

ACCU Group Training Course 2022

Case Study Reports





Problem and Needs for the Restoration, Preservation, Management and Utilisation of Wooden Built Heritage in India

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This report identifies problems and needs in relation to the restoration, preservation, management and utilisation of wooden built heritage in India. The 19th ICOMOS General Assembly, New Delhi, identified *wooden built heritage* as ‘all types of wooden buildings and other wooden structures that have cultural significance or are parts of historic places, and includes temporary, movable and evolving structures.

As wood was a naturally available building material, it has been used over the centuries for constructing residential and secular structures, furniture, household items, and other movable structural systems. The sheer quantity of wooden structures seen in India reflects the natural availability of wood in the country. Typical geographic and cultural factors have shaped the wooden architecture seen in different regions of India. Timber was essentially used in constructing walls, intermediate floors, doors, windows, and roofs traditionally.

The following problems and needs identified in relation to the wooden built heritage are based on my perspective as a conservation architect working in Kerala, the southernmost state of India.

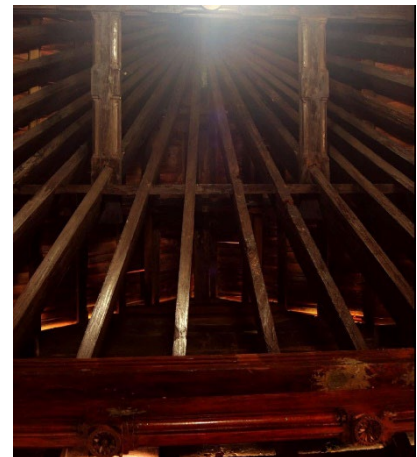


Figure 1. Open ceiling showing roof joinery details of a wooden structure in Kerala

Problem 1: Environmental concerns

Geographically as part of southern India, the state of Kerala lies more than 56% on the Western Ghats, a mountain range which includes mainly forest cover and runs for a stretch of almost 570 km as its coastline. Deforestation, floods, and other natural calamities constitute the main problems faced by the wooden heritage of the region. As traditional houses of Kerala have a high-pitched roof system, they require strong and long timber members of good quality for rafters and for the ridge in particular. According to a Kerala Forest Research Institute report, the growing stock of timber in Kerala has been severely depleted over the years. Degradation of historic forest reserves leads to unavailability of authentic good quality timber, which is ideal for conservation practices. Shifting cultivation, rotational felling of indigenous trees, improper use of forest lands impacting the microclimate, soil water quality, and biodiversity of the region are some of the other growing environmental concerns identified.

Another important problem identified is the recurring annual flooding that happens due to heavy monsoon rains. In the Aranmula Heritage Zone of Kerala, the 2018 floods affected traditional houses, submerging them to with water reaching levels of 6 to 20 feet. The silt left by the flooded river caused severe



Figure 2. Traditional snake boats of Aranmula, damaged due to flooding

dampness in the wooden walls and cellars of 300-year-old Aranmula houses, and more than 40 percent of the *palliyodams* (wooden snake boats), which are part of the associated age-old tradition of the Valla Sadhya celebration and feast, were damaged. Floods also affected traditional wooden weaving equipment in Chendamangalam, a weaving village in southern Kerala.

Problem 2: Loss of knowledge

The wooden built heritage of India is known for its craftsmanship and functionality. Traditional architecture and techniques can be seen as mutually linked over the years. Similarly, the wooden built heritage is integrated into the practices associated with it. However, predominantly over the past decade, the loss of intangible heritage associated with the structures has weakened the transmission of the system of knowledge involved in constructing and maintaining certain wooden buildings. In the case of *koothambalams*, ancient wooden performance theatres of Kerala, due to the diminishing interest towards *koothu* (the performance associated with the structure), the buildings are on the verge of becoming mere wooden structures, without proper maintenance, management, and continuity, since the function has been taken out of the form. Most of the associated practices are performed by a specific community. The shift of interest by members of the present generation in the community away from the tradition also adds to the loss of the relevant traditional knowledge system.



Figure 3. Koothambalams, traditional performance theatres of Kerala, and their timber roof joinery details

Other reasons contributing to the loss of knowledge are the decreasing numbers of practitioners and craftsman. In the case of the industry involving *uru*, traditional wooden ships of the Malabar coast, the number of master craftsman who are well versed in the unique techniques used to construct and repair the ships has dwindled to merely five persons over the past twenty years. The main reason is decreased interest in the craft and other economic pressures. Most of the wooden techniques are regionally specific and few historical data are available as documentation. For example, in the case of wooden houses of Thazhathangadi, an ancient port town in southern India known for its wooden walls and cellars (*ara, nira* houses), there are no or few available authentic literary sources presently available on the traditional building materials and carpentry tools, which would have been helpful for the conservation and maintenance of these houses.

Problem 3: Economic pressures

Economic pressures faced by the wooden built heritage are mainly the growing trend of importing timber from abroad, and the mass production of modern materials replacing locally produced items. In conserving

wooden temples, there are cases where natural treatments and paints are found economically not feasible because of their long setting time. In the case of the traditional ship-making industry of Beypore, a historic port, the traditional wooden nails, waterproofing oils, wooden gums, and tools, etc., are being replaced by modern materials. The increasing cost of transporting timber logs and the heavy duties imposed and other bureaucratic delays add to the pressures. The shift in employment of youth away from carpentry due to low wages has made some of the skills in traditional woodworking almost non-existent today.

Problem 4: Unsympathetic interventions

Due to the lack of proper awareness among the inhabitants and to other financial constraints, there are cases of adding unsympathetic interventions to heritage structures. Since wood coexists with masonry and other materials, misapplication of incompatible materials like cement over wooden frameworks often destroys the wooden fabric and its integration with other materials.

The following needs relate to the measures that can be carried out to tackle problems for better protection, management and utilisation of the wooden built heritage.

Need 1: Sustainable approaches

Protection of forest reserves

For the successful maintenance and sustainability of wooden heritage, it is important to protect the historic forest reserves as the primary source of timber. This can be done by implementing sustainable forest practices, curbing deforestation, promoting programs like establishing timber plantations for conservation purposes, and protecting the existing woodland reserves.

Certain praiseworthy efforts have been taken by governmental authorities, such as establishing a Teak Museum in Nilambur, the oldest teak plantation in India (1842), and recognising the need for resource development. Setting up banks of materials like seasoned timber, traditional repair tools, and other products for treatments that are essential for the conservation of wooden built heritage is another suggested solution.

Risk preparedness

Since recurring floods in riverine areas result in severe damage, including material deterioration, structural distress to traditional wooden structures, ships, and boats, there is an immediate need for heritage-oriented risk preparedness programs and mitigation measures as remedial interventions.

The Aranmula Heritage Trust in the southern Indian state of Kerala has proclaimed an immediate need for post flood rehabilitation of craftsmen who know the skill of making and repairing *pallyodam* boats. Under the leadership of the Trust, various revitalisation programs including seminars and exhibitions on restored artifacts have been held, which have served as a helping hand for the artisan community.

Ensuring continuity

There is a need to ensure the continuity of wooden craftsmanship, as it is integral to the associated built heritage. This can be attained through proper monitoring and by following informed management strategies. Sustainability of the community and its traditions are vital for preserving the traditional knowledge system related to the built heritage.

Economically viable approaches like adaptive reuse can be brought into practice through people's participation, which can also result in sustainable economic management. The Alappuzha Heritage Project and Muziris Heritage Project funded by the government of Kerala are examples of such economically reliant program initiatives.



Figure 4. A coir (coconut fibre) society building restored under the Alappuzha Heritage Project

Need 2: Transmission of knowledge

For preserving and upholding the authenticity and associated values of our wooden built heritage, there is a need to transmit the existing knowledge system to future generations. It is essential to respect and tap the traditional ancestral wisdom regarding wood conservation, which lies within communities. This can be achieved by creating awareness through teaching basic indigenous carpentry techniques, and about wood's interaction with other materials, as part of the school curriculum. Preparing every citizen to be equipped with basic restoration techniques and tools, making the wooden heritage accessible and attractive for people, and conducting heritage walks, workshops, and other interactive programs, are other suggestions. Programs like the Kochi-Muziris Biennale have showcased the stories of traditional wooden boats and communities of fishermen, shedding light on the rich maritime heritage the country possesses. The Vasthuvidya Gurukulam, a state-run institute at Aranmula, aims to teach traditional architecture and conservation principles which can be applied regionally.

Need 3: Generation of proper guidelines

The Ancient Monuments and Archaeological Sites and Remains Act (1958) of India and its subsequent revisions protect the country's ancient monuments and their precincts. There is a gap in conservation legislation when it comes to legally assuring the protection and maintenance of vernacular houses. Special guidelines to protect the existing wooden built heritage are essential since most of the traditional houses are disappearing due to the pressures of modernisation. Identifying and assigning protective designation for items of wooden craftsmanship can help secure the survival of these crafts. There is a need to formulate specific guidelines for flood-prone wooden structures, such as traditional wooden temples, residences, ships, snake boats, etc. There are cases (e.g., 50 examples of wooden houses in the old port town of Thazhathangadi) where heritage structures were demolished under economic pressures. As documentation and listings of various existing items of wooden built heritage are presently lacking, there is a chance that once these structures are demolished, it is nearly impossible to reconstruct or conserve similar ones. A possible solution, along with generating proper guidelines, is to have a knowledge pool of historical data on various types of wood used for construction during olden days, and traditional wood treatments and different conservation practices that were followed back then. Since there is a prevalence of knowledge about wood conservation that is locally specific to regions, sharing that knowledge with other geographical parts of the country with similar problems through a common platform seems fruitful.

Conclusion

This report summarises various problems and needs related to the wooden built heritage of India, by drawing examples from case studies of Kerala. Through awakening a sense of responsibility, by ensuring the

structural stability and physical continuity of wooden structures, by understanding their cultural significance and by faithfully accepting traditional methods for conservation, the wooden built heritage of India can be managed efficiently and celebrated all the more.

(This report relates to themes of Units 2 and 5. All photographs used in the report are by the author.)



Past and Present Status of Wooden Canoes in the Coastal Region of Papua New Guinea

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Unit 3 and 5

Trading along the Coastal Region

In Papua New Guinea (PNG) there have been voyages tracing all the way back to prehistoric periods. Some of these expeditions became famous for the trade between people living along the coastal region and on coral islands, for instance, the long distance trade between the people of Hiri Motu and inhabitants of the Gulf of Papua.

Outrigger canoes known as *lakatoi* became expedient for carrying close to twenty thousand clay pots each year. “Every year men from the Motu villages around Port Moresby set out in a fleet of mighty canoes (*lagatoi*) for the villages of the Gulf, where they exchanged pots for sago, logs and betel nut” (Langmore, 1974, p. 56).

This study focuses on the development of the *kula* trade, and on ocean-going outrigger canoes used for trading, which has involved the people of Misim in the Trobriand Islands for around 2000 years (Damon 2017, p. 146). The discussion will briefly bring into perspective the significance of wooden canoes in relation to trading purposes. The major part of the discussion, however, will concentrate generally on the preservation of the canoes, of related knowledge and skills, and their continuity.

The *kula* trade is one of the highly celebrated activities to have taken place around the coastal region of PNG over the years. The people of Misim in the Trobriand Islands became aware of the need for exchanging arm shells, which increased incrementally in value as they passed from one island to another. The *kula* trade, as Weiner (1988) explained, is closely linked with the outrigger canoes, used for long ocean voyages undertaken for the exchange of goods such as the shells which were highly valued.

A significant part of ocean-going expeditions aims to achieve fame throughout the islands visited during these voyages. It is how one would be able to successfully reach other islands, proving their skills of making successful landings. When sailors returned home safely, it gave them recognition. So the fundamental idea about these expeditions was to showcase the people’s skills, to test their magic in navigating through rough ocean currents, demonstrate the strength and worth of their outrigger canoes, and give fame and prestige to the people.

Preference for Boats with Outboard Motors

Damon observed that *kula* trade technology has become lost. Not only technical skills but also the locations for *kula* exchange shifted as some villages, even entire islands, ceased to be part of the *kula* circuit of prehistoric times.

One of the significant changes that colonialism brought was motor-driven boats and commercial fishing and shipping. Communication between islands was no longer dependent on sailing canoes, and often a local man working on a government or commercial ship could visit a *kula* partner on his own without waiting for a *kula*

expedition to be launched. Travel by motorboat for *kula* is much preferred since it is faster, safer, and easier, but in the beginning there was some resistance (Damon 2017, p. 147).

I have made a number of trips since last year and just recently visited one of the villages located along the Purari River (on the Gulf of Papua). It was observed that people are still using wooden canoes. Both men and women, and even children aged between 14 and 16, are familiar with using canoes along the Purari River. It was observed that few canoes, perhaps not more than four, are usually passed when travelling up and down the river.

Thus it is also true that not all villagers have their own wooden canoe. I learned that villagers who wish to cross the river would normally be carried by individuals who own one. There is less need to own a canoe or build one since there are other means available compared to the past. It is not surprising to see that young men seemed to care less about owning a wooden canoe or about building one if they do not own a canoe. One of the reasons is they are used to travelling on boats with outboard motors, which only a few people own. It makes sense that people prefer travelling by boats with outboard motors than simply owning a canoe.

A striking response received from the younger generation is about their lack of skills and knowledge regarding the production of wooden canoes and what they were used for in the past. Even though trade with Hiri Motu concentrated in this part of the region in the past, young people have no idea about what canoes were used for.

Most of them would relate stories of how they get on outboard motorboats and travel to the provincial town rather than about long voyages by wooden canoe. Canoes were seen as necessary for daily use to catch fish and other activities along the river. Most of the interest that was observed focused on boats with outboard motors. With the use of outboard motors, measured in terms of speed and efficiency, wooden canoes will become things of the past in the future. It is not just about the preference for using it as a form of transport, but people are not willing to learn or pass on the skills and knowledge associated with the canoe.

As explained above, canoes became significant for transportation in areas where long distance trading was conducted in the past. This applies also for the skills and knowledge associated with canoe construction. Seen more closely from an emic perspective, as explained by Damon, certain designs and patterns given to the canoes represent material objects familiar to the people. A canoe is constructed in a way as to enable reasoning, in terms of shape, the way it sits in the ocean and on shore, that gives a sort of meaning to the people. The boat makers carefully select the right tree, making sure certain angles of the wood are carved in such a way that it does not overlap with anything. Also important is where and when to launch it for the first time, as a necessary aspect as well (Damon 2017, p. 298). It goes without saying that the art of canoe making and the meanings behind it are no longer seen as in the past.



Figure 1: Two photos along the Purari River close to a village, Poroi 2. The left photo shows two canoes, one under construction (front) and the other in use. Photo by Yawan Alo. On the right is a woman with her son in a wooden canoe. Photo by Benjamin Leme, 18 June 2022.

Preservation and Management of Wooden Canoes

When canoes are no longer being used, care is not given for their preservation. Sometimes the wood is used as fuel for burning, and others are left to rot. Accordingly, the younger generation begins to forget the knowledge of specific designs, and the magic involved in the carving of the canoe.

My discussion aims to trace customs of the past and present to see how the times have altered the inputs involved in the carving of the canoe. When speaking of inputs, what I mean is the knowledge, skills, and recitations of magic involved in designing and carving the canoe, which have changed over time. Canoes were made by skillful individuals, who not only knew how to fashion the canoe but also had knowledge of where to cut the tree, meaning local knowledge of the specific trees to cut, and of speech involving the magic words useful for the builder to carve it well, and other necessary skills that accompanied the process.

It is obvious that as more people depend on outboard motorboats for transportation and for meeting other needs, the value of the wooden canoe and of its uses in the past are easily forgotten. For instance, someone may have the skills to build a canoe and could teach another person in order to pass that knowledge forward. But what is lacking is effort on the part of others to learn, and even those who have the knowledge have no reason to pass it on to others. This is how the knowledge and skill of building wooden canoes is easily forgotten.

In the past, as explained in the context of the *kula* and Hiri trade, the news of passing and sailing were celebrated with great joy and admiration. As Damon explains, every time one sailed by, those on shore could not help but watch it—watching the movement of the canoe moved the watchers. The same may be said every time a new one was drawn ashore. Villagers waited with rollers to place under the keel and outrigger float as they touched the slope of the shore. Then they pulled and pushed the boat up to its resting perch. These beachings—launchings were similar—were full of excitement, laughter, and straining bodies. Then everyone became quiet as they welcomed the crew and examined the craft (Damon 2017, p. 296).

In the remote coastal villages, wooden canoes are merely means of transportation nowadays. But in terms of preference, people wish to operate and own boats with outboard motors. Also, it is difficult to find old canoes kept in the villages. Usually, during flooding and at times of high current, wooden canoes are carried away. This happens perhaps because not much care is being given to them. What anyone would normally see in the past was wooden canoes that were in use and perhaps one that had been recently fashioned. As the numbers of wooden canoes decrease, the skills needed for building them also decline. From this perspective, we find that learning to build a wooden canoe or passing on the relevant knowledge to the younger generation is seen as a waste of time. This is how the prospects for easily preserving the culture of wooden canoes have started to fade away.

Canoe Festivals

Canoe festivals take place almost every year in different parts of the coastal regions of the country. Most of these events take place on the 16th of September every year to celebrate Independence Day. Usually, each province has its own calendar for organizing the festival. In terms of preserving and passing knowledge the effect is limited, as canoes are built only for the festival and afterward left unused.

Perhaps it has become just an aspect of entertainment and a tourist attraction, and not serving as a bridge with the past, and so the old forms of activities associated with the ceremony remain unknown and are forgotten. Because at the end of these events, no one talks about them or thinks to ask questions about their significance.

Gaps in Documentation and Recording

There is ample literature on wooden canoes but what is lacking is detailed documentation and recording. Short documentary films are shown during special events; however, there is no detailed documentation of the initial planning and construction phases of canoe making. At present, it is unlikely that we will find proper recording of the canoes that were used for *kula* exchange or of *lakatoi* and their state of preservation; thus how many are currently in use, who still has the skills and knowledge, and which groups are currently using it are unknown. What is documented and recorded should be made available to the public as an effective tool for raising awareness.

This is perhaps a huge and rewarding project if an attempt is made to document and record canoe making in regions that were known for long distance exchanges in the past. This will surely give a sense of historical connection for the younger generation. It is one way to preserve knowledge for future generations and will surely close the generation gap in terms of wooden canoe technology. Without this, the canoe culture in the country will cease to exist and even if it is practiced, it will take the lowest priority.

Conclusion

The use of wooden canoes made long distance trading between people living along the coast possible. The continuity and preservation of this culture are now threatened by the use of modern transport like boats with outboard motors. Though some villagers use wooden canoes even today, the need to operate and own outboard motorboats diminishes the value of wooden canoes. Thus, prospects for passing knowledge to the younger generation to preserve the culture of canoes are slowly fading. This is not to say that the yearly canoe festivals that are conducted have largely contributed to entertainment and tourist attractions rather than preservation. But to keep the memories of the past for future generations, one way to do so is to make detailed documentation and recordings.



Comprehensive Architectural Documentation of Quiapo District's Ancestral Houses

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Introduction

This report identifies the problems and needs in relation to the protection, preservation, and management of Philippine ancestral houses still existing in the District of Quiapo, Manila. In the Philippines, heritage architecture is commonly associated with only a few places although this rich heritage is found all over the country. Various works (Zialcita and Tinio 1980; Perez 1989; Hila 1992; Javellana, Zialcita, and Reyes 1997; Villalon 2001) feature the heritage architecture of Batangas, Bulacan, Manila, Quezon, Ilocos Norte, and Vigan. Zialcita (1997) suggests two types that constitute a national style of vernacular houses. These are the *bahay kubo*, also called the farmer's house, and the town dweller's house, made of stone and wood and called *bahay na bato at kahoy*. The typical *bahay na bato* has a number of regional variations with notable differences in the Tagalog, Pampango, Visayan, and Ilocano regions that were built during the late 1700s to early 1900s. In Bohol, the oldest known Spanish era house was called Casa Boholana, probably built around 1820 (Luspo 2006). Some *bahay na bato* in Vigan were built in the last quarter of the 1700s. The *bahay na bato* is the pinnacle of the integration of multi-cultural influences with indigenous forms – an architecture that responds to the environment and history.

The construction methods and architectural styles of the *bahay na bato* are principally similar to those found elsewhere in the Philippines (e.g., Floral, Geometric, Art Nouveau, Art Deco, Neo-Renaissance, Neo-Gothic). Most *bahay na bato* in Luzon, for example, have their ground floor made of stone (adobe, coral stone, or brick). The construction of the upper floor is of wooden materials, from its structural framing to its "skin" and to almost all of its parts. The roof was commonly made out of thatch in earlier times, and subsequently evolved to clay tiles and then to galvanized iron. Quiapo, as the heart of Manila, has a number of these ancestral houses still existing up to this date, but they need urgent attention.

Problem 1: Urbanization – Global Development Pressure

Although these structures obviously fall under the protection of the Republic Act 10066, or the National Cultural Heritage Act of 2009, contemporary development in our community inflicts concerns that contradict heritage conservation practices in the Philippines. These are evident in places where commercial establishments encroach upon properties on which these houses stand. Demolition of these structures is also taking place in order to give more economic value and opportunity to the locale for the benefit of the community in our modern setting. A number of *bahay na batos* in the country, as of today, still face these demolition threats. Some are in various stages of disrepair, and some are already in ruins. However, their architectural value can be inferred even from the ruins. So much still has to be learned that can be passed on to future generations about the *bahay na bato*.



The technical documentation team cannot access the site safely because of threats from tenants.

Problem 2: Property Loss Due to Inability to Sustain Maintenance of the Property by the Owners, Theft, and Natural Calamities

The *bahay na bato* were mostly owned by rich families during earlier times. While some have maintained their good fortune, others were not fortunate enough to keep the resources they had before and are thus unable to sustain the maintenance of the buildings. However, regardless of the ownership of the house, it is most likely that the maintenance will not go beyond minor repairs. The more expensive repairs such as leaking roofs, tilting posts, and rotting wood are likely to be postponed, as the residents may not be willing to shoulder the expenses alone (especially if they are not co-owners, or only have a small share in the building). Non-resident co-owners are likewise unwilling to share in the expenses as they, living elsewhere, do not benefit from the house. All these neglected repairs gradually contribute to the serious physical and aesthetic deterioration of the house. In the event of such unfortunate circumstances, stakeholders are unable to do the repairs necessary for preserving the integrity of the property. Some may resort to selling the property in order to cut their losses. The new owners may then demolish the property and sell the remains as antique parts. The grounds of the property are usually a prime location suitable for new commercial establishments which would give a bigger monetary return to the owner. These are some of the reasons that these Spanish colonial houses are decreasing in number. Another reason is the value of parts taken from the houses that thieves sell openly on the market as antiques. Houses without caretakers are being exploited and parts are taken if nobody is around. Lastly, due to its geographical location the Philippines is prone to tropical

cyclones, which generally produce heavy rains and flooding of large areas and also strong winds, resulting in the destruction of properties and especially these ancestral houses.



The Boix House in poor condition with informal tenants in Bautista St.

Need 1: Comprehensive Architectural Documentation

A consortium of property owners, administrators, custodians, and heritage advocates is pushing for a House bill (congressional bill) for the declaration of Quiapo District as a Heritage Zone in accordance with the provisions of the Republic Act 10066, better known as the National Cultural Heritage Act of 2009. Part of the initiative would document all the remaining ancestral houses in the area, as some of them are already in poor condition. Ideally, a combination of digital scanning and documentation by direct measurement is needed as the houses also have concerns regarding the current tenants.

Need 2: Toolkit for Training and Production of References

There have been a few attempts at making a proper toolkit for architectural documentation but it is still far from being comprehensive. The National Commission for Culture and the Arts (NCCA) continues to support the Philippine Heritage Architecture and Cultural Sites documentation effort, but only few areas in the country have been documented with the help of national grants or from the initiative of local government

units. An example of these publications are the Heritage Homeowner's Preservation Manual of Vigan, developed within the framework of the UNESCO program on "Integrated Community Development and Cultural Heritage Site Preservation in Asia and the Pacific" (LEAP Program). It is hoped that this manual will encourage active participation in heritage conservation and management among homeowners in the Historic City of Vigan as an inscribed World Heritage Site. This manual would also be an inspiration that the Quiapo Heritage District could one day have for local utilization.

Conclusion

It is sad to think that future generations may not see existing examples of architecture that gracefully co-exist with the *Habagat* (southwest monsoon) and *Amihan* (northeast monsoon); with the humidity and intense sunlight; with the torrential rains, typhoons, and earthquakes. This is Filipino architecture that, in all honesty, integrates ornamentation with structure. The *bahay na bato* articulates what is Filipino.



Developing a Preventive Maintenance Guide for Wooden Structures and Components

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(Themes: Repair & Restoration; Management and Utilization)

Introduction

Wood is one of the most common materials used in almost all types of heritage structure in the Philippines, primarily due to its abundance and wide variety in different regions of the country. The use of wood in prehistoric and colonial era architecture in the Philippines attests to the availability and reliability of the material as a major building material. Many of the structures that feature wood as the main material are recognized by the government as valuable cultural properties, and as such should be preserved to maintain their significance. However, the task of protecting cultural assets that showcase the extensive role of wood in the development of the country's architecture and built heritage has been confronted with challenges, especially in a developing country that may have other priorities, particularly with regard to allocating resources for its heritage assets. Although the state recognizes its responsibility for protecting its cultural properties, it is the position of this paper that citizens, as stakeholders, share the responsibility for safeguarding this heritage and have the potential to actively fulfill this role that could reduce any risk a property may be facing. But to do so, owners, custodians, users, and even communities need to have the appropriate capacity and guidance. The lack of capacity of and guidance given to key stakeholders shall be the focus of this study, which aims to fill a gap in preserving wooden heritage in the Philippines.

Problem Statement

Although some heritage structures that feature wood as the main material can be conserved through the initiative of the state and some capable owners, the actions taken are commonly as reactions to the already grave condition of the structure or sometimes to disasters. In the capital city of Manila alone, countless wooden structures have been demolished due to their dilapidated state, being considered hazardous to the community. Many others are in a poor state of conservation and likely to suffer the same fate as others that have been taken down or dismantled for the materials to be used for some other purpose. Some property owners choose to sell their property, again, with the structures being simply taken down. A common sentiment among owners of heritage structures is the lack of resources and capacity to maintain for example an old house, which becomes a reason for its neglect or sale. Even when a property is recognized by the state as a cultural asset, government resources are not guaranteed to be allocated for the care of all heritage structures. Left without the capacity to take



Figure 1. A wooden post in the Old Convent of Manaoag Church showing damage and loss of material. (Photo courtesy of Escuela Taller de Filipinas Foundation, Inc.)

care of the structure, owners tend to let go of their valued properties. A gap therefore lies in the capacity of owners and custodians to take care of their properties. Without the appropriate knowledge for preserving wooden building components, the building fabric will continue to deteriorate into a state that would require more resources to properly preserve the structure, discouraging the owners and managers from taking the necessary steps towards conservation of their heritage asset and leaving the property vulnerable to hazards and potential risks.

Objectives of the Study

With the established need to build the capacity of owners and custodians regarding the preservation of wooden heritage structures, this study aims to develop a practical guide that could enable owners and custodians to develop and implement a preventive maintenance program specific to wooden materials and building components. This practical guide aims for the owners and custodians to understand the characteristics of wood and how it is used as a building material, so they will be able to monitor the wooden structure or component, plan for the needed repair and restoration, and manage the implementation of this plan. Since it can be assumed that owners and custodians of heritage properties do not have the technical knowledge and skills in conservation and do not have access to professionals and technicians specializing in wood care, it is logical to build their capacities in taking care of their properties in a practical and active way.

By equipping owners and custodians with knowledge in the proper and active care of wooden components and materials through preventive maintenance, the vulnerabilities of the heritage structure can be minimized and risks are reduced.

Theoretical Framework

This study intends to utilize the various concepts in preventive maintenance in developing a guide for wood preservation, but with an emphasis on risk-based maintenance that prioritizes resources for elements that have the highest risk. The choice of risk-based maintenance over other forms or methods (such as event-based, time-based, condition-based, etc.) is primarily motivated by its nature of being economical. By having a risk-based approach in preserving wooden structures and components, maintenance resources (funds, technicians, materials, etc.) are efficiently utilized based on the greatest risk if the structure or component were to fail. Although this study shall focus on wooden structures and components, it should be noted that it should be a part of other similar guides addressing other types of structures or building materials.

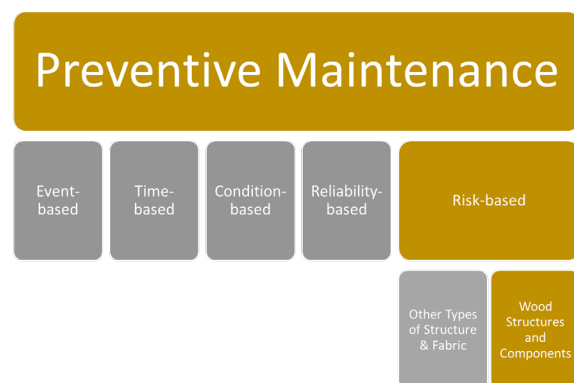


Figure 2. Diagram showing the approach in preventive maintenance. Highlighted items shall be the focus of this study—risk-based preventive maintenance focusing on wooden structures and components.

Case Study

The structure that will be the subject of this study is the Old Convent of Manaoag Church. Typical of convents built during the Spanish colonial period in the Philippines, the building is composed of a masonry wall at the ground level and a second level made of wood. The building, which has been reused as a school, has been recently evacuated due to its deteriorating state, which presents health and safety risks to the users. The old convent was chosen for this case study of developing a preventive maintenance guide due to the presence of components that can also be found in other heritage structures in the Philippines that extensively use wood as a building material.

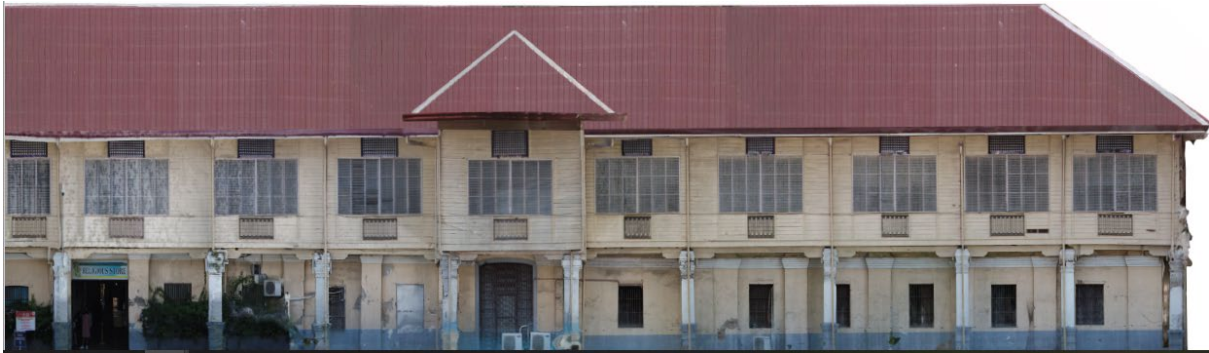


Figure 3. A rectified photo of the front side of the old convent of Manaoag Church. (Photo Courtesy of Escuela Taller de Filipinas Foundation, Inc.)

Conclusion

Being in a region where natural events with devastating effects such as typhoons and earthquakes often occur, heritage structures need to be in their best form to avoid sustaining damage during these destructive events. The proposed study presents a gap in the care of heritage structures making them vulnerable to such events, and the gap may be filled by equipping owners and custodians with a practical tool that can enable them to fulfill their common role in preserving the wooden heritage of the country. With the availability of such a guide, owners and custodians can be considered as “frontliners” in actively responding to the needs of the built heritage under their care and consistently minimizing the risks to which these important properties are exposed.



Disaster Risk and Mitigation Measures of Built Heritage in Nepal

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This case study report attempts to highlight the disasters and risks to the wooden built heritage, as well as the mitigation of these hazards and the prevention of loss of heritage due to disasters, in the context of Nepal. There are seven World Heritage sites in the Kathmandu valley, which are Kathmandu Durbar square, Patan Durbar square, Bhaktapur Durbar square, Swayambhu, Baudhanath, Pashupati, and Changu Narayan, plus one World Heritage site outside Kathmandu, Lumbini. Another 15 sites are on the country's Tentative List for nomination as World Heritage. Most of these national and World Heritage sites consist of monuments built using mainly wood, brick, stone, and mud. All of the heritage structures built using traditional materials, techniques, and processes are highly at risk due to natural calamities, and environmental and developmental causes. The following observations are from my personal perspective on disasters and the risk to built heritage in Nepal, and data presented herein are collected from the Department of Archaeology, Nepal.

1.0 Disaster types and their impact in terms of heritage loss

Disasters which cause significant loss of built heritage in Nepal are mainly natural disasters. Human-induced disasters can also cause damage, although lesser in intensity.

1.1 Natural disasters and their impact in terms of heritage loss

All of the major loss of heritage in the history of Nepal has been caused by natural disasters. As the timing and intensity of a disaster and its potential for damage cannot be known before the actual event, protection of the built heritage from natural disasters is always challenging for Nepal. Below are some of the forms of potential natural disasters and their damage in terms of impact to the built heritage.

1.1.1 Earthquakes

In the context of Nepal, earthquakes are the major form of natural disaster which historically have caused significant losses of heritage. Over an average 100-year time period, there is a reoccurrence of a major earthquake which causes large-scale destruction of the built heritage. The recent 2015 earthquake in Nepal with a magnitude of 7.6 caused extensive loss of heritage structures all over Nepal. Earthquakes have had the largest impact in terms of heritage loss throughout the history of Nepal. As an earthquake event can spread over a large area impacting heritage sites, it has the capacity to destroy large numbers of heritage properties in a very short period of time. So in the context of Nepal, earthquakes have had the largest negative impact on heritage in terms of the amount of heritage destruction in a given time period.

As earthquakes damage large numbers of heritage properties in very short periods of time, recovery of the loss is very difficult. Recovery needs large amounts of resources in terms of finance, time, and people. After every large earthquake there is a significant complete loss of heritage which is never restored. The recovery process for the heritage lost during the 2015 earthquake is still incomplete.

1.1.2 Fire

As many heritage structures of Nepal consist of wooden elements on a large scale, these structures are always at risk due to fire. In the event of fire, the loss of heritage is inevitable as most of the monument sites in

Nepal are in places where fire extinguishing teams cannot reach in time with the necessary equipment. The Pratappur Shikhara temple of the Swayambhu World Heritage site of Nepal was completely damaged by a fire in 2011, and later restored at its original location. As many built heritage sites are in close proximity to private residential settlements, there is always a high risk of the spread of fire and the loss of heritage due to fire will be catastrophic. Once an event of fire happens at any site, especially for built heritage which consists of wooden elements, the loss to the value of the heritage is irrecoverable. Many struts, doors, and windows of tiered temples of Nepal which have unique artistic and architectural value cannot be recovered and restored to their original status. So the loss of heritage due to fire has a larger impact than any other disaster event.

1.1.3 Lightning

Heritage structures in Nepal are always at risk due to lightning. During the months of April and May the central and eastern parts of Nepal receive the majority of lightning strikes. In Nepal, major heritage sites which are listed as World Heritage properties are in the central region which is always at high risk of lightning damage. As human life and private properties are thus always at risk due to lightning, there are also many events where major damage to the built heritage has been caused by lightning in Nepal. The Pratappur Shikhara temple of the Swayambhu World Heritage site of Nepal was damaged by lightning in 2008.

1.1.4 Floods and landslides

As more than 80% of the land area of Nepal is occupied by mountains and hills, there is always risk of floods and landslides. Landslides have the largest impact in terms of loss of heritage as they can completely wipe built heritage away from its original location and recovery of the heritage with its value is impossible after the loss.

During the monsoon season there are major events of flooding in the river basins and plains regions of Nepal. Although there is no well documented event of floods or landslides which have caused a loss of heritage in Nepal, there is always a risk.

1.2 Human-induced disasters and their impact on heritage loss

There is no recorded loss of built heritage due to human-induced disaster or armed conflict, but the threat to cultural heritage properties due to theft, and the removal of archaeological objects from the original locations of built heritage to other places of interest, are always important issues for the protection of built heritage and its value.

2.0 Mitigation measures for disaster risk

To prevent the loss of heritage due to natural calamities and human-induced disasters, mitigation measures should be adopted and followed as per the unique needs of the built heritage. With the proper adoption of mitigation measures, the severity of heritage loss can be reduced significantly.

2.1 Mitigation measures for earthquakes and heritage loss

As we know, earthquakes cannot be avoided but their damage to the built heritage can be reduced significantly. In every event of a major earthquake, the focus is directed towards saving human life. In preparation for such critical periods of time there should also be proper mitigation measures to save heritage properties and their value. We can conserve or restore built heritage at its original location, protecting its outstanding universal value, only if we have proper plans and documentation beforehand to save the heritage which is at risk of loss due to earthquakes. Also, periodic assessments of built heritage for possible

earthquake damage should be carried out, which leads to periodic maintenance of the built heritage and reduces the loss of heritage in the event of a future earthquake.

2.2 Mitigation measures for fire

There have been many events of fire and loss of heritage in the past in Nepal. Fire can be caused by various reasons, among which many can be avoided. From the example of the Pratappur Shikhara temple of the Swayambhu World Heritage site, it came to be known that proper study of fire risk at that site and prevention measures could have avoided such a fire event.

2.3 Mitigation measures for landslides and flooding

As we can assess the built heritage which is already in danger due to future landslides and floods, necessary protection works can be carried out to mitigate damage to the heritage at the time of an actual disaster.

Conclusion

This report has attempted to point out the types of natural and human-induced disasters and their risk to the built heritage, as well as some mitigation measures which can be followed to avoid the loss of heritage in the context of Nepal.

*Report relates to the themes of Unit 5



Challenges in the Management of Wooden Built heritage in Fiji

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Challenges in the Management of Wooden Built Heritage in Fiji

The Fiji Museum is a statutory body that is governed by the Fiji Museum Act¹ and the Preservation of Object of Archaeological and Paleontological Interest Act.² The Fiji Museum utilizes the latter in all its operations, with the aim of identifying, recording, protecting, and preserving archaeological and cultural heritage sites for the current and future generations.

This report will discuss and identify preservation works that have been conducted by the Fiji Museum with cultural stakeholders in the preservation of the wooden heritage materials from Makogai Island and how we have managed to use adaptive measures for wooden heritage materials not only in the museum building but also at other sites.

Early in 2016, a post disaster assessment on Makogai Island was carried out by the Fiji Museum Archaeology and Gazetting Section. The highlights from the report recommended potential inclusion of the island as a national heritage site and how the building debris could be reused to repair buildings that were devastated in the Historic Levuka Port Town World Heritage Site.

Site A

The first building took the team one week, from the 19th – 24th September, 2016, to dismantle. The team started off with nine members and was divided into two. The first team dismantled the building while the second team extracted nails and bracings from the timbers neatly piled according to sizes. Once the structure was cleared, the team then recorded the timbers and sorted them for transportation to Levuka.

Table 1. Oregon timber recovered from the salvage exercise

Site	Size	Number of Timbers
A	6 x 1	171
	3 x 1	13
	2 x 2	24
	5 x 1	11
	2 x 1	62
	4 x 2	38

¹ Fiji Museum Act, Chapter 263, Laws of Fiji

² Preservation of Objects of Archaeological and Paleontological Interest Act, Chapter 264, Laws of Fiji

	3 x 2	25
	4 x 3	31
	4 x 4	46

Below are photos from Site A



Dismantling the building structures. Images credit: Fiji Museum



Team lifting the timbers from the site to the beach front; team stacking the timbers according to their sizes and extracting nails. Images credit: Fiji Museum

Site B

The team then dismantled the second building (60% intact) in the second week, from the 26th – 30th September, 2016. Divided into two groups again, the team continued with the process from the first week as the team was joined by two other members. Once the structure was cleared, the team then recorded the timbers and sorted them according to their sizes for transportation to Levuka.

Table 2. Oregon timber recovered from the salvage exercise

Site	Size	Number of Timbers
B	6 x 1	250
	3 x 1	26
	9 x 1	12
	4 x 2	100
	4 x 4	70
	6 x 2	32

Site B – Nasau



Site B building structure. Images credit: Fiji Museum



Measuring, extracting nails, piling the timbers according to their sizes. Images credit: Fiji Museum



The salvaged materials ready for loading. Images credit: Fiji Museum

Loading from Nasau, Makogai

The team was assisted by the *MV Vunilagi* captain and crew with the Public Works Department workers.



Off-loading at the Levuka wharf

The team was assisted by the *MV Vunilagi* captain and crew with the Public Works Department workers.



Images credit: Fiji Museum

PLANNED USE FOR THE SALVAGED TIMBER

As per the Phase 1 report, the Department of Heritage and Arts has identified buildings that will utilize the timbers that were recovered from the salvaging exercise. Work has been started for the following buildings:

1. The Ovalau Club
2. Katudrau Building
3. The Community Center
4. Other proposed buildings are those belonging to Josephine Williams, Bobby Williams, and Nemani Marawai. These buildings will be repaired depending on the amount of available timber and pending assessment by a certified engineer on whether the building is safe for repairs or requires total overhaul.

RECOMMENDATIONS

1. The salvaging exercise is now finally completed.

- a. Makogai Island to be nominated as a World Heritage Site.
- b. According to information gathered from the Fisheries Department, Makogai Island receives tourist cruise ships twice every month. There are also yachters who frequent the shores of the island and there are few resources of information about the history of the island.
- c. The Department of Heritage and Arts and its agencies should look into the development of the island which can benefit from visitors, both tourist and locals alike. The Dalice site has potential for eco-tourism development.
- d. Demarcation of the burial site by the Fiji Museum with assistance from the institutions mentioned below.

2. Proposed institutional collaboration and suggested roles

Institution	Roles
Department of Heritage and Arts/Fiji Museum/National Trust of Fiji	Supervise, technical expertise, funding, human resources
Fisheries Department	Human resources
Forestry Department	Equipment—Chain saws and portable saw Mill
Fiji Corrections Services	Human resources
Fiji Military Forces—Engineering Division	Human resources
Lomaiviti Provincial Office	Protocols
University of the South Pacific/Fiji National University Tourism Department	Human resources and documentation
Lomaiviti/Ovalau youth groups	Human resources

CONCLUSION

After this training course, I will be able to contribute to the management of wooden heritage material not only for the Fiji Museum, but for any heritage wooden buildings. Lessons learned from this will enable me to have more collaboration and networking with stakeholders on the preservation and management of heritage buildings. This will also build my knowledge and experience in the adaptive reuse of the wooden built heritage, looking at the heritage materials together with the currently available materials so that we do not take anything away from the significance of the materials.

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Approaches and Issues in the Conservation of Wooden Heritage in Kiribati

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Wooden heritage in Kiribati is one of the most important and honored types of heritage that has to be preserved through the generations. In line with the aim of the Museum in Kiribati to preserve and protect this heritage, two points will be covered as part of this report in relation to approaches and issues in the conservation of wooden heritage in Kiribati. It will first outline the approaches, and then convey some issues in the conservation of wooden heritage that Kiribati is currently practicing and experiencing.

First, the preservation of wooden heritage is a high priority task for preserving the old state of things, to honor the knowledge of our ancestors who were involved in making it. As a curator it is my responsibility to maintain the extant wooden heritage inside and outside the Museum that is documented as part of the Museum collections. For example, inside the Museum, wooden heritage items are preserved through registration, weighing, labeling, daily cleaning, proper storage, recording, and categorization.

Registration is the recording of all the important information about an object—the name of the person who invented/made the object, the year that it was made and when obtained by the Museum, and its composition, or from what it is made. Weighing is to weigh and record the weight of a wooden object every year to check if there is any decrease in weight, which can show the strength or weakness of the object. Labeling is to make a label for each object to show all the information in its registration for exhibit to the public. Daily cleaning includes wearing an apron and using a soft brush to clean the dust off a wooden object every day. Proper storage means to store small wooden structural objects in proper places in the Museum, such as an eel trap (*te uu*), a fish trap (*te bwanga n aine*), or traditional house (*bwiaa*), etc., being placed in display cases for exhibition. Recording involves entering the objects with complete details into a database for categorization. Categorization means separating the objects according to category, such as according to the type of plant material or wood used, etc.

Second, protection is also a part of this program of conservation for defending our heritage against human modifications. To this end, the Culture Center and Museum developed a legislative bill called *Te Umwanibong Bill*, meaning the Museum Bill, to protect all of its collections, but it is still waiting to be passed in a Parliament Session in the near future and then be turned into law. As museum staff and cultural officers, there was also a lack of capacity needed for drawing up this Bill, but we worked together with the Office of the Attorney-General to develop this Bill to protect of our heritage. This is not yet completed and is still in the hands of members of the Cabinet, to be passed subsequently in the Parliament. A security system is also part of the protection of the wooden architectural heritage, whereby a security officer is responsible for looking after the public who visit the Museum to ensure that all collections in the Museum are safe and used in an appropriate manner. He is also responsible for locking the building after working hours.

Fire extinguishers are also part of the protection; to help limit damage in case there is a fire, all rooms have fire extinguishers installed and all staff members are trained in how to use them. Recording and digitalization are the most important part of our approach as we record all information and details of all objects in a database. The ordering of replicas is also done, to obtain exact duplicates of the wooden architectural items displayed in our Museum, for the purpose of other exhibitions held outside the Museum or in other important

festivals that may require the participation of the Museum, such as the Festival of Arts, National Trade Fair, National Cultural Day, etc.

We all know that deterioration is inevitable as a result of human handling and natural phenomena like sunlight, moist air, wind, etc., and there is a need for conservation skills for this heritage. Therefore, if there is damage to a wooden object, it needs to be repaired as soon as possible. However, there is a lack of capacity for repairing an object that is not my own invention or creation, so there is a need for someone who has the skills for repairing it. For this reason, I hire a local stakeholder who has the necessary capacity in the conservation of such a deteriorated wooden object, to restore its former state. Accordingly all of the aspects of conservation together can be costly, so there is a big budget for paying local people who have the proper skills in the conservation of wooden heritage. There is also a lack of advanced technology/tools and equipment to enhance the production of wooden architectural heritage, and also a lack of funds to support a high volume production of wooden architectural heritage, and thus only a few items are produced. Lack of space for them to be exhibited is also one of the issues faced by this Museum in accommodating bigger items of wooden architectural heritage.

In conclusion, preservation and protection are now becoming part of the conservation of wooden heritage in Kiribati. Preservation is done through registration, weighing, labeling, daily cleaning, proper storage, recording, and categorization. Protection is done through the establishment of Te Umwanibong or Museum Bill 2022, a security system, installing fire extinguishers, and providing replicas for additional exhibition purposes. Beyond this, issues relating to the conservation of wooden architectural heritage include a lack of space, lack of advanced technologies/tools and equipment, lack of human capacity, and lack of funds.



**Issues and requirements for timber heritage conservation
restoration management, or use in the context of Bangladesh**

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The conservation, restoration, management, and use of various types of heritage is a very important issue for recovering the history of a nation. Therefore, through the restoration of a nation's past behavior and culture, it can be seen how the human culture of the present era has been transformed and modernized. Moreover, heritage conservation plays an important role in helping people of the present age to understand the utilization and craftsmanship of wood used in the past.

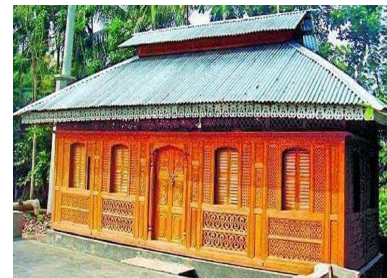
Background: Numerous wooden historical buildings and monuments located in different parts of Bangladesh include Rabindra Kuthibari in Kushtia district, an ancient sailing schooner uncovered at Kuakata beach in Patuakhali district, and the religious building Shapna Momin Mosque in Pirojpur district with wooden carvings.



Rabindro Kuthi Bari



Ancient boat



Momin Mosque

These are maintained by the Directorate of Archaeology. I will now discuss the historic building Shilaidah Rabindra Kuthibari, the memorial to the universal poet Rabindranath Tagore. I am working as a supervisor of some other nearby sites of dreams along with that dream. The historic Kuthi Bari is a beautiful two-and-a-half-storey pyramid-shaped house with seventeen rooms, in which the use of wood is noticeable in such features as the following: In addition to the use of *kardi barga* with numerous wooden doors and windows, there are wooden cupboards, chairs, tables, shelves, sofas, etc., used by Kabiguru (“the poet”). The current training will play a helpful role in the maintenance of all these artefacts, which are intertwined with the history of the nation and the memory of Rabindra, as well as taking appropriate steps to increase their lifespan.

Problems: As the building is heavily wooded inside and out, the exterior is exposed to strong sun and rain, and after a certain period of time, the wood becomes deformed and cracks, and the wood takes on a faded color. Moreover, the wood is getting attacked by different species of insects. As a result, the stability of the structure is decreasing day by day. It should be noted that due to the fact that the structure is a two-storied building, many tourists and visitors are constantly walking on the second floor, so the roof placed on the

wooden beams is subjected to stress day by day. The existing wooden artefacts inside the structure are exposed in the open which is constantly being affected by a variety of dust. It should be noted that due to the use of lime, mortar, and brick in the building, the wooden door and window frames used inside and outside are being destroyed by various types of insects. Due to the use of the building as a museum, the wooden frames and the photographs are getting damaged very quickly due to the damp effect of material from the old walls falling on the photo frames displayed on the walls. On the east and west sides of the structure, the wooden verandas are discolored due to the effects of rain and sun, and there is dampness on the walls of the structure. It should also be noted that the structure is on the banks of a river in the southwest region, so the effect of salinity is noticeable on the walls, including the wood used in the construction.

Actions taken by the Department of Archeology: In order to protect the structure, the Department of Archeology is periodically painting the exterior and interior doors and windows with synthetic enamel paint, and also varnishing the wooden artefacts displayed inside. Moreover, insecticides are being sprayed periodically to eliminate termites and wood insects.

					
Before conservation	After conservation	Before excavation	After excavation	Before conservation	After conservation

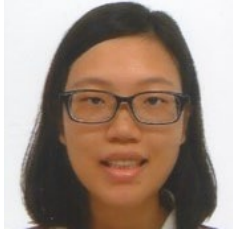
Requirements to overcome various problems: In order to preserve this historical structure, rich in historical and architectural features as the Rabindra Smriti (memorial) and to increase its longevity, recruitment of skilled and trained manpower by the government is required, along with high-quality training of persons related to this structure in the country and abroad, and close supervision and overall management by trained personnel. It is necessary to identify problems and take appropriate measures to take care of them. In a word, in enriching the history of a nation, a proper role should be played in the preservation, restoration, and recovery of its wooden heritage. Professional development training courses for heritage specialists are an important means for them to continue training throughout their professional careers based on their skills. Keeping up with the latest advances in technology is just one example. New information technologies provide archaeologists with access to tools that can efficiently record information with improved accuracy and provide better management tools for communicating and sharing results.

Troubleshooting obstacles:

- Lack of training abroad.
- Lack of action and logistics in natural disaster management.
- Inadequate budget allocation.
- Lack of skilled manpower.
- Lack of hands-on training.

- Impact of unplanned urbanization.
- Lack of site management or conservation plans.

Conclusion: As the Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (ACCU) organizes better training and ensures the participation of more trainees, it becomes possible for those trainees to make better contributions to the conservation and restoration management of wooden heritage. Moreover, the World Heritage Committee has given priority to Bangladesh over other countries, which can play an important role in identifying problems with the restoration and conservation of the wooden heritage and protect the wooden heritage located in Bangladesh with funding from the World Heritage Fund.



Singapore's building and fire regulations and conflict with the preservation of historic timber buildings

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Relevant topics: Unit 1 & Unit 5

This report aims to identify the general difficulties in achieving building and safety compliance for historic buildings with timber elements, while ensuring the authenticity in restoration work in the context of Singapore's regulatory frameworks. Through the case study of the restoration project for a former residential bungalow, the report will also present different strategies employed to address building regulations and evaluate their effectiveness and shortfalls as measured against the yardstick of heritage preservation.

Building conservation framework in Singapore and historic residential buildings

This section will focus on the residential typology and the current conservation state as context for the challenges in conserving and restoring timber elements in the case study, an 1890s half-timber bungalow.

The main historic residential types that exist in Singapore's landscape today originate from various traditional building practices and primarily consist of the shophouse/terrace house, bungalow, and vernacular dwelling genres. The shophouse has its origins in the terrace house of southern China, but has over time developed to respond to the climatic and social conditions of tropical Singapore. The typical shophouse is constructed of brick masonry party walls, while most of its interior elements, such as floor, doors, staircase, wall panelling and roof, are constructed of timber. The vernacular dwelling genre draws directly from various traditional Malay building practices established before colonialism. These are typically all-timber structures with generous roof eaves, balconies, and raised floors for the living and sleeping areas. The colonial bungalow drew upon various sources of building traditions. The earliest, built in the 19th century from local Malay and Indian building vernaculars, are often half-timber structures with features such as raised floors and balconies. Influences from global architectural discourse such as arts and craft, neoclassical, and art deco exerted considerable sway on 20th century bungalows, making them eclectic stylistically though the brick and timber construction remain widespread.

Select historic buildings and sites in Singapore are under legal protection by two main provisions. The first is for National Monuments under the Preservations of Monuments Act (2009), and the other is for Conserved Sites and Buildings under the Planning Act (1998). The former, enforced by the National Heritage Board, encompasses architecturally and historically significant monuments such as religious institutions and former governmental buildings. Buildings under this Act are subject to stringent preservation guidelines, where demolition, modification, and renovations are not allowed without written permission from the Board. The latter is enforced by the Urban Redevelopment Authority and the scale of protection ranges from individual buildings to compounds and whole city blocks. Sites under this provision are allowed higher degrees of modification including at times complete renewal of the interiors. A majority of colonial bungalows and shophouses are protected under the Planning Act as conserved buildings. However, it should be noted that there remain numerous bungalows and vernacular timber structures which lack any legal protection status whatsoever.

The case study pertains to a bungalow defined as a Conserved Building, a type which often undergoes change of use, and therefore such projects are often viewed under the lens of a renovation project in addition to a historic conservation project. They are additionally subject to other stringent current-day regulations that are sometimes at odds with the interests of heritage preservation and authenticity.

Major conflicts between regulation compliance and heritage concerns for conserved structures

Compliance with fire safety and building regulations are some of the major factors that disproportionately affect the restoration of timber building elements in Singapore. Issues arise as old structures undergoing addition and alteration work are expected to comply with the same standards as newly built structures by default, and exceptions are only made on a case-by-case basis. Buildings accessible and used by the public are especially subject to stricter requirements. This section attempts to give an overview of some of the major provisions which conflict with the restoration of conserved timber structures and elements.

A major consideration that often arises in the early project stage is the calculation of the appropriate structural loading of floor or roof structures given the building will be reused, especially for those that will be adapted for higher occupancy loading or for commercial or hotel usage. The standard imposed loading requirement calculation adopted in Singapore is equivalent to the use categories and loading forces defined in Eurocode EN1991-1-1. In the context of a historic timber structure in a residential setting, the original structure is first of all not designed to take more than the imposed load of residential usage, and second, the original design for imposed load would not have followed current standards, or even any standards to begin with. To a lesser extent, roof structures are sometimes subjected to the same structural calculations and design specifications as they support new mechanical and electrical equipment. Often this translates into strengthening the design, varying from minimal additions to invasive procedures and, in some cases, a replacement of the structure with new construction such as reinforced concrete floors, or new steel structures for the roofs.

While standards and provisions for new timber building elements and structures exist (namely the Code of Practice for the use of timber in buildings), there are none that address the requirement for rehabilitating existing timber structures. The Code is also modelled after the relevant Eurocode 5 and Malaysian Standards provisions, which apply strict specifications on member sizes, loading, treatments, and combustibility requirements, with which old structures struggle or completely fail to comply.

For fire safety compliance, the only provision addressing conserved buildings is Clause 9.9.1 of the Fire Safety and Shelter Department (FSSD)'s Fire Code, which specifically covers structures built before 1969. However, the definitions of this provision primarily address the shophouse/terrace house category, with several assumptions made based on their typical layout and building elements. This means that the same Code is enforced for other historic timber buildings even if they may not be applicable. For instance, there is no provision to address the protection of first-storey timber floors that are raised, a common element of vernacular houses and bungalows. These ambiguities require the project team to interpret and implement decisions based on similar clauses that may not be the most applicable. Furthermore, such implementation is assessed and approved case-by-case by the FSSD, which adds to the uncertainty of what would and would not be conserved.

Although the elements are protected by the Planning Act, the responsibility to ensure that restored buildings are appropriate for reuse means elements such as structures and staircases are not exempt from such requirements and standards. As these buildings were built decades or centuries before the code requirements came into force, many facets of the building are understandably non-compliant. This has sometimes necessitated major

modifications or complete replication/replacement of elements to fulfil such requirements. The lack of comprehensive official standards for building rehabilitation that can be consulted also allows decisions to carry out invasive works. This directly goes against any conservation principles of minimum intervention to historic structures.

Case study of an adaptive reused bungalow and the strategies adopted

The present case study aims to illustrate how through a consultative approach, a project team must negotiate between retaining the authenticity of a historic building, along with its building elements which are rare and in good condition, while at the same time attempting to satisfy current-day building and fire safety standards.

The building is a two-storey timber and masonry bungalow with a turret tower overlooking a central part of Singapore, built in 1892. The conserved building is now a part of a condominium development, adapted as a clubhouse for the residents. The main elements which utilise timber in this building are the roof structure, second-storey floor structure and flooring, exterior veranda posts and beams, the main interior staircase, and all doors and windows.

Based on this new use, the building is no longer considered residential as multiple users and guests are anticipated. Thus consultants were required to determine the appropriate imposed loading, especially on the upper timber floors. In the initial phase, the category of use (per Eurocode) referenced for structural assessment for meeting rooms was based on 'C4 - areas susceptible to large crowds', translating to an imposed loading of 5 kN/m². In other rooms, the imposed load ranged between 3.5 and 4 kN/m², and similar details were proposed for select joists. As such, the initial strengthening design involved sandwiching historic timber joists with L-angles on both sides, bolted through, for about 20 joists. This was deemed extremely invasive for floor joists in good condition, and consultants considered redefining the formula for imposed loads differently, that is, calculating maximum load in terms of maximum human occupancy per square meter as allowed by fire safety standards rather than categories of use. This is appropriate as the floor area of the second storey is less than 300 m². As a result, the imposed load for meeting rooms was calculated to be 4 kN/m² while for other rooms it dropped to 2.5 kN/m². As a result, strengthening was reduced to 6 joists, and where excessive deflection was an issue, secondary sister joists were introduced to select areas.

Furthermore, as combustible materials, timber flooring and staircases which will be used in the event of emergency are required to be fireproof for up to 1 hour. Per the Fire Code and relevant standards, accepted methods of fire-proofing timber elements includes the introduction of fire-rated boards, fire retardant treatment via vacuum chamber impregnation, and application of intumescent paint. The team deemed these considerably challenging for the proper conservation of a historic timber floor structure and staircase. Chemical impregnation was ruled out entirely as the whole of the historic floor and staircase would require dismantling and be subjected to vacuum chamber treatment, which would likely affect the integrity of old timber especially finer members such as staircase balustrades. Though less invasive, introducing intumescent paint and fire-rated boards would obscure the original material and transparent finish of the timber elements. As a result, a performance-based proposal was considered: The team proposed a transparent fire-retardant treatment complying with the 1-hour standard for protection against the spread of flame, and also with the required BS476-7 Class 2 standard. Through several consultations with the FSSD, this was finally deemed an acceptable solution. The adopted proposal aims to both preserve the appearance of the original architecture as well as fulfil the fire-proof performance requirement for newly inhabited buildings.

The historic grand staircase is designated as an emergency passage. This means an increase in imposed and lateral loading (on the railings) had to be taken into account, in addition to railing height, spacing, and widths of treads, as well as fire-proof performance. As a result, a secondary concealed structure was introduced to support new railings and strengthen the staircase structure to reduce invasive work and minimise visual bulk.

Conclusion

Despite some positive compromises achieved in the project, there are still numerous challenges regarding proper conservation of timber elements within the bungalow of this case study arising from the need to comply with current-day regulations. For instance, while timber doors and windows have been restored and preserved, 90% of these are decorative as secondary glass doors and fixed glass windows are introduced to fulfil emergency passage and barrier to fall standards. Especially with regards to retaining the original uses and finishes of historic timber structures in the adaptive reuse of buildings, multiple challenges remain.



Importance of survey and documentation of heritage sites

Pema

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1. Introduction

According to the Cultural Heritage Bill of Bhutan, the heritage sites of Bhutan are classified into three broad categories: heritage buildings, cultural sites, and archeological sites. We have over two thousand Buddhist temples and ten thousand pagodas nationwide. The building blocks (main load-bearing walls) of our heritage sites are rammed earth or stone masonry with mud mortar, and heavily integrated with timber components (Figure 1). Further, timber forms both the structural and non-structural components in a vernacular construction. We afford the highest regard and recognition to our heritage sites, as living testimony to our forefathers' extraordinary vision and knowledge. The diversity of forms, designs, elements, techniques, etc., provides valuable information about the art, architecture, knowledge, and wisdom of a particular region or locality. Therefore, the Department of Culture (DoC) under the Ministry of Home and Cultural Affairs is vigorously pursuing detailed surveys, mapping, and documentation of heritage sites. We intend to build a comprehensive inventory system to protect our heritage sites and adapt to the changing needs of society. We adopt the value-based protection principle in carrying out the registration and designation of heritage sites. With the administrative framework in place, monitoring is essential for ensuring that our heritage sites are protected and preserved for posterity.

In addition, our heritage sites are also living heritage used daily by the local custodians and as places of worship by local people. The constant use of the heritage sites keeps our heritage sites intact and relevant to the changing times. However, they are susceptible to deterioration, decay, aging (an inherent phenomenon), and damage due to poor utilization and understanding of the structure (human-induced loss). Moreover, Bhutan has high exposure and risk to earthquakes and other natural disasters that may cause irreplaceable damage to our heritage sites.

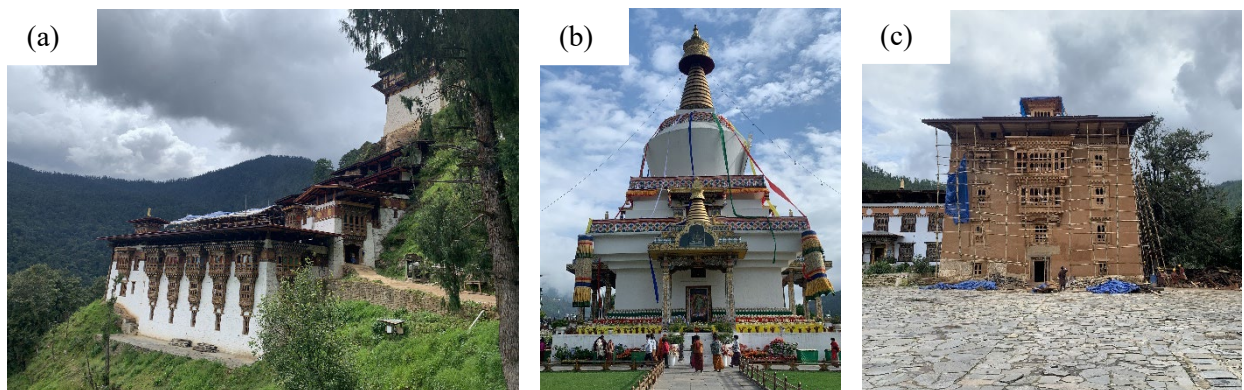


Figure 1: (a) Chari Monastery (Buddhist temple), (b) Memorial Chorten (Buddhist Pagoda), and (c) Pangrizampa Lhakhang, under renovation.

1. Approach to better protection of our heritage sites

The traditional knowledge system of Bhutan is mainly intact, passed down through generations via apprenticeship and oral communication. This means of transmitting skills and knowledge has induced social inclusion and communication, but has also impeded the keeping of written records. Thus it is rather difficult to find any written records of alteration and intervention maintained for most of the heritage sites. If found, the information is embedded in religious texts such as autobiographies of Bhutan's significant religious and spiritual figures. Moreover, emphasis is placed on the sacred relics and invaluable artifacts rather than the heritage structures. Therefore, in the last few decades, the DoC has approached the preservation and promotion of heritage sites more holistically and systematically by incorporating scientific know-how and a technical approach. The activities include, amongst others, the following: (i) creating awareness and sensitization about preserving and maintaining the fabric of heritage structures, (ii) building the technical capacity of private technical professionals, (iii) detailed documentation of heritage sites, (iv) digitalization of inventory, and (v) public-private partnership in the revitalization of traditional houses.

2. Contextual-based practice of recording and documentation

As explained above, timber is an integral construction material of heritage sites, from simple vernacular buildings to massive fortresses (Dzongs). More often than not, there is a need to replace the timber members, especially those embedded in the load-bearing walls. While there are understandable reasons to replace individual timbers, the custodians prefer to replace the entirety of the timber components. The common reasons are structural aspects and embellishment. On the other hand, for the main load-bearing walls, that is, the rammed earth and stone masonry structures, the DoC is conducting extensive scientific research on our traditional structures' seismic capacity and performance. Therefore, we have a certain understanding of these structural elements; consequently, this helps us make informed decisions. In contrast, there are limited studies on timber structures and their engineering aspects. Therefore, we are proceeding further with the documentation of timber members as they are an invaluable component of our heritage sites.

From my professional experience, I have worked on the documentation of heritage buildings and other traditional timber bridges (local name: *bazam*), on damage assessment, and the preparation of structural consolidation plans and programs. We try to ensure that these reports are consistent, relevant, and readily available. Still, such works are limited to heritage sites where the Department has direct or indirect involvement. Aside from these documents, there are hardly any monitoring documents available for making informed decisions for better protection. For better protection and promotion of our heritage sites, we need to clarify and ensure a proper system of recording and documentation of all heritage sites of Bhutan. Such work is ambitious but necessary.

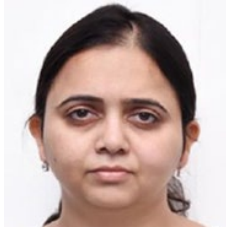
Therefore, with the realization of the importance of this task, we are developing a standard monitoring and recording system that can accommodate even the least heritage buildings. Moreover, we are focusing on an approach to better record keeping that can be easily used by both heritage owners as well as technical professionals. Such recording work will help better protect and reduce the disaster risk, in addition to ensuring that the cultural heritage values are intact. We have begun to implement such recording practices for heritage sites that are of national importance and have management and disaster risk reduction plans in place.

3. The way forward

We understand that Japan's heritage buildings and many other cultural properties are composed of timber with an exemplary protection system in terms of the administrative framework and technical know-how. I look

forward to learning from the highly experienced professionals from Japan and other international experts who will guide us through a series of interconnected lectures. In particular, I look forward to the sessions under Unit 3—Recording and Documentation, and will try to understand the survey and recording methods at individual and group levels. I plan to take away the best practices and, if possible, integrate them and improve our recording and documentation work.

****Remarks: The report relates to course Unit 3—Recording and Documentation.***



Challenges of Conservation of Cultural Heritage in Historic Towns and Cities of India

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The concept and definition of heritage has evolved from the monument-centric approach to the present-day inclusion of natural heritage, historic towns and cities, cultural landscapes, industrial architecture, and gardens, etc. While the concept is well understood internationally, its application in the context of historic towns and cities is still a challenge, as heritage is often understood as buildings and sites of significance. The cultural heritage of Indian cities represents the rich cultural past of geographic regions and traditional knowledge systems that evolved under concepts of sustainability. With this case study report, I am presenting a brief introduction to the cultural heritage of the historic cities of India based on research, site surveys, cultural mapping, significance and risk assessments, and consultations with government departments and stakeholders.

Issue: Promotion of specific sites/monuments

It is often observed that one of the significant cultural attributes of a city may be promoted while undervaluing other important historical and cultural features of the same city. The best example for this is Agra—which is known for the Taj Mahal, Agra Fort, and Fatehpur Sikri, monuments of national importance and World Heritage Sites with high tourist traffic—as a result of most of the urban interventions focusing on developing the area around the Taj Mahal to facilitate the tourism experience. To lessen the impacts of high tourist traffic on the attributes of value of the Taj Mahal, there is need for preparing a visitor management plan along with the conservation management plan of the site. There is an unexplored Agra beyond the Taj Mahal which requires the attention of different areas of expertise for archaeological excavation, areal development, revival of traditional water systems, addressing the issues of the river Yamuna, and conservation of the significant buildings and historic gardens along the river Yamuna, etc., to attract more tourist interest to other parts of the city.



Image 1. View of Taj Mahal from Mehtab Bagh on the banks of River Yamuna



Image 2. Entrance gateway and tomb of Itmad-ud-daula—one of 44 historic gardens on the banks of river Yamuna restored under partnership of the Archaeological Survey of India and the World Monuments Fund, New York

Issue: Buffer zones in and around protected structures

The Archaeological Survey of India (ASI), under the Ministry of Culture, is the apex organization focussing on the maintenance of ancient monuments, archaeological sites, and remains of national importance. Similarly there are sites which are protected and maintained by the state governments guided by individual state laws. The third category is the urban local bodies (ULBs) within states which can protect the buildings at the local level/city level under the regulation of municipal laws, town planning acts, as well as the 74th Amendment of the Constitution which gives power to the ULBs to develop processes that suit their local context. The ASI-protected monuments have buffer zones prohibiting construction within 100 m, and regulating activities within 300 m. The state-protected sites also have provisions of buffers which vary as

per state legislations. These buffer areas are encroached upon or come under ownership and management of different department/line agencies.

Issue: Urban development pressure and the role of ULBs/municipalities

This is the most challenging issue that conservation professionals address, as it frequently involves the demolition of historic buildings causing irreparable loss, replacing older structures with contemporary ones to provide and develop better infrastructure facilities. These urban interventions for infrastructural facilities are developed in isolation without any interdepartmental consultations or contextual analysis, such as a significance assessment of the heritage or an impact assessment of the project, due to the absence of statutory guidelines for the protection of heritage and to a lack of awareness. The ULBs perceive heritage with the tourism lens due to a lack of awareness, knowledge, and technical and professional expertise. By contrast, the local communities in small towns and settlements are much more aware of the places of their origin and are more informed about the context and setting of their communities.

Issue: Loss of identity and morphological character of the historic cities

Srinagar, one of the 246 cities of the UNESCO Creative Cities Network, located in a valley surrounded by the Zabarwan mountain range and reserve forests, was historically known as a city of 15 bridges (of timber) and was also compared with Venice for its waterways, canals, and lakes that formed the local transport network. But with urban expansion and infrastructure development the city turned its back on the river Jhelum and its waterways, impacting the connections of the people with the ghats, religious buildings, and neighbourhoods. There are only two timber bridges surviving (one historic and one contemporary), while the others have been replaced with new concrete bridges. The vernacular houses of the historic neighbourhoods showcase the traditional construction system known as *taq-daab* and *dhajji-dewari*, where timber is used extensively as reinforcement with brick masonry; however the new developments do not follow the traditional sustainable systems that are less susceptible to earthquakes.



Image 3. Srinagar Jhelum waterfront with Shah Hamdan (an ASI-protected site) and vernacular houses with Hariparbat Fort in the background

Issue: Protecting the spirit of the place, its character and living traditions based on traditional management systems

Every historic city is unique and different, therefore it is necessary to develop city-specific conservation and urban design guidelines to protect each city's significance and the attributes of its values. Puri is a sacred cultural landscape and pilgrimage town of India, where people worship Lord Jagannatha and their daily activities are centred on the main shrine. It is a city with living traditions and practices. The idols of the main shrine are made of timber and are renewed every 10–12 years, based on astronomical calculations and following a highly sacred process, from selecting the trees for the sacred logs of wood, bringing them back to the temple, followed by the making of the idols. Simultaneously, outside the temple, on Grand Road three chariots are constructed from timber by local artisans offering their service to Lord Jagannatha, for the annual procession from the main shrine, carrying the deities to Gundicha temple at the end of the road.



Image 4. Workshop of the artisans on Grand Road, Puri, during the Nabakalebara festival, 2015



Image 5. Construction of three chariots on Grand Road of Puri, during the Nabakalebara festival, 2015

Issue: Loss of the traditional knowledge system and the decline of artist guilds

The availability of crafts and skilled artisans is a prime requisite for carrying out conservation and restoration for any site. It is observed that people, especially the younger generation from artisans' families, are not interested in taking tradition forward due to the lack of economic benefit, poor recognition for their crafts, and occupational health hazards. Also, the traditional methods and techniques require a lot of patience to achieve excellence in the various crafts, whereas artisans can earn more by catering to the market demand for simplistic products. There is also a disconnect/gap between the education system and the traditional ways

of learning these crafts. A similar shift has also happened in the traditional material used for wood carving, from hardwood to softwood which is easier to carve to make artefacts.

Issue: Project time frames

Government or municipal projects, either for building conservation/restoration or for interventions and policy formulation on an urban scale, have fixed time frames for their completion varying from four months to one year. This presents a challenging goal to achieve, considering the time required for exhaustive research, field surveys for documentation, cultural mapping, conservation planning, contextual analysis, and site implementation, along with stakeholder and community consultations.

Ways forward:

For the management of cultural heritage in historic cities:

- Compilation and development of a centralised GIS-based national database which is accessible to all.
- Protection of natural features, rivers, indigenous water systems, landscapes, and forests, etc.
- Integration of the natural and culture heritage resources in the planning process and development plans of cities, guiding future development.
- Policy and guidelines for the conservation, restoration, and management of the cultural and natural heritage.
- Bringing conservation into the mainstream of development processes and bridging the gap between multiple disciplines.
- Heritage impact assessment (HIA)—At present carrying out an HIA is mandatory for infrastructure development projects proposed near sites of national importance, but there is a need to adopt this for state-protected sites as well as sites of local importance.
- Creating awareness that conservation is not anti-development.
- Disaster preparedness

For artisans/craftsmen/professionals:

- Need for a database of skilled craftsman and artisans.
- Enhanced income and livelihood opportunities to encourage and promote local artisans and craftsmen.
- Revival of traditional programmes within mainstream education for learning the local craftsmanship.
- Education and outreach programmes to engage youth, focussing on the study of local vernacular architecture practices, traditional knowledge systems, and intangible practices.
- Multi-disciplinary capacity building programmes for professionals and government officials who are the direct or indirect custodians of the heritage.

At the site level:

- Conservation and management plans of the sites.
- Protection of the buffer zones of ASI- and state-protected monuments.

- Site guidance and signs through use of digital technologies for site interpretation.
- Creating immersive experience for interpreting site narratives and oral histories.

**All the images used in the report are taken by the Author*



Conservation of wooden structures at examples in Uzbekistan

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This report covers the problem of conservation of wooden structures using the examples of two mosques in Itchan Kala, a World Heritage property of Uzbekistan. Itchan Kala was inscribed on the World Heritage list in 1990. It is the inner town located in the city of Khiva, Uzbekistan.

One site for this study is Bogbonli Mosque, which was built at the beginning of the 19th century. The mosque is rectangular in plan, and has a wooden aiwan¹, with two wooden columns, a wooden door, and aiwan ceiling that has preserved some paintings. In 2020–2022, the UNESCO Tashkent Office carried out conservation/adaptation works at this mosque. As there was a lack of budget and skills of local specialists who could restore the painting on the ceiling of the aiwan it was decided to clean the ceiling and put on a protective layer but not repaint it. As for the wooden doors and columns, these were cleaned and covered with drying oil.

The second mosque is Djuma, which is one of the oldest mosques in Itchan Kala (built over the 10th–18th centuries). It is a unique mosque with 212 wooden columns, and each column is different from the others. Due to the discovery of termites, the local authority plans to carry out the restoration of the roof of this mosque and replace some of the columns.

Problem 1. Protection system for wooden heritage

It seems there is no officially approved document on methods or guidelines for how to deal with wooden structures. There is a set of recommendations produced by the local specialists; however, it does not have mandatory status and the document itself has not been finalized.

There is no officially approved conservation and management plan for this World Heritage property. Work for the Project of Detailed Planning (PDP) and management plan have been carried out by the state party for some years, but there were many recommendations from ICOMOS and the final version of the PDP has not been completed.

There is a lack of communication among stakeholders. For example, the local government decided what to do at Itchan Kala and its surroundings, however, according to the law all development projects should be approved by the National Scientific Council under the Ministry of Tourism and Cultural Heritage and by the World Heritage center. But this link is sometimes lost, and with the approval of the local government hotels have been constructed in place of demolished houses. As a result, more and more hotels and B&Bs are appearing, and houses disappear.

¹ Aiwan is used in architecture to refer to an open-air pavilion, usually walled on three sides and open on the fourth side with a beamed ceiling on columns or pillars.

Another problem is termites. The Khorezm Mamun Academy in Khiva has been researching this agent of deterioration for many years. The termites were found in the roof and in some columns of Djuma Mosque. Due to termites, some neighborhoods (*mahallas*) were demolished near Itchan Kala and now are empty spaces. These empty spaces caused concerns during the Reactive Assessment mission of ICOMOS and had been pointed out in the World Heritage Committee decision. In addition, there are no strict regulations on what to do with the houses/buildings injured by termites; usually these structures are demolished.

Problem 2. Recording and documentation

During the Soviet era, the practice for documentation of historical buildings and elements was the creation of sketches or drawings. The elements or the whole building were accurately measured and drawn. The same situation applied for the wooden elements. They were measured and drawn to the necessary scale. Also, some description was provided. All of these sketches, drawings, and documentation are collected in the archives of the Agency of Cultural Heritage (in the Soviet era it was under of the Ministry of Culture). However, not all historical buildings were recorded like this, as it took a lot of time to make detailed drawings for each site and element. Uzbekistan has more than 7000 historical sites, and in the Soviet era there were many more sites.

For example, the drawings for Bogbonli Mosque were not found and there was a lack of information about this mosque. So, the first thing before doing any intervention, a condition assessment of the building and drawings in AutoCad were created. Also, an international expert team utilized photogrammetry for a detailed recording of the mosque. In particular, the current conditions of the ceiling, columns, and doors were recorded by use of the photogrammetric method.

Problem 3. Repair and restoration

There are no guidelines for which types of mortar or building materials should be used for the protection of wooden structures.

In conducting conservation work for the wooden structure of Bogbonli Mosque, the UNESCO Tashkent Office involved local specialists who have knowledge and skills about how to deal with wooden elements. However, as there was no extensive knowledge about how to paint the ceiling, it was decided to preserve the painting by just cleaning and covering it with a protective layer. Specifically, the following methods and materials were used for the painted ceiling of the aiwan of Bogbonli Mosque:

- The condition of the beams of the aiwan was checked and no termites were found, but all wooden structures were treated with a protective substance against insects.
- There were some places with lost painted panels that were replaced by larch panels without painting and carvings, so the intervention can be clearly seen.
- The entire surface of the painted ceiling was cleaned with air pressure and then washed with alcohol.
- Next, the protective layer was applied as a cover. A special solution was prepared by the cold boiling method, using a mixture of bioprotection plus priming.
- The last layer was a matt acrylic lacquer. There was no painting done.

The wooden elements such as the doors, door frames, columns, and aiwan cornices were treated by the following method:

- First the necessary details were fixed, and then all the details were cleaned with a special solution. The solution was applied by spraying, or roller and brush, then washed off with water pressure, and finalized with a toothbrush and a special tool.
- Then, a layer of the oil was applied. The first layer of drying oil was heated to 80–85 °C and applied with a brush, and the second and third layers were applied cold by spraying under pressure.

For the Djuma mosque, the specialists explained that the cause of termite damage was because the previous repair was made in an inappropriate way. There was also not enough slope to the roof and so the water did not drain properly. As a result, rainwater collected in the wooden structure of the roof and increased the humidity, causing decay of the wood on the ceiling in some parts of the mosque. Also, on top of the roof there was a soil layer, which was considered to be a main reason for termites spreading, as the soil facilitates moisture infiltration. All these factors of moisture, light, and an insufficient ventilation system created favorable conditions for the spread of termites.

It was proposed to remove the soil layer and put profiled sheeting on top. However, it was recommended to consider other options with the use of more traditional techniques.

Need 1. Lack of methodological documents or guidelines

Guidelines or methodological documents for how to deal with wooden construction should be created and approved at least at the local level. For example, detailed guidelines on how to record wooden elements and how to carry out conservation work for each type of wooden element are needed.

There is a need at minimum for a conservation plan for all elements of the structure and the building itself.

Need 2. Capacity building activities for local specialists

During the implementation of conservation/adaptation work for Bogbonli Mosque it was found out that there was no institution that could produce the documentation for a condition assessment and conservation plan. There was one training program that was carried out in 2020 together with the International Institute for Central Asian Studies (IICAS) and University College London (UCL) through the Central Asian Archaeological Landscapes (CAAL) project. However, it will be good to gather all specialists who are qualified for developing project documentation for historical sites to conduct training in how to record and document wooden elements in particular, and how to carry out a condition assessment and develop a conservation plan.

Also will be good to conduct practical training with specialist restorers from each region in how to implement conservation work for wooden elements.

Need 3. Development of protections/mechanisms for wooden built heritage

There are no strict regulations or policy to protect wooden structures. There are some rules about punishment in case of vandalism or harming, but these do not address the wooden elements. In addition, there are no

laws/regulations about what to do if the wooden elements have been damaged or harmed. For instance, wooden columns can be easily replaced in historical monuments and houses. Also, the technique of having metal tubes framed by wooden carving elements is used often for the reconstruction/replacement of the old columns.

Conclusion

This report provided a brief introduction to the main conservation issues for one of the World Heritage properties in Uzbekistan.

It is clear that the legislative base is not strong enough to protect and manage the site. There is a lack of guidelines on how to deal with wooden elements and what to do if termites are found.

Also, there is a lack of skills for how to make recordings of the sites/elements according to international norms, as well as how to implement conservation work.

*Report relates to the themes of Unit 2, 3, and 4.



**CONSERVATION OF THE MEGALITHIC JARS SITES IN
XIENGKHUANG—PLAIN OF JARS —LAO PDR**

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Introduction

The Megalithic Jar Sites in Xiengkhuang Province, with the common name of the Plain of Jars, was the third site of World Heritage in Lao PDR to be inscribed on the UNESCO World Heritage List in 2019. More than 2,100 tubular-shaped megalithic stone jars used for funerary practices in the Iron Age give the Plain of Jars its name. This serial property of 15 components contains 1,325 of these large carved stone jars, stone discs (possibly lids for the jars), secondary burials, grave markers, quarries, manufacturing sites, grave goods, and other features. Located on hill slopes and spurs surrounding the central plateau, the jars are large, well-crafted, and required technological skill to produce and move from the quarry locations to the funerary sites. The jars and associated elements are the most prominent evidence of the Iron Age civilization that made and used them, about which little is known. The sites are dated from between 500 BCE and 500 CE (and possibly up to as late as 800 CE). The jars and associated archaeological features provide evidence of these ancient cultural practices, including associated social hierarchies.

Criterion (iii): The Plain of Jars exhibits an exceptional testimony to the civilization that made and used the jars for their funerary practices over a period from approximately 500 BCE to sometime after 500 CE. The size of the megalithic jars, and their large number and wide distribution within the Province of Xiengkhuang is remarkable, and the serial property of 15 components contains a range of sites that can attest to the quarrying, manufacturing, transportation and use of the funerary jars over this lengthy period of Southeast Asian cultural histories.

Management and Protection Requirements

The serial property is protected under the Law on National Heritage 2013, supported by the Decree of the President of the Lao People's Democratic Republic on the Preservation of Cultural, Historical and Natural Heritage 1997, and the Provincial Governor's Decree concerning the Management and Conservation of the Plain of Jars World Heritage Sites No. 996. In addition, Decree No. 29 concerning Establishment and Operation of Plain of Jars Heritage Office was issued and put into function, as well as other relevant legal documents. Implementation of the mechanisms of protection occurs at the national, provincial, district, and village levels. Coordination is provided by the National Committee for World Heritage and the Xiengkhuang Heritage Steering Committee. A five-year action plan of specific projects has been developed, including an archaeological research plan, as well as resources for fencing, basic visitor facilities, road improvements, implementation of the national heritage law, and production of interpretive materials. The day-to-day management of most components is provided by nearby villages based on contracts established with the Provincial Government, and a formula for sharing the income from ticket sales with local communities is in place.

The main factors affecting this property are processes of natural deterioration and future development pressures, while the UXO (unexploded ordinance) is also a challenging barrier to access, research, and safety for the buffer

zones.

The management system requires further development, including the establishment of a management plan and a conservation plan to ensure coordination and consistent conservation approaches, and to pursue needed longer-term strategic improvements. A number of aspects of the management system are yet to be fully implemented, such as the arrangements for a Heritage Impact Assessment. Interpretation and provision of information about the sites to visitors are modest and should be enhanced in the longer term, particularly in light of continuing archaeological research and sustainable tourism initiatives for the Province.

With the above requirements for the management and protection of the Plain of Jars, some management themes and issues are illustrated below.

Management Issues and Objectives		
Management Theme	Management Issues	Management Objectives
1. Property protection	<ul style="list-style-type: none"> • Illegal excavation • Infrastructure and other development, including in the wider setting (Zone 4) • Pressure due to urban expansion and development, including in the wider setting (Zone 4) • Intrusion of cattle • Encroachment for residences 	Protect the property from impacts which endanger the long-term safeguarding of its heritage values and attributes, including in the wider setting (Zone 4).
2. GIS, inventory, and database	<ul style="list-style-type: none"> • Incomplete GIS recording of the property • Incomplete inventory of jars and other attributes • Incomplete database of the property 	Improve documentation of the property and its attributes to provide a baseline for management and monitoring by heritage authorities and other agencies.
3. Tourism and property development	<ul style="list-style-type: none"> • Understanding and interest of visitors • Inappropriate actions by visitors including recreational use • Future tourism pressures • Local communities in need of improved livelihoods 	Communicate the property's importance to local, national and international audiences through improved interpretation and presentation, in line with the latest research findings. Ensure tourism develops in a sustainable manner in line with the property's carrying capacity. Provide benefits to local communities through community-based tourism and other development activities.
4. Awareness-raising	<ul style="list-style-type: none"> • Limited understanding leading to intentional/unintentional impact on jars and other attributes • Encroachment of agricultural areas 	Improve understanding of the property's significance and management requirements as a basis for better cooperation in safeguarding the property.
5. Capacity-building	<ul style="list-style-type: none"> • Limited capacity in conservation of the property • Limited capacity in conducting a 	Improve capacity among management staff and local teams to undertake conservation,

Management Issues and Objectives		
Management Theme	Management Issues	Management Objectives
	Heritage Impact Assessment	research, management, and monitoring in cooperation with international and local partners. Improve capacity to prevent or mitigate adverse developments through carrying out Heritage Impact Assessments.
6. UXO clearance	<ul style="list-style-type: none"> Remaining UXO contamination 	Complete the clearance of UXO within the property, to ensure the safety of residents and visitors, and to enable research and rural livelihood activities.
7. Disaster Risk Management	<ul style="list-style-type: none"> Threatening hazards—wildfire, soil erosion, vegetation, etc. Inadequate data and information on hazards, vulnerability of and risks to the jar sites. Limited understanding of risk and related capacity to manage disaster risks to communities and the World Heritage property. 	Strengthen disaster risk management capacities of concerned government agencies and communities to effectively manage disaster risks to the communities and the World Heritage property.

Achievements

The Plain of Jars was newly inscribed on the UNESCO World Heritage List in 2019, even though the attempt to enlist it was made from 2000, thus there have not yet been many achievements clearly visible regarding its management and protection. The main achievements after the enlistment of this property include following:

- The Plain of Jars Management Office was established in 2020 to provide day-to-day management of the property and coordination with all stakeholders from the local to the international level.
- The master management plan and tourism management plan were developed and endorsed by the provincial governor to serve as the main documents for management and protection of the property.
- The Plain of Jars properties are mostly located in rural villages, so the villagers and communities have a major role in looking after the properties in terms of cleanliness, monitoring of the jars, reporting any issues to the district authorities and the Plain of Jars World Heritage Office. In this regard, the office assists the local communities through the provision of some funds from the tourist ticket sales for their work on cleanliness and monitoring of the sites. Regular awareness raising initiatives aimed toward the villagers and communities are carried out by the World Heritage Office.

Challenges

Even though the Office has the master management plan endorsed with the key issues identified, the implementation of the plan to address the issues is still challenging. This is due to the Management Office being

still young. The office has a lack of experience in management of the World Heritage because most of the staff is not directly from a World Heritage background. The support from the government in terms of funding is limited. While seeking funding from external sources, it has not been easy to find supporters working on heritage in the area. Thus, to achieve the goals of the master management plan, there are still challenges in near future.



Problems and Needs Identified in the Revitalization of Saribu Rumah Gadang, West Sumatra

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In 2018, the Ministry of Public Works initiated the Saribu Rumah Gadang (Saruga) Area Revitalization Project because there was a need to adapt the existing unused *rumah gadang* for the purpose of tourism as designated for the area. *Rumah gadang* is the vernacular house of the Minangkabau people in the West Sumatra region, known for its *bagonjong* (horned-shaped) roof and raised platform floor. Saruga is a traditional Minangkabau settlement, located in the Solok Selatan Regency in West Sumatra. As of 2022, Saruga has the largest number of original *rumah gadang* houses and the least amount of disaster risk settlement area in West Sumatra. It is also a settlement with the most diverse families living together, whereas one or two families occupy most traditional villages; thus, it has almost every type of *rumah gadang*, albeit smaller than the ones in their original locations.



Picture 1. (left) Area map of the location of Saruga on West Sumatra Island, Indonesia, and the distribution of 32 rumah gadang selected in the revitalization program in 2018, from 104 buildings. Base map source: Google Map, 2018; combined by PDA, 2018

Picture 2. (right) Front façade of a rumah gadang. Source: PDA, 2018

It was a large-scale project by the national ministry and the regency. The latter will manage the tourism utilization for the local community of Saruga. I was with the Pusat Dokumentasi Arsitektur (PDA) team, involved in the early stage of documentation and conservation management planning in 2018–2019. The finished documents will be used as the base plan and guidance for adaptive reuse by the conservator architect. While the documentation was completed in early 2019, the physical revitalization planning and construction work took two years, from 2019 to late 2021, due to the pandemic restrictions in Indonesia.

One year after completion of the construction work, the revitalized buildings are unused, while the owner prefers to live in a brick house nearby. They expected to utilize their *rumah gadang* for tourism purposes, so none of them use it for daily living. The pandemic situation in Solok Selatan Regency has halted all the tourism programs, and the regent focused on stabilizing more pressing internal matters such as vaccination, food availability, etc. Another disparity is that the *bagonjong* roof became segmented and not as smooth as it is supposed to be.

After analyzing the impacted situation and the revitalization project process, there are three issues identified, based on the severity level:

Problem 1: The Utilization Management

As mentioned above, since 2020, the regency has halted many of Saruga's events and festival plans. This was all the more necessary because cultural events need and will attract visitors in masses, which was prohibited during the 2020–2021 pandemic situation. In 2021–2022, the regency shifted their priority to developing small and micro businesses. Saruga is hard to access as a tourist destination; it is around 130 km from Kota Padang, the province's capital city, and can only be accessed by 4–5 hour car trips. The attraction of Saruga is limited to its *rumah gadang*, cultural ceremonies, and surrounding natural heritage. But since the locals have adopted a semi-modern lifestyle, the current cultural events are dwindling.



Picture 3 (left). Examples of a traditional ceremony procession in Saruga. Source: PDA, 2018.

Picture 4 (right). Documentary filming activity in Saruga. Source: Directorate General of Culture, Ministry of Culture & Education, 2021

It is apparent that locals are still dependent on the regency regarding tourism management. With the lack of tourism income, the locals have begun to feel restless and dissatisfied, but no action has been taken up until this report is being made. Currently, most of the tourism programs for the newly revitalized Saruga come from private tourism agencies and private connections of local homestay owners, which is at least once every month. Due to their rare occurrence, the tour packages are not diverse enough to attract a steady flow of visitors, thus making Saruga a single-visit tourism destination. There are a couple of forward-minded youth who realized their precarious situation and tried to unite the locals into organizing community tourism management. But even if they have the will to conduct tourism management, they need sufficient professional training and guidance to create sustainable and community-based cultural tourism.

Problem 2: The Construction Process

There were some decisions that the ministry took based on the conservation management plan and the professionals' suggestions. One of them was to employ local craftsmen or *tukang tuo* in the Minangkabau language and local laborers for the entire construction process. At the time, only one elderly *tukang tuo* was residing in Saruga, so he was open to the suggestion of recruiting *tukang tuo* from other areas in West Sumatra. The problem stemmed from local laborers who demanded to work only with Solok Selatan Region's *tukang tuo* and laborers. They strongly rejected anyone from other regions. This ended with the contractor finally complying with the laborers because no middle ground was achieved and they were under the pressure of the construction deadline. The noticeable outcome was the segmented *bagonjong* roof, which was detrimental because it was one of the most significant valued elements of *rumah gadang*. This happened

because the laborers lacked the necessary skills to create the traditional *rumah gadang*, and the *tukang tuos* could not keep up the pace needed to teach every worker the correct craftsmanship.



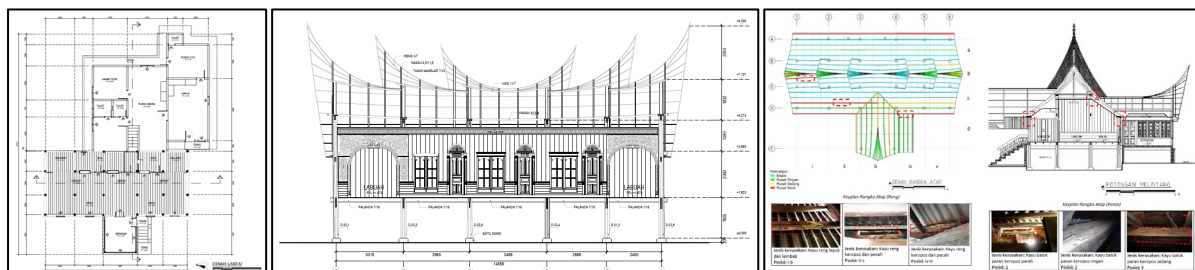
Picture 5. Bagonjong roof that is supposed to be smoothly curving. Source: PDA, 2018

Picture 6. The segmented bagonjong of the same rumah gadang as above. The photo does not noticeably show the segmentation due to the bad angle and reflective light. Source: Directorate General of Human Settlement, Ministry of Public Works, 2020

The other architectural decisions that the ministry made, in complying with the adaptation management plan, were to replace the thatch roof material with metal for easier maintenance by each owner, and a new wooden ceiling that was installed to lessen the heat from the new aluminum roof. These decisions were communicated to and accepted by the locals before being included in the plan. Despite its negative effect on the overall architectural value, the conservation and adaptation team still accepted the change because thatch is not a suitable material in present-day Saruga. Furthermore, roofing material and ceilings are replaceable in future situations.

Problem 3: The *Rumah Gadang* Documentation

The third concern was whether the documentation was too complicated to understand for its readers, while at the same time, whether it met the standards for tangible cultural heritage documentation. Three types of data were documented: the measurements of the existing building and its site, the identification of damage to every element, and an inventory of significant elements. Reflecting on the *rumah gadang* documentation, the readers (government, architect, and contractor teams) did not ask for guidance in reading, nor did they provide feedback on whether our documentation was sufficient for cultural heritage architecture. There is a possibility that the documentation was complicated and might be a problem in the overall process of the project.



Pictures 7–9 (from left to right). The measurement drawing, element identification, and damage inventory documentation. Source: Directorate General of Human Settlement, Ministry of Public Works, 2018

Based on the above problems, I conclude that there are two identifiable needs, as follows.

Need 1: Utilization Management Plan and Strategy to Encourage Community Participation

The government and the locals can use a utilization management plan with proper socialization. It would be even better if the local youth could participate in the making of the plan, to create a balance between cultural heritage conservation and the community's needs. Their participation would also ensure community compliance to the strategy and monitoring, especially in cases like the laborers' disagreement. It would be even better if a community-based management body could be created as part of the plan. There are some local youths with the drive to develop Saruga's tourism, but they currently lack sufficient support to emerge. At the very least, assistance from the regency is needed to help them gain initial support from the locals.

Need 2: Documentation Guidelines

The ideal cultural heritage documentation we had in mind is comprehensive and understandable by all its intended readers, from the local community to the experts. At the same time, we know that such documentation would probably not be detailed enough to be used as a reference for the future development of the intended cultural heritage. Should documentation differentiate into two separate versions according to their readers? Is there any documentation method and output that can balance the needs of all its readers?

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