

Mausoleum of Ahmad Yasawi

Turkestan, Kazakhstan

I. Introduction

The mausoleum of Ahmad Yasawi was built in the fourteenth century by the emperor Timur (Tamerlane). It was built, in two stages, to commemorate the Sufi poet and teacher Sheikh Ahmad Yasawi, who died in 1166. Yasawi is credited with the conversion of the Turkic-speaking people to Islam, and is commonly known as 'Father of the Turks'. The structure comprises eight main chambers, twenty-seven smaller rooms and some twelve passages, all enclosed within a single building and spread over two floors. The complex includes a mosque, a tomb chamber, a sacred well, a refectory, meeting rooms, a library space and a large assembly hall.

The building stands within the remains of a citadel, which once would have surrounded it. Parts of the mausoleum's external walls were severely damaged by Tsarist troops in 1864, and it has been under continuous restoration since 1907. The most recent effort, financed by the government of Turkey, was carried out between 1992 and 2000, when Kazakh and Turkish experts completed the restoration of the monument. The project attracted considerable public attention, and the government of Kazakhstan has nominated it for listing as a UNESCO World Heritage site. Although the monument has been under restoration for over one hundred years, it is the achievements of the Turko-Kazakh restoration project that are to be considered for the Award.

II. Contextual Information

a. Historical background

Although the mausoleum is six hundred years old, the building's importance must be considered in a contemporary context: it is a national symbol and the most important historical monument of Kazakhstan (its image appears on every Kazakh currency note). Timur did not complete the building, neither did his successors, and so the edifice is incomplete. Nevertheless, its association with Timur and the historical uniqueness of the building has lifted its status far above that of all other Kazakh monuments.

The basic core of the building was completed by about 1394. During the second stage of construction (1397–99) the upper parts of the mausoleum, including the revetments and the domes, were completed, but the gigantic portal that dominates the front (south) elevation of the building was never finished. Abdullah Khan made significant additions to the mausoleum in 1591 but the bulk of it remained without any ceramic or other decorative finishes. The result is the massive walls of exposed brick masonry that can be seen today.

As with so many of the Timurid structures that were left incomplete when Timur died in 1405, a slow deterioration of the unfinished building over the centuries was more or less inevitable. After its bombardment in 1864 by troops under the command of the Tsarist General Chernyayev, the terrified population sheltering inside surrendered and the region

came under Russian rule. Subsequently the shrine was used for many years as a military depot. In 1884 Russian engineers began a series of attempts to survey the damage to the building. These efforts continued irregularly until 1930, but without any serious achievement. During this period the Russian Army also virtually destroyed the adjacent mausoleum of Rabiá Sultan (the daughter of Ulugh Beg), and reused its bricks to construct official buildings.

After the Russian Revolution, a number of Soviet scholars – based initially in Tashkent and subsequently in Almaty – carried out detailed studies of various aspects of the monument. These took place between 1951 and 1989. The findings of these studies greatly increased understanding of Timurid history and architecture, and placed the monument in its position as one of the keys to the architecture of the Timurid world.

The pivotal role of the research material provided by the Soviet investigations of the Yasawi monument cannot be underestimated. It provided vital clues regarding both the theory and practice of Timurid architecture, alongside information about its innovative vaulting techniques and the forms and inscriptions found in its surface decoration. During this period of research, dedicated restorers carried out extensive restoration work; through their efforts the building was substantially stabilized, and much of the surface decoration was brought back to its former glory. The mausoleum thus became one of the most spectacular Timurid buildings in Central Asia.

The final phase of restoration work was carried out between 1992 and 2000. Based on the findings of earlier Soviet and Kazakh research, this last restoration effort, funded by the Turkish government, introduced innovative strengthening and waterproofing techniques which should, at long last, significantly slow down the rate of deterioration.

b. Local architectural character

Prior to the nineteenth-century introduction of Russian architecture into the region, the local domestic buildings were usually made from sun-dried mud bricks and mud mortar. These mud walls supported roofs of flat-rammed earth, placed on timber rafters. Important monuments, built with royal patronage, used more permanent methods: fired bricks, mud and lime mortar, and vaulted or domed roofs. The fortified walls of the citadel and the buildings within it were constructed of mud and timber. The Russian buildings of the nineteenth and twentieth centuries used fired bricks, cement and concrete. During the Soviet period an enormous amount of construction work took place; this led to the founding of new urban systems as well as new methods of construction such as pre-cast and reinforced concrete. By and large these modern construction systems prevail in contemporary architectural work.

c. Climatic conditions

Turkestan is in the steppe region. In winter the temperatures fall to -25°C due to the polar continental winds that come south from the cold air masses that accumulate in the northern region of the Caspian Sea. In the summer the temperatures rise to above 40°C. These high temperatures are caused by the hot air masses that collect over the steppes. The consequences

of this enormous temperature range can be seen in the buildings in the region. Any rigid cladding of built surfaces has to withstand pronounced temperature-induced movements, which can result in damage such as cracks or bulging revetments. The cracks that often occur in roofs and wall claddings can cause water to penetrate into the interior of a building. The construction techniques used in Timurid buildings are particularly susceptible to such damage, which makes regular maintenance especially important.

d. *Immediate surroundings of the site*

The building is located in the midst of an archaeological site that was considerably disturbed during the latter half of the nineteenth century. The surface archaeological remains comprise the accumulations of the demolitions of the Tsarist period, when soldiers levelled a large number of houses and smaller ancillary buildings. As a Timurid structure, the Yasawi Mausoleum was originally located within the Yasi citadel, a roughly pentagonal, 2.6-hectare site that contained a necropolis and domestic dwellings. To the west and south of the citadel area are the remains of the *shahristan*, a quadrangle area of about 2.3 hectares which was once the site of a settlement; on the north and west can be seen the remains of the original wall and towers of the citadel.

The damage caused by the Russian invasion, as well as site clearance carried out in the Soviet period, is irreversible. Today the Yasawi Mausoleum stands as an isolated structure surrounded by the levelled rubble of the vernacular buildings and necropolis structures that were once an integral part of the complex. The other structure of note nearby is the tomb of Ulugh Beg's daughter, Rabiá Sultan Begum, which is located to the south, opposite the great portal. This octagonal structure has been almost entirely reconstructed from the remains of the original, which had been dismantled by the Russians in order to build an army barracks. The original version is known only through photographs taken before the end of the nineteenth century, and from excavations carried out between 1952 and 1957 when the walls and foundations were uncovered to a height of 3 metres.

e. *Topography of the project site*

The site around the mausoleum is undulating due to a number of earth mounds, the result of the stacked remains of the demolished necropolis and residential buildings. In the 1950s some of the earth mounds were levelled to improve the view of the building from afar. Some parts of the citadel wall were reconstructed in the 1970s to provide a reference to the original context of the mausoleum and its setting within a citadel.

III. Programme

a. *Conditions of programme formulation*

The restoration of this important monument has a long history; in effect, the restoration programme has been under continual review due to changing political and technical realities. To all intents and purposes, the programme should be viewed as a continuous effort initiated in 1872 after the Russian bombardment of 1864.

The early attempts at restoration were uneven and spasmodic, but can still be regarded as part of the programme because with every effort, the mausoleum benefited. The first efforts to clean the monument of its shell debris took place in 1872. Thereafter, up until 1928, cleaning and strengthening of the structure continued in fits and starts. Descriptions by the traveller and writer N I Vesselovsky in 1905 first drew the serious attention of Russian academics to the structure; as a result, a number of committees were asked to initiate further scientific surveys with a view to eventual restoration. The restoration project that was financed by the Turkish government in 1992 was therefore the culmination of a process that had begun over one hundred years earlier.

The first measurements were undertaken by Zasytkin in 1938, and his drawings still form the basis of the plans used by the Kazakh restorers. Elevations and more detailed sections were completed much later, in the 1950s. It was Zasytkin who originally drew up a set of principles for the restoration of Timurid monuments, and these principles remained the guiding rules for restoration in Central Asia until very recently. Zasytkin stipulated that the oldest parts of a monument should remain undisturbed but should be strengthened; and that while damaged portions could be reconstructed, the reconstruction should be clearly evident. Apart from some deviations, it could be said that the monument as it stands to day is a fine example of the principles of restoration laid down by Zasytkin.

b. Programme objectives

The Yasawi Mausoleum is one of the finest Timurid monuments in existence. As it was never completed, its exposed condition provides vital clues to the building techniques of that time. One of the prime objectives for its earlier phases of restoration, therefore, was to preserve it as a unique example of the Persian building techniques imported by Timur into Central Asia. In recent years the monument has become more important as a symbol of national identity. (To some extent this is due to the virtual collapse of academic institutions in the countries of the Commonwealth of Independent States (CIS): scholars whose research work was once adequately funded are now scrambling for alternative ways to earn a living, and the chances of getting adequate funds to conduct further research into Timurid buildings seem somewhat remote.) Timur has become an 'alternative hero' for Central Asian countries, a pre-Soviet legendary figure who epitomizes pure national rather than religious identity. His face appears on every currency note, and an important monument constructed by him naturally assumes nationalistic overtones. The political agreement between the Kazakh and Turkish governments to finance this last phase of restoration work can therefore be seen as part of a nationalistic Kazakh objective to identify with all that they imagine Timur symbolized.

c. Functional requirements

Ostensibly the monument is nowadays a museum. But the term 'museum' is here loosely interpreted to mean a place where people can pray, sit, meditate or simply wander around exploring the building's complex spaces. One room is given over to a display of objects connected with the history of the monument, but that is certainly not its primary function. Throughout the day a steady trickle of visitors comes in for a variety of reasons including

prayer, wish grants, curiosity, tourism or just a discussion with the peer who seems to have established himself on a chair under the great portal.

IV. Description

a. *Building data*

The building appears compact from the outside and is well defined within a rectilinear form that measures 65.5 by 46.5 metres. The simplicity of the geometry as well as its elegant proportions immediately signal it for attention as one approaches from a distance. The enormous portal attached to the southern façade of the building – begun by Abdullah Khan V in 1591, but never completed – rises above the roof of the shrine by some 20 metres. It features two main domes and a number of subsidiary, segmented domes. The central assembly hall (*jama'at khaneh*) is surmounted by a dome that is 37.5 metres high – the same height as the portal. The diameter of the dome is 20.5 metres, roughly half that of the dome of Florence Cathedral designed by Brunelleschi some twenty years later. There is some speculation that the Timurid dome was intended to be the inner dome of a much higher second double dome that was never completed.

A double, ribbed dome, set on a tall cylinder, covers the chamber that contains the tomb of Yasawi. Situated at the northern end of the building, it stands on the central axis. The external tile revetments wrap around the entire building. Internally, the building is divided into nine sections with the central axis extending symmetrically from the portal through to the tomb chamber. Along this axis lie the entrance *iwān*, the large assembly hall (the *kazanlik* or *jama'at khaneh*) and the tomb chamber (*gur khaneh*).

Eight short passages connect the central assembly hall to subsidiary spaces around it. Each of these sections is unique in its configuration, apart from two identical ones that lie to the east and west. The dimensions of the central hall provide the key to the proportional system that determines the overall dimensions of the building. This key was found in the original text of the *Zafar Nameh* that reported Timur's visit to the town in 1397 and which fortunately survived, providing a vital clue to the measurement systems for many Central Asian Timurid buildings. The unit of measurement used by Timur's builders is the *gaz* (60.6 centimetres), and the central hall is a square chamber that measures 30 *gaz* on each side. The location and dimensions of the mausoleum and the portal, as well as the overall dimensions of the entire building, are related to modules of the *gaz* as well as the diagonal dimensions of the central hall. The subsidiary rooms that surround the central hall use the same module for their proportions.

Three of the subsidiary rooms have identifiable functions. The north-west room is known as the library (*kitab khaneh*), the east room is called the 'small palace' (*aq saray*), and to the west there is the mosque (*masjid*) with a *mihrab* on one wall and arched recesses on all the sides. The other rooms are smaller and their original function is difficult to determine, although the nineteenth-century usage of the building provides some clues. The mosque measures 6.4 by 9.4 metres; its inner dome is decorated with *muqarnas* that conceal the junction of the dome with the walls. In the north-eastern corner of the building is located the

larger *aq saray*; the south-western corner has the kitchen or ritual food chamber (*khalim khaneh*); while the south-eastern corner has the sacred well (*kudk khaneh*) located in its centre. The library, the kitchens and the large *aq saray* are double-height rooms with galleries on the upper levels. These spaces are covered with shallow domes. The dome and vaults over the kitchen were demolished by Russian cannons and were reconstructed in 1928.

b. *Evolution of design concept*

Three aspects of its design contribute in a vital way to the style and character of this Timurid monument; these aspects have determined the scope of research about the building as well as the philosophy behind its restoration. The first is the vast size of the structure; the second relates to the deeper symbolism of its decorative elements; and, connected to this, the third concerns the design philosophies and practices that lie behind the monument's structure and aesthetics.

The most striking thing about the building on first sight is its enormous mass, which reflects Timur's determination to leave behind buildings of a size that had never before been seen in this region. Investigations into the foundations carried out in the 1950s by Russian archaeologists revealed that the monument that stands today was built upon the remains of many smaller structures. During construction, changes were carried out to the plan and foundations of the building before the superstructure and revetments were completed. There are reports that Timur was not satisfied with the original heights proposed by the builders and that he ordered additional foundations to further strengthen the walls so that they could take a higher structure.

Below the northern portal that backs onto the north wall of the tomb chamber, the foundations consist of a mixture of stones. Only the three axial rooms (portal, assembly hall and tomb) have stone foundations; the other spaces have the buried remains of earlier brick foundations, pointing to the possibility that there might have been an earlier, pre-Timurid version of the Yasawi Mausoleum. Proskurin suspects that this consisted of a pillared structure that looked onto the street. Inside the building there is clear evidence of additional structural walls having been built in order to strengthen the edifice and allow it better to support the load of the domes. These structural walls have the effect of narrowing the passages that lead out from the central hall.

The vaults used in the building make it a virtual catalogue of Timurid vaulting techniques. Some of the vaults rise directly from the walls while others spring from transitional polygonal devices, rise up from the top of arches, or are placed on arch nets. There are also tunnel vaults, which cover the passages and some of the subsidiary rooms. The kitchen has groin vaults while the *aq saray* has spherical cupolas that are set on recumbent arches. Some of the smaller rooms have pyramidal or tent vaults.

The interiors of the central assembly hall and tomb chamber both have *muqarnas* decorating the domes, and tiled dados. The external walls are entirely decorated with calligraphic tiles, which are set in geometric patterns into the fired brick façades. The portal is incomplete and is therefore undecorated, although the intention to decorate it is evident from the definition of

the brick panels on the surface, which have been prepared to take a dado. Tuyakbaeva has undertaken considerable research on the inscriptions of the external walls, and has been responsible for decoding and reinstating much of the lost text. Writing as a decorative element has been used in different parts of the building. *Suras* from the Koran appear on the friezes, the façades and the cylinders under the two main domes as well as in the mosque. *Hadith* texts appear over the openings, while epithets to Allah and writings with historical content appear in other parts of the building – they are especially found in the spiral motifs on the revetments of the external walls.

The Yasawi Mausoleum is most conveniently compared to the *masjid-i jami'* (Bibi Khanum) in Samarkand, which was constructed at around the same time. Much of the decoding of inscriptions has been carried out with the help of the texts that have been preserved on the surfaces of that great mosque. The large *iwān* of the Samarkand mosque is clearly similar to that seen here, and the surviving decoration on the Bibi Khanum portal provides plenty of clues about how the Yasawi *iwān* was to have been completed.

Geometry is important in the design of Islamic monuments, and the Yasawi Mausoleum provides one of the finest examples of the use of geometrical calculations to determine design dimensions. Bulatov and Man'kovskaia conducted much research into this question and produced a geometrical analysis of the monument. The Yasawi Mausoleum also provides evidence of the complex geometrical principles of Timurid architecture through a surviving contemporary text (see enclosed drawings based on Man'kovskaia's work).

c. *Structure, Materials, Technology*

Notwithstanding the recent burst of restoration activity undertaken between 1992 and 2000 (resulting in the nomination of the building for the Award), it is important to review the entire efforts at restoring this building, which date back to 1872. This is necessary because each wave of restoration that has taken place has benefited from and added to the earlier efforts. Indeed, the history of the restoration of this monument is quite unique and symbolizes the achievements of decades of dedicated work done by a number of professionals – often at great risk to themselves – who have chosen to remain unknown. Their diaries and notes constitute one of the most extraordinary accounts of our age. To consider the restoration work on this great monument in more detail we will look at its three main component parts: foundations, superstructure and roof.

Foundations

A number of foundation types have been uncovered under the building; these were constructed over a two-hundred-year period using different materials and techniques. The stone foundations are confined to the three central axial spaces of the portal, the assembly hall and the tomb. Just north of the tomb there is evidence of the remains of other ancillary structures, which were probably demolished in the Timurid period. The foundations of the ancillary rooms have been made out of bricks at different times, using bricks of different sizes.

The first serious restoration work on the foundations took place under the supervision of the Georgian architect Tina Karumidze and engineer V T Rasskazovsky. Although there was evidence of the entire structure having sunk, they rejected the technique of inserting a concrete band under the footings to form a new foundation bed. Rasskazovsky's detailed survey of the portal area, as well as some of the foundations under the assembly hall, led him to adopt a less intrusive solution. Using brick masonry in a cement mortar ribbon system, he stabilized the sinking walls with metal ties running across the foundations of the old wall, which was supported by two parallel ribbon walls that were constructed on either side of the original walls. This intervention seems to have been successful. The distress to the foundations that Karumidze and Rasskazovsky sought to rectify had primarily been caused by the existence of shallow graves at the base of the walls of the monument. This was an age-old practice, and over the centuries people had quietly dug into the foundations of the walls to bury their dead. As a result water had penetrated the lower levels of the monument, causing parts of it to sink.

These valiant efforts were severely compromised, however, in 1963, when an irrigation canal was laid down along high ground some distance from the monument. As the canal was not lined, water began to seep into the subsoil. Over the years this water began to soak up in the walls. Once more the monument began to sink in parts, and a more drastic solution was required. However, despite much discussion about possible solutions, for the following two decades the restoration teams concentrated on the restoration of the superstructure. In any case the funds allocated for restoration work were not sufficient to tackle both the superstructure and the foundations.

Eventually, as the Turkish government's interests in Central Asia began to grow during the 1990s, the Kazakh government decided to ask for financial assistance and limited technical help for the restoration of the Yasawi Mausoleum foundations and superstructure, and the Kazakh restorers requested assistance in carrying out the engineering work. It is widely accepted that the Turkish engineers did a marvellous job, and one which constitutes an undisputedly Turkish contribution to the restoration and status of the monument. The Turkish engineer Fuat Oriyan devised a final solution to the problem of sinking. Using a bold technique, he devised a concrete ribbon raft that would run under all the foundations. It was supported on concrete piles that were bored to the lower strata of rock. Metal girders were inserted at regular intervals over the pile caps through the walls in order to transfer the load from the walls onto the piles. It was certainly an uncompromising solution and not intended to be reversible, but the Kazakh restorers agreed to it after considerable discussion. Apparently Oriyan used the *gaz* module to centre his piles.

Superstructure

The 1864 Russian bombardment of the monument had made eleven large openings into the superstructure. The damage was worst in the western and southern ends, which had faced the advancing army. The bombardment was followed by the demolition of all the surrounding houses, which the Russians deemed potential hiding places for 'native saboteurs'. Eight years later, following the publication of photographs of Turkestan by A Kun, academic interest grew in the monument and it was cleared of all debris. However, the RUB 15,000 allocated

by the Tsarist government for the restoration of the monument apparently leaked out into various pockets en route, and a slipshod job of whitewashing the interiors was carried out. This coat of paint covered the colourfully painted interiors. The substantial brick buttresses that can be seen supporting the walls were added in 1886 to stabilize the bulging walls.

Apart from a dome that was reconstructed over the room of the sacred well in 1928, no serious restoration work was carried out on the superstructure until 1951. Between 1951 and 1954, B N Zasytkin and T Karumidze undertook an enormous amount of restoration work, which finally obliterated the damage that the Russian cannons had caused ninety years earlier. During this period over 2 metres of debris were removed from the surrounding area, and the foundations were strengthened. The restoration and investigative work continued until 1989, when the Kazakh government ran out of money and work came to a virtual standstill.

The next major restoration effort was initiated in 1992 under the Turko–Kazakh agreement. A Kazakh site team carried out the restoration, working with Turkish architects who based their individual projects for different parts of the building on the details that had already been worked out by Proskurin and Tuyakbaeva. These details were contained in five filing boxes full of precious project documents that had been prepared by the Kazakh Institute over the previous two decades. It is unfortunate to learn that these documents have now been dispersed in Turkey. These archive documents are remarkable for their detailed and meticulous attention to every aspect of the monument. Detailed watercolours had been made for the possible restoration of all the decorative work.

The Turkish team based all their drawings on this documentary work, and then commenced their restoration work. They engaged the services of Nurgaly Imazhanov, from the Institute for Scientific Research and Planning on Monuments of Material Culture, who had trained for a number of years under Tuyakbaeva and Proskurin. During the course of this last restoration project, many of the results of the restoration carried out by Karumidze, Man'kovskaia, Tuyakbaeva and Proskurin were removed in a needlessly severe manner on the grounds that the quality of the earlier restoration work was sub-standard. While it is true that much of the restoration to surface decoration carried out in the 1950s had suffered through the vagaries of time, it is possible that the Turkish team did not consider the issue of repair and replacement carefully enough. This was to result in major disagreements between the Turkish and Kazakh restorers.

Roof

The major reconstruction and restoration work begun by Karumidze in the 1950s included a detailed examination of the roof surface. The 1864 bombardment, combined with lack of maintenance, had led to severe deterioration of the roof surface, with water seepage being the main problem. Much of Karumidze's work consisted of clearing the debris as well as restoring the timber drain spouts and restoring the surface slopes to enable quick disposal of rain and melted snow. Both she and Zasytkin were careful to conserve the original Timurid system of roof surfacing, even though it clearly required regular and intense maintenance.

The cladding of the main dome over the assembly hall was left with the original cover of square terracotta bricks, but today it has a ceramic surface. Zasyarkin and Karumidze had discussed the question of cladding it with ceramic tiles, but felt that this level of intervention would add new elements to a building that was never completed by Timur. In any case, the question of whether this dome was to have had a second over-dome of the type found at Samarkand was unresolved. The debate over cladding this dome remained alive till the 1970s. Bayan Tuyakbaeva, who had referred to Karumidze's notes to guide her own efforts, had always resisted any moves to cover the dome in ceramic tiles. However, she became ill in 1973 and had to withdraw from active work on the monument. In her absence the dome was clad for the first time in ceramic tiles, which were produced locally. She returned to the project at the end of 1974 and, although unhappy about these developments, devoted herself to the restoration of the fluted dome over the tomb chamber as well as to the question of calligraphy to enable her to proceed with the restoration of the scripts on the parapet. This work was completed in 1989.

The Kazakh–Turkish team that started restoration in 1992 took some difficult decisions. Firstly, they decided to replace completely the blue tiles on the main dome, which had deteriorated considerably. Secondly, since Karumidze and Tuyakbaeva had not fully done away with the problem of roof leakage, the Turkish restorers elected to make a serious intervention on the roof that would use modern membrane materials to solve the problem once and for all. A Turkish subcontracting firm did this work. This solution may have solved the serious nature of the problem, although at the time of the review visit there were some fresh traces of water leakage. Although largely successful this intervention was only reluctantly accepted by Proskurin and Tuyakbaeva because it destroyed too much of the original roof surface construction material.

d. *Origin of technology, materials, labour force, professionals*

The process of restoration of the monument can be divided into four periods, each involving different personnel.

First came the Tsarist period, which started in 1872 and continued until 1914. During this time the major achievements consisted of clearing the debris, making the initial documentation, and identifying the major problems of the foundations and water seepage as well as areas that needed to be reconstructed. The names of professional people associated with this period are not fully documented – or at least it was not possible to access any material relating to those times in Kazakhstan, since it was primarily directed from Moscow and Kazan. Of significance, however, were A Kun's photographs, published in his *Turkistan Album*; N I Veselovsky; P N Akhmerov, who attempted the first interpretations of the inscriptions; and other Russian engineers engaged in efforts to stabilize the decay.

Secondly came the first Soviet period. The first commission was set up in 1922, and subsequently a series of professionals and committees directed the restoration work until 1989. In 1925, the monument was measured and photographed by M M Logvinov and Professor B P Denike. In 1928, M E Masson and T Mirdiazov carried out extensive repairs to the lower sections of the walls and other chambers, and made an archaeological and

topographical survey of the area. B N Zasytkin took charge in 1938 and in that year the monument was measured again under the directions of Professor A Baklanov.

There followed the second Soviet period. During this time major restoration and reconstruction was carried out, of a scale and quality that had not been possible earlier. In 1951 B N Zasytkin became much more active in the restoration work, and T Karumidze and I Pletnev were located at the site to start restoration work on the structure and superstructure. The first architect restorer to work continuously on the site during this period was Tina S Karumidze. She was a political exile whose husband had been shot on Stalin's orders. Stalin died in 1954, and Karumidze was able to return to Georgia. She left behind, in the archives, her complete notes and diaries and these provided her successors with the basis for their restoration approach for the next half century. She was succeeded by L Man'kovskaia. Between 1956 and 1958 the entire monument, including its upper levels, was documented for the first time. This detailed documentation led Man'kovskaia to discover the proportional system that Timurid builders had used to work out dimensions for their structures. This fresh documentation was done by L Man'kovskaia, A Khusainov and E Osipov. The draftsmen engaged in this effort were I Usmanhodznakov, S Neumyavkin and V Lovkachev. L Man'kovskaia later went on to assume a crucial role in the restoration process and to teach both Proskurin and Tuyakbaeva. During the latter part of this third period, between 1970 and 1989, the major efforts of restoration were directed by Man'kovskaia's successors Proskurin and Tuyakbaeva. The initiatives during this third period were directed from state institutes, located in Tashkent until 1958. After 1960, the Kazakh institutes in Almaty directed the restoration efforts, with L Man'kovskaia in charge of the site work.

Finally came the period of Kazakh self-government, which followed the breakdown of the Soviet Union and the formation of the CIS in 1991. The change in the political situation brought Turkey into Central Asia as a potential partner for economic revival. The restoration efforts in this period were dominated by the work carried out by the Kazakh and Turkish teams between 1992 and 2000. This involved a combination of indigenous and imported personnel as well as materials and technologies. These can be summarized as follows:

Technology: All standard construction technologies were of local Kazakh origin. Turkish technology was used for foundation stability, for roof waterproofing and for the manufacture of the ceramic tiles used in cladding work.

Materials: As with technology, the imported materials consisted of waterproofing chemicals and membranes, ceramic materials and adhesives. The rest of the material was local except for the gypsum, which came from Tajikistan.

Labour force: Kazakh, Uzbek and Turkish labour was employed for the restoration process.

Professionals: The senior consultants were Turkish and Kazakh. The engineering and waterproofing consultants were Turkish; the restoration consultants were primarily Kazakh, with one overseeing senior Turkish consultant located in Istanbul.

Contractor: The prime contractor was the Turkish firm Vakif Insaat. The foundation subcontractors were STFA; the two ceramic subcontractors were Guvan Chini and Marmora China; and Khorkmas Yapus Insaat undertook the roof work. The Uzbek subcontractor Kais Burish carried out the restoration work on the *mihrab*.

V. Construction Schedule and Costs

a. History of the project

The restoration process of this monument has a history of 130 years. The last phase of its restoration, carried out in 1992–2000, should be viewed as a culmination of the earlier work.

1391–95	First stage of building completed under orders and funding from Timur.
1397–99	Second stage: the upper part of the building is completed, including revetments.
1405	Timur dies, building is incomplete.
1591	Third stage: portal is added by Abdullah Khan V.
1864	Monument is bombarded by Tsarist forces.
1872	Monument is cleaned of debris and superficially repaired.
1884	Tsarist government allocates funds for more significant repairs.
1886–87	Massive buttresses are added to prevent the north-west of the building from subsiding.
1894	First research work on calligraphic inscriptions is carried out.
1906	Russian Committee for Central Asia sends expedition to record monument.
1907	Attempts are made to raise local donations for repair.
1910	Russian administration establishes a special committee to repair the monument.
1922	Executive Committee and the Council of People's Commissars of the Turkestan Republic pass a resolution to preserve the monuments of Turkestan.
1925	Monument is measured and photographed.
1928	Archaeological and topographical studies of Turkestan are carried out and extensive emergency repairs undertaken.
1938	Repair and restoration work is carried out in accordance with council resolution. Documentation of interior surfaces is carried out.
1939–40	Central dome is restored with brick cladding, external walls are repaired with gypsum as a holding operation, tie-bars are introduced into the portal, and fluted dome is partially repaired. Detailed survey of tomb chamber superstructure is carried out. Structure and support system of double dome is recorded.
1945	Republican Board on Architectural Matters of the Council of Ministers is formed and entrusted with the task of directing restoration.
1951–57	A remarkable period of achievement in the restoration of this monument. Much of the structural damage to the monument is repaired. The detailed documentation of the building leads to a deeper understanding of Timurid

	architecture. The monument becomes a key to comprehending the construction techniques and principles of Timur's architecture.
1958	The responsibilities of restoration earlier assigned to the Gosstroi Restoration Workshop of Uzbekistan SSR are terminated and taken over by the Gosstroi Restoration of the Kazakh SSR. Effectively, the decisions regarding restoration shift from Tashkent to Almaty.
1966–89	The restoration workshop established by the Kazakh Council of Ministers handles restoration work.
1991	Kazakhstan becomes an independent republic.
1991–2000	Restoration efforts are spearheaded by a Turkish contractor working under the guidance of Kazakh and Turkish consultants.

b. Total costs and main sources of financing

Information on costs over the past 130 years is scarce. In 1884, the Tsarist government gave RUB 15,000 for repair work. However, according to written sources much of this funding never reached the site. In 1910, the local sheikhs collected RUB 12,000 for repair work. The Kazakh–Turkish agreement to restore the monument with Turkish funds made available the sum of some USD 17 million. Of this, apparently around half was spent in Kazakhstan and the remainder in Turkey on material and services connected with the restoration.

c. Qualitative analysis of costs

It is difficult to formulate either norms or standards against which to judge the appropriateness of the costs. Inevitably, with large sums of money being allocated to the monument in Tsarist times as well as under the Turko–Kazakh restoration programmes, there have been allegations of wastage and corruption. However, these allegations remain anecdotal and difficult to verify or substantiate.

d. Maintenance costs

Maintenance costs are difficult to determine, since it is hard to define what constitutes maintenance and what constitutes restoration. The definition of such categories is probably not so relevant for a building whose expenditure figures are buried deep in archival records.

VI. Technical Assessment

a. Functional assessment

Until the Soviet period this monument was an important pilgrimage site. Between 1917 and 1991 it came under successive Communist governments and was treated more as a museum than a place of pilgrimage. From 1991 it assumed a less clear function as a museum, a tourist monument and a religious site. This multiple function continues today.

b. *Climatic performance, durability and ageing*

The Central Asian climate is not kind to Timurid buildings. The wide fluctuations in temperature inevitably put stresses on their surfaces, resulting in cladding fatigue. Regular monitoring and maintenance is therefore necessary. Despite the efforts of the Turkish team to minimize the effects of thermal movements, a building of such vast size will inevitably have complex movement patterns that will need continual monitoring. The suitability of the most recent interventions will be revealed in time, since the building is now six hundred years old.

VII. Users

a. *Description of those who use or benefit from the project*

The monument as it stands restored today, at the conclusion of the last phase of work, has become a national symbol. Its images appear on every currency note and it is the most important monument in Kazakhstan. It is not only the pride of the country, but also an important pilgrimage site and the object of many tourist visits in the country. In addition, its significance as a unique monument of Timurid times will continue to attract scholars.

b. *Response to project by community, etc.*

There have been mixed responses to two aspects of the recent interventions carried out to the monument and its surrounding territory. As regards the restoration work, questions have been asked about the suitability of some of the interventions made on the walls and roof, and doubt has been cast on the suitability and authenticity of the new ceramic tiles (which were made in Turkey). Some Kazakh restorers have expressed their unhappiness at these interventions. There is, however, universal agreement about the success of the engineering work carried out in the foundations. With regard to the work being carried out and proposed for the surrounding territory, this was strongly criticized by the Kazakh Union of Architects in a formal letter dated 17 June 2000 to the Chairman of the Parliamentary Majlis and the Prime Minister.

There is, however, wide popular support for the achievement of the project, as awareness of the controversial technical issues and problems does not concern most pilgrims and tourists. For the majority of visitors, the successful restoration of the monument is a source of pride. A UNESCO expert has visited the monument and encouraged the Kazakh UNESCO Commission to apply for World Heritage status for the mausoleum.

VIII. Persons involved

a. *Project personnel*

Successful restoration inevitably involves multidisciplinary work and engages a wide variety of professionals and craftsmen. It is often difficult to identify a single figure who can be seen as crucial for the achievement of the end result. Throughout the history of this restoration

project, many professionals and craftsmen have been involved; some of these have been mentioned above.

Certain individuals, however, can be seen as significant guides in the restoration process and demonstrate a long-term commitment to the project goals. Among those who are no longer alive, the names of M E Masson, Tina Karumidze, B N Zasytkin and L Man'kovskaia clearly stand out. Over a period of sixty years, they established methodologies and theories for the restoration, documentation and research of Timurid monuments. Bayan Tumataevna Tuyakbaeva and Alexei Nicholaevich Proskurin, who looked after the monument for thirty years – nearly until the end of the twentieth century – inherited their knowledge. On the Turkish side, contributions were made by consultant Doğan Kuban; Serpil Avukatoglu, site architect for four years; Hakki Egemen, the project manager at the site for nine years; Nurgaly K Imazhanov, the Kazakh restoration architect who worked with the project team at the site; a number of engineers who are identified in the credits below; and the directors of the Turkish contracting company, Vakif Insaat.

Romi Khosla

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