Capturing the Heritage of Church Building through Measured Drawings in Malaysia a Case of St James Church, Quop

Mervyn Wong Hsin Jyi., Atta Idrawani bin Zaini., Chong Wan Siang., Joy Natalie Cotter., Kelvin Lee Kian Shie

Faculty of Built Environment, University of Malaysia Sarawak

DOI: https://doi.org/10.47772/IJRISS.2026.10200331

Received: 23 February 2026; Accepted: 28 February 2026; Published: 09 March 2026

ABSTRACT

This study aims to investigate the architectural and historical significance of St. James Old Church, a centuries-old ecclesiastical building located in the heart of Kampung Quop Kota Samarahan, Sarawak. The old church is not properly documented and alteration works has been carried out which has deviated from the original design. The research aims to preserve detailed information on the endogenous influences during the British colonization Era. St James Church Kampung Quop was consecrated on Dec 7, 1865 by Bishop Francis McDougall. It is believed to be the one of the oldest outstation churches in Sarawak land. St James was a prefabricated church, similar to the numerous out-station Belian (timber species) forts of the same period, built by the Rajah.

The research employs pre-fieldwork, fieldwork and post fieldwork measure as the method for this documentation. The results are compiled through interviews, site measurements and observation of the building.

In conclusion, these research findings provide the chronology and history of the old rugged St James Church that rich in its heritage value, construction techniques, and ecological design. This research reinforces its status as a monument of enduring historical and cultural significance.

The objectives of the studies are to: a) Preserve and appreciate the Architectural Heritage Design of the Church Building. b) Record the building construction, detailing and documentation of the history features through measured drawings. The methodology adopted for this research are divided into pre-fieldwork, fieldwork and post fieldwork. The results are compiled through interviews, site measurements and observation of the building. In conclusion, these research findings provide the chronology and history of the old rugged St James Church that rich in its heritage value, construction techniques, and ecological design.

Keywords: church building, architectural heritage, timber construction

INTRODUCTION

St James Church is sitting on a hill at the edge of Kampung Quop, which is approximately 10 miles from Kuching City. It was built 161 years ago and it is believed to be one of the oldest out-station churches in Sarawak. St James was a prefabricated church, in common with numerous outstation Belian forts of the same period, built by the Rajah.

The construction of the church was initiated by Fr William Abe, a pioneer missionary who, among others, pastored the rising new Anglican community of Kampung Quop in the 1800s. The wooden walls, roof, and truss were fabricated in the year 1863 in Kuching under master carpenter T A Stahi's supervision. The components were later transported upriver to Kampung Quop via the Sarawak and Quop Rivers. The church itself is built in the Gothic style which is common in ecclesiastical architecture across Europe from Notre Dame to Salisbury Cathedral.

According to information supplied by the Sarawak Muzium Department to the Sarawak Heritage Society, the 159-year-old St James Quop church building has received approval to be gazetted as a heritage building. Its

nomination as a gazetted heritage building under the Sarawak Cultural Heritage Ordinance 1993 was approved in 2007. Beyond its architectural allure, St. James Church holds a special place in the hearts of the local community, serving as a hub for various religious and social activities. From weekly prayer services to educational programs and charitable initiatives, the church plays a pivotal role in nurturing spiritual growth and promoting social welfare among its congregation. The building means a lot to the present and future generations of the Bidayuh community.

Moreover, St. James Church serves as a custodian of local heritage, preserving artifacts and archival materials that chronicle the village's religious and cultural heritage. Through its efforts in historical conservation and community engagement, the church continues to uphold the legacy of Kampung Quap for generations to come. However, few architectural drawings were recorded for this building. As a result, little detail is preserved in its origin. The preservation of heritage churches is essential for safeguarding cultural heritage, promoting architectural appreciation, preserving historical documentation, stimulating tourism and economic growth, maintaining spiritual and social significance, and contributing to environmental conservation.

By recognizing the value of these cherished landmarks and investing in their protection and upkeep, communities can ensure that their cultural legacy endures for future generations to cherish and enjoy.

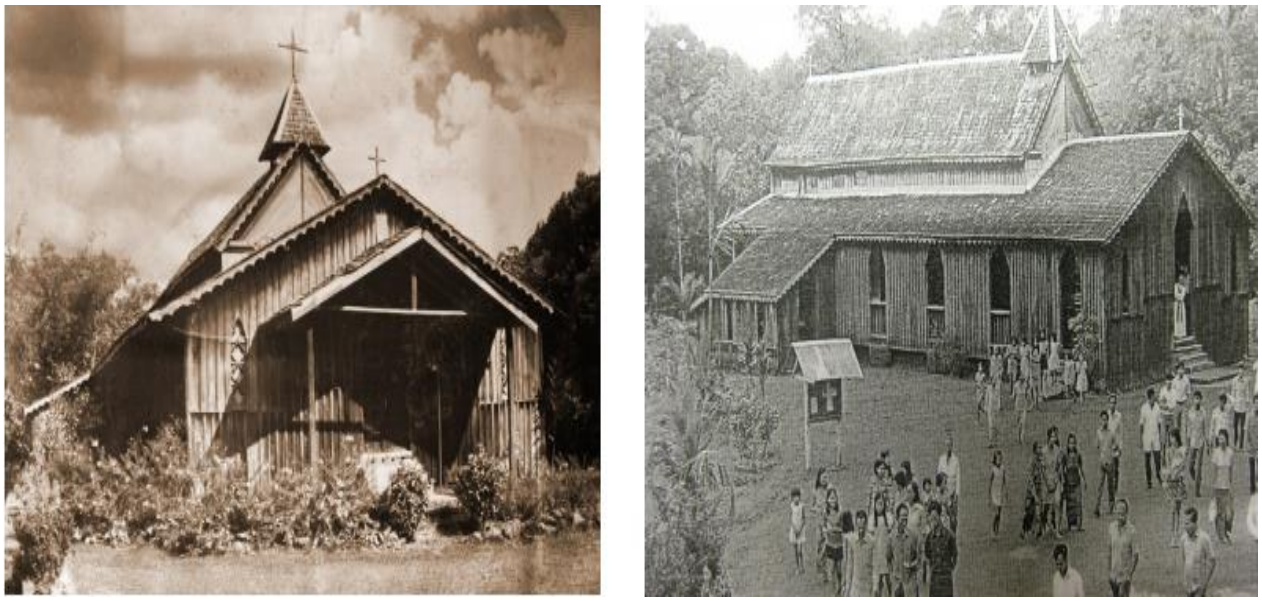

Fig.1: Photograph of the original church before any alteration work was done.

RESEARCH METHODOLOGY

The methodology used in this study is based on both qualitative and quantitative methodologies. Qualitative approaches acquire data through interviews, case studies, and observations, whereas quantitative methods use numerical data and building measurements. The Church's data collection was divided into four categories: a) report, b) technical, c) multimedia, and d) cataloging. During the fieldwork, each team was allocated distinct data collection duties. The report team is tasked with acquiring historical and architectural information about St James Church. The data was obtained through interviews, on-site notes, capturing the essential elements in every detail, on-site sketching, and the collection of articles that would enhance the report's content for better comprehension. The technical team was tasked with measuring each element of the building, including architectural features, crafting, and dimensioning. A 3D computer model was generated as well using the right scale and measurements. The multimedia team was in charge of taking pictures and videos of the church. The catalogue team was responsible for compiling the acquired data. The information is made up of sketches, drawings, photos, multimedia recordings, articles, and measured drawings, which are all categorized and organized using cataloging. Sketching, photography, and digitizing methods were used to document any drawings, reports, and papers that included major ornamental details, architectural characteristics, and materials. All data gathered will be documented in reports and drawings.

RESULTS AND DISCUSSION

The hybrid architecture of St. James Church combines aspects of the surrounding area with the well-known Gothic architectural style. Form, scale, and proportion are used in the design to convey the robust, old-world impression of a building while vibrant building materials are used to enhance the overall impression. Figure 2 shows a linear floor plan formed by the church's balanced and symmetrical structure on both sides. With a ceiling height of 7 meters, it is a one-story timber structure constructed primarily of Berlian timber. The Gothic architectural style, which is embodied in St. James Church, is characterized by a design that carefully considers utility to ensure that the structure satisfies the user's needs.

Fig. 2: Top view of St. James Church, Kampung Quop

Source: Google Map

Fig. 3: Perspective view of St. James Church, Kampung Quop

Space planning

To maximize both practicality and spiritual value within the architectural framework, the St. James Church space layout is carefully designed. The high altar is located in the chancel, which is focused at the eastern end and acts as a sacred area for the congregation. The choir room is a designated place for the choir to improve the worship experience, and it blends in beautifully with the architectural ensemble next to the chancel. Strategically placed altar server and priest vestries ensure seamless coordination of liturgical operations, while the preparation room ensures efficient ceremony planning.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue II February 2026

To emphasize the holiness of the Eucharistic celebration, a thoughtful communion step is used to signal the change from the chancel to the nave. Auxiliary routes for processions and mobility are provided by the north and south aisles, which flank the nave and hold the assembly. The nave's center seating arrangement serves as the primary site for worship, fostering a sense of community and connection. The ornate altar and nave architecture, among other elements, all contribute to the overall spiritual ambiance.

Practical considerations are addressed through the inclusion of a store, providing a discreet space for storage while ensuring the church maintains its aesthetic integrity. The intricate chancel and the useful storage area are seamlessly integrated, demonstrating a careful balance between historical preservation and modern functionality. This enhances the overall experience for worshippers and maintains the architectural and spiritual legacy of a Gothic church in a local context.

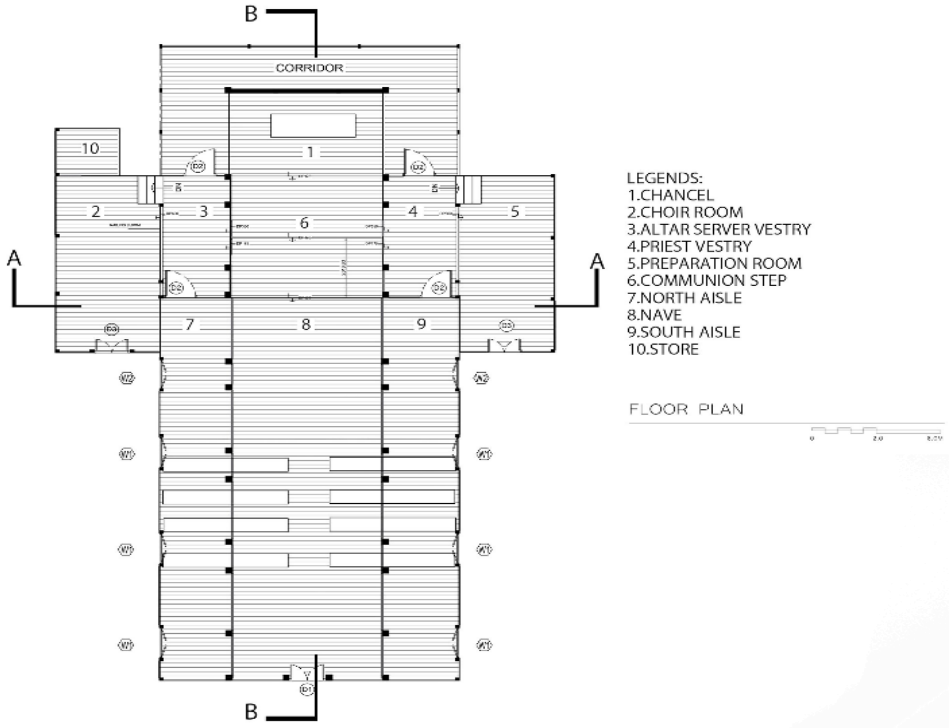

Fig. 4: Ground Floor Plan of St. James Church, Kampung Quop

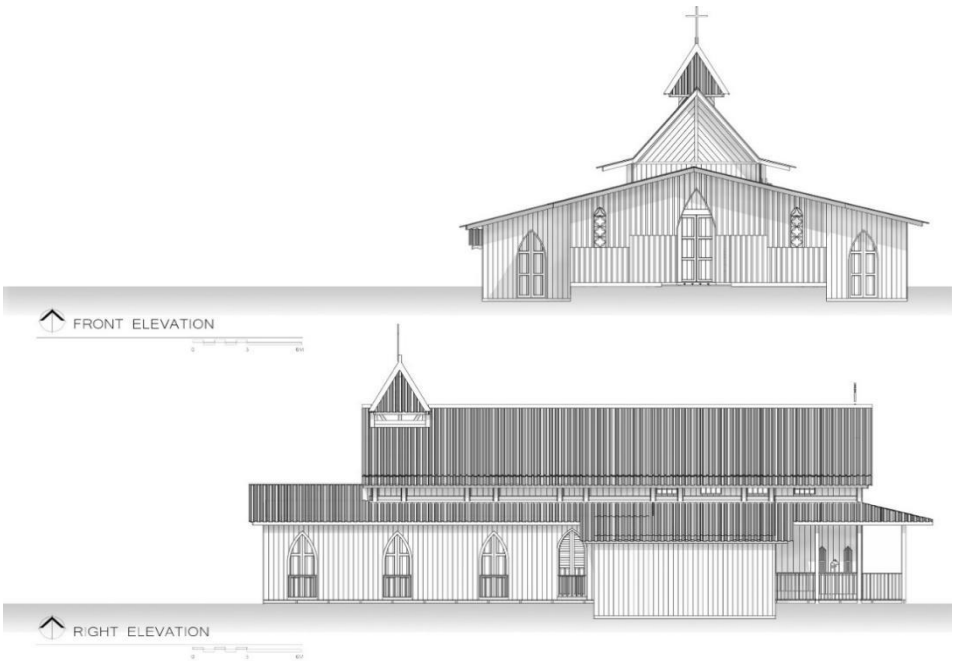

Fig. 5: Front & Right Elevation of St. James Church, Kampung Quop

Material & Construction

St. James Church was built in 1865, during the British colonization era. In order to localize the construction method, the choice of timber was chosen as the primary building material for the church, coupled with a reinforced concrete strip foundation that was later added on as the original timber pile was rotten. Berlian hardwood also known as Borneo Ironwood, is a type of hardwood with high natural durability that can be widely sourced in Sarawak, its heartwood is extremely resistant to preservation treatment. Its texture is moderately fine to fine and even with grain fairly straight or shallowly interlocked. The timber falls into Strength Group A (Burgess, 1958). With these properties and ease of source, Berlian timber was selected as the main building construction material of the church during the time. The foundation, Berlian timber post, walls, and beam used in St. James Church were other structural systems under study.

The foundation used in St. James Church is a reinforced concrete strip foundation. A reinforced concrete strip foundation is laid to provide a stable base for the entire structure, ensuring even load distribution and resistance to settlement. Since it provides strong support with a low chance of subsidence, this form of foundation is especially well-suited for timber construction. Part of the reinforced concrete strip foundation was raised above the existing soil ground level to prevent direct contact between the timber members and the ground for better durability of the materials. To prevent damage due to rising dampness in timber walls, ensuring a sufficient distance of the wall base to the Reinforced Concrete (RC) foundation level, as opposed to a direct contact, which likely would lead to durability problems. (R. Scotta, D. Trutalli, L. Marchi, L. Pozza, 2018). A reinforced concrete strip foundation is constructed along the perimeter of the building as it is a continuous strip, which is formed centrally under the timber walls and posts. Figure 5 shows the strip foundation was raised from the ground level as the foundation for St. James Church.

Fig. 6: Raised Reinforced Concrete Strip Foundation of St. James Church, Kampung Quop

The Berlian timber posts and beams construction is implemented as the main structural frame in the construction of St. James Church, which mainly features the timber grain, texture, and natural colors to give the aesthetic look of the Church and, at the same time, the high durability and strength Berlian timber act as the post and beam frame that holds up the superstructure of the building as shown in figure 6. The Berlian timber posts were erected directly onto the reinforced concrete strip foundation on the ground. They transfer the continuous loads from the roof and building into the ground. The timber posts are arranged in an order of 900mm distanced double timber posts pattern and are arranged in a grid arrangement of 2100mm from one pattern to another.

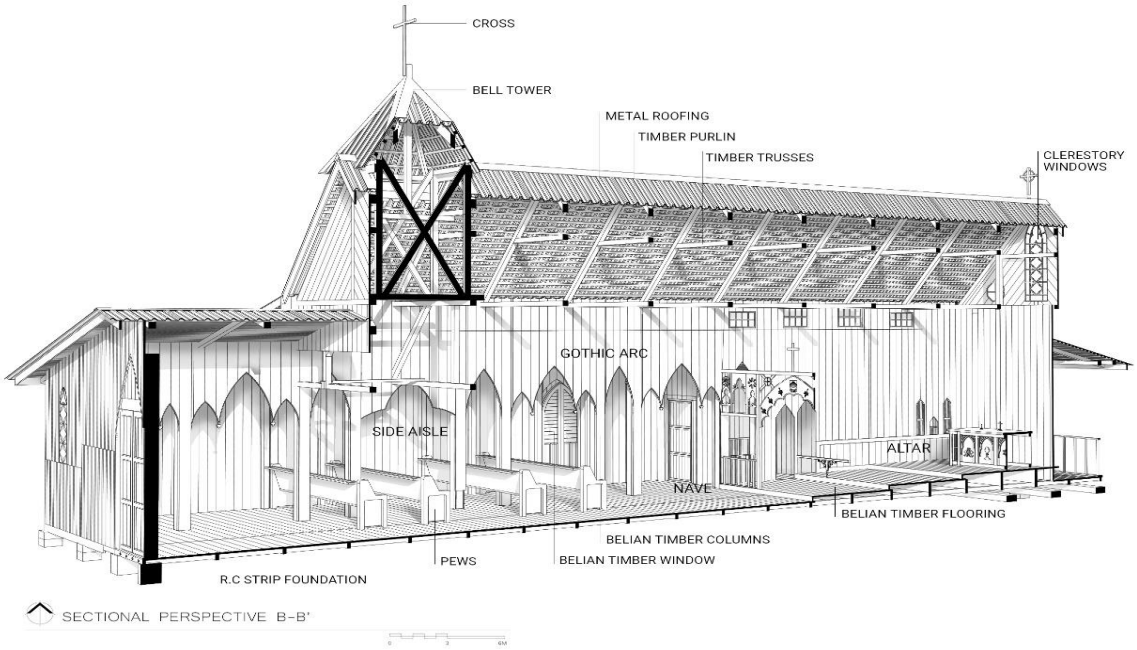

Fig. 7: Sectional Perspective B-B' of St. James Church, Kampung Quop

Another one of St. James Church's most noticeable elements is the way of roof is constructed. The church has a double-gable metal roof supported by timber roof trusses. This kind of roof is made up of two gable roof layers with varying side slopes. It makes use of two separate timber roof truss structure types, measuring 15 and 51 degrees. Among its characteristics is a lower slope that is not as steep as the upper slopes seen in Figure 7. This design featured the integration of the clerestory high window in the Gothic Church and double gable roof in a tropical climate country which provides natural ventilation, shading, and sufficient natural lighting into the interior space, especially during the non-mechanical ventilation era it is a great design approach to give a comfortable interior environment in a humid tropical climate country.

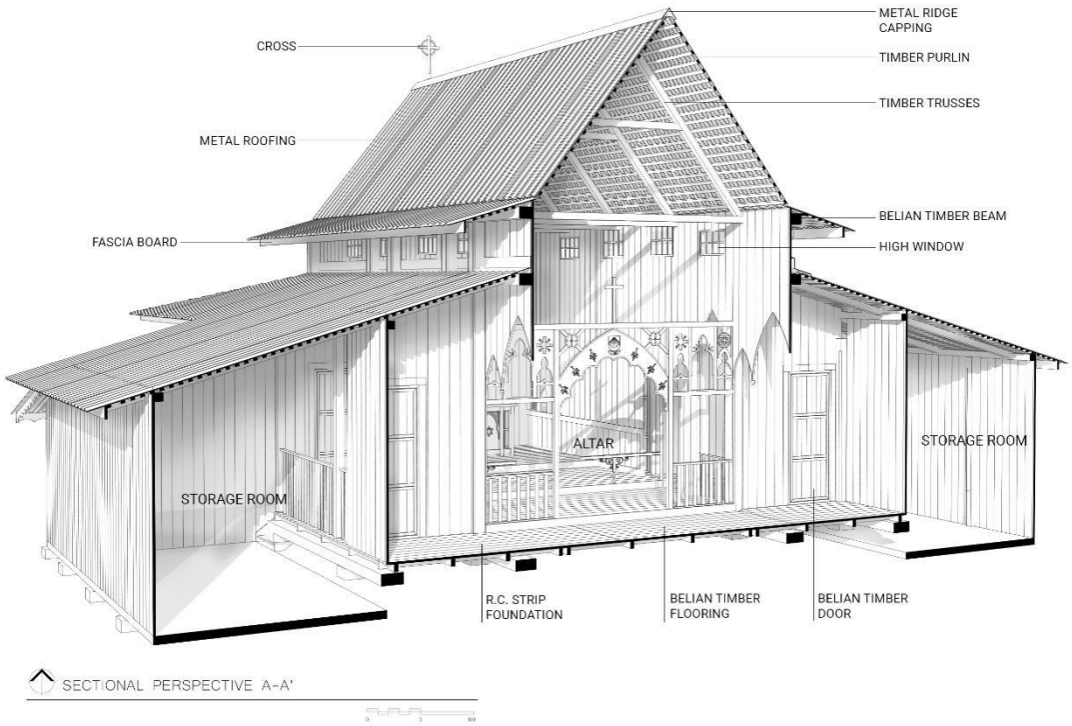

Fig. 8: Sectional perspective A-A' of St. James Church, Kampung Quop

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue II February 2026

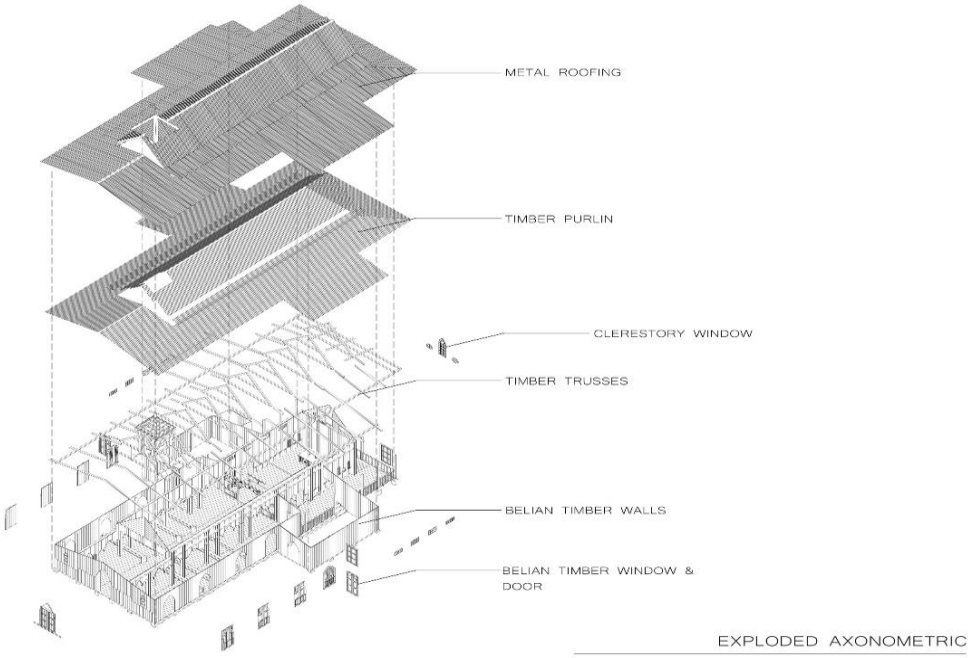

Fig. 9: Exploded Axonometric Diagram of St. James Church, Kampung Quop

Design Elements

The design elements of St. James Church feature high clerestory windows, timber Gothic arches, and meticulously crafted timber ornaments that reflect a harmonious blend of architectural elegance, spiritual symbolism, and craftsmanship.

High clerestory windows are an essential component of design that fulfills practical as well as aesthetic needs. These windows, which are arranged along the church's upper walls, let in a lot of natural light, which gives the interior an air of ethereality and highlights the verticality typical of Gothic architecture. By directing worshippers' gaze upward, the windows' elevated placement symbolically unites heavenly and earthly places and uplifts their spirits. Intricate tracery inside the windows frequently has designs influenced by Gothic architecture, which adds a level of spiritual meaning and visual complexity.

The timber Gothic arches are a distinctive architectural element that gives the church an air of grandeur and elegance. The room's breathtaking quality is enhanced by the Gothic style's pointed arches, which produce a visual movement that is both vertical and upward. These arches, which are made of Berlian timber, preserve classic Gothic architectural aesthetics while showcasing the structural beauty of timber and the adaptability of the architectural style to the local context. Worshippers are invited to embark on a mystical journey as they pass through the space by the arches' repeating rhythm, which runs along the nave and aisles.

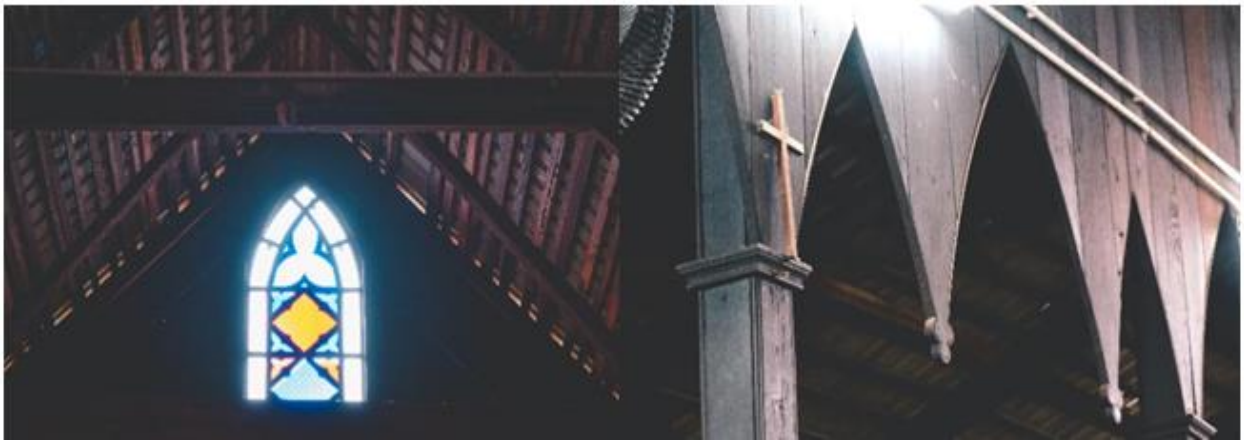

Fig. 10: High Clerestory Windows (Left) & Gothic Arches (Right) of St. James Church, Kampung Quop

The addition of timber embellishments to the church's architecture enhances it even more and highlights the local craftsmen's meticulous attention to detail and skill. Important architectural features like timber posts, beams, arches, entrances, window and door panels, walls, and furniture are decorated with intricate carvings, tracery, and moldings. These intricately patterned wood ornaments, which give layers of significance to the room, are frequently influenced by historical motifs, religious symbolism, or natural phenomena. Every ornament becomes an homage to the craftsmen's skill and a representation of the historical and cultural background of the church. The ornament on the door and window panel successfully proved the innovation of architectural style to adapt to the local context with the ability of the local craftsmen to merge seamlessly the local Bidayuh motifs into the timber panels with the Gothic architectural style.

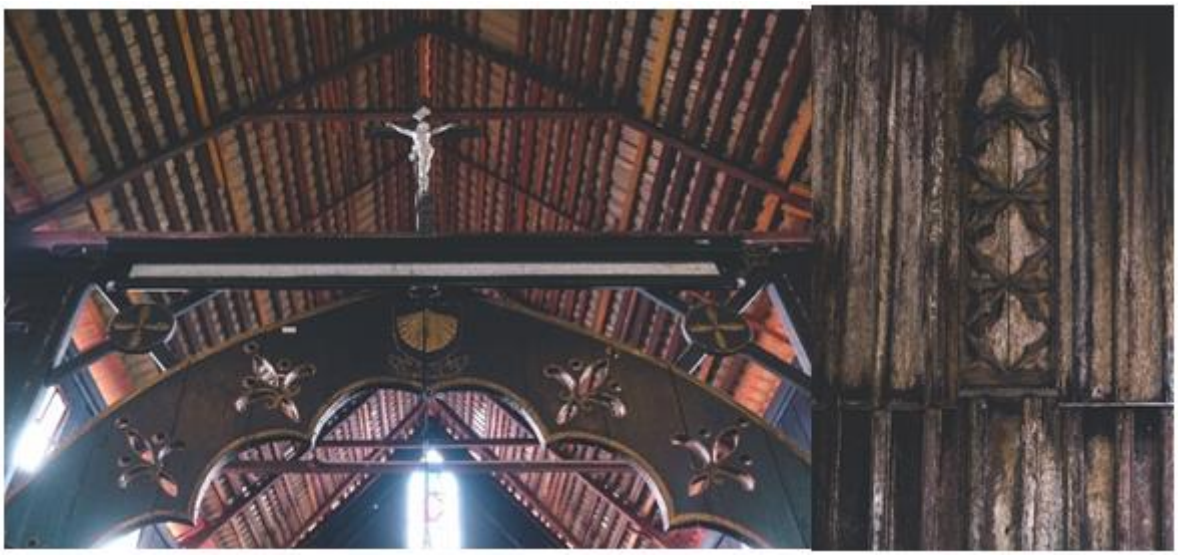

Fig. 11: Crafted Timber Ornaments (Left) & Bidayuh Motifs Window Panel (Right) of St. James Church, Kampung Quop

Fig. 12: Crafted Timber Altar of St. James Church, Kampung Quop

Passive Design

La Roche (2001) pointed out that climate-responsive building design is significant as it provides thermal comfort and energy saving for occupants thus, sustaining precious resources. The passive design of the St. James Church takes thoughtful architectural consideration to the local tropical climate that maximizes environmental conditions to achieve thermal comfort, energy efficiency, and sustainability. There are a few key elements in the

passive design of St. James Church to be discussed in this study which are natural cross ventilation, shading devices, and daylighting.

1. Natural cross ventilation

Natural ventilation as defined by N.A.M. Al-Tamimi (2011), is the intended current of outdoor air through apertures that can mitigate the heat and remove relevant humidity by taking the wind and thermal pressure into account in the tropical climate. It is crucial to have natural ventilation in a tropical climate country. To allow for the unrestricted movement of air throughout the room, the design includes elements like big windows, louvers, and well-placed openings. Cross-ventilation improves air circulation and fosters comfort and coolness by arranging openings on opposing sides of the church. Large timber louver windows opening for natural cross ventilation were designed as shown in Figure 13. The church's double gable roof design acts as an important element in creating a stack ventilation effect to direct out solar heat gain and heat produced by human activities in the building at high ceiling space and discharge out through the high window and roof gap while cooling air remains at ground level for maximum thermal comfort.

Fig. 13: Large timber louvers window opening for natural cross ventilation of St. James Church, Kampung Quop

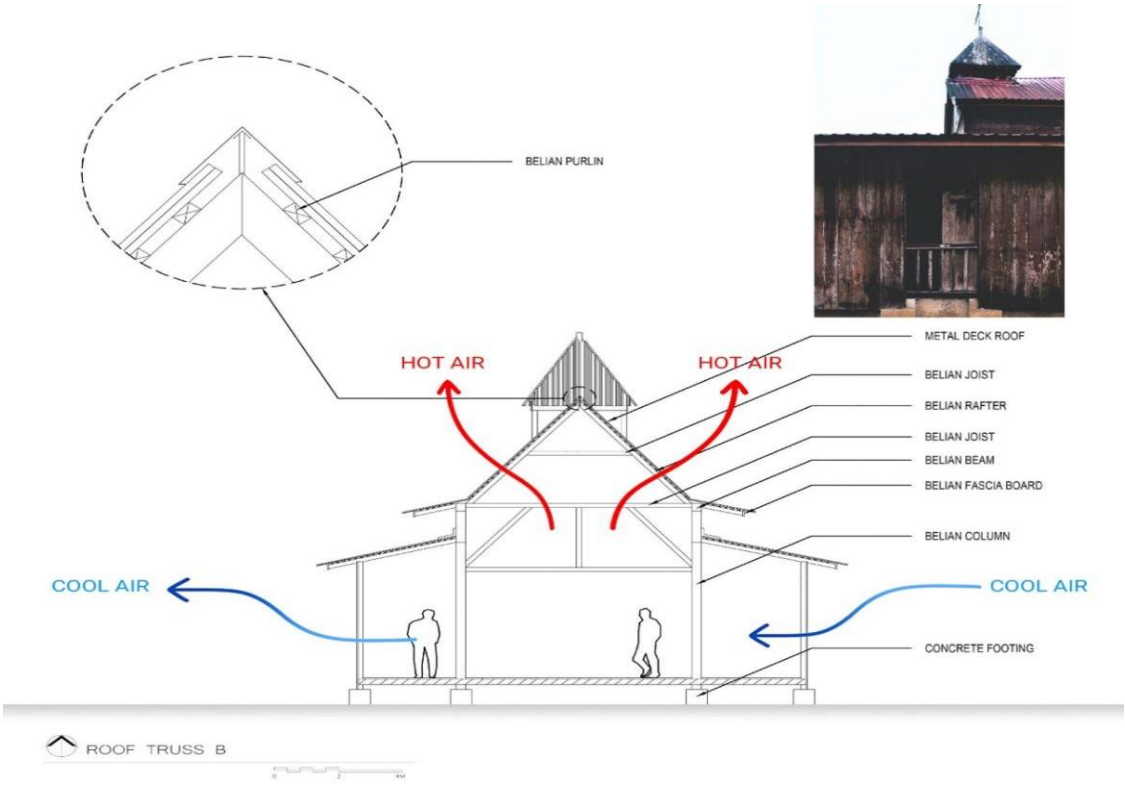

Fig. 14: Cross section showing natural stack and cross ventilation of St. James Church, Kampung Quop

2. Shading devices

Toe & Kubita (2015) recommended constant low roof eaves alongside the window top and strategically locating broadleaf trees that are taller than the building height to shade the building. Effective shade is needed due to the intense sunshine in the tropics. The church's external shading systems, eaves, and overhangs are designed to shield it from direct sunshine. In addition to lowering heat gain, this produces shaded outdoor areas that are suitable for gathering activities.

Fig. 15: Overhang eaves design of St. James Church, Kampung Quop

3. Daylighting

Mettanant & Chaiwiwatworakul (2014) also declared that natural daylighting via board windows maintains the required indoor illuminance for buildings in the tropics and this can save energy from reduced usage of artificial lighting. The daylighting strategies applied in St. James Church such as the high clerestory window are integrated to allow maximum natural daylight to enter the building interior to reduce the reliance on artificial lighting during the day. The gap between the double gable roof is also utilized for the diffusion of natural daylight into the roof space and reflects into the interior spaces to avoid glare and visual discomfort.

Fig. 16: High Clerestory Window of St. James Church, Kampung Quop

CONCLUSION

In the realm of architectural preservation and historical scholarship, the importance of measured drawings for a historical church cannot be overstated. As a custodian of local heritage, St. James Church is responsible for the safeguarding of objects and archival records that chronicle the religious and cultural past of the community for future generations. These meticulously crafted records serve as indispensable tools, offering a window into the past that is crucial for understanding, conserving, and appreciating the architectural heritage of these sacred site.

In general, measured drawings provide a detailed and accurate representation of the physical dimensions, intricate details, and structural complexities of historical buildings. They capture the essence of the original design intent, documenting every facet of the building with precision. Such meticulous documentation is invaluable for preservation efforts, serving as a comprehensive reference for architects, conservators, and historians tasked with maintaining the integrity of these revered structures.

Limited information was obtained due to the limited sources available, as there was no comprehensive documentation. Thus, the information was collected from internet news and interview. Measured drawings at St James Church play a vital role in the restoration process. By providing a clear understanding of the building's original form and construction techniques, they enable preservationists to make informed decisions about repair, replacement, and conservation treatments. Whether addressing structural deficiencies, restoring decorative elements, or recreating missing components, measured drawings serve as indispensable guides, ensuring that restoration efforts remain faithful to the building's historical authenticity.

Moreover, measured drawings facilitate scholarly research and architectural analysis, offering insights into the cultural, social, and religious contexts in which these churches were constructed. Through the study of architectural plans, elevations, and sections, researchers can unravel the stories embedded within these sacred spaces, exploring their significance as religious monuments, cultural artifacts, and architectural achievements.

In essence, measured drawings for historical churches serve as a bridge between past and present, connecting us to the rich tapestry of human history and cultural heritage. By preserving these architectural treasures through meticulous documentation, we not only honor the craftsmanship of the past but also ensure that future generations can continue to marvel at the beauty and significance of these timeless landmarks. Thus, investing in the creation and preservation of measured drawings is not merely an act of preservation but a commitment to safeguarding our shared cultural legacy for posterity.

ACKNOWLEDGEMENT

The fieldwork was carried out by third-year students from the University of Malaysia Sarawak (UNIMAS), under the supervision of Ar. IDr. Mervyn Wong Hsin Jyi as shown in the picture below. Furthermore, we express our appreciation to our photographer, Chiam Xin Ru, for her outstanding contributions.

REFERENCES

1. Devi, I.A.R., Vijayalaxmi, J., & Srikonda, R. (2023) The Diversity of Street Trees: Density, Composition and Shade in the Urban Residential Areas of Visakhapatnam, India. *ISVS e-journal*, 10(3), pp. 146-162.
2. Burgess, H.J. 1958. Strength Grouping of Malaysian Timbers. Malayan Forest Service Trade Leaflet No. 25. The Malaysian Timber Industry Board and Forest Research Institute Malaysia, Kuala Lumpur. 15 pp.

3. Toe, D. H. C., & Kubota, T. (2015). Comparative assessment of vernacular passive cooling techniques for improving indoor thermal comfort of modern terraced houses in hot–humid climate of Malaysia. Solar Energy, 114(0), 229-258.
4. Al-Tamimi, N. A. M., Syed Fadzil, S. F., & Wan Harun, W. M. (2011). The effects of orientation, ventilation, and varied WWR on the thermal performance of residential rooms in the tropics. Journal of Sustainable Development, 4(2), p142.
5. Mettanant, V., & Chaiwiwatworakul, P. (2014). Automated Vertical Blinds for Daylighting in Tropical Region. Energy Procedia, 52(0), 278-286.
6. La Roche, P. (2001). Keeping Cool: Principles to avoid Overheating in Buildings: PLEA, Passive and Low Energy Architecture International.