

## THE RELOCATION, CONSERVATION AND PRESERVATION OF KAMPUNG TELUK MEMALI MOSQUE IN IPOH, PERAK MALAYSIA

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### ABSTRACT

The main purpose of relocating this long-abandoned century old traditional Malay vernacular mosque on to a new area is to ensure that it can be preserved and re-used by many in an area that is presently in need of such a place of worship. It is also to preserve the rich architectural heritage of this unique and unusual mosque. More importantly, it is to let its function to be continued as a place of worship for the future generations of Muslims living in Perak and from elsewhere to experience the act of praying in a century old mosque. It is hoped that with this restoration work, the mosque will still be in existence for many centuries to come.

**Keywords:** Architecture, Heritage, Preservation, Dismantling, Timber.

### INTRODUCTION

Village mosque in Malaysia is built within a loosely arranged traditional residential quarter known as the *kampungs* (villages). The traditional Malay mosque is often built on a raised floor, either on stilts or platforms. It follows the typical Malay vernacular house typology. It can be easily identified by its pyramidal roof or pointed dome on a square layout, where the prayer hall sits. Due to the unique features of the walls and made of timber materials, the traditional Malay mosque structure can be dismantled and shifted to a new site, if necessary, even though this practice is uncommon in most states across Malaysia. Most times, the older mosques were demolished to make way for a bigger mosque to cater for the growing population at that time.

As the surrounding semi-urban population grows, many villages in the rural areas were deserted, mainly due to the exodus of its residents, especially when today's youngsters are migrating to urban areas in search of a better lifestyle and most importantly good paying jobs. This has caused the abandonment of many built structures, including many traditional timber houses and mosques. In some areas, the *kampungs* have been displaced and relocated to other areas due to the government programme to help the villagers and at times upon their request.

The existence of many old, dilapidated and vacant century-old timber buildings, especially in the state of Perak were of good structural with invaluable historical treasures which have given rise to the grave necessity for the preservation of these structures. The relocation approach through dismantling and reinstallation on the new site may be applied, rather than the orthodox approach of restoring these structures in-situ, at its current site. This method may be the only way to salvage these buildings and to give it a new lease of life.

Relocating timber buildings for it to be reused is a common practice in the Malay house building culture. It is a customary tradition that can be traced back as early as the 16th century and can be found in most traditional villages in the Malay Peninsular of even around the Nusantara region. Relocation has also been practised and the most preferred practice in salvaging various traditional Malay houses to be converted into outdoor museums and villas in an upscale resort.

## BACKGROUND STUDY

### Traditional Malay Architecture

Due to the climatic and geographical factors, the traditional Malay architecture in Malaysia favors the use of many types of timber. Various types of houses, traditional mosques, palaces and simpler structures such as pavilions and gazebos are extensively made of the various wood species that can be found in a typical tropical rainforest.

Parts of the Austronesian architecture, timber have been commonly used as a building material due to its availability, as well as durability and its component strength. Timber has also been employed due to its elasticity, ability to be shaped, worked to in various shapes of timber materials for the use of building construction (Nasir, 1985). Additionally, the relatively light-weight timber has always been at what might be regarded as the cutting edge of the building technology of the era (Rodd, 2003).

Another notable feature of the Austronesian architecture is the use of pile (raised) foundations that can be found in this region from the mainland to islands of South East Asia, as well as Micronesia and Melanesia (Waterson, 1990). Due to this ingenious jointing system whereby, the buildings are fitted together without nails is that are often capable of being dismantled and reassembled back at a different location. A pile-built house can even, with enough helpers, be lifted intact from its foundation-stones and carried bodily to a new site (Waterson, 1990). In Malaysia, this practice is commonly known as *angkat rumah* (lifting the house) which will be discussed further.

### Vernacular Timber Construction and Materials

Nonetheless, until recently, especially in the urban areas, the use of timber as the main material has been gradually replaced by more durable materials such as stone, brick and mortar, and concrete (Killman, 1994). Until the 1960s, timber was largely used in many parts of the buildings, including the floors, internal walls, porches and verandas, ceilings, roofs, staircases, doors and windows.

However, in some areas, if the *chengal* is unavailable or scarce, other heavy or medium hardwoods often used, such as the *balau*, *petaling*, and *merbau*, whereas *merbau* is rarely used due to its characteristic of red-blood like sap, thought to be haunted, as described by Yuan (1987). Nevertheless, timber has also its natural weaknesses as a construction material. Killman (1994) stated that wood is a transient material; therefore, actions must be taken to guarantee a longer lifespan of the timber materials in the buildings. These measures depend on the wood species and its end-uses.

The use of timber relies on an understanding of the material. Evidence for this can be seen in Malay house construction using traditional timber framing. Ali (1991) argued that the traditional dwelling is a sophisticated system that had evolved with Malay culture over many centuries. The construction system incorporates the beliefs of the Malays and responds to the hot and humid tropical environment.

Traditional Malay construction relied on the post and beams structure as the primary load bearing elements, with wooden or bamboo walls and thatched roof. Sahabuddin (2012) implied that using prefabricated construction methods where all the components are made and assembled

on site allows the house to be dismantled and reassembled elsewhere at a different location.

### **Relocation Practice As A Conservation Effort**

According to Rahman (2015), the relocation is a process of moving the entire building to a new site, which is another form of reconstruction, due to the unsuitability of the original site. However, the setback is that it would lose its original setting. Furthermore, from the viewpoint of the cultural heritage preservation, original location preservation is the best way, and relocation to preserve for it to be reused should only be the last resort (Wang, 2005). It is often interpreted as a least favourable method but would be the last resort when other options are not viable.

While according to Feilden (2003), relocation is inferred to the situation whereby if the valuable cultural property is being damaged irretrievably or is threatened by its environment, it may have to be moved to a more suitable environment and a reproduction substituted to maintain the unity of a site or building.

Killman (1994) also highlighted the same issue coined when relocation is concerned. Two questions surfaced, whether the house be restored at its original site or does it need to be moved to a more suitable area. As much as other buildings, removing a structure from its present site will lose its original settings and surroundings. As for traditional Malay architecture, it would lose its village setting and context, particularly as a mosque, as it is a communal activity Centre. This is further emphasized by Rashid (2016) on the significance of the buildings do not always rely on its architecture and aesthetic appeal, but also its locations, surroundings and its original purposes and history.

Nevertheless, often when a building is threatened there is no other solution than to relocate the building. Otherwise, it may be torn down to make way for other modern structures. In other cases, the owners may find the repair option too costly, and abandon the structure entirely, which will cause it to weather, infested with insects, covered with fungi and finally decay will set in.

### **RESEARCH METHODOLOGY**

Field research has been conducted as a case study and detail research on the Kampung Teluk Memali Mosque in Ipoh, Perak. For the Kampung Teluk Memali Mosque, it involved through the direct participation with the project team. Based on the accumulated data and information from the literature review and the field research, it has been analysed which lead to many important findings. The findings have led to the fruition of results and conclusion, presented with several recommendations to assist others who may want to undertake similar approach in preservation and conservation.

### **FINDINGS**

The Relocation of Kampung Teluk Memali Mosque Fund Committee is a successor to the Seri Bougainvillea Musolla Construction Working Committee that has been set up in 2013 after they were granted the permission to build a *surau* (musolla) from the Mosque Management Division of Islamic Religious Department of Perak State (JAIPk). The *surau* is located on a 0.5 acres (2,023 square metres) site allocated by the developer, Taiko Properties at Taman Seri Bougainvillea in Bandar Seri Botani, Ipoh, Perak.

This non-profitable CSR effort was initiated by ATSA Architects after they had a joint publication effort with Politeknik Ungku Omar (PUO) back in 2014, for the publication of a monograph on mosque architecture in Malaysia entitled 'Masjid – Selected Mosques and Musollas in Malaysia'.

In researching and collating the suitable content materials for the book, ATSA Architects had stumbled upon a remarkable work which has been carried out by PUO in documenting various built heritage buildings, particularly in the state of Perak, including the Kampung Teluk Memali Mosque located in Kampung Gajah, Perak. It was also suggested by PUO for us to lead a team to preserve the mosque by moving it to an area where it could be used again.

Therefore, it was then decided after an intense deliberation within office and others in 2015 to try to restore the mosque and to be continued to use as a mosque after it was left abandoned for the past 20 years. The effort was also intended to preserve the mosque's priceless historical and heritage values.

The measured drawing exercise of the mosque was done by the students and faculty members of PUO back in 2011 as part of their architectural education curriculum. The mosque structure was still sound and standing intact in a remote area nearby Perak River back then in 2011 until the recent re-visit by the project team in 2014. By looking at this neglected state and its heritage value, it was decided that there must be an immediate conservation intervention. ATSA Architects and faculty members of PUO began work hand in hand to obtain the duly permission to relocate and restore the mosque from the former villagers of Kampung Teluk Memali, as well as the Land and District Office of Kampung Gajah, Islamic Religious and Malay Customs Council of Perak State (MAIPk), the Mufti Department of Perak State to seek the official *fatwa* (Islamic cleric) guidance in relocating the mosque and the Ipoh City Council (MBI) for the planning and building approval of the new site.

After successfully obtaining permission from the respective parties, monies were raised from donations, and various funding drives carried out to fund the whole conservation effort of the mosque. A proper tendering process was steered in early 2016 after the initial dilapidation survey report, and wood identification tests had been conducted earlier. The new site in Bandar Seri Botani, Ipoh, Perak has been selected after a deliberative session with ATSA Architects and PUO in finding the new suitable 'home' for the mosque in various areas across the state of Perak. In the end, the Seri Bougainvillea Musolla Construction Working Committee was chosen as they were in need of a *surau* (musolla) for the neighbourhood, located about 10 kilometres in the south of Ipoh city centre. The site has also been picked to continue the architectural language of the mosque itself, which is the Perak Malay architectural style for mosque building typology. The current site in Bandar Seri Botani, Ipoh is located approximately 65 kilometres from the former site in Kampung Gajah, Perak.

### **Historical Background of Kampung Teluk Memali Mosque**

According to Yunos (2012), the mosque was constructed in 1908 and completed in 1910 with the cost of construction was donated by a wealthy man living in Kampung Teluk Memali. However, it also believed that the mosque was built years earlier, functioned as a *surau* and located on the edge of the river bank. Due to soil erosion, the mosque was relocated to its current site, which is around 100 metres from the riverbank. Since 20 years ago, the mosque had been left vacant and abandoned due to the rising flood waters.

The mosque is also located near the tomb of the 19<sup>th</sup> Sultan of Perak, Sultan Abdul Malik Mansur Shah. It is located 300 metres from the tomb. The Sultan ruled the state of Perak from 1806 until 1825, when the surrounding area was the former royal capital of Perak, known as Bandar Baharu. There could be a link between the mosque and this tomb, but there are yet any findings to support this claim. However, it is probably correct to say there may be an older mosque or mosques

that have been built before the year 1905 as this area had been settled earlier. According to the Malay Historical Annals, the rulers of the Sultanate of Malacca came to the state of Perak after the fall of Malacca in 1511. They brought with them their faith, Islam. Islam was established during the Malacca Sultanate in 1414. The mosque is also believed to have been built during the reign of Sultan Idris Murshidul Adzam Shah I Ibni Almarhum Raja Bendahara Alang Iskandar Teja, the 28th Sultan of Perak from 1849 to 1916. However, there have not been traces as evidence of an earlier mosque or its foundation within the surrounding area. The temporal nature of wooden mosques where it is easily demolished or left to decay over the years if it is not properly maintained.

There is another evidence to support the claim of the year the mosque was built, which is carved on the intricate timber *mimbar* platform. At the rear side of the mimbar frame, an old *Jawi* inscription can be seen; and can be translated into English and read as 'Megat Jaafar on 15-11-1339.' The mentioned date is believed to be written using the *Hijri* calendar, which is equivalent to the Gregorian calendar of 21<sup>st</sup> July 1921. While Arif (2014) implied that the inscribed date could also be translated as the year when the mosque was built.

In the recent enthronement ceremony of the 35th Sultan of Perak, Sultan Nazrin Muizzuddin Shah on 13<sup>th</sup> May 2015, the Sultan had visited the nearby tomb of Sultan Abdul Malik Mansur Shah, the 19<sup>th</sup> Sultan of Perak, as a customary pilgrimage to the Malay royal tombs along the Perak River before ascending the throne as the new Sultan of Perak. During the ceremony, the Sultan had travelled on the Perak River by using a special vessel known as *Balai Gambang* named 'Cempaka Sari' from Pasir Salak town through Teluk Intan to Bagan Datuk, where the mouth of Perak River that flows into the Straits of Malacca. It is a symbolic ritual to pay homage to the journey taken by the first Sultan and the many Sultans after him. In conjunction with this visit, a jetty was purposely built, and a road access was paved from the jetty to the tomb. The road currently passed through the Kg Teluk Memali Mosque building.



**Fig. 1** The mosque on the old site in Kg. Teluk Memali, Kg. Gajah, Perak  
Source: (ATSA Architects, 2015)

### **Design Concept and Layout of Kampung Teluk Memali Mosque**

The layout of the mosque comprises the main mosque building and an annexe building known as *balai lintang*; the Kampung Teluk Memali Mosque was the main place of worship for the local Malay Muslim community ever since it was built. The main prayer hall is measuring 8.95 metres by 8.95 metres that can comfortably fit approximately 150 people. It had also been used as a hub

for social gathering and communal activities for the villagers for decades. It was also used as a learning and teaching centre for the children and youngsters of the village, before it was finally abandoned approximately 20 years ago as part of the government resettlement programme to resettle the village to a new nearby area, that is now known as *Kampung Tersusun Teluk Memali* (Teluk Memali Planned Village).

The mosque had also been used for daily *solah jamaah* (congregation prayers), other than the weekly Friday prayers, *Eid* prayers and other religious occasions such as the *Eid* sacrificial rites, thanksgiving feasts or even formal or informal lessons in Islamic studies and the use of musical instruments such as *kompang* (wooden tambourine).

The main prayer hall building is preceded with an *anjung* (foyer) area, a welcoming area where a *beduk* (large drum) was once located to be used before the call for prayer five times a day by a rhythmic beating of the timber log. The sound of the *beduk* can be heard many metres away. The *anjung* is then followed by three steps over the concrete platform base to the *serambi* (veranda) area. It also acts as a small gathering area; this is also where an old *kentung* (hanging musical instrument) was hung that had also a similar function to the use of a *beduk*. Fringed with a wooden balustrade, the *serambi* area is nicely decorated with multifoil lattice arches and two ornamented columns. On the right corner of *serambi* is a newly added covered ablution water trough to hold water sourced out initially from the rainwater and even underground water via a hand pump from a ground well.

The core area of the main building, a rectangular prayer hall with an area of 85.64 square metres (922 square feet) can fit up to 100 to 150 worshippers at a single prayer time. The main prayer hall is bordered with a double panel door over a crossbeam from the *serambi* area. The expansive prayer hall is formed by four central columns, the *soko guru* or *tiang seri*, the first columns to be erected during the mosque construction. The main prayer hall is then surrounded by 12 supporting columns that stand in between the pre-fabricated wall panels that consist of full height window panels. These panels provided a generous source of natural ventilation and lighting, other than the decorative lattice ventilation panels located above the windows. Other than the multi-openings, the high internal opening between the floors and ceiling level about 5.43 metres (17.8 feet) had also attributed to the ingrained cross ventilation of this building.

On the front part of the prayer hall, the *qibla* wall is earmarked for a *mihrab* area, a square space where the imam stands and leads the prayer. Before the *mihrab* area is an area where the intricate wooden *mimbar* is usually located. It is also where the *khatib* or the *imam* delivers the Friday prayer sermons and other religious lectures. In the *mihrab* area, a wooden cupboard was found, where many old books and Islamic scriptures are stored.

While the *balai lintang* is an additional building that is believed to be built later than the mosque building. This is evident from the architectural style of the building, which is a rudimentary type structure made of *tindih kasih* (horizontal) wall planks and double pitch hip roof that suit its functions and surrounding context. Unlike the main mosque building that sits on a concrete platform base, *balai lintang* is an elevated structure on wooden stilts, supported with brick plinths.

The colour of the mosque is quite unusual. Bright yellow and turquoise blue were painted and used over the timber which separates the mosque building with other surrounding buildings at that time. The reason of the use of the colours has not been established yet, but there were some

buildings made of timber were also used.

## Materials

Based on the timber structure pre-inspection test done by the Malaysian Timber Industry Board (MTIB) on the mosque building, the mosque structure is overwhelmingly made of a *chengal* hardwood timber for most of its components. The *chengal* can be seen in all of its structural columns, wall panels and other decorative elements of *anjung*, *serambi* and the main prayer hall. Other than *chengal*, *balau* can also be found in certain structural elements, except *tualang* of the wall panel skirting.

Other than timber, several non-timber materials can also be found, such as the one metre (three feet) concrete platform base, which is a common feature in many mosques in the district of Kampung Gajah and Central Perak. This would be attributed to the occasional flooding of the area due to the water overflowing the river banks, which had resulted in the use of the platform base, instead of the wooden stilts of the traditional Malay house. Other industrial-based materials are also visible, such as the corrugated zinc and asbestos sheet for the roofing materials, which have now been replaced by *singgora* tile material. The *singgora* tiles were hand made in Bachok, Kelantan by the woman folks. The clay used to make the roof tiles were taken by using the clay soil of paddy field. The *singgora* tiles were made at or near their houses and paddy field as part of their cottage industry. It is a roof making method that had existed and passed down over generations.

The clay tiles were used because it is believed that the original roofing materials were made of clay. Zinc sheet roofings were probably used to replace the clay tiles due to the damage and the easy use of zinc sheets as roof pattern. Marine ply was also added below the *singgora* tiles to avoid future leakages due to anticipated breakages, as a result of future wear and tear.

A thin plywood suspended ceiling can also be found, which is a later addition, which has been dismantled and replaced with timber strip ceilings during the re-building.

## Chronology of Dismantling, Relocation and Reinstallation Methods

The dismantling and relocation of the Kampung Teluk Memali Mosque can be classified into five major stages, which are the preliminary works, dismantling process, loading and transportation, cleaning, repair and treatments and also reinstallation. The detailed 54 chronology steps can be referred in the following list:

### Preliminary Works

1. Dilapidation survey of the mosque building on the old site.
2. Preparation of the new site (earthwork, new concrete platform base).
3. Determine dismantling and relocation methods.
4. Coding and numbering by the workers.
5. Relocation of old *mimbar*.
6. Clearance of the old site and cleaning works inside the mosque building.

### Dismantling Methods

Kolah

7. Dismantle *kolah* structure from its base.

Roofing

8. Removal of zinc and asbestos free sheet roofing.
9. Remove the fascia boards.
10. Remove louvre window panels at the upper tier roof.
11. Remove the purlins.
12. Remove the pinnacle.
13. Remove the rafters of the upper tier roof.
14. Remove the purlins of the upper tier roof.
15. Remove the upper tie beams.
16. Remove the loft floorboards.
17. Remove the ceiling strips.
18. Remove the loft floor joist.
19. Remove the trusses.
20. Remove the rafters.

#### Wall Panels and Tie Beams

21. Dismantle multifoil lattice arch.
22. Dismantle balustrade.
23. Remove decorative wall panels.
24. Remove the wall panels.
25. Dismantle window and door panels.
26. Put up the temporary wooden bracing supports.
27. Remove the tie beams.
28. Dismantle the wall skirting.

#### Columns

29. Take down the original columns.

#### Loading and Transportation

30. Loading and transportation process.
31. Unloaded all materials on the new site.

#### Cleaning, Repair and Treatments

32. Timber evaluation and identification.
33. Wood sanding process.
34. Unload and store treated and non-treated components on the new site.
35. On-site timber treatment using wood preservatives.

#### **Reinstallation Methods**

36. Fixed up the reinforced column bases.
37. Reinstall the columns.
38. Put up the temporary wooden bracing support.
39. Reinstall the tie beams.
40. Reinstall the rafters.
41. Reinstall the marine plywood.
42. Reinstall the purlins.
43. Reinstall the loft floor joists.
44. Reinstall the loft floorboards.
45. Reinstall the pinnacle.
46. Reinstall the wall skirting.



47. Reinstall the wall panels.
48. Reinstall the window panels.
49. Reinstall the roof eaves ceiling strips.
50. Install the *singgora* clay roof tiles.
51. Install internal timber ceiling strips.
52. Reinstall the decorative wall panels.
53. Paint the wall panels, columns and tie beams using primer coats.
54. Reinstall the fascia boards.
55. Reinstall the multifoil lattice arch.
56. Reinstall the *serambi* and window balustrade.
57. Reconstruction of *anjung*.
58. Install timber flooring.

## DISCUSSION OF FINDINGS

Based on the methods of the dismantling, relocation and reinstallation methods can be further examined in the following analysis;

### Preliminary Works

Killman (1994) emphasised on the little aspects that need to be considered in the preliminary works before any physical removal works take place. The preliminary works, including the dilapidation survey, are a necessary initial action in determining the suitable house or mosque to be relocated. Based on this survey, the degree of defects and dilapidation can be identified, as well as the pre-determination of replacement and repair works that required. This is also the time to prepare measured drawings of the mosque, as it is important to record and document the condition of the mosque before the dismantling works, other than taking photographs.

Other than the dilapidation survey, the cleaning work is also imperative before the dismantling works. It involved the spaces with the structure itself, other than the site and its surrounding area. A clean and clutter-free site is important in executing and managing the further dismantling works.

Before engaging the dismantling works, sets of suitable tools and machinery were prepared to perform the dismantling tasks. However, just before the workers commenced the dismantling work, it is equally imperative to do the coding and numbering on every single component of the structure. This was done through referencing with the measured drawings that were prepared earlier.

## Dismantling Methods



**Fig. 2 The dismantling works of the mosque on the old site**

(Source: ATSA Architects, 2016)

The dismantling works are the most crucial stage in any relocation practice. Based on the methods of dismantling works implemented in this mosque, the dismantling works can be divided into six major components that involved structural components of timber structures, which are the roofing, wall panels, floorings, joists, tie beams and columns in 24 to 29 detailed steps altogether.

However, an addition step is identified for the Kampung Teluk Memali Mosque that had relocated the *kolah* structure first, followed by the structure building. This is due to the reason of managing the site properly, as the *kolah* was located nearby the mosque building. Thus, it was important to move the smaller and detached structure first, before proceeding into the dismantling of the main building.

Nevertheless, before dismantling works began, a smaller *doa selamat* or thanksgiving ceremony was organised on 2<sup>nd</sup> June 2016. It was intended by the village folks and the project team members. Soon after the event, the dismantling of the 107-year old mosque kicked off.

### **Loading and Transportation**

Another important aspect of relocation is the loading and transportation processes from the old site to the new site. After the dismantled components have been identified, collated and bundled, they must be kept and arranged properly inside the lorry or on a larger sized vehicle. This is important to ensure the materials are not messed up and can be unloaded properly. The length of the transportation depending on the distance between the old site and the new site.

As the new site will permanently change the contextual setting of the originally built forms, it is nonetheless suggested the building to be relocated within the same district or state to further maintain the regional architectural identity of that particular building, for instance, the Kampung Teluk Memali Mosque that had been relocated within the same state of Perak, from Kampung Gajah in the Central Perak district to Ipoh in Kinta District.

## **Cleaning, Repair and Treatments**

Before the original timber can be used, it is an utmost important to have it sorted out and to identify which parts can be used or not. This can be identified after all components have been dismantled. It can be done either on the new site or in the designated workshops by the engaged contractors or carpenters.

Should the existing wood is coated with a layer or paint, it is advisable to remove the existing paint layers by a sanding process. This can be done using handy sanding devices or machines in nearby workshops.

After sanding, the repair process can be carried out accordingly. It is done based on the levels and types of defects and disrepair. This is when the carpentry skills are tested and needed in refurbishing the wood components. If the defects are severe, it may need to be replaced with a new wood component, but there must be a supervision by the appointed conservator in ensuring the project adhering to the conservation principles.

Meanwhile, the treatment process can be done either earlier or later, which is before the reinstallation of the wood components or after the structure has been completed. However, it is highly advisable to do before the reinstallation, as the treatment preserver would cover up any exposed surfaces, including the joints, which is imperative as a protective measure for the wood components. It can be executed either in the workshop or on the new site.

It is equally important to store the dismantled components, either treated or non-treated in a proper storage area on-site or off-site. This is to ensure the wood components are protected from the elements. Thus, they can be stored properly under a shaded canopy or tent and above the ground level, to avoid direct contact with the soil. Such measure had been prepared during the restoration of the Kampung Teluk Memali Mosque on its new site in Ipoh, Perak.

## **Reinstallation Methods**

Reinstallation is another vital part of relocation as a conservation practice. It is the stage where the final structure takes place and will be utilised for final usages.

From the comparable reinstallation methods of each case study, precedent studies and literature review, there are about 19 to 23 detailed reinstallation steps for Malay vernacular timber structures, depending on the building typology and its intricacies.

The reinstallation method began with the fixing up the concrete base, either the platform base or the normal pad footings for elevated timber structures. The process then commenced with the reinstallation of the *tiang seri* or *soko guru* columns, followed by other supporting columns and crossbeams to fully erect the structural frames. After this temporary structure has been erected, it is critical to support this structure temporarily by using wooden bracing supports attached to the columns and crossbeams.

For the roof structures, the reinstallation method begins with the rafters, tie beams, king posts, ridge end beam, pinnacle (if any), insulation ceiling (optional), purlins, upper fascia boards, roofing tile finishes, gable end walls and later the lower fascia boards. If the building may have a loft area, the loft floor joists and floorboards can be reinstalled subsequently. It was paramount to complete the roof and its first structure to give shade to the internal spacing for further finishing work, such as the internal timber ceiling strips. This is comparable to the use of canopy with the

other conservation works, such as repairing or adaptive reuse that deploy a large tent over the preserved building. Nevertheless, the steps can be mismatched depending on the carpenters' skills and its suitability in response to the site.



**Fig. 3** The reinstalled columns temporarily supported by wooden bracings  
(Source : ATSA Architects, 2016)

Moving on to the next stage is the wall panels that dominate most of the building form and façade. The wall panels can be constructed as soon as the tie beams have been put in place, as it acted as the pegging frame for the wall panels, other than the wall skirting. After the wall panels, including decorative such as latticework or any supplementary wall panels, the window and door panels can be fixed to their respective frames on the wall panels and later the balustrade of each window segment. Though, this was in the case of the Kampung Teluk Memali Mosque where some wood components had been reinstalled oddly due to the delayed in the treatment process, and also because of missing parts, which had resulted in the carpenter to remake the missing parts to allow for the rebuilding of the mosque.

The final finishing works were done partially as an when the whole structure has been completed. Many types of wood finishing can be used, either the Gori wood preservative, varnish or wood stain. If desired, the building can be painted using layers of wood coating from various brands in the market.

Other civil works, such as the apron, drainage, electrical and wiring, landscaping and other finishing works were done simultaneously.

### **Funding**

As the project was a private initiative, initiated by ATSA Architects, the financial cost of the relocation of the mosque was solely done through donations from the public and various organizations. ATSA Architects spearheaded the donation drive and collected approximately RM 700,000.00 or USD 160,000.00. Financial donations were a crucial aspect of every conservation effort as a big sum of money needed to restore and repair the decaying and damaged components, especially the timber structure and roof tiles without such support, it would be impossible to restore the historic mosque. It is also the most difficult task as it took a tremendous effort to raise the sum.

## Community and Corporate Involvements

Despite the conservation effort was launched and initiated by ATSA Architects, the restoration effort had also been planned and designed to be a communal conservation effort. Other than the public funding, the restoration works had also involved the participation of students and the local community of Taman Seri Bougainvillea in a series of community social works.



**Fig. 4** The partially completed restored mosque on new site  
(Source : ATSA Architects, 2016)

In the last February 2017, a community social work was organised on the mosque restoration site in Ipoh, Perak. Other than the local Muslim community, the work saw the hands-on work contribution by students and teachers of various higher learning institutions in and around Ipoh, including the Politeknik Ungku Omar (PUO), Universiti Teknologi MARA (UiTM) Perak, Seri Iskandar campus and also Lebu Cator Vocational College (KVLC). The idea was to expose this architecture and landscape architecture students with some practical exposure on the site.

Extending the spirit of the community involvement, some of the building materials used in the mosque restoration effort were donated by various corporate organisations, particularly the construction suppliers, such as concrete, lights, tiles, sanitary wares and wooden carved panels. Individual donations were also made and were also crucial in the completion of the mosque. Without their kind donations, the mosque restoration and relocation works will not be completed. The architectural consultancy services provided by ATSA Architects and conservation advice by PUO were also provided with extra-gratis basis.

## CONCLUSION

Often regarded as the least favourable conservation approach, this research is, however, aiming to prove that relocation is indeed a feasible conservation practice that should be considered whenever possible. This study has also offered insights on the idea of relocation of valuable historical buildings located in rural areas as a tool in safeguarding many timber heritage buildings in Malaysia which were often on the verge of being demolished. Hence, the study has been examining the detailed relocation methods based on the case study of this research, an on-going relocation project by ATSA Architects, which is the relocation and restoration of Kampung Teluk Memali Mosque from Kampung Gajah, Perak to Ipoh, Perak. The exercise demonstrated many challenges that one might have encountered during the process of restoration without the full financial support from the authorities.



**Fig. 5** The *gotong-royong* event at the mosque site  
(Source : ATSA Architects, 2017)

Therefore, the methods of relocations have been reviewed with around 48 to 57 detailed steps ranging from the earlier stages of preliminary works, dismantling process, loading and transportation, cleaning, repair and treatment and reinstallation. Based on the identified relocation methods step-by-step, the relocation methods were influenced by the carpenters' mastery and skills. The carpenters' mastery and skills are largely passed down as to carry out the traditions of their ancestors or by learning from the elderly, without any formal education and through their innate passion.



**Fig. 6** The nearly completed mosque building and its surrounding  
(Source : ATSA Architects, 2017)

Other than the carpenters' mastery and skills, the building typologies and sizes would also influence the various relocation steps, but nonetheless, still retain the key elements of the traditional Malay architecture that deploy timber materials. Meanwhile, regarding the transportation and storage of the dismantled components, the wood components must always be protected against the elements before proceeding with the repair and treatment works. The different repair and treatment preference also prevalent in the case and precedent studies, depending on the conservators or consultant involved, but with the same goal of prolonging the durability and usage of every single timber component that was used in the building of the mosque.

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