

Material Authenticity and Typological Degradation of Shophouse and Temple Structures in Pecinan Pasar Lama Tangerang, Indonesia

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Abstract

Pecinan Pasar Lama Tangerang contains a significant group of historic shophouses and Chinese temples that have developed through a long period of occupation and adaptation. This paper examines the condition of their material and structural fabric, with particular attention to differences between commercial shophouses and temples. Rather than focusing only on changes to the urban area or building façades, the study looks at the buildings themselves and examines four aspects of their physical fabric: roof and ridge construction, wall materials and finishes, structural connections, and ventilation details.

A purposive survey was conducted on nine buildings, consisting of three *temples* and six shophouses. The buildings were assessed using four categories of material authenticity: Original, Repaired-in-kind, Substituted-compatible, and Substituted-incompatible. The results show a clear difference between the two building types. The temples generally retain their original materials and construction details, while the shophouses have experienced more extensive changes, particularly in their structural frames and wall finishes. The replacement of teak members with light-gauge steel and the covering of exposed brick walls with ceramic tiles were among the most noticeable changes in the commercial buildings. Changes to traditional ventilation details were also common in shophouses that had been converted for commercial activities.

Based on these findings, the paper proposes a four-tier authenticity classification and several retrofit principles that can be applied while maintaining the original construction character of the buildings. The approach is intended to support future conservation work in historic Sino-vernacular districts where commercial activities continue to put pressure on existing building fabric.

Keywords material authenticity; building typology; shophouse; Chinese temple; Sino-vernacular architecture

1. Introduction

Pecinan Pasar Lama Tangerang is a historic Sino-vernacular district characterized by narrow-frontage shophouses and Chinese temples. The area has been continuously occupied since the late seventeenth century and has undergone considerable changes as its commercial and social functions have developed. Previous studies have mainly discussed these changes at the urban scale, including spatial transformation and the changing

role of the district within the city [1–3]. Less attention, however, has been given to the physical condition of the buildings themselves, particularly their structural and material fabric.

Changes in the use of historic buildings do not necessarily affect only their appearance. Alterations may also extend to structural members, roof systems, wall materials, connections, and ventilation features. A façade survey may reveal that a building still appears historic, while important parts of its original construction may already have been removed or replaced. For conservation purposes, these two situations should not be treated in the same way.

For example, a building that still retains its original teak structural frame but has received a new coat of paint presents a different conservation condition from a building in which the original timber

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structure has been replaced by light-gauge steel and the original brick walls have been covered with ceramic tiles. The visible appearance of the two buildings may still suggest historical continuity, but their levels of material authenticity are substantially different.

This study therefore examines the material and structural condition of shophouses and temples in Pecinan Pasar Lama Tangerang. The study has three main objectives. First, it develops a building-level fabric survey that can be applied to Sino-vernacular shophouse and temple districts. Second, it examines the extent to which original materials and construction systems have been retained or replaced in the selected buildings. Third, it develops a four-tier classification that can be used to identify different conservation conditions and guide future intervention.

2. Building Typologies under Study

2.1. The Shophouse System

The shophouses in Pecinan Pasar Lama generally has a narrow frontage, approximately 3–5 m wide, with a relatively deep plan. The depth-to-width ratio is generally around 3:1 to 4:1. Historically, this arrangement accommodated both commercial and domestic activities, with the commercial area facing the street and residential functions located further toward the rear [4].

Traditional construction relied largely on teak post-and-beam structures combined with fired clay-brick infill. The brick walls were either left exposed or finished with lime plaster. Clay tiles were commonly used for the roof, including curved ridge elements influenced by Chinese architectural traditions. Ventilation was supported by openings and stacked-brick ventilation courses located above doors and windows. These features served both climatic and cultural functions, responding to the tropical environment while reflecting traditional principles of building orientation and airflow.

Many of these elements have changed as the buildings have adapted to contemporary commercial uses. In particular, changes associated with food-and-beverage businesses have introduced new structural materials, wall finishes, glazing, and mechanical air-conditioning systems.

2.2. The Temple System

The temples follows a more formalized architectural arrangement. Its characteristic features include multi-level curved roofs, ceramic roof ornaments, and a sequence of spaces extending from the forecourt toward the inner sanctum. The curved roof form, or *nok bergelung*, also contributes to the visual hierarchy of the sacred building.

The structural system generally uses teak members, while foundations are constructed from stone or brick. Ceramic materials are also prominent on important façades and ornamental elements [5].

Compared with the *shophouses*, alterations to temples buildings tend to be more restricted. Religious practices and community involvement influence decisions concerning repairs and modifications. As a result, the temples provide a useful comparison for examining the degree of material change that has taken place in the commercial buildings of the district.

3. Methods

The survey was conducted in 2025–2026 and covered nine buildings: three temples: Boen Tek Bio, Boen San Bio, and Boen Hay Bio, and six shophouses. The sample was selected purposively based on three considerations: building age, location, and accessibility for visual inspection.

The selected buildings were generally constructed before 1950, based on archival information and information obtained from local informants. Three shophouses were located along the main commercial corridor of Jalan Kisamaun, while another three were situated along secondary streets, namely Jalan Cilame and Jalan Bhakti. Accessibility was also considered because the assessment required visual inspection of structural and material conditions.



Fig.1. Boen Tek Bio (Source: Observation, 2026)



Fig.2. Boen San Bio (Source: Observation, 2026)

Four physical indicators were used in the assessment: (1) roof and ridge construction; (2) wall material and surface finish; (3) joinery and structural connection systems; and (4) ventilation details.

Each indicator was classified into one of four material-authenticity conditions. Original refers to material and construction methods that remain substantially unchanged. Repaired-in-kind refers to replacement or repair using materials and methods similar to the original. Substituted-compatible refers to a different material that remains compatible with the original construction logic, while Substituted-incompatible refers to a material or construction method that significantly differs from the original system.



Fig.3. The Map of Pecinan Pasar Lama Tangerang on the banks of The Cisadane River (Source: Google Earth, 2026)

4. Results

4.1. Comparative Material Condition: Shophouses and Temples

The survey indicates a noticeable difference between the material condition of the temples and that of the shophouses. At least two of the three surveyed temples retained original or repaired-in-kind conditions across the four indicators. In contrast, material substitution was more common among the shophouses, particularly those located along the main commercial corridor.

The most substantial changes were found in the structural connections of the primary-corridor shophouses. Original timber members had frequently been replaced or supplemented by steel framing. Wall surfaces and ventilation details had also been modified as buildings were adapted to contemporary commercial requirements.

Table 1. Aggregated fabric-survey results by typology (n = 9)

Indicator	Temples (n=3)	Shophouses, primary (n=3)	Shophouses, secondary (n=3)
Roof / ridge	Original (2/3); Repaired (1/3)	Incompatible (2/3); Compatible (1/3)	Repaired (2/3); Compatible (1/3)
Wall material	Original (3/3)	Incompatible (3/3) - tile/brick	Compatible (2/3); Original (1/3)
Joinery / connection	Original (2/3); Repaired (1/3)	Incompatible (3/3) - steel/teak	Incompatible (1/3); Repaired (2/3)
Ventilation	Original (3/3)	Incompatible (2/3); Repaired (1/3)	Original (1/3); Repaired (2/3)

4.2. The Teak to Steel Transition

The most significant structural change identified in the survey was the replacement of teak framing with light-gauge steel in the primary-corridor shophouses. All three sampled shophouses along this corridor had experienced either partial or substantial replacement of their original teak post-and-beam members.

The steel framing was generally introduced during conversion of the buildings for food-and-beverage activities. From a practical standpoint, the material offers resistance to termite damage and can accommodate contemporary construction requirements. However, its introduction changes the character of the original structural system. The original timber frames were designed around timber connections, including

tenon-and-mortise joints, whereas the new steel framing follows a different structural and visual logic.

The replacement also affects the visibility of carved teak elements that formed part of the original architectural character. This condition was not found in the surveyed temples, where damaged timber members were repaired using teak with profiles corresponding to the original elements.

4.3. Façade Cladding and Ventilation

Another recurring change was the application of ceramic tiles over existing brick walls. This treatment was found in two-thirds of the primary-corridor shophouses sample. Although ceramic cladding can theoretically be removed, it conceals the original brick coursing and details associated with the building's construction period.

The changes were also visible in the ventilation system. Original stacked-brick ventilation courses above doors and windows had been sealed in several of the commercial buildings. These openings were replaced by fixed glazing and, in some cases, mechanical air-conditioning systems. Such modifications were particularly evident in shophouses converted for food-and-beverage activities.

The pattern suggests a relationship between increasing commercial use and the gradual loss of passive-ventilation features. The changes therefore involve more than the appearance of the façade; they also affect building elements that originally contributed to environmental performance.

4.4. Ornamental Fabric and Symbolic Materiality

The material character of these buildings is also expressed through their ornamental elements. In the temples, carved teak panels with dragon and phoenix motifs, *chien nien* ceramic mosaics, and Chinese-character inscriptions form part of the religious and symbolic environment of the buildings [9].

The *chien nien* technique, which uses ceramic fragments embedded in mortar to create figurative compositions, was found in all three surveyed temples. These elements have remained relatively well preserved, partly because their religious significance

encourages their continued maintenance.

The situation is different in the shophouses. Original carved teak lintel brackets, lattice ventilation panels, and traditional shop-front inscriptions have been lost or altered in several buildings. Lintel brackets were absent or had been replaced by plain timber boards in four of the six surveyed shophouses. Traditional lattice ventilation panels remained in only one secondary-lane shophouses that had not undergone extensive commercial conversion.

These elements should not be viewed only as decoration. The original ventilation panels also provided shading at the wall-to-eave junction. Their removal therefore changes both the appearance and the environmental behaviour of the upper part of the building.

The difference between the two building types points to the importance of community custodianship. Buildings that remain under religious and community management appear to have experienced less alteration to their original material and ornamental fabric. This suggests that conservation in active commercial districts cannot rely solely on technical repair; the way buildings are managed and valued by their users also has an important role.

4.5. Discussion: Conservation Implications of Typological Divergence

The findings are consistent with previous studies of adaptive reuse, which have shown that functional changes do not necessarily require the loss of a historic building's principal character [6][7]. However, the observations in Pecinan Pasar Lama indicate that commercial adaptation can extend beyond the interior and façade.

In the surveyed shophouses, changes have reached the structural frame, ornamental components, wall surfaces, and ventilation systems. This is important because guidelines that focus mainly on façade preservation may overlook changes taking place deeper within the building fabric.

The difference between temples and shophouses is also consistent with the broader pattern reported in Sino-vernacular districts in Southeast Asia, where temple buildings often retain more of their historic fabric than commercial shophouses [11]. In Pecinan Pasar Lama, the change appears particularly pronounced along the primary commercial corridor.

The survey indicates that the replacement of teak

framing by steel has occurred predominantly since around 2010. If this pattern continues, further changes to the original construction system may become increasingly difficult to reverse. The findings therefore support the need for more detailed controls on material substitution and renovation work in historic commercial buildings.

5. Four-Tier Authenticity Classification

Based on the survey, four levels of material authenticity are proposed. The classification considers not only the visual condition of the buildings but also the condition of their structural and material systems.

The purpose of this classification is to provide a practical way of distinguishing buildings that require different levels of intervention. Buildings in Tier A generally require preventive maintenance, while Tier D buildings require greater attention because incompatible structural substitutions may result in permanent loss of original construction technology.

Table 2. Proposed four-tier material authenticity classification

Tier	Criteria	Cases	Action
A High	$\geq 3/4$ Original/ Repaired; frame intact	3 temples; 1 shophouses	Preventive maint.; teak repair
B Moderate	$2/4$ Original/ Repaired; partial subst.	2 shophouses (sec.)	Targeted repair; reversible retrofit
C Compatible	Substitution, compatible logic	1 shophouses (prim.)	Accept; guideline at next change
D Incompatible	Incompatible $\geq 2/4$ incl. frame	2 shophouses (prim.)	Priority retrofit; restrict change

6. Technical Retrofit Guidance

For buildings classified as Tier C and Tier D, future interventions should accommodate contemporary use without unnecessarily removing the remaining historic fabric. Four principles are proposed.

First, structural frames. Where light-gauge steel has already been installed, it may be retained in less visible areas such as rear additions or mezzanine structures. At street-facing bays, however,

replacement or exposed bracing in solid timber should be considered where feasible, using profiles and connection details compatible with the original members. Steel may still be used as concealed reinforcement where structurally necessary.

Second, wall cladding. Ceramic tiles applied directly over historic brick should preferably be removed from principal street-facing façades during future renovation cycles. Their retention may be considered on side or rear elevations where the original wall is not visually prominent.

Third, ventilation. Original stacked-brick ventilation courses above doors and windows should be retained or reinstated wherever possible. Mechanical air-conditioning can still be accommodated, provided that its installation does not require the permanent sealing or removal of significant original ventilation features.

Fourth, documentation. Further structural alterations should be preceded by measured drawings or photogrammetric documentation of the remaining original fabric. Such documentation would provide a record for future maintenance and restoration and would also strengthen the authenticity register developed through this study.

7. Conclusions

The survey demonstrates a clear difference in the condition of historic material fabric between the temples and shophouses of Pecinan Pasar Lama Tangerang. The surveyed temples generally retain a higher level of material and structural authenticity, while the shophouses—particularly those along the main commercial corridor—have experienced more extensive changes.

The most significant alterations involve the replacement of teak structural members with light-gauge steel, the covering of original brick walls with ceramic tiles, and the loss or modification of traditional ventilation details. These changes are closely associated with the adaptation of the buildings to contemporary commercial activities.

The four-tier classification developed in this study provides a practical basis for identifying different levels of intervention. Buildings with high authenticity can primarily be managed through preventive maintenance and appropriate timber repair, while buildings with incompatible structural substitutions require more careful intervention and greater control

over subsequent alterations.

The study is based on a nine-building sample and therefore does not represent the complete building stock of Pecinan Pasar Lama. Further research should expand the survey to cover the wider shophouse population and combine visual assessment with non-destructive structural testing. Such work would help verify the condition of existing joints and structural members and provide a stronger basis for future conservation decisions.

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