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Restoration of Architectural Heritage of Central Asia

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Abstract: This article explores the historical development and contemporary challenges of architectural restoration in Central Asia, emphasizing the region's longstanding cultural engagement with preserving built heritage. It traces the continuity of restoration practices from antiquity to the present, highlighting how restoration was historically understood and executed within local traditions before the influence of European architectural ideologies. The paper also examines the significant impact of environmental changes, particularly climate change and the Aral Sea ecological crisis – on the conservation of architectural monuments. Through detailed case studies of key sites in Uzbekistan, Kazakhstan, Turkmenistan, Kyrgyzstan, and Tajikistan, the article evaluates the evolution of restoration approaches, from Soviet-era centralization to modern efforts that aim to reconcile authenticity, sustainability, and national identity. The study concludes that effective heritage conservation in Central Asia must be interdisciplinary, integrating traditional craftsmanship, scientific innovation, and environmental resilience.

Keywords: architectural heritage, restoration, "ta'mir", globalization impact, climate change impact, cultural identity, traditional craftsmanship, conservation, environmental resilience, Islamic and pre-Islamic architecture, Soviet and post-Soviet era.

INTRODUCTION

The way society treats its cultural heritage has always reflected people's way of thinking in different times. The practice of architectural restoration in Central Asia dates back to ancient times, reflecting a long-standing cultural value placed on maintaining built heritage. Evidence of this can be observed at Toprak Kala, an ancient city in Khorezm (1st century BCE – 6th century CE), where visible traces of repair work are found in the citadel's structure. Similarly, the Jome Mosque in Afrasiab – the ancient core of Samarkand – was originally constructed in the 9th century and underwent several renovations through the 12th century. The Kalyan Mosque in Bukhara also exemplifies this tradition, having been built in the 9th century, renovated in the 12th century, and fully reconstructed in the early 16th century. These examples demonstrate that restoration was not an imported concept but an integral part of architectural culture in the region for centuries. In Central Asia, restoring historical and cultural monuments has changed a lot since the middle of the 20th century. What started as a practical skill has now become a complex field that includes not only technology and science but also legal, social, educational, and even spiritual issues. This shows that cultural heritage is more than just old buildings or artworks – it represents the identity and values of a nation. Today, many people understand that every national culture is part of the world's shared heritage. While globalization connects countries, it can also cause local traditions to fade.

Another factor that necessitates the restoration of architectural heritage of the world is the climate change. In recent years, climate change has emerged as a significant challenge for the

preservation of cultural heritage worldwide. Increasingly, experts and international organizations are recognizing the urgent need to integrate environmental sustainability into conservation practices. UNESCO has emphasized that climate-related risks – such as rising temperatures, increased precipitation, desertification, and extreme weather events – pose serious threats to both tangible and intangible cultural heritage [25]. Architectural heritage, especially in regions with fragile ecosystems or historic materials vulnerable to weathering, is particularly at risk.

In Central Asia, the effects of climate change are already being observed. For instance, the region has experienced rising temperatures and changing rainfall patterns that can accelerate the deterioration of ancient brickwork, plaster, and stone in historic buildings and monuments [4]. Furthermore, increased desertification and soil erosion, especially in arid zones like Turkmenistan and Uzbekistan, threaten the structural integrity of historic sites built from earthen materials. Traditional architectural forms, many of which rely on climate-sensitive techniques like mudbrick construction, are especially vulnerable without proper adaptation strategies.

The need for climate-resilient and sustainable conservation practices is therefore growing. Integrating traditional knowledge with modern environmental science offers a potential path forward. Organizations such as ICOMOS have called for heritage professionals to consider climate change adaptation in their conservation planning, and to reduce the carbon footprint of restoration activities through sustainable materials and energy-efficient techniques [7]. Addressing climate change in heritage preservation is no longer optional – it is essential to ensure the survival of architectural heritage in Central Asia and beyond. Conservation strategies must now account for not only historical accuracy and cultural values, but also long-term environmental resilience. That's why restoration work now focuses not just on fixing monuments but also on protecting the deeper cultural meanings behind them.

METHODOLOGY

This study employs a historical-comparative and interdisciplinary methodology, combining qualitative analysis of primary and secondary sources with case study evaluation. Historical texts such as *Jami at-Tawarikh*, *Zafarnama*, and *Baburnama* are examined to contextualize pre-modern understandings of restoration. Soviet and post-Soviet policy documents, conservation reports, and international charters (e.g., the Granada Convention, UNESCO guidelines) are analyzed to track the transformation of restoration practices. Case studies of major architectural sites, including Registan Square, Ichan-Kala, the Samanid Mausoleum, Old Nisa, and the Khoja Ahmed Yasawi complex, serve as empirical evidence of evolving restoration strategies. The paper also considers the environmental and socio-political factors influencing restoration, using data from environmental studies, UNESCO projects, and heritage preservation organizations such as ICOMOS and the World Monuments Fund. A cross-disciplinary perspective bridges architectural theory, environmental science, and cultural policy analysis to provide a comprehensive understanding of restoration in Central Asia.

RESULTS AND DISCUSSION

Architectural heritage, as defined by UNESCO, falls under the broader category of "cultural heritage" and encompasses monuments, groups of buildings, and sites that are of outstanding universal value (OUV). According to the World Heritage Convention, architectural heritage includes both individual monuments and groups of buildings that hold exceptional value from historical, artistic, or scientific perspectives. This concept emphasizes that such sites, whether architectural (e.g., historic cities, buildings, or monuments) or natural (e.g., landscapes), hold values that are important not only to the local or national context but to all of humanity [19]. The recognition of outstanding universal value (OUV) is central to the process of inscribing a site on the World Heritage List, which seeks to preserve those cultural landmarks that represent significant achievements of human civilization.

"Monuments, groups of buildings, and sites of outstanding universal value from the point of view of history, art, or science." [19]

In this framework, architectural heritage is understood as the preservation of buildings and monuments that embody the historical, artistic, or scientific significance of human cultures, transcending their physical form to reflect deep cultural meanings and collective identities.

The Granada Convention, which specifically addresses the architectural heritage of Europe, further clarifies this concept. It defines architectural heritage as a collection of historically significant buildings, both individual monuments and ensembles (groups of buildings), along with any associated features. The convention places strong emphasis on the preservation of these sites, recognizing their ongoing cultural value for both present and future generations.

"The architectural heritage comprises the collection of monuments and ensembles of buildings of historical or artistic interest, whether on an individual or collective basis." [20]

Additionally, the Operational Guidelines for the Implementation of the World Heritage Convention offer practical criteria for identifying and conserving architectural heritage. These guidelines stress the importance of maintaining the authenticity and integrity of sites, ensuring that the protection and conservation of architectural monuments and sites accurately represent their historical, cultural, and symbolic significance. This comprehensive approach ensures that architectural heritage is not merely preserved as a physical structure but as a living testimony to human achievements and cultural memory. Thus, UNESCO's various instruments highlight that architectural heritage is not only about preserving physical buildings but also about safeguarding their deeper cultural, historical, and symbolic meanings, which reflect the achievements and values of past civilizations.

The essence of the Uzbek words *"ta'mirlash"* or *"ta'mirchilik"* is formed by the Arabic word *"ta'mir"*, and its lexical meaning is *"restoration"*. If we pay attention to the information provided in *"Jami at-tawarikh", "Zafarnama"* (in the works of both Ali Yazdi and Hafizi Tanish), *"Baburnama"* and other medieval manuscripts, we see that the word "repair" was equally used in both new construction and restoration works [3]. The international term *"restoration"*, which is an alternative to it, differs slightly from the Uzbek word *"ta'mir"* and means *"repairing"* from Latin *"restauratio"*. However, in modern Uzbek, the phrase *"ta'mir"* means only the renewal, restoration, and repair of the old one, and unlike the Middle Ages, it does not mean the construction of a new building.

This conceptual overlap persisted until the late 19th and early 20th centuries, when the influence of European restoration theories introduced a clearer distinction between restoration and new construction. Two main factors contributed to this change: the arrival of European architectural methods following the Russian Empire's conquest of Central Asia, and the ideological shift in architecture after the October Revolution, which steered local architectural development in new directions. Prior to these changes, artistic creativity from the 9th to 19th centuries showed remarkable continuity. For example, architects working on madrasas, mosques, minarets, and caravanserais at the beginning of the 20th century could restore monuments built by Ulugh Beg in the 15th century or earlier mosques with relative ease, given the shared stylistic and construction traditions. However, starting in the 1920s, a sharp rupture emerged in architectural expression. The new generation of architects, influenced by modernist trends, became increasingly distant from the artistic principles of traditional architecture, necessitating new approaches and expertise for restoration.

Throughout the 20th century, Uzbek architecture gradually adopted European construction techniques and materials, resulting in significant technical and methodological transformations. Features such as wide-paned windows, attic roofs, modern heating stoves, and the use of metal and concrete replaced many traditional building elements. This shift was accompanied by a prevailing ideology that regarded local architectural traditions as outdated, while European styles were promoted as progressive and modern. Consequently, the demand for skilled artisans and folk architects – custodians of centuries-old construction knowledge –declined sharply. Additionally, the Soviet campaign against private craftsmanship further eroded traditional building skills. By the 1930s, much of the ancestral craft knowledge had been lost, creating a

generational gap in expertise. As a result, restoring 20th-century monuments has become a unique challenge requiring specialized study of architectural practices from this transitional period. This necessity led to the emergence of restoration as a distinct discipline within architecture, focused on bridging historical traditions with modern conservation needs.

After gaining independence, Central Asian countries began to reconnect with their traditional cultures. People became more interested in the region's past, including Islamic and pre-Islamic history. They also started to value the influence of European art and ideas that came in the 20th century. As a result, restoration efforts grew to include rebuilding historic sites, bringing back old crafts, and rethinking historical events and figures. In Uzbekistan, this revival of cultural awareness is supported not only by public interest but also by a legal framework. According to **Article 61 of the Constitution of Uzbekistan**, it is the **duty of citizens to protect the historical, spiritual, cultural, scientific and natural heritage**, and the **state is responsible for ensuring its protection** [32]. This constitutional commitment reflects the importance placed on heritage preservation at both the civic and institutional levels.

During the 1990s, many museums in the region faced challenges because they lost connections with Russian restoration centers [2]. At the same time, experts from Central Asia began working more with international partners and learning new methods. This helped the field grow. Today, a restorer is not just someone who repairs old objects – they are seen as professionals who protect cultural treasures and help keep history alive for future generations [2]. Building on this momentum, recent decades have seen a broader transformation in how Central Asia approaches cultural heritage preservation. What began as local efforts has increasingly aligned with international standards and values. This shift reflects a growing global understanding that cultural heritage is not merely a collection of artifacts but a living expression of national identity and memory. International organizations have played a pivotal role in this evolution. UNESCO's initiatives, such as the *"Silk Roads Heritage Corridors in Central Asia"* project, have been instrumental in promoting the conservation and sustainable management of heritage sites along the ancient Silk Road. This project, funded by the European Union, aimed to strengthen capacities for safeguarding tangible and intangible cultural heritage, raise awareness, and use heritage as a foundation for sustainable development, including through heritage-based tourism [26]. ICOMOS has contributed through thematic studies like *"Rock Art in Central Asia"*, which emphasizes the importance of rock art in the region and provides guidelines for its protection and management [5]. Meanwhile, the World Monuments Fund has supported multiple efforts in Central Asia, including the restoration of traditional houses in the Old Jewish Mahallah of Bukhara and the conservation of the Abdulazizkhan Medrese [30], [31]. These collaborations reflect a growing global commitment to preserving Central Asia's diverse cultural legacy.

Islamic architecture began to emerge and flourish in Central Asia between the 6th and 9th centuries. This early development established a strong continuity in architectural styles that persisted well into the 19th century. Consequently, for a 19th-century architect in Central Asia, restoring monuments from the 9th or 10th centuries was a familiar task, grounded in a shared artistic language. By contrast, European architecture experienced multiple stylistic transformations between the 9th and 19th centuries, including the rise and fall of Gothic, Renaissance, Classicism, and Modernism. Each new architectural movement required practitioners to learn new design principles, making restoration of older styles more challenging. Architects trained in modern styles often had to study previous historical methods carefully to restore earlier buildings authentically. This contrast highlights how Central Asian architects maintained a remarkable degree of stylistic continuity in their restoration practices, a tradition that was disrupted only in the early 20th century with the introduction of European architectural methods and ideologies.

Following the 1920s, Uzbek architecture increasingly aligned itself with European modernist principles, moving away from traditional regional styles. This shift created a new challenge: architects trained exclusively in contemporary architectural methods lacked the specialized knowledge required for the authentic restoration of historical monuments. The earliest organized

restoration efforts during this period were led by figures such as M. Saidjonov, B. Zasipkin, A. Jahongirov, V. A. Shishkin, and others. Their work laid the foundation for a local cadre of specialists, including Abduqodir Boqiyev, Shirin Murodov, Abdulla Boltayev, Quli Jalilov, and Shamsiddin Gafurov, who contributed to the formation of the architectural schools of Samarkand, Bukhara, and Khiva [3]. Key projects included renovations of the Sherdor Madrasah portal in Samarkand, the Samanid Mausoleum in Bukhara, and the trading domes and madrasahs across the region. Notably, the northeastern minaret of the Ulugh Beg Madrasa was straightened, and the Gur-e-Amir Mausoleum was restored. Despite these achievements, limited funding and centralized control during the Soviet era constrained the scale of restoration efforts. As a result, several important monuments – such as the citadels of Bukhara and Khiva, the Bibi-Khanym Mosque and Ishratkhana Mausoleum in Samarkand, and the Kyrkyz Fortress in Termez – fell into ruin or suffered damage. For example, the Shirbudun Palace in Bukhara and the Charmgar-Chorbog Palace in Karmana were destroyed during the 1970s.

After Uzbekistan's independence, restoration efforts gained new momentum. Today, practically no monuments remain neglected. Projects across Samarkand, Bukhara, Termez, Khiva, Tashkent, Karshi, Shakhrisabz, and Andijan have demonstrated significant advances in restoration science and practice, securing the preservation of Uzbekistan's rich architectural heritage for future generations.

The territory of modern Central Asia has historically been the geographical and political heart of the region known as Maverannahr, Turkestan, and earlier as Turan and Transoxiana during the Middle Ages. This centrality fostered a shared cultural and architectural heritage across Central Asia, reflected in the artistic features of monuments and the methods employed in their restoration.

Prior to the 9th century, most buildings in this area were constructed from adobe and adobe bricks. As a result, many early structures have survived only as ruins or archaeological sites. Notable examples include fortresses such as Sapallitepa and Djarkutan in the Surkhandarya region, which share cultural links with monuments like Namazgohtepa and the Marrud oasis in present-day Turkmenistan.

Architectural monuments dating from the second half of the first millennium BCE are found throughout Ancient Khorezm – now part of the Republic of Karakalpakstan and the Khorezm region – including Jonboz Kala, Tuprokkala, and Ayaz Kala. One of the oldest surviving architectural sites is the Forty Fortresses (9th–10th centuries CE) in Termez, constructed from intact adobe bricks.

Although fired brick technology was known in Central Asia since ancient times, it became widespread only after the 9th century, notably following the construction of the Samanid Mausoleum in Bukhara. Other exemplary monuments from the 9th to 12th centuries – such as the mausoleum of Mir Said Bahram, the Deggaron Mosque in Karmana, and the minarets of Bukhara, Vabkent, and Djarkurgan – demonstrate the region's mastery of baked brick architecture.

From the 11th century onward, frame structures, previously known but not extensively used, began to be adopted more widely in building construction. Many of Uzbekistan's surviving architectural monuments date from the 9th to 13th centuries, but the most prominent and majestic structures were built during the reigns of Amir Timur, Mirzo Ulugbek, the late Timurid dynasty, and the Uzbek Khanates. These periods represent high points in the region's architectural development and left a profound legacy not only within Central Asia but also influenced the architectural landscapes of neighboring regions such as Afghanistan, Iran, the Caucasus, and India.

The political and cultural dynamics of the 16th to 18th centuries led to the emergence of distinct architectural schools in Bukhara, Khorezm, and Kokand. While these schools contributed to a

unified material culture across Uzbekistan, they also fostered remarkable examples of regional artistry, each shaped by local climate conditions and cultural traditions.

Recognizing and respecting these regional differences is essential for effective restoration practices, ensuring that preservation efforts honor the unique historical and environmental contexts of each monument.

Registan Square remains one of the most emblematic architectural ensembles of Central Asia. Soviet-era restoration focused heavily on aesthetic reconstruction, often prioritizing visual uniformity over material authenticity [15]. In the post-independence period, restoration methods have improved in cultural sensitivity and use of traditional techniques, although the site still faces issues related to over-restoration, insufficient maintenance planning, and inconsistent documentation [22], [9].

Restoration in Ichan-Kala has been notable for incorporating local artisans and maintaining craft traditions. Despite this, tourism-driven pressures have prompted reconstruction and functional repurposing that risk diluting the site's historical authenticity. Funding gaps and inadequate infrastructure in surrounding areas further complicate long-term conservation [1], [18].

Restoration at Old Nisa (Ashgabat, Turkmenistan) is guided largely by international best practices for archaeological preservation, such as minimal intervention and reversibility (Getty Conservation Institute, 2020). However, the use of vulnerable materials (mudbrick, clay) and limited local conservation capacity pose ongoing threats. The site's restricted access and lack of public engagement also reduce its visibility and educational value [24], [10].

Mausoleum of Khoja Ahmed Yasawi (Turkistan, Kazakhstan), UNESCO-listed site is a Timurid masterpiece built in the late 14th century. Restoration began under Soviet management and continued post-independence with significant state funding. Techniques have included structural reinforcement, tilework conservation, and site digitization [23]. While the Kazakh government has invested in infrastructure and tourism promotion, some scholars criticize the "monumentalization" of the site, which may risk altering its religious and cultural landscape [12]. The recent development of a surrounding museum complex and pilgrimage facilities illustrates tensions between preservation and national branding.

The Uzgen complex (Osh region, Kyrgyzstan) dates back to the 11th–12th centuries and features Islamic funerary architecture with Seljuk influences. Restoration efforts led by Kyrgyz authorities and supported by international organizations have focused on stabilizing the minaret and conserving decorative brickwork [21]. Community participation remains limited, partly due to lack of funding and awareness. Moreover, natural disasters – especially earthquakes – pose recurrent threats to the structural integrity of the complex [29]. A lack of technical conservation expertise in Kyrgyzstan further limits sustainability.

Hissor Fortress (Tajikistan) is a reconstructed historical complex with origins in the pre-Islamic period. Restoration activities gained momentum after Tajikistan's independence, with partial reconstructions undertaken using modern materials and techniques [13]. While the fortress has become a prominent cultural site and tourist attraction, its restoration has been criticized for prioritizing aesthetics over archaeological authenticity. The lack of comprehensive documentation and public transparency in restoration decisions has raised concerns among heritage professionals [8].

Environmental Impact: The Aral Sea Crisis and Architectural Heritage. The desiccation of the Aral Sea has had significant environmental consequences for the surrounding regions, particularly in Karakalpakstan and the southern parts of Kazakhstan. As the sea receded, it left behind a vast, exposed salt plain that now contributes to frequent dust storms carrying salt, toxic residues, and sand. These airborne particles accelerate the weathering of historic structures, corroding masonry, ceramics, and wooden elements over time [14], [27].

Notably, sites like the Mizdakhan Necropolis near Nukus and other historic Sufi shrines in western Uzbekistan have suffered from erosion, salt crystallization, and loss of surface material

due to increased salinity and fluctuating humidity [6]. Conservation work in these areas is complicated by the need for environmental mitigation strategies – such as protective shelters or specialized materials resistant to salt damage – which are costly and not widely available in the region. Moreover, health and economic challenges stemming from the ecological disaster have deprioritized cultural heritage funding in affected areas.

The ecological transformation caused by the drying of the Aral Sea serves as a stark example of how environmental disasters intersect with cultural heritage vulnerability. In addition to the physical deterioration of monuments from salt-laden winds, the disaster has contributed to socioeconomic decline, population displacement, and public health crises in regions like Karakalpakstan. These conditions have indirectly undermined heritage restoration by limiting local government capacity, reducing available funding, and shifting political priorities away from cultural preservation [17], [28].

In some cases, international aid and environmental monitoring projects have created opportunities for integrated approaches, combining heritage conservation with ecological rehabilitation (e.g., afforestation of salt flats and sustainable tourism initiatives). However, such efforts remain fragmented and underfunded. Long-term strategies for restoration in this region must account not only for material conservation but also for environmental resilience and community adaptation [24].

CONCLUSION

Restoration in Central Asia is both a reflection of deep historical traditions and a response to modern challenges. The region's architectural heritage has long been maintained through local knowledge systems and craftsmanship, which persisted with remarkable continuity until the early 20th century. However, the introduction of European architectural models during the Soviet period caused a rupture in these traditions, necessitating new methodologies and expertise. Today, restoration is no longer a merely technical process but a culturally and politically significant act that reinforces national identity, historical memory, and environmental stewardship. Climate change, ecological degradation, and shifting socio-economic conditions have made the task of conservation more urgent and complex. Sustainable and climate-resilient approaches, rooted in both local traditions and global best practices, are essential to safeguarding Central Asia's built heritage. Future restoration efforts must prioritize authenticity, inclusivity, and resilience, ensuring that the architectural legacy of the region remains a source of pride and continuity for generations to come.

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