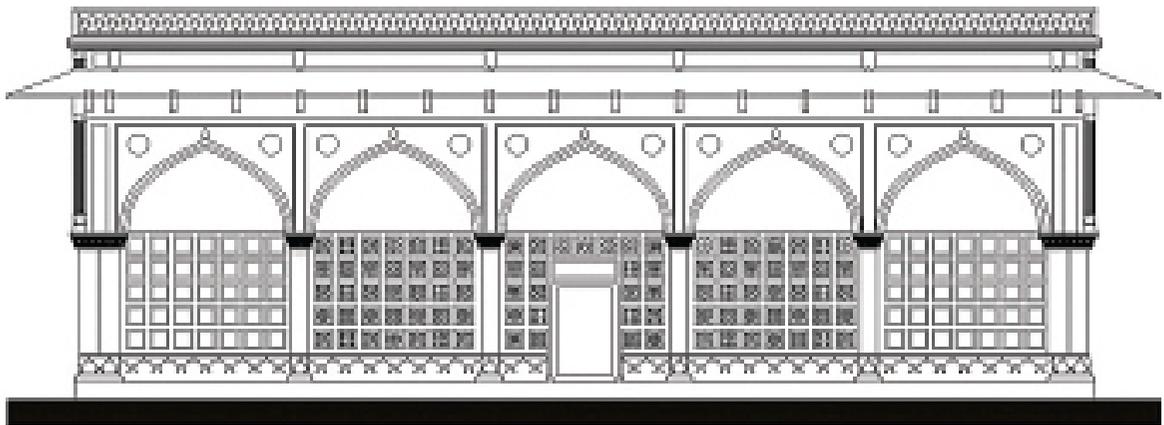


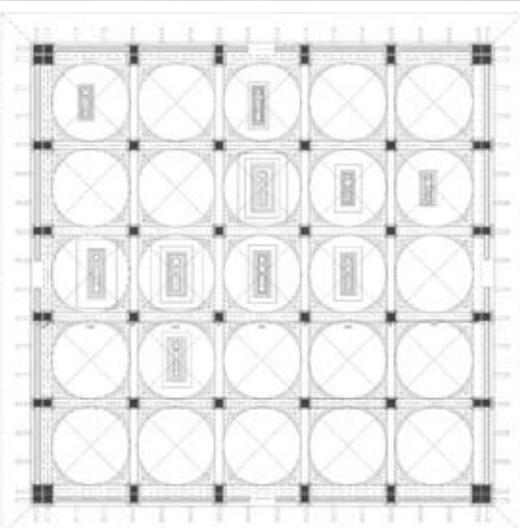


AGA KHAN TRUST FOR CULTURE



CHAUSATH KHAMBA CONSERVATION

Aga Khan Trust for Culture,
with co-funding of Federal Republic of Germany, New Delhi
and in partnership with the Archaeological Survey of India
undertook the conservation of Chausath Khamba during 2011-2014.



(Top) 19th century archival painting of Chausath Khamba; (Middle) A detailed architectural documentation of the structure, and (Bottom) stone-by-stone assessment of the structure showing cracks and condition of the domes prior to commencement of conservation works in 2011

INTRODUCTION

Chausath Khamba was built in AD 1623 - 24 to serve as a tomb for Mirza Aziz Koka, foster brother of the great Mughal Emperor Akbar. It is so called on account of the 64 (*chausath*) monolithic marble pillars (*khamba*) and stands in close proximity to his father, Atgah Khan's tomb, at the edge of the Dargah of Hazrat Nizamuddin Auliya.

The tomb enclosure is entered through a lofty arched gateway and has a large sunken forecourt. The mausoleum is unique on account of it being built entirely of marble, with 25 marble domes supporting the flat roof of the structure. The plan for Chausath Khamba could have been inspired from the wooden garden pavilions from Persia - such as the Chihil Sutun, and in turn, the Chausath Khamba seems to have inspired the architectural design for Emperor Shahjahan's Diwan-i-Aam, Hall of Audience.

Each facade of the square structure has five marble arches inset with marble *jaallis* or lattice screens and a doorway in the central arch providing access to the tomb. The column capitals are intricately carved with simple yet striking pendentives bridging the square floor plan to the circular dome above.

STATE OF CONSERVATION

The marble blocks of the 25 domes were tied to one-another and embedded in the brick masonry over the domes with iron dowels. The rain water spouts from the inaccessible roof got blocked resulting in large quantities of rain water collecting on roof. This resulted in the rapid deterioration of the roof and large scale water ingress from the roof leading to the corrosion, rusting and expansion of the iron dowels. The significant pressure from the expanding iron dowel led to bursting of the marble blocks in all parts of the mausoleum – domes, arches, facade, pendentives and even the column capitals – threatening structural failure and collapse of the structure.

The forecourt of the mausoleum – segregated with a masonry wall built in between in the 1980's – was in a poor state. Similarly, the abutting tomb enclosure of Mirza Ghalib was paved with cement and enclosed within a metal fencing, significantly disfiguring the historic character of the complex.

DOCUMENTATION

A high definition survey, using 3D laser scanning technology, was carried out on the structure as a precursor to conservation works. This was followed with a stone-by-stone assessment of the entire structure to map the profile and defects on each individual stone coupled with photo and video documentation. To complete a structural analysis pits were dug to study the foundations – which were surprisingly found to reach a depth greater than five metres.

Archival research revealed sketches dating from the early 19th century, descriptions and a continuous record of photographs from the mid 19th century.

CONSERVATION PHILOSOPHY

The study of the structure revealed that over 80% of the stone blocks had severe cracks and past repairs had inappropriately only filled up burst portions of stone blocks with white cement – masking the damage but allowing the deterioration to accelerate.

In view of the unique architectural design, construction techniques of the Chausath Khamba as well as the fact that each stone itself was unique in shape and size, it was agreed that all original stone was required to be retained. However, steps needed to be taken to replace iron dowels with non corrosive stainless steel dowels of matching size. Roof repairs to halt water penetration were also urgently required.

The forecourt – largest open space in Hazrat Nizamuddin Basti – was to be landscaped to create a performance venue for the Qawwali musicians residing in the historic neighbourhood.

THE CONSERVATION CHALLENGE

The preservation of Chausath Khamba was possible only if the iron dowels could be removed and thus it was necessary to commence a conservation programme that required dismantling each of the 25 domes. Such an effort had never before been undertaken anywhere in the world.

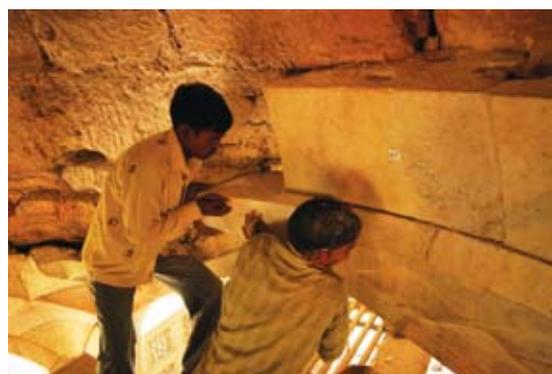
The multi-disciplinary conservation team comprising experienced engineers, craftsmen and conservation architects could only access the iron dowels from below as the documentation had revealed over 1m thick masonry above the marble domes. Each stone was thus required to be numbered and mapped.

Once a specially designed support framework was built, the keystone was held in place and rings of marble blocks were dismantled and carefully reassembled on the floor. Iron dowels manually removed and stone indents of matching size prepared for corners which had burst.

The brick masonry above the marble domes was found to have severe cracks, often over 1 m deep and up to 112 cm in width. The cracks were stitched with similar material and lime grout from the roof above used to fill inaccessible portions.

The stone carvers, using traditional tools and building techniques took eight months to successfully repair the first dome – on the northwest corner – thus establishing the repair methodology for the mausoleum. This allowed urgently needed repairs on the roof to be taken in hand – first dismantling the cement layers applied in the 20th century and once the cracks had been cleaned, stitched and filled with lime grout a layer of lime concrete with traditional additives such as brick aggregate was laid to slope.

The repair of the 25 domes has taken almost four years during which time three teams of stone craftsmen have worked under close supervision. The repairs to the domes has been coupled with repairs to the 350 mm thick arch stones



(Above) Various stages of conservation of one dome: 1. Numbering each stone; 2. Dismantling the marble blocks and repairing of cracks in the masonry; and 3. Repair of marble blocks with indents of matching stone where these had burst by master craftsmen using tools, techniques used by the original builders and 4. Re-installation of marble blocks in the original location.



The manner in which this complicated conservation work was undertaken bears remarkable tributes to Indian master craftsmen. (Top) Stitching and grouting of cracks in the masonry while dismantling marble blocks for repair; (Middle) Cracks on the terrace were allowing water penetration and resulting damage; (Bottom) repairs on the roof by adding a layer of lime concrete with traditional additives like Jaggery and Bael fruit pulp.

and the diamond shaped pendentives – several of which were severely damaged and displaced - creating a major threat to the structure as these pendentives and arches support the marble domes.

Conservation works on the facade of the structure needed to similarly repair damaged stones, though this did not require complete dismantling.

LANDSCAPING THE SETTING

The masonry wall built in the 1980's to limit access to Chausath Khamba was dismantled and replaced with a transparent fence using motifs from the decorative lattice screens of the mausoleum.

The forecourt itself was paved with stone in a manner that not only enhanced the historic character but also allowed the creation of a performance space for concerts and cultural festivals. Twice a year the Urs ceremony of Hazrat Nizamuddin Auliya and his favourite disciple, the Sufi poet Amir Khusrau is held at the Urs Mahal built within the enclosure in the mid-20th century. It is proposed to install a permanent exhibit in this space.

MIRZA GHALIB'S TOMB

Mirza Ghalib, one of India's most famous poets was buried adjacent to the Chausath Khamba. As an extension of the conservation effort the poet's tomb enclosure was also landscaped to create a tranquil space for veneration and poetry sessions organised regularly.

CREATING ECONOMIC OPPORTUNITIES

The conservation effort at Chausath Khamba created at least 25,000 man days of work for traditional stone craftsmen and allowed training younger craftsmen. Youth from Hazrat Nizamuddin Basti have been trained to serve as heritage volunteers guiding tourists, pilgrims and school children through the seven centuries of built and living heritage of Hazrat Nizamuddin Basti.

At the onset of the Nizamuddin Urban Renewal Initiative, baseline surveys revealed that under 1% of the women residents had any kind of livelihood. Self Help Groups established here have been trained to make souvenirs in paper and textiles with motifs from Chausath Khamba and Humayun's Tomb.

The Nizamuddin Urban Renewal Initiative has aimed to create a model for urban conservation in the Indian context by also improving education, health, and water and sanitation infrastructure. The Quality of Life for local residents and visiting pilgrims has been enhanced by diverse project components ranging from building community toilets, landscaping neighbourhood parks, housing improvement, vocational training opportunities, early childhood care and development, cultural revival, amongst others. Conservation of other monuments such as the 14th century step-well and the Khalji-era mosque has also been undertaken within the Basti.

*For more information visit www.nizamuddinrenewal.org or www.facebook.com/NizamuddinRenewal ; Email: info@nizamuddinrenewal.org
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