

History of Structural Design: A Hands-on Approach - First Uzbek-German Summer School for Preservation of Monuments 2007

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ABSTRACT: In collaboration with the main Uzbek universities for architecture and construction in Tashkent and Samarkand, in September 2007 the Institute for Architectural Research and Monuments Preservation at Potsdam University of Applied Sciences held the First Uzbek-German Summer School for Preservation of Monuments. The project was managed by Sven Wallasch. One of the main aims of the Summer School for Preservation of Monuments was increasing awareness of Uzbek architecture among civil engineering students and their teachers for careful management of historic monuments that does justice to their significance in an architectural history context. This paper describes the overall project of the first Uzbek-German Summer School for Preservation of Monuments organised by Potsdam University of Applied Sciences, the project work and a selection of results obtained by students. The paper focuses on the methodical implementation of the project aims, which can be recommended for adoption.

STARTING POSITION

Preservation of monuments in Uzbekistan

The Uzbek cities of Bukhara, Samarkand, Shahrissabz and Khiva look back on more than 2000 years of urban history, and are listed as UNESCO World Heritage Sites. This immeasurably rich heritage is threatened by physical and chemical erosion processes, but also by the inexpert handling of historic structures – the present practice for the maintenance of historic monuments in Uzbekistan is strongly characterised by the reconstruction of the fabric of historic buildings. Many buildings that are prime examples of artistic history, in particular with regard to the history of construction, have in the past been reconstructed and repaired in such a way that traces of history have been obliterated and the material substance changed. As a result of this approach to monuments, much of the original fabric, authenticity and therefore history have been lost.

Starting in 2002 and building on previous projects, the Potsdam University of Applied Sciences, together with the principal Department for the Protection of Historical Monuments at the Uzbek Ministry of Culture, carried out various restoration and protection measures in Samarkand and Bukhara. These projects, such as the restoration of the Shadi-Mulk-aga mausoleum or the conservation works on the Tilla-Kari madrasa provided the opportunity to hold the three-week "First Uzbek-German Summer School for the Preservation of Monuments" together with the main Uzbek universities for architecture and construction in Tashkent and Samarkand – with generous support from the German Foreign Office, the German Academic Exchange Service, the Gerda Henkel Foundation and the Association of Friends and Supporters of the Potsdam University of Applied Sciences.

Objective of the project

Practical projects are rare in Uzbek higher education. There is no specific academic education in the preservation of historic buildings and monuments, and to date there are no study courses or professional training in restoration. The subject of construction history is not explicitly taught at the universities.

One of the main concerns of the First Uzbek-German Summer School for the Preservation of Monuments was therefore to raise the awareness among prospective architects and structural engineers, PhD students in these faculties, Uzbek university lecturers, conservation officers and other decision-makers of the careful handling of historic buildings and monuments.

The aim was also to pass on specialist knowledge in the areas of architectural and construction history, such as architecture, the preservation of historic monuments and buildings maintenance, through attendance at specialist lectures, field trips and practical projects on a historic building. Participants would learn methodological and technical approaches for the differentiated, sensitive treatment of historical structures and be informed of the German technology and standards in connection with the preservation of historical buildings and monuments.

Participants

The participation of a wide variety of German and Uzbek contributors was essential to the success of the project. The project's target group was approx. 40 Uzbek architecture and structural engineering students, selected by an application procedure, together with some individual PhD students. German lecturers and student tutors from the master's and diploma courses in architecture, structural engineering, building conservation and restoration at Potsdam UAS took charge of the highly-motivated Uzbek students. Some Uzbek lecturers were also involved. Language difficulties were overcome by Uzbek professional interpreters and trainee interpreters from among students of German at the World Languages University of Tashkent. In total the number of lecturers and assistants of all kinds was almost equal to the number of trainees.

Ruined monuments to be studied to provide construction details and an illustration of construction history

The Ishrat Khana mausoleum, which once stood in the centre of a large, artistically-designed garden, is the most prominent ruined protected monument in Samarkand. Badly damaged by two earthquakes and then left to decompose over more than a hundred years, the Ishrat Khana mausoleum offered a fascinating opportunity to undertake a direct study of the structural details revealed. A few remains of the original rich interior decoration are also retained.

Habibah Sultan Begum, the oldest wife of the last Timurid ruler Abu Said (1451-69), commissioned the mausoleum in 1464 for her deceased daughter. The Ishrat Khana was subsequently used as a mausoleum for the royal wives of the Timurid ruling dynasty. Historical excavations uncovered the graves of 20 women in an underground cruciform burial chamber. The layout of the complex is today dominated by the prominent pishtak (a towering walled section crowning a portal). The damaged portal of the mausoleum is 17 metres wide and 20 metres high. Despite the serious dilapidation of the building, the whole of the structure could be seen clearly.

The building is laid out to a rectangular ground plan (Figure 1). This was the typical plan of a single-room mausoleum with a quadratic floor plan and two side aisles. The roof structure consisted of several flattened domes. The most significant design element, however, was the central dome with its towering tambour (the cylindrical support for a dome) above the main central room of the mausoleum. The melon-shaped dome and the tambour were positioned over two intersecting pairs of arches, which formed a self-supporting square in the air. The square was divided by spandrels into an octagon and further into a sixteen-sided pattern forming the base from which the outer dome ultimately rose.

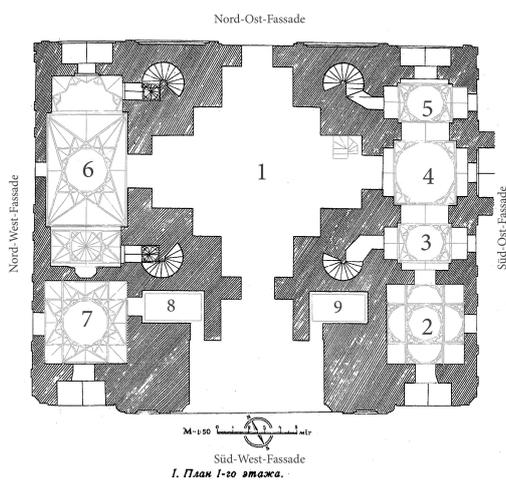


Figure 1: Floor plan of the Ishrat Khana mausoleum with room numbers (left) and group photograph in front of the Pishtak (right)

The earthquake of 1860 caused the destruction of the dome, and the earthquake of 1903 also destroyed the ceiling vaults. Since then the rooms, staircases and interior frescoes have been left open to erosion by the weather. However, there has long been substantial scientific interest in the ruins of Ishrat Khana and its contents (Pugatschenkowa 1958). Now the mausoleum is classed as a significant structure at the highest national level, Class 1 (Class 2 = structures at local level). It is under the authority of the Samarkand Region Inspectorate for Conservation, which has put together information on the building in a monument pass document.

METHODOLOGICAL APPROACH

Specialist lectures, field trips and practical project weeks

In order to present concentrated specialist knowledge, the first week was spent in attending lectures in Tashkent and Samarkand. The subsequent two weeks of practical projects enabled the Uzbek students to gain first-hand, open-air experience of the construction history of the spectacular archaeological ruins of the Ishrat Khana mausoleum. The agenda also included field trips to some of the significant buildings and monuments of Samarkand and Tashkent. The whole of the Summer School was monitored by the "documentation" group, who produced a brochure containing a detailed description of the project on its completion (Kaiser et al. 2008). An edited video can also be obtained on request from the Faculty of Structural Engineering of the Potsdam UAS (<http://summerschool-usbekistan.fh-potsdam.de>). The two weeks of the practical project proved to be the heart of the Summer School, and so the focus in the following text is on the project work.

Practical project on the historical ruins of the Ishrat Khana mausoleum

In the early stages of planning the implementation of the project work, a detailed logistical plan for supplying the activities at the ruins was drawn up. Protection from the heat was provided by a working pavilion covered by an awning, large enough to accommodate table and benches, a power supply was needed for the laptops, a lockable room for the technical equipment was set up in an adjacent shed and toilet cubicles needed to be installed. Social interaction was deemed important, and was ensured by having lunch together on site in the working pavilion. The students enjoyed the tasty, well-prepared food – quite a feat, involving the transportation by car of meals for 70 people (Figure 8, right).

The necessary materials also had to be provided, which substantially increased the luggage (and unfortunately also the budget for the project). The luggage included around 160 field manuals (Wallasch 2007) and approx. 50 Summer School posters, copies of the existing plans of the Ishrat Khana mausoleum, technical equipment (e.g. theodolite, levels, electronic distance meters, climate measuring equipment), laptops, projector, printer, cameras, writing and drawing materials for the students. "Technology that inspired enthusiasm", it could be said, as the interest among the students in working with this equipment was so great that one or two could even be found still pottering around the site as darkness fell. Equipment was also needed for trial restoration work, and on-site research was largely replaced by extensive photocopied literature (Andrews 1997, Brandenburg 1972, Golombek 1988, Hillenbrand 1994, Pugatschenkowa 1958 and 1979).

The main aim of the project work was to teach methodological skills in the care of historical buildings and monuments and construction history. It was not a matter of obtaining completed results, but giving examples of approaches and methods – the how and why. By way of introduction, the students were first given an overview of the building's history and construction by the head of the Samarkand building conservation authority. The students then had their first contact with the structure as they were instructed to provide a sketch of the ruins, starting by looking at the building as a whole before undertaking specialised tasks (Figure 2).



Figure 2: The result of a student's sketch of the Ishrat Khana mausoleum

structure of the walls and the materials used. Each component (walls, ceilings, floors, etc.) on each side were described in detail – combining text and images in a unified presentation.

Sub-group A III, "Use", developed the idea of erecting individual protective roofs over the destroyed ceiling panel areas; a measure which would preserve the fabric of the building. The idea arose from this of using the ruins as a "museum for restoration". Conservation measures for the vaults, squinches and mukarnas, and the rich kundal ornamentation, can be displayed on site. In order to visualise the idea of a utilization concept for a "Restoration Museum", sub-group A III decided to construct two models, a clay model (1:200) of the ideal condition based on reconstruction drawings (Pugatschenkowa 1958) and a plaster model (1:100) of the actual condition of the ruins of the monument (Figure 4).



Figure 4: Clay model based on reconstruction drawings (left), plaster model of the current condition (right)

The five "Restoration" sub-groups drew up maps showing materials and damage in selected areas (e.g. north-east façade, main room and side rooms). Examples of the finished mapping are shown in Figs. 6 and 7, made even clearer by the use of colour. The appropriate descriptions for the bilingual legends required considerable discussion. Climate monitoring was undertaken on the basis of climatic measurements at various times of day. Sub-group R II recorded the wall structure, based on five layers, of the north-east external façade (Figure 5). From inside working out, this was found to consist of: 1. Core masonry of horizontal square bricks, 2. a mortar backfill layer, 3. a levelling layer of vertically-laid square bricks, 4. a further layer of mortar and 5. the facing masonry of unglazed and glazed tiles with majolica and mosaic tile inserts.

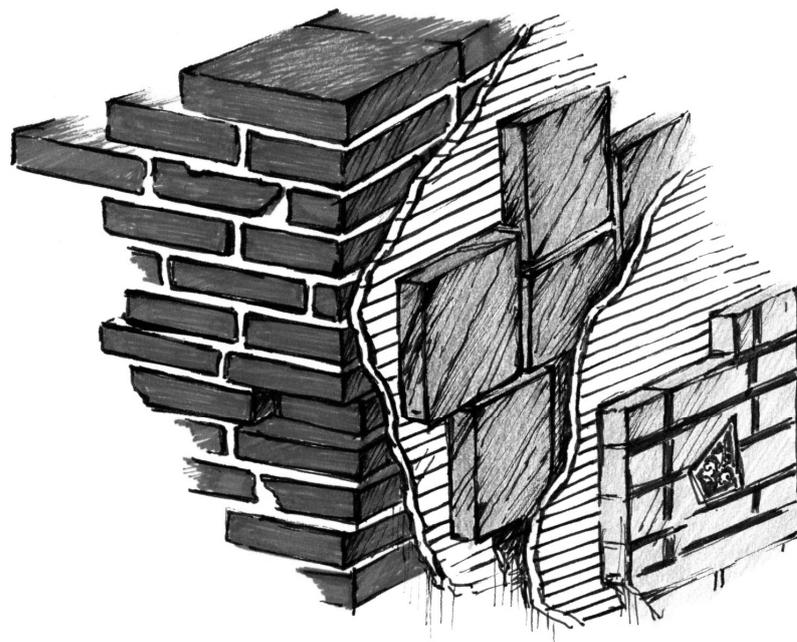


Figure 5: Structure of the north-east external façade



Figure 6: Original image for mapping of the north-east external façade (produced digitally on site, format approx. DIN A4)

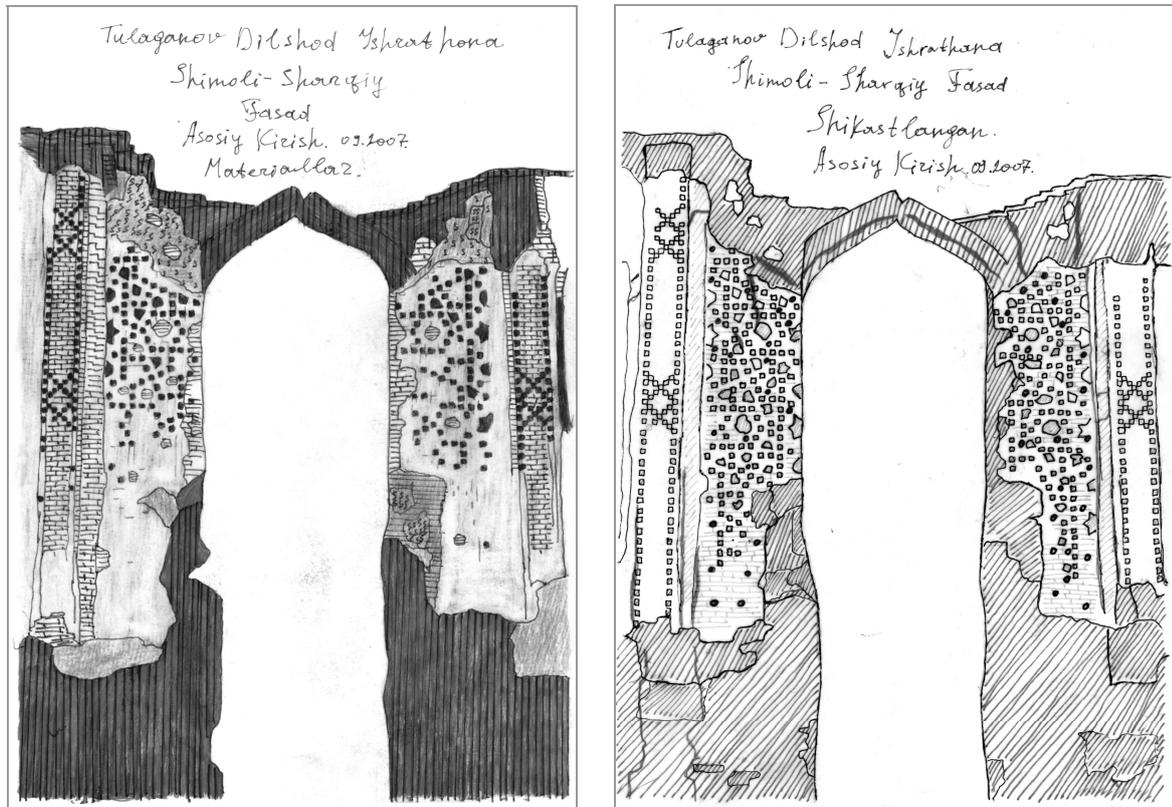


Figure 7: Mapping of materials (left) and associated damage (right) on tracing paper, format approx. DIN A4 for the documentation of various decorative techniques and the weathering and damage patterns, cf. original, Figure 6

Evaluation and prospects of the Summer School

The First Uzbek-German Summer School for Preservation of Monuments was an outstanding success. The news, broadcast nationally, reported in detail on the opening of the Summer School in Tashkent. The closing event was broadcast on regional TV in Samarkand and reported upon in Uzbek daily newspapers.

From a social communications point of view, special mention should be made of the extraordinarily harmonious cooperation by the students of both countries. Further plus points were the good support work, including that by young student tutors (1 / 9!!), and student interpreters (1 / 7!!). Despite the serious nature of the work it should not be forgotten that a lot of fun was had while working. On the last evening everyone celebrated and danced – from a 65-year-old professor down to the youngest 20-year-old student – until late into the night. This social aspect made a valuable contribution to the effectiveness of the learning atmosphere (Figure 8, left), ensuring that the specialist content of the lectures and training sessions was very well received by the Uzbek participants. Above all, the practical work on site achieved extraordinarily valuable results.

This is reflected in the students' evaluations, obtained on the last day of the practical project by means of a written questionnaire. The texts of the news sheets fixed to the walls of the working pavilion included the following, for example: "Our aim was to make new contacts and acquire new knowledge. We have achieved this. We have had a lot of experience. In future we will use some different approaches in our work."

In particular, the interdisciplinary approach and the cooperation between the lecturers – architects, structural engineers, art historians and restorers – ensured that awareness and a sense of care were imparted in dealing with the structure of the ruins of the Ishrat Khana mausoleum. The project awakened understanding on the part of the Uzbek lecturers and students for the maintenance and conservation of the ruins as a witness of their time in their original state. Many of its constructional details have been preserved and the construction history of the mausoleum left on view. This would have been lost in a full reconstruction, such as a glimpse of the masonry courses in the squinches or the massive timber trunks visibly walled in as protection from earthquakes.

The Preservation of Monuments Summer School resulted in numerous specific activities on various levels which will be continued. Ideas have been expressed for a joint research project at professor level, specific proposals for the joint German-Uzbek support of Uzbek PhD students, and an initial project outline for an Uzbek-German building academy with a German-Uzbek master's degree course and Summer Schools for the Preservation of Monuments to be held annually.



Figure 8: Concentration and enthusiasm while working on and around the scaffolding in Interior Room 1 (left) and interaction at the communal lunch in the working pavilion on the site of the mausoleum (right)

CONCLUSION

Uzbekistan has many buildings that are important from both a construction history and art history perspective. These are at risk not only from environmental influences, but also restoration practices, which in Uzbekistan are understood and implemented mainly in the form of reconstruction. The aim of this project was to hold a three-

week Summer School where 40 Uzbek architecture and construction students were made aware of a new, different perspective on construction history and the preservation of monuments – contrary to the usual teaching in their country. A particular influence on the students was the opportunity to work directly on the building in question, in the course of a practical, open-air project – the most significant ruined monument in Samarkand, the Ishrat Khana mausoleum (1464).

Working methods and practice in the conservation of buildings and monuments are of their nature very different from new build, where the emphasis is on design. Conservation involves above all the question of determining and evaluating the condition, and building around the existing structure, which requires special consideration. As part of the practical exercise, various items of equipment and processes, in line with the latest European technology, were introduced to the students, who were given “hands on” experience of them in their own work. Another essential aspect was the inherent interdisciplinary nature of the programme work. The presence of architects, structural engineers, natural scientists and restorers among both the lecturers and the participating students facilitated or even demanded specialist networking during the project, giving each professional sector an insight into the others' worlds.

Essential factors for the success of the Summer School and the work carried out included the relationships formed: the relationship with the monument on which the students gained hands-on experience, and the interpersonal relationships which transcended cultural, language and hierarchical boundaries. A concentrated, open working atmosphere prevailed between students and teachers, characterised by fun, enjoyment and harmony.

A further special aspect related to the questioning of the issues arising from conservation procedures when dealing with historical ruins. The intensive, wide-ranging, tactile contact with the building over 14 days substantially changed the students' perception of the monument. A transformation took place from “wayside ruin” to property, and the participants took respectful interest in its future development. The role of the devastated ruin as a witness of its times was recognised, as the number of hidden but preserved details allowed for the comprehensive visualisation of the original. If an observer of the property is given time and visual aids, reconstruction is not necessary, as one Uzbek lecturer observed.

Projects of this kind are strongly recommended by the German team as an aspect of studies in Germany or any other country. It has proved important to link construction history studies to central projects, enabling them to be lifted from everyday university life and also to be brought closer to those outside the academic sphere. A valuable aspect is the opportunity to concentrate on a particular property and adopt a unified approach. Another essential factor is strengthening the motivation and teamworking skills of lecturers, which in turn ensures a good flow of information. They need to be able to deal with any frustrations arising among participants during the course of a project; where appropriate incorporating them creatively and meaningfully, and supporting the students with a reasonable input.

PICTURE CREDITS

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