RESTORATION PROJECTS IN BAMIYAN, AFGHANISTAN
COURSES OF ACTION AND TRADITIONAL TECHNIQUES AND MATERIALS

After the destruction of the Buddhas of Bamiyan by the Taliban forces in March 2001 and their expulsion from the region, the first international seminar on the restoration and preservation of Afghanistan’s cultural heritage was held in 2002 by UNESCO and the Ministry of Information and Culture of Afghanistan. Joint missions of UNESCO and ICOMOS were sent to Bamiyan since July 2002 under the direction of ICOMOS president Michael Petzet (Manhart 2009: 38 f), these first assessments showed clearly that immediate action was needed in order to preserve the niches and the remaining fragments (Petzet 2009b: 45). The international ‘Expert Working Group on the Preservation of Bamiyan Site’ held their first meeting in November 2002 in Munich and has since published a catalogue of recommendations on an annual basis (Petzet 2009b: 54). The cultural landscape and the archaeological remains of Bamiyan have been put on the World Heritage list in July 2003 as well as on the list of endangered World Heritage (Bläsdorf et al. 2009a: 17).

After the initial investigations and surveys, first safeguarding of the works were started in fall 2003 at the particularly endangered niche of the eastern Buddha (Margottini 2009: 175ff). The recovery of the fragment of the Buddhas could only be started in 2004 after a steel grid was installed of to protect against rock fall. Since Fall 2008 restoration and safeguarding works have been carried out at the eastern Buddha. In 2012, the deteriorated domed tombs of Khawaja Sabz Posh at the entrance of the Fouladi valley were restored on behalf of UNESCO. A seminary on sculptures was held at this historical location in the same year, with twelve participants from Bamiyan, employing and reviving traditional craftsmanship methods. This seminary functioned as a symbol of the revival of the art of statuary. In 2013 the Rheinisch-Westfälische Technische Hochschule Aachen University (RWTH Aachen) and cartographers of DAFA began the restoration of the ruins of the fortified city Shahr-e Gholghola, which was destroyed by Genghis Khan in the 13th century AD. The following sections will provide a summary of some of these projects.

THE GREAT BUDDHAS OF BAMIYAN:
THE RECOVERY OF THE FRAGMENTS AND THE CONSOLIDATION OF THE NICHES

The two giant Buddha sculptures of Bamiyan are usually referred to as the Eastern and the Western Buddha. The Eastern Buddha, is with a height of 38 m slightly smaller and older. The Western Buddha is 56 m high and approximately 50 years younger. Both figures had once been part of a big Buddhist complex with about 700 rooms carved into the bedrock. These rooms may have functioned as sanctuaries, cells for monks, guesthouses for pilgrims, or storage rooms. The interior of these cave chambers were plastered with mud and frequently decorated with paintings or ornamental plastering (Blänsdorf 2009: 18).

In order to fully comprehend the restoration work carried out at the Buddhas it is necessary to review how they were made. The radiocarbon dates suggests that the construction of the Eastern
Buddha falls into the second half of the 6th century AD and the building of the Western Buddha dates to the beginning of the 7th century AD. It is within this time frame that the Buddhas were sculptured from the northern cliff conglomerate. This conglomerate is a typical sedimentary rock with horizontal layers of varying width ranging from very fine grained (silt) to coarse-grained deposits. The most problematic aspect of those sediments is the lack of a natural binder, such as lime. The binding effect was provided by the pressure of the rock masses and embedded salt (sodium chloride). For that reason, the sediments erode very easily and are extremely sensitive to water. A piece of Buddha rock put in a bucket of water will dissolve within minutes (Zou 2009: 52 ff).

The two statues endured the centuries fairly well, as they were relatively well protected inside the two niches. The mud plaster, with which these two relatively roughly carved sculptures were covered, provided additional protection. The plaster of both figures consisted of a body of clay material over which a fine layer of clay was applied. Straw-tempered mud plaster is still today the most commonly used plastering material for mudbrick buildings. The coating of the Buddhas however, is special, insofar as it did not contain straw but animal hair. To ensure that the plaster adhered to the conglomerate, Buddhist craftsmen chiseled 6-8 m big round holes into the rock at the Eastern Buddha into which a suitable stone was inserted with mud to function as a dowel substitute. A different method was employed at the Western Buddha. Here, a moil-point chisel was used to punch 4 cm large and 7 cm deep holes into which wooden pegs were inserted. The pegs were placed in rows along the garment folds and were connected with each by means of a special rope material. The pegs were made predominantly from poplar, which is fairly prevalent in the region even today. Rowan and oak were used rarely. The method employed indicates that most of the garment folds of the Western Buddha were, in fact, modelled. The Britishman Vincente Eyre made the same observation in the mid-19th century, when he was held captive in Bamiyan. Eyre’s description was later confirmed in greater detail by Captain Maitland (Blänsdorf 2009: 201 ff).

The Salvage of the Fragments

Prior to launching the salvage work, storage depots needed to be built at both Buddha sites in order to be able to store the fragments properly and to protect them from humidity. Approximately 1400 cubic meters of rubble, rock fragments, and chunks of plaster of the Western Buddha needed to be stored in dry condition. The unstable composition of the conglomerate needed to be taken into consideration when carrying out the salvage work.

The salvage work was primarily carried out by laborers from Bamiyan with shovel and wheelbarrow. Wheel loaders and heavy duty cranes were used as well, in particular to move the heavier fragments of up to 30 tons to the storage depot. An essential part of the salvage operation was the work done by the demining experts. The work sites needed to be checked on a daily basis as the rubble contained large amounts of shell splinters, other debris from explosions, and especially unexploded parts of anti-tank mines, aircraft bombs, etc. Initially, the Taliban used self-propelled guns to fire at the Buddha, but met with limited success. Later, they piled up and detonated large amounts of explosives underneath the Buddha in order to execute their plan to destroy the statues. As a consequence, the rubble contained many exploded and unexploded parts (Praxenthaler 2009a: 66 ff).
In both niches debris deposits were sorted according to sand, gravel, and fragment without any recognizable worked surfaces. All the pieces with recognizable worked surfaces were stored in the storage depot, recorded on a registration form, and photographed. The large amounts of small fragments, such as chunks of plastering, wooden pecks and ropes, which had once belonged to the plastering and surface molding, were recorded in the same fashion and temporarily stored in storage facilities of the local cultural bureau.¹

While the bulk of rock fragments could be salvaged between 2004 to 2010, there are several larger rock boulders from both statues, with a weight of up to 80 tons, which could thus far not be lifted with the cranes available in Bamiyan. Those large fragments have been supplied with on-site weather protection.

Stabilization of the Rear Wall of the Eastern Buddha and Securing the in situ Mud Plaster²

Part of the Eastern Buddha remained intact after the detonation. Parts of the right shoulder, some remains of the garment folds, and the mud plaster was still in situ, though dangerously prone to unhitch. It was the goal to preserve as many fragments as possible in their original location. As the scaffold could not be erected at the time, the initial emergency safeguarding work of the clay plaster was conducted in alpine style. The mud plaster fragments which were still hanging from the wall were reached by rappelling. Rubble which had accumulated behind the somewhat detached mud plaster pieces was removed. The pieces were temporarily and reversibly secured with a punctually applied adhesion, consisting of a mixture of mud, lime, and gypsum (Praxenthaler 2009: 71). The scaffolding could only be erected after the niche was mostly cleared in 2004. Several of our staff members from Bamiyan, who had since 2004 gained considerable skills in the course of the clearing work of the niches, were able to expand their skill set in the field of restoration as builders in securing the still in situ mud plaster pieces.

It was the goal to have most of the work carried out by the local work force. Hence, advanced professional training in the methods and theories of restoration work was an important element of the work process. Based on the experience with mudbrick building and mud plaster a mortar was developed for the consolidation of the edging, which might turn out to be suitable for the long-term stabilization of the mud plaster (Praxenthaler 2009: 137).³ As the core of the workforce remained essentially the same from year to year, a continuous education was possible. The Bamiyan colleges received a certificate each year, describing their specific skills, which they could use to re-apply in the following year.

In 2008, by means of consolidating the first section of the back wall, the formerly destroyed walls of the sanctuaries behind the feet of the Eastern Buddha and a pillar in the right part of the niche could be rebuilt. Due to the destruction of the side and front walls of the temple rooms by

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¹ To date, Edmund Melzl recorded approximately 10,000 fragments of the plaster coating of the figures. See also Blänsdorf 2009: 201 ff.
² Published in Margottini (2009; see also Margottini, ed. 2014).
³ A bounding, consisting of a mixture of fresco mortar Ledan (from Italy, used particularly for frescos) and various types of mud from Bamiyan was developed and tested. The consolidation of the original mud plaster was accomplished not only by means of dorsal bounding with the edging, but for the most part with needling consisting of thin bolts of stainless steel and glass fiber.
the detonation, the entire block of the back wall was lacking support from below (Fecker 2009: 145 ff). The walls were rebuilt with quarry stones, in the same fashion as was done during the restoration in the 1970s.

The stabilization of the back wall began in 2009, after the assessment of damage carried out by Fecker and Margottini (Fecker 2009: 145 ff., 170 ff.; Margottini, ed. 2014: 147ff). Parts of the right shoulder, folds of the garment, and fragments of the head were still in situ, though in a very fragile state. Also the outline of part of the left garment is still preserved. In particular the right shoulder is close to be completely preserved. However, the original pieces tear off easily. In particular at the head section the stone fragments have separated from the back wall and shifted a couple centimeters downwards. In order to preserve the silhouette of the figure, it was the goal to secure as many pieces in situ as possible. In order to be able to even begin with the consolidation measures, the unstable pieces needed to be secured by heavy duty nylon tension belts.

After that, the gradual infilling of the cracks with adhesive mortar could be done. Using this method, the stability of the loose stone fragments could be increased day by day. After the completion of the infilling process, the needling and armature boring was done. The borings were also used to fill those gaps with mortar that could not be reached from the front. This swaging process made it possible to insert the needles and anchors (Praxenthaler 2014: 265 ff.). A total of 44 stainless steel anchors were needed and spread over 200 m. The principle, to preserve the remaining, albeit limited, original substance of the monument, could be realized here. In the course of this work, the visitors’ paths were also improved. The loop path up to the head of the Buddha was protected by handrails and parapet walls. Key to the successful execution of the work was the productive teamwork between our longtime Bamiyan staff and an Afghan conservator who had received his training in Germany. The archaeology student from Bamiyan, who was able to participate in the project as an intern, and the local representatives of the Ministry of Information and Culture contributed to the success of the mission as well. The Eastern Buddha was officially opened to visitors in 2012.

**DOME MAUSOLEUM AND ZIYARAT OF KHWAJA SABZ POSH**

Located at the entrance to Fouladi Valley, not far from the bazaar of Bamiyan, is a small complex of mausoleums which were formerly covered by domes and whose state of preservation became noticeably critical. The poor state of preservation of these buildings was partly the result of their exposed location and the difficulty to adequately maintain the buildings’ fabric during the war. In addition, the location of the building complex at the edge of a water ditch has led to the heavy erosion of its foundations. The domes of the three main buildings had collapsed and the walls were heavily eroded. Thanks to the financial support of the Swiss Agency for Development and Cooperation (SDC) it was possible to carry out a restoration project that began

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4 Those jobs, as well as the construction of the platform and pillars at the lower seam of the garment of the Buddha for the protection of the visitors, were executed by architect Sekandar Ozod-Seradj in consultation with Prof. Emmerling, TUM, and Prof. Fecker (Petzet, ed. The Giant Buddhas, Safeguarding the Remains Vol II, in press).

5 Mujtabah Mirzai flew to Germany in 2001, where he received a degree in stonemasonry. After receiving an advance degree in stone restoration, he has been part of the Buddha project since 2008.
in April 2012. In the course of the clearing of the foundation walls, some artifacts were recovered.\(^6\)

Those tombs are regularly visited and function as a place of veneration for the local population. Visitors would come on a daily basis, often with their families. As part of the ritual they would cook a traditional soup at this sacred place, a dish that they would also offered to us.\(^7\) Women and children would come regularly to pray and ask for divine support. The mausoleums are also popular wedding venues.

Before the restoration of the square plan building could begin, the heavily eroded foundations and “melting” walls with their blend arcades needed to be stabilized. Preserving as much of the original building fabric as possible was also in this context important. In the process of restoring the foundations and walls, preserving intact original parts was strictly adhered to and not simply removed to make the work process easier. In addition, the restoration was done in a way that allowed for distinction between the reconstructed and original building fabric. As one of the tombs contained several historically important graves with mud tomb slabs and wall paintings it was decided to reconstruct its dome. Only traditional construction techniques were used. Mudbricks were specially made to correspond to the historical ones, in terms of both dimension and grit tempering. The foundation and retaining walls were built in the style of the archetype of calc-sinter quarry stones and boulders. Specially-made, dried mudbricks were used for the construction of the gullies of the walls. Finally, the dome was rebuilt using an authentic brick-ring technique with a polygonal wooden anchor and a final coating consisting of several layers of a straw-mud plaster. Particular attention was paid to a well-functioning water drain. As a result, the domes or rather the roofs remained in great conditions in 2015, three years after their restoration. Once more, the great outcome is the result of blending long-term experience of our Bamiyan staff with international standards and concepts on restoration and cultural heritage preservation.

**INTANGIBLE AND IDEATIONAL HERITAGE: WHAT DUST WILL RISE, A DOCUMENTA**

Another, though slightly unconventional, restoration project was realized in spring of 2012. The artistic directorship of the 13\(^{th}\) Documenta in Kassel (Germany) put an exhibition on display with the theme “collapse and recovery” – specifically selecting Kabul and Bamiyan as exhibition venues that also included the involvement of local artists.\(^8\) The author was able to organize an outstanding sculpture seminar in Bamiyan together with artist Michael Rakowits and the Afghan sculptor Abba Alladad, who had been forced to emigrate under the Taliban regime. Twelve young people from Bamiyan, six women and six men, worked at the historical site to revive the art of statuary in Bamiyan. The work was carried out in a spacious cave chamber located slightly above the Western Buddha. The material used for the manual training of the craftsmanship came entirely from Bamiyan. The tools, chisels, hammers and work benches were manufactured by

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\(^6\) The ceramics and the Kufic gypsum reliefs are currently analyzed and not yet published.

\(^7\) Preparing the food at the site is what makes the food special. The ingredients are no different from the dishes generally consumed in the area.

\(^8\) The “Documenta” was held the first time in 1955 in Kassel, Germany, and has since evolved into one of the most important international exhibitions of contemporary art. The director of Documenta 13, Carolyn Christov-Bakargiev wanted to include specifically Kabul, Bamiyan and Cairo, Alexandria in the exhibition.
local smiths and carpenters. The stones were obtained from historical marble and travertine quarries. After more than a thousand years, sculptures were made once more in Bamiyan. The sculpture were first put on display in Bamiyan and later in the big Afghan Documenta-exhibition in the Bagh-e Babur of Kabul.

Meant merely as a symbolic gesture, the event nevertheless showed that the available resources in Bamiyan allow for the revival of the great sculpting tradition of the region. Of course, it will be some time before the arts and crafts of sculpture as well as mural art will be fully re-established in Bamiyan. However, the enthusiasm of the twelve local students certainly marks the beginning of the revival of the kind of art that once was the driving force behind the creation of the Great Buddhas.

THE UNESCO SHAHR-E GHOŁGHOLA RESTORATION PROJECT

The formerly fortified city of Shahr-e Gholghola is located in the Bamiyan valley, slightly to the west of the confluence of the Kakrak river, coming from the Koh-e Baba mountain, and the Bamiyan river. The castle hill is, strategically speaking, extremely well situated, as the entire valley can be easily kept under surveillance from its location and thus controlled. This old city, whose origins probably date back to Buddhist times, was conquered in 1220 AD by Genghis Khan who, according to legend, had the entire city population killed. The majority of the visible ruins was radiocarbon dated to the Ghorid period, and some even to Ghaznavid Period, thus from the mid-10th until the beginning of the 13th century AD. Furthermore, the investigations and associated finds indicated the presence of even older occupation levels (Praxenthaler 2016b: 331).

Given the strategically well-situated location of the castle hill for military purposes, both the Soviets as well as the Taliban maintained observation points and gun placements on the plateau. In order to protect the occupying forces, the hillsides of Gholghola were mined. Thus, before any archaeological investigations or restoration work could take place the entire site needed to be demined in 2008-2009. After most of the western part was demined, first archaeological investigations in unison with restoration works were carried out with the financial support of the Italian government. RWTH Aachen, commissioned by the UNESCO, made the first assessments of damage in 2010 of the western part. In fall 2012 le Délégation Archeologique Française en Afghanistan (DAFA), in cooperation with ICONOM, carried out the first cartographic work based on photogrammetry.

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9 See article by Emma Graham-Harrison in the Guardian: [http://www.theguardian.com/world/2012/may/16/stone carvers-taliban-bamiyan](http://www.theguardian.com/world/2012/may/16/stone carvers-taliban-bamiyan).
10 Shahr-e Gholghola, also called Shar-i Gholghulah, is one of the ten world heritage sites in the Bamiyan valley (Blänsdorf 2009: 17).
12 Relevé photogrammétrique aérien et diagnostic de 3 sites archéologiques de la vallée de Bamiyan Kakrak, Shar-Sohak, Shahr-e Gholghola, ausgeführt von DAFA durch Philippe Barthelemy, Yves Ubelman (ICONOM) (not published).
Based on the results a proposal on future approaches was developed in close cooperation with DAFA and submitted to UNESCO in 2013. The plans could be implemented in May of the same year. Within the scope of historical construction research, three stories could be delineated in the wall profile, running in NW-SE direction of the western part of the site.\textsuperscript{13} The domed central building complex was documented with a 3D scanner prior to and after its restoration.\textsuperscript{14} The restoration, which had been carried out simultaneously to the archaeological investigations, was primarily concerned with the complex on the western hillside. First, the foundations of those buildings were stabilized, which were at great risk of collapsing. Many of the ruins had solid stone foundations, primarily consisting of round river pebbles with a supporting wooden meshwork of elastic branches of \textit{Altar Voh}. The wooden meshwork prevents the stones from collapsing. The foundations of many buildings were heavily eroded as a result of being built on a slope and receiving the heavy rainfall that occurs at specific times throughout the year. The walls also had the typical erosion induced grooving and washouts. The roofs, mostly pointed vaults, were for the most part collapsed. The only building complex, located at the center of the western part, whose roof was still partially preserved turned out to be a garrison building from the 20\textsuperscript{th} century AD. This building, which consists of eight rooms with domes, was clearly built atop an older structure. This modern building was completely restored and will function as a visitor center in the near future.

The visibility of the older wall remains was maintained to visualize the building’s construction history. In order to avoid further erosion damage to the foundations special attention was paid to water drainage. Traditional methods, as seen in the historical building structures, were employed in the restoration work.\textsuperscript{15} Bricks were specifically manufactured for the restoration of the walls. In order to distinguish between the new from the historical bricks, a larger quantity of straw was added. The restored brickwork was only grouted but not plastered. The wall crests are protected by a straw-mud plaster and particularly exposed parts were covered with travertine slabs.\textsuperscript{16} As was the case for the Khwaja Sabz Posh Project, a clay pit with a clay comparable in quality to the historical brick material was sought out. Next to the lab analysis, the experience of the staff from Bamiyan was considered, as they know where appropriate clay pits can be found.

In Shahr-e Gholghola, the goal was to restore a part of the building structures on the western slope of the castle hill and to make it accessible to visitors including information boards for educational purposes. Furthermore, it was the goal to make the building useable for the local population. For example, part of the building complex of Shahr-e Gholghola was used in for cultural events June 2015, only two years after its initial restoration.

The combination of a long-term and stable core of employees, the involvement of students of the Bamiyan University, and the support of the Bamiyan cultural office, allowed the staff members as well as the project management to gain a high level of expertise. This allowed for developing a reliable and well-functioning framework within which the restoration tasks at Bamiyan could

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\textsuperscript{13} Hardy Maaß, from the Department of Near Eastern Archaeology of the LMU Munich, carried out the historical construction research and building survey in September 2014 in Bamiyan at a 1:20 scale 1:20 (Maaß 2016: 315).
\textsuperscript{14} The scanning was done by architect Sekandar Ozod-Seradi.
\textsuperscript{15} \textit{Altar Voh} (\textit{Salsola Montana}): this very elastic shrub grows along the tributarys of the Bamian River and is frequently used for the manufacturing of brooms. In most buildings \textit{altar voh} is used in the reinforcement the foundation.
\textsuperscript{16} The most common dimensions of dried mudbricks in Gholghola are 29 x 29 x 8 cm.
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be carried out. As a result, many of the above-mentioned projects could be carried out in a relatively short timeframe with an exceedingly high quality of craftsmanship. Furthermore, the intense engagement of the staff members of Bamiyan with their own cultural heritage, in addition to their training over several years, led to an increased appreciation for historical and cultural values among local groups (see also Wyndham 2015). By integrating cultural events such as performances of traditional music and poetry readings in the restoration process, the missions were able to considerably expand their public outreach, including to representatives of the Afghan government. Ethnic and religious tensions, which were prevalent at first, lessened over time. One could go even so far as to say that working jointly on heritage projects fostered a sense of a common identity independent of specific religious and ethnic backgrounds.

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2004-2010 Salvage of the Buddha fragments
2008-2013 Stabilizing and restoring work at the two Buddha
2012 documenta sculptor project for the Khoja Sabzposh mausoleums
2012-2014 Restoration of the mud stucco in the sanctuaries of the western Buddha
2013-2015 UNESCO Shar-I-Gholgholah Conservation Project
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