

Building Maintenance in Old Buildings Conservation Approach: An Overview of Related Problems

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Abstract

Building maintenance in conservation of old buildings is one of the approaches applied within the built environment of Malaysia. For instance, it is realised that these old buildings contribute an important significance to our nation's priceless heritage and unique historical development. However, most of these buildings' maintenance is influenced by related problems that affect the overall building conservation approach. Therefore, these old buildings face problems which greatly affect their overall condition and performance: building structure; building appearance and aesthetic; building materials and building character. In most critical situations, there is a greater possibility that we could lose the cultural significance and heritage values of these old buildings through ignoring the related problems. This paper tries to identify the related problems, reveal the findings and discuss suitable approaches to conserving these old buildings.

Keywords: *Building Maintenance, Old Buildings, Building Conservation Approach*

Introduction

In overall conservation purposes, building maintenance is the key factor for the building conservation approach. By considering building maintenance as one of the important factors in building conservation, Mohd Khairuddin (2002) stressed that sound and a good understanding on a good conservation approach is important in determining and achieving continuous effectiveness in building protection.

According to Section 15(1) of the Antiquities Act 1976 (Act 168), the Minister (defined as Minister of Culture, Arts and Heritage) may by his order declare any monument to be an ancient monument and any site to be an historical site. Any

monument here includes old buildings that have heritage value that relates to the nation's historical development (Figure 1 - Figure 3). Besides that, The Minister also has the power to determine or declare any site and monument, inclusive of old buildings situated in any state, as historical site provided that concurrence or agreement of the State Authority is to be first obtained.

Furthermore, Section 15(2) outlines that The Director General of the Department of Museums and Antiquities may, with the approval of the Minister, publish in the *Gazette* a schedule of ancient monuments and historical sites together with the limits thereof and may, from time to time with the approval from the Minister, add to or amend such schedule. Even though the provision

in this act clearly aims to protect these old buildings, problems arise that affect the building maintenance aspect as well as conservation approach that had been applied to upkeep these old buildings.

However, the provision in this act is no longer applicable as it is now replaced with improved provision under the new National Heritage Act 2005 (Act 645). This new act provides for more comprehensive provision on the conservation and preservation of National Heritage such as natural heritage, tangible and intangible cultural heritage, underwater cultural heritage and treasure trove. The new act received Royal Assent on 30 December 2005 and was published in the Gazette on 31 December 2005. The National Heritage Act 2005 came into effect on 1 March 2006.

National Heritage Act 2005 (Act 645) will be enforced and administered by The Monuments and Natural Environment Office of the Department of Heritage, Minister of Culture, Arts and Heritage. The office will implement the formulation of related acts, collection of documentation, research, preservation and development of heritage. Therefore, with the act, the office can function efficiently and orderly to identify and preserve the authenticity of cultural heritage, plan for the monitoring and protection of cultural heritage such as old buildings and historical sites as well as work together with local councils to implement this act.

In brief, Part I of the act explains the preliminary section which consists of the title of the act and the related interpretations. The provision of policy in relation to conservation and preservation of the heritage is stated in Part II in Section 3. For administration of the act, the Commissioner of Heritage, officers as well as their functions and power related under the act were appointed. The establishment of National Heritage Council details and their responsibilities were explained in Part IV while the financial aspect that relates to the enforcement of these act is provided in Part V.

In comparison with Antiquities Act (1976), the National Heritage Act 2005 has more comprehensive provision for publishing schedule of ancient monuments and historical sites which come under the National Heritage Register. Part VII includes five main chapters that explain accordingly the Designation of Heritage Site, Interim Protection Order, Dealings Involving Heritage Site, Conservation and Preservation of Heritage Site and Conservation Area and Conservation Management Plan. Under Part VIII, three chapters explained the provision of Discovery of Object, Application for Registration and Management of Heritage Object which may relate to old buildings.

Furthermore, detailed explanation for any building which may be declared as national heritage, the guideline and reference are provided in Sections 67 - 72. The provision for protection of treasure trove which may have relationship to old buildings is explained in Part XI of the act. Under the enforcement aspect, this act has the provision on licensing matters such as export and import of heritage item, licence to excavate and registration of dealer of heritage item, appeal, powers relating to enforcement, seizure, arrest, etc. and related offences. The miscellaneous items repeal and saving provisions are also explained as one of the provisions under this act, which may relate to the conservation of old buildings.

For instance, Section 2 in this act outlines clearer interpretation on meaning of building as well as antiquity and responsible parties involved in establishing and maintaining a list of heritage items. For example, the National Heritage Council established under Section 8 is responsible for "safeguarding" the identification, protection, conservation, restoration, renovation, maintenance, documentation and revitalisation of historic or traditional matter, artifact, area and their environment which may directly or indirectly protect old buildings.

The new act also gives more comprehensive definition on "monument"

which means architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, and combinations of features, which are of outstanding universal value from the point of view of history, art or science; while "object" includes any moveable antiquity, tangible cultural heritage, intangible cultural heritage and historical object but excluding treasure trove.

In addition to that, "historical object" means any artifact or other object of religious, traditional, artistic or historic interest. In Section 97 under this act; "conservation management plan" is defined as a plan for conservation as prepared under Section 46. Various principles and terms applied in the conservation such as restoration, reconstruction, rehabilitation and conservation as a whole process involved are defined in detail.

For example, under this act, "restoration" means the process of accurately recovering the form and details of a structure or part of a structure and its setting, as it appeared at some period in time, by removing the latter work and replacing the missing original work, and includes— (a) full restoration which involves both exterior and interior; (b) partial restoration which involves the exterior, interior, or any partial combination and is adopted when only parts of a structure are important in illustrating cultural values at its level of historic significance, or contribute to the values for which the area was designated; and (c) adaptive restoration which involves all or a portion of the exterior restoration with the interior adapted to a modern functional use.

While "reconstruction" is defined as the process of accurately reproducing, by new construction, the form and detail of a vanished structure, or part of it, as it appeared at some period in time and includes full or partial reconstruction; "preservation" means aiming to halt further deterioration, decay or a state of dilapidation and providing structural safety and well

being but does not contemplate significant rebuilding and includes - (a) techniques of arresting or slowing the process of deterioration, decay or state of dilapidation of an item or structure; (b) improvement of structural conditions to make a structure safe, habitable, or otherwise useful; and (c) normal maintenance and minor repairs that do not change or adversely affect the fabric or historic appearance of a structure.

In addition, "rehabilitation" means the process of returning a property to a state of utility through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic architecture.

Therefore, in comprehensive definition, "conservation" process includes preservation, restoration, reconstruction, rehabilitation and adaptation or any combination; "owner", in relation to any land, means the registered owner or the holder by customary tenure of the land; "occupier" includes the cultivator or person in actual possession, management or control of any land, and includes any person having the possession or control of any moveable property in that premises or land.

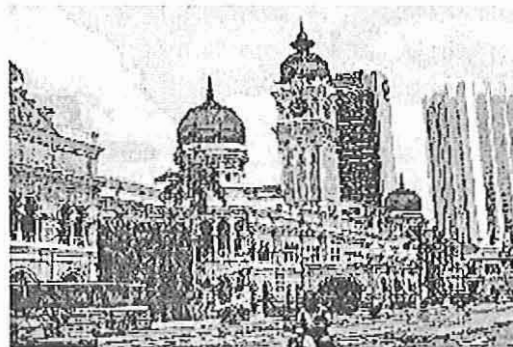


Figure 1: Sultan Abdul Samad building

Source : Kayan (2003)

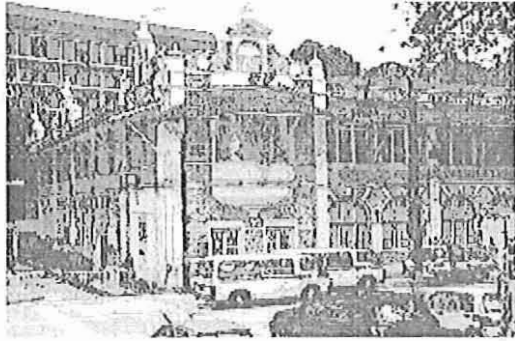


Figure 2: Kuala Lumpur Library
Source : Kayan (2003)

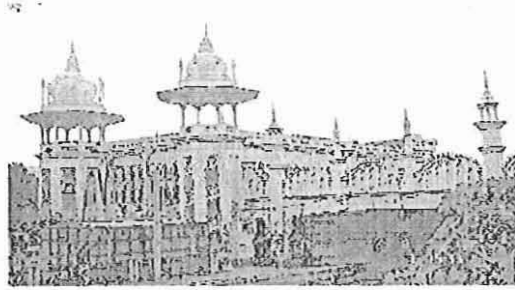


Figure 3 : Keretapi Tanah Melayu Old Station
Source : Kayan (2003)

Building Maintenance in Old Buildings Conservation Approach: An Overview of Related Problems

According to the Department of Museums and Antiquities (2001), the main problems occurring in old building conservation are related to their maintenance management aspect. Most of the common problems are building dilapidation and ignorance (English Heritage, 2005a), illegal renovations and not complying with the legal requirements either by the owner or user of the old buildings in order to apply the building conservation approach (Glover, 1981; Kohl, 1986 & A. Ghafar Ahmad, 1994). Other problems are difficulties in conducting repairing works, building maintenance as well as lack of enforcement of building control aspects in the building conservation approach (Ransom, 1981 & Seeley, 1985).

Building Dilapidation

Generally, the building dilapidation process is due to the most common defects (Richardson, 2001). Identification and determination of most common buildings defects that occur on old buildings are as follow:

a. Fungal Stain and Harmful Growth

These usually occur in old buildings with the presence of water or high moisture content in building materials such as masonry, bricks and concrete. Furthermore, this situation rapidly occurs when there are flourish of high humidity as well as lack of air ventilation. For example, creepers and ivy plants can grow on either stone or brick walls with the presence of the nutrients provided by water. Normally, roots of plant growth can go deep into the existing holes of the wall or building elements causing cracks and water penetration (Figure 4 – Figure 6).

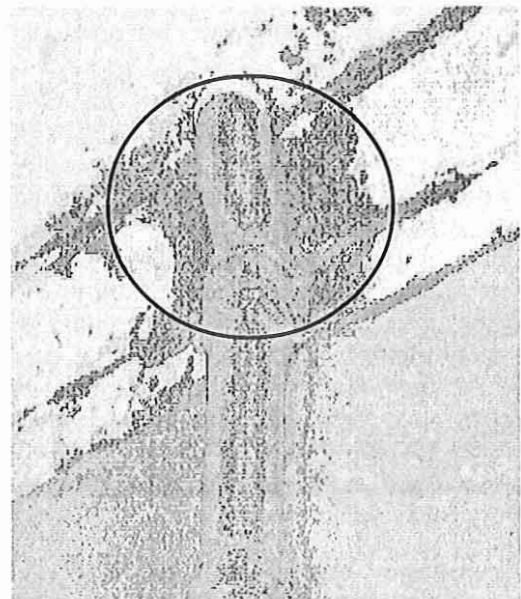


Figure 4 : Fungal staining on upper floor with the presence of water and high moisture content.

Source : Meng *et al* (2006).

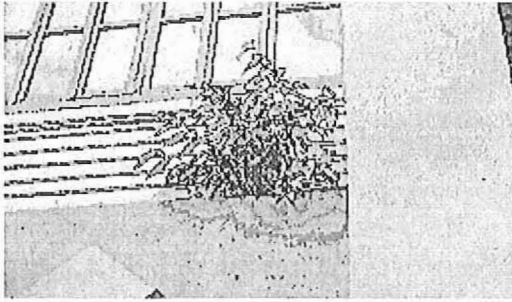


Figure 5: Plant growth on the existing holes of the wall.

Source : Meng *et al* (2006)



Figure 6: Plant growth on flat roof

Source : Meng *et al* (2006)

b. Erosion of Mortar Joints

Normally, causes of the erosion of mortar joints in old buildings include a presence of salt crystallization. Scouring action of winds and disintegrating effects of plant growing on a wall or water penetration leading to the concentrations of moisture and dampness that affected mortar joints (Figure 7 & Figure 8).



Figure 7: Disintegrating effects of mortar joints

Source : Kayan *et al* (2005).

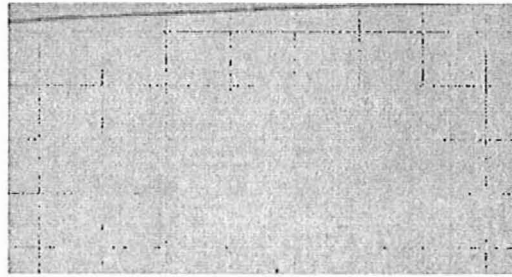
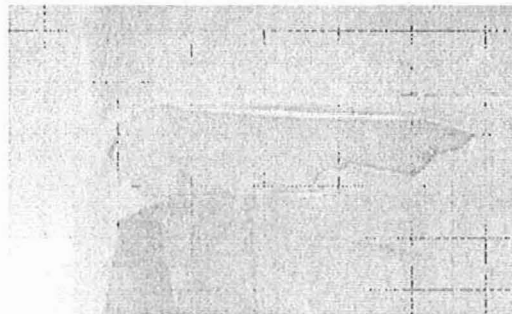


Figure 8: Erosion of mortar joints

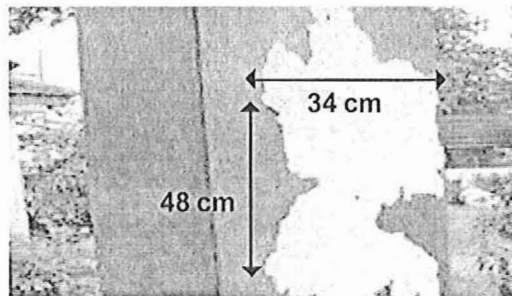
Source : Kayan *et al* (2005).

c. Peeling of Paint

This defect usually occurs on building facades of old buildings, mainly on plastered walls, columns and other areas which are exposed to excessive rain and dampness. The paint will be peeled off from the wall surface during the process (Figure 9).



(a)



(b)

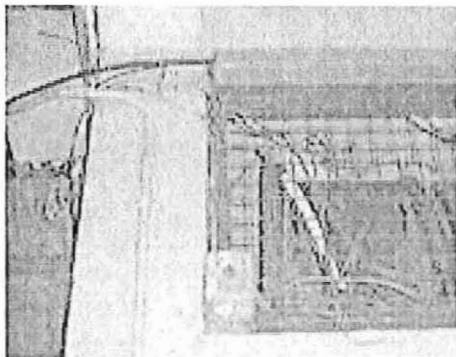
Figure 9: (a) Peeling of paint on floor beam

(b) Peeling of paint on column

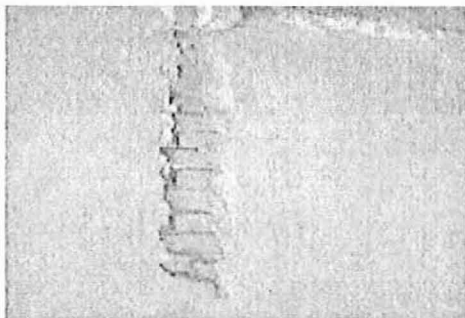
Source : Kayan *et al* (2005).

d. Poor Installation of Building Services Equipment

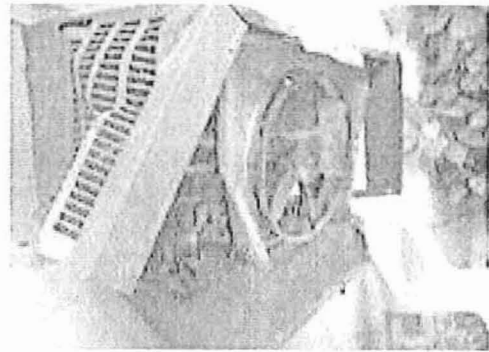
This defect is due mainly to poor workmanship during the maintenance and upgrading works. The most common example of poor work quality in old building maintenance and conservation works is much related to poor installation of artificial ventilation equipment such as air-conditioning systems. Firstly, the cooler and drier air produced by the air-conditioning systems may possibly cause shrinkage of old building materials. Secondly, there will be a possibility of condensation either on the surfaces or within the structure of the building fabric. This will allow the build-up of mould or fungal stains that affect the appearance and aesthetic characteristic of the old buildings. All of these defects more seriously occur when there is leakage on the joints of the air-conditioning causing water dripping on the wall surfaces (Figure 10).



(a)



(b)



(c)

Figure 10 : (a) Exposed electrical wiring
(b) Defective plastering layer
(c) Defective compressor cover

Source : Kayan *et al* (2005)

e. Defective Plaster

Defective plaster occurs mostly on external walls, columns and ceilings of the old buildings. It is mainly due to biological attacks arising out of penetrating rain, water evaporation, condensation process, air pollution, dehydration and thermal stress on old building materials. Other causes may come from mould or harmful growth, insect and animal attacks as well as from traffic vibration. Prior to being decomposed and broken apart, plastered rendering may become cracked due to either shrinkage or movement in the substrate itself (Figure 11 & Figure 12).

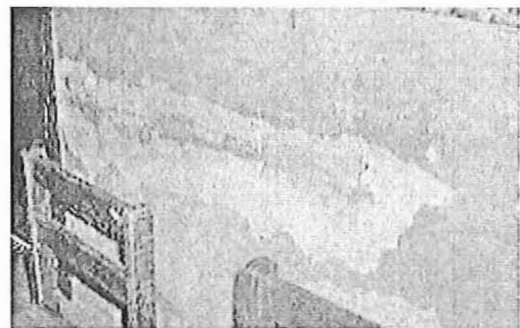


Figure 11 : Defective plastered
Source : Kayan *et al* (2005)



Figure 12 : Chipping of defective plaster on wall

Source : Eng *et al* (2006)

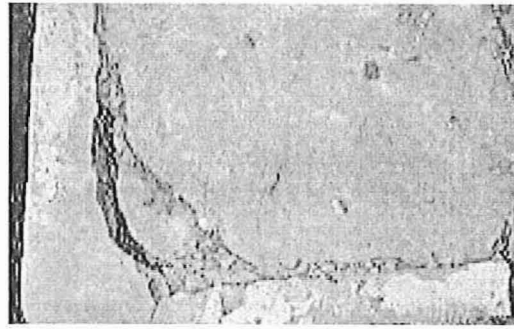


Figure 13 : Dimensional changes and thermal movement lead to cracking of the wall.

Source : Ping *et al* (2006)

f. Cracks

Cracks in old building walls, either vertical or diagonal, are common symptoms of structural instability. Causes diagnosed are either the foundations, unsuitable materials and weak joints, or any shrinkage or thermal movements such as sagging on timber window frames. Diagonal cracks often occur when shallow foundations are laid on shrinkable sub-soil that is drier than normal or when there is a physical uplifting action of main roots of a large tree close to the walls. Few causes to the problem of leaning walls including spreading of the roof which forces the weight of the roof outwards towards the walls, hogging and sagging due to soil movement, weak foundations due to the presence of dampness, shrinkable clay soil or decayed building materials. Disturbance of nearby mature trees in which their roots gradually expand causes settlement in the old buildings (Figure 13 & Figure 14).

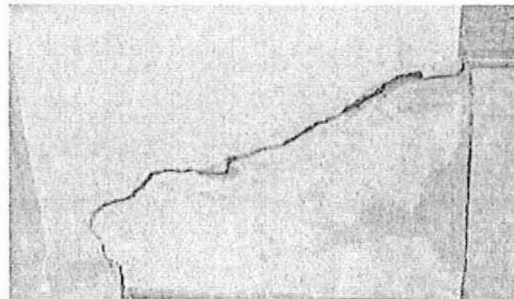


Figure 14 : Cracks on apron at verandah ways.

Source : Kayan *et al* (2005)

g. Defective Rainwater Goods

Common problems associated with the defective rainwater goods in old buildings include sagging or missing eaves gutters, corroded or broken galvanized iron down pipes or leaking rainwater heads (Figure 15 & Figure 16). In some situations, others may include undersized gutters or down pipes which cause overflow of water, particularly in heavy rain and an improper disposal of water at ground level. There are a few other possible causes to the defects of rainwater goods. For example, due to inadequate painting, iron rainwater good can become rusted and badly fractured. Lack of proper fixing to the wall, particularly by means of projecting lead ears or lugs can cause instability to the down pipes also consider as most common factors.



Figure 15 : Damaged gutters and ceiling board.

Source : Ping *et al* (2006)

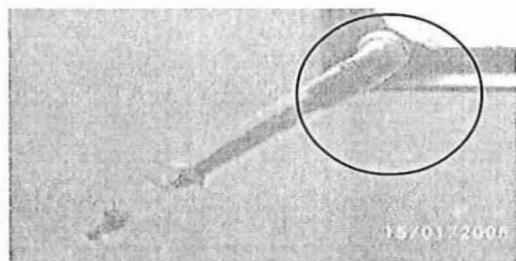
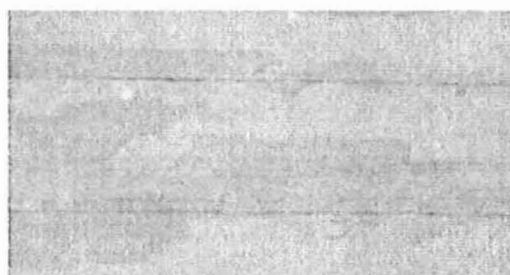


Figure 16 : Leakage between the joining of down pipe and gutter caused water leakage.

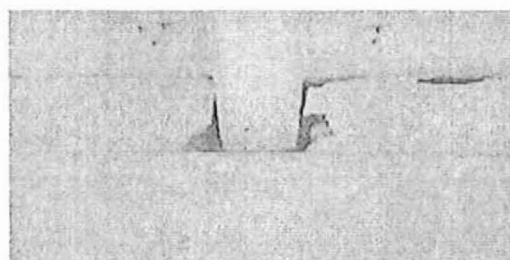
Source : Akashah *et al* (2006).

h. Decayed Floorboards

In the case of old buildings, some of the floorboards are badly abused with serious damage on the surface and deteriorate. This problem will lead to further structural problems and make it unsafe for building occupants. The main causes of the deterioration of floorboards are insect and termite attacks, careless lifting of weakened boards by occupants, electricians or plumbers. Lack of natural seasoning and preservatives in floorboards and corroded nails are identified as one of the causes to this type of old building defects (Figure 17).



(a)



(b)

Figure 17: (a) Decayed floorboard
(b) Decayed floor joists on timber flooring

Source : Kayan *et al* (2005)

i. Insect or Termite Attacks on Timber Elements

Insect or termite attacks are a common danger to timber elements of old buildings. In general, they usually happen in damp and digestible timber which can be found in elements such as wall plates, the feet of rafters and bearing ends of beams and trusses. Timbers which are placed against or built into damp walling are mostly affected (Figure 18 & Figure 19).

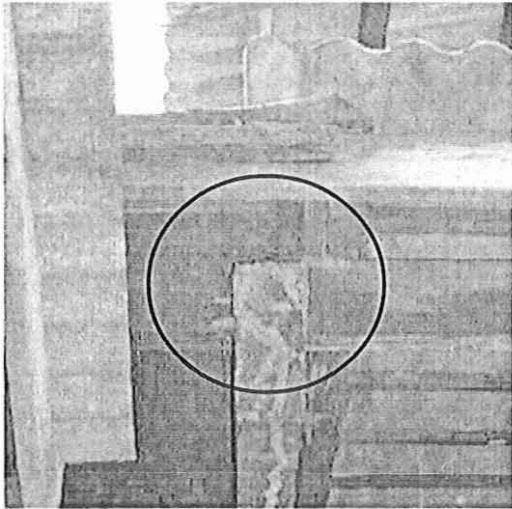
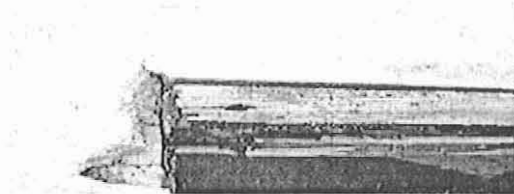


Figure 18 : Termite attacks on timber rafter element
Source : Mohd Nor *et al* (2006)



(a)

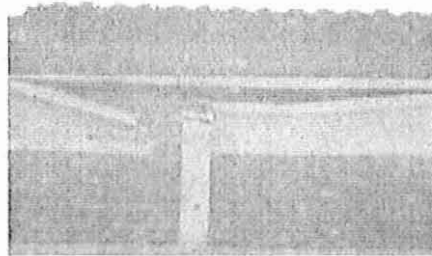


(b)

Figure 19: (a) Rotten timber attacks by wood borer.
(b) Split of timber frame.
Source : Kayan *et al* (2005)

j. Roof Defects

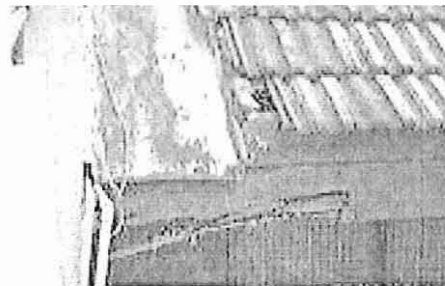
Common defects of roof tiles in old buildings include the corrosion of nails fixing the tiles to battens and rafters, the decay of battens. Because of this, cracking of roof tiles occurs which may be caused by harmful growth or being walked upon. The harmful growth is quite dangerous to the tiles because it may lift the tiles and create leaks (Figure 20).



(b)



(a)



(c)

Figure 20: (a) Corrosion of roof flashing element
(b) Defective fascia timber board
(c) Corroded gutter fixing
Source : Kayan *et al* (2005)

k. Dampness Penetration

Water penetration occurs commonly through walls exposed to prevailing wet wind or rain. With the existence of gravity, water is likely to penetrate through capillary actions or cracks between mortar joints and bricks or concrete blocks before building up trapped moisture behind hard rendering. This process will expand further up the wall to emerge at a higher level. Dampness may also occur in walls of old buildings because of other factors such as leaking gutters or down pipes, defective drains, burst plumbing and condensation due to inadequate air ventilation. Dampness may also enter a building from the ground through cracks or mortar joints in the foundation walls (Figure 21 & Figure 22).



Figure 21: Dampness on wall through moisture penetration
Source : Akashah *et al* (2006)

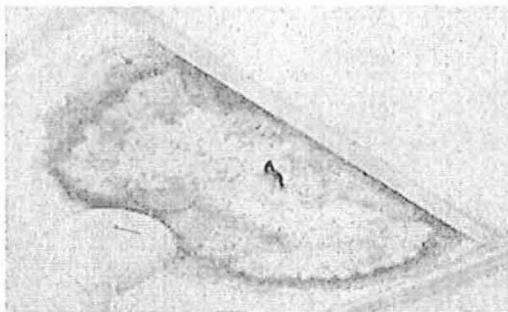
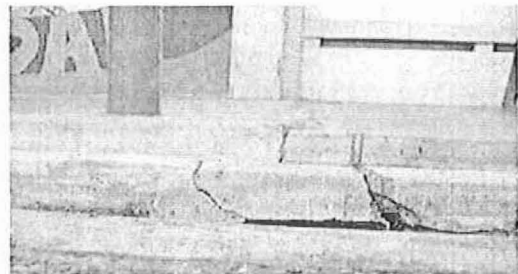


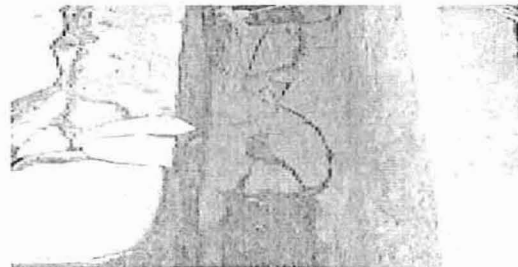
Figure 22 : Dampness on ceiling panel.
Source : Huew *et al* (2006).

l. Unstable Foundations

Unstable foundations may occur because of several reasons including shrinking clay soil. Therefore, it results in unstable foundations when the sub-soil is drying and water table is low which no longer holds the structure above. Rapid penetration of dampness and water may decay walls and foundations of old buildings. Besides that, with presence of large trees near the old building and the undertaking of extensive excavations or mining activities nearby, this condition will increase the process of unstable foundations. Other causes include landslides caused by heavy rain, heavy construction near old buildings and lowering of water tables, usually by hard landscaping and road areas. This problem may also occur from traffic vibrations, deteriorating of building materials and the increased loads, particularly when there are changes in building function and usage (Figure 23).



(a)

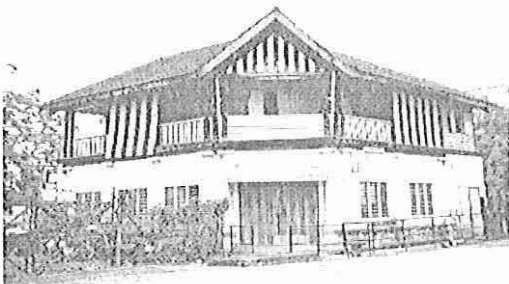


(b)

Figure 23 : (a) Cracks on apron layer due to unstable foundation
(b) Defective concrete drainage
Source : Kayan *et al* (2005)

Building Ignorance

In many cases, the building owner and user did not know or had not been notified that their old building had been listed or declared as heritage buildings (Pickard, 1996). It seems that they are not fully aware of the implications for their listed building in terms of legal requirements as well as legal restriction. In more serious cases, these building owners ignored the declaration notice by the authorities related for their building protection. In addition to that, some of the owners may have insufficient resources to pay for their building upkeep while for the others it is due to deliberately neglecting the building to cash in on the value of its site (English Heritage, 2005b). In most cases, when these unaware building owners ignore the notice; they also ignore the building maintenance for their building conservation (Ransom, 1981; Seeley, 1985 & Hollis, 2004). With no appropriate maintenance, less protection as well as no suitable conservation approach applied, these old buildings are affected by the dilapidation process (Figure 24). Furthermore, building dilapidation process obviously happened in which it was influenced by urban development factor (RICS, 2005). In some cases, building owners choose to let their old building to become dilapidated and be finally demolished so that they can have reason for building anew on the site. It seems that this situation happens when an old building owner is restricted from having new additional or buildings works on their premises as well as on surrounding development (Paiman, 2002a).



(a)



(b)

Figure 24 : (a) Abandoned Pejabat Pos building at Jalan Panggong, Kuala Lumpur
(b) Dilapidated Istana Hinggap Kedah, Kuala Lumpur

Source : Kayan (2004)

Illegal Building Renovations Works

Due to economy factors, commercialisation and fast track of development, building owners ignored the restriction for commencing illegal renovations works. In addition to that, most of the renovations carried out did not comply with legal requirements such as conservation acts, enactments and guidelines as outline by the local authorities and conservation bodies.

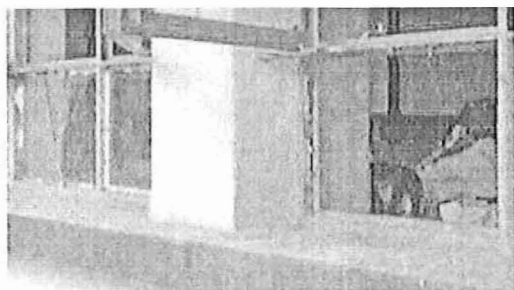
Building Intrusion Threat

Building intrusion threats are usually committed by individuals and irresponsible parties (Mill, 1980). Agreeing to this sentiment, Faezah (2000) added that even the building owner himself or herself trespassed into building with the purpose to carry out building works without written approval, could be define as an intrusion action. In most serious situations, these intruders also vandalised these heritage buildings. Furthermore, this problem became worse whereby it affected the image and overall performance of the buildings (Richardson, 2001). Most common vandalism acts such as writing and sketching on the building walls.

Intentionally acts by intruders to demolish and vandalise old buildings such as throwing and hammering frequently occur (Figure 25). Apart from that, these irresponsible intruders sometimes stole valuable heritage from these old buildings (Paiman 2002a).



(a)



(b)

Figure 25: (a) Writing and sketching on wall element
(b) Broken window glass caused by vandalism

Source : Ping *et al* (2006)

Difficulties in Carrying Out Building Maintenance Works

The difficulties arise whenever old building owners are facing insufficient financial support to carry out building maintenance works. This situation became more critical when the building owner cannot justify or estimate the sufficient related cost for maintenance and conservation purposes (English Heritage, 2005b). Generally, old

building owners did not consider or allocate annual maintenance in their overall operation cost of their building (Paiman 2002a).

Difficulties in Enforcing of Building Control Regulations

In building control enforcement, related parties involved facing difficulties in identifying and determining old building defects and their actual causes or factors (ICOMOS, 2003). For instance, most of these buildings did not have any specific or planned maintenance programme to protect them. Generally, the building maintenance teams worked on an 'ad-hoc' basis. There is no fixed or planned schedule of old building inspection even though these building legally protected (Mill, 1994; Paiman 2002b). For example, there are certain buildings that have been ignored and emptied by the owner. On top of that, no parties are willing to save, maintain, upkeep and protect these deteriorated buildings. Therefore, planned maintenance programmes and inspection schedules are nearly impossible to draw up or apply for conservation of these buildings.

Other Related Problems

Mohd Khairuddin (2002) quoted that other related problems which affected old building maintenance include difficulties in hiring skilled labour to carry out maintenance works. In addition to that, there are the long period of time required for completing the maintaining process, unsound conservation laws and guidelines as well as very high conservation cost needed in order to maintain these old buildings. The related problems are further explained as follows:

Lack of Expert and Skilled Labour in Technical Areas Related to Building Conservation

According to Amer Hamzah (1994), in general, the parties involved in building conservation were unskilled labour and

inexpert contractors. Beside that, the involvements of these parties were only restricted to minor works in overall building maintenance and conservation.

In relation to this scenario, the invitations for foreign building conservation experts by conservation organisations to conduct their training activities in this country are very few and only had been organised on certain occasions. Some of the most common reasons are insufficient financial support, unsuitable timing and right venue selection constraint for conducting the training locally.

Apart from that, the Department of Museums and Antiquities (2001) added that even though they had conducted courses and training related to old building conservation, it was limited to short courses only. These short courses are attended by individuals, conservation bodies and organizations. Generally, they were participating on the normal participation basis. The courses conducted involved parties or individuals who were not professionals and inexpert in the building conservation approach. For example, in most courses conducted, they were participated by junior technicians as well as low grade conservation contractors. Besides that, the course also did not involve the related parties or an organisation that has direct responsibility for maintaining and conserving old buildings. There are authorities who are financially supported or sponsored on the courses related to building conservation, such as organised by UNESCO and SPAFA (South Pacific Association of Fine Arts), but the courses are mainly locally based. The financial support and sponsorship did not enhance or develop these courses into the global scope.

Paiman (2002c) also raised the observation that overseas courses had been offered to our local conservators. However, it only involved the administration and management teams who are professional in terms of their education background. It seems that the involvement of support staff with

lower qualification in these related courses is very minimal. Financial allocation to these support staff for attending the related courses outside the country only focused on certain countries such as Australia, United Kingdom, France, Italy, China, Hong Kong, Indonesia and India. Once again, there are a many countries that have expertise in building conservation. However, financial support seems to be insufficient to accommodate the demand to attend the related courses in other countries and normally this problem is identified as the main factor and constraint.

Unsound Legal Aspect

Previously, only the Antiquities Act 1976 (Act 168) was applied and referred to for old building conservation purposes (Lakhbir, 1986). Mohd Khairuddin (2002) argued that this act had been outdated to be used or applied when considering the year it was established. Until now, there are efforts to amend and strengthen this act to make the scope and content suitable or accommodative to current needs. Paiman (2002b) also raised the same sentiment by stating that provision clauses and penalties as outlined by the Antiquities Act 1976 (Act 168) are not really suitable and strong to comply with up to date needs and requirements.

According to the Department of Museums and Antiquities (2001), nowadays, related conservation acts are still in the early stage for their establishment. Even where there are efforts to establish the related acts; it was only on the drafting level. Therefore, this draft cannot be referred as an approved and fully legal act. Even though there are efforts of co-operation between the Ministry of Housing and Local Government and the Department of Museums and Antiquities to establish the conservation act together, but according to the Federal Constitution, there is no such power or any provision to allow any ministries and government agencies to establish current law with their proposed act. Therefore, state

authority has the power to reject or accept these new laws. For example, if the particular old buildings are located in Kuala Lumpur, Local Government Act 1976 and Planning Act (Kuala Lumpur 1982) need to be referred to for conservation purposes. However, on the other hand, if the particular old building's age is 100 years or more, normally only the Antiquities Act 1976 was applied. If the building age is less than 100 years old, then the local authority where the subject old building is situated is responsible and they have the power to gazetting these buildings. But, it seems to be that it is not the case in the actual practice. In fulfilling the needs and requirements of maintaining and conserving old buildings, the government established and introduced the National Heritage Act 2005 (Act 645). However, this new act may require certain period of time to be enforced completely and smoothly.

High Maintenance and Conservation Cost

Cost allocation for old building maintenance and conservation normally is generated from the related parties namely the government, NGOs as well as individuals who are directly or indirectly involved in the building conservation (English Heritage, 2005a). However, the Department of Museums and Antiquities and the Public Works Department of Malaysia are fully responsible to maintain and upkeep legally protected buildings. Generally, the allocation for the related works is controlled by the Development Unit of Department of Museums and Antiquities and State Public Works Department (Paiman, 2002c).

Nowadays, the inspection process is carried out by these two departments after these old buildings were legally protected by the law. However, this scheduled inspection is restricted by the insufficient allocation of financial support. Generally, the inspection was carried out by the demand or request of the building owner or by consultation of the Department of Museums and Antiquities on regular basis. However, in most cases, this scheduled inspection was

not properly conducted according to the planned schedule. This situation worsens as the Department of Museums and Antiquities is facing difficulties to employ experienced expert and strong and broad-knowledged contractors in building maintenance and (Othman Mohd Yatim, 1979). Paiman (2002c) added that, it was difficult to set the quality for the workmanship by these inexperienced contractors because they are not recognised as a competent contractor and there are insufficient numbers of qualified contractors as a comparison, guidance or reference. Even though there are competent contractors available, their operation in building maintenance and conservation for old buildings is mainly focused in the foreign countries.

Conclusion

Building dilapidation and ignorance, illegal additions and renovations works by the building owner are the most common problems and issues affecting the whole effort of old building maintenance and building conservation. The defects analysis of old buildings is an important aspect to be taken into consideration to ensure the success of the maintenance works and conservation approach applied for old buildings protection. The appropriate ways of building condition investigation, building appraisal as well as building defects diagnosis and analysis, is essential to ensure continuous effort to conserve and maintain these building consistently. With the continuously comprehensive undertaking of building surveys, building inspections, building appraisals and investigations, these national heritage buildings can be successfully conserved, as references for related area of studies and can be protected for our future generations.

Building damages, trespassing and intrusion and difficulties in enforcing the building control also contribute to related problems. Other problems occur such as

insufficient financial support, lack of numbers and minimal involvement by the expert and skilled labour is also considered one of the key factors that influence the overall building maintenance and building conservation. Non-comprehension of previous legal aspects and lack of participation from the related parties and organisations also contribute to the lack of maintenance works on these old buildings. By considering all of these factors, issues and related causes, all of them contribute problems and issues. In the broader context, it may affect the overall conservation approach for old buildings which can become a main threat for the continuous protection.

Therefore, the participation of Federal Government, States Authorities, Local Authorities, Government Agencies, Non-Government Organisations, Conservation Bodies, or even individuals are essential to make sure that the National Heritage Act 2005 (Act 645) is successfully implemented and enforced in national context. It is also important for these parties to cooperate with the expert or professional in the conservation and preservation fields. On the other side, views and public interest need to be taken into consideration. The role and contribution of every party in implementing and enforcing the act and achieving the aim and goal of its establishment must be appreciated.

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