample of deep struck re-pointing was approved to be used on joints of 1/4" to 3/8" thickness.
- The principle of minimum interventions is to be adopted; no stone replacement to be carried out.
- For the damaged stone at the steps wooden nosing may be used.
- Where possible remove cement used earlier for surface repair on columns. At highly damaged surfaces of columns matching mixture of mud and lime may be used.
- Matching lime sand water proof layer to be applied to damaged surfaces of stones above the entrance canopy. Proper drainage should be maintained to discharge on east side.
- Floor stone slabs in the enclosure and the grave canopy may be re-laid in order to ensure effective drainage.
- Because of the centrality of the entrance and lack of any access from the south side, wooden step may be added.
- The lintel to be lifted by hydraulic jack to its original position and vertical steel post with packing to support the lintel of Zanana doorway.
- In the Zanana enclosure corner stone to be realigned and parapet stones to be re-fixed and made water tight.
- A temporary roof structure sloping toward the east in bamboo, clearly identified as a reversible roof cover, above the Zananah walls may be constructed for safe-guarding of structure.
- In order to protect damaged stones silicates may be used at surfaces of stones. Only silicates that do not create glossy surface may be used. A test sample may be prepared using suitable chemical and its performance over the last several years may be ascertained.
- Sacrificial layer of mud plaster mixed with stone colour to be applied in places where layers of stone have spalled, or cracks have developed.
- The joints of the dome to be repointed through and through as a first priority. After interior pointing is completed, exterior plastering of the dome may be taken up.
- The two domes that are to be re-constructed, have to be recognizable as new structures. Bamboo reinforced lime concrete may be considered as an option after preparing a sample and examining its visual impact.
- A channel outside north enclosure wall, between the external grave platform may be created to ensure effective drainage.
- Instead of a plinth protection an unobtrusive arrangement for water drainage may be considered.



Loss of stones of the walkway being examined.



Material and tool samples placed in the porch.



Enclosure walls being discussed.



Studying the enclosure walls.



Examining the soffit of stone slabs in the entrance canopy.



Examining the perimeter wall panels.



Discussing the environs and site conditions.



Identifying architectural elements in order to assess the sequence.



Examining display of samples of materials.

After lunch, a visit was made to other heritage sites being conserved by HF including the tomb of Sultan Ibrahim (under US Ambassador's Fund for Cultural Preservation), Mosque of Al-Ashabi being treated with L-EPI or Lari-Emergency Preventive Intervention, as well as the unique baoli or stepped well (both with support from Ms. Safeeyah Moosa of South Africa).

It was explained that the mosque was provided first aid at comparatively low cost and within comparatively short period. The value of L-EPI in providing stabilization to endangered structures in order to buy more time for the large number of structures that require immediate attention.

In view of the importance of the tomb of Jam Nizam al Din, Dr. Michael Jansen and Mr. Saleem ul Haq spent considerable time in discussion with the structural and soil experts in developing an understanding for stabilization of the tomb.

The engineering experts explained that the ridge required stabilization and it was constantly being eroded. Unless immediate action was taken, many structures, including the tomb of Jam Nizam al-Din were in danger.

Ar. Yasmeeen Lari agreed to get track monitors installed in order to monitor the movement in the structure, which she directed will be done in the subsequent week.



Tomb of Sultan Ibrahim - examining kashi samples.



Yasmeen Lari pointing towards extant kashi portions.



Application of L-EPI on Mosque of Ashabi.



Dr. Jansen and other experts examining the L-EPI application.



Experts discussing the cracks appearing in tomb of Jam Nizam al-Din



Tomb of Jam Nizam al-Din under discussion.



Discussion on installation of crack monitor.

August 2015

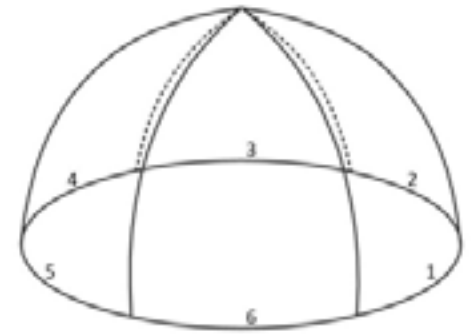
The visit of Experts Committee to the tomb of Jan Baba was conducted on 22nd July 2015 in order to consider issues and conservation treatments of the tomb.

Among the issues requiring immediate attention was the only surviving dome of the monument which is located in the central bay of the Graves Canopy within the large stone enclosure.

ENDANGERED CENTRAL DOME

As highlighted in various reports prepared by HF, the central dome was in a highly vulnerable condition and it was agreed that it needed to be stabilized urgently. The Experts' Committee provided clear directions to maintain the original structure even though deformation had taken place within the dome structure as well as supporting stone joists and pillars. It was agreed that after stabilizing the dome, regular monitoring should be carried out in order to determine any movement in the structure.

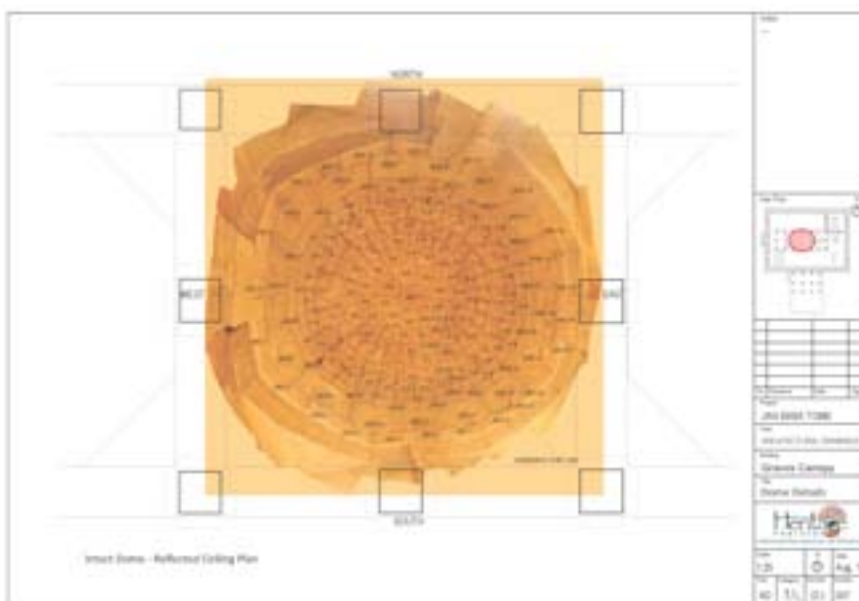
Prior to undertaking stabilization of the dome, a great deal of discussion was carried out by HF's personnel including the field coordinators and artisans. Various possibilities of conservation treatments, their practicality and implementation, and the after effects / reaction and compatibility of that treatment with the historic structure and its material were discussed. Since dislocation of even one stone piece might lead to collapse, it was important to weigh all the options and work out a solution which would also conform to international guidelines.



Division of Dome into section.



View of soffit of central dome.



Record of condition of dome before treatment and numbering of stones.

CONSERVATION ALTERNATIVES

The following alternatives were discussed:

- At first it was discussed to only carry grouting of the opened masonry joints with lime mortar. However some of the joints were very wide and deep and they would not have contained the grout.
- The insertion of small wooden planks to contain the grout was considered, but then the issue of holding that into position was raised and no possible solution came up except for the highly invasive ones. This alternative had to be dropped.
- Another alternative discussed relied on the mortar being laid in layers in order for it to dry evenly and cured properly. However this process would have taken too long and would put the stability of the dome at risk due to the empty joints.
- One of the solutions discussed was to fill the masonry joints by following the circular band construction of the dome and one row at a time. In this case the bamboo scaffold/support would have to be shifted continuous in circles. This would require extraordinary care and might pose danger to the stone gravestones directly under the subject dome.

On reviewing the options for careful implementation it was decided that the dome will be worked in segments, one segment will be completed from bottom band till the top stone and then left for curing. Leaving one segment, the next segment will then be worked on. As per the diagram, after completing segment 1, segment 3 will be worked on, followed by work on segment 2, then segment 4 will be worked on. Next will be segment 6 and this process will end with segment 5. In this way the dome will not be vulnerable at any point during the process.

- The discussion of the filling of masonry joints led to the decision that the wide and the narrow stone masonry joints should be treated in different ways.
- It was discussed that the narrow joints will be filled in through and through by injecting mortar into the joints using a household icing gun. These will be re-pointed after filling.
- The wide joints were considered separately and first the option of inserting a stone piece to fill in the gaps was considered. It was then discussed that whether the new stone filling be of different color, whether it should follow the same cusped shape of the historic stones, should it be marked with the year of intervention and other conservation concerns.
- The difficult workability of the stone to carve in the precise shape was discussed as a point of concern.



Injecting Lime Mortar into deep joints



First layer of injected mortar



Preparing terracotta piece for filling..

IMPLEMENTATION

As a result of the foregoing discussion, the decision of utilizing terracotta/brick pieces to treat the wide joints was adopted, which conformed to the following conservation concerns:

- By using brick the difference of material along with its different color will conveniently mark the new conservation work, with 2015 marked in an unobtrusive manner on one of the brick insertions.
- The workability of brick is easier than the stone and the skilled master artisans available with HF will be able to carve the brick into the required shape on site.
- This material will be stronger than mortar and less likely to develop cracks upon any movement / settlement.
- The brick will not be as strong as the original material (stone) as is preferred for new conservation work.
- The weight of brick will be less than the stone filling and hence no extra weight will be put on the dome.

The work has been carried out with a great deal of care by Master Artisans Baba Ismail and Baba Amu, under close supervision of Architects Saba Samee and Ashfaq Ahmed, as well as Field Coordinator Naheem Shah and Site Architect Waseem Akbar, while Ar. Yasmeen Lari provided oversight and in taking critical decisions. The finished work is neatly executed, with the interventions clearly visible and identifiable. The colour of the terracotta brick insertion is distinguishable from the mellow colour of the original stone, at the same time blending well with each other.

The next step is to provide a cover to the two bays on either side of the middle dome. A dome constructed with shaped concave brick tiles will be tried out and submitted to the committee of experts before proceeding with the next dome.



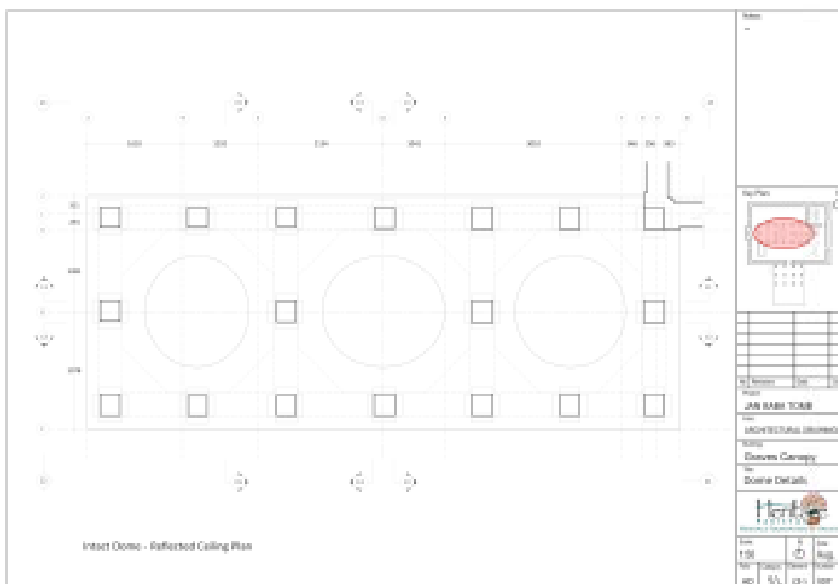
North East Section after Brick underpinning



North section after stabilization.



Close-up of the terracotta piece profiled to fit in the gap.



Plan of Grave Canopy showing central dome.



Before conservation - Reflected ceiling view of middle dome.



After conservation - Reflected ceiling view of middle dome.