Short Guide : Maintaining Your Historic Building

THE HONG KONG INSTITUTE OF SURVEYORS
香港測量師學會

發展局保育歷史建築基金資助
Funded by Built Heritage Conservation Fund, Development Bureau

Contents

Chapter 1
Introduction

Established in 1984, The Hong Kong Institute of Surveyors (HKIS) is the only surveying professional body incorporated by ordinance in Hong Kong. In 2023, the number of members reached over 10,000 which includes corporate members, associate members, probationers and students.

The Institute has an important consultative role in government policy making and on issues affecting the profession. We have advised the government on issues such as building safety and unauthorized building works, problems of property management, town planning and development strategies, construction quality and housing problems. We have also issued guidance notes on floor area measurement, real estates valuation and land boundary survey, etc.

Hong Kong is a fast-developing city with prosperous modern vitality, and also numerous historic buildings. They might not be sharing a thousand years' history like those in Mainland China or Europe. However, many still highly represent the brilliant and memorable days a century ago. And today, you can still notice them hidden in every corner in Hong Kong, likely to be kept by private owners. And if you find that this is exactly your case - owning a historic building, This Short Guide : maintaining of Your Historic Building by the HKIS would be perfect for you.

To have the best accompanying life with your historic building, you would need to properly take care of it and have it function in the longest and healthiest way. The first and foremost thing to do would be to understand how to appreciate the architecture itself. In Hong Kong, historic buildings can be roughly categorized into Chinese Traditional Architecture, Western Colonial Architecture and the more vernacular building – Tong Lau. Each of them enjoys a variety of design features. Next, you would be recommended to inspect common defects of differ-

ent architectural elements with the appropriate methods to repair them. Identifying the problems and following the guidance, you are then able to maintain your historic building in the best condition and spend less money afterwards to remedy greater problems that the building could possibly trigger.

This short guide would be the forerunner in Hong Kong among all the similar kinds of publications, and the first step to clean out a frame for maintenance as well as lead the public to get familiar with and participate in such activities. With the overall awareness enhancing, there will surely be a more perfect future for Hong Kong's historic heritage.

Chapter Two
Get To Know Your Buildings

2.1
Chinese Architecture in Hong Kong

Many historic Chinese architectures in Hong Kong can be dated back to as early as the Qing Dynasty (1636-1912). There were Chinese settlements in Hong Kong that were much earlier. For instance, the first generation of the Tang Clan migrated to Hong Kong in the Northern Song Dynasty (960-1127). However, most of the buildings of these early settlements have mostly been derelict and demolished. The Great Clearance in 1661-1669 in the Qing Dynasty forced residents in coastal areas, including Hong Kong, to leave their homes and migrate inland. Many buildings were left unattended and became derelict. After the Great Clearance, people moved back to Hong Kong and started to rebuild their villages and houses. Some of them formed our stocks of historic Chinese architecture.

The great clans of the Punti built magnificent ancestral halls with the type of three halls and two courtyards to worship their ancestors. The Tang Ancestral Hall at Ping Shan, Yuen Long, the Tang Chung Ling Ancestral Hall at Lung Yeuk Tau, Fanling, the Man Lung Fung Ancestral Hall at San Tin, Yuen Long, and the Liu Man Shek Ancestral Hall at Mun Hau Tsuen, Sheung Shui are some of the typical examples. These ancestral halls were constructed with high-quality materials

and richly decorated to reflect the official ranking of the clansmen. Apart from ancestral worship, the ancestral halls were also used for the clans' meetings, traditional ceremonies and festival celebrations.

The clansmen were highly devoted to the education of the young generation. Study halls can always be found in their villages. The Kun Ting Study Hall at Ping Shan, Yuen Long, and Yau Kung Tong at Ha Tsuen, Yuen Long, are some distinctive examples.

As for living, the wealthy clans also built magnificent residential houses. Among all these houses, Tai Fu Tai Mansion at San Tin, is considered one of the finest traditional residential houses in Hong Kong.

Tang Ancestral Hall at Ping Shan

The clansmen gathered at the forecourt of the ancestral halls for a ceremony.

Tai Fu Tai Mansion

Tai Fu Tai Mansion

Besides the great clans, some other people migrated from the northern part of China, who were often categorized as Hakka. These Hakka people were scattered around Hong Kong. Although their houses might not be as grand as the clans, they have made a significant contribution to the historic assets of Hong Kong. Some simple Hakka houses were also declared monuments in Hong Kong including Law Uk at Chai Wan and Hoi Pa Old House at Tsuen Wan. These Hakka houses were typically constructed with local and economic materials like mud bricks or rammed earth with earthen plaster and limewash as finishes. For some wealthy families, the front façades were constructed with green bricks and stone so as to be more elegant.

Kun Ting Study Hall

Some Hakka families would live together for better protection and defense. As the number of members grew, more additional houses were sided to the existing ones, forming a cluster of houses like the case of Sam Tung Uk at Tsuen Wan. Some even built walled villages for better safeguarding. Tsang Tai Uk at Shatin is one of these.

The worship of gods is one of the Chinese religious customs. There are many temples around Hong Kong worshipping different kinds of gods. Some temples start with a small and humble temple. With the built-up of donations, they would undergo renovations and become larger temples with various halls. Some of these temples are richly decorated with timber carvings and decorative paintings. Some grand temples

Kun Ting Study Hall

have glazed roof tiles and decorated ridges with glazed Shiwan pottery figures. The figures exhibit the stages of Xiqu, telling us the stories of the Xiqu.

In some villages, shrines can also be found at the entrance, which are the demarcation of a village. Pagoda was also built by villagers for the sake of Feng Shui.

Hoi Pa Old House

Tsang Tai Uk Walled Village

Glazed Shiwan pottery figures at the ridge of Tai O Kwan Tai Temple: exhibiting the story of Song Taizu, Zhao Kuangyin（宋太祖三下南唐）

Earth God shrine at the entrance of the village at Ping Shan, Yuen Long

Appreciation of Chinese Architecture

Characteristics of Chinese Architecture

Looking from the outside, Chinese architectures have simply small windows and some even have no windows on the external façade. People may have doubts about natural lighting and ventilation. In fact, this is not a problem in Chinese architecture. There is always a courtyard for natural lighting and ventilation in a grand ancestral or small house regardless of its size. The windowless external façades can improve the privacy and security of the houses. The courtyard also serves as a point to catch the rainwater from the pitched roofs and is designed with a drain to divert water away. Sometimes the direction of the drain in the courtyard is selected by the geomancer and has Feng Shui considerations.

Unlike Western architecture, usually there is no gutter at the eaves in Chinese architecture. Instead there are some drip tiles in some grand architecture. Rain drips down from the row of drip tiles in the eave line, forming a romantic scene of a rain curtain. Having no gutter at the eave also has some advantages. There is no need to clear the blocked gutters regularly. It also eliminates dampness problems due to overflow of the roof gutters.

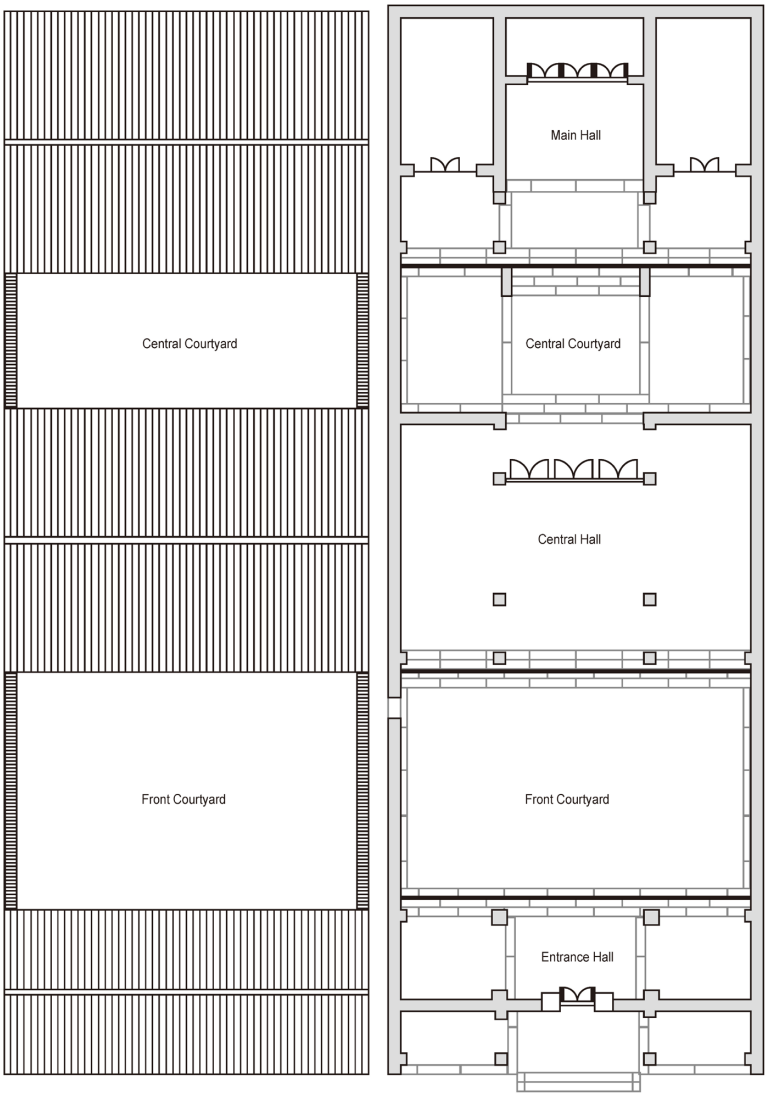
Chinese architecture is richly decorated with Chinese auspicious symbolic features. The delicate wood carvings on the beams, the plaster decorations on the wall frieze and ridges, the mural painting in the frieze, and so on all demonstrate our traditional craftsmanship and culture. Each feature has its symbolic meaning of bringing good elements to the people or fighting against evils. The symbols not only decorate the houses but comfort the people. All of these are of great cultural value to the Chinese people. These decora-

tive features sometimes are incorporated into the functional building elements and serve both decorative and practical purposes.

Cap tiles and drip tiles at the eave of the roof

Symbolic decorative features

Left: Dragon fish has the symbolic meaning of suppressing fire; Right: Phoenix has the symbolic meaning of virtue and propriety

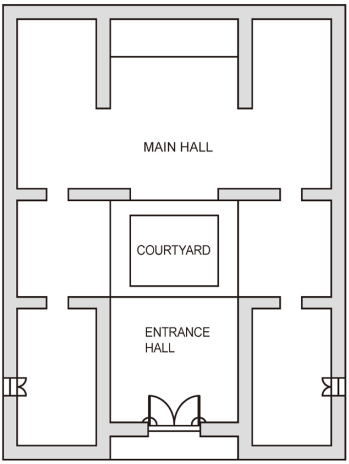


Typical layout of Ancestral Halls: Three-hall type with two courtyards

Spirit of Places

The conservation of historic buildings is not only about tangible elements. It also concerns those which are intangible. According to the Quebec Declaration: Spirit of Place, which is defined as the tangible (buildings, sites, landscapes, routes, objects) and the intangible elements (memories, narratives, written documents, rituals, festivals, traditional knowledge, values, textures, colors, odors, etc.), that is to say the physical and the spiritual elements that give meaning, value, emotion and mystery to place.

Hong Kong has two heritage trails in the New Territories; one at Ping Shan, Yuen Long, and one at Lung Yeuk Tau, Fanling. Both trails are culturally fruitful with different traditional Chinese architecture such as ancestral halls, study halls, walled villages, temples, shrines, etc. Walking on these trails, you could see the fine Chinese architecture of Hong Kong and, at the same time sense the spirit of the villages.



Typical layout of Chinese Vernacular Architecture:
Two-hall type with one courtyard

2.2 Western Colonial Architecture

Brief History

During the 19th and 20th centuries, many Asian countries were still in the colonial periods before their independence. Hong Kong was also under the British colonial rule from 1841 to 1997. Since the town has long been one of the busiest business ports globally, a large number of Western architectures were left as the witnesses of those days. Western colonial architecture in Hong Kong can be classified into four generations, and all have different characteristics. We could therefore see the evolution and transformation of styles:

1. 1841-Early 1900s
In Queen Victoria's days, Western-style buildings were mainly built by the army, therefore serving primarily military purposes. Even the residential buildings were less decorative and retained simple classicism elements.

2. Early 1900s-1920s
Edward VII came to his throne, and the First World War broke out. Professional architects brought here the red-and-white Queen Anne Revival style and the Edwardian Baroque featuring the dome and tower. The design of the curves became noticeable.

3. 1930s-1940s
In the interwar period, modern design was conceived. Popular aestheticism at this time was Stripped Classicism

Flagstaff House, Hong Kong.

and Art Deco, both of which embraced the strategy of clean lines and as few ornaments as possible.

4. 1950s-1990s

After the Second World War, the town was rebuilt and developed rapidly. Modernism which was simply about function was also applied to buildings constructed in this period. This movement originated from the Bauhaus School of Design in Germany, distinguished by the extensive use of new materials such as glass, steel and reinforced concrete.

Characteristics

Pre-war Days: 1841-Early 1900s

Early Western architectures in Hong Kong were characterized by their simplicity and lack of ornament. Many British royal officers, who were also architects and engineers, built these humble government or public buildings for the military. Although most of them have been demolished, the surviving Flagstaff House (1846) could still exemplify this

Colosseum in Rome.jpg Photo by Azhar Muhammedu, CC BY
www.pexels.com/zh-cn/photo/3021382/

style with its white façades and porticos. This building was once the residence of the commander of the British forces. Corresponding to the Classical Revival influence, its columns are of the so-called Doric and Ionic orders. These two most common orders represent relatively the muscularity and gracefulness of the human body. You could also see similar fusions while visiting the Roman Colosseum. The porticos and balconies (loggias) can also be noticed adapted for the tropical climate in Hong Kong.

Western Market, Hong Kong.

Main Building of the University of Hong Kong, Hong Kong.

Pre-war Days: Early 1900s-1920s

After entering the 20th century, red bricks became very common in Western colonial buildings, and the ornament was starting to be valued. The curved gable is another feature on the top of the façades, such as the Western Market North Block (1906). This kind of red-and-white building is known

as the Queen Anne Revival Style. In the streets of the British cities, this design is typical. Another grander architectural direction was also on the way – Edwardian Baroque, and it was often mistaken for another different style – Neo-Classicism. Edwardian Baroque architecture features its two-storey columns, triangular gables, towers and domes, and you could also observe those details in Belfast City Hall (1906). In Hong Kong, the Main Building of the University of Hong Kong (1912) and the Court of Final Appeal Building (Old Supreme Court, 1912) are the best examples of this imposing style.

Pont Street in London (Photo by Spudgun67, CC BY-SA 4.0, via Wikimedia Commons)

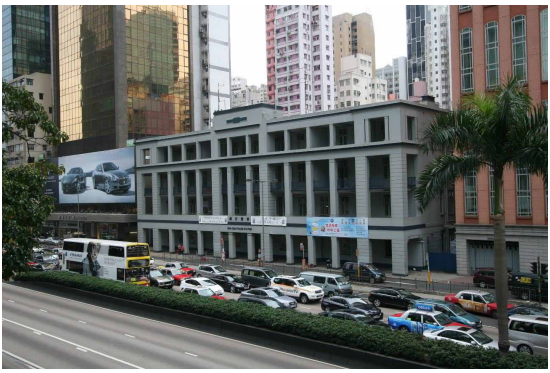
Post-war Times: 1930s-1940s

The time during the 1930s and 1940s marked the transition from the interwar period to the Second World War. Although war could be imminent at any moment all over the world, this was undoubtedly a prosperous and fruitful decade of design harvest. Stripped Classi-

Belfast City Hall
(Photo by K. Mitch Hodge on Unsplash)

The Zeppelinfeld Arena in Nuremberg.
(Source: public domain, wikimedia)

Cleveland Greyhound Station in Cleveland.
(Photo: Eli Pousson, CC BY-SA 2.0, via Wikimedia Commons)



Old Wan Chai Police Station

The Chrysler Buildingin New York.
(Photo by Nicole Padin on Unsplash)

Historic photo of Old HSBC Building
(Source: Wikimedia Commons)

cism, which was inspired by Totalitarianism from German Fascism that highly emphasized the regime, majesty and order, tried to use a more modern language to express the rationality and functionalism that architectures could have. The Zeppelinfeld Arena in Nuremberg in the historical photos allows you to have a glance at what this design once looked like. This style was followed by government buildings of some modern nations afterward in a softer tone. In Hong Kong, you can still see this design with a sense of the times at Old Wan Chai Police Station (1932).

Despite this, Art Deco and its later variation Streamline Moderne brought the more stylish and experimental designs from France, the United States and other countries. The former combined various exoticized elements that are not of Western major design, but some pioneering arts and crafts of the time, while the latter highlighted modern industrial design (such as a streamlined hull). In Hong Kong's Old HSBC Building (1935, demolished) and Central Market (1939), you can glimpse the luxury, glamour, exuberance, technological progress and modern society portrayed by

Central Market

such movements. The Chrysler Building and Cleveland Greyhound Station in the United States also share these fantastic fashions.

Post-war Times: 1950s-1990s

After the World War II, the world ushered in peace. The architecture was moving towards Modernism in which, form follows function. The superfluous decorations were simplified, while simplest geometric designs and skyscrapers underlining utility and Internationalism were promoted. At the same time, modern materials (i.e. reinforced concrete) and modern construction techniques (i.e. prefabricated construction) were widely applied to emphasize the sense of transparency, lightness and flexibility of space. Europe and America have produced a large number of classic masterpieces along with the development, such as Villa Savoye, Seagram Building and the Bauhaus Building. The Bauhaus was and still serves as a school of art and architecture located in Dessau, Germany, whose pioneering Modernism advocacy had a far-reaching influence and was introduced to Hong Kong architecture design, such as City Hall (1962). Hong Kong people therefore often vaguely refer to this early Modernism as the 'Bauhaus style'. The later Modernist style in Hong Kong was more marked in the sprung-up commercial high-rise buildings, represented by the Bank of China Tower (1990), a gift from the last Modernist master – I. M. Pei. The finale of Western colonial

Seagram Building in New York, US. Noroton (talk) 03:19, 1 May 2008 (UTC), Public domain, via Wikimedia Commons

Villa Savoye in Poissy, Photo by Valueyou, CC BY-SA 3.0, wikipedia.

The Bauhaus Building in Dessau, Germany.

Bank of China Tower

City Hall, Hong Kong.

architecture was therein composed before the handover, while the endeavour to step out of the traditional and classical past led us to the embracing new century.

Religious Architecture

Moreover, here is a brief note of the religious architectures in Hong Kong. Having been one of the largest international ports in Asia, Hong Kong has very diverse ethnic races together with their religious architectures. Here several mentionable examples are selected, which could be found throughout Hong Kong.

For the Christian churches that the Europeans have introduced, the Hong Kong Cemetery Chapel (1845, Protestantism) is considered the oldest church and perhaps one of the oldest Western architectures in the city, while St John's Cathedral (1852, Protestantism) on Government Hill has been best known to both the believers and public. The former one is situated peacefully inside a Protestant cemetery in Happy Valley and the latter is in the busy Central. At the same time, there are also churches of other denominations such as the Cathedral of The Immaculate Conception (1888, Catholicism) and sanatorium complexes like Béthanie (1875, Catholicism). Without stepping into the churches, you could still observe the beautiful stained glass and window frames, beautiful arched windows, flying buttresses and so on from the outside.

The Cathedral of The Immaculate Conception

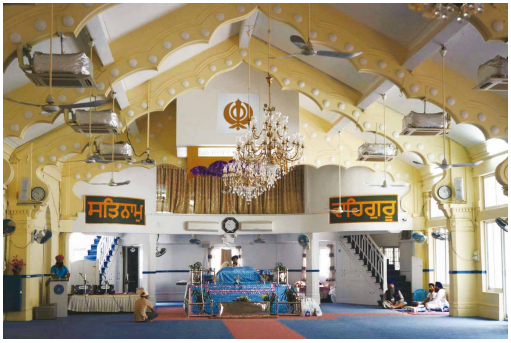
St John's Cathedral

Muslims in India brought Islam into Hong Kong. The present Jamia Mosque (rebuilt in 1915) is the oldest mosque, while the more recent Kowloon Mosque (1984, Sunni) is the largest in the city. In order not to disturb the salah of the followers, you might still be able to appreciate the Arabic architectural elements such as minarets and arched windows from the outside.

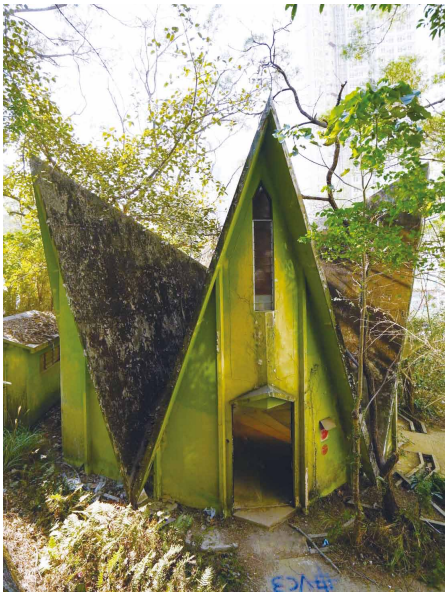
The Jewish synagogues, the Sikh gurdwaras and Hindu temples usually do not have a common design language and could diversify a lot depending on its periods or locations, but many of the architectural elements are still inspired from their doctrines and sym-

Jamia Mosque

Ohel Leah Synagogue, Hong Kong



Former Khalsa Diwan Sikh Temple
(The temple was rebuilt in 2018 and reopened in 2022)



Hindu Temple at Burma Lines

bolisms. After a successful conservation project before the millennium, the Ohel Leah Synagogue (1902) once again composes the Jewish landscape in the Mid-Levels. The Former Khalsa Diwan Sikh Temple (1901) also became the cohesive core of the Sikh community in Wan Chai. The remains of Hindu Temple on Queen's Hill (1960s) is a rare and unique witness of Gurkhas' (Nepal soldiers) Hinduist worship with lotus and god of Shiva's blessing. You could also have a try on comparing the characteristics of different religious architectures and enjoy their diverse uniqueness.

Why Conserve?

Europe, either the continent or the United Kingdom, is a place Hong Kong people have always fantasized about. The colorful impression to us is a cup of slow-paced coffee under the ancient historic streetscapes, which is so different from Hong Kong with the city's fast and furious development. Europeans have grown up in a classical environment, consequently attaching to their heritage, history and culture. They also believe that it is heritage that shapes the identities of their cities and people. On account of their efforts, modern development and historical heritage coexist, complement each other and continue to feature the cities.

Slowing down and learning to appreciate the diverse heritage and integrate them into our lives would be the first step towards the future.

Reference

Hoyin Lee (2015) Hong Kong Colonial Architecture 1841-1997
https://www.colorful-concepts.eu/cc-artdeco-architecture/2017/10/15/art-deco
https://gwulo.com/node/30186

2.3
Tong Lau

Tong lau is one of Chinese tenement housing in response to the critical shortage of living quarters to accommodate the rising population. It belongs to the generic urban shop-house typology commonly found in Chinese cities in Southern China and Southeast Asia. In Hong Kong, tong lau has transformed into four generations, and we can differentiate them by means of the materials and construction techniques used. Most of the pre-war or post-war tong lau were demolished upon urban development.

After the revitalization of 10 blocks of tong lau along Prince Edward West commissioned by the Urban Renewal Authority, the cluster of historic buildings now provides multi-function event space for the community.

However, as living urban heritage, some successful cases of tong lau conservation or adaptive re-use always remind us to perceive them as a source of identity, distinctiveness, and social attachment.

Thus, understanding the heritage value or recognizing its cultural significance of tong lau, documentation and conservation measures should be undertaken to ensure its lifespan and sustainable development. And it is essential to educate the public to appreciate the beauty and heritage values of tong lau.

Characteristics of Hong Kong Tong Lau and its different generations

Photo of Sheung Wan in early 20th century showing different-generations of Tong Lau.
The top part of the photo shows large groups of Tong Lau without back lanes.

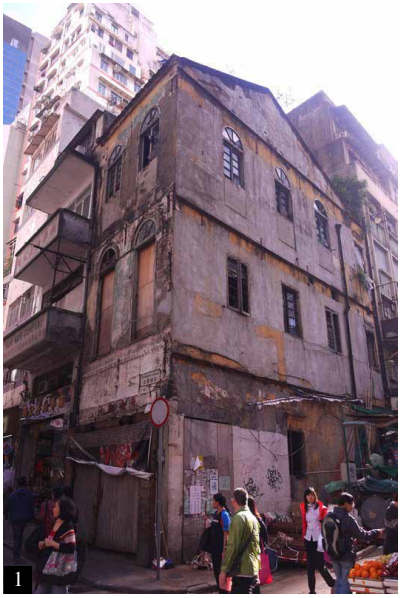
Period: 19th century (1840s to 1900s)

From the 1840s, Hong Kong's first generation shophouses or tong lau were typically built. Normally comprising two to three storeys, these shophouses were constructed of walls of Chinese grey brick, timber floors and beams, a gable roof of timber beams and clay tiles, displaying the minimum amount of decorative details.

This typology of tong lau has a narrow building frontage and always shares the party walls with adjacent buildings. The ground floor was used for doing family business while the upper levels were reserved for residential use. The cockloft was to provide working or storage space.

Examples:
120 Wellington Street, Central (1884) Wing Woo Grocery—adaptive reuse is not known. Grade 1 historic building
60-66 Johnston Road, Wanchai (1888) Wo Cheong Pawnshop—adapted as high-end shops & restaurants. Grade 2 historic building
Shophouse Yuen Kut Lam (1889), 112 Jervois Street, Sheung Wan. Grade 1 historic building (2020)

Cultural Significance:
Historical value, aesthetic value and social value
Yuet Kut Lam is a rare and surviving tong lau of the first-generation typology. No major alterations have been made. The shop owner still sells herbal tea in this grade 1 historic building. Herbal tea is one of Hong Kong's intangible cultural heritage. No 120 Wellington Street, Central once housed a grocery shop selling oil & rice to nearby residents. During the Japanese occupation, it was a depot of salt and sugar and it could be a reminder of food shortage during the war.

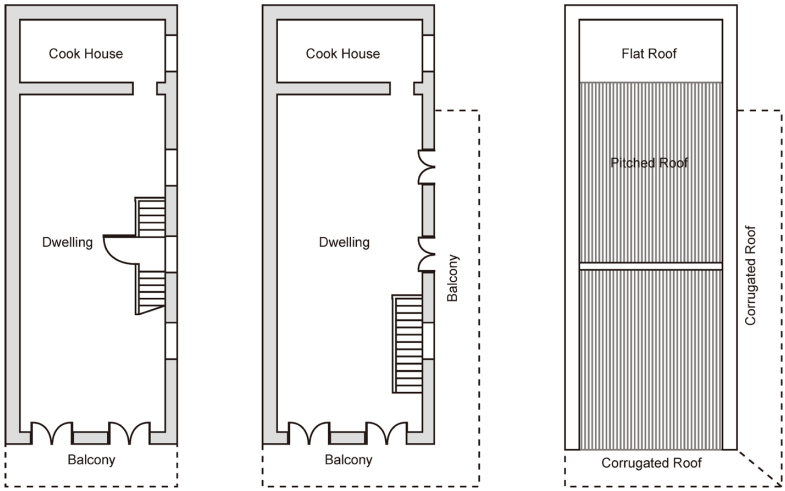


1: The tong lau at 120 Wellington Street was completed in 1884 which housed the famous Wing Woo Grocery. The use of timber floor slabs and beams is very common in this generation of tong lau. This tong lau was once nearly to be demolished (Source: Urban Renewal Authority)

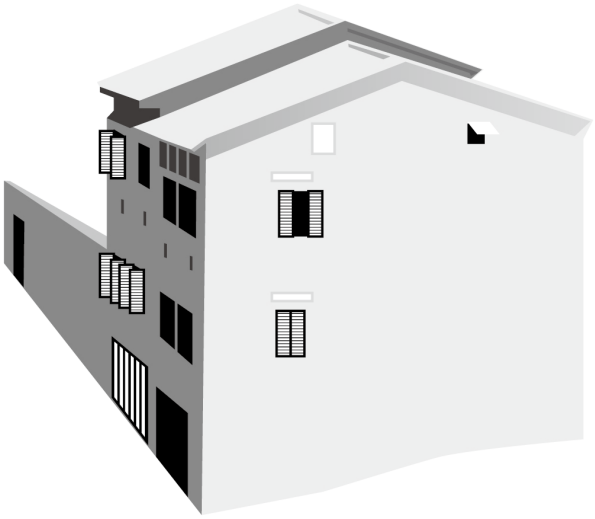
2: The Urban Renewal Authority is currently renovating the structure of tong lau at 120 Wellington Street, Central and promised to reopen it for the public in 2024.

Tong lau with open verandahs in late 19th century at 60-66 Johnston Road, Wanchai. (Source: Urban Renewal Authority)

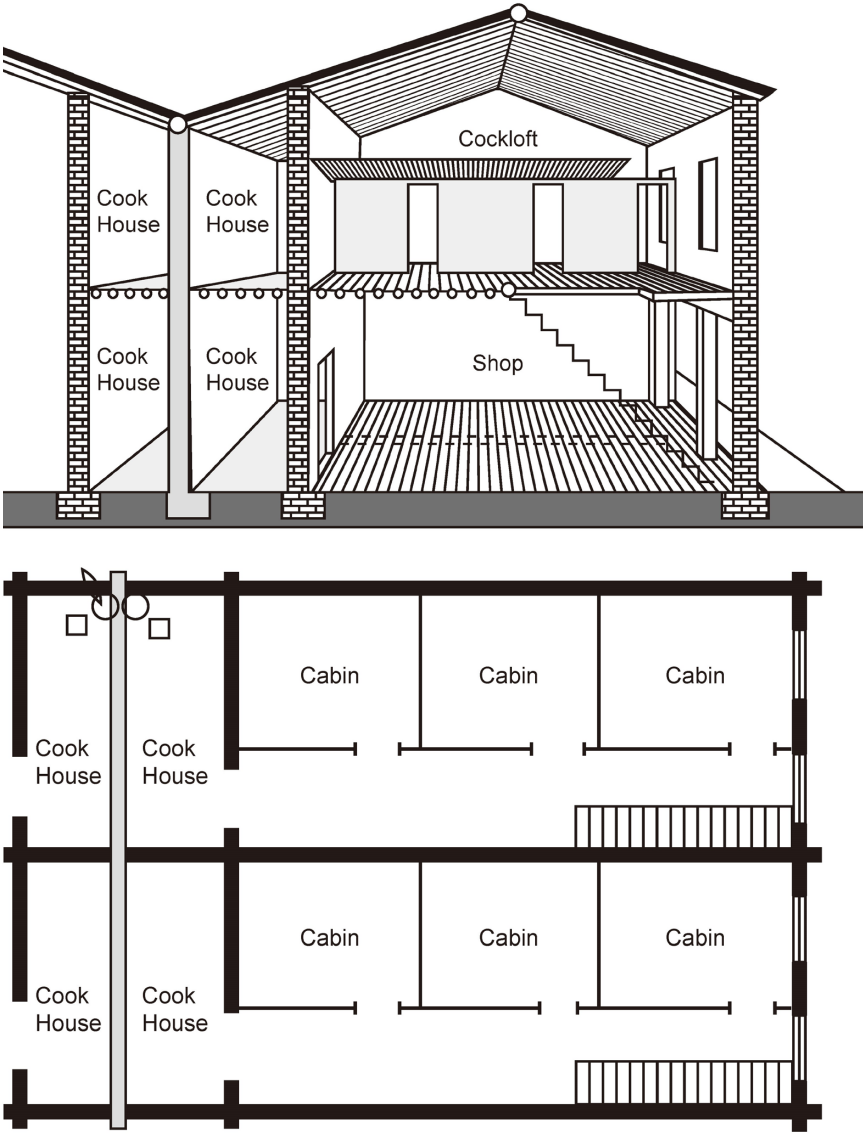
A row of 4 blocks of tong lau has been adaptively reused.



The floor plan of Wellington Street



1st Generation Tong Lau



The layout plan of an early tong lau with reference to Mr Chadwick's Report 1882

1: No 112 Jervois Street, Sheung Wan is the only surviving example of the first generation of tong lau and the fabric and use has not changed much.
2: The shophouse at 112 Jervois Street, Sheung Wan was under repair in May 2022.

The Second Generation
Period: early 20th century (1900s to 1920s)

After the outbreak of bubonic plague at Tai Ping Shan, Central in 1894, the Public Health and Buildings Ordinance was implemented. A higher standard of living space and sanitary conditions had to be included. Building depth was reduced and scavenging lane behind buildings were required. Reinforced concrete construction and cantilevered balconies started to appear on shophouses.

Tenement buildings of more than 4 storeys were not permitted. Ventilation and light are important. The Ordinance requires all kitchens at the back must be installed with windows.

Examples:

Blue House Cluster (1922) : The Blue House has been converted into social housing and a community arts space.

Shanghai Street Shophouses (1920s), 600-626 Shanghai Street, Mongkok. Grade 2

Shophouse, 6 Arran Street, Mongkok (1924). Not graded

117-Nam Cheong Pawn Shop Building, 124 Nam Cheong Street, Shamshuipo (1920s). Grade 2 historic building, degraded to Grade 3

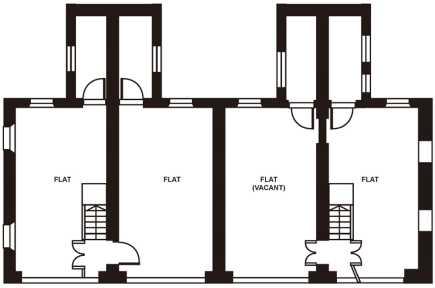
The shophouses at 600-626 Shanghai Street, Mongkok were revitalized.

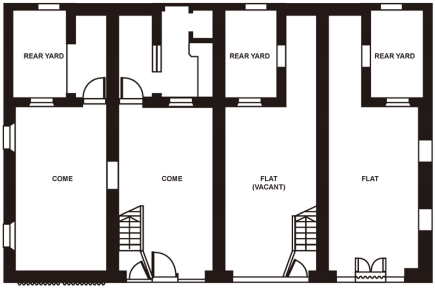
The famous Blue House Cluster is a successful case of revitalization. The spirit of the place is preserved.

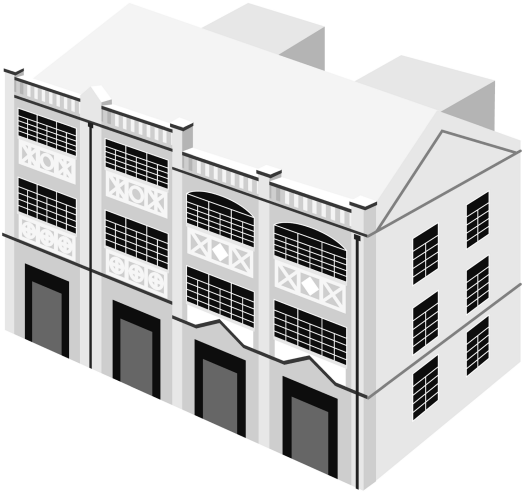
Cultural Significance:

Aesthetic value and social value

The Blue House Cluster won an Award of Excellence by UNESCO Asia-Pacific Awards for Cultural Heritage Conservation in 2017. The major merit of this adaptive re-use project is to retain both people and buildings. Old tenants and new tenants live there under the "The Good Neighbor Scheme" and always come together to enjoy the place. The Non-Government Organisation (NGO) retains the social network of the place which has high authenticity in both tangible and intangible heritage values.







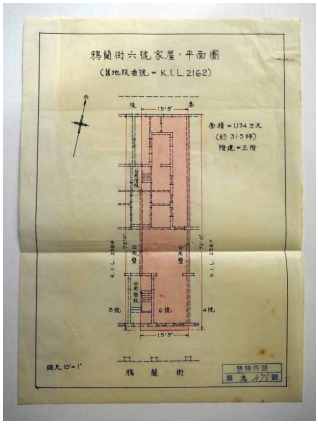
Window for ventilation and light are provided in kitchen of Yellow House.

The Third Generation
Period: pre-war (1930s to 1940s)

At that time, Art Deco became a dominant architectural style worldwide. There were some tong lau built of an eclectic mix of Classicism and Art Deco. Lui Seng Chun is one of 28 blocks of tong lau at the corner site with its distinctive curved corner balustrades. It has been revitalized and converted into a Chinese medicine centre. The row of shophouses at No. 190-204 and No. 210-212 Prince Edward Road West, Mongkok was under the influence of Art Deco. This is a verandah-type tong lau. It is rare to find a row of shophouses to be conserved. Some front shops are still selling flowers.

The shophouse of 6 Arran Street at Mongkok is not a graded building.

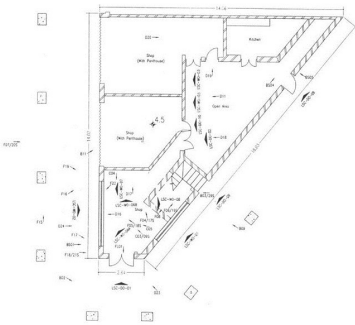
Examples:
Lui Seng Chun (1931) has been declared monument recently.
No. 190-204 & No. 210-212 Prince Edward Road West, Mongkok (1930s). Grade 2 historic building
1-22 San Lau Street adjoining shophouses, Sha Tau Kok (1934). Grade 2 historic building
3 Nam Kok Road, Kowloon City. Not graded (1940s)
11 Yuk Sau Street, Happy Valley (1939-40). Grade 3 historic building
4 Second Lane, Tai Hang. Grade 3 historic building



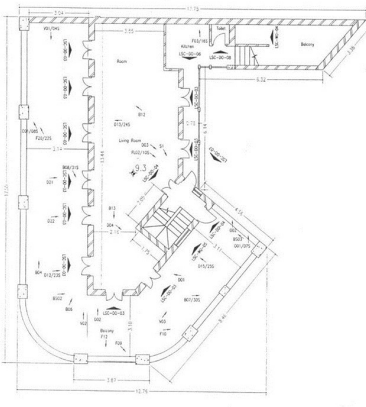
The layout plan of a tong lau.
(Source: Wikipedia)

Cultural Significance:
Social value, historical value and aesthetic value
Lui Seng Chun, Mongkok is one of the surviving tong lau buildings with a curved design in the main front elevation. Its original building fabrics and architectural features are intact with a high degree of authenticity and integrity. New additions that integrate the old

structure are distinguishable. The granite columns support the ground floor and verandah extended to the public pavement and naturally form an arcaded footpath and an area with very good circulation. The adaptive reuse successfully extends the original use of Chinese medicine shop which can benefit the neighborhood and exemplify the past community life of Sham Shui Po.



Lui Seng Chun, Mongkok



The ground floor plan of Lui Seng Chun (above). The typical floor plan of Lui Seng Chun.

No. 51-53 Yen Chow Street, Sham Shui Po (left) The grade 3 historic tong lau was built in 1933 and it is currently an art exhibition venue. It is at 4 Second Lane, Tai Hang. (right)



1: A row of 22 2-storey shophouses at Sun Lau Street, Sha Tau Kok
2: No 113 Bonham Strand East, Sheung Wan Grading to be assessed
3: The Grade 3 historic building at 11 Yuk Sau Street, Happy Valley now houses a photo museum.

The Fourth Generation
Period: post-war

There was a widespread application of reinforced concrete in construction. Tong lau of this generation was no longer limited to 3-storey high and became 6-storey high.

These buildings reflected the greater sophistication of construction techniques. Again, you would find both Western and Chinese architectural features in this typology of tong lau. The design of streamlined moderne is very distinctive. Long balustraded verandahs or corridor-style balconies is the essential element. This later typology of tong lau was replaced by modern patterns of high-rise and high-density development.

Examples:
Chinese tenement buildings on Wing Lee Street, Central
Shophouse on Brown Street, Tai Hang. Not graded
88-90 Staunton Street, Sheung Wan. Grade 2 historic building
190 Nathan Road, Tsim Sha Tsui. Grade 3 historic building
The tenement buildings on Wing Lee Street, Central

The tenement buildings on Wing Lee Street, Central

No 190 Nathan Road, Tsim Sha Tsui is one of the surviving tong lau at corner site.

A row of tong lau buildings in Cheung Sha Wan.

No 88-90 Staunton Street, Sheung Wan

Left: Mido Café, Yau Ma Tei and its streamlined modern tong lau

Right: Tong lau of the fourth generation located on Brown Street, Tai Hang.
Different from the second and third generations of tong lau, the depth of tong lau became shorter. There is always a back lane which complies with the new building ordinance, which could bring about better ventilation.

Cultural Significance:

Aesthetic value, social value and historical value

The significant feature of this generation lies in its streamlined modern architectural style. The signature attribute is its corridor-style balconies stretching across the block. No. 88-90 Staunton Street, Central was famous because the former owner was the founder of Wah Kiu Yat Pao. The tong lau building at No. 190 Nathan Road, Tsim Sha Tsui is currently owned by the prominent entrepreneur Ma Kam-chan's family who owns Tai Sang Bank. These two blocks were once faced with the chance of demolition. The one on Staunton Street was preserved after residents and a concern group raised their opposition. Ma's family planned to demolish the Grade 3 historic building of Nathan Road in 2021. Some conservationists and the Chairman of the Antiquities Advisory Board urged the landlord to conserve the building. The former said the cream-colored building was a blend of the Eastern and Western design characteristics which were common in the pre-World War 2 era.

The Character-defining-elements of Tong Lau

Construction materials and fabric


1


2

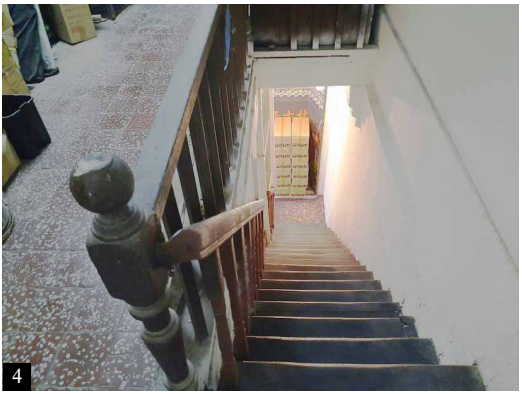

3

1. Load-bearing canton green-grey bricks were used. Use of green-grey bricks for buildings of over 36 feet high was not allowed after the Building Ordinance was enacted in 1889.

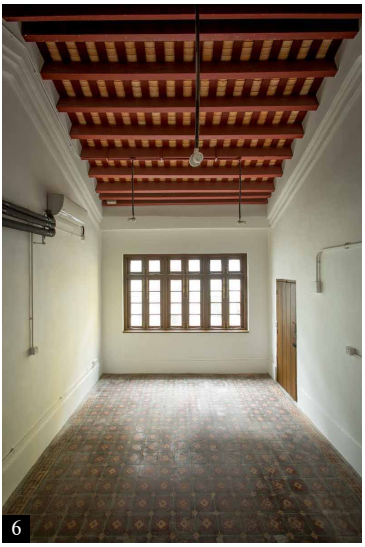
2. Reinforced concrete, blue-painted brick wall façade and thin concrete balconies which are both functional and decorative were used. Flat roofs and interior timber structure can be found.

3. Shanghai plaster is a kind of granolithic cement plaster that emerged in HK around mid-1920s. It became one of the most popular material choices for modern buildings in 1930s.

Timber structure


4

5


6

4. Timber staircase
5. Carved timber panel for decoration at the shopfront
6. Timber purlins and batten under Chinese filed roof

Decorative granite corbel & column

1. The staircase entrance has a small porch formed with Ionic columns supporting arched pediment
2. Ionic columns in an enclosed balcony.
3. The decorative column is distinctive

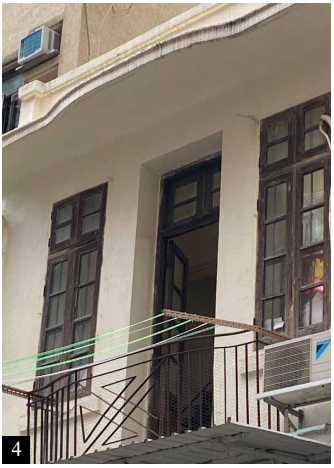
Original granite corbel & columns

Balcony & railing


1


2


3


4

1. Curving balconies at the rear of the upper floor add visible interest to the exterior
2. Balcony with simple railing at 113 Bonham Strand East, Sheung Wan
3. & 4. Balcony with different railings found in Tai Hang shophouses

Signage & flagpole

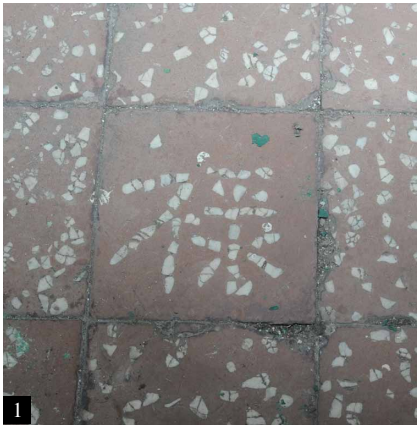

5


6

7

5. Traditional sign is found at the shophouse at Nam Kok Road, Kowloon City
6. Traditional sign at pediment showing the year of construction is very common at Tong Lau
7. Flag pole of Tong Lau

Floor tiles


1


2


3

1. The cement floor tiles with a Chinese character "祿", which means it will bring wealth to the family

2. There are floor tiles of checkerboard pattern found in the tong lau building at 88-90 Staunton Street, Central

3. By preserving the floor tiles, the authenticity of shophouses can be revealed

Kitchen and the use of cockloft


4


5


6

4, 5, 6 Kitchen & chimneys stucks for kitchen

Windows


1


2


3

1. Reminiscent of Chinese Manchurian style, windows with exquisite design of lozenge patterns were fitted with pressed glass of different colors

2. The use of French windows is very common in some tong lau building

3. Geometrically shaped windows are used. Octagonal windows are meant to keep evil spirits out of the home.

The Conservation Principles

Conservation vs development

Tong Lau or the shophouses are often exposed to the risk of demolition. For example, Tong Lau at No. 120 Wellington Street of Central was nearly to be demolished by the Urban Renewal Authority for redevelopment. And many Tong Lau buildings in the urban areas currently house many sub-divided flats. The building safety of Tong Lau may be adversely affected if building works are not properly carried out. Thus, repair and proper maintenance by landlords should be encouraged especially for those pre-war buildings.

Proper maintenance and structural assessment are both important.

Guiding principles for renovations and repairs are necessary

The government should set up a guideline or guiding principles for any renovations or repairs of graded Tong Lau. The landlords must be aware of conserving heritage value, retaining authenticity and integrity, maintaining minimum intervention. To make sure any additions to Tong Lau should be reversible, integrating old and new elements. Careful documentation and regular structural assessment of the condition of Tong Lau are also important.

Action plan for documentation and survey

It is recommended that the Antiquities and Monuments Office could set up a task force to study all remaining Tong Lau in Hong Kong or follow up on the study finished by NGOs or local universities. To proactively find out some Tong Lau with strong heritage values and conserve them in a sustainable way.

Education & public appreciation

Furthermore, we should educate the public and promote Tong Lau as one kind of Hong Kong cultural heritage and unique element of the cityscape. Tong Lau encompasses both Chinese and Western architectural features. They are one of the symbols of Hong Kong, we need to conserve them.

Chapter Three
Get To Know The Building Elements

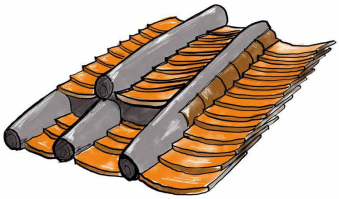
3.1
Roof Coverings

Pitched roofs covered with Chinese tiles dominate the skyline of Hong Kong in the 19th Century. Buildings were constructed with masonry walls and timber purlins as horizontal structural members. The Chinese tiled roof coverings were supported on these timber purlins. Flat roofs are getting more common after 1930s when the technology of reinforced concrete frame structure was developed. Flat roofs soon replaced Chinese tiled roofs and became the major form of roof construction in Hong Kong. Many tong lau built after 1930s had reinforced concrete roof slab. Lui Seng Chun, Mongkok built in 1931 was one of the examples. Before that there was a transition period that buildings were still constructed with load bearing masonry structure but with some horizontal slabs constructed with reinforced concrete. Some of these buildings have Chinese tiled roofs over the main building area while the area above the balconies is covered with flat slab.

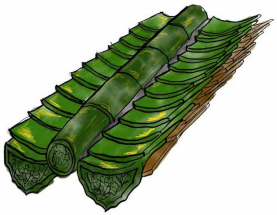
Chinese Tiled Roof

Chinese tiled roof covering is a common feature in most historic buildings in Hong Kong no matter they are Western colonial buildings or Chinese architecture. The roof covering

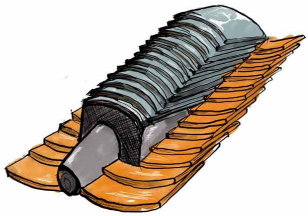
is constructed with clay tiles in the form of roll tiles, pan tiles and sometimes with some decorative tiles at the eave. The most common types of roof covering are as follows:



Double tiles double rolls is commonly found in Western historic buildings



Double tiles single roll is commonly found in Chinese vernacular architecture such as ancestral halls and residential houses



Hakka roof covering is commonly found in village houses

Characteristic of Chinese Tiled Roof

The design and construction of the Chinese tile coverings proved to be effective against extreme weather. The roof covering consists of about 6 pan tiles in a vertical section. It should provide adequate protection against the rain entering the house even if there are a few cracked tiles. The dead weight and the laying of the roll tiles with mortar on top are also proved to provide adequate protection against the wind. For the Hakka roof, though the grey tiles are laid on top of the pan tiles without any mortar as the bonding agent, it is closely packed and provides sufficient dead load to prevent the covering from being lifted up by strong wind. The covering itself, in particular the double layers double rolls, has air space between the layers which improve the thermal insulation and air ventilation of the roof. The tiles are non-combustible material and can provide fire protection.

Common Defects

Dislocation of Tiles

Tiles will slip down due to loose mortar bedding, or the slope of the roof being too steep. This can be identified by horizontal cracks on roll tiles near the ridge. If the upper part of the ridge cannot be accessed for inspection, the eave line can be checked. The eave line should be a straight line in normal situations. If a few rolls project out, it is an indication of slipped tiles.

Sometimes if a whole portion of tiles is cracked and sagged down, it may be caused by the failure of its supporting members. The timber battens or purlins

1. Horizontal cracks on roll tiles near the ridge

2. The eave line is not in a straight line and has rolls projected out at the eave. This is an indication that the tiles are slipping.

3. A portion of tiles cracked and sagged due to failure of supporting members underneath

underneath the tiles may be decayed and fail to support the tiles.

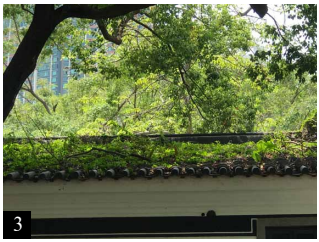
Rainwater Disposal

Water penetration from the slope of the roof is rare since the roof design is effective for disposal of rain water. Rainwater disposal, however, will be affected by blocked roof gutters or downpipes. It is one of the major causes of dampness in masonry walls of Western historical buildings with roof gutters and downpipes. This problem is less found in Chinese architecture as there is usually no roof gutter at the eave. If there is a parapet wall higher than the eave in front, the situation will be even worse. As the water cannot be disposed quickly, it will overflow underneath the tiles and wet the head of the masonry wall, causing damage to internal finishes. In the worst scenario, continuous moisture will cause rotting or termite infestation of the timber wall piece resting on the wall head. Subsequently it will affect the timber trusses or rafters resting on the wall piece, resulting in structural failure of the roof structure. If damp patches are found on the upper part of a masonry wall, it may be an indication of a blocked roof gutter or failure of waterproofing of the precast roof gutters.

Regular inspection and clearance of the debris and blockage on roof gutters is necessary. Most of the roof gutters are at a high altitude. The work should be carried out by workers with safety precautions. To prevent blockage of the gutter by leaves, there is a trend to use gutter brushes in the gutters, but


1


2


3

1. Damp patches indicating failure of roof gutter
2. The drain hole connected to the downpipe was blocked causing water to flow back into the internal side.
3. Leaves and debris are trapped on the roof surface, which affects water flowing down the roof. The trapped water will saturate the tiles and cause water leakage.

regular cleaning of the brushes is still required.

For Hakka roofs, debris like soil or leaves will be trapped in the tiles. This will affect the flow of the water down the sloping roof. If the situation gets worse, water will soak and saturate the tiles, and then water may drip down into the internal area. Traditionally, the occupants would climb up to the roof annually to clear away the debris, replace broken tiles and pack up the tiles after the harvest season. Nowadays, owners are not encouraged to do the work by themselves due to site safety. Depending on the extent of debris accumulation, they shall appoint specialists with adequate site safety measures to carry out the work annually or biannually.

Condensation

Hot moist air will be accumulating at the triangular roof void.

Historic buildings were designed with proper consideration of ventilation by employing ridge vents, louvre openings at the gable end, etc. These vents and openings provide cross ventilation to the humid void space in a natural way to prevent condensation and rotting of the timber structure. However, to achieve thermal comfort, many historical buildings are equipped with air conditioning. The vent and opening were blocked. The hot and moist air will condense on the roof soffit of the room with air conditioning. Therefore, water drops are visable on the purlins. This is always mistaken as rain water penetration from the roof and induces unnecessary or improper repairs to the roof covering. Maintaining cross ventilation and preventing moist air from stagnant in the triangular void underneath the roof can effectively prevent condensation. A simple remedial approach is to restore the original design by opening the

roof vent or louvre openings. Installation of oscillating fans or mechanical ventilation at the void is another approach to prevent stagnant moist air and drawing away the humid air from the void. If there are ceiling panels in the room, provision of openings at the ceiling panels can improve the cross ventilation. Traditionally, the fretted board was fixed on the ceiling for ventilation and as a feature of decoration.


1


2


3


4


5

1. Water drips onto the purlins due to condensation

2. Openings at gable ends were blocked. They shall be opened for providing cross ventilation by means of fixing weather-proof louvre to the openings

3. Oscillating fans at truss to create air circulation at roof space

4. Mechanical ventilation system to vent the roof space

5. Fretted boards as border at ceiling panel for ventilation and as decorative features

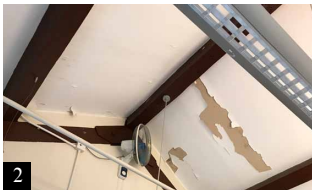
Things not to do

When there is water leakage, without identifying the actual causes, people will treat the tiled roof as a flat roof by applying waterproofing coating onto the tiled roof. This cannot stop water leakage but make the situation even worse. Waterproofing material is typically not very elastic and can be cracked easily on tiled surfaces due to the thermal movement of the tiles. Water penetrated from the upper part of the roof will flow down and flow out at the tiles at the lower part. The waterproofing layer will obstruct the water flow, and since water cannot flow out at the lower part, it is trapped in the tiles and finds its way out by dripping down to the room.

Sometimes people will add insulation boards underneath the battens, thinking it would reduce condensation. Hot moist air will enter the space from outside but not from inside as in Western countries. The dew point for condensation may occur in the space above the insulation boards, and moisture trapped in the space above the boards may cause decay of the timber structure. The boards also blocked the inspection of the roofing and structure elements. The sudden collapse of the roof can occur due to hidden failure of the timber structure.

Electrical fittings shall not be simply screwed onto the purlins. Longitudinal cracks will develop along the purlin due to shrinkage. The fixing may get loose and the fitting may fall eventually. It is advised to fix appliances on the wall instead


1


2


3


4

1. Applying waterproofing at the tiles will affect the smooth water flow of rainwater and should thus be avoided

2. Fixing insulation board at roof soffit will trap moisture at the space above and cause decay of timber elements and hide their failure.

3. Screwing of the light fitting on purlin should be avoided

4. If it is necessary to fix fittings on the purlin, it should be done by circular mounting bracket around the whole section of the purlin

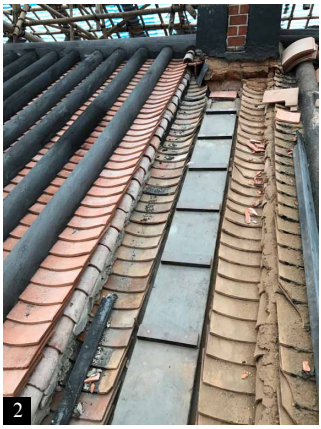
of timber elements. If it is necessary to fix the appliance on the purlins, the fixing shall circulate around the whole purlin.

Things to be observed for inspection and roofing works

When you inspect the soffit of the roof space with traditional ceiling boards, never step on the ceiling board. You can step on the timber joists supporting the boards. For safety and convenience inspection, it is advised to fix walking platforms on the timber joists and install light fitting for illumination in the ceiling void during renovation.

In carrying out the roof surface work, never step on the pan tiles. You can step on the rolls. The best way is to provide walking steps or sandbags at the roof for safe access on the roof surface. Other safety measures like a working platform and personal safety equipment are a must for work on the Chinese tiled roof.


1


2

1. A walking platform at the ceiling void for inspection

2. Climbing steps on roof

Flat Roof

Flat roof became a kind of common roof construction after 1930s. The earliest form of flat roof was constructed with reinforced concrete. It was covered with screed laid to falls and with asphalt as waterproofing material. The asphalt was then protected by screed and canton tiles. Surface channels with drain outlets connected to down pipe was provided for discharging the storm water. Asphalt is a viscous liquid applied on the roof by melting bitumen blocks. The site melting process produces strong smell and causes environmental nuisance. It was replaced by new waterproof-

ing material in the form of liquid applied or in sheet membrane in the 1990s.

Chinese tiled roofing is a breathable roofing. Hot air can escape from the roof. The flat roof, however, is not breathable and heat will be built up on the slab. The top floor will become very hot in summer. Insulation layers are sometimes installed on the flat roof to reduce the heat.

Maintenance of Flat Roof

It is also important to discharge storm water effectively from the roof to prevent ingress of water through the slab. A good fall of the roof to direct water away from the roof is critical. The waterproofing layer is very critical to stop water penetration. Asphalt is a durable and good waterproofing material. With good workmanship and protection for sunlight, it can last for as long as twenty years.

The common defects at flat roofs include accumulation of water due to lack of fall, blockage of the drain outlets and downpipes by debris and leaves. The waterproofing layers are dressed up into the parapet walls at about 150mm to 200 mm above the roof level. If water builds up above this waterproofing level, it will penetrate into the slab through the parapet wall. The accumulation of debris also encourages vegetation growth, the root will damage the waterproofing layer.

The waterproofing also has its functional life. It will lose elasticity over time and become brittle and cracked. Water will seep through the cracks and wet the concrete slab. If damp patches are observed at the soffit of the roof slab and waterproofing has exceeded its functional life, it is time to consider complete re-roofing.

Mechanical damages like puncturing of the waterproofing layers by fixing appliances on the roof are another cause of water leakage. Damaged roof tiles and protective screeding will also accelerate the deterioration of the waterproofing.

Waterproofing at the drain outlets failed easily due to differential material movement. It can be identified by damp patches below the outlets.

Flat roofs need regular maintenance which include clearing of vegetation and debris on the roof, checking the drain outlets and rectify the defects. Scheduled maintenance by arranging complete re-roofing at the end of functional life of the waterproofing shall also be considered. Prevention is better than cure. Dampness on the roof slab will speed up the corrosion of steel reinforcement and lead to concrete spalling of the slab.

Flat roof of Lui Seng Chun, Canton tiles supported on bricks were added on the roof over the room area as insulation against the heat.

Both flat roof and Chinese tiled roof are found in Helena May

Jessville at Po Fu Lum Flat roof of Western residential house covered with canton tiles

Flooding at roof due to blocked drain and downpipe

3.2 Masonry

Description

The term “masonry” is used today meaning bricks or blocks of any materials laid on one another, usually with mortar as a binding material, to form building elements, rather than a simple stonework to which it was once limited. Masonry units consist of different types of bricks, blocks and stones.

Ashlar stone wall

Rubble stone wall

Red brick wall

Grey brick wall

Rammed earth wall

Mud

There has been a long history of the use of masonry as a structural element in Hong Kong. The Buildings and Nuisances Ordinance (No.8 of 1856) stipulated that "The walls of all houses shall be solidly built of bricks or stone throughout and shall be of the thickness of not less than nine inches at the upper story, thirteen and a half inches at the story immediately below the upper story, and eighteen inches at the story (if any) immediately below the said two stories".

Therefore, many colonial buildings and tong lau buildings contain masonry load bearing structures.

Despite the variety of materials, masonry construction as load-bearing elements or façade finishes could be easily found from both the traditional Western and Chinese historic buildings in Hong Kong where rammed earth, mud bricks, grey bricks, red bricks and stones, etc. are popular in construction.

Types of Masonry Commonly Found in Hong Kong

Stone is a common building material in Western architecture. From the Greek and Roman Empire to modern Britain, stone was used in large quantities in various public buildings due to its durability and symbol of eternity.

Granite stone quarries have been found in Hong Kong before the British's arrival. There was enough supply of quality local granite for the building construction works in Hong Kong. In the 19th century, local stone in Hong Kong was used to build the early forms of military and public buildings, the stone façade of the Old Mental Hospital is an example. Many buildings have now been demolished. The Murray House in Stanley is reassembling the Murray House (1846) in Central by cladding the old stones dismounted from the old Murray House on the façade. Besides, the granite struc-

ture of the Old Supreme Court (1912) is another impressive example.

Local residents also used stone to construct their houses. Large stone pieces are too expensive to them. Instead, they used smaller pieces of stones and rubbles to construct their houses. Stone House at Kowloon City is a typical example of rubble wall house. Some Chinese houses and tong lau were also constructed with stone at the front façade or as columns to show their significance.

Court of Final Appeal

Stone facade of Old Mental Hospital (1892)

Stone column of tong lau

In the early 20th century, brick masonry was a typical load-bearing material for construction. Architects from England brought here the popular designs in Britain and adapted them by local materials. In Hong Kong and Mainland China, grey bricks were widely used as building materials. Due to legal and hygienic issues, red facing bricks gradually replaced grey bricks at the intersection of the 19th and 20th centuries and became the colour of many public buildings, such as the Central Police Station Compound (Tai Kwun, started from 1864), Old Pathological Institute (1906), The Old Halls of the University of Hong Kong (1913), YMCA Bridges Street Centre (1918) and King's College (1926), all situated in the Central and Western District. There is an anecdote which claims that the red bricks were initially used as the ballast (heavy materials placed in the ships to increase stability and control) shipped to Hong Kong by the British, and they were later used as building material incidentally. The red brick masonry is also durable and has become a unique scenery in the city.

Grey bricks are produced by adding water to the kiln to remove the oxygen at the later stage of the firing process. Some grey bricks are stronger than common red bricks

Central Police Station Compound

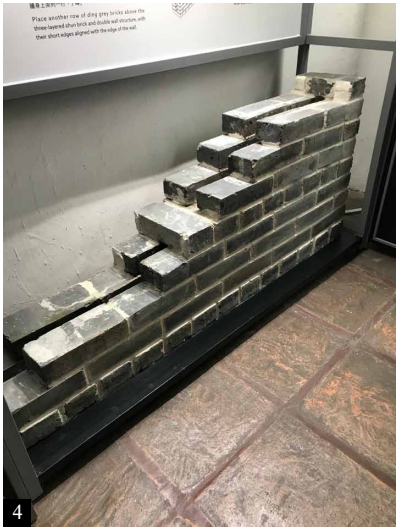
Old Pathological Institute

and with better alkali resistance and durability. These grey bricks can be found as facing bricks in Chinese traditional buildings like ancestral halls, study halls, walled villages and some village houses in Hong Kong. High quality grey bricks were also used in Western historic architecture. The fair face grey brick wall with hairline pointing at Kowloon Hospital is one of the best examples.


1


2


3


4

1. Grey brick wall of Tai Fu Tai Mansion at San Tin
2. Grey brick wall of Kun Lung Wai, Fanling
3. Grey brick wall at Kowloon Hospital
4. Typical construction of a Chinese grey brick wall. Two leaves of stretcher bonds (shun 順) with a cavity between them, the two leaves are tied by a course of header (ding 丁) at regular interval. Common brick bonding patterns include three shun one ding (三順一丁) and five shun one ding (五順一丁).

Earthen Walls

Earthen walls in the form of rammed earth walls or mud brick walls are commonly found in village houses in the New Territories.

Rammed earth walls are formed by laying a mixture of mud, organic fibre or even sugar in thin layers between wooden shuttering and ramming hard to consolidate it.

Mud bricks are formed by molding a mixture of mud with organic fibre into blocks and dried naturally.

Trapped moisture will weaken the strength of earthen walls. Therefore, earthen walls are normally constructed on top of stone plinth to reduce ground moisture. The surface of the walls is usually protected by a layer of earthen mortar or lime mortar and finished with limewash.

The earthen mortar is made from lime earth with addition of different materials like grain shells, straw, grass, etc. Some limewash render mixed with Wu Yin (black carbon soot) was used to provide a dark grey finish. Thin line was pressed onto the render and brick lines were drawn along the line to imitate a grey brick wall.

Many Chinese historic buildings would compose different types of masonry in one building. For example, for some relatively important Chinese houses like ancestral halls, the plinth of the walls was constructed with granite stones or rubble stones for better control of rising damp. Red sand stones were sometimes used to show that members of the clan had certain official ranking in the Qing Dynasty. For some village houses, stones and fair face grey bricks can be found at the most important front façade, while side walls or internal partitions were constructed with mud bricks or rammed earth to save the cost.


1


2


3


4


5


6

1. Mud brick house

2. Lime render of mud brick wall with shells of crops added

3. Elegant front façade with granite stone footing and fair face brickworks. Internal walls and side walls were constructed with mud bricks

4. Wu yin lime render with drawn brick lines

5. Tat Tak Communal Hall at Ping Shan, Yuen Long
The plinth of the wall normally constructed with rubble stones to reduce rising damp

6. Old Stanley Police Station at Stanley

Common Defects of Masonry Walls

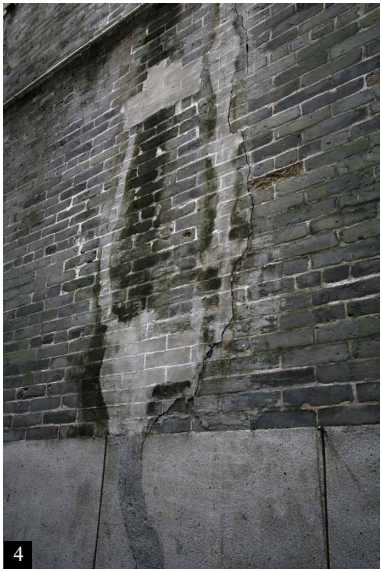
A. Cracking

Cracking may result from a variety of conditions. Structural cracks may be due to differential settlement, decay of timber lintels, overloading or improper alteration, etc. Minor cracking may be the result of moisture or thermal movement. Vegetation growth if unattended may result in structural cracking in the masonry wall.

Cracks normally occur along the pointing of the masonry walls, as it is the weaker part of the walls. However, if the weak pointing is replaced by strong cement pointing, which is stronger than the masonry, cracks will occur at the masonry instead.

It is important to assess the cause of cracks and remove them before carrying out repair. For structural cracks, especially for through cracks, a detailed investigation shall be carried out by building professionals. Structural strengthening works might be required to remove the structural risk. Cracked bricks or stones can be replaced. If the surface of the brickworks is covered with render, plastic repairs – patching defective areas of bricks and stones with a suitable cement sand grout to match the substrate – could be adopted.

If the cracks were caused by application of strong pointing mortar, repointing with lime mortar matching the profile of the original shall be carried out. The mortar shall be softer (measured in compressive strength) than the bricks or stones. Pigment might be added to the mortar to resemble the original.



1. Diagonal cracks along the pointing of a brick wall. A tell-tale (small piece of glass plate) was found at the bottom right corner to monitor the progress of the crack.

2. Cracks along pointing of brickworks

3. A vertical through crack extending from the top of the wall was found near the central courtyard. It was due to settlement caused by alteration works of adding beams and columns for the incense pavilion to the central courtyard.

4. View of cracks from the external side of the wall

B. Dampness

Moisture plays a critical role in the deterioration of historic buildings. Moisture trapped in the masonry walls can induce a lot of problems which include fungal attack and termite infestation to embedded timbers; collapse of earthen walls; brick decay; and staining due to algae growth or efflorescence, etc.

Moisture at the base of the walls can be caused by rising damp, high external ground level or rain splashing from hard surfaces. Rising damp is caused by the suction of groundwater into the base of masonry walls through capillary action. In most of the historic buildings, especially the village houses and Chinese architecture, there is no damp proof course. The plinth of the wall is normally constructed with rubble stones to reduce rising damp. The mortar between the rubble stones can still cause some rising damp problems.

Rain penetration through walls can be the result of cracks in the render of earthen walls, water absorption of the masonry wall itself or defective pointing. Water penetration in brick or stone walls may not have significant problems if the moisture is allowed to evaporate from the wall before it is saturated with moisture. However, if the wall was finished with impermeable plaster or finishes, or cement base pointing is being used to replace the traditional lime based pointing, the rate of evaporation will greatly reduce and the wall will become saturated and cause problems.


1


2

1. The dark stain at the lower part of the wall is caused by the growth of algae. It is an indication of a damp wall. The moisture may be caused by rising damp or water splashing from the hard paving surface.

2. The dampness of the wall was caused by a defective roof gutter.

Moisture at wall head is normally caused by defective roof covering or overflow from roof gutters. Roof gutters are normally found at the eaves of Western architecture. This should be addressed immediately as timber roof structure is supported on the wall head. Moisture will cause decay of structural timber.

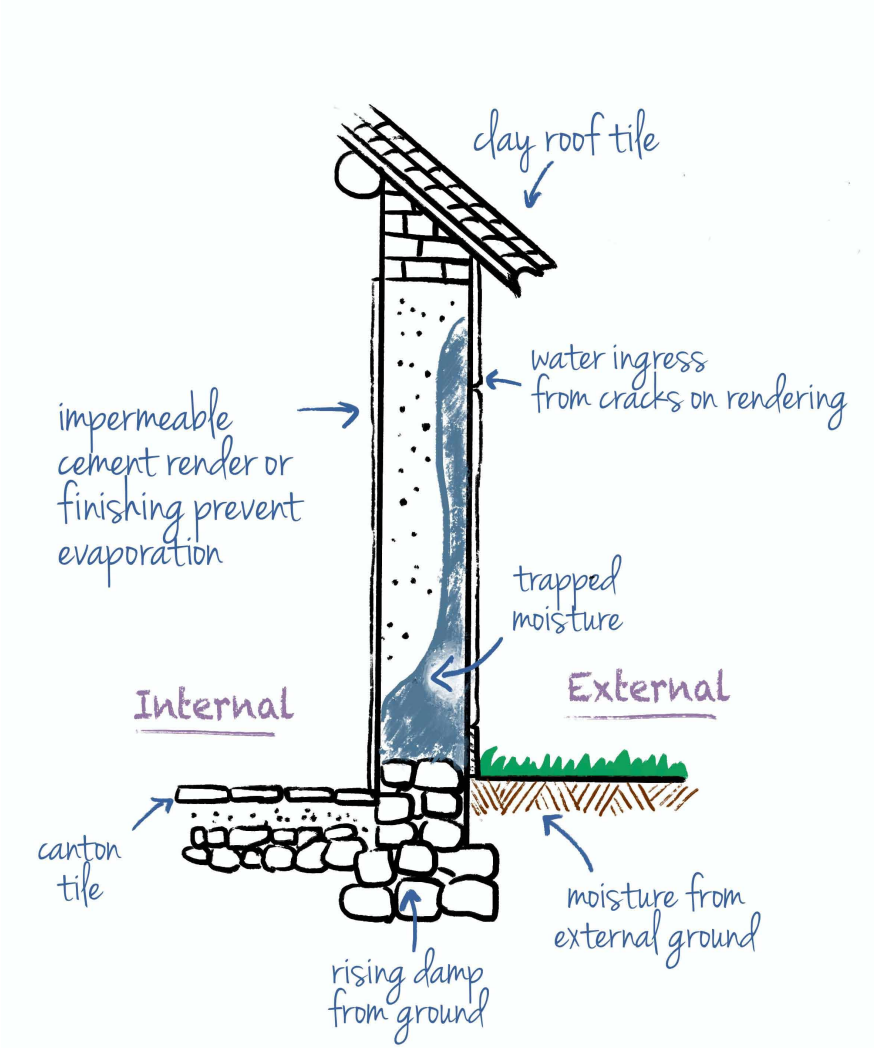
Pitting on mud bricks by insects will increase the risk of water penetration.

Trapped moisture in earthen walls may reduce the plastic property of the walls and pose a risk of structural failure.

It is necessary to identify the source of dampness and rectify it at an early stage. If there is defective drain, it should be rectified as soon as possible. If external space is available, subsoil drain can be installed to lower the water table. If the water comes from the roof, the roof covering should be repaired or the debris of roof gutter should be cleared. The render is an effective protection to earthen walls against wind-driven rain and insects. Patch repair to defective render should be carried out once identified.

C. Staining

Efflorescence is identified by white crystal powder on the masonry surface. As water evaporates from the wall, soluble salts tend to crystalize on the surface and result in efflorescence. Efflorescence may be more unsightly than harmful, but



Dampness problems in building.
Plant growth may also induce moisture into the wall. Insects like earth bees can cause pitting on the wall surface and lead to water ingress.

its presence on an older or historic masonry building often serves as a warning, indicating that water has found a point of entry into the structure. Once this has occurred, more serious damage can usually be predicted.

Dark stains on the wall surface are due to algae growth. It is also an indication of moisture on the wall. Vertical running dark stains may be caused by loss of groove line for dripping or lack of overhang at the wall head to shed the water away.

D. Erosion

The surface, edges, corners or carved details of masonry are slowly worn away usually by the natural action of wind or windblown particles and water. Crystallization of salts just below the surface of the brick can cause brick spalling. There can also be defects in the materials during manufacturing. Bricks will wear quickly if the surface fire coat is eroded. If the erosion is serious, the defective bricks have to be removed using a saw and inserting a new or salvaged brick is required.

Regular inspection, small repairs and routine actions may help to keep our building envelope in functioning properly. John Reskin has said, “A few sheets of lead put in time

Running water stains can be reduced if water drip lines or grooves are formed at the upper frame of the plaster decoration.

on the roof, a few dead leaves and sticks swept in time out of a water course, will save both roof and walls from ruin."

Guiding Principles for Repair:

1. Repair like for like: ensure compatibility
2. Use tried and tested repair methods rather than unproven innovative techniques
3. Minimize intervention: if in doubt, postpone any aggressive masonry cleaning program until the most appropriate therapy is determined.
4. Reversibility: any treatment should be reversible.
5. Appoint only experienced and skilled workers.
6. Adopt a planned preventive maintenance system for the building.

Reference

Alan Oliver, James Douglas and J. Stewart Stirling (1997) Dampness in Buildings, 2nd edition, Blackwell Science Ltd, UK.

1. Brick spalling on some of the bricks

2. Running water stains can be reduced if water drip lines or grooves are formed at the upper frame of the plaster decoration.

3. Erosion of red sandstone due to weathering

G.D. Taylor (2000) Materials in Construction: An Introduction, 3rd edition, Pearson Education Limited, UK.

Jack Stroud Foster and Roger Greeno (2007) Michell's Structure and Fabric Part 1, 7th edition, Routledge, London and New York.

Barry A. Richardson (2001) Defects and Deterioration in Buildings, 2nd edition, Spon Press, London.

Anne E. Grimmer (1984) A Glossary of Historic Masonry Deterioration Problems and Preservation Treatments, Department of the Interior, National Park Service, Preservation Assistance Division, US.

Duncan Marshall, Derek Worthing & Roger Heath (2009) Understanding Housing Defects, 3rd edition, Estate Gazette, A Division of Reed Business Information, London.

ICOMOS Singapore (2019) Conservation Technical Handbook Volume 4 | Structure, Urban Development Authority, Singapore.

3.3
DOORS AND WINDOWS

Doors and windows are the active building elements that connect the external and internal areas and provide access, natural lighting and ventilation, security and so on. There is no major literature concerning the transformation of the design of doors and windows over decades in Hong Kong. However, it can be generally observed that the materials used for manufacturing doors and windows have been changing in different periods of time.

Regardless of the Western or Chinese architecture, timbers and metals are the most common materials used for doors and windows in historic buildings. In the absence of local production of metal doors and windows before the War, the supply of metal doors and windows heavily relied on expensive shipping from Britain, and some from other overseas countries. Thus, metal doors and windows were not widely adopted before the 1950s until the establishment of the factories in Hong Kong and Mainland China.

Steel and iron were the major types of metals used for fabrication of windows in the 1950s to 1970s. They were usually painted for prevention of rusting. In the early 1980s, aluminum windows gradually took over the market due to its higher corrosion resistance and lower manufacturing price. There are no longer standardized factory production of timber and steel/ iron windows available in the market nowadays.

Regarding the condition of the old timber and steel / iron windows, the durability of the materials used and the cost of repair / replacement, owners of historic buildings may opt for complete replacement with modern aluminum windows

instead of cautious repair to conserve the original materials, which requires highly skilled labour and tailor-made components to match with the existing materials.

Apart from materials used, there are different types of windows serving different functional and aesthetic purposes. Casement windows with one or more window sashes swinging outward were the most commonly found in historic buildings. French windows with door-sized “windows” for panoramic views and ventilation were sometimes found in the Western architecture. Windows shutters with operable louvres allow the control of natural lighting and ventilation.

Most of the timber doors in heritage buildings are flush doors where a wooden frame is enclosed by wooden panels on the two sides and panel doors which are assembled by traditional wood joiners. In some Chinese architecture, panel doors / screen doors with exquisite craftsmanship can also be found.

1. Timber casement windows
2. Steel casement windows
3. Timber French windows


4


5


6


7


8


9

4. Timber window shutters
5. Timber flush windows in traditional Chinese architecture
6. Timber panel windows in traditional Chinese architecture
7. Timber flush doors in traditional Chinese architecture
8. Timber panel doors in traditional Chinese architecture
9. Crafted timber screen doors in traditional Chinese architecture

Timber

Timber is prone to changes of the building environment in terms of humidity and temperature. It also faces insect infestation like termite attack.

Common Defects

1. Rotting

Rotting of timber elements is resulted from fungal attack leading to the disintegration of the cellulose and lignin of wood and decay of timber elements.

Wet rot is usually found in damp environment where water accumulates and remains within the wood, e.g. the bottom rails of door / window leaves.

Dry rot is usually found in environment of low moisture content. In addition to the decay of timber, a "fruiting body" of fungus is sometimes found on the infected timber elements.


1


2


3

1. Wet Rot
2. Wet Rot
3. Dry Rot

2. Termite / wood boring insects

Infestation of termite / wood boring insects is one of the most common problems found in timber structures. Mud tubes may be noted around the infected areas.

Specialists should be appointed to carry out disinfestation treatment and skilled carpenters should be appointed for repairing works of traditional timber elements.

4

5

6

4. Termite attack on door jamb
5. Termite attack on door hinge
6. Termite attack on screen doors

3. Weathering

Timber doors / windows facing the external environment are likely to suffer from defects caused by erosion of rain and sunlight. Fading and / or flaking paintworks, cracking and splitting are most commonly found on the external side of doors and windows.

In addition, being one of the character-defining elements often found in Chinese architecture, the door gods painting at the entrance of temples and ancestral halls should be re-painted from time to time.

Flaking paint on timber doors

Faded out door gods painting

4. Wear and tear

Frequent operation of doors / windows may result in minor defects such as worn off paintwork, chipped timber frame / panel, failure / loosening of ironmongeries, etc.

Wear and tear on timber door

5. Deformation and dislodgement

Deformation / dislodgement may occur as a result of structural movement of the building or thermal movement of the timber components. The timber door / windows should be rectified at once if it poses any risk such as disintegration of or falling off of the window sash due to the deformation / dislodgement.

Dislodged timber frame on top vent

6. Vegetation Growth

Vegetation growth is often noted near windows in the presence of fissures and accumulation of water around the window sill. The plant roots may threaten timber windows and lead to water seepage to the interior of the building.

Vegetation growth on window sill

7. Gaps

Gaps between the door / window frame and the wall opening due to rotting / thermal movement of the timber frame or loss of grouting between the frame and wall opening could lead to water ingress to the interior of the building.

Gaps at window surround

Water seepage at window surround

Metal

Ferrous metal, copper-based metal and aluminim are commonly used for manufacturing of doors and windows and associated components like gates and grilles. While aluminim components are widely adopted in modern architecture and are more readily available in the market nowadays, due care should be paid for repair and maintenance works of ferrous and copper-based metal components.

Common Defects

1. Corrosion

Ferrous metals are prone to oxidation in the presence of oxygen and moisture in air and undergo corrosion. Exposure to the damp environment may accelerate the rate of corrosion of metal components, resulting in improper functioning of the doors / windows, cracking of window glazing, water seepage from the door / window opening, etc.

1. Rusted metal door and frame
2. Rusted steel windows
3. Rusted steel windows
4. Rusted metal grilles

2. Flaking Paint

Painting on ferrous metal doors / window frames can protect metal components from oxidation and thus corrosion. However, it is normal for the paint coats to deteriorate and start flaking in a few years and repainting is needed as a preventative measure under regular maintenance.

Flaking paint on metal window frame

Flaking paint on metal windows

3. Overpainting

Where the flaked / delaminated paint layers were not completely removed before repainting, moisture could be easily trapped in between layers when the outermost paint layers start to crack or flake. The corrosion of the metal doors / window frames becomes more serious when the rusted component has not been de-rusted before repainting.

Also, improper workmanship of repainting work on window frames, sashes and hinges may sometimes hinder the normal operation of the windows.

4. Mould / Algae Growth

The metal doors / gates exposed to the damp environment are likely to suffer from mould / alage growth.

Mould and algae growth

Algae growth

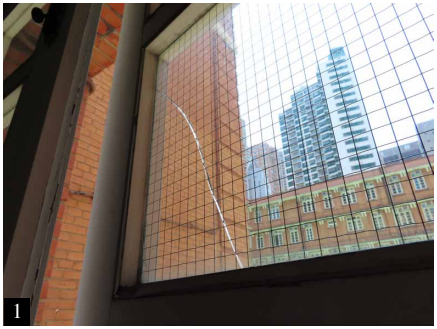
Glass

Common Defects

1. Fracture / Breakage

Fracture / breakage of glass panes on doors / windows are usually caused by physical damage which could be manual impact or damage under adverse weather.

Besides, cracking of the glass panes could also be resulted from frame distortion, e.g. corrosion and expansion of metal window frames.



1. Cracked glass pane
2. Cracked glass panes
3. Broken and missing glass panes on louvres

2. Inappropriate Repair or Modification Works

Inconsistent glass panes with different roughness, opacity, colour and / or pattern, etc., may sometimes be used for partial replacement of broken glass panes.

Defective windows are sometimes boarded up and prohibited from use instead of being rectified.

When some doors / windows are no longer being used, they may be sealed up or painted over.


1


2


3

1. Replacement of glass panes with inconsistent textures
2. Windows without glass panes are boarded up
3. Painted over glass panes

Ironmongeries

Ironmongeries are the components connecting the door / window frame with the door leaves / window sashes and allowing swing of door leaves / window sashes. Their failure or malfunction may result in falling off of door leaves / window sashes and incur imminent danger to the occupants or the general public. Thus, regular maintenance to ironmongeries is essential for normal operation and secure installation of the doors / windows. Common defects of different types of components are discussed in this section.

Common types of ironmongeries:
- hinges;
- knob / lock / handle;
- latch / bolt; and
- window stay / tie bar.

Common Defects & Maintenance

1. Rusting of ironmongeries;
2. Broken ironmongeries;
3. Defective welds on ironmongeries;
4. Overpainting on hinges that hinder normal operation;
5. Corrosion of butt hinges due to bi-metallic reaction between different metals used for plates and screws
6. Detached bolts;
7. Misaligned or deformed bolts / latches


1


2


3


4

1. Detached window sashes
2. Rusted barrel hinge
3. Corroded butt hinge
4. Missing door lock


5


6


7


8

5. Detached bolts
6. Corroded bolts
7. Broken window stay
8. Broken tie bar

Guiding Principles for Repair and Maintenance

Timber

1. Maintain consistent humidity and temperature levels;
2. Regularly varnish the timber elements;
3. Regularly inspect for any insect / termite infestation;
4. Conserve the original material as far as possible; carry out partial replacement of component of same species of timber; or replace the defective component with similar product if it is no longer available in the market;
5. Repair work to be carried out by skilled carpenter and / or craftsman;
6. Record and tag the fittings and all the components with proper documentation before any disassembling works.

Metal & Ironmongeries

1. Maintain steady control of humidity;
2. Remove defective paint, rust and residue and re-apply zinc-rich primer to protect the ferrous metal from oxidation;
3. Replace the defective component partially with the same material;
4. Regular oiling of hinges to maintain the smooth operation of hinges and to prevent rusting;
5. Replace ironmongeries by the same model if it is impracticable to repair the defective part;
6. Avoid further damage to the doors / windows during repairing of the ironmongeries.

Glass

1. Avoid cleaning with corrosive detergents;
2. Repoint with same type of sealant to maintain water-/ air-tightness;
3. Record the types of glass with proper documentation before carrying out any replacement work.

Use of Salvaged Historic Materials

Where the defective component needs to be repaired partially or replaced completely, use of salvaged historic materials collected elsewhere in the building is recommended.

Improvement / Enhancement Works

To consider improvement / enhancement works to mitigate the influence of the existing components with minimal intervention to the original building design.

1

2

1. Addition of lead flashing for improvement of water-proofing design at window opening
2. Salvaged ironmongery of windows and doors

Reference

https://industrialhistoryhk.org/china-kam-moon-morlite-and-standard-manufacturers-of-metal-windows-in-the-1950s-and-60s/

https://industrialhistoryhk.org/shing-y-tang-%E9%84%A7%E5%85%B8%E5%88%9D-pioneer-of-the-hk-nail-and-metal-windows-industry/

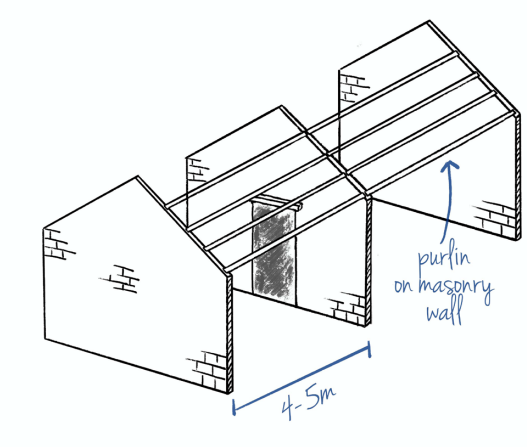
3.4
Timber Structural Element

Timber is commonly used as a structural element in both Chinese and Western historic buildings in Hong Kong until cement was widely used after 1920s. Timber is widely used as roof structure supporting the Chinese tiled roof, in the form of floor joist to support the floor slab and for construction of staircases.

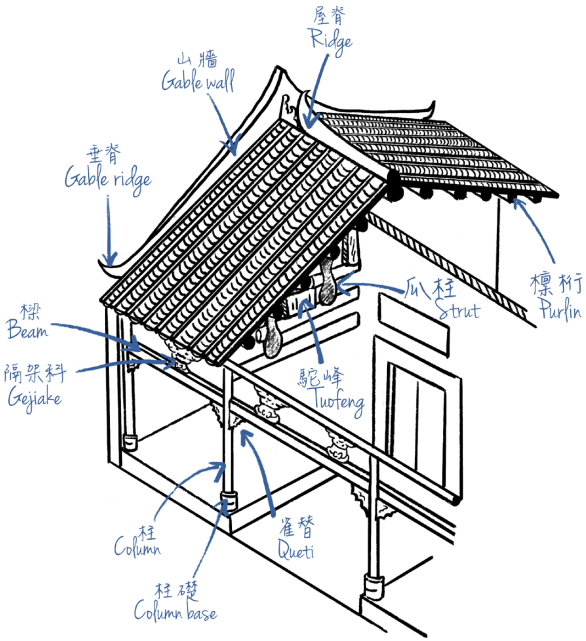
In **Chinese historic buildings**, the timber structural elements are commonly found at the following areas:

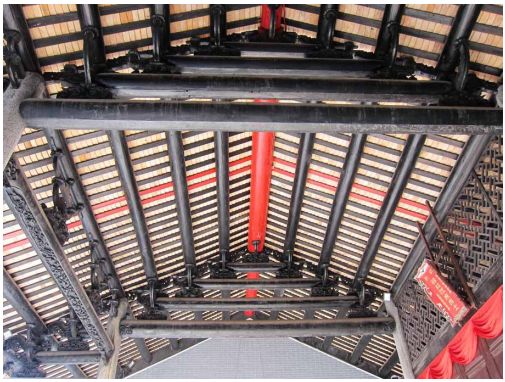
1. Roof

The roof covering is supported by timber purlins and timber battens. For small village houses, the timber purlins are just spanning on two load bearing gable walls. China fir is the most common material for purlins. For a small section of 150 to 200 diameter, China fir purlins can span 4 to 5 meters which limit the spacing of the load bearing walls. It is also one of the reasons why the frontage of most tong lau buildings and Chinese village houses is below 5m. For ancestral halls with a wide frontage, say 12 m to 14m, two sets of beam and strut system supporting on stone or timber columns or internal partition walls are used to bridge the wide spacing to support the purlins each around 4m long. This beam and strut system formed an important feature in Chinese architecture. They may consist of tuofeng, dougong and triangular brackets as structural members and as decorative features. Some beams and struts are richly carved and decorated to show the status of the clans.



Purlins supporting on two gable load bearing walls with a maximum spacing of 5m





Two sets of beam and strut systems between the gable walls to support the purlins. The beam and strut systems are supported on stone columns.

1


2

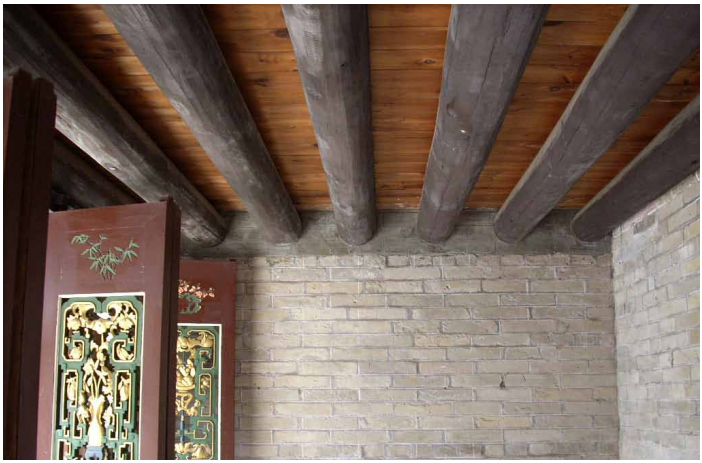

3


4

1. Timber purlins and timber battens of roof at Chik Kwai Study Hall at Yuen Long
2. Richly carved timber beam and strut system
3. Tuofeng at Tai Fu Tai Mansion, San Tin
4. Duogong at Yeung Hau Temple, Tai O

2. Floor & Balcony

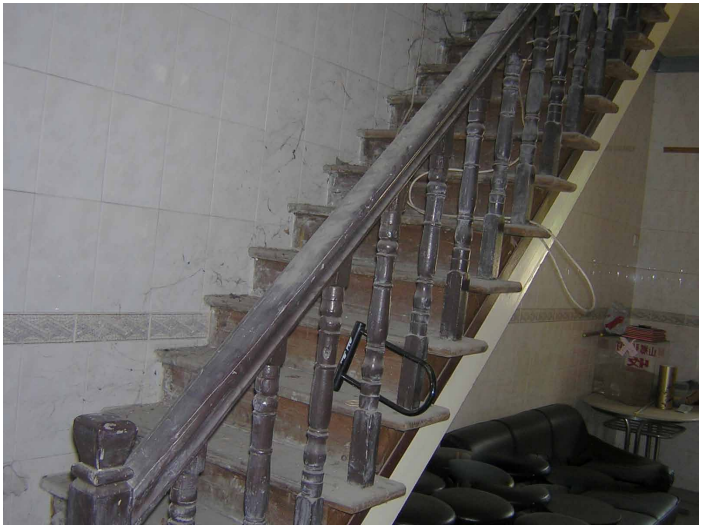
It is also very common that the cockloft, floor slab of a second storey or the balcony in Chinese historic buildings to be formed by timber planks sitting on timber beams supported by the brick walls and columns.



Timber planks and beams for the second storey at Tai Fu Tai, San Tin

3. Staircase

Timber staircases are commonly found in Chinese historic buildings such as Chinese Hakka residence, where timber is used to form the frame, the steps and the railing of the staircases.



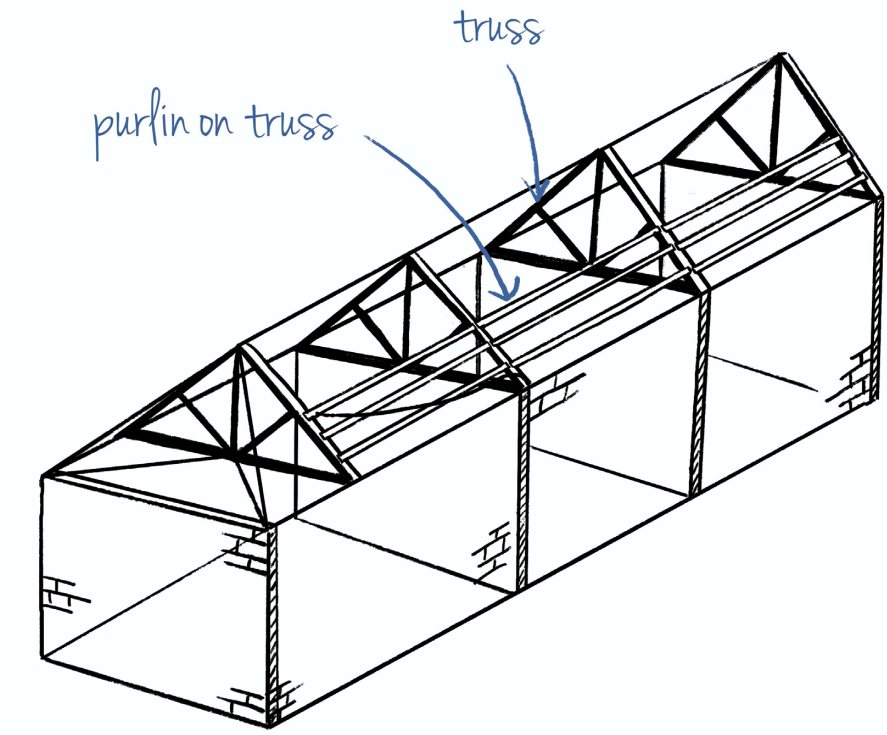
Chinese timber staircase

In **Western historic buildings**, timber structural elements are commonly found in the following areas:

1. Roof

Pitched roof is commonly found in Western historic buildings. Western architecture sometimes employs the long rectangular form with the gable walls at the long-distance end. At the short distance, there are two long load bearing walls. Timber trusses supporting on the load bearing walls form the basic roof structure to support the purlins. The most common roof trusses

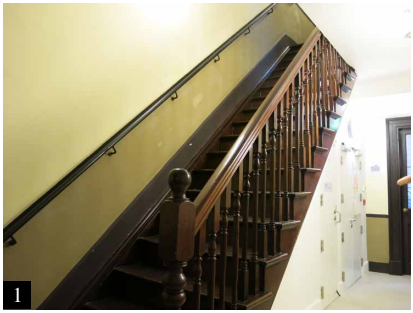
are the king post truss and the queen post truss. For a larger span and high headroom, portal form trusses are used. For example, the St. John's Cathedral, Central, which has a high headroom and long span, has a main portal that was completely rebuilt using timber from a British military ship. The roof of the Chapel (Dining Hall) of the University Hall, the University of Hong Kong is also supported by timber trusses resting on symmetrically placed vaulting shafts.



1. Timber roof truss - Queen Post at Murray House, Stanley
2. Main portal at St. John's Cathedral, Central
3. Timber roof truss - King Post.
4. Timber truss at dining hall of the University Hall

2. Staircase

Staircases in Western historic buildings are sometimes made of timber which are supported on timber strings, carriage and cantilever beams. The steps and railing are also constructed with timber. The railings are important decorative features in a Western house.



1. Timber staircase at Tai Kwun, Central
2. Timber staircase at the Clock Tower, Tsim Sha Tsui

Characteristics of Timber Structural Elements

Timber was commonly used in both Chinese and Western buildings as a supporting frame in Hong Kong as they were economically available from China and Southeast Asia in the early years. Common types of timber used include China Fir, Chinese pine and tropical hardwood like teak and San Cheong (camphor 山樟).

In most of the historic buildings, mortise and tenon joints are used in the timber structure. This construction method has the advantage of taking up vibration so it can withstand earthquake.

Common Defects

1. Termite attack

Termite attack is one of the most common defects found in timber due to the hot and humid weather in Hong Kong. Mud tubes or termite trails are common signs of termites. Mud tubes are shelter tubes built by termites to travel to and from the food source, usually appeared as a long brownish-yellow line on the wall or the timber column or beam. Another sign is termite droppings - termites often leave behind brown-coloured faecal pellets after consuming wood. When tapped on timber attacked by termites, they usually sounded hollow.

Mud tube on timber purlin

Termites damage timber structural elements by consuming the wood inside. The structural elements such as columns or beams then become hollow and therefore are no longer able to support the structure of the building.

Timber purlin damaged by termites. Termite infestation may be overlooked as the termites sometimes consume the internal sap wood, while the external still looks sound.

2. Rot

Rotting is caused by the presence of different types of fungi. Favourable conditions for fungal growth include temperature between 24 to 32 °C, presence of moisture, sufficient oxygen and food, such as wood. The weather in Hong Kong is usually humid and hot, which creates favourable conditions for fungal growth. Water leakage from the roof would also increase the risk of rotting as a continuous water source would increase the moisture content of the wood and hence provide favourable conditions for fungal growth. Sometimes, rotting and termite attack might happen at the same time as the timber structure might have spores or cracks which allow fungi or termite infestation. Signs of rotting include hollowed timber structures and badly infested timber.

1

2

1.Fungal attack at the end of timber resting on the wet wall
2.Timber decay at the end of a timber truss which was embedded in a damp wall

3. Cracks

Most of the cracks found on timber are shrinkage cracks. This is one of the natural characteristics of timber and normally does not affect structural integrity. These cracks are usually minor in size. However, they could sometimes become the home for termites and fungi if favourable conditions are created, such as sufficient moisture and suitable temperature. If the cracks are developed into the centre core, it will affect the structural strength of the timber, assessment by building professionals is required.

Cracks that require attention to are structural cracks. They are caused by overloading and if left unattended, this could lead to collapse of the whole structure.

Shrinkage cracks on timber beam

Restoration and Conservation

Common inspection of timber structure includes checking signs of soft tissues, odour and colour which was caused by moisture or fungus; cracks/splits, distortion and joint having poor integrity which may be caused by structural problems. Sometimes, defect of roof tiles and masonry may be an indication of timber defects. Before doing restoration works, it is important to identify the cause of defects. For example, if it is caused by moisture, it is important to identify and locate the sources of moisture and carry out necessary remedial measure to stop the ingress of moisture before carrying out any restoration of the timber elements. For structural defect, it is necessary to consult building professionals.

Protective Treatment of Timber

Preservative treatment of timber against insect and fungal attack is basically required nowadays. New timber should be processed in the factory before fixing. Traditionally, timber is protected by oil paint to prevent rapid moisture absorption so as to reduce moisture movement within the timber, and to prevent breakdown of lignin by ultraviolet light if the timber is used externally. Tung oil was used to protect timber since ancient China. It can protect timber from moisture absorption and insect attacks as it is believed that many insects do not like the scent of tung oil. Nowadays, timber can be coated with synthetic paint or synthetic resin varnishes or wax for general protection and decoration.

Repair and Replacement

If the timber is infested by insects or fungi and severely decayed, partial or complete replacement might be needed. The severely decayed timber can be cut and replaced with sound pre-treated wood.

Use of epoxy resins and steel reinforcement or other structural strengthening may be considered if there are difficulties to replace the structure elements.

Before replacing the timber structural elements, specialists should be consulted.

3.5
Finishes and Decorative Features

Decoration is an integral part of traditional architecture, whether in Chinese or Western style, it gives aesthetic, social, cultural and religious significance to the plain architectural form. With the rapid social development, ornamentation has become a symbol for expressing the function of architecture and the public spirit of society as well as a convention by which people identify the various forms of architecture.

Commonly used finish materials in Hong Kong

Floor finishes

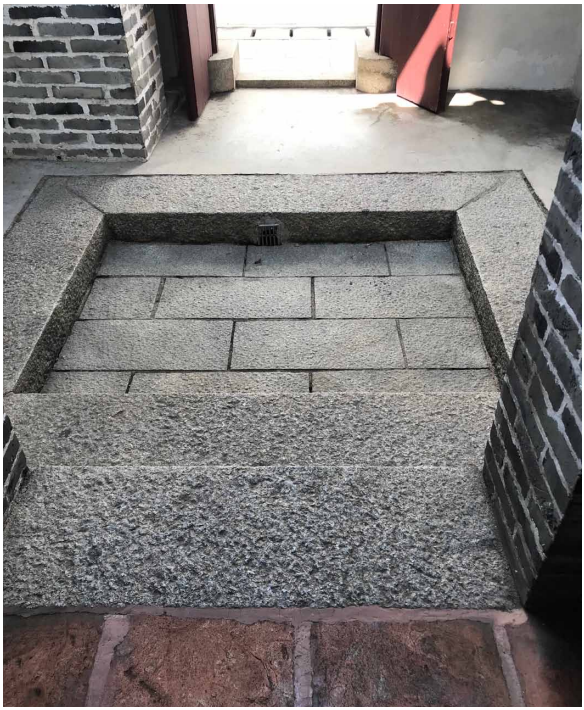
A fundamental requirement of a habitable building is a floor to walk upon. Flooring finishes vary in quality and value from ordinary to highly decorative. As an economic, durable and attractive flooring solution, terra cotta Canton tiles were widely used in the past in addition to natural stone floors. In the late 1900s, high-density porcelain tiles were imported from the United Kingdom, providing a new interpretation of the material. Today, examples of traditional, local and European floor tiles are readily found in Hong Kong. Another hard flooring method type produced locally is coloured cement tiles. Unlike the terra cotta and porcelain floor tiles, they are highly durable and affordable tiles with unique style. Granite is widely available in Hong Kong, reflecting the volcanic geology of the city. This stone type is ubiquitous with local construction and flooring methods.

Floor

Stone

Granite

Granite with the dressed finish was commonly adopted as the stone flooring material.



Granite is commonly found at the courtyard of Chinese houses

Tiles

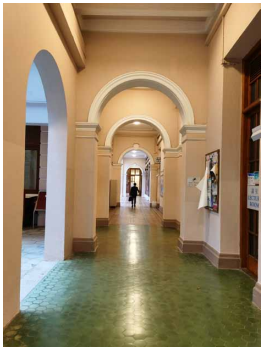
Terra Cotta Canton Tiles

Terra cotta Canton tiles are the most economical of the various hard flooring options mentioned. The fired tile tends to display various shades from brown, red to pink.

Terra cotta Canton tiles paving in a side chamber of a Chinese house

Porcelain tiles

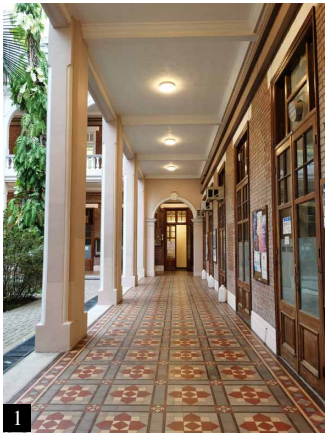
The durability of porcelain is related to its high firing temperature which produces a vitreous tile, resistant to weather and wear. Its ingredients are similar to ceramic tiles but white clay is used instead and mixed with sand and feldspar. Porcelain tiles are either self-coloured (one color) or polychrome (more than one colour), which are referred to as encaustic tiles and can be up to six different colours.



Porcelain tiles on the corridor of the Main Building, the University of Hong Kong

Coloured cement tiles

Unlike clay tiles, cement tiles do not require firing in a kiln, instead, they rely on the hardening action of the cement alone. Local Chinese companies produce industrial quantities of cement patterned tiles. These coloured cement tiles are around 300x300mm, rarely much larger as large tiles are prone to breakage.



1. Enclaustic tiles on the corridor of the Main Building, the University of Hong Kong
2. Mosaic tiles used as flooring at Kom Tong Hall

Mosaic Tiles

The mosaics were created by the Italian glass manufacturer Antonio Salviati (1816-1890) who revived the smalti mosaic technique of the Middle Ages. Mosaic tiles became popular in the early 1970s and they are comparatively cheaper. Some research shows that mosaic tiles were extensively used in more than 80 percent of domestic projects. The glazed surfaces of mosaic tiles produce a self-cleaning property that allows the tiles to be free from dirt and mold and is more cost-effective to maintain. And their hard and impervious surfaces enable them to be vandal resistant and waterproof, and able to withstand thermal changes and weathering.

Wall finishes

External wall finishes play a crucial role in performing these functions, by increasing the durability of the external wall structure, protecting against climatic as a sacrificial barrier and environmental conditions, and providing aesthetic expression. There are many different types of external wall finishes, such as curtain walls, paint, and tiles. The selection of external wall finishes does not only depend on time, cost, and quality tradeoffs, but is also determined by the environment in which the building is situated.

Wall

Paint and Decorative Coatings

Lime-based whitewash

In Hong Kong's hot and humid climate, lime wash—referred to as white liming and whitewash until the mid-1900s—was the most practical of exterior finishes. Lime wash can also be tinted with a range of pigments.

A lime-based whitewash wall.

Modern Paint

Modern paint includes several types such as distemper, washable distemper, cement paint and modern emulsion paint. The colour of the modern paint varies and is typically affected by a powdered pigment (e.g. earthen ochre or mineral sources). Among these, mineral paint has breathability. Modern emulsion paint became widely used in the postwar years and is now the mainstream of building paint today. However, generally designed for modern cement plasters, synthetic paints are film-forming with low vapour permeability, and thus not suitable to serve as the substrate for lime plaster.

Modern paint used on tong lau

Mortar, Render and Plaster

Shanghai Plaster

One of modern Hong Kong's ubiquitous exterior building finishes is Shanghai plaster. This decorative feature could be considered as part of the same family as granolithic and possibly also terrazzo. All three are variations of the same basic recipe of cement, sand and fine stone aggregate. All are protective and durable whilst at the same time used as decorative coatings. It is commonly found in the Western-style buildings in Shanghai and Southeast Asia in the 20th century.

The Shanghai plaster wall finish

Terrazzo

Terrazzo is used to create a smooth surface by grinding and polishing the granolithic render to give an appearance similar to that of polished marble. The history of terrazzo dates back to over 500 years. Terrazzo (Italian for Terrace) floors were invented in Venice during the 15th century. Workers were left with oddly shaped pieces of marble after jobs. They would put the small marble rocks in clay and grind them flat for a more comfortable walking surface.

1. Terrazzo sign and columns of 1 Queen's Road West, Sheung Wan
2. The detail of terrazzo

Ceramic tiles

Ceramic is created with white, red or brown clay that is combined with sand, lime, kaolin, feldspar and other ingredients depending on the materials and performance required. Historically, glazed ceramic tiles were used for walls and occasionally incorporated into fireplaces, furniture and other items. Glazed ceramic tiles can withstand normal wear and tear well and are washable. Therefore, they are relatively easy to maintain. Being relatively straightforward to produce, durable and simple to clean, ceramic tiles were widely used in bathrooms and kitchens. As buildings became larger in Hong Kong for both public and residential occupancy, tiles also became a popular choice for stairwells and public spaces, such as hallways.

The incorporation of glazed ceramic tiles in fireplace

Decoration and Ornamentation

Very fine decorations are found inside and outside village buildings. Most of these are in the form of paintings, carvings, moldings and ceramics. The excellent craftsmanship and techniques reflect the creative power and skills of the craftsmen of historic architecture. Due to different cultures, the decorative features of Chinese architecture and Western architecture are different.

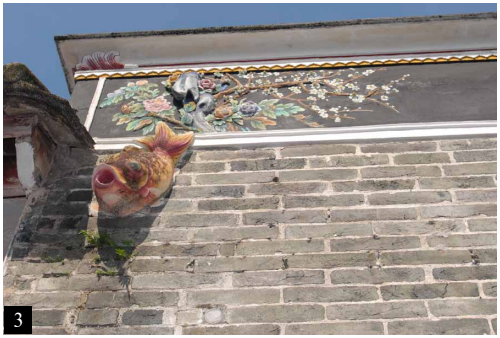
• **Chinese Architecture**

Chinese architecture has diverse art forms which attribute to the rich decoration and ornamentation of the different architectural structures. Ancient craftsmen used different materials like bricks, tiles, plaster, stones and a wealth of colours of glaze and paint to create a distinctive colour ambiance using contrast, harmonization and interplay. They are good at painting, carving and sculpture which enhance the ideological content and expressiveness of buildings.

Built-in wood structure, most of the pillars, purlins, tie beams and bucket arches were completely exposed so that people can clearly see, which also give the craftsmen an opportunity for art processing. As an essential part of Chinese architecture, it embodies people's plea to heaven and is an important testament to the 'unity of heaven and man'. Consequently, the decoration of the roof is in no way inferior


1


2



3

4

1. A richly timber crafted beam and strut system of Tang Ancestral Hall at Yuen Long
2. Plaster decorative ridge of Tang Chung Ling Ancestral Hall at Fanling
3. Plaster decorated wall frieze and a fish water spout of a roof gutter
4. Carved timber door of the side chamber of Tai Fu Tai Mansion at San Tin

to that of other parts of the structure and can be argued that it was even more elaborately decorated. For instance, the zoomorphic ornaments on the roof ridge, the brick carvings of the corbie gable, and the zoomorphic ornaments on the vertical ridge. The interior beam frame structure of most vernacular dwellings in Hong Kong was completely exposed and is always the focus of carvings. The doors and windows of Chinese architecture are the parts that come into most contact with people, and there is certainly a concentration of decoration on them.

• **Western Colonial Architecture**

The 150-year-old colonial city left behind a group of valuable architectural heritage structures. In order to adapt to Hong Kong's climate, the colonnaded open verandahs always dominate the facade of the colonial buildings to give the front elevation a classical appearance.

And to add a sense of solemnity, columns became the main architectural language, with decorative treatments on the top and bases of the Roman arch. The top gable is often decorated with triangular gables to reduce the dullness of the roof level. The pitched roofs reflect an adaptation to the subtropical climatic conditions in Hong Kong.

1. Old Stanley Police Station at Stanley
2. Triangular gables of Old Stanley Police Station

There were also domed corner rooftop pavilions and central tower projecting to create a dramatic roofline, enlarged keystones and other components of Italian Baroque. Repetitive elements such as windows, balconies and verandahs add to the overall richness and layering. Some windows of the church are ornate with carved granite and trimmings such as angular carved hoods above the windows.

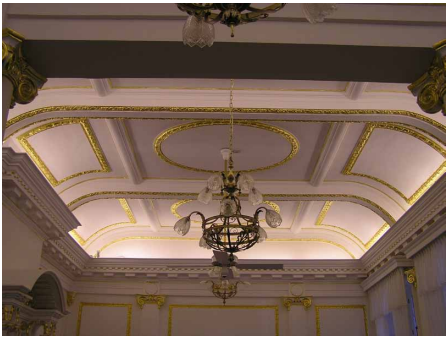
Towers are often seen as polygonal or round, which is a distinctive feature in Queen Anne-style houses. They are often accompanied by round turrets. Adding to this multi-layered effect, wrap-around porches are commonly seen on Queen Anne style houses.

Windows with carved granite framing in the form of trefoil-headed tracery, Kowloon Union Church at Yau Ma Tei

Segmental-arched pediments and arched doorways are always found in the Edwardian Classical Revival style. Rough-cast rendering, wide overhanging eaves, arched windows and doorways, and arcaded verandahs are also the typical features of the Arts and Crafts style.

Towers on the roof of Jessville

Ceilings in Western colonial architecture were normally built with substantial wooden joists with plaster applied to laths or, in more modern buildings, plasterboard nailed to the joists. In houses built before 1939, ceilings were usually constructed from laths, i.e. thin wooden slats which were nailed to the joists, coated with plaster that oozed between the laths and which, once became dry, locked the plaster to the laths. Distemper can be one of the various types of decorative finish, and it can be used both on the wall and ceiling. Distemper and water paint fell out of use by the 1950s with the advent of acrylic (latex) paints.



Decorative ceiling with plaster molding at Kam Tong Hall, Central

Distemper ceiling of the Main Building, the University of Hong Kong.

The largest and most conspicuous elements of decorative metalwork in historic interiors are staircase balustrades and balusters. Wrought ironwork is composed of bars of iron, heated and hammered into scrolling shapes that can be welded together to form balustrades, gates and screens of almost any size. The shape, material and size of balustrades are varied, while the balusters are fixed by the longitudinal ornaments, which are the link between the two columns, using the distance formed by the columns to give the building façade a sense of rhythmic beauty.

The iron staircase baluster of Tai Kwun, Central

The baluster of the Main Building, the University of Hong Kong.

When it comes to the modern period, it was felt that the form of buildings should come from their function and useless ornamentation was redundant. The role of ornaments of providing visual pleasure and making distinctions came to be fulfilled not by carved or gilt forms but by the grain of planed wood, the veining of stone veneer, the shine of chrome, the tint and reflectivity of glass, and the saturation of paint and white paint.

Maintenance of External Finishes

Building envelopes are expected to provide a barrier between occupants and the external elements of wind, rain and uncomfortable thermal conditions. They are also expected to be durable, attractive and stable. One of the functions of the external finishes is acting as a sacrifice layer to protect the building elements. They are therefore subject to wear and tear and need to be repaired or replaced regularly.

Tiles and Stones

Tiles and stones are considered to be very durable materials. For floor tiles, the most common problem may be wearing out because of heavy traffic. Staining is also a major concern for tiles. In areas prone to be stained with food, oil, etc., a sealer

may be appropriate to protect the surface. For wall tiling, debonding is a major concern as it will cause a safety hazard. Tiles may separate from the bedding, render and even the concrete substrate and the dislodgement may lead to the cracking.

Ageing and wear of floor tiles

Damaged tiles were replaced by improper tiles

Abrasion of floor tiles without causing hazards such as slipping or uneven surfaces is acceptable. Small areas of tiles that have debonded may be patch repaired with tiles as close in color as possible to the original and the exact matching is preferred. Floor tiles shall be cleaned with the appropriate cleaning agent, otherwise, it will damage the finishes. For example, the acidic solution may stain the granite stone. Steam can be used to clean the tile, but excess water from runoff can cause problems by saturating the floor and walls.

Paint and Decorative Coatings

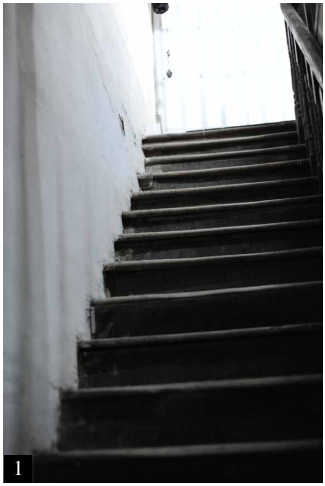
Paint coating is the most common finish and its common defects may be due to various underlying causes, e.g. ultra-violet (UV) light, driving rain, vegetation and animal waste. Pollutants may also cause chemical reactions of components in the coating, leading to discoloration or breakdown. The presence of excessive humidity may cause mold growth, which could infest and stain painted surfaces. Wear-and-tear to accidental impact and inappropriate

or inadequate maintenance are other common causes. Water seepage, rising damp from the ground, and biotic attack and salt crystallization are problems that commonly affect the substrate, leading to issues such as poor adhesion, chemical degradation, efflorescence and volumetric expansion of the paint or coating material.

Life span of paint coatings is limited and it is recommended to consider redecoration according to manufacturer's recommendation. A proper maintenance regime should include periodic cleaning and touch-up and periodic inspection so as to extend its lifespan.

Granolithic

Granolithic finishing materials such as Shanghai plaster or terrazzo are more durable than paint as they are cement materials. Hairline cracks may be developed due to thermal movement. Staining and building up dirt on the surface over time is one of the major concerns for these finishes. Before


1


2

1. Peeling of the painting on the wall
2. Efflorescence and volumetric expansion of the paint.

repairing granolithic, the substrate needs to be correctly prepared, i.e. cleaned, free of dust, dampened, etc. Cleaning of granolithic finishes with chemicals shall be avoided before obtaining expert advice. Cracking and debonding may occur if there is a failure of the substrate that they rest on. No repair is required if minor defects like shrinkage cracks are found. Attention should be paid to respecting the authenticity of the original shape during the repair process. The inappropriate repair like saw cutting the cracks and filling it up will cause more aesthetical and integrity damages than leaving it alone. If there is debonding, it is advised to consult a building consultant.

Reference

HKICON and ERA Architects Inc. (2020). Heritage Conservation in Hong Kong A TECHNICAL GUIDEBOOK. HKICON.

Hilary Davies. (1998). Repair methods for tile-clad buildings in Hong Kong. MCB University Press.

Forest Products Laboratory. (2010). Wood Handbook Wood as an Engineering Material. United States Department of Agriculture.

Stan Lebow, Ronald W. Anthony. (2012). Guide for use of wood preservatives in historic structures. United States Department of Agriculture.

ICOMOS-ISCS. Illustrated glossary on stone deterioration patterns. ICOMOS International Scientific Committee for Stone (ISCS).

John Pendlebury and Tim Townshend. (1998). An Illustrated Glossary of Architectural and Constructional Terms. University of Newcastle.

Charlie Q.L. Xue. (2016). Hong Kong Architecture 1945–2015 From Colonial to Global. Springer Nature.

Jonathan Massey. (2013). Ornament and Decoration. London: Bloomsbury Academic.

Lee Ho Yin and Lynne DiStefano. (2009). Tong Lau: A Hong Kong Shophouse Typology. The University of Hong Kong.

Lee Ho Yin. From Moderne to Modern: Art Deco and Bauhaus Architectural Heritage in Hong Kong. The University of Hong Kong.

Urban Redevelopment Authority. (1997). Conservation Guidelines Technical Supplement. Urban Redevelopment Authority.

Urban Redevelopment Authority. (2020). Conservation Technical Handbook

A Guide for Best Practices. Urban Redevelopment Authority.
Antiquities and Monuments Office. (2020). Western School Buildings of Hong Kong. Antiquities and Monuments Office
Antiquities and Monuments Office. (2020). Historic Building Appraisal No. 578 Canton Road, Yau Ma Tei, Kowloon. Antiquities and Monuments Office.
Antiquities and Monuments Office. (2020). Historic Building Appraisal No. 190 Nathan Road, Tsim Sha Tsui, Kowloon. Antiquities and Monuments Office.
Antiquities and Monuments Office. (2020). Historic Building Appraisal No. 120 Wellington Street, Central, Hong Kong. Antiquities and Monuments Office.
Antiquities and Monuments Office. (2020). Heritage Appraisal of No. 6 Stewart Road, Wan Chai, Hong Kong. Antiquities and Monuments Office.
Antiquities and Monuments Office. (2020). Heritage Appraisal of Lui Seng Chun. Antiquities and Monuments Office.
Antiquities and Monuments Office. (2020). Heritage Appraisal of Nos. 109 and 111 Lockhart Road, Wan Chai, Hong Kong. Antiquities and Monuments Office.
Michael Forsyth and Lisa White. (2012) Interior Finishes & Fittings for Historic Building Conservation. Blackwell Publishing Ltd.
香港 . 發展局, and 廣州大學. 嶺南建築研究所. 景賢里復修工程誌. 香港]: 發展局, 2012. Print.
HO, D. C., Lo, S. M., Yiu, C. Y., & Yau, L. M. (2004). A survey of materials used in external wall finishes in Hong Kong. ol. 15 Issue 2 December 2004.
https://www.thespruce.com/queen-anne-house-5220474
https://www.thespruce.com/victorian-architecture-4769162
https://www.designingbuildings.co.uk/wiki/Edwardian_architecture
http://www.vam.ac.uk/content/journals/research-journal/issue-no.-7-autumn-2015/out-of-the-shadows-the-faade-and-decorative-sculpture-of-the-victoria-and-albert-museum,-part-1/
https://evewaldron.com/blogs/news/design-history-edwardian
http://www.bricksandbrass.co.uk/design_by_element/ceilings/ceilings_in_period_houses.php
https://www.amo.gov.hk/en/historic-buildings/monuments/kowloon/monuments_45/index.html
https://www.amo.gov.hk/en/historic-buildings/monuments/hong-kong-island/monuments_100/index.html
https://www.amo.gov.hk/en/historic-buildings/monuments/kowloon/monuments_116/index.html
https://www.amo.gov.hk/en/historic-buildings/monuments/hong-kong-island/monuments_60/index.html
https://www.buildingconservation.com/articles/encaustic-tiles/encaustic-tiles.htm

3.6 Vegetation

Located in the humid-subtropical area, the climate of Hong Kong is ideal for a rich variety of flora and fauna, even in the urban areas with the harshest growing environment. For example, on the stonewall and the tiny cracks of the built structure, we can still find plants growing on it. Green landscape and buildings that feature greenery are always regarded as a merit to the environment and are known to be beneficial to people. However, property owners and managers should also be aware of the damage that plants may bring to the building structure.

Benefits of Vegetation to the Surrounding Environment and Buildings

Green landscape is beneficial to our living environment. Through thoughtful planning of various trees, shrubs and vegetative ground covers, establishment of greenery in the surrounding spaces can create a fresh, beautiful and comfortable environment that can help fight climate change, improve living conditions and contribute to health and well-being.

Plants help filter particulates and other pollutants from the air, and purify the air as plants can absorb gaseous contaminants. The sound generated by trees and plants is generally considered to be quite pleasant both directly (rustling) and indirectly (birds), and it can partially mask other noises. Trees particularly improve air quality and reduce noise nuisance effectively due to their size and volume, and dense vegetation can screen off the buildings from sources of air and noise pollution such as traffic and industry.

Greenery also contributes to enhance biodiversity in urban areas as plants provide food and a habitat for wildlife. Pollen, nectar and fruit bearing trees, shrubs and perennials in the surroundings can attract insects, birds and small mammals, and green roofs and façades can act as links between different green areas.

Furthermore, greenery can moderate the temperature in the urban areas and therefore reduce energy usage. Traffic and industrial activities emit heat, and hard surfaces such as roads and buildings absorb more radiation from the sun. That's why average temperatures in the urban areas are generally higher than that in the rural areas (the "heat-island" effect). Urban greenery provides cooling to the surroundings by providing shade, evapotranspiration and reducing solar radiation. Green roofs even provide insulation effect and passive cooling function to buildings, and thus reducing energy consumption on air-conditioning.

Last but not least, green living environments can benefit mental health. It can defuse stress, and may help prevent stress-related conditions such as cardiovascular diseases, depression and anxiety disorders.

How Do Plant Become Problematic to Buildings in Hong Kong

1. Trees

In Hong Kong, the majority of trees growing on the built structures are banyan trees, most of them are Chinese Banyan (Ficus microcarpa). The strangling habit of banyan is vital for its presence on the built structure. Starting from tiny seeds scattered on the cracks and joints by birds and bats, aerial roots of the seedling immerse through the gaps between masonry or cracks on the structure for soil and water. The aerial roots of the seedlings are established on the

vertical surface or the roof of buildings, and consequently envelop the built structure and grow into big trees. Since the aerial roots can develop into new trunks rapidly after they reach the ground, the banyan trees can grow even larger on the built structure. When Typhoon Mangkhut struck Hong Kong on 16 September 2018, the wall of a tong lau building in Tai Kok Tsui fell when a tree growing on it was pulled out by the intense wind.

Also, if there are trees growing adjacent to the buildings which have structural defects involving cracks, fissures, cavity or decay on branches, hangers, co-dominant stems and girdling roots, they are prone to failure and cause damage to properties, in particular during May to September that occasional showers, thunderstorms and tropical cyclones occur.

The Chinese Banyan growing on the vertical surface of a building

2. Climbing Plants

Climbing plants grow up high for sunlight and over buildings by attaching themselves to the nearby walls through a variety of structures, such as tendrils, adhesive discs, thorns and adventitious roots. For example, diverse-leaved creeper (Parthenocissus dalzielii) has tendrils tipped with adhesive discs that can affix to walls. Night-blooming cereus (Hylocereus undatus) and creeping fig (Ficus pumila) use adventitious roots to attach themselves to walls. Thousands of these attachments and penetrations can result in damage to the built structures. They can drain moisture from the walls and dislodge masonry, also damage the mortar on pointed brickwork, prise the mortar away on the rendered surfaces, allow water to encroach and cause further damage.

Climbing plants including diverse-leaved creeper and creeping fig growing on the vertical surface of a building

Fern and small trees growing on the vertical surface of the building. Moss stains can also be found.

3. Mosses and Weeds

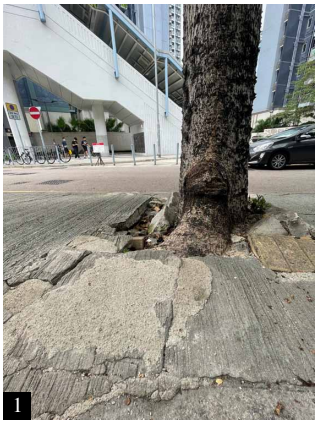
Although mosses and weeds are small in size, they can also become a problem on buildings by erosion. Not only the roots allow water to encroach into building materials, the natural acids excreted may then react with the alkaline materials used in construction, further weaken the tiles and bleach the colour. Together with the moss stains, it makes the buildings look old and unattractive. Besides, these small plants provide cover for fungus, which is much more destructive to the wooden materials.

Problems Caused to Built Structures

1. Foundation

Tree roots constantly extend themselves to look for water and nutrients. Tree roots can displace the soil around them and dry out the soil, and cause the soil to shift. Since the foundation is supported by the surrounding soil, when roots grow larger or draw out the soil moisture, the foundation starts settling and become unsupported. When soil shifts, support beams shift, walls crack, and ceilings become uneven.

Tree roots can also stick up and buckle pieces of concrete sidewalks or pavers and may create a tripping hazard.



1. Tree root sticking up the pavers

2. Tree roots can dry out the soil and cause differential settlement to building

2. Walls

On pointed brickwork, climbing plants with attaching structure can result in damage to the mortar, while on rendered surfaces, the plant can actually prise the mortar away from the wall, allow water to encroach and cause further damage.

Plant roots may result in cracks or enlarge cracks which can retain water and allow small animals to penetrate in. Plants also retain moisture and cause chemical deterioration of building materials. Further, substantial growth of plants may hide the problems of the building materials underneath.

1. The plant root penetrates to the mortar of the brick wall

3. Roofs

Plants with aggressive roots can move tiles and makes holes on the roofs, and can cause water seepage.

Also, the plants and their debris will facilitate the accumulation of water and increase the weight to the roof, which may bring safety risk to the structure, in particular for wood structures and tiled roofs.

Large tree limbs and branches hanging over the rooftop could become dangerous during the storm, and it could cause serious damage to buildings when branches or limbs fail. Also, damage to roofs may occur if tree branches rub the roof over time.

1. A tree branch rubbing and hanging over the roof
2. Plants growing over the roof
3. The plant roots penetrate the roof of the building.

4. Gutters and Rainwater Hoppers

When certain debris such as leaves and twigs from nearby trees and clumps of moss accumulate in the gutters and rainwater hoppers, and mix with the rainwater off the roof, it creates a perfect environment for plant growth. Plants can block the gutters, making them unable to drain away the rainwater and thus causing the collected rainwater overflow. Plants also attract wildlife such as birds, rats and insects, and all of them may cause damage to buildings and nuisance to occupants.

1. A banyan tree growing from the gutter and in the rainwater hopper
2. Old Stanley Police Office at Stanley

What to Do

1. Routine Inspection and Preventive Maintenance

Inspection is particularly important before the rainy and storm season. Litter and debris on the roof and rain gutters should be removed to avoid drain blockage. Failure to do so will result in overflow of rainwater and cause excessive moisture on the walls and in the foundation of buildings. It is also important to remove any plants growing on buildings as soon as possible to prevent it from growing too large, and ensure that all the roots are entirely removed.

Besides, tree inspection should be conducted on a regular basis if any trees grow adjacent to buildings. It is necessary to consult a tree care specialist if there is a risk of tree failure which may cause damage to properties, and prune the tree or install a tree support system if appropriate.

2. Reactive Maintenance

When cracks are found on buildings, consult a heritage repair expert for timely maintenance. Defective joints have to be re-pointed, and any damaged bricks have to be cut and replaced as appropriate.

Reference

Green Power, Climbing Plants, Green Country, Issue 118 (Feb 2016), URL: https://www.greenpower.org.hk/html5/eng/an_118.shtml

Chapter Four
Maintenance

4.1
Maintenance Inspection for Historic Buildings

Maintenance of buildings is the key to longevity, especially for heritage buildings. Well-maintained heritage buildings retain their originality and values for long periods.

While much maintenance is routine, there will be occasions when the need for action is triggered by unforeseen events, such as accidental damage or inclement weather. A good maintenance plan should make provision for dealing with such eventualities.

Understanding the building and its behaviour gained through regular surveys will help identify areas that might be at risk. For example, if it is known that gutters and gullies are prone to blockage with leaves, they should be checked during and after autumn gales.

Maintenance Inspections

There are two types of maintenance inspections:

- Periodic inspections - carried out at determined intervals depending on the nature of the building
- Occasional inspections - carried out following inclement weather

All inspections and maintenance work should be recorded. The easiest way to do so is to fill out the basic checklist dur-

ing the inspection process.

Photographs are helpful for monitoring the condition of various elements of the building.

The following checklist can help owners maintain the historic buildings in routine.

Inspection Checklist for Owners:

	Building elements	Frequency of inspection
Rainwater gutters, channels and hopper heads		
1	Are there any leaking joints?	Quarterly
2	Does the water pool in any area?	Quarterly
3	Do the gutters slope correctly towards outlets?	Yearly
4	If gutters are fixed to timber elements, check the condition of the timber elements too	Quarterly
Rainwater pipes		
1	Inspect when it is raining and note leakages	On rainy days
2	Check rear side of pipes with a mirror and look for cracks and corrosion	Yearly
3	Are there any signs of staining or algae growth or any washed-out mortar joints on the wall behind the pipe?	Quarterly
5	Are pipes securely fixed to the wall?	Yearly
Pitched roof coverings		
1	General inspections	Half yearly and after typhoons

2	Are there any loose, slipped, broken or missing tiles?	Half yearly and after typhoons
3	Is there a lot of moss? This could block gutters and damage tiles	Half yearly
4	Look for signs of dampness on ceilings as a possible indication of roof leaks	Half yearly
Flat roof coverings		
1	General inspections	Half yearly
2	Are there any splits, tears, cracks or holes in the roof coverings?	Half yearly
3	Look for signs of dampness on ceilings as a possible indication of roof leaks	Half yearly
Exterior walls (masonry / brick walls)		
1	Is there deep erosion or missing pointing in the joints?	Bi-yearly
2	Are there any cracks?	Bi-yearly
3	Look for defects in stonework, brickwork and rendering	Bi-yearly
Exterior wall finishes		
1	Look for defects for render or plaster, like bulging, staining, blistering, crumbling or cracking	Bi-yearly
2	Look for defects for paint surface, like staining or blistering	Bi-yearly
Windows and doors		
1	If made of timber or metal, is the paintwork in good condition and is there any decay?	Yearly
2	Check for bare timber, especially on thresholds, sills and lower and underside areas of window sashes	Yearly

4.2
Preventative Maintenance for Historic Buildings

Defects may be noticed during regular inspections and thus lead to corrective maintenance. On the other hand, “preventive maintenance” is intended to assess and reduce the probability of failure or the degradation of the functioning of a building element. Preventive maintenance is one of the strategies to prevent failure in building elements, facilities and systems through regular and appropriate inspections and repair initiatives.

All building elements or finishes have a functional life, and it is better to prevent than cure. The following table provides an indication of the life cycle of some common building elements or finishes that you may be aware of periodically to prepare for planned maintenance.

Maintenance cycle for common building elements

	Activities	Maintenance cycle
1	Clear debris or leaves at gutters	Monthly
2	Clear any blockages of rain water pipes	Quarterly
3	Remove plants and vegetation abutting and growing on the building	Quarterly
4	Fresh water tank cleaning	Quarterly
5	Flush water tank cleaning	Half yearly
6	Repaint external walls	Every 5 years
7	Repaint metal works	Every 3 years
8	Repaint timber works	Every 5 years
9	Re-roofing of tiled roof	As needed
10	Removal or cleaning of bird guano on masonry	As needed

Daily Care

Some housekeeping acts can also help in preserving historic buildings, like putting floor mats at heavy traffic areas, such as doorways. Temporary protection can be provided to floor tiles during large events. For internal wall tiles, they may be easily damaged by movement of adjacent furniture, guards or protective railings could be good choices for preventing placement of table or chairs against the wall.

Chapter Five
Resources

As an owner for historic buildings, have you faced any challenge in maintenance? There are schemes and resources that can help the owners technically and financially.

5.1
List of Consultants of the Architectural and Associated Consultants Selection Board

You may find it hard to start. A consultant can help owners handle various challenges arising from maintaining or repairing a historic building, like condition survey, defect diagnosis, technical issues, procurement process, financial management, etc. The advantage of engaging a consultant is that you can have one single point of contact.

Under the List of Consultants of the Architectural and Associated Consultants Selection Board (AACSB), the category "Building Surveying" provides a reference for owners to approach. Owners can look for consultant with relevant experience. The list can be obtained from:
https://www.archsd.gov.hk/en/consultants-contractors/consultants/list-of-consultants-of-aacsb/who-have-been-included.html

5.2
Financial Assistance for Maintenance Scheme on Built Heritage (the "Maintenance Scheme")

The Maintenance Scheme is aimed to help preserve historic buildings from deterioration due to lack of maintenance by providing financial assistance in the form of grants to the owners of privately-owned graded historic buildings and tenants, who are non-profit-making organisations ("NPOs"), of government-owned declared monuments and graded historic buildings for them to carry out minor maintenance works by themselves.

Amount of Grant

The amount of grant for each successful application will be determined based on the justifications provided by the applicant. The ceiling of grant for each successful application is HK$2 million inclusive of both the consultancy fee and costs of the maintenance works.

Eligibility

Owners of privately-owned graded historic building, and tenants, who are NPOs, of government-owned declared monuments or graded historic buildings can apply for grants under the Maintenance Scheme. A list of the current declared monuments and graded historic buildings can be obtained from the following links:
https://www.amo.gov.hk/en/historic-buildings/monuments/index.html

https://www.aab.gov.hk/filemanager/aab/en/content_29/AAB-SM-chi.pdf
https://www.aab.gov.hk/filemanager/aab/en/content_29/list_new_items_assessed.pdf

Detail of the Maintenance Scheme can be obtained from the following link:
https://www.heritage.gov.hk/en/maintenance/about.htm

With the financial assistance, owners should appoint the right person to take care of the repair works. You can refer to the list of specialist contactor under the Repair and Restoration of Historic Buildings Category.

Specialist contractors under the Repair and Restoration of Historic Buildings Category can be obtained from the following link:
https://www.devb.gov.hk/en/construction_sector_matters/contractors/supplier/index.html?search=true&category=REHI&group=&class=

Appendix I
Table of common defects of historic buildings and remedial actions

Items	Causes	Remedial actions
1. Roofs		
1.1 Roof tiles		
Horizontal cracks at roll near ridge or eave	Tile slip due to decay timber purlins or battens, loss of friction between mortar and tiles	Repair/replace decay timber elements. Relay tiles and add in bamboo nails at regular intervals to increase friction
Cracks and dislocation of grey tiles	Mechanical damages due to strong winds or hitting by tree branches	Stack the tiles again and replace broken tiles. Trim nearby trees regularly
Cracking and sagging of tiles	Failure of supporting timber purlins or battens	Check for timber decay due to rotting or termite infestation. Eliminate the source of decay and replace/repair the defective part
Debris and vegetation accumulated on roof	Mature trees nearby and lack of maintenance	Clear the debris and leave in particular before the rainy season. Trim the nearby tree regularly

Items	Causes	Remedial actions
1.2 Valleys, parapet gutters and eave gutters		
Overflowing, damp stains on wall at high level, leaks in room below	Accumulation of debris, plant growth, inadequate slope and capacity of gutter, damaged flashings	Clear debris, plant at valley and gutters. If the slope and capacity of the gutter is inadequate, the gutter to be designed to improve the flow. If there is no flashing at valley or parapet gutter, add lead flashing to prevent backflow into the room. Replace damaged flashing.
1.3 Ridges		
Sagging or out of alignment	Failure of supporting purlins below due to timber decay caused by rot or termite attack	May be a structural problem. Check for termite infestation or timber decay. Carry out termite abatement immediately. May be necessary to consult a specialist for replacement or repair
Water drops at bottom of ridge purlin or purlins	Condensation	Improve ventilation of the roof space

Items	Causes	Remedial actions
2. Walls		
Surface decay on isolate bricks or stones	Weakness in original material; mortar pointing too strong i.e. using cement mortar	Minor or isolate surface decay can be left unattended. If erosion occurrs on a number of masonries or cement mortar is used, repointing with lime or other weaker mortar can be considered. Serious decayed bricks shall be replaced with similar bricks
Vertical cracks from eave and wider at top; crooked walls	Uneven settlement due to defective drains or nearby trees; horizontal thrust by roof structure pushing the wall outward	Repair the drains. Check the tree species. Some species may not be suitable to grow near buildings. Monitor the cracks by tell-tale. Ongoing movement will cause structural instability and need to consult building professional
Cracks above window or door lintel	Decay of timber lintel	Replace the timber lintel
Fine cracks or weathered pointing	Shrinkage or weathering	No action required. If getting serious and covering large area, repointing is required

Items	Causes	Remedial actions
Brick spalling	Continuous crystallisation of salt behind the fire coat of brick	Eliminate moisture to reduce salt crystallisation. Replace severely stripped bricks
Algal growth	It is an indication of wet wall. If algal growth occurs behind the down pipe, it may be caused by pipe leaking	Normal condition, no action required. If excessive moisture is incurred due to pipe leaking, repair/ replace leaking pipes
Damp stains and efflorescence near the ground level	Water splash from hard surface of ground; rising damp due to high water table above plinth; soil built up at the footing of the wall	Brush and rinse down the wall to remove the stain and salt. Install subsoil drain near the base of the wall to lower the water table. Remove built up soil at the wall
Hollow / detached render	Thermal expansion and contraction between the render at the masonry/earthen wall; loss of adhesion due to water infiltration	This defect encourages water ingress in earthen wall and weaken its stability. Need to address the problem as soon as possible
Vertical running stains	Lacking overhang, grove line, or grove line filled up by thick paint	Design some drip line or drip point above the running stains. Remove thick paint to restore the grove line

Items	Causes	Remedial actions
Plant firmly attached to wall	Tree overgrowth or left unattended	Consult arborist to remove the tree. Carefully remove all the root on the wall. Remove vegetation on walls regularly to avoid causing damages
3. Timber Elements		
3.1 Structural Elements		
Mud tube on surface	Termite infestation	Remove all source of moisture. Consult termite specialist to eradicate the termite and consult a building professional to assess the decay of the structural element
Fungal growth	High moisture content	Remove all source of moisture. Consult a building professional to assess the decay of the structural element
Longitudinal cracks along the surface	Moisture movement of the timber	If there is just a shallow crack, no attention is required. If the cracks are deep and wide, consult a building professional to assess the timber element.

Items	Causes	Remedial actions
3.2 Windows and doors		
Localised timber decay	External weathering, water running down windows or doors may trapped in the bottom rail and causing decay; wet wall will cause decay of embedded frame	Replace the decayed timber section only
Missing of mastic or sealant between wall and frame	Wear and tear of the mastic. If leave unattended, it may cause water ingress	Remove all mastic / sealant and inject new mastic
Broken lignin	Ultraviolet light can cause breaking of lignin due to loss of protective paint	Apply protective paint coating
Broken glass	Mechanical damages	Remove beads or putties and replace glass
Splitting of timber panels	Moisture movement of timber	No immediate action required
Window and door cannot be closed properly	Paint too thick, deformation of the frame	Strip off paint and apply new coatings. If it is caused by deformation of frame, it may be necessary to check if there is any structural movement of building

Appendix II
Acknowledgements

This Short Guide is the joint efforts of a group of surveyors of the HKIS and students of Architectural Conservation Programmes of University of Hong Kong. Some of the chapters are based on the literature works of the programme co-founder Dr Hoyin Lee and Dr Lynne DiStefano. We sincerely thank both of them on conservation education in Hong Kong.

On behalf of HKIS, We would like to acknowledge the writers of the guide book.
• Sr Arthur Cheung
• Sr Connie Ho
• Sr Idi Chan
• Sr Ruby Lo
• Sr Sharon Shieh
• Mr Yanda Wu
• Miss Yixin Wang
• Miss Kitty Ho
• Miss Joey Leung

The Short Guide is enriched with a lot of photographs and illustrations. We would like to thank the above writers for shaning their photographs and Ir Eric PW Chan for providing his photographs of historic buildings. We would also like to thank Popcorn Design Studio and Parabola Solution for the illustrations.

We would like to express our heartfelt gratitude to Miss Wong Wai-lam, the Champion of the Drawing (Student Category) in the “Maintenance and Appreciation of Historical Buildings” Creativity Competition, for the cover design of this book.

Finally, We would like to thank Sr Vicent Ho and Sr Daniel Ho for providing valuable comments to the Short Guide and Seeker Publication Ltd for their editorial and publishing works.

發展局保育歷史建築基金資助
Funded by Built Heritage Conservation Fund, Development Bureau

THE HONG KONG INSTITUTE OF SURVEYORS
香 港 測 量 師 學 會

Produced by The Hong Kong Institute of Surveyors.
© 2023 The Hong Kong Institute of Surveyors. All rights reserved.

Any opinions, findings, conclusions, or recommendations expressed in this material do not necessarily reflect the views of the Government of the Hong Kong Special Administrative Region, the Built Heritage Conservation Fund and the Advisory Committee on Built Heritage Conservation.

No part of this manual may be reproduced or transmitted in any form or by any means without the permission of the Hong Kong Institute of Surveyors. Contents of the Short Guide do not necessarily reflect the views or opinion of the Institute and no liability is accepted in relation thereto.

賞・惜・舊築跡

www.hkis-heritage.com

Facebook and YouTube: HKIS Heritage 賞.惜.舊築跡

THE HONG KONG INSTITUTE OF SURVEYORS
香港測量師學會

Head Office

Room 1205, 12/F Wing On Centre, 111 Connaught Road Central, Sheung Wan, Hong Kong

Website : www.hkis.org.hk