

Technical report
UNESCO/UNDP
Project UZB 94/002/A/01

UZBEKISTAN

Sustainable Development
and Revival of Cultural
Heritage

Architectural conservation and restoration
of Abd al-Aziz Khan Madrasa, Bukhara

DRAFT

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United Nations
Development Programme

Educational, United Nations

Scientific and
Cultural Organisation

November 1995

Uzbekistan
The Republic of

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Madrasa, Bukhara.

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A technical report
prepared for the Republic
of Uzbekistan by United
Nations Development

Programme (UNDP)

**Executing Agency:
United Nations
Educational, Scientific
and Cultural Organisation
(UNESCO)
November 1995.**

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Architectural conservation and restoration of Abd al-Aziz Khan Madrasa, Bukhara.

Technical report.

"The reaction in front of a historical building is very often a complicated psychological reaction. The feeling of authenticity depends on genuine materials, construction and form. It is often so that the wear and tear through hundreds of years makes this feeling evident."

(Ove Hidemark, architect and restorer of the Skokloster, Sweden; ICOMOS Bulletin, 6/1981)

I Introduction:

1. The present report is prepared within the framework of the UNESCO/UNDP project for promoting sustainable development and revival of cultural heritage in Uzbekistan. A first mission was undertaken from 17 April to 9 May 1995 with the main purpose of preparing outline proposals for the restoration of selected historic monuments aiming to mobilize international support and to develop an integrated approach between the preservation of cultural heritage, tourism and handicrafts development.

2. A second mission was fielded from 13 to 28 October 1995 with the main purpose of finalizing the project proposals for two selected historic monuments: Abd al-Aziz Khan Madrasa in Bukhara and the Tillya-Kari Mosque and Madrasa in Samarkand. The two projects have been prepared simultaneously, but I have thought it most appropriate, albeit some views will be repeated, that they are presented in separate reports.

3. This report is aiming to outline the extent and character of the restoration of the Abd al-Aziz Khan Madrasa in Bukhara. Under the respective headings, the report provides a brief history of the building followed by a description of the actual building condition and a review of the previous restoration. Subsequently, the report provides an outline specification of the proposed restoration work and preliminary cost estimates.

4. Furthermore, general principles on restoration are being discussed with a special view to *The Charter of Venice* (Venice, 1964). A conservation policy is based on inspection, research and analysis of the historic fabric before the objectives of the presentation is formulated, and the restoration proposal will depend on the individual historic background and appearance of

the building. While the Venice Charter has become an international standard reference on conservation of the build heritage, the charter is subject to individual interpretation in relation to the diversity of cultural traditions and values in different societies. Therefore both the objectives and the way the building is to be presented need to be discussed and agreed before conservation action is undertaken.

A Building history:

5. The reign of Khan 'Abd al-Aziz (1055-91/1645-80) was regarded as the end of the great period of Uzbek rule that replaced Mongol sovereignty in 1500. Lasting until the Russian revolution, the Uzbek polity, however, was carved up by various princes, who made themselves independent and the Khan in Bukhara came to rule only a small portion of his former kingdom. The central power structure ceased to exist and thereby also the capability to built the monumental architecture, which had developed to be the hallmark of the past empires.

6. Founded in the year 1651 'Abd al-Aziz Khan Madrasa was then one of the last big Muslim madrasas to be erected according to the Bukhara school of architecture that developed fully in the 16th century. Built opposite the Ulugh Beg Madrasa dating from 1417, it also follows and terminates the so-called *Kosh* tradition by which two madrasas are facing each other, creating an architectural ensemble as well as an urban space between the two main facades.

7. At first glance there is little to distinguish the two buildings from each other despite disparity in age of more than two hundred years. Together they form a harmonious whole. Studied more closely, however, the tile decoration and wall paintings reflect the new extraneous influences which modified the traditional Timurid style. In addition to geometric and floral patterns of design, panels with flower vases in high relief, snakes with birds' heads and similar alien motifs appear.

8. The benefactor wanted a building which would muster the best of Bukhara, bringing together architecture and the applied arts. In addition to the traditional glazed tile decorations, rich decorative paintings were put to use for decorations at the *muqarnas* vault of the *pishtaq* (portal) and in the most prominent rooms of the building. The *darskhana* (assembly hall) and the *khanaka* (winter mosque) in particular, located to either side of the entrance hall, as well as the vaulted summer mosque, have rich polychrome mural paintings in the so-called *kundal* techniques. The intricate floral patterns in high relief appear on a blue background. But also picturesque landscapes with garden pavilions and kiosks sparsely

decorate some panels, resembling romantic Indian miniatures from the time of the Moghuls.

9. We know, according to Pugachenkova (1975), the names of the master craftsmen. The architect was Muhammad-Salihi whereas the name of the master calligrapher was Maulian-Muhammad Amin and his son, Mim-Chakan ibn Chodsha-Muhammad Amin, was responsible for the mosaic work.

10. Unfortunately the decorative elements were never completed due to a *coup d'etat*, but still the building remained in use as a madrasa until 1920. More recently the courtyard was used for concerts and other public performances, but at present the building is only partially used. The Regional Inspectorate of the Board of Monuments occupies a few rooms at the ground floor for offices, the *darskhana* is used as an antique- and souvenir shop and the winter mosque houses an unpretentious small museum for wood crafts, while the rest of the building remains empty. As part of the historic itinerary the mosque and *darskhana* are accessible for tourists together with the courtyard and the summer mosque.

B Building description and general condition:

The building structure:

11. Designed as a four-*iwan* complex, the building lay-out follows basically the Timurid tradition that evolved throughout the Turan and Khorrasan areas. The slightly oblong plan measures 48 by 68 metres on the outside. Each corner is accentuated by a *guldasta* (turret) protruding from the facades. The entrance facade has deep niches in two tiers to each side of the *pishtaq* (portal), which appears with an imposing grandeur.

12. The *khudras* (dwelling cells) are located both at the ground floor and the first floor. Each cell consists typically of an anteroom with a fireplace for cooking and a flight of stairs leading to a mezzanine, which was used as a sleeping place. The partition walls had openings giving on to the living room and round the walls are niches intended for household objects and personal belongings. At ground floor level the mezzanine was relatively much larger and placed close to the external wall, leaving only a low storage area below. This arrangement was possibly due to the high position of the windows to the outside.

13. The marble panels along the base of the building are badly weathered and severely damaged by salt efflorescence in many places, which has caused flaking of the surface and loss of adherence. The tlinth was never completed and it appears in several places that the elaborated detailing was abruptly abandoned (se

fig. 04). At the front facade only one marble slab is left *in situ* giving a vague idea of the intended splendour. The marble originates from stone quarries at Nurata, approximately 170 kilometres from Bukhara.

14. A pit latrine situated in one room at the south-eastern corner of the building is causing severe salt efflorescence and damp conditions in the walls. At one time modern piped water supply has been installed in some rooms at the southwestern corner, possibly aggravating the structural condition in this part of the building.

15. Parts of the brick pavement inside the courtyard is missing in front of the northern *iwan*, where a stage has been put up for public performances and concerts. As appear from early photographs in the archive, previously a square brick structure with three arched openings (to each side ?) stood in the middle of the courtyard. The function is not known, but it may possibly have been a place for ablutions.

Structural problems

16. The main cracks and structural failures are attributed to damage from the earthquakes of 1976 and 1984. The worst situation occurs at the external wall of the eastern and the southern wing, including the south-western tower, where structural consolidation will be needed. The static condition is said to be stable, but telltales put up in 1989 on the walls at first floor of the eastern wing, indicate fairly recent movements varying from 1 to 35 millimetres, and further investigations of possible foundation failures need to be undertaken after removal of excess soil along the eastern side of the building.

17. The ground to the south of the building has been lowered about 2.50 metres in order to reach the original ground level, but the required retaining walls and drainage have not yet been established. To the east of the building accumulated soil reaching to a height of about 3 metres is causing damp conditions and need to be removed. Exposure of the wall, however, will increase the outward thrust, and structural consolidation will have to be completed before removal of the soil. So much more because the eastern wing has severe cracks running all along the external wall.

18. Throughout the building many minor cracks are visible. It is difficult to ascertain in each and every case, whether the cracks are caused by structural failures or whether they relate mainly to the plaster. Hard and brittle, the gypsum plaster is very liable to cracking and any movement of the backing can easily cause detachment of the plaster from the wall.

19. Furthermore, suspended from the vault by means of timber hangers and struts projecting from the masonry and attached with lumps of gypsum mortar, the *muqarnas* vaulting is independent of the structural wall. In most cases experiments are needed to ascertain, whether the wall plaster or the *muqarnas* can be affixed and stabilized *in situ* by gravity grouting.

The glazed tile decoration:

20. Originally introduced in the 12th century as a decoration of glazed blue bricks and tiles in dome facing or as insertions in the overall ornamental design on walls, the polychrome tiling reached a high standard of perfection during the Timurid (and Safavid) times. During the following centuries painted *majolica* tiles came into use instead of the cut mosaic tiles, mainly because the *majolica* work was cheaper to produce. Both techniques as well as more ordinary polychrome brickwork are used for the tile revetment in the Abd al-Aziz Madrasa. However, the tile decorations were only partially completed, before the construction was hastily abandoned.

21. Judging from the still remaining tilework, only the portal and the right hand side of the main facade were originally completed. The tile revetment was never been applied to the turrets, neither to the inside of the niches and only one marble panel exists *in situ* at the plinth. Likewise, the glazed tile revetment in the courtyard was only completed at the facades of the eastern half of the building and the marble panels only partly completed. Fairly recent, two tympanons and the interior of the related niches have received a new decorated tile revetment, that is based upon conjectural design. The external facades to the back were probably never intended for decoration and appear with plain masonry.

22. The condition of the tile revetment is well documented in the beautiful water-colour drawings dating from 1959 and the total area of existing tile decoration is shown on the elevations included in this report (fig. 08-10).

The wall paintings:

23. The rich and elaborate wall decorations are the most prominent features of the Abd al-Aziz Madrasa (see fig. 05). The majority of the sumptuous wall decorations are executed in the so-called *kundal* technique, which are characteristic of the XVI century. Executed with a floral design in high relief, the projecting patterns were originally intended to be covered with gold leaves on a background of a deep ultramarine background. It is not clear, however, how large parts of the decoration were ever

completed. To-day the floral design appear in the read colour of the clay on a much faded blue background, but according to Mrs. Galina Asamova, chief expert at the Uzbek State Scientific Restoration Enterprise ('Cadriat') under the Ministry of Culture, spectroscopic analysis of the paint layers in the *Khanaka* carried out in 1989 has revealed traces of gold leaves. An alloy of inferior metals may have been in use, locally called *potal*. Also paintings in deep relief appear.

24. The painted surfaces are very large, not unfolded, the *muqarnas* vaults and painted wall surfaces comprise roughly the areas indicated in the first column, while the second coloumn gives the approximate total area :

- the <i>muqarnas</i> vault of the <i>pishtaq</i>	125 m ² x 3.5 =	438 m ²
- the domed room above the entrance hall	25 m ² x 2.8 =	70 m ²
- the summer mosque	125 m ² x 2.0 =	25 m ²
- the <i>khanaka</i> (winter mosque)	600 m ² x 3.0 =	1.800 m ²
- the <i>darskhana</i> (lecture hall)	<u>500 m² x 2.5 =</u>	<u>1.150 m²</u>

total area of wall decoration, approximately 3.000 m²

25. Also the individual *khudjas* (cells) are richly decorated. Walls and ceilings alike are painted and divided into *ganch* (gypsum) panels, which are carved with patterns in deep relief (see fig. 06 and 11). Each cell has been subject to repeated redecoration according to the current style and preference of the individual student, who rented the accommodation for the entire period of his study in the madrasa. In this way the interior decoration represents different ornamental styles and colour schemes that are characteristic of the various periods during which the cells were used. In the main, the existing decor in a style characteristic of the Khiva and Bukhara regions, probably dates from the 19th century. But older decoration may be hidden under more recent layers of plaster, which in several rooms have about six successive layers. The actual condition of the dwelling cells varies and in most cases the mezzanines have been taken down leaving the compartments incomplete. Altogether, there are about 28 dwelling cells at first floor level, each with its own entrance and a window to the outside. A similar number of rooms is existing at the ground floor level, but the majority of the rooms are blocked at the moment and the decoration cannot be studied. The total decorated areas in the student cells amount to about 700 m².

C Building records and documentation.

26. The archives at the Board of Monuments in Tashkent contains

valuable documentation of measured drawings and index file cards with about 220 black-and-white photographs in approximately 9x12 cm format, documenting the building condition and previous restoration work from the 1920s onwards.

27. The measured drawings date mainly from 1959 at which time a comprehensive survey of the building was carried out under direction of the architects Notkin, Krukov and Filimonov, and subsequent surveys have been completed in 1967. Traced in ink, the majority of the drawings are beautifully water-coloured and constitute a real treasure that merits publication (see selected examples rendered fig. 01-03). A full list of the drawings are given in appendix I. More recently, a new set of survey drawings was made in 1992, including plans, main sections and elevations of all facades in scale 1:100 and subsequently, a restoration project was prepared in 1993 (please refer to the subsequent discussion para. 42).

28. Likewise, Students from the Architectural Department of the Tashkent Polytechnical Institute have made exquisite studies of Islamic architectural and decorative art, illustrating details of the outstanding monuments in the country. Studies have also been made of the interior decoration of the Abd al-Aziz Madrasa and four admirable examples are published in *Ornamentation in Uzbek architecture (in Russian)*, Tashkent, 1974. Similar studies have been made by art students in Bukhara but the documentation needs to be collected and supplemented.

29. Much additional photographic documentation of the building can be traced, if time permits. Special attention should be made to the depository of the Bukhara Arts and Architecture Museum collections of A. Efremov and I. Panov, who documented monuments and daily life in the city at the beginning of this century. Some of these photographs are published in *Bukhara, a Museum in the Open*, Tashkent, 1991. Further documentation may be available in the archives of the Institute of Oriental Studies and the Institute of History in Tashkent.

D. Previous restoration work:

30. The madrasa has maintained a high degree of authenticity as a historic monument. In the main, no alterations have been made to the original building structure, which remain with all the traces of uncompleted work. Yet the building has been in use for more than 300 years. This situation is quite unique, posing a specific challenge to the architect restorer in order to respect the genuine materials and constructions.

31. Some regular upkeep has been carried out in the past. Most importantly, the tile roofing has been regularly maintained and recently new waterspouts in concrete have been installed to throw rain water away from the walls.

32. About one third of the *muqarnas* vaulting of the entrance *pishtaq* was renewed in 1930 by the master craftsman Usto Shirin Muradov. The new *ganch* surfaces were left unpainted and the year of restoration indicated. The work is documented in black and white photos (index card 4231/37-13 and the following). Likewise, minor repairs to the stalactites of the summer mosque have been left unpainted, leaving the great majority of the 17th century wall paintings untouched. Part of the *muqarnas* in the eastern *iwan* was restored in 1957 (see condition before restoration fig. 01), but the vault has never been decorated and the actual extent of the renewal is not visible *in situ*. Most lately repainting in low relief at the upper part of the entrance *pishtaq* was initiated in 1994 by local masters, but this work was stopped by the Board of Monuments Commission.

33. Unfortunately, the Indian caravanserail which was located immediately to the west of the madrasa was demolished in the 1960s in favour of a new public square and a row of new souvenir shops. The exposure was made in consequence of the then current planning concept for 'a museum in the open'. As part of this scheme of 'beautification', new gypsum screens were inserted in the window apertures towards the west, while the majority of the remaining openings in the external facades still remain blocked up.

34. Soil deposits of the past have accumulated around the building raising the ground level about 2 to 3 metres above the original level. To the west of the building the area was cleared in connection with the demolition of the Indian caravanserail and also to the south soil has been removed, leaving a 3 metres wide muddy trench along the facade.

35. Several restoration works were initiated in the early 1980s. The brick facing of the plinth of the main facade was renewed with a rather unpleasant finish. Also the roofing was repaired, including the installation of new water spouts. To the interior of the courtyard, two new tympanum panels of mosaic tilework were put in place at the ground floor above the niches immediately to the east of the northern and the southern *iwan* respectively and likewise were the walls of these niches completed with new brick tiles. Allegedly, the rest of the existing glazed tile work is authentic, apart from one faded fragment of blue inscription in the *pishtaq* above the main entrance.

E Outline specification of restoration and preliminary

estimate of costs.

36. The restoration involves three largely independent operations, which may be carried out simultaneously or in order of succession: (i) structural consolidation and restoration of the building structure as well as renovation of neighbouring service buildings and landscaping of the precinct, (ii) restoration of the glazed tile work and (iii) conservation of the wall paintings.

37. The following outline project description and approximate assessment of costs is listed accordingly. While scarcely exhaustive, the list is sufficiently extensive to cover the main project activities, awaiting a specified cost estimate to be prepared on basis of a detailed restoration project. For planning purposes, an early agreement about the future use of the building is essential.

38. The project will have to be prepared by the Institute of Restoration under agreement with the Board of Monuments and UNESCO. The required planning include detailed specifications, project drawings and costing as well as the setting up of the steering committee and the project implementation unit. The appropriate organisation of the work site, including plans for the immediate precinct and arrangements for the reproduction of documentation and survey drawings all need to be completed before the actual restoration starts.

39. All prices are quoted in SUM or US dollars as per April 1995 (exchange rate 34.00 to the dollar). Apart from the stipulated involvement of international consultants, professional local fees and expenses are not included, neither is VAT (value-added tax), overheads or any other extra costs added.

Preliminaries

40. In consultation with prospective users and the mayor of Bukhara, Mr. Karim Jamalovich, identification of a possible future function of the building is essential. Two different proposals have been voiced: (i) The possible use as a dormitory for the neighbouring Mir-i-Arab Madrasa. This usage in relation to the well established religious institution of Bukhara would be in perfect continuity with the original intention of the building. (ii) Alternatively, the madrasa could provide lodgings for an art school.

41. In both cases, service facilities, studio and work-rooms have to be established outside the building proper and public access need possibly to be limited to the *darskhana* and the *Khanaka*. Anyhow, these prominent rooms exhibit the most important wall

paintings and the privacy of the hostel can easily be controlled by the warden at the entrance gate. The service facilities can conveniently be set up in the neighbouring buildings in order to avoid installation of piped water inside the historic monument.

(i) Restoration of the building structure and precinct.

42. Planning for the restoration of the the building structure has been prepared together with Mr. Bakhtiyar Parsayev, Deputy Director of the Regional State Inspectorate of Historic Sites on the basis of my direct observations at site. The cost has also been conferred by the bill of quantities, which were included in the project prepared by the Institute of Restoration in 1993, but this project needs modification and change according to agreement between the Board of Monuments and UNESCO on basis of the recommendations contained in the present report.

43. In general terms, traditional materials and constructions are providing the most suitable methods for restoration of historic structures. This principle involve, *inter alia*, that the indiscriminate use of cement and reinforced concrete should be abandoned and the use be restricted to very specific structural purposes, if no other means are available. And adherence to the seismic standars requirements that are established for new constructions should not be followed rigorously. The following standard of ethics are recommended as the basis of the restoration proposal (according to Feilden, 1982):

(i) The condition of the building before any intervention and all methods and materials used during treatment must be fully documented.

(ii) Historic evidence must not be destroyed, falsified or removed.

(iii) Any intervention must be the minimum necessary.

(iv) Any intervention must be governed by unswerving respect for the aesthetic, historical and physical integrity of cultural property.

Excavation, earthwork and renovation of service buildings

44. Acquire school buildings and plot to the east of the building,

set up site office and arrange storage and workshop facilities. After completion of the restoration work, the premises will provide service amenities as required for the new function of the madrasa, according to design, and direct access can be established from the eastern *iwan* through a new doorway in the external wall (see sketch site plan fig. 12).

. Total estimated cost of service facilities...2.5 mill SUM

45. Archaeological excavations to the east of the madrasa need to be carried out simultaneously with the lowering the ground to the original level in an area of about 10 meters from the building and subsequent disposal of about 1.200 m³ surplus soil. Structural consolidation of the building need to be completed before removal of soil.

. Total estimated cost of earthwork.....0.6 mill SUM

46. Installation of new drainage, establishment of brick pavements and construction of retaining walls gradually stepped back from the building according to design.

. Total estimated cost of landscaping.....1.0 mill SUM

Structural consolidation and brickwork

47. Structural consolidation of the northern and eastern external wall, preferably by use of Adjar timber as wall plate in the external walls and connected by tie rods inserted perpendicular to the facades at the first floor and at roof level (see sketch design fig. 13.) Provision of a 'ring beam' at first floor and roof level of the south-western turret by insertion of pre-stressed iron ties after drilling. All iron members to be treated with anticorrosive paint and brushed over with a thin cement slurry to prevent access of air and humidity producing rust. Possibility of later adjustments of the tensile strength is essential. Dimension and spacing according to the design of the structural engineer.

48. Stripping down all plaster to expose blank masonry, rake out loose joints and cracks thoroughly and clear away dust and debris, patching of brickwork where required, consolidation of masonry by gravity grouting or injection with thin hydraulic (pozzolana) *ganch*/lime slurry and repointing. The same procedure is repeated for all external walls and niches. The colour, thickness and surface texture of the pointing are of vital importance to

the final appearance of the brickwork.

49. Opening of all original window apertures presently blocked up and replace with new *pangaras* (*ganch* screens). Re-open and repair staircases leading from the eastern and western *iwan* to the first floor.

50. Replacement of missing brick pavement in courtyard and repair of all brick flooring.

51. Repair to the roof, including completion of upper part of the western *iwan* and brick-on-edge copings along all external facades. A close investigations of the construction will reveal to which extend the entire roof needs replacement due to collapsed spandrels and water leakages. After clearance, new tie-rods can be placed inside the spandrels for reinforcement as required according to the engineers recommendations. Carried out according to traditional construction methods, the roof is constructed of: (i) Back-filling levelled to fall towards rainwater outlets. (ii) A water-proof lime mortar screed coat, possibly improved by a membrane of vulcanic sodium-bentonite clay that swells up to 15 times its dry volume when contacted by water. Found as natural deposits in the U.S.A and marketed under the name 'Volclay', the product can be used as a granulate mixed with sand in a ratio of about 1:3, or it may be applied as biologically decomposable carton panels, about 5 mm in thickness, containing a layer of Volclay amounting to 5 kg/m²; the cost is competitive with other water-proofing materials according to informations provided by the Danish supplier. (iv) A final lime mortar setting bed and paving with two courses of square bricks laid flatwise.

. Total estimated cost of structural repair
and brickwork 6.0 mill SUM

Marble panels

52. Remove marble panels and consolidate weakened parts, insert damp proof course and reinstate panels in the original position by aid of cramps of stainless steel leaving ventilated space behind.

53. Replacement of weathered or deteriorated panels about to decompose; the total cost depends on the extent to which it can be justified to cut supplementary panels for replacement.

. Total estimated cost of marble panels 1.5 mill SUM

Joinery

54. New window frames with glass inserted into all openings to the outside behind the external *ganch* screens.

55. New double leave doors to doorways and repair of the existing ancient door leafs, including ironmongery of traditional type.

. Total estimated cost of joinery.....1.0 mill SUM

Interior repair work and restoration/redecoration of *Khudras*

56. Restore cells with wall painting and decorative *ganch* panels; selected examples to be restored as exhibition rooms, complete with mezzanine and fireplace; rooms with lesser or no decoration are left white washed or redecorated; arrangement can possibly be made with the Faculty of Art Painting and Graphics for training purposes; average cost per room estimated at 30.000 SUM.

. Total estimated cost of redecoration1.5 mill SUM

General services

57. Service requirements for the building, such as electrical installations and heating, need to be investigated. The service facilities, which are thought to be best suited to meet future requirements, depend largely upon the future use of the building. Water installations and toilet facilities are planned to be put up in the neighbouring buildings.

. Total estimated cost of general services.....1.5 mill SUM

(ii) Restoration of the glazed tile decorations.Sketch project prepared by the Institute of Restoration

58. Based on sketch plans worked out by the architect Vladimir Filimonov, the architects Svetlana Krolivetskaya and Irina Filimonova employed at the Institute of Restoration have started

preparing working drawings for the restoration of the glazed tile decorations. The project is planned to involve the following activities:

- (i) Conservation of original tile work;
- (ii) Partial reconstruction of missing parts based on clear evidence of the original design;
- (iii) Conjectural design of new decoration completing the eastern part of the main facade and all facades and niches of the eastern half of the courtyard facades, while the unfinished parts of the western court facades will remain without decorations. The design of new mosaics and *majolika* is based partly on analogical reconstruction.

59. The water-colour drawings in scale 1:2 and 1:1 of individual tympanons are executed with superior professional skills according to the well established traditions in Uzbekistan. However, evaluation of the proposal can only be made on basis of the completed design showing all the facades in scale 1:20 or 1:50.

. Total estimated cost of tilework 10 mill SUM

Alternative project for preservation of the glazed tile work.

60. With a view to the principles of restoration as expressed in the Venice Charter, the intentions for a partial completion of the tile decoration is controversial. Article 9 outlines that..'the aim of restoration is to preserve and reveal the aesthetic value of the monument and is based on respect for original material and authentic documents. It must stop where conjecture begins...'. .

61. Relevant alternative approaches can be drawn for example from the recent restoration of the entrance gate to the Gur-Emir Mausoleum in Samarkand, where the uncompleted decoration indicate the original pattern and leave room for the imagination. Or for example a previous preservation of the Tuman-aka Mausoleum at Shah-i-Zinda, where the missing part of the decoration has been replaced by ordinary plaster to secure the preservation of the remaining tile work, but the colour and texture of the plaster has been delicately blended to enhance the original tile work.

62. Based on the principles set out in the Venice Charter, such alternative proposals for the preservation of the tile decorations

are required for evaluation by the Board of Monument and UNESCO on basis of project drawings showing all the facades in scale 1:50.

63. The project need to be prepared with respect of the autentic tilework, presenting the monument in accordance with its history as an uncompleted building. A gradual transition from the plain brickwork to the preserved tile revetment need to be established, ensuring the overall harmony of the building. This can be achieved through a careful use of different surface treatments, varying from (i) plain brick work at the western facades; (ii) rendered surfaces; (iii) rendered surfaces with brick framing ready for the application of tilework and (iv) surfaces with the original tilework preserved. The careful selection of suitable colours and textures of plaster and mortar are essential for the good result. Areas of small extent may be replaced with new tiles for completion of a panel, but special care should be made to sort out and reuse existing tiles from debris stored within the madrasa before new tiles are being produced.

64. The argument for the least possible intervention may be supported from a purely economic point of view. The need for urgent repair work to a large number of historic buildings must have preference over any restoration work that may be considered redundant.

. Total costs will depend largely on the detailed project, but a rough estimate can be stipulated in the order of 1/3 of the proposed reconstruction....3.3 mill SUM

(iii) Restoration of 17th century wall paintings.

65. Repair of cracks and stabilization of the *muqarnas* vaulting is needed before actual conservation of the wall paintings can start. The large vaults in the *darskhana* and the *khanaka* display serious cracks, but according to Mrs. Larisa Lukina, structural engineer in the Institute of Restoration, the structural problems in the front wing of the building are negligible. Structural consolidation of brickwork is required in southern wing, where the summer mosque is situated. Suspended from above by means of timber hangers and struts rom the masonry behind, the *muqarnas* vaulting can be repaired *in situ* independently of the structural wall. As a first try, this would imply a possible consolidation and stabilization of the *muqarnas* by gravity grouting, after cleaning and surface repair of the cracks has been completed from the outside.

66. Before any treatment be undertaken, the paintings have to be thoroughly examined, including investigations and analysis of (i) the painting materials, i.e. colour pigments and binding media, (ii) the painting techniques and (iii) the actual state of

preservation, including a a general photographic and graphic documentation of the actual state of conservation.

67. The condition report forms the basis for the decision concerning the extent and the character of the conservation work. Possible restoration works should be carefully considered. It would be highly problematic, both in terms of ethics and aesthetics, to attempt to reestablish the appearance of the wall paintings in accordance with what may possibly have been the original intention. Generally, a variety of techniques can be adopted depending on the specific conservation/ restoration problems. I will recommend that the treatment be limited to conservation and some retouching. Minor injuries and small losses are usually tinted with approximate or neutral colours so that they should not interfere with the general artistic impression. This measure could advantageously be applied for the previous repairs to the *muqarnas* in the vault of the summer mosque, where the large white areas are disturbing the general apprehension of the decoration. And in the case of the large areas decorated in *kisil-kasakh* technique (red earth pigment), completion can be made without relief, which will differ from the original parts on close examination. In order to apprehend the original intended appearance, a section of some squaremetres could be reconstructed, including f.ex. gilding of the floral ornamentation standing out in relief on a blue ground.

68. A preliminary condition report has been prepared this year by Mrs. Galina Asamova, chief expert on restoration of architectural decoration at the Uzbek State Scientific Restoration Enterprise ('Cadriat'). According to the investigations the painting layers are flaking and crumbling due to loss of binding media, while the ground and undercoat show extensive exfoliation. From a visual examination only, it appears that the continuous blue background for the ornamentation is seriously faded and worn. The ornamentation in a high relief-technique was originally probably meant to be gilded, which may never have been completed. However, according to Mrs. Galina Asamova, spectroscopic analysis of the paint layers in the *Khanaka* reveals traces of gold leaves. Other materials imitating gold have possibly been in use according to the so-called '*potal*' technique applying copper or similar alloys imitating gold. Comparable studies can be made f.ex. of the wall paintings in the Masjiid Baljand in Bukhara (16. cent., not restored) or in Tillya Kari Mosque in Samarkand (1646-1660, heavily restored).

69. The costing can only be estimated after careful analysis, specification of work procedures and after agreement has been reached to which extent the restoration/conservation shall be carried out. Bukhara musters very skilled painters, but they will need special training in restoration techniques and the actual conservation must be carried out under guidance of an experienced conservator, who can secure consistency and guarantee the quality

of the final result. The work can be carried out independently of the building restoration and may be extended over a longer period of time starting with the less complicated wall decorations in the *Khudjras* (student cells) and extending to the most complicated work in the *Kharnaka* (winter mosque).

70. Short training courses held by specialists are necessary, teaching general principles and practical work on the main topics and problems of conservation. One international consultant from ICCROM (International Centre for the Study of the Preservation and the Restoration of Cultural Property in Rome), Department of Mural Paintings, or from a recognized university institution, should be made available for this job, working in close cooperation with the specialists from 'Cadriat' (the Uzbek State Scientific Restoration Enterprise). Training abroad for professionals to undertake specialization courses is the next step.

71. Based on the assessments made by Mrs. Galina Asamova the restoration work will take about five years to accomplish for a group of about 15 painting restorers. Based on an average cost of 3200 SUM/m² and a total area of 3,700 m², including the *khudjras*, the total estimated cost of the painting restoration will amount to 12 mill SUM

Equipment and sundries

72. For the proper functioning of the Regional State Inspectorate of Historic Sites various equipment will be necessary. It is recommended that the following items be purchased as part of the project: One small truck. Steel tube scaffolding, pulleys, tools and equipment according to specifications. Office equipment: one photocopy machine, one computer with printer, camera for photographic documentation, filing cabinet, stationaries and drawing equipment.

. Total estimated equipment and sundries3.3 mill SUM

Grand total estimated cost of restoration

Service buildings, earthwork, foundation and landscaping.....	4.5 mill SUM
Restoration of brick structures, interiors and installations.....	11.5 mill SUM
Conservation of tilework.....	3.3 mill SUM
Conservation of wall paintings.....	12.0 mill SUM
Equipment and office sundries.....	3.3 mill SUM
	<u>34,6 mill SUM</u>

Unforeseen expences 15 % 5.2 mill SUM

Grand total estimated cost of restoration 39.8 mill SUM

External consultancies:

architect restorer, 6 m/month each 12.000 US.D. ... 72.000 US.D.

Structural engineer, 1 m/month 12.000 US.D.

Painting conservator, 6 m/month 72.000 US.D.

Total external consultants 156.000 US.D

F. Institutional Framework, project organisation and implementation

Steering Committee

73. The following persons are proposed as members of a steering committee that will help promote the project activities in Bukhara and get them well under way:

- Mr. S.S. Sirajev, First Deputy Khokim of the Bukhara Region
- Mr. K. Jamalovich, Mayor of Bukhara.
- Mr. Khairulla Salamov, Head, Regional State Inspectorate of Historic Sites.
- Mr. Robert Almeyev, Director General of National Parks and Museums of Bukhara and Chairman of the Crafts Association.
- one representative from the Board of Monuments.
- Mr. Vladimir Filimonov, honourable member, former chief architect with the Institute of Restoration.

Project Implementation Unit

74. The responsibility for implementation of the project will remain with the existing organizational structure for cultural heritage preservation under direct supervision by Mr. Bakhtiyar Parsayev, Deputy Inspector of the Regional State Inspectorate under the Board of Monuments, assisted by Mrs. Bariya Valiulina, architect employed by the Inspectorate. To ensure efficient and effective implementation, it is recommended that the project receives an independent status and the day-to-day responsibility for coordination and implementation of the project is handed over to a site architect, who is appointed specifically for this project with the following main tasks:

- (i) Collect, analyze and update all project documents and drawings.

- (ii) Appoint the required workforce, negotiate all sub-contracts, procure materials and required equipment, as well as ensuring suppliers delivery dates.
- (iii) Coordinate all building activities and ensure satisfactory progress in the day-to-day running of the project, including preparation of regular site reports, periodic summery reports and documentation for record purposes.
- (iv) Deal with any queries raised on the site and exercise daily quality control in terms of material, workmanship and adherence to project and agreed principles of restoration.
- (v) Exercise cost control and budget management.

75. The project will be subject to periodic review in accordance with the policies and procedures established by UNDP/Unesco for monitoring project and programme implementation.

General recommendations:

76. Preventive maintenance routines and regular repairs need to be general practice. And use of traditional building techniques and materials should be the general approach in restoration of historic buildings, not only as a matter of etichs, but also due to incompatibility of traditional and modern materials, especially cement and concrete.

77. The shortcomings and harmful effects of cement in historic buildings should now be acknowledged as a general problem to the preservation of the built heritage all over Uzbekistan and the indiscriminate use of cement and reinforced concrete should be abandoned. Hard and inflexible cement mortars do not work well together with the more subtle traditional materials and entrapment of moisture causes severe destruction. However, lime for building purposes is hardly available and specific effort is needed to resume production of good quality lime products.

Appendix I : Abd al-Aziz Khan Madrasa

List of drawings in the archives of the Board of Monuments:

ref. nr.	text of drawing	scale	technique
Portfolio no. 77: Drawings without date:			
2663	Plan	1:67	ink
2664	Main facade	1:100	ink
2665	Section through main portal	1:143	ink
2666	Panel of main portal (mosaics)	1:5	water-colour
2668	Facade of main portal	no scale	water-colour
2667	Court view from summer mosque	no scale	water-colour

Drawings dating from 1959:

38/59	Ground floor plan	1:100	ink
39/59	First floor plan	1:100	ink
40/59	Roof plan	1:100	ink
41/59	Elevation of the main facade	1:50	watercolour
42/59	Elevation of the western facade	1:100	ink
43/59	Elevation of the eastern facade	1:100	ink
44/59	Elevation of the southern facade	1:100	ink
45/59	Elevation of the western court f.	1:50	water-colour
46/59	Elevation of the northern court f.	1:50	water-colour
47/59	Elevation of the eastern court f.	1:50	water-colour
48/59	Detail of southern court facade	1:10	water-colour
49/59	Elevation of the southern court f.	1:50	water-colour
50/59	Elevation of the eastern court <i>iwan</i>	1:25	water-colour
51/59	Section A-A	1:50	water-colour
52/59	Section B-B	1:50	water-colour
53/59	Section C-C	1:50	water-colour
54/59	Section D-D	1:50	water-colour
55/59	Stalactites of entrance portal	1:10	ink
56/59	Stalactites of eastern court <i>iwan</i>	1:8	ink
57/59	Decoration of vault in summer mosque	1:25	water-colour
58/59	Tympanum of the northern court f.	1:2	water-colour
59/59	Tympanum of the northern court f.	1:2	water-colour
26/69	Stalactites of vault in <i>darskhana</i>	1:10	ink
26/70	Stalactites of vault in library	1:10	ink

Portfolio of drawings no. 77 (1): Drawings dating from 1967:

2147	Elevation of south-eastern court f.	1:20	water-colour
2148	Elevation of north-western court f.	1:20	water-colour
2149	Eastern court facade, the first floor	1:10	water-colour
2150	<i>Majolica</i> panel, eastern <i>iwan</i> , detail	1:1	water-colour
2151	Elevation of the eastern facade	1:50	ink

Appendix II

Select bibliography

(Author's note: Regretfully, essential books on historic monument preservation in Russian language are not listed due to my inability to read Russian).

Vitaly V. Naumkin, *Boukhara, Juste á temps: Les grandes archives Photographiques*, Paris 1993.

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Lisa Golombek and Donal Wilber, *The Timurid architecture of Iran and Turan*, vol I-II, Princeton, 1988.

G.A. Pugatschenkowa, *Samarkand - Bukara*, Berlin, 1975; translated from Russian, first edition Moschow, 1968.

V.A. Nielsen and V.N. Manakova, *Ornamentation in Uzbez architecture* (in Russian), Tashkent, 1974.

Ernst Cohn-Wiener, *Turan, Islamische Baukunst in Mittelasiien*, Berlin, 1930.

Conservation practice and theories:

InternationalCommittee on Monuments and Sites, '*International charter for the conservation and restoration of monuments and sites*' ('*The Charter of Venice*'), Paris, 1966.

Hans E. Wulff, *The traditional crafts of Persia*, MIT, Cambridge, Massachusetts, 1966, reprint 1976.

Ian Melville and Ian Gordon, *The repair and maintenance of houses*, London 1973 and 1979.

Bernard M. Feilden, *Conservation of Historic Buildings*, London, 1982.

Bernard M. Feilden and Jukka Jokilehto, *Management guidelines for world cultural heritage sites*, ICCROM, 1993.

P. Mora, L. Mora, P. Philippot, *Conservation of Wall Paintings*, Butterworths Series in Conservation and Museology, ICCROM, 1994

List of illustrations: Abd al-Aziz Khan MadrasaColour photographs (photo: F. Aalund)

Survey drawing of eastern <i>iwan</i> of the courtyard, water colour 1959	fig. 01
Survey drawing of mosaic panel and marble plinth, water colour 1959	fig. 02
Survey drawing of niche with glazed tile decoration, water colour 1959	fig. 03
Unfinished decoration of marble panel in deep relief ..	fig. 04
Wall decoration inside the vault of the <i>Khanaka</i> (winter mosque)	fig. 05
Wall decoration in cell at first floor	fig. 06

Survey drawings:

(reduced from the originals in the archive of the Board of Monuments; registration of glazed tile decoration added by G. Boccardi from survey of 1958 and 1967).

Plan of ground floor and first floor, scale 1:300	fig. 07
Elevation of main facade, scale 1:200	fig. 08
Sections and elevations of courtyard facades towards south and west, scale 1:200	fig. 09
Sections and elevations of courtyard facades towards north and east, scale 1:200	fig. 10
Sketch survey of cell at first floor with stucco panels and wall paintings (G. Boccardi)	fig. 11
Site plan, sketch only, with proposal for adjoining service amenity buildings (F. Aalund)	fig. 12

