Reassessing the conservation and restoration activities of Champa temples in Ninh Thuan province, Vietnam

Đánh giá lại hoạt động bảo tồn và trùng tu đền tháp Champa ở tỉnh Ninh Thuận, Việt Nam

Tuyen Quang Dai
Faculty of Tourism
Nguyen Tat Thanh University, Ho Chi Minh, Vietnam
qdtuyen@ntt.edu.vn, quangdaituyen@gmail.com

ABSTRACT

The preservation and restoration of Champa temples in Ninh Thuan Province, Vietnam, have been the subject of increasing attention from the government and conservation experts. This study aims to reevaluate the current conservation and restoration efforts and provide recommendations for ensuring the sustainable preservation of these important cultural relics. The research data were gathered between 2010 and 2019, using a combination of archival documents, site surveys, and ethnographic fieldwork. The study highlights that Champa temples are valuable national and special national heritage sites, receiving significant support from the State of Vietnam to safeguard and protect these historical structures. Despite the substantial conservation and management efforts, certain conservation methods have resulted in some limitations, such as testing directly on the body of the tower and modifying the architectural features of the sculptures and new constructions of the Champa temple, which could alter the core meaning of these sites. Therefore, this study suggests that conservationists and researchers must closely collaborate with the Cham community to understand and appreciate the significance of the Champa heritage, while also preserving its cultural and historical authenticity. Overall, this research proposes a reconsideration of the conservation approach, taking into account the cultural context, community values, and long-term sustainability of the Champa temples in Ninh Thuan Province, Vietnam.

Nghiên cứu này đánh giá lại việc trùng tu và bảo tồn các đền tháp Champa ở Ninh Thuận và gợi mở một số đề xuất nhằm thực hiện công tác bảo tồn một cách đảm bảo nhất trong tương lai. Dữ liệu nghiên cứu được thực hiện từ năm 2010 đến năm 2019 bằng việc áp dụng nhiều phương pháp khác nhau bao gồm dữ liệu văn bản, khảo sát thực địa và nghiên cứu điền dã dân tộc học. Nghiên cứu này cho thấy rằng các đền tháp Champa đã nhận được sự quan tâm rất lớn của Nhà nước Việt Nam nên được công nhận là di sản quốc gia và di sản quốc gia đặc biệt. Bên cạnh đó, Việt Nam cũng đã có những biện pháp để bảo tồn và bảo vệ các di tích này. Do đó, có một số kiến trúc và nghệ thuật đã và đang dần được duy trì và bảo vệ. Tuy nhiên, những nỗ lực bảo tồn và quản lý đã có một số vấn đề giới hạn từ cách tiếp cận bảo tồn của các chuyên gia trùng tu. Cụ thể, thử nghiệm trực tiếp trên thân tháp, thay đổi nhiều đặc điểm kiến trúc điêu khắc và xây mới hướng lên tháp Champa đã làm thay đổi ý nghĩa cốt lõi của đền tháp Champa. Nghiên cứu này khẳng định rằng, các nhà nghiên cứu và trung tu đền Champa cần phải nghiên cứu một cách kỹ lượng và gắn với cộng đồng Chăm để đảm bảo được tính nguyên trạng và ý nghĩa di sản Champa.

Keywords: bricks, heritage conservation, Champa temple, Cham people, Vietnam | Từ khóa: gạch, bảo tồn di sản, đền tháp Champa, người Chăm, Việt Nam

INTRODUCTION

Preservation and promotion of Vietnamese ethnic-minority cultures is a crucial objective of Vietnam's Ministry of Culture (Luong Thu Oanh 2012; Mai Thanh Son 2011). This includes the Cham people and their cultural heritage, which is concentrated in central Vietnam and encompasses many heritage sites containing the collective knowledge of the Cham people, including their history, culture, and religion. The Cham temples, in particular, exemplify the Cham architectural arts, history, culture, and religion and have attracted increasing attention from researchers interested in heritage conservation.

Foreign researchers, such as French archaeologists from 1902 to 1954 and Polish architects from 1975 to 1998, have made significant efforts to document and protect the Champa cultural heritage sites, generating greater interest from the Vietnamese government in preserving and protecting these sites. After the Mỹ Sơn site was recognized by UNESCO as a World Cultural Heritage Site in 1999, a large body of data concerning the conservation and management of the Cham temples was collected. While some architectural features are being maintained and protected (Tran Ky Phuong 2007: 2), other preservation efforts have caused irreparable damage and become a point of contention among residents. Issues affecting the management of these cultural heritage sites (Tran Ky Phuong, 2008) often concern the treatment of architectural features and spiritual spaces and reflect negative interactions between Vietnamese conservationists and cultural heritage.

The ancient Champa temples reflect the architecture, history, culture, and relationships of the Cham people with other civilizations in the region. However, some Cham temples are in danger of collapse, and authorities are making their best efforts to preserve and protect them. Despite the literature on the conservation of Cham heritage mainly focusing on Quang Nam, Da Nang, Hue, and Binh Dinh Provinces, little research has been conducted on heritage conservation in Ninh Thuan Province, where most Cham people live. As the Cham people who reside in this province still maintain traditional ceremonies and festivals at Champa temples, conservation and restoration work also impacts their spiritual world. In recent years, negative and positive issues have arisen at all temples, making it essential to assess and compare the changes before and after conservation and propose suitable solutions for the heritage conservation of Cham sites in this province. Therefore, this research uses a case study in Ninh Thuan to investigate one of the unique cases of conserving Champa temples in Vietnam.

The Champa temples and the history of conservation

In the field of Champa studies, temples attracted the most attention from researchers during the late 19th century and early 20th century. The first works that French scholars published on Cham culture focused mainly on architecture. Some notable scholars, including C. Lemire, C. Paris, L. Finot, H. Parmentier, and P. Stern, established a vast wealth of documentation on Cham temples in Vietnam, including collections, descriptions, classifications, and formal assessments of architecture and sculptures. These documents and collections have been the primary sources of reference for researchers from the earliest days into the 1970s (Ngo Van Doanh 2005: 6–11; Tran Ky Phuong 2007: 53–55). After 1975, there was renewed interest on the part of scholars in researching the Champa temples; these scholars include Cao Xuan Pho, Ngo Van Doanh, Le Dinh Phung, Hoang Dao Kinh, Tran Ba Viet, Nguyen Hong Kien, and Tran Ky Phuong. The bulk of their research focuses on architecture, culture, history, art, and construction techniques. Today's greatly increased body of data concerning the Champa temples demonstrates the importance of the temples in gaining an understanding of both the history and culture of the Cham people.

The most significant legacy of the Champa Kingdom that remains today in Central Vietnam is seen in the form of approximately 80 documented brick temples (*kalan/bimon* in the Cham language). These temples are scattered mainly throughout the region's lowlands, with only a handful found in the highlands. The construction of these Hindu and Buddhist temples dates to periods as early as the 7th and 8th centuries and as late as the 16th and 17th centuries. Cham kings constructed temples for religious purposes, but the temples also functioned as a demonstration of power. In the aftermath of the collapse of the Cham Kingdom, many temples were damaged or completely destroyed, leaving only a fraction of the temples that inhabit swaths of land in the Central Highlands of Vietnam. Today, there remain about 23 areas with temples, with approximately 40 monuments of various sizes. Most of these temples were built along the main rivers of the region (Tran Ky Phuong 2008: 10). Before the 7th and 8th centuries, most of the Champa temples were of wooden construction and thus vulnerable to incendiary attacks. As a result of the region's protracted warfare, all of these temples were destroyed, leading to subsequent innovations in temple construction and the use of brick and sandstone (Lam My Dzung 2008: 294; Tran Ky Phuong 2006: 8).

The materials and building methods used to construct Champa temples have attracted the attention of a considerable number of scholars studying Cham culture. There are many assumptions and varying opinions about the exact organic materials and building methods used to build brick towers. In 1928 Zeane Lenba (cited by Tran Ba Viet 2007) stated that Champa temples were built using unbaked bricks, with certain features later fired in place, whereas Maspero argued that the Champa temples were built with baked bricks (Maspéro 2002). Other opinions are that the Champa temples were built with bricks and mortar derived from plant-based glues and mixed with brick powder (Claves 1939 cited by Tran Ba Viet 2007). Awawrencrak and Skibinski (1987) speculated that the Champa temples were built using baked bricks and were tied together by a thin film of clay and that later the tower was baked again as a whole.

After 1975, Vietnamese scholars began proposing their own theories about the construction of Champa temples, building on hypotheses from previous researchers. Various studies have suggested that the mortar used was mixed with cactus molasses (Ngo Van Doanh 1978), Dipterocarrpusalatus (cây dầu rái) (Nguyen Xuan Ly 1991; Tran Ky Phuong 2002), or that the bricks were arranged using a grinding technique (Trinh 1985). According to Le Dinh Phung, the temples were constructed using locally produced materials and a sharpening surface to create a powder used as mortar mixed with water (Le Dinh Phung 1990). Oral history and Cham legends, as researched by Cham scholar Thanh Phan, suggest that the Champa temples in Ninh Thuan Province were built using unfired bricks immersed in vegetable oil just before assembly. The assembled bricks were allowed to cure in place, backfilled with soil, clay, and sand, and repeated in stages until the tower was erected in an encapsulating shell. The structure was then decorated and sculpted from the top down (Tran Ba Viet 2007). Luu Tran Tieu and colleagues tested permutations of this theory and speculated that the Cham people arranged unbaked bricks for the outer shell, used a thin adhesive layer, and created pilasters from bricks and stones to form an overall cohesive or "decorative theme" (Luu Tran Tieu et al. 2000: 183). One hypothesis for the composition of the mortar is that a superfine aggregate produced by rubbing bricks was mixed with an organic resin (Brambilla and Condoleo 2011: 278), which is currently being tested in conservation efforts at Cham temples.

These studies have been vital in understanding the construction and preservation of Champa temples. The conservation of these sites can be divided into three periods:

- the French Colonial period from 1902 to 1954,
- the Polish-Vietnamese conservation period from 1975 to 1998, and
- the contemporary period from 1999 to today.

Throughout these periods, archaeologists, architects, private citizens, institutions, and organizations have contributed to a body of work that is an essential resource for future research and conservation efforts. Many of these parties have also acted as advocates, protecting and securing the Champa temples through international legislative and diplomatic efforts. However, despite these efforts, adverse impacts on the temples have occurred, particularly during the Vietnamese conservation period (Tran Ky Phuong 2006: 23).

Today, the condition of Champa temples can be categorized into three types:

- Buried under the ground or leveled to the ground. The Dong Duong Buddhist Sanctuary in Quang Nam Province is an example;
- Existing as ruins, such as My Son or Chien Dan in Quang Nam Province, and Po Dam group in Binh Thuan Province;
- Partially damaged. Examples include Bang An and Khuong My groups in Quang Nam Province; Banh It, Thap Doi, and Duong Long in Binh Dinh Province; and the Po Klaong Girai groups in Ninh Thuan Province.

Temples in the latter two categories will soon be in critical condition without conservation efforts. Thus, there is a strong case for more substantive scientific and ethically grounded conservation efforts in the preservation of the Champa temples (Hoang Dao Kinh 2012: 3).

Summarizing the three major periods of conservation efforts at Champa architectural heritage sites:

Period	**Timeframe**	**Description**
French Colonial Period	1902-1954	The French Colonial period saw the initial restoration and conservation efforts at Champa architectural sites.
Polish-Vietnamese Conservation Period	1975-1998	During this period, conservation efforts were carried out through the collaboration between Polish and Vietnamese conservationists.
Contemporary Period	From 1999 to today	The contemporary period marks the current era of conservation efforts at Champa architectural heritage sites. Efforts have been made by archaeologists, architects, private citizens, institutions, and organizations to preserve and protect these sites.

Additionally, the following table summarizes the current condition of the Champa temples:

Condition	Description
Buried or Leveled	Temples that have been buried or leveled to the ground, such as the Dong Duong Buddhist Sanctuary in Quang Nam Province.
Existing as Ruins	Temples that still exist in a ruined state, such as My Son or Chien Dan in Quang Nam Province, and Po Dam group in Binh Thuan Province.
Partially Damaged	Temples that have suffered partial damage, such as Bang An and Khuong My groups in Quang Nam Province, Banh It, Thap Doi, and Duong Long in Binh Dinh Province, and the Po Klaong Girai groups in Ninh Thuan Province.

Conservation efforts are needed to preserve the Champa temples, particularly those that are currently in a state of partial damage or ruin.

Overall, the construction techniques used for Champa temples are still the subject of speculation and ongoing research. Scholars have proposed various hypotheses regarding the materials and methods used, and these theories have been tested through experiments and conservation efforts. The history of conservation work at Champa sites can be divided into three major periods of international collaboration, with the most recent period highlighting the need for more substantive and ethically grounded conservation efforts to ensure the preservation of these sites. Today, many Champa temples are in critical condition, emphasizing the urgency of ongoing conservation efforts.

Backgrounds of Champa Temples in Ninh Thuan Province

This study focuses on Ninh Thuan Province, which was an important part of the Cham Kingdom until 1834 and is rich in cultural heritage sites that provide valuable insight into the history, culture, and religion of the Cham people (Po Dharma 1999). The temples in this province serve as a centre for daily religious practices and festivals for the Cham people. The cultural heritage sites in Ninh Thuan Province are composed of relatively well-preserved temples, structural remains and ruins, and a variety of artifacts dispersed throughout the region, extending beyond the temple precincts. The three primary temples in this area are Hoa Lai, Po Klaong Garai, and Po Rome, which hold significant cultural and historical value and serve as focal points for ongoing research and conservation efforts.

Fig. 1 Map of Cham temples in Ninh Thuan province.

The Po Rome temple, situated on a desolate hill covered with cacti and wild plants about two kilometers west of the Cham village in Ninh Phuoc district, is one of the cultural heritage sites in Ninh Thuan Province. It is a group of towers constructed during the final period of Cham architecture in the 17th and 18th centuries (Ngo Van Doanh 2002). The temple complex comprises a Kalan built in honor of King Po Rame, a temple dedicated to his wife, and his relative's tomb. In the past, it also housed a repository for offerings, but it has since been severely damaged, with only traces remaining today. The temple is considered the last tower showcasing the art, history, architecture, and sculpture of the Cham people.

Fig. 2 The Po Rome temple. Source: **Photo** by Ja Khang, 2018.

Ninh Thuan Province is rich in cultural heritage sites that embody the collective knowledge, including culture, history, and religion, of the Cham people. The temples and artifacts scattered throughout the province are closely associated with the Cham's daily practices of worship and festivals. Three significant temples in the province are Hoa Lai, Po Klaong Garai, and Po Rome. The Po Rome temple, in particular, is an excellent example of the Cham's remarkable architectural and artistic accomplishments during the 17th and 18th centuries.

Figs. 3-4 Hoa Lai temple before conservation work. Source: Ninh Thuan Provincial Museum, 2000.

The Hoa Lai/Ba Thap temple, also known as Yang Bakran in the Cham language, is dedicated to the form of Shiva called Adidiveshavara (Schweyer 2011). Originally, the temple had three Kalans or towers, but the middle one was destroyed during the American War. In the early 20th century, French scholars discovered the remains of a wall that surrounded the three Kalans, as well as other structures such as a main tower (Mandapa) and a Gorupa (gateway tower) facing the central Kalan (Tran Ky Phuog 2008: 103). While the Hoa Lai complex is built in the traditional Cham style, its decorative patterns are unique, representing a style typical of the late 8th and early 9th centuries (Tran 2008: 106). Scholars consider the Hoa Lai temple the most valuable piece of art among the existing temples in Ninh Thuan Province (Ngo Van Doanh 2002; Parmentier 1909; Luu Tran Tieu et al. 2000). Parmentier described it as a masterpiece of ancient Cham architecture, featuring a multi-tower complex with unique design patterns that reflect cross-cultural influences. He also noted that the Hoa Lai style marked the end of the first phase of Cham art, featuring square shapes, symmetry, and no small decorative towers on the floor of the complex. The motifs include cylindrical flower motifs and naturalistic foliage (Parmentier 1909: 118–120).

The Po Klaong Girai temple complex is situated on Trầu hill in Phan Rang–Thap Cham city. This complex, dedicated to King Po Klaong Girai, was constructed during the late 13th and early 14th centuries and was later rededicated to the king during the reign of the Cham monarch Jaya Simhavarman III in the late 14th century. Po Klaong Girai temple is considered one of the most advanced examples of Cham architecture and construction techniques (Tran Ky Phuong 2007: 138). In the early 20th century, the temple had an abundance of unique architectural details, as noted by Parmentier (1909: 96). Unfortunately, the temple fell into ruin and today only a few towers remain among the ruins of the central tower, entrance tower, and southeast building.

Fig. 5: Po Klaong Girai temple. **Source:** Ninh Thuan Provincial Museum, photo by author, 2016.

The Po Klaong Girai temple is deeply intertwined with the traditional Cham belief system and is the site of numerous annual festivals and ceremonies.

Today, all Champa temples in Vietnam have been designated as special national historical sites by the Ministry of Culture, Sports, and Tourism. In Ninh Thuan, both Hoa Lai and Po Klaong Girai temples were recognized as special national architectural relic sites in 2017. Additionally, the Katé festival of the Cham people was recognized as a national intangible cultural heritage in the same year. Po Klaong Girai temple is therefore doubly recognized as a special national historical site and a site for national intangible cultural heritage. These designations not only acknowledge the importance of the Po Klaong Girai cultural heritage to the Cham community but also serve to preserve and promote its cultural heritage values for local development.

Methods

My study of Champa heritage conservation involved three stages of research: a literature survey, a site survey involving photography and preparation of field notes, and data analysis.

Stage 1: Archive Document Research

My research relied on available databases from previous and ongoing archaeological projects, as well as historical documents, oral histories, artifacts, and photographs. These records varied in quality and quantity, with marked gaps in information for some projects, particularly those conducted before 1975. I consulted archived photo collections stored on-site in the Ninh Thuan Provincial Museum and Center for Cham Culture Studies to compare and analyze changes in decorative and structural patterns and conditions of each site.

Stage 2: Site Survey

I documented and photographed each temple with a high-resolution digital camera in RAW format for later analysis. I wrote field notes and evaluated current issues to describe in great detail all existing discernible patterns, such as decorative patterns, ground surface, materials, and surrounding landscape. My assessment process emphasized the examination of the current condition of these temples and how the three temple towers are being managed currently.

Stage 3: Data Analysis Plans

The data analysis incorporated results of library-based research, site survey, and ethnographic research in interpreting the findings of the site survey. The library-based research involved the compilation of all conservation work by organizations, periods, principles, and conservation methods. Compiling this inventory helped me to ascertain the reasoning or thought behind each of the previous methods of conservation. I could also see what elements were conserved and compare the different stages up to the current conditions of temples. My field-based site survey involved visits to the temples to evaluate their current conditions. I coded and photographed each temple for comparison of the previous conditions and the current condition after conservation.

Results

This research found that Po Klaong Girai temple is considered to have the best conservation work in Ninh Thuan province. It is in relatively good condition when compared to other Champa temples in Vietnam, with successful consolidation methods employed by conservation specialists that have helped in its preservation and maintenance. However, the use of cement in the conservation process has resulted in the rapid erosion of the original brickwork, spreading to the surrounding bricks and ultimately creating more harm than good. This same issue is present at Po Klaong Girai temple, where new bricks are now covered in a black patina of surface lichens (Kwiatkowski and Hoang Dao Kinh 1995).

Despite these negative issues, the conservation works at Po Klaong Girai and Po Rome temples have successfully restored some damaged decorative elements and have placed original features back into place as harmoniously as possible. Kwiatkowski, a conservation expert, emphasized the importance of maintaining the condition of the temple for future generations with more professional skills and knowledge to conserve the Champa temples (Tran Ky Phuong 2007: 4). While his use of cement has been criticized, it was acknowledged that he worked in a nation destroyed and under embargo, with limited resources available for conservation (Zolese 2009).

In general, the conservation of the Champa temples has shown several negative issues. There are three main points of concern: the use of cement, which can result in damage to the original materials and structure; the lack of long-term planning, which has resulted in piecemeal and inconsistent approaches to conservation; and the lack of local community involvement in decision-making, which can result in a lack of understanding and support for conservation efforts. It is therefore crucial to involve local communities in conservation efforts and to consider more sustainable and long-term solutions, such as the use of traditional materials and techniques, to ensure the preservation of Champa heritage for future generations.

Conducting the experiment directly on the body of temples at Po Rome and Hoa Lai temples

Conservationists often used the temple as a lab for their experiments. This is particularly true in this case. For instance, 1m2 of the wall was divided into three small parts to test different methods of a chemical nano-spray technique or "phun sơn thếp vàng". This is a serious violation of the principles of restoration and this fact has been brought to the attention of the local authorities responsible for conservation projects in Ninh Thuan province. However, the experiments still continue.

Fig. 6 Direct testing on the body of the Po Rome temple with three different segments. **Source:** Photo by author, 2012.

A similar issue was the decision by the conservationists in using new bricks in conserving the Hoa Lai temple. In particular, the bricks used in conservation began showing signs of decay before the project was completed. The Institute for Building Science and Technology conducted experiments with materials of uncertain origin in the restoration (Ho Xuan Tinh 2012: 2). The debates and discordant opinions voiced about the various methodologies of restoration on the brick temples have been well broadcast (Tran Ky Phuong 2008: 29); yet the Institute for Building Science and Technology continued to experiment on the towers and its specialists have proceeded to use their new construction methods on the Hoa Lai temple.

Because the bricks in the Hoa Lai temple were already degrading, conservationists had to halt construction many times. Still, despite problems they continued with the work (Ho Xuan Tinh 2012: 2). The methods of restoration with substandard bricks and experimental adhesives became widely used for almost all the temples. As a result, conservation projects continue to damage this and other

temples. After just a few years, almost all the temples with new bricks and experimental adhesives have degraded or otherwise decayed. More critically, the mortar powder used decays in rain and erodes the surfaces of the original bricks. The new layer of powder formed is likely a caustic agent that accelerates erosion to the bricks of the towers. Furthermore, the new bricks at the base of the West and Southern towers retain moisture, a condition that further places the original bricks at risk. New bricks are fraught with a blight of surface flaws, compromised of biological organisms such as black patina and lichens. Currently, the Hoa Lai temple is heavily damaged from the impacts of the conservation.

Fig. 7 Current conditions of the Hoa Lai temple due to new conservation work. **Source:** Photo by author, 2012.

Changing architectural details, decorations, and motifs on the surfaces of the temples at Hoa Lai and Po Rome temples

The conservation efforts at Hoa Lai and Po Rome temples have resulted in unintended consequences such as changing the original architectural details, decorations, and motifs on the surfaces of the temples. These mistakes are a result of a lack of knowledge and experience in historical conservation and archaeology site management. Despite acknowledging the need for careful consideration of methodology, inappropriate restoration practices continue to be used. The negative impact of these practices is evident in the case of Hoa Lai temple where the mistakes of the past have led to new problems.

Fig. 8 Some decorative objects characterized Kinh cultural features are added to the Po Rome temple. Source: Photo by author, 2013.

Many scholars have criticized the conservation works at Hoa Lai temple, citing it as the biggest debacle among all the restorations in Cham. Examples of inappropriate restoration practices include the alteration of decorative patterns of Garuda into human faces, the resurfacing of decorative patterns resulting in a rough and rigid appearance, and the alteration of special features that now make the towers seem strange and unfamiliar to the Cham people. It is important for conservationists to learn from past mistakes and ensure that their methodologies are carefully considered to avoid unintended consequences that could negatively impact the cultural heritage they are trying to preserve (Luu Tran Tieu et al. 2019).

Constructing a new entrance on the Po Rome and Po Klaong Girai temples that go against the practices of traditional Cham culture

The decision to construct a new entrance on the Po Rome and Po Klaong Girai temples that goes against the traditional practices of Cham culture is deeply concerning. In Cham culture, the east direction is considered sacred and reserved only for gods, while the west is typically avoided for entryways in traditional homes and buildings. However, the architects involved in the restoration of these temples chose to create a direct entrance to the central temple from the east, disregarding the values and traditions of Cham culture. This decision not only shows a lack of respect for the cultural significance of these sites but also highlights how the Cham community has been excluded from the preservation and management of their own ancestral heritage. Furthermore, the new entrance alters the original design and aesthetic of the temples and undermines their historical integrity. It is essential that any restoration work takes into account the cultural beliefs and practices of the community and works to preserve the authenticity and historical value of these important sites.


Fig. 9 & 10 The new entrance from the East offends traditional Cham beliefs about temple entrances. **Source:** Photo by author, 2013.

DISCUSSION

The conservation of Champa temples has been a priority for many foreign architects, archaeologists, and conservationists. In order to preserve these structures, they have adopted empirically established principles of conservation. One such example is the collaboration between Italian and Vietnamese conservationists, who have followed a strict set of principles including repairing and consolidating the remaining parts of the buildings as much as possible, leaving the present profile of the ruins as intact as possible, maintaining the original masonry, and using new bricks only in cases of dangerous stability deficiency (Brambilla and Condoleo 2009: 301).

Similarly, Polish architect Kwiatkowsky adhered to basic principles of conservation during his time, as demonstrated by his work conducting an inventory survey and evaluating the condition of Champa heritage in Central Vietnam after the American war. The conservators conducted emergency repairs, prepared inventories, and applied technological reinforcements at several temples, including My Son in Quang Nam Province, Thap Doi and Duong Long temples in Binh Dinh Province, and Po Klaong Girai temple in Ninh Thuan Province (Hoang Dao Kinh 2012:26).

These efforts demonstrate a commitment to preserving Champa heritage while respecting the original structure and materials of the temples. By following these principles, foreign conservationists are able to minimize interventions and maintain the integrity of the original design. However, it is important to note that there have been instances where these principles have not been followed, leading to controversy and criticism among scholars and the Cham community.

In recent years, many conservationists have applied methods to explore the techniques, construction, and materials that comprise Champa structures in the hopes of preserving these ancient temples. Foreign architects, archaeologists, and conservationists have adhered more strictly to empirically established principles of conservation. In particular, they have minimized the interventions on the temples and have attempted to consolidate and maintain the original condition of the temples. Collaboration

between Italian and Vietnamese conservationists is a good example of conservationists conducting their practices using these principles (Brambilla and Condoleo 2009: 301).

Conservation workers believed in the principles and technology of archaeological restoration, using a conservative anastylosis method (Hoang Dao Kinh 2012:27), which involves using original materials to the greatest degree possible. Conservators reused fallen bricks and modern cement to restore damaged walls and temples. They also applied the methods of consolidation, anastylosis, and fragmentary restoration to preserve the authenticity of the temples (Tran Ky Phuong 2002:116-118).

The major method used, called "anchor P.O.K.," involved inserting a steel rod into one brick to reinforce it and link it to another brick. Furthermore, decorative reliefs on walls were restored at Po Klaong Girai temple in Ninh Thuan Province, and at My Son group B and Chien Dan temples in Quang Nam. The use of sanding to restore original brick walls often created indentations in the reinforced walls approximately 5 cm deeper/wider than those in the original walls. Large numbers of broken bricks were moved and rearranged in many temples in central Vietnam after the devastating bombing raids of the American war, which reduced large portions of My Son, for example, to ruins (Nguyen Thuong Hy 2012:3).

According to Hoang Dao Kinh (2009), his conservation projects were highly effective, although he was unable to research the original Cham techniques of making bricks and adhesives. He could only use temporary materials to maintain the temples, and he allowed for future advances in conservation for the next generation of conservationists, who might have better skills and knowledge to continue this important work. At this point, the majority of Cham temples have been restored and preserved.

Tran Ky Phuong, a well-known scholar, and Vietnamese conservationists are actively taking part in the restoration of the Champa temples and argue that most Vietnamese conservationists base their own ideas rather than considering historical facts (Tran Ky Phuong 2006: 22). Unfortunately, heritage conservationists have not performed empirical scientific research on architectural monuments before carrying out restorative works, due to government policies that require expediency (Tran Ky Phuong 2006: 23). Moreover, these actions are undertaken without appropriate cultural knowledge. Coupled with a maxim of expediency, the entire process has led to unfortunate distortions and misleading representations of Cham's cultural heritage. The overlaps of knowledge between construction crews and museum conservators (Nguyen Hong Son 2012) means that the experts are ultimately accountable for the negative impacts upon all temples, even those at which they did not work. The work of the restoration and conservation of Cham monuments has generated a body of discordant opinions. The conservation of the Hoa Lai temple in Ninh Thuan Province is another exemplar of negative interventions on cultural heritage (Tran Ky Phuong 2006: 23).

The preservation of ancient brick buildings, such as the Roman period brick structures, has been accomplished through the use of effective and proven conservation methods. Preservation efforts typically begin with the consideration of original brick size, quality, and colour to be replaced, and experts warn against the use of cement-based mortars in most situations. Instead, new mortar should be flush with the existing edges. (Baer and Livingstone 2015, Camuffo et al. 1999).

In the case of the Champa temples, conservation efforts must take into account the quality of both bricks and adhesives, as these are the two most important elements in determining the success or failure of the project. There have been numerous experiments with traditional Cham materials, but doubts persist as to whether these materials have the same quality as the originals. Therefore, the use of new and untested methods on the Champa temples can have disastrous consequences. Improper work could result in the loss of elements of the Cham heritage forever.

Unfortunately, previous interventions have resulted in deformed architecture due to the experimentation with new bricks, adhesives, and cement. Additionally, these new materials are often used in areas where the temples are most vulnerable. Recently, conservation specialists in Vietnam have started using the Nano spray technique to preserve the Po Rome temple in Ninh Thuan Province. However, critics question the long-term effects of this method on Champa temples. There are concerns about the catastrophic failure of materials and the responsibility for such mistakes. It is unclear whether the new materials will last for a thousand years like the traditional Cham materials.

The evidence shows that the experimental use of bricks and mortar has led to the rapid erosion and decay of the Hoa Lai temple. Therefore, conservationists must exercise caution when implementing new methods to preserve ancient brick buildings, especially those with such significant cultural and historical importance as the Champa temples. It is vital that conservation efforts focus on preserving the original architecture using traditional methods, rather than risking the loss of valuable heritage through arbitrary experiments. (Baer and Livingstone 2015, Camuffo et al. 1999).

The Champa temples not only serve as historical artifacts but also hold great significance for the Cham community. However, most of the Cham temples in Vietnam are not used for religious practices, with only four temples in Ninh Thuan and Binh Thuan Provinces being used for this purpose. The Po Klaong Girai and Po Rome temples are two such temples still used for worship and ceremonies, but the former is currently being impacted by tourism development. The conservation work on the Po Rome temple, which is still ongoing, could potentially lead to a similar fate, thereby diminishing the value of the temple for both tourists and younger generations of the Cham community.

It is essential to involve the Cham people in the conservation work of these temples to avoid any mistakes and ensure that their beliefs and values are respected. However, previous conservation efforts have shown a lack of community participation, leading to the creation of new entrances at the Po Klaong Girai and Po Rome temples that go against Cham beliefs. Heritage experts play a crucial role in the decision-making, design, and management of heritage, as highlighted by Smith and Waterton (2009: 29), but community participation is often overlooked and misrecognized.

Therefore, it is imperative to strike a balance between conservation and community involvement to preserve the historical and cultural significance of these temples. As stated by Labadi and Long (2010: 3), “Heritage conservation should be seen not only as a technical exercise but as a socially embedded and participatory process.” By involving the Cham community in the conservation process, we can ensure that the temples remain meaningful to both the community and future generations.

RECOMMENDATIONS AND CONCLUSION

Scholars have been attempting to identify the original adhesive, brick, and construction techniques of the Cham temples for some time, but there is no final result yet. While waiting for experts to solve the technical renovation of Champa temples, conservation projects can continue to preserve these temples with the aim of strengthening, repositioning, and repairing existing problems to maintain the buildings (Hoang Dao Kinh 2012: 3). However, in recent years, there have been fewer conservation efforts, and many Vietnamese conservation agencies and foreign experts interested in conducting conservation projects on Champa temples in Vietnam are still seeking opportunities. While waiting for debate and experiments to bear fruit, the Cham temples continue to deteriorate with numerous examples still awaiting conservation treatments.

To preserve the Cham temples, three main principles should be considered in the conservation work. First, the monuments need to be maintained in their existing stage to prevent further damage and preserve their historical and aesthetic value. Second, conservation work should be based on scientific knowledge to limit mistakes that can lead to significant deviations. If conservationists' knowledge is limited, they should leave further advances in conservation to future generations. Finally, the conservation methods that have been successful, such as those used by Kwiatkowski from 1975 to 1998, should be continued. These methods have been successful in maintaining the My Son, Chien Dan, and Po Klaong Girai temples for almost thirty years, and if Vietnamese conservationists continue to use them, the Champa temples can be preserved for many more years (Nguyen Thuong Hy 2012; Hoang Dao Kinh 2012; Ho Xuan Tinh 2012).

Additionally, present-day conservationists recommend that repairs of the architectural temple should rely on consolidation principles of anastylosis, and restoration and reconstruction should be limited to help restore the original composition and reinforce existing (Nguyen Thuong Hy 2012; Hoang Dao Kinh 2012; Ho Xuan Tinh 2012). By following these principles, Champa temples can be preserved for future generations to appreciate and understand the unique cultural heritage of Vietnam.

The negative issues currently affecting the Champa temples require urgent attention from those in authority. For instance, the entrances of Po Rome and Po Klaong Girai temples were recently re-aligned in accordance with Cham spirituality. However, this research argues that Cham people should have a greater say in the conservation of their ancestor's temples. Previous conservation efforts have negatively impacted Cham religious practices, and it is important to consider the spiritual values of the Cham people in any conservation strategies.

Tourism is an important aspect of Ninh Thuan Province's economic development, and local authorities have sought to promote the Champa temples as a major tourist attraction. However, the conservation process has altered the temples and caused tension between the Cham and local authorities. For example, the construction of an Eastern pathway for tourists has affected Cham spiritual values. The Cham people, who comprise the largest population in Vietnam, continue to maintain their cultural values around these temples as part of their spiritual and religious activities.

Cultural heritage management in Ninh Thuan Province takes the form of a "living cultural environment," where conservation projects promoting Cham cultural heritage have had both positive and negative impacts. While Champa temples are generally less affected by restoration during the first phase,

conservation works that lacked community involvement had significant negative impacts. Nonetheless, conservation efforts that followed the principles of conservation and had the assistance of international scholars were successful in saving the temples from total collapse.

To preserve the Champa temples and their cultural and spiritual values, it is crucial to plan and manage cultural heritage in a way that is appropriate and careful, taking into account the local community's environment. This will not only help preserve the temples but also promote a sustainable form of tourism that is sensitive to the needs and values of the Cham people (Nguyen Thuong Hy 2012; Hoang Dao Kinh 2012; Ho Xuan Tinh 2012)

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