

Article

A Comparative Study of the Conservation and Sustainable Renewal of Arcade Buildings in Four Lingnan Cities

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Abstract

Against the background of China's large-scale, fast-paced, and uniformly constructed urban renewal, Lingnan arcade buildings are confronted with unprecedented conservation challenges, a contextual feature that endows this research with unique academic value in the international arena. Drawn from the authors' practical participation in a government-led arcade conservation project in Zhao'an, three pragmatic research gaps unaddressed by existing theories are identified. Through a systematic comparative analysis of conservation and sustainable renewal models, as well as specific adaptive reuse cases of arcade buildings in four representative Lingnan cities, Macao, Hong Kong, Guangzhou and Shantou, three targeted recommendations corresponding to the aforementioned dilemmas are proposed to inform future practices: 1. Arcade conservation practices should not be restricted to superficial facade restoration. Instead, a well-defined intervention framework shall be established prior to the implementation of any conservation works. 2. Sufficient emphasis shall be placed on the material and structural authenticity throughout the design and construction phase. 3. A sustainable long-term operation mechanism shall be formulated post restoration to facilitate the revival of the inherent vitality of arcade buildings.

Keywords: arcade buildings; conservation techniques; sustainable renewal; comparative case study; adaptive reuse



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1. Introduction

Arcade buildings are a common form of tangible cultural heritage in Asian cities, a significant part of Chinese modern urban history [1–4], and crystallization of the inclusive Lingnan culture. South China, Singapore, and Malaysia are among the main distribution areas of this historic architecture. Historical studies suggest that Chinese traditional arcade buildings developed from the late nineteenth to the early twentieth century. Furthermore, they were shaped by the subtropical climate of Lingnan, local building traditions, Western veranda-like architectural forms, and the increasing use of reinforced concrete technology at that time [5–7]; moreover, they developed through cultural exchange and adaptation under different administrative circumstances as well as periods of external administration. They created forms, layouts, ornamentation and craftsmanship with distinctive Lingnan style [8], integrated commercial, residential, and pedestrian functions, formed continuous streetscapes and historic urban districts, and emerged first through bottom-up vernacular

construction and later were promoted through top-down government policies. As a result, this type of heritage comprehensively reflects the representative urban process of modern cities in Lingnan: urbanization formed by the intertwined effects of urban architecture, port trade, and commercial development [9].

The adaptive reuse of historic buildings is beneficial for urban sustainability and has been recognized by scholars in different countries [10–14]; the conservation and sustainable renewal of arcade buildings in Lingnan Cities today is different from counterparts in Singapore and Malaysia. China's rapid economic development requires that these works have to be coordinated with the process of rapid urbanization. Most surviving Lingnan arcade buildings are located in historic districts. Large-scale urban renewal has not only brought about a great deal of practical needs but also triggered fierce social disputes [15], brutally revealing that current theories are still unable to adequately address the complex reality caused by the excessive differences in attributes such as the volume, location, and function of local arcade buildings. The aforementioned conditions determine that the adaptive reuse of Lingnan arcade buildings cannot remain as comparatively intact as those in Singapore and Malaysia [16–19], which have leading positions in this academic field.

The core questions of this study are raised from a practical project the author Li was involved in: the conservation and sustainable renewal of Zhongshan Road arcade street in Zhao'an County, Fujian province. Under the strong support of the national government for local economic construction, Zhao'an has only recently been lifted out of poverty, and the relative undertakings of its arcade buildings remain at an early stage. In this practice, the design team faced several typical Chinese circumstances, e.g., the tight construction schedules of government-led district-scale projects; the apparently acceptable partial repair of existing defects in the detailed inspection and overall implementation; the difficulties for designers in following up projects from a different city during the middle and later stages; and the protracted negotiations over the ownership of individual arcade buildings. By thoroughly reviewing the theoretical literature to seek practical guidance, we extracted three aspects of the current theory that urgently need improvement from the above situation:

1. What factors determine whether arcade buildings are conserved, repaired, or adaptively reused?
2. How do different projects balance structural safety, material authenticity, and the identifiability of new interventions?
3. What kinds of operational models support sustainable renewal after restoration?

The comparative analysis of representative cases is the key research method of this study, and Macao, Hong Kong, Guangzhou and Shantou's systematic models of the conservation and sustainable renewal for arcade buildings were chosen as the comparison objects given their exemplary leading positions in both academic and professional fields of Lingnan arcade buildings. All four places belong to the broader Lingnan arcade building system and share a historical relationship with maritime trade, commercial streets and modern municipal road development, while also representing different historical and administrative trajectories. These differences shaped distinct approaches to urban development, building control, ownership and conservation. Guangzhou and Shantou contain relatively large and continuous arcade building stocks, whereas Macao and Hong Kong have fewer surviving examples but more visible legal, institutional and project-based conservation records [20,21]. Rather than comparing the four cities solely from a macro-planning perspective, this study combines their historical and institutional contexts with selected project cases as the basis for comparative analysis. It examines how each city has addressed practical shortcomings in the conservation, repair, and sustainable renewal of arcade buildings. Details of the project cases are provided in Supplementary Table S1. Consequently, corresponding to the three aforementioned issues, three targeted strategic recommendations are formulated to

provide reference for the future conservation and sustainable renewal of arcade buildings in the Lingnan region.

What should be mentioned here is that Zhao'an historically formed part of the Lingnan region, although it belongs to Fujian Province under the current administrative division. The geographical location, local culture and customs, and the style of arcade buildings along Zhongshan Road remain closely related to the Lingnan rather than Minnan area [22,23]. Figure 1 shows the geographical distribution of the Lingnan region and the provincial areas relevant to this study [24].

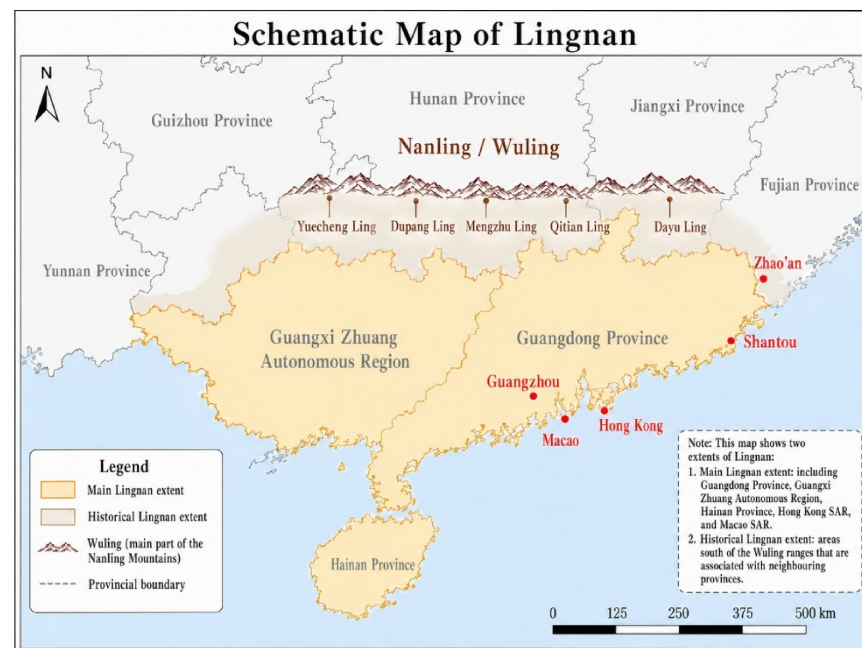


Figure 1. A schematic map showing the location of Lingnan and the four cities. Source: drawn by the authors; base map and provincial boundaries adapted from the Standard Map Service of the Ministry of Natural Resources of the People's Republic of China; historical Lingnan extent and Nanling/Wuling reference interpreted from *Records of the Grand Historian: Basic Annals of Qin Shi Huang* and *A Brief Account of the Historical and Geographical Characteristics of Lingnan* [25,26].

2. The Historical and Institutional Contexts of Arcade Building Conservation in the Four Cities

This section does not aim to provide a comprehensive urban history of the four cities. Instead, it outlines their historical and institutional backgrounds from the perspectives of arcade building formation, building control, and conservation systems. Macao, Hong Kong, Guangzhou, and Shantou all belong to the modern commercial urban development system of Lingnan and South China. However, they differ significantly in administrative trajectories, urban renewal pressures, ownership structures, and conservation mechanisms. These differences provide the basis for the following comparison of the grounds for conservation intervention, repair methods, and reuse models of arcade buildings.

2.1. Macao: Arcade Heritage Conservation in a Multicultural Context

Since the Portuguese first entered and settled in Macao in 1553, and particularly after the signing of the Sino-Portuguese Treaty of Peking in the thirteenth year of the Guangxu reign of the Qing dynasty (1887), Macao's built environment during the period of Portuguese administration developed through the juxtaposition and integration of Chinese and Western architectural traditions. Created through the combined efforts of local residents as well as architects, missionaries, and artists from different parts of the world,

the buildings left from this period were not simple copies of Western culture. They also incorporated features of Southeast Asian and Lingnan architecture, forming distinctive historical and cross-cultural products [27,28].

Since the 1980s, Macao's economy has been supported by four major sectors: tourism, export processing, construction and real estate, and financial services. After the government liberalised the gaming market in 2001, tourism and gaming became the leading industry, followed by the construction sector. The gaming industry brought Macao into a highly commercialised stage of development, which differed significantly from the GDP-driven development paths of Hong Kong and mainland cities. Local residents and the government gained substantial economic benefits, and many cultural heritage conservation projects also received relatively sufficient financial support. Many of the Macao arcade building cases discussed in this paper were constructed between the 1910s and the 1940s. As shown in Table S1, the selected cases mainly reflect the early twentieth-century commercial development of Macao.

For arcade buildings, this background gave them not only the everyday functional character of Lingnan commercial-residential buildings, but also hybrid features shaped by Southern European decoration, Southeast Asian climatic adaptation, and the demands of local commercial streets [29,30]. Macao's arcade buildings and related commercial-residential buildings are mainly embedded within high-density, small-scale historic streets and lanes. Their urban form has long been shaped by port trade, commercial activity, and local ways of life (Figure 2).



Figure 2. “A Sailor in Macao: A 1903 Travel Album” (published by the Macao Maritime Museum), Buildings along Macao’s Inner Harbour in 1903.

In terms of the conservation system, Macao gradually established a framework for the effective protection of cultural relics and historic monuments. In the 1950s, protection work was mainly limited to the registration of architectural monuments. In the 1960s, a specialised group was established to formulate cultural heritage conservation strategies, and the government issued its first relevant decree in 1976. In 1982, the Cultural Affairs Bureau (IC) was established to implement cultural and heritage policies. In 1984, the decree on the Protection of Historical Relics was promulgated, introducing differentiated conservation measures for different categories of heritage for the first time. In 1992, the

category of “Buildings of Architectural Interest” (BAI) was added, forming the current five-category heritage classification system [31].

On the basis of the officially published heritage protection list, Macao has carried out regular repair and restoration works. In 2001, the Heritage Environment Management Committee was formally established, bringing together statutory bodies, non-statutory organisations, and stakeholders involved in heritage and urban management. In 2005, the Historic Centre of Macao was inscribed on the World Heritage List, further raising public awareness of the conservation value of historic districts and architectural heritage [32]. Subsequently, the Cultural Heritage Protection Law (Law No. 11/2013) came into force in 2014, with the Department of Cultural Heritage under the Cultural Affairs Bureau assuming responsibility for policy implementation and conservation management [33].

2.2. Hong Kong: Arcade Building Conservation Under Real Estate-Led Redevelopment Pressure

The Hong Kong cases discussed in this study also belong mainly to the early twentieth-century development of tong lau and related commercial–residential buildings. They were a common type of mixed commercial–residential building in modern Hong Kong. Some featured verandahs, balconies, or covered pedestrian spaces on the second floor and above. Later, under the pressures of increasing housing demand and rising urban density, the upper floors were often subdivided into rental units (Figure 3).



Figure 3. View of Queens Road, Victoria, 1890s. Source: LCUSZ62-120618, Prints and Photographs Division, Library of Congress, Washington, D.C.

The formation of tong lau in Hong Kong was closely related to the land system, building regulations, public health requirements, and high-density commercial development during the period of British administration in Hong Kong. Existing studies suggest that tong lau were not simply “traditional Chinese dwellings”, but a hybrid building type shaped by the interaction of local Chinese building traditions, real estate investment, urban management policies, and building regulations [34]. This background helps explain why Hong Kong’s arcade buildings combined local residential and commercial functions while also being continuously affected by identity-related sentiment, high land values, redevelopment pressure, and the logic of property appreciation.

In terms of the conservation system, Hong Kong established a statutory monument and historic building assessment framework relatively early. The Antiquities and Monuments Ordinance came into force in 1976. In the same year, the Antiquities Advisory Board and the Antiquities and Monuments Office were established to undertake the protection of historic and archaeological sites and related administrative work [35]. In 2008, the Development Bureau launched the Revitalising Historic Buildings Through Partnership Scheme, which promotes the adaptive reuse of government-owned historic buildings through operation by non-profit organisations [36]. However, Hong Kong's conservation system coexists with intense pressure for urban renewal. Existing studies have pointed out that many traditional commercial-residential buildings in older districts face the risk of demolition during urban redevelopment, while adaptive reuse in government-led projects is often constrained by redevelopment plans, ownership arrangements, and social impacts [19]. Therefore, in this study, Hong Kong represents a model in which institutionalised conservation is relatively mature, but is also strongly affected by real estate-led renewal and high-density urban pressure.

2.3. Guangzhou: Large-Stock Arcade Streets and Government-Led District Renewal

Guangzhou is one of the cities in the Lingnan region with the most prominent stock of arcade buildings and the strongest continuity of arcaded streets. The construction and consolidation of Guangzhou's arcade streets were closely related to municipal road widening and commercial street development from the early twentieth century onwards, with many representative arcade buildings and streets taking shape during the Republican period, especially from the 1910s to the 1930s.

It was among the earliest cities in mainland China to respond to arcade building construction through urban planning in the early Republican period, and it occupied a leading position in the modern development history of arcade buildings. In 1912, during the period of Republican governance in Guangzhou, the Guangdong Provincial Police Department issued one of the earliest building technical regulations, the Regulations and Implementation Rules for Building Control, which included specific provisions for arcade buildings [37]. Since the modern period, the development of commercial streets, the widening of municipal roads, traditional commercial culture, and the architectural form of arcade buildings have jointly shaped the street spaces of Guangzhou's old city. Compared with Macao and Hong Kong, the conservation of arcade buildings in Guangzhou is characterised more by its large-scale building stock and district-scale governance. Current practice has not yet fully shifted towards the revitalisation of individual buildings, but remains largely at the stage of clarifying the relationship between arcaded streets, historic and cultural districts, and urban commercial culture [38].

Guangzhou began to explore the conservation of historic and cultural heritage in 1998. The Conservation Plan for Guangzhou as a National Famous Historical and Cultural City (2021–2035) and the Guangzhou Regulations on the Conservation of the Historic and Cultural City (revised in 2024) have established a street-level conservation framework, under which all arcaded streets are classified into three categories, together with a building-level grading and designation system that includes cultural relic protection units, historic buildings, historic and cultural districts, and buildings with traditional character. Meanwhile, the conservation planning of historic buildings in Guangzhou has gradually produced a relatively complete set of planning documents. Through control plans, conservation requirements, and technical documents for repair, these documents provide relatively clear guidance for the repair and adaptive use of historic buildings [39].

At the practical level, the renewal of arcade buildings in Guangzhou is often integrated with the conservation of historic and cultural districts, old-city regeneration, the upgrading

of commercial streets, and the improvement in public space. Arcade districts such as Enning Road, Beijing Road, and Shangxiajiu have already undergone upgrading works. The advantage of this approach lies in its ability to coordinate architectural character, public space, and commercial culture at the district scale. However, its risks are also evident. Some projects may tend towards façade-oriented renewal, display-based use, or short-term demonstration effects, while the genuine continuity of existing commercial life, ownership coordination, and long-term operation still require further examination. Therefore, in this study, Guangzhou represents a model characterised by a large building stock and rich experience in government-led district renewal, but one that also needs to guard against superficial repair and insufficient operational sustainability.

2.4. Shantou: Port–City Arcade Fabric and District-Scale Streetscape Restoration

The formation of arcade buildings in Shantou was closely related to modern port trade, overseas Chinese networks, and local commercial development. In 1921, Shantou established its municipal administration and began to prepare urban planning. The representative arcade buildings in the Xiaogongyuan port-opening area were mainly formed during the 1920s and 1930s, including the Aw Boon Haw Building, built in 1927, and Huilan Academy, built in 1934. Existing studies have pointed out that, since the mid-nineteenth century, with the opening of treaty ports and the rise of ocean-going trade, Shantou gradually developed from a coastal sandbank and local fishing and salt port into a modern city with international commercial value. Driven by chambers of commerce, investment from overseas Chinese communities, and local municipal improvement, Shantou formed an urban construction path characterised by self-organised trade [40]. Against this background, Shantou's arcaded districts are not only architectural heritage, but also spatial evidence of port commerce, overseas Chinese capital, and local urban modernisation.

The Xiaogongyuan port-opening area is the most representative area of arcade buildings in Shantou. Existing studies have pointed out that, by the 1930s, Shantou had formed one of the largest continuous groups of arcade buildings in mainland China, together with a radial pattern of arcaded streets that is rare in the country. This area has historical, social, cultural, and economic value [41]. As a witness to Shantou's history as a century-old commercial port, the Xiaogongyuan arcades reflect the distinctive urban image of the port-opening area and the traditional culture of Chaoshan. Unlike Guangzhou, where large-scale district governance is more prominent, Shantou is characterised by a highly concentrated spatial form of arcaded districts. Its radial street network and the core space of Xiaogongyuan together form a distinctive urban image.

In recent years, the Xiaogongyuan port-opening area in Shantou has undergone a renewal process centred on the restoration of historic character, cultural display, and tourism-oriented revitalisation. Existing studies also remind us that the conservation of historic districts should not only focus on visible architectural character, but should also address less visible contextual factors such as everyday life, local industries, and community use. Otherwise, after restoration, historic districts may shift from lived spaces into tourist-oriented historical landscapes [42]. Therefore, in this study, Shantou represents a model characterised by prominent overall character restoration and a highly recognisable spatial form of arcaded districts, while its subsequent operation, continuity of local life, and functional connection with the wider area still require further observation. Its experience helps respond to the third research question of this paper: how restored arcade buildings can maintain long-term use and public value.

3. Method

This study adopts a qualitative research approach to examine how arcade buildings can be conserved and sustainably renewed. The research focuses on real architectural cases and on the social significance of reusing historic Lingnan arcade buildings within the context of contemporary Chinese cities. The four cities were selected as representative cases in the Lingnan region. Multiple methods of data collection and analysis were used in order to develop a comprehensive understanding of the relevant issues and urban contexts. Through comparative case analysis, the study responds to the practical difficulties encountered by the authors in real conservation and renewal work. The case study integrates evidence from different sources, while the analytical process draws on the core logic of the ARP model, which evaluates buildings through multiple architectural dimensions.

This study connects this logic with both urban governance and the architectural fabric of arcade buildings. It first compares the four cities at the urban and institutional levels in order to clarify differences in development background, conservation mechanisms, and renewal trajectories. To ensure that the selected cases are not treated as isolated project descriptions, the four-city comparison is organised around three analytical dimensions corresponding to the research questions: conservation mechanisms and intervention triggers, repair strategies and intervention depth, and functional adaptation and operational sustainability. The detailed comparative criteria are shown in Table 1.

Table 1. Similarities and differences in the development of arcade buildings across four cities.

Research Question	Comparative Dimension	Case-Level Indicators	Evidence Used in This Study	Purpose of Comparison
RQ1. What factors determine whether arcade buildings are conserved, repaired, or adaptively reused?	Conservation mechanism and intervention trigger	Heritage designation; ownership structure; government involvement; redevelopment pressure; private initiative; charitable or institutional participation	Heritage grading; owner and operator information; policy documents; project records; case descriptions	To identify whether conservation is mainly driven by formal protection, public policy, private capital, social value, or redevelopment opportunity
RQ2. How do different projects balance structural safety, material authenticity, and the recognisability of new interventions?	Repair strategy and intervention depth	Structural reinforcement; façade retention; original material retention; reconstruction or replacement; reversibility; legibility of new additions; colour and surface treatment	Restoration descriptions; historical and current photographs; conservation reports; field observations; project documentation	To compare whether repair practices prioritise safety, visual continuity, material authenticity, or commercial redevelopment
RQ3. What kinds of operational models support sustainable renewal after restoration?	Functional adaptation and operational sustainability	Current use; operator type; public accessibility; continuity of original business or community function; commercialisation; vacancy risk; long-term maintenance	Operation period; reuse model; operator information; public accessibility; business model; case assessment	To evaluate whether restoration leads to sustained use, public value, local continuity, or merely symbolic/visual preservation

The primary research data and other sources of information were derived from a range of documents, archival records, field investigations, direct observation, participatory observation, and semi-structured interviews with operational staff in arcade buildings open to the public. These documents include policy documents issued by local governments, media reports, online articles, and academic publications. Historical records, maps, and photographs were obtained from local archives, libraries, county gazetteers, and online searches. The pre-restoration conditions of the arcade buildings were reconstructed through historical records and photographic materials. Supplementary Table S1 is not intended to provide an exhaustive description of each project. Instead, it records comparable information for each case, including project ownership, operational mode, reuse model, heritage designation status, and preliminary assessment results. These data form the analytical basis for the subsequent cross-project comparison.

In studying the arcade building cases in the four cities, the researchers adopted direct observation and participatory observation methods. Between 2019 and 2025, the researchers conducted direct observations of arcaded streets, selected arcade building cases in the four cities, and took photographs of architectural details after restoration. Combined with archival materials, these observations enabled a detailed comparison of the changes in the condition of the arcade buildings before and after conservation and repair, thereby demonstrating the sustainable design outcomes of historic arcade buildings under multiple forms of use. In addition, by participating in cultural heritage promotion programmes and art-related activities organised at the city and governmental levels in Macao and Hong Kong, the researchers were able to gain a deeper experiential understanding of the distinctive appeal of these arcade buildings after their reopening to the public.

The discussion and analysis of policies and strategies for the reuse of arcade buildings in this paper are based on semi-structured interviews with several groups, including operational staff involved in selected arcade building projects in the four cities, stakeholders in the Zhao'an practice project, architects with experience in similar projects, and local residents. Since these groups have different interests and expectations, they also hold different views. By organising and analysing these perspectives, the researchers aim to clarify the importance of coordinating multiple urban interests and public participation for the long-term sustainable operation of arcade buildings.

4. Comparative Analysis of Arcade Building Conservation and Sustainable Renewal

4.1. Conservation Mechanism and Intervention Trigger

As shown in Section 2, the different historical backgrounds of the four cities in Lingnan have shaped different opportunities for arcade building conservation and different timelines in the development of conservation systems. The conservation of arcade buildings should therefore not be judged solely by whether a building is included in a protection list. Instead, it should take into account architectural value, structural risk, ownership conditions, policy instruments, social function, and operational potential. For arcade buildings, which combine commercial, residential, public pedestrian, and streetscape functions, the rationale for conservation intervention should be based on an integrated assessment of heritage value, actual risk, implementing bodies, and subsequent use. The differences among the four cities are reflected precisely in the ways these triggering factors are combined.

Macao is often compared with neighbouring Hong Kong, which has commonly been regarded as a more economically and politically developed region [43]. The handover of Macao and the prospect of its inscription on the UNESCO World Heritage List strengthened local awareness of heritage conservation and led to a new trend, one core aspect of which was greater attention to the conservation of “Chinese architecture” and other traditional

architectural forms [44]. Another contributing factor was the development of the gaming industry. The highly commercialised urban development driven by this industry may appear to stand in contrast to Macao's image as a World Heritage city, yet the two have in practice reinforced each other. At the same time, the growth of tourism generated demand from developers for land to build hotels, casinos, and other supporting entertainment facilities.

Macao's limited land area, distinctive historical background, and relatively clear decision-making chain have contributed to its current conservation system, which combines local heritage management with an international outlook. As a result, arcade building conservation in Macao is characterised by relatively sufficient funding, a high degree of refinement, strong attention to authenticity, and small-scale reuse. Compared with Guangzhou and Shantou, the representativeness of the Macao cases discussed below does not lie in the scale of its arcade building stock. Rather, it lies in the smaller scale of its historic districts, the meticulous preservation of buildings, and the coexistence of multiple operational models, including public libraries, charitable medical services, cultural exhibitions, and hotel-related commercial use. These cases therefore provide typical examples for examining the public value and continued use of arcade buildings after repair.

Hong Kong's current heritage conservation policy has certain limitations, partly because public finance cannot cover all conservation needs. Against this background, the Revitalising Historic Buildings Through Partnership Scheme, hereafter referred to as the Partnership Scheme, was introduced to guide the adaptive reuse of historic buildings. Only buildings declared as monuments are legally protected, while historic buildings assessed under the three-tier grading system are not subject to the same statutory protection. Many historic buildings are privately owned. Under the Basic Law, private property rights are protected by law, meaning that the government cannot directly prevent or penalise owners for making alterations or carrying out demolition. In such cases, it can only negotiate the purchase of the site or propose land exchange arrangements.

Over the past few decades, a large number of arcade buildings have disappeared as a result of redevelopment. Nevertheless, among the smaller number that have survived, several arcade building projects have been conserved and sustainably renewed. Lui Seng Chun, which is a declared monument, was donated to the Hong Kong Government by its original owner. It first underwent basic repair works funded by the government, and was later granted to Hong Kong Baptist University under the Partnership Scheme after the university submitted a detailed revitalisation and operation proposal. It has since become a representative example of conservation and renewal in Lingnan, demonstrating a revitalisation pathway that combines government-owned heritage assets, institutional operation, and public service functions [45].

By contrast, the two Grade II historic building projects at 190–204 and 210–212 Prince Edward Road West, Mong Kok, and 600–626 Shanghai Street, Mong Kok, were acquired and led by the Urban Renewal Authority at substantial cost. Compared with declared monuments, these arcade buildings have less prominent decorative features and cultural value, and their renewal has focused more on adapting the buildings for commercial operation. In order to comply with modern fire safety and barrier-free access regulations, relatively substantial internal alterations were carried out. This indicates that whether a building is incorporated into an urban renewal project is an important condition affecting whether it can be retained and reused. Therefore, the conservation of arcade buildings in Hong Kong is promoted by heritage grading, government-led projects, and institutional operation, but is also constrained by land value, property acquisition, and the logic of old-district redevelopment. Its conservation system and intervention triggers are strongly shaped by the role of specific institutional actors, while also being more vulnerable to pressure from real estate-led urban renewal.

Guangzhou's arcade building conservation is characterised by government-led, district-scale renewal. Because the city retains a large and relatively continuous stock of arcaded streets, conservation intervention is usually not initiated through individual buildings alone, but is embedded within the broader agendas of historic district conservation, old-city regeneration, traditional-character building protection, and commercial street revitalisation. The selected cases reveal different intervention triggers. Tao Tao Ju Restaurant shows how continuing commercial use, established brand value, urban memory, and everyday consumption can support conservation. The Former Site of the Military Commission of the Guangdong–Guangxi Regional Committee of the CCP and the Memorial Hall of the former site of the CPC Guangdong Provincial Committee indicate that revolutionary historical value and public commemorative function can justify government-led repair and conversion into exhibition space. Nos. 217–225 Enning Road reflect the logic of pilot restoration within a wider district renewal process. However, the cases on Tongfu West Road and Nanhua West Road suggest that even when government intervention or custodial mechanisms are present, long-term use remains uncertain if operational models and ownership coordination are not clearly resolved.

Guangzhou's intervention basis therefore derives mainly from its multi-level conservation system, district renewal policies, and public cultural value. Its strength lies in the capacity to coordinate architectural character and public space at the street or district scale. Its limitation is that conservation goals may be reduced to façade improvement, environmental upgrading, or demonstration projects, while deeper issues such as original commercial continuity, ownership coordination, and operational sustainability remain insufficiently addressed.

Shantou's arcade building conservation is mainly driven by the overall restoration of the Xiaogongyuan port-opening area, the renewal of urban image, and the demand for cultural display. The transformation of the Aw Boon Haw Building from a private commercial building into an urban development exhibition space reflects an intervention logic centred on government-led repair and the representation of urban memory. The restoration and reuse of Huilan Academy further shows that the conservation of historic buildings depends not only on the value of the building itself, but also on the cultural positioning of the wider district and the introduction of subsequent public functions.

Similar to Guangzhou, Shantou's strength lies in its ability to restore the continuous streetscape of arcade districts through area-based conservation. However, compared with stand-alone revitalisation projects, district-scale renewal is more likely to face problems of weak operational continuity after restoration, the decline of existing commercial life, and the replacement of everyday local use by tourism-oriented consumption. The Shantou cases therefore suggest that area-based conservation can provide an important trigger for arcade building repair, but without stable operational bodies and the continuity of local life, the outcomes of restoration may remain at the level of image renewal.

4.2. Repair Approaches: Structure, Material Authenticity, and Recognisability

RQ2 concerns how arcade building repair can balance structural safety, material authenticity, and the legibility of new and old fabric. The cases from the four cities show that arcade building repair is not simply a matter of “restoring the old as old” or beautifying façades. Rather, different depths of intervention are shaped by conservation grading, ownership conditions, functional requirements, and construction capacity. Based on the selected cases, this paper summarises the repair approaches into five types: low-intervention repair, legible new interventions in adaptive reuse, district-scale character restoration, commercialised repair, and the risk of reconstruction-oriented repair.

The Macao cases show clear characteristics of refined repair and authenticity-oriented conservation. Projects such as Tak Seng On and the Former Opium House did not aim primarily at large-scale spatial restructuring, but maintained building use through public cultural and charitable medical functions. Patane Library sought to preserve three of the seven adjoining arcade buildings and developed specific repair solutions, allowing the complex to serve citizens as a fully open public library.

The focus of these projects was not to create new visual spectacles, but to continue the original building scale, interior spatial relationships, and everyday service functions within the historic district. Figure 4 shows Tak Seng On before and after repair, with the pre-restoration condition on the left and the post-restoration condition on the right. The repair work distinguished between old and new fabric and replaced decayed timber structures, making it a representative example of strict attention to material authenticity and the legibility of new and old interventions.



Figure 4. Before-and-after comparison of Tak Seng On. Source: a historical photograph displayed in the Tak Seng On Pawnshop Heritage Exhibition; information on the heritage status and conservation of Tak Seng On adapted from the Macao Cultural Heritage website [46]; current photographs taken by the authors during fieldwork.

The repair of Patane Library further demonstrates a commitment to refined conservation and authenticity. Because the Patane area is affected by seawater erosion and the humid, hot climate, architect Yip Kin Hung noted that the project needed to incorporate a Western damp-proofing and desalination system. As shown in Figure 5, a specially developed titration system was used to inject an inorganic silicate damp-proofing solution into the wall. This scientific method analysed the material composition and reproduced compatible mixtures based on the original materials, addressing two problems: crystallised salts in the deeper layers and on the surface of the walls, and the concealed limewash coating on the original building façade [47].

Hotel Central and Hotel Grande reveal another side of commercialised repair. The integration of building repair with hotel operation, cultural display, and tourism consumption can provide relatively stable operational funding, but it may also transform arcade history into a nostalgic consumption setting. The San Tung Fong Commercial Inn North Wing, formerly the Luk Kwok Hotel, further shows that when the original building fabric has been severely damaged, a project may retain the street interface while becoming closer to reconstruction-oriented renewal than conservation and repair in the strict sense. The Macao experience therefore suggests that low-intervention repair does not mean excluding

new functions. The key question is whether the new function respects the original spatial scale, material traces, and relationship with the historic district.



Figure 5. Before-and-after comparison of Patane Library. Sources: the before photograph reproduced from the official website of the Cultural Affairs Bureau of the Macao S.A.R. Government; the after photograph taken by the authors during fieldwork; the restoration schematic on the right redrawn by the authors based on Ye Jianxiong [47], pp. 136 and 138.

The Hong Kong case highlights the tension between adaptive reuse and compliance with modern regulations. The survey report for Lui Seng Chun indicated that its reinforced concrete structure was generally in good condition, and the government therefore carried out only basic repair works [48]. Under the Revitalising Historic Buildings Through Partnership Scheme, Hong Kong Baptist University subsequently submitted a sustainable renewal proposal and assumed the related costs, while the government was expected to save HK\$10,610,000 in renewal and operational expenditure [45]. As shown in Figure 6, in order to meet current building regulations for the proposed new use and additions, new structural steel beams were inserted beneath the floor slabs. On the basis of retaining the corner form, verandah characteristics, and historic architectural image of Lui Seng Chun, the project introduced functions related to Chinese medicine, exhibition, and public health. It therefore represents a repair pathway based on the preservation of major historic features together with legible new interventions required for adaptive reuse.

By contrast, URA-related projects such as those on Prince Edward Road West and Shanghai Street have enabled the retention and reuse of some arcade-style tong lau, but they also reveal the compromises involved in urban renewal. Under the requirements of modern fire safety, barrier-free access, commercial leasing, and district redevelopment, interior spaces and traces of former everyday life may be weakened to varying degrees. Existing studies have also noted that repair and conservation practices in Hong Kong tend to place greater emphasis on contemporary use requirements, whereas Macao is more inclined to restore historic buildings according to their original condition. The issue in Hong Kong is therefore not the absence of a conservation system, but how to prevent adaptive reuse from reducing arcade buildings to preserved external images while eroding their internal materials, spatial organisation, and social memory.



Figure 6. Before-and-after comparison of Lui Seng Chun. Source: conservation management plan and adaptive reuse planning drawings/images adapted from The Oval Partnership Ltd. et al. [45] and AGC Design Ltd. [48].

Guangzhou's repair approaches more clearly reflect planning control and technical management at the district scale. The value of Tao Tao Ju Restaurant lies in the mutual support between its continuing commercial function and architectural memory. Its repair did not transform the building into a purely exhibition-oriented space, but instead maintained its urban memory as a long-established restaurant. The two former CPC-related sites represent a stricter repair pathway led by heritage status and public commemorative function, with an emphasis on material authenticity, the expression of historical information, and public education. Guangzhou's advantage lies in its relatively detailed repair guidelines and methods for controlling value-bearing elements. In the government-issued Repair Guidelines for Historic Buildings in Guangzhou, repair measures can be identified through an index linking the condition of damaged value-bearing elements with corresponding interventions, including partial infill, patch repair, strengthening, cleaning, and removal. This guideline-based approach helps avoid one-size-fits-all repair. However, in actual renewal practice, it remains necessary to guard against reducing repair objectives to façade improvement, district image enhancement, or the display of demonstration projects.

Shantou is distinctive in terms of the large scale of repair, the number of construction packages, and the uneven quality of implementation [49]. In some cases, joints, inconsistencies, and construction differences were retained, becoming more legible than the original architectural fabric itself. This reflects the tension among the efficiency of large-scale construction, the discontinuity of traditional craftsmanship, conservation standards, and funding constraints.

As shown in Figure 7, the image on the left presents the conservation approach adopted in the first phase of the Xiaogongyuan arcade building project, while the image on the right shows three arcaded streets restored during the second and third phases. The repeated decorative motifs appear to have been produced using templates, and the colour and material treatment of the façade mortar also show a high degree of repetition. Although this approach may help achieve visual unity across the district, it risks compromising historical accuracy and reducing the conservation of individual buildings to a standardised treatment. Such an undifferentiated approach to decorative elements and building fabric is therefore not advocated here. Cases such as the Aw Boon Haw Building and Huilan Academy indicate that character restoration can strengthen the historical image of the district. However, building repair becomes more than visual renewal only when it is reconnected with specific functions, operational responsibilities, and local everyday life.

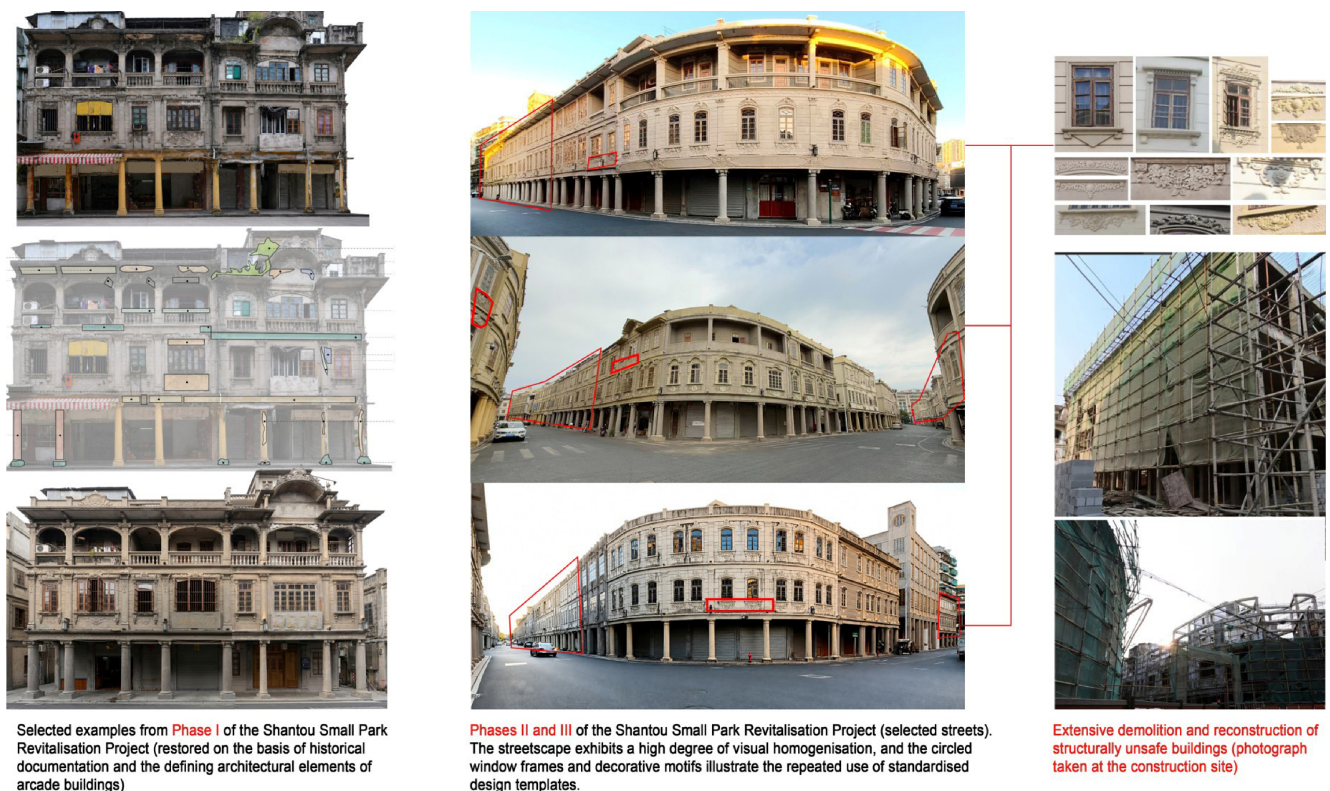


Figure 7. Before-and-after comparison of Xiaogongyuan arcade buildings. Source: photographs taken and compiled by the authors during fieldwork.

In summary, the cases from the four cities show that the key issue in arcade building repair is not to choose between “retention” and “renewal” as two opposing positions, but to determine an appropriate depth of intervention according to architectural value, structural condition, material integrity, and future use requirements. Macao demonstrates that adaptive repair and public service functions can be mutually reinforcing. Hong Kong shows that adaptive reuse must avoid preserving only the external image while weakening internal authenticity. Guangzhou indicates that guideline-based repair and district-scale control can help refine conservation measures, but still needs to avoid façade-oriented intervention. Shantou reminds us that the restoration of district character cannot replace material authenticity or the continuity of everyday life. Arcade building repair should therefore move beyond the pursuit of visual completeness towards an integrated assessment of structural safety, material authenticity, the legibility of new and old fabric, and functional adaptability.

4.3. Post-Restoration Operation and Sustainable Renewal

RQ3 concerns how arcade buildings can maintain long-term use and public value after restoration. The cases from the four cities show that the effectiveness of arcade building conservation should not be judged only by the degree of repair completion or the visual recovery of façades. It should also be assessed in relation to post-restoration functions, operational bodies, modes of public access, commercial continuity, and community use. For arcade buildings, which were originally closely connected with street commerce, residential life, and public pedestrian space, the capacity for sustained use after repair often plays a more decisive role in conservation outcomes than the one-off restoration project itself.

The first relatively stable pathway is public service-oriented reuse. Macao’s Patane Library, the Former Opium House, and Tak Seng On exemplify this model. Patane Library converted historic buildings into a public library, the Former Opium House introduced

Chinese medicine acupuncture and medical services through a charitable organization, and Tak Seng On gained a new public function through cultural display and operation by a public cultural institution. These projects are advantageous because they have relatively clear user groups, strong public accessibility, and a certain connection with everyday community services. Hong Kong's Lui Seng Chun shows similar characteristics. Operated by Hong Kong Baptist University, it introduces functions related to Chinese medicine, exhibition, and public health, allowing the historic building not merely to be displayed, but to continue performing a social service role. This suggests that the involvement of public institutions, universities, or charitable organisations can, to some extent, reduce the exclusiveness associated with purely commercial operation and increase the likelihood of stable post-restoration use.

The second pathway is commercial continuity or commercialised reuse. Guangzhou's Tao Tao Ju Restaurant and Macao's Hotel Central and Hotel Grande are all cases involving strong commercial functions, but their nature differs. The significance of Tao Tao Ju lies in the continuity between its original commercial brand, restaurant function, and urban memory. In this case, commercial operation itself forms part of the heritage value of the building. In other words, the project does not transform a historic building into a new consumption symbol, but continues its use on the basis of an existing commercial culture. By contrast, the repair and reuse of Hotel Central and Hotel Grande depend more heavily on tourism, accommodation, and nostalgic consumption. Although this model can provide stronger financial support and relatively stable operation, it may also transform arcade buildings into tourist-oriented historical scenery or commercial packaging. Commercial reuse does not necessarily weaken conservation value. The key issue is whether the new commercial function continues the original social relationship between the building and its district, or merely uses the historic appearance to create a consumption atmosphere.

The third pathway is cultural display and commemorative reuse. In Guangzhou, the Former Site of the Military Commission of the Guangdong–Guangxi Regional Committee of the CCP and the Memorial Hall of the former site of the CPC Guangdong Provincial Committee are mainly reused as museums, memorial halls, or exhibition spaces. The advantage of this type of project is that conservation objectives are relatively clear, public educational functions are strong, and government-led repair and management support can be more easily secured. Shantou's Aw Boon Haw Building and Huilan Academy show similar characteristics. After restoration, they mainly function as spaces for urban history display, cultural activities, or academy-style public cultural use. Such projects help strengthen urban memory and public recognition. However, their risk lies in the limited intensity of everyday use, as their operation can easily become dependent on exhibitions, visits, and festival events. Without sustained programme planning, community participation, and connections with local industries, restored buildings may become cultural display spaces used only at low frequency.

The fourth condition is one in which operation remains unstable after repair, or becomes disconnected from local everyday life. Some URA-related projects in Hong Kong have retained the external image of arcade-style tong lau and introduced multi-functional spaces, short-term activities, or leasing uses. However, their original mixed commercial–residential life and neighbourhood social networks are often difficult to sustain in a complete form. The cases of Enning Road, Tongfu West Road, and Nanhua West Road in Guangzhou also show that government-led pilot repair and district renewal can improve the built environment, but do not necessarily lead immediately to a mature long-term operational mechanism. Similarly, the overall character restoration of the Xiaogongyuan area in Shantou suggests that the recovery of district image is not equivalent to the revival of local life. If subsequent tenant recruitment, business organisation, and

residents' everyday use fail to keep pace, arcaded districts may shift from lived spaces into tourist-oriented landscapes.

Overall, the cases from the four cities show that the post-restoration sustainability of arcade buildings depends on three sets of relationships. First, it depends on whether the operational body is stable, including the allocation of responsibilities among government agencies, public institutions, universities, charitable organisations, private owners, and enterprises. Second, it depends on whether the new function is compatible with the building type and district life, rather than merely pursuing display-based or consumption-oriented use. Third, it depends on whether the restored building maintains public accessibility and local social connections.

The cases in Macao and Lui Seng Chun in Hong Kong show that public service-oriented reuse can help sustain public value. Tao Tao Ju demonstrates that commercial continuity can also form part of heritage conservation. By contrast, some cases involving hotel-based reuse, exhibition-oriented reuse, or district image renewal indicate that, without everyday use and continuous operation, restoration may remain at the visual level. Therefore, the ultimate goal of arcade building conservation should not be merely to complete repair works, but to reintegrate buildings into everyday urban life and allow them to gain sustained vitality through public services, local commerce, and community activities (Table 2).

Table 2. Cross-city comparative findings on arcade building conservation and sustainable renewal.

City	RQ1: Conservation Mechanism and Intervention Trigger	RQ2: Repair Strategy and Intervention Depth	RQ3: Functional Adaptation and Operational Sustainability	Comparative Lesson
Macao	Small-scale intervention, protection listings, and the coexistence of public, charitable and private operation	Tends towards careful repair and authenticity, but some commercial projects risk turning heritage into nostalgic consumption	Diverse forms of operation, including libraries, charitable medical services and hotels	Repair has been relatively effective, but excessive tourism-oriented commercialisation needs to be avoided
Hong Kong	A clear grading system exists, but conservation is strongly affected by the URA, property-led renewal and ownership conditions	Emphasises compliance and adaptive reuse, although internal authenticity may be constrained	Institutional operation, commercial leasing and community services coexist	A relatively mature chain of conservation, renewal and operation has been established, but property-led redevelopment may weaken social continuity
Guangzhou	Strong government leadership and relatively strong capacity for district-scale renewal	Places greater emphasis on material authenticity, the conservation of revolutionary sites and the coordination of district streetscapes	Catering, exhibition, retail and mixed-use operation coexist	District-scale renewal is facilitated, but exhibition-oriented reuse and pilot-project logic should be avoided
Shantou	District-wide restoration in the small park area is subject to pressure to deliver visible results; the overall condition of the arcade building stock is relatively poor	Streetscape restoration has produced visible results, but differences between phases are evident, and the connection between repair and operation remains uneven	Mainly exhibition, Cultural space and academy-oriented functions	The restoration of the overall streetscape is important, but post-restoration operation mechanisms must keep pace

5. Discussion

5.1. From Protection Status to Intervention Judgement

Based on the comparative analysis of the four Lingnan cities discussed above, Macao represents a small-scale model in which protection lists coexist with public, charitable, and private operation. Against the background of heritage tourism, public–private cooperation

has facilitated certain adaptive reuse projects, although these projects may still depend on government leases and cultural display functions. Hong Kong has a clear grading system, but its arcade building conservation is often affected by the URA, real estate-led renewal, and property ownership. It has a relatively mature heritage grading and revitalisation system, but the number of surviving arcade buildings is limited, and they face strong pressure from commercial redevelopment. Guangzhou, as a provincial commercial centre, demonstrates strong government-led and district-scale renewal capacity. However, it also reveals tensions among micro-renewal, developer participation, and everyday community life. Shantou, as a treaty-port city in eastern Guangdong, retains a large-scale and continuous arcaded fabric. It demonstrates the urgency of regional-scale rescue-oriented repair, while also exposing the weakness of post-restoration operation and long-term maintenance mechanisms.

As shown by the analysis of the common intervention triggers in the conservation mechanisms of the four cities in Section 4.1, decision-making before arcade building conservation should begin with a basic survey of building conditions and the establishment of a graded inventory of historic arcade buildings for reference. When conservation work is carried out, judgement should not only depend on whether a building is included in a protection list, but also consider structural condition, ownership, social value, and reuse potential.

Within existing governmental conservation frameworks, arcade building conservation should respond to the shift from static value protection to dynamic spatial governance, as seen in Hong Kong and Macao, and to the development of differentiated intervention strategies based on layered assessment, as seen in Guangzhou. During repair work, the principle of authenticity should not be compromised, and intervention should avoid excessive, over-rapid, or unnecessary repair. When budgets are limited, some projects in Macao and Hong Kong, such as Lui Seng Chun and the Former Opium House, provide useful references: the government first carried out basic strengthening and repair, and then sought suitable cooperation models. Arcade building conservation should therefore move from the repair of single buildings towards the circular use of existing resources in order to balance historical value, public life, and urban function.

5.2. From Façade Repair to Authenticity-Based Conservation

Arcade building repair is an important starting point for both conservation and sustainable renewal, and the two should not be understood as mutually exclusive choices. Precisely because many arcade building repairs have caused irreversible losses, designers must remain aware that conservation and repair should not stop at façade beautification, but should address structure, materials, space, and the legibility of new and old fabric.

The conservation of arcade buildings often begins after a professional dangerous-building assessment report has been obtained. Based on the assessment results, structural strengthening strategies can then be formulated for buildings classified from Grade A to Grade D. As shown in Table S2, six main strengthening methods are currently used, several of which have been applied in the cases discussed above and have not produced any adverse effects to date. What designers and supervisory bodies need to remain alert to, especially in large-scale conservation and repair projects, is the risk of destructive repair. The Xiaogongyuan project in Shantou, for example, reveals problems caused by different contractors undertaking the first phase and the second and third phases: significant differences in construction quality, the retention of only façade walls and complete reconstruction of interiors in many non-listed arcade buildings, the indiscriminate application of the same strengthening procedure, and negative responses from some local residents and visitors.

In the conservation and repair of Lingnan arcade buildings, understanding the physicochemical properties of traditional materials is a prerequisite for ensuring the compatibility and durability of interventions. In high-density cities in southern China, vehicle exhaust, industrial dust, humidity, and mould can easily darken façades. In the repair of arcade façades and masonry, original shell lime is now rarely used because it no longer meets current environmental requirements. Traditional lime-based materials prepared through scientific proportioning should therefore be prioritised in order to avoid secondary structural damage caused by incompatible modern materials such as cement.

Based on the studies by Chang Qing, Yip Kin Hung, Zhang Xueyan, and Lü Qi on the façade materials and colours of arcade buildings in Haikou, Macao, Guangzhou, and Shantou [47], together with the researchers' field surveys and photographs of arcade façades in the Lingnan region between 2018 and 2024 (Table S3), this study summarises the existing colours observed in Guangzhou, Foshan, Dongguan, Shantou, Hong Kong, Macao, Beihai, and Haikou. Five main colour ranges can be broadly identified in the Lingnan region. As shown in Figure 8, even where variations occur, they generally remain within these ranges. This differs from many arcade buildings in Southeast Asia, whose façades often use brighter colours. The proposed colour ranges may therefore provide a reference and research basis for future conservation practice involving Lingnan arcade buildings.

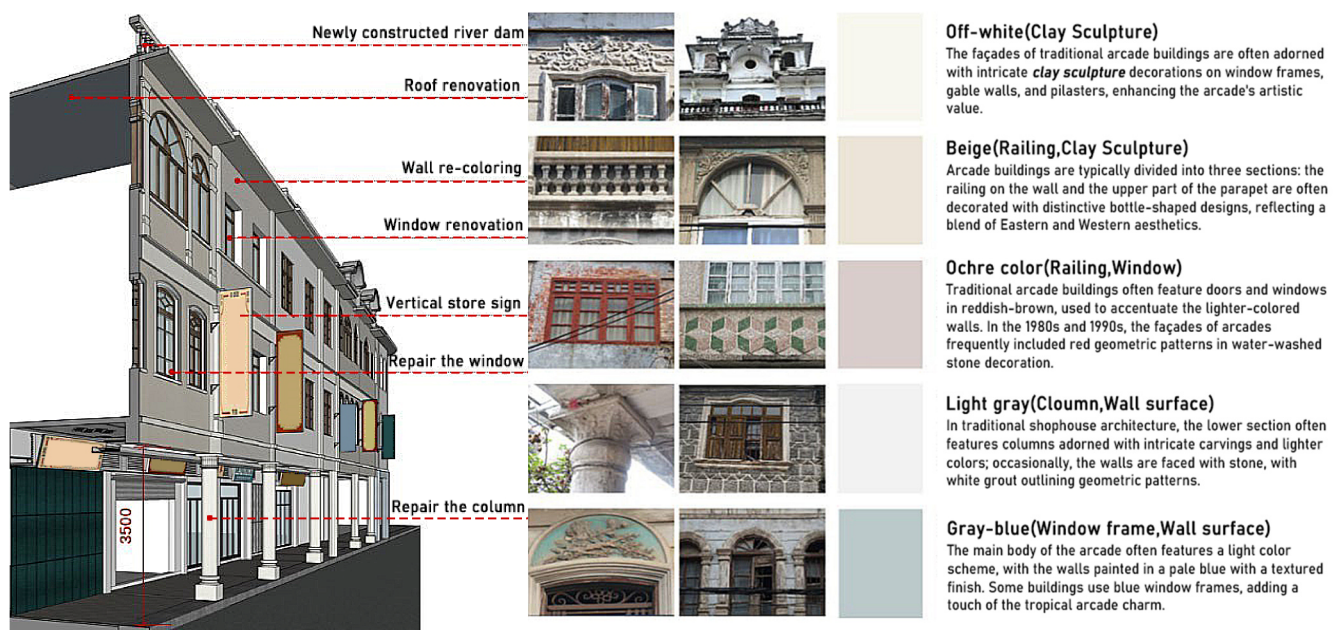


Figure 8. Guidelines for the restoration, renovation, and colour schemes of arcade buildings. Source: drawn by the authors based on field investigations in the four cities.

5.3. From Restored Buildings to Sustained Urban Life

As shown in Section 4.3, the post-restoration sustainability of arcade buildings is closely related to their operational bodies. Three pathways have produced relatively positive outcomes: public service-oriented reuse, commercial continuity or commercialised reuse, and cultural display and commemorative reuse. Whether commercial functions or new forms of use are introduced, the protection of the historical and cultural characteristics of the Lingnan region should remain the premise. A single consumption-oriented model should not replace genuine community life. At the same time, the renewal of historic arcade districts should not pursue commercial footfall alone, but should establish a balance among public services, community life, cultural display, and moderate commercial use.

The cultural characteristics of Lingnan arcade districts are diverse. In addition to architectural heritage itself, they also include celebrity-related traditional culture, overseas Chinese remittance culture, charitable association culture, food culture, and port and wharf culture, all of which deserve further development. Arcade culture should not be reduced to retro symbols or aesthetic consumption, as this would weaken its authentic historical memory and local basis of everyday life.

Sustainable renewal does not simply mean that buildings have been “repaired”. More importantly, it concerns whether they can continue to be used after repair, serve the public, and sustain local commerce and community life. The sustainable renewal of Lingnan arcade buildings should continue the layered logic used in value assessment, and should be carried out at three corresponding levels, the district, the street, and the individual building, which together form the macro, meso, and micro levels. At the macro level, functional positioning should begin with the designation of historic and cultural areas. Functional positioning should then be refined according to the specific value and cultural characteristics of each district and street. Specialised repair guidelines should be prepared for government departments, design and construction teams, and the responsible parties for historic building conservation, and these guidelines should be connected with the preliminary planning outcomes for historic buildings. Finally, internet-based and digital technologies should be used to conduct systematic records of historic buildings, thereby facilitating comparative supervision before and after construction.

Relevant government departments should also include follow-up supervision and assessment of arcade building operators. The sustainable renewal of historic arcade districts should not replace existing street life with a single commercial plan. Instead, it should adopt a gradual renewal approach based on respect for historical business forms and everyday community use. The renewal of historic buildings is usually based on functional replacement. Therefore, before operating a historic arcade building, the feasibility of the proposed plan should first be assessed. Since tensions often exist between modern functional spaces and historic buildings, it is necessary to examine whether the spatial structure of the arcade building has sufficient compatibility, and whether adaptation can provide the possibility of meeting contemporary use requirements. Functional control should therefore be introduced.

6. Conclusions

In summary, there are three core implications for the conservation and sustainable renewal of arcade buildings in Lingnan and other regions with similar historic urban typologies:

1. Arcade conservation practices should not be restricted to superficial facade restoration. Instead, a well-defined intervention framework shall be established prior to the implementation of any conservation works.
2. Sufficient emphasis shall be placed on the material and structural authenticity throughout the design and construction phase.
3. A sustainable long-term operation mechanism shall be formulated post restoration to facilitate the revival of the inherent vitality of arcade buildings.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/buildings16142854/s1>, Table S1: Case information of arcade buildings in the four cities; Table S2: Strengthening methods for arcade buildings; Table S3: Repair and Conservation Methods for Facade Elements of Lingnan Arcade Buildings.

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Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

IC	Cultural Affairs Bureau of the Macao SAR Government
BAI	Buildings of Architectural Interest
URA	Urban Renewal Authority
ARP	Adaptive Reuse Potential
UNESCO	United Nations Educational, Scientific and Cultural Organization
CPC	Communist Party of China
CCP	Chinese Communist Party
RQ	Research question

References

- Knapp, R.G. *China's Vernacular Architecture: House Form and Culture*; University of Hawai'i Press: Honolulu, HI, USA, 2000.
- Campanella, T.J. *The Concrete Dragon: China's Urban Revolution and What It Means for the World*; Princeton Architectural Press: New York, NY, USA, 2008.
- Mei, Q.; Luo, M. Up-Down Nine and Five-Foot Way: Characteristics of cityscape in a cultural perspective. *J. Chin. Archit. Urban.* **2019**, *1*, 20–34. [CrossRef]
- Ning, Y.; Zhang, W.; Qian, J. *Zhongguo Chengshi Fazhan Shi [History of Urban Development in China]*; Anhui Science and Technology Press: Hefei, China, 1994.
- Lu, Y.; Wei, Y. *Guangdong Minju [Guangdong Vernacular Dwellings]*; China Architecture & Building Press: Beijing, China, 1990.
- Lin, L. *Gang-Ao Yu Zhujiang Sanjiaozhou Diqu Jianzhu: Guangdong Qilou [Regional Architecture in Hong Kong, Macao and the Pearl River Delta: Guangdong Arcade Buildings]*; Science Press: Beijing, China, 2006.
- Lin, C. *Qilou Xing Jiewu de Fazhan yu Xingtai de Yanjiu [The Development and Morphology of Qilou-Type Shophouses]*. Master's Thesis, South China University of Technology, Guangzhou, China, 2000.
- Yang, H. *Lingnan Qilou Jianzhu de Wenhua Fuxing [Cultural Renaissance of Lingnan Arcade Buildings]*; China Architecture & Building Press: Beijing, China, 2010.
- Wang, T.; Fujimori, T. *Zhongguo Jindai Jianzhu Zonglan: Guangzhou Pian [The Architectural Heritage of Modern China: Guangzhou Volume]*; China Architecture & Building Press: Beijing, China, 1992.
- Jacobs, J. *The Death and Life of Great American Cities*; Random House: New York, NY, USA, 1961.
- Jones, G.A.; Bromley, R.D. The relationship between urban conservation programmes and property renovation: Evidence from Quito, Ecuador. *Cities* **1996**, *13*, 373–385. [CrossRef]
- Cohen, N. *Urban Conservation*; MIT Press: Cambridge, MA, USA, 1999.
- UNESCO. *Asia Conserved: Lessons Learned from the UNESCO Asia-Pacific Heritage Awards for Cultural Heritage Conservation (2000–2004)*; UNESCO: Bangkok, Thailand, 2007.
- Rodwell, D. *Conservation and Sustainability in Historic Cities*; Blackwell: London, UK, 2007.

15. Yung, E.H.K.; Langston, C.; Chan, E.H.W. Adaptive reuse of traditional Chinese shophouses in government-led urban renewal projects in Hong Kong. *Cities* **2014**, *39*, 87–98. [CrossRef]
16. Baroldin, N.M.; Din, S. Documentation and conservation guidelines of Melaka heritage shophouses. *Procedia Soc. Behav. Sci.* **2012**, *50*, 192–203. [CrossRef]
17. Davison, J.; Tettoni, L.I. *Singapore Shophouse*; Talisman Publishing: Singapore, 2010.
18. Lee, S.L. Urban conservation policy and the preservation of historical and cultural heritage. *Cities* **1996**, *13*, 399–409. [CrossRef]
19. Lee, L.M.; Lim, Y.M.; Aini, Y.N. Strategies for urban conservation: A case example of George Town, Penang. *Habitat Int.* **2008**, *32*, 293–304. [CrossRef]
20. Fung, I.W.H.; Tsang, Y.T.; Tam, V.W.Y.; Xu, Y.T.; Mok, E.C.K. A review on historic building conservation: A comparison between Hong Kong and Macau systems. *Renew. Sustain. Energy Rev.* **2014**, *34*, 643–654. [CrossRef]
21. Wang, X. Guangzhoushi Lishi Jianzhu Baohu Guihua Bianzhi yu Shishi Yanjiu [Research on the Compilation and Implementation of Historic Building Conservation Planning in Guangzhou]. Master's Thesis, South China University of Technology, Guangzhou, China, 2019. [CrossRef]
22. Zhao'an County Local Chronicles Compilation Committee. *Annals of Zhao'an County*; Fangzhi Publishing House: Beijing, China, 1999.
23. Li, Q.Y. Research on the renovation design of Qilou Street on Zhongshan Road in Zhao'an County. *China Build. Decor.* **2023**, *22*, 105–107.
24. Cihai Compilation Committee. *Cihai*; Shanghai Lexicographical Publishing House: Shanghai, China, 1979; p. 790.
25. Sima, Q. *Records of the Grand Historian: Basic Annals of Qin Shi Huang*; Zhonghua Book Company: Beijing, China, 2019.
26. Guangdong Literature and History. A Brief Account of the Historical and Geographical Characteristics of Lingnan. Available online: <https://www.gdsws.gov.cn/> (accessed on 15 March 2026).
27. Liu, R. *Wenming de Boyi: 16 zhi 19 Shiji Aomen Wenhua Changboduan de Lishi Kaocha* [Contest of Civilisations: A Long-Term Historical Investigation of Macao Culture from the Sixteenth to the Nineteenth Century]; Social Sciences Academic Press: Beijing, China, 2008.
28. Porter, J. 'The past is present': The construction of Macau's historical legacy. *Hist. Mem.* **2009**, *21*, 63–100. [CrossRef]
29. Ung, K.I. Uncovering the Socioeconomic and Cultural Layers of Macau (1920s–1970s). Ph.D. Thesis, Delft University of Technology, Delft, The Netherlands, 2025. Available online: <https://repository.tudelft.nl/record/uuid:9d93d60d-d9c7-41ea-b219-6c4141b4a819> (accessed on 24 December 2025).
30. Lang, J. A cornerstone in East-Meets-West representation: Macau's approach to adaptive reuse in colonial and postcolonial eras. In *Revitalization in Asia: Adaptive Reuse in Macau, Mumbai, and Penang*; Hong Kong University Press: Hong Kong, China, 2025; p. 92.
31. Cultural Affairs Bureau. Macao Heritage Legislation. Available online: <http://www.macaoheritage.net/Decree/indexE.asp> (accessed on 13 December 2025).
32. UNESCO World Heritage Centre. Decision 29 COM 8B.28: Nominations of Cultural Properties to the World Heritage List (The Historic Centre of Macao). Available online: <https://whc.unesco.org/en/decisions/491/> (accessed on 27 June 2026).
33. Cultural Affairs Bureau of the Macao SAR Government. *Law No. 11/2013: Cultural Heritage Protection Law*; Department of Cultural Heritage, Cultural Affairs Bureau: Macao, China, 2013. Available online: <https://www.icm.gov.mo/en/heritage/law> (accessed on 20 March 2026).
34. Chu, C. Between typologies and representation: The tong lau and the discourse of the 'Chinese house' in colonial Hong Kong. In *Colonial Frames, Nationalist Histories: Imperial Legacies, Architecture, and Modernity*; Rajagopalan, M., Desai, M., Eds.; Routledge: New York, NY, USA, 2012; pp. 253–283.
35. Antiquities and Monuments Office. Introduction. Available online: <https://www.amo.gov.hk/en/about-us/introduction/> (accessed on 27 June 2026).
36. Development Bureau, Heritage.gov.hk. Revitalising Historic Buildings Through Partnership Scheme. Available online: <https://www.heritage.gov.hk/https://www.heritage.gov.hk/> (accessed on 27 June 2026).
37. Guangdong Provincial Police Headquarters. *Guangdong Shengcheng Jingchating Xianxing Qudi Jianzhu Zhangcheng ji Shishi Xize* [Regulations and Detailed Rules for the Implementation of the Existing Building Controls by the Guangdong Provincial Police Headquarters]; Manuscript; Toyo Bunko: Tokyo, Japan, 1912.
38. Wang, L. Research on the Conservation and Revitalization of Historical and Cultural Districts in Guangzhou. Master's Thesis, South China University of Technology, Guangzhou, China, 2025.
39. Guangzhou Municipal Housing and Urban-Rural Development Bureau. Notice on Issuing Three Technical Guidelines Including the 'Analysis of Key Difficulties and Optimization Guidelines for the Renovation Construction Drawings of Traditional Style Buildings in Guangzhou (Trial)' (No. Sui Jian Fang Guan [2025] 171). Available online: https://zfcj.gz.gov.cn/gkmlpt/content/10/10172/post_10172717.html#1090 (accessed on 27 June 2026).
40. Zheng, L. The Study on the History of Modern Shantou Urban Construction Development. Ph.D. Thesis, South China University of Technology, Guangzhou, China, 2018.

41. Lv, Q. Protection and Utilization Strategy of Arcade Buildings in Shantou Small Park Kailuan District from the Perspective of Contextual Continuance. Master's Thesis, South China University of Technology, Guangzhou, China, 2019.
42. Wang, H. From Superficial Qiaoxiang to Living Chaoxiang: The Cultural Governance and Everyday Life of Shantou Old Town. Master's Thesis, National Taiwan University, Taipei, Taiwan, 2022.
43. Tieben, H. Urban image construction in Macau in the first decade after the 'Handover', 1999–2008. *J. Curr. Chin. Aff.* **2009**, *38*, 49–72. [[CrossRef](#)]
44. Chu, C.L. Spectacular Macau: Visioning futures for a World Heritage city. *Geoforum* **2015**, *65*, 440–450. [[CrossRef](#)]
45. The Oval Partnership Ltd.; Professional Property Services Ltd.; Hong Kong Polytechnic University; Johnston Stokes & Master; Franklin+Andrews (HK) Ltd.; Architectural Conservation Office. *Planning of Adaptive Re-Use of Lui Seng Chun*; Antiquities and Monuments Office: Hong Kong, China, 2007.
46. Cultural Heritage of Macao. Tak Seng On Pawnshop. Available online: <https://www.culturalheritage.mo/detail/99936> (accessed on 10 June 2026).
47. Ip, K.H. Application of traditional materials in the restoration of cultural relics in Macau. *Cult. Rev.* **2015**, *95*, 129–140.
48. AGC Design Ltd. *Conservation Management Plan for Lui Seng Chun: Revitalisation Scheme—Conversion of Lui Seng Chun into Hong Kong Baptist University Chinese Medicine and Healthcare Centre*; Antiquities and Monuments Office: Hong Kong, China, 2010.
49. Cai, G.; Li, B.; Yuan, J.X.; Chen, Z.Y. Quality status and strengthening and repair strategies of modern buildings in Shantou. *Eng. Qual.* **2017**, *35*, 19–22.

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