GARIS PANDUAN PEMULIHARAAN BANGUNAN WARISAN

JABATAN WARISAN NEGARA 2017
KEMENTERIAN PELANCONGAN DAN KEBUDAYAAN MALAYSIA

PEMBERITAHUAN

Garis panduan ini menggantikan Garis Panduan Pemuliharaan Bangunan Warisan versi 2012, 2014 dan 2016 yang disediakan oleh Jabatan Warisan Negara, Malaysia.

Garis panduan ini hendaklah dibaca bersama-sama Akta Warisan Kebangsaan 2005 (Akta 645), peraturan-peraturan, dasar Persekutuan dan Negeri, serta garis panduan yang telah disediakan oleh Jabatan atau agensi-agensi teknikal berkaitan.

Prakata

Sejak penubuhan Jabatan Warisan Negara pada tahun 2006. Bahagian Konservasi, Jabatan Warisan Negara telah membuat beberapa penambahbaikan Garis Panduan Pemuliharaan Bangunan Warisan 2016 sebagai panduan untuk pelaksanaan kerja pemuliharaan bangunan warisan di Malaysia dan memastikan segala usaha pemuliharaan dapat dilaksanakan selaras dengan kehendak dan keperluan Akta Warisan kebangsaan 2005 (Akta 645). Selaras dengan visi dan misi Jabatan Warisan Negara untuk memelihara dan memulihara khazanah warisan bangsa dan negara, penyediaan dan penerbitan Garis Panduan Pemuliharaan Bangunan Warisan 2016 ini disediakan selaras dengan fungsi Pesuruhjaya Warisan untuk menggalakkan dan mengawal selia standard dan amalan yang terpakai dalam pemuliharaan dan pemeliharaan warisan.

Oleh itu, Bahagian Konservasi, Jabatan Warisan Negara telah mengambil langkah proaktif bagi melakukan semakan terhadap Garis Panduan Pemuliharaan Bangunan Warisan dengan bantuan daripada ahli akademik dan individu yang mempunyai kepakaran dalam bidang yang berkaitan dengan pemuliharaan bangunan warisan bagi memastikan isi kandungan Garis Panduan Pemuliharaan Bangunan Warisan Jabatan Warisan Negara bertepatan dengan keperluan dan prinsip pemuliharaan bangunan warisan.

Garis Panduan Pemuliharaan Bangunan Warisan ini diterbitkan dalam dwibahasa (Bahasa Melayu dan Bahasa Inggeris) dalam usaha menggalakkan pemuliharaan dan pemeliharaan untuk memanjangkan jangka hayat bangunan supaya ia boleh terus kekal untuk generasi yang akan datang. Objektif penyediaan Penerbitan Garis Panduan Pemuliharaan Bangunan Warisan ini adalah seperti berikut:

- Sebagai panduan asas kepada pihak yang bertanggungjawab dalam mematuhi prosedur dan prinsip pemuliharaan yang diaplikasi dalam pemuliharaan bangunan di Malaysia adalah berdasarkan Akta Warisan Kebangsaan 2005 (Akta 645) dan juga merujuk kepada prinsip pemuliharaan bangunan warisan sebagaimana yang terkandung dalam piagam dan garis panduan antarabangsa seperti UNESCO dan ICOMOS.

- Panduan arahan dan etika pemuliharaan yang terdiri daripada batasan-batasan kerja dan gangguan yang dibenarkan dalam melaksanakan kerja-kerja pemuliharaan.

Semakan Garis Panduan Pemuliharaan Bangunan Warisan ini adalah permulaan kepada beberapa langkah proaktif yang telah diambil seperti melantik Konservator Berdaftar dengan Jabatan Warisan Negara dalam membantu kerja-kerja Pemuliharaan Bangunan Warisan di Malaysia. Dengan adanya Konservator Berdaftar dengan Jabatan Warisan Negara, pihak Jabatan berharap para konservator dapat memastikan semua aktiviti dan kerja yang berkaitan dengan Pemuliharaan Bangunan Warisan mestilah mematuhi prinsip dan prosedur yang terkandung dalam garis panduan.Garis Panduan Pemuliharaan Bangunan Warisan Jabatan Warisan Negara dan Garis Panduan lain-lain dari pihak berkuasa tempatan diharapkan dapat membantu dalam memberi panduan terhadap kerja-kerja awalan bagi melaksanakan kerja pemuliharaan bangunan warisan.

Setinggi-tinggi penghargaan diberikan kepada Pesuruhjaya Warisan dan juga mereka yang telah bertungkus-lumus bagi menghasilkan garis Panduan Pemuliharaan Bangunan Warisan ini. Penghargaan diberikan kepada: -

BIL	ORGANISASI	NAMA
	Panel Pakar Jemputan	
1	• Universiti Sains Malaysia	Prof. Dr. A Ghafar B. Ahmad
2	• Universiti Teknologi Mara	Prof. Madya. Dr. Siti Norlizaiha Bt Harun
3	• Universiti Teknologi Mara	Prof. Madya. Amran B. Abdul Rahman
4	• Universiti Teknologi Mara	Dr. Shahrul Yani Bt. Said
5	• Universiti Islam Antarabangsa Malaysia	Dr. Nurul Hamiruddin Bin Salleh
6	• Universiti Malaya	Sr. Dr. Zuraini Bt. Md Ali
7	• George Town World Heritage Incorporated	Lim Chooi Ping
	Jabatan Warisan Negara	
8	• Ketua Pengarah	Dato' Dr. Zainah Bt. Ibrahim
9	• Timbalan Ketua Pengarah	Tuan Hj. Mesran Bin Mohd Yusop
10	• Bahagian Konservasi	Sr. Dr. Robiah Bt Abdul Rashid • Sangam@ Musa Antok • Wan Noazimah Bt. W Kamal • Sahrudin B. Mohamed Som • Edwin Clarie Edward • Rafeah Bt Ibrahim • Nasarudin Bin Sulaiman • Mahadzir Bin Mohd Aris • Mas Ayu Bt Mohd Tahir • Mohamad Fitri Bin Pathil • Afiszal Bin Abu Sha'ari • Mohd Risham Bin Mohd Rawi • Johari Bin Baharom • Mohd Hadi Bin Muhamad Ganti • Shairul Atikah Bt. Mohd Sha'ari • Mohd Dzahirudeen Bin Yahaya • Fakhrul Iqbal Akhrul Iqbal Bin Mohd Fauzi •
11	• Bahagian Pengurusan	Muhammad Heeza Bin Hassan
12	• Bahagian Daftar Warisan	Muhammad Muda Bin Bahadin
13	• Bahagian Arkeologi	Ruzairy Bin Arbi
14	• Bahagian Warisan Tidak Ketara	Khalid Bin Syed Ali
15	• Bahagian Warisan Dunia	Mohd Syahrin Bin Abdullah
16	• Zon Tengah	Johar Bin Kadis
17	• Zon Selatan	Masni Bt. Adeni
18	• Zon Utara	Ardi Asmera Bin Saeman
19	• Zon Timur	Mohd. Syukri Bin Mohd. Isa

ISI KANDUNGAN

BAHAGIAN SATU

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1.0 PENGENALAN

Garis Panduan Pemuliharaan Bangunan Warisan disediakan sebagai panduan untuk pelaksanaan kerja pemuliharaan bangunan warisan di Malaysia. Penyediaan garis panduan ini merujuk kepada Akta Warisan Kebangsaan 2005 (Akta 645) dan garis panduan pemuliharaan di peringkat antarabangsa iaitu *United Nations Education, Scientific and Cultural Organization (UNESCO)* dan piagam-piagam di bawah *International Council on Monuments and Sites (ICOMOS)* seperti Piagam Burra, Piagam Australia 1999 (*Charter for the Conservation of Places of Cultural Significance*). Rujukan garis panduan UNESCO dan ICOMOS dalam garis panduan ini lebih kepada prinsip pemuliharaan bangunan. Selain daripada Akta 645 dan garis panduan antarabangsa, penyediaan garis panduan ini juga berasaskan amalan pemuliharaan bangunan warisan yang dilaksanakan oleh pihak Jabatan Warisan Negara (JWN). Dengan adanya garis panduan ini, semua aktiviti dan kerja yang berkaitan dengan pemuliharaan bangunan warisan mestilah mematuhi prinsip dan prosidur yang terkandung dalam garis panduan ini.

Kandungan garis panduan ini terbahagi kepada empat (4) bahagian utama iaitu:

BAHAGIAN 1 : Pengenalan
BAHAGIAN 2 : Prinsip Dan Proses Pemuliharaan
BAHAGIAN 3 : Kaedah Dan Teknik Pemuliharaan
BAHAGIAN 4 : Pendokumentasian

1.1 DEFINISI WARISAN

Warisan umumnya didefinisikan sebagai sesuatu yang bernilai yang diwariskan dari satu generasi ke satu generasi yang baru. Ia merangkumi adat resam, kebudayaan, kawasan, bangunan, bahan arkib dan cetakan termasuk penulisan buku dan makalah. Warisan kebudayaan merupakan aset yang bernilai kerana ia mempunyai nilai estetika, arkeologi, seni bina, budaya, sejarah, saintifik, sosial, spiritual, linguistik atau teknologi. Secara khususnya *United Nations Education, Scientific and Cultural Organization* (*UNESCO*) 1972 mendefinisikan warisan ketara sebagai merangkumi aspek-aspek berikut:

- **Monumen:** hasil kerja seni bina, ukiran monumen dan lukisan, elemen atau struktur arkeologi, tulisan dan ukiran pada dinding, kediaman dalam gua dan ciri-ciri lain yang menggambarkan nilai sejagat (*universal value*) yang tinggi dari aspek sejarah dan seni.

- **Sekumpulan bangunan:** sekumpulan bangunan yang berkelompok atau terasing, yang bernilai dari segi seni bina, *homogeneity* atau *tataletak (setting)* dalam landskap yang menggambarkan nilai sejagat yang tinggi dari segi sejarah, seni dan sains.

- **Tapak:** hasil kerja manusia atau alam semulajadi atau kombinasi keduanya termasuk tapak arkeologi yang menggambarkan nilai tinggi sejarah, estetika, etnologi atau antropologi.

Tafsiran Akta Warisan Kebangsaan 2005 berkaitan Bangunan Warisan

- **Bangunan**

  "bangunan" ertinya suatu bangunan atau kumpulan bangunan yang berasingan atau bersambung, yang disebabkan oleh seni binanya, kehomogenannya atau tempatnya dalam landskap, mempunyai nilai sejagat yang menonjol dari pandangan sejarah, seni atau sains;

- **Tapak**

  "tapak" termaksuklah mana-mana kawasan, tempat, zon, warisan semula jadi, monumen atau bangunan yang melekat pada tanah, rizab arkeologi dan mana-mana tanah dengan bangunan, taman, pokok atau rizab arkeologi;

- **Warisan Kebudayaan yang penting**

  "warisan kebudayaan" termasuklah bentuk ketara atau tidak ketara harta, struktur atau artifak kebudayaan dan boleh termasuk perkara, objek, butiran, artifak, struktur pembentukan, persembahan, tarian, nyanyian, muzik warisan yang penting kepada cara hidup rakyat Malaysia, dari segi sejarah atau semasa, di atas atau di dalam tanah atau warisan kebudayaan di bawah air bagi bentuk ketara tetapi tidak termasuk warisan semula jadi;

- **Zon**

  "zon" ertinya sesuatu kawasan atau sebahagian daripada sesuatu kawasan bagi maksud pemeliharaan dan pembaikpulihan berkenaan dengan landskap luar Bandar dan Bandar, sama ada semula jadi atau buatan manusia, yang mempunyai apa-apa warisan kebudayaan yang penting.

- **Tapak Warisan**

  "tapak warisan" ertinya sesuatu tapak yang ditetapkan sebagai tapak warisan di bawah seksyen 24;

1.2 KONSEP PEMULIHAN

Konsep pemuliharaan warisan yang diterima dan dipraktis sejagat ialah "Keaslian dalam Pemuliharaan Warisan". Keaslian boleh dianggap sebagai satu aspek estetik manakala proses untuk mengembalikannya adalah perkara etika. Dalam konteks pemuliharaan bangunan warisan, aspek yang paling penting adalah kepatuhan kepada kepentingan nilai-nilai warisan.

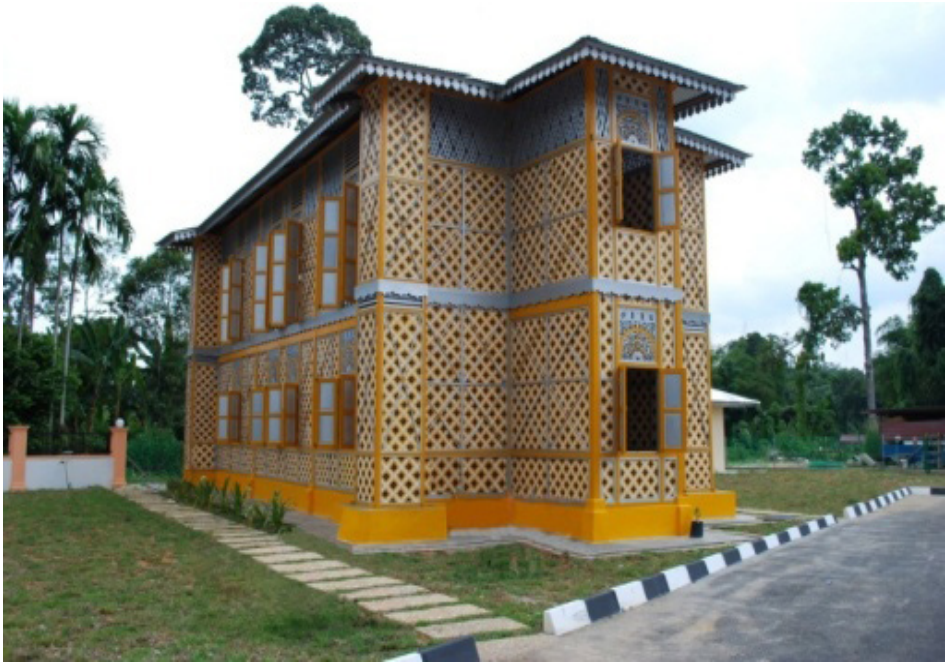

Foto 1: Masjid Lama Kampung Kuala Dal, Kuala Kangsar, Perak merupakan bangunan kelarai buluh dibina pada 1938

Sumber : Pemuliharaan Masjid Kampung Kuala Dal, 2009

Keaslian Bahan Binaan

Keaslian bahan merupakan aspek yang paling utama. Bahan binaan dianggap nilai penting pada bangunan kerana ia telah membawa bersama nilai sejarah masa lepas. Dalam bahan binaan ini terkandung bukti-bukti mengenai ilmu pengetahuan terdahulu gubahan idea dan keunggulan bangunan. Bahan binaan bangunan warisan banyak bersumberkan bahan semulajadi seperti kayu, batu dan kapur. Tujuan pengekalan keaslian bahan binaan bukan sahaja bagi tujuan sejarah dan nilai budaya malahan penggunaan semula bahan yang sama atau hampir sama seperti yang asal adalah lebih serasi dari segi tindak balas bahan selain kesepadanan dari segi rupa.

Keaslian Reka Bentuk

Setiap bangunan lama mempunyai sejarah perkembangan pembinaan. Bangunan yang masih kekal pada masa kini telah melalui pelbagai perubahan pada binaan mengikut era dan penghuni yang mendiaminya. Dalam keadaan ini konsep keaslian akan menjadi bertambah sukar kerana untuk menentukan reka bentuk yang sebenar di samping memastikan dan memilih era apakah bangunan patut dipulihara perlu dikaji dengan teliti. Bagi pemuliharaan reka bentuk, adalah perlu untuk mengkaji struktur asal bangunan, gaya seni bina dan hubungan bangunan dengan persekitaran.

Keaslian Kerja Binaan/Pertukangan

Bangunan Warisan mempunyai keunikan dari segi kerja binaan atau pertukangan tukang-tukang pada zaman dahulu. Kesenian kerja binaan mestilah dikekalkan dan sebarang pemuliharaan dan pembaikan pada bahan yang rosak atau hilang bahagian penyambungan mestilah dipulihara dengan bahan yang asal juga mengikut teknik kerja pertukangan asal. Kerja-kerja membaik pulih kerosakan mestilah menghasilkan bentuk yang harmoni di antara yang asal dengan yang baharu.

Keaslian Tataletak
Bentuk bangunan dan kedudukan bangunan termasuklah susun atur kawasan dan bangunan mestilah dikekalkan seperti yang asal. Keaslian pada bentuk dan susun atur bangunan dapat menstrukturkan gambaran sebenar berkenaan bentuk bangunan dan mengaitkannya dengan peristiwa-peristiwa sejarah yang dialami. Biasanya keaslian bentuk dan tataletak ini diperolehi selepas penyelidikan arkeologi dilakukan.

1.3 PENDEKATAN PEMULIHARAAN

Pemuliharaan merupakan satu proses menjaga dan mengawasi sesebuah bangunan warisan dari dimusnahkan atau dibaikpulih tanpa perancangan dan pengurusan yang sistematik. Pemuliharaan melibatkan kerja-kerja bagi mengekalkan keadaan asal sesebuah bangunan dan tapak warisan dan usaha ini merupakan satu proses untuk memanjangkan jangka hayat bangunan supaya ia boleh terus kekal untuk generasi yang akan datang. Usaha untuk memulihara dan memelihara bangunan warisan melibatkan beberapa pendekatan. Maksud pendekatan adalah tindakan-tindakan yang berbentuk proses kerja bagi memulihara bangunan. Pendekatan pemuliharaan didalam garis panduan ini merupakan tafsiran yang dirujuk dalam **Akta Warisan Kebangsaan 2005 (Akta 645) Bahagian I, Seksyen 2.**

Pengekalan
Pengekalan *(preservation)* didefinisikan sebagai kerja pembaikan untuk mengekalkan sesuatu dalam keadaan asal dan hendaklah dijalankan jika perlu dalam usaha untuk mencegah pereputan berlaku pada masa akan datang. Pengekalan merupakan usaha untuk memastikan fabrik pada sesuatu tempat itu berada dalam keadaan asalnya dan mencegah dari berlakunya keusangan. Pengekalan secara lazim melibatkan kerja-kerja pengawasan dan penjagaan sesebuah monumen dan tapak tanah bersejarah agar tidak mengalami kerosakkan dengan menggunkan kaedah saintifik dan sistematik.

Pencegahan
Pencegahan *(prevention)* didefinisikan sebagai usaha melindungi bangunan bersejarah dengan mengawal alam persekitaran yang secara tidak langsung mencegah agen kereputan dan kerosakan dari menjadi aktif. Pencegahan ini merangkumi kawalan ke atas kelembapan dalaman, suhu dan cahaya termasuklah tindakan untuk mengelakkan kebakaran, khianat, kecurian dan vandalisma dengan menyediakan kaedah pengurusan bangunan yang baik. Pencegahan dapat dilakukan melalaui pemeriksaan berkala, penyenggaraan dan jadual pencucian untuk mencegah kemerosotan serta kerosakan bangunan dari berlaku.

Pengukuhan
Pengukuhan *(consolidation)* didefinisikan sebagai tambahan dalam bentuk fizikal atau aplikasi menggunakan bahan tambahan atau bahan sokongan ke atas struktur asal pada sesebuah bangunan bersejarah bertujuan untuk meneruskan ketahanan dan integritinya dalam usaha untuk mengekalkan keaslian bahan dan rupa bentuknya. Dalam erti kata lain, tiada satupun bahan yang mempunyai nilai sejarah boleh dialih dan dilupuskan begitu sahaja.

Pengembalian Semula
Pengembalian semula *(restoration)* didefinisikan sebagai usaha untuk mengembalikan atau menghidupkan semula konsep keaslian yang terdapat pada bangunan warisan. Lazimnya melibatkan perincian dan rupa bentuk bahan itu dilakukan dengan mengambil kira keaslian bahan, bukti arkeologi, reka bentuk asli dan dokumentasi rujukan dari sumber yamg sah. Pengembalian semula lazimnya melibatkan usaha untuk mendapatkan bentuk dan butiran secara tepat sesuatu benda sewaktu ia wujud dalam satu tempoh masa yang tertentu melalui penanggalan atau pengantian bahan yang telah hilang dengan yang baru. Pengembalian semula juga turut melibatkan kerja-kerja baik pulih dengan mengekalkan keaslian seni bina dan bahan binaannya kepada suatu masa atau era tertentu yang difikirkan sesuai atau sebaik mungkin ke tahap mula didirikan dan hinggalah kegunaannya yang asal.

Pemulihan
Proses mengembalikan *(rehabilitation)* sesuatu bangunan atau tapak kepada keadaan kebergunaan melalui pembaikan atau pengubahan, yang memungkinkan penggunaan semasa yang bersesuaian sambil memelihara bahagian dan ciri bangunan atau tapak itu yang penting kepada seni bina dan sejarah.

Pengeluaran Semula
Pengeluaran semula *(reproduction)* didefinisikan sebagai penyalinan sesebuah artifak yang lazimnya bertujuan untuk mengantikan bahagian kompenan yang hilang atau reput agar nilai estetik secara keseluruhannya terpelihara. Pengeluaran semula turut melibatkan kerja menyalin artifak dan bahan hiasan yang diancam kerosakan dalam usaha untuk mengekalkan keharmonian nilai estetiknya.

Pembinaan semula
Proses pembinaan semula *(reconstruction)* struktur secara tepat melalui suatu pembinaan baru, rupa bentuk dan perincian suatu struktur yang telah hilang, atau sebahagian daripada struktur itu, sebagaimana yang didapati pada suatu tempoh masa dan termasuklah pembinaan semula keseluruhan atau sebahagian. Pembinaan semula harus mengambilkira rekabentuk asal bangunan dan boleh dianggap sebagai replika sesebuah bangunan yang telah musnah.

Penyesuaigunaan Semula
Kerja-kerja mengubah suai *(adaptive reuse)* fungsi dan kegunaan bangunan lama kepada yang baharu, tetapi masih mengekalkan bentuk dan ciri-ciri bangunan yang asal. Sebelum kerja-kerja ubah suai fungsi dilakukan, butiran bangunan seperti penggunaan ruang asal dan ciri-ciri elemen asal mestilah direkodkan. Lukisan 'measured drawing' dan lukisan binaan baharu mesti disediakan bagi tujuan rekod perubahan pada bangunan

Penyenggaraan
Penyenggaraan *(maintenance)* didefinisikan sebagai menjalankan kerja, membaiki, dan penjagaan ke atas struktur bangunan bersejarah secara berterusan dan dilakukan selepas pembinaan atau selepas pengembalian semula selesai pada suatu tahap yang memuaskan dalam usaha untuk mengelakkan kemerosotan.

BAHAGIAN DUA

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2.0 PRINSIP DAN PROSES PEMULIHARAAN

Prinsip-prinsip yang memandu kepada pelaksanaan Garis Panduan Pemuliharaan Bangunan Warisan ini mengandungi kenyataan dari segi maksud, panduan, arahan dan etika pemuliharaan yang terdiri daripada batasan-batasan kerja dan gangguan yang dibenarkan dalam melaksanakan kerja-kerja pemuliharaan.

Apabila sesebuah bangunan warisan hendak dipulihara, aspek utama yang menjadi matlamat dan nilai pada projek adalah kepentingan budaya, sejarah dan seni bina bangunan. Bangunan warisan hendaklah dipulihara sebagaimana bentuknya yang asal. Ini melibatkan keaslian bangunan dari segi seni bina, bahan binaan, kaedah dan teknik binaan termasuklah tekstur, fasad dan warna bangunan. Bagi mencapai matlamat pemuliharaan, proses kerja yang dilakukan adalah berpandukan prinsip iaitu panduan-panduan yang memastikan bangunan warisan sentiasa terpelihara sepanjang projek dilaksanakan.

Prinsip pemuliharaan juga diaplikasikan dalam proses pemuliharaan. Ia merupakan aspek-aspek yang berkaitan dengan nilai yang terdiri daripada ciri-ciri etika dan kualiti estetika dalam melaksanakan kerja-kerja pemuliharaan. Etika dalam prinsip-prinsip pemuliharaan amat menekankan kepada sikap yang baik ke atas bangunan warisan manakala kualiti estetika ialah pengekalan kualiti seni bina bangunan sebagaimana yang asal atau yang asli. Bagi mencapai hasil kualiti kerja yang baik, Jabatan Warisan Negara amat menekankan kepada kepatuhan terhadap prinsip pemuliharaan. Prinsip pemuliharaan yang diaplikasi dalam kerja-kerja pemuliharaan di Malaysia adalah berpandukan Akta Warisan Kebangsaan 2005 (Akta 645) dan juga merujuk kepada prinsip pemuliharaan bangunan warisan sebagaimana terkandung dalam piagam dan garis panduan antarabangsa seperti UNESCO dan ICOMOS.

2.1 PRINSIP PEMULIHARAAN

Antara prinsip-prinsip asas pemuliharaan yang terkandung dalam piagam antarabangsa ialah :

i. Dapat memanjangkan usia bangunan.
ii. Menghormati kualiti tempat.
iii. Mengutamakan bahan yang asal juga keaslian kerja tangan.
iv. Berhati-hati membuat penyelidikan dan perekodan sebelum gangguan.
v. Pemuliharaan merupakan kerja-kerja yang menganggu bangunan dari segi kedudukan, susunan dan fabrik bangunan. Oleh itu sebarang gangguan untuk penyelidikan dan kerja awalan mestilah paling minimum.
vi. Toleransi dalam interpretasi dan kegunaan.
vii. Risiko paling minimum ke atas kehilangan bahagian-bahagian yang penting dan kerosakan yang tidak dijangka semasa ujian ke atas bahan binaan.
viii. Gangguan yang boleh dikembalikan semula.
ix. Pengubahsuaian yang paling minimum ke atas fabrik bangunan.
x. Dapat membezakan antara bahan lama dengan baharu.
xi. Memberi peneguhan yang maksimum kepada struktur asal.
xii. Menyediakan dokumentasi sebelum, semasa dan selepas kerja-kerja pemuliharaan.

2.2 PROSES PEMULIHARAAN

Pemuliharaan merupakan satu proses menjaga dan mengawasi sesebuah bangunan warisan dari dimusnahkan atau dibaikpulih tanpa perancangan dan pengurusan yang sistematik. Pemuliharaan melibatkan kerja-kerja yang cuba mengekalkan keadaan asal sesebuah bangunan dan tapak warisan seperti mana yang asal dan dapat mengekalkan kepentingan kebudayaan. Proses menjaga termasuklah pemuliharaan, pembaikan, pembinaan semula dan penyesuaigunaan, dan biasanya lebih daripada salah satu kombinasi diperlukan. Proses pemuliharaan merupakan pemanjangan usia bangunan agar bangunan itu sentiasa berfungsi.

Tujuan utama pemuliharaan ialah untuk menjaga kepentingan budaya dengan pengekalan fabrik melalui kaedah pemuliharaan yang betul supaya dapat memanjangkan usia bangunan dan dapat berfungsi dengan baik.

Proses pemuliharaan bangunan warisan terbahagi kepada lima (5) peringkat seperti berikut:

Kajian awalan
Menjalankan kajian awalan bagi mendapatkan maklumat tentang bangunan merangkumi lokasi, latar belakang sejarah, nilai-nilai kepentingan, keadaan semasa dan pemilik.

Kajian dilapidasi
Menjalankan kajian dilapidasi bagi mengenalpasti jenis dan tahap kerosakan bangunan serta mengemukakan cadangan kaedah pemuliharaan.

Penyediaan Dokumen
Menyediakan dokumen tender atau sebut harga bagi menentukan skop kerja, kaedah dan teknik pemuliharaan bangunan beserta anggaran kos.

Kerja kerja pemuliharaan
Menjalankan kerja-kerja pemuliharaan bangunan berdasarkan garis panduan ini, termasuk menyediakan Laporan Awalan, Laporan Kajian Dilapidasi, Laporan Sebelum, Semasa Dan Selepas Pemuliharaan, Laporan Akhir Dan Rakaman Video.

Pelan Penyenggaraan
Pelan penyenggaraan disediakan bagi memastikan bangunan diurus dan disenggara dengan baik dari semasa ke semasa melalui kaedah dan teknik yang betul. Ia merupakan satu perancangan bagi menjalankan penyenggaraan secara berkala.

2.2.1 Konservator

Kerja-kerja pemuliharaan mesti dikendali dan diurus oleh mereka yang mempunyai kelayakan teknikal dan pengalaman profesional dalam pemuliharaan bangunan warisan. Oleh itu, Pegawai Penguasa/Perunding Arkitek/Kontraktor hendaklah melantik (jika perlu) seorang Konservator bagi pihak mereka untuk mengawasi kerja-kerja yang akan dilaksanakan.

Skop tugas seorang konservator adalah seperti berikut:

i. Memahami sejarah dan teknologi monumen bangunan atau tapak bagi memudahkan pengenalpastian identiti, merancang pemuliharaan dan interpretasi hasil penyelidikan.
ii. Memahami perletakan monumen, bangunan atau tapak, kandungan dan persekitaran yang berkaitan dengan bangunan atau landskap.
iii. Memahami dan menganalisis ciri-ciri monumen, bangunan atau tapak.
iv. Diagnosis punca-punca asas kerosakan bangunan dan boleh mencadangkan tindakan pemuliharaan.
v. Menyiasat dan membuat laporan kerosakan yang disokong dengan lakaran dan gambar yang bersesuaian.
vi. Membuat keputusan berasaskan etika dan prinsip, dan tanggungjawab jangka panjang ke atas warisan budaya.
vii. Menjelaskan pandangan dan memberi nasihat ke atas bidang yang perlu dikaji oleh pakar seperti lukisan dinding, arca dan objek/tapak yang mempunyai nilai seni dan budaya.
viii. Memberikan nasihat kepakaran berkaitan strategi penyenggaraan, polisi pengurusan dan rangka kerja untuk penjagaan alam sekitar, pengekalan monumen, bangunan dan tapak.
ix. Mendokumentasikan semua kerja.
x. Bekerja dalam kumpulan yang pelbagai bidang/disiplin dan kepakaran.
xi. Boleh bekerja dengan semua kumpulan sama ada pentadbir, pengurus dan perancang bagi menyelesaikan konflik dan merancang strategi pemuliharaan.

Pelantikan konservator bagi projek pemuliharaan untuk mana-mana bangunan Warisan atau Warisan Kebangsaan (yang telah diwartakan di bawah Akta Warisan Kebangsaan 2005), ianya mestilah merujuk kepada senarai Konservator Berdaftar Jabatan Warisan Negara bagi mendapat ulasan dan pengesahan daripada Pesuruhjaya Warisan.

2.2.2 Pelantikan Kontraktor

Bagi mana-mana kerja konservasi yang melibatkan bangunan Warisan dan Warisan Kebangsaan, pihak pegawai penguasa mestilah memastikan perlantikan kontraktor yang berdaftar dengan CIDB dibawah kod B03 (pemulihan dan pemuliharaan) bagi memastikan kerja-kerja dapat dilaksanakan dengan baik sehingga mencapai matlamat yang ditetapkan.

- Pegawai Penguasa perlu mendapatkan ulasan bertulis daripada Pesuruhjaya Warisan sebelum melantik Konservator dan Kontraktor bagi memastikan perlantikan dibuat selaras dengan keperluan JWN.

2.3 PANDUAN KERJA PEMULIHARAAN

Perlindungan

Struktur dan komponen bangunan warisan perlu dilindungi semasa kerja pemuliharaan supaya tiada kerosakan tambahan berlaku. Sesetengah komponen bangunan warisan tidak dapat ditanggalkan dan perlu dipulihara di tempat asalnya. Oleh itu ia perlu dilindungi bagi memelihara komponen atau elemen bangunan semasa kerja-kerja pemuliharaan dilakukan. Contohnya membina bumbung sementara bagi memberi perlindungan pada struktur bumbung sedia ada.

Mengenalpasti dan Mengekalkan Elemen

Setiap komponen dan elemen bangunan yang hendak di pulihara termasuklah bumbung, dinding, lantai, tiang, pintu, tingkap dan elemen dekorasi bangunan hendaklah dikenalpasti dari aspek ciri-ciri elemen dan mengekalkan keseluruhan ciri-ciri yang mempunyai kepentingan sejarah dan budaya. Melalui pengenalpastian dan pengekalan ciri-ciri elemen yang penting kepada sejarah bangunan ini, secara tidak langsung pihak terlibat dapat merangka dan merancang tatacara kerja bagi pemuliharaan setiap komponen dan elemen bangunan.

Mengganti Elemen yang Rosak

Elemen-elemen yang mengalami kerosakan yang terlalu teruk seperti reput, patah, pecah atau diserang anai-anai dan kulat perlu digantikan dengan bahan yang sepadan seperti yang asal dan hendaklah ditandakan pada bahan pengganti dengan tag yang mempunyai tarikh elemen dipulihara. Ini bagi membezakan bahan yang lama dan yang baharu. Keseluruhan kerja penggantian hendaklah direkod dengan menandakan lokasi tersebut di atas pelan/lukisan.

Merawat dan Menjaga

Bahan-bahan yang telah dibaiki dan dipulihara hendaklah dijaga dan disenggarakan dengan baik semasa kerja-kerja pemuliharaan sedang berjalan. Elemen yang mungkin terdedah kepada kerosakan baharu seperti kotoran pada permukaan atau kesan tindakan mekanikal seperti calar akibat geseran beban berat hendaklah dilindungi. Bahan-bahan kayu memerlukan rawatan terlebih dahulu seperti rawatan kimia atau proses pengeringan diluar tapak hendaklah dilakukan dengan baik. Penggunaan bahan kimia berbahaya harus mematuhi prosedur keselamatan dan khidmat nasihat pakar diperlukan.

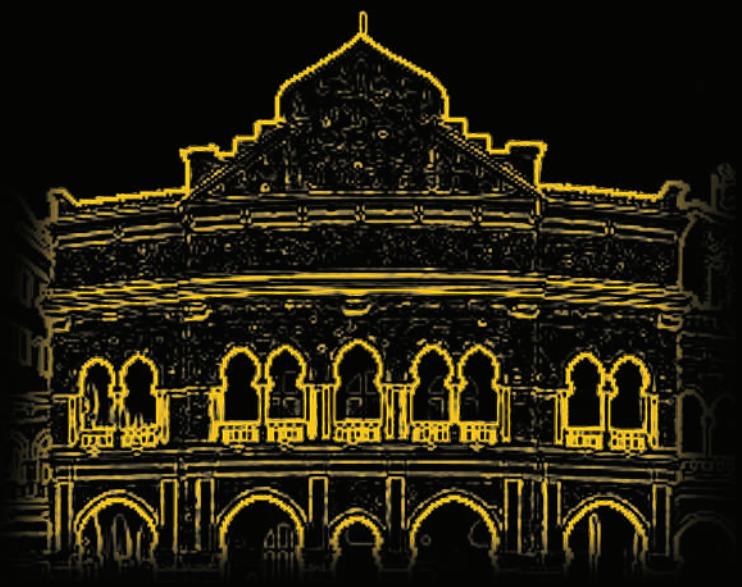
Pengubahsuaian dan Penambahan
Memasang sebarang peralatan atau perkakas baharu bagi fungsi perkhidmatan dalam bangunan seperti pemasangan penghawa dingin, lif, pendawaian elektrik termasuklah tambahan fungsi baharu bangunan seperti anjung letak kereta, cermin/kaca pada bukaan. Pengubahsuaian dan penambahan mestilah tidak mengubah bentuk dan fungsi asal bangunan dan menggunakan bahan binaan yang harmoni dengan keseluruhan rupa bangunan dari aspek warna dan reka bentuk.

Bangunan Tambahan atau Bangunan Baharu
Sebarang cadangan bangunan tambahan atau bangunan baharu yang hampir dengan bangunan sedia ada atau berada dalam tapak yang sama mestilah:

i. Pembinaan baharu seperti penambahan pada sesebuah tapak dibenarkan apabila ia tidak merosak atau mengaburkan kepentingan budaya tapak tersebut atau jauh daripada interpretasi dan apresiasi ke atas keasliannya yang sebenar.
ii. Cadangan bangunan baharu yang hampir dengan bangunan warisan sedia ada perlu mengambilkira pengekalan karektor seni bina bangunan warisan, integriti tapak dan tataletak ruang bersejarah;
iii. Pembangunan baharu mesti tidak menjejaskan struktur asal, reka bentuk dan seni bina bangunan warisan;
iv. Tiada pembinaan menegak yang boleh melindungi atau menghalang pandangan kearah bangunan Warisan atau Warisan Kebangsaan. Pembinaan struktur baharu dalam tapak/bangunan warisan, tidak boleh mendominasi atau melebihi reka bentuk dan ketinggian bangunan sedia ada;
v. Ketinggian dan jarak bangunan baharu dari bangunan warisan mestilah menghasilkan satu kehormanian seni bina kepada bangunan dan tataletak tapak warisan. Pihak pemaju perlu kreatif bagi mentafsirkan aspek keharmonian seni bina samada ianya berupa reka bentuk yang menyerupai bangunan warisan sedia ada atau pun pembinaan baharu yang boleh dibezakan dengan yang lama.
vi. Kerja-kerja pembinaan baharu tidak boleh mengganggu struktur Bangunan Warisan atau Bangunan Warisan Kebangsaan. Penyediaan kajian dilapidasi dan lukisan terukur mesti dihasilkan sebelum kerja-kerja pembinaan baharu bermula.
vii. Reka bentuk cadangan perlu mengambilkira elemen, skala serta karektor bangunan dan tapak tanpa menenggelamkan nilai senibina dan identiti bangunan Warisan atau Warisan Kebangsaan sedia ada serta tidak mengelirukan orang ramai untuk mengenalpasti bangunan warisan yang sebenar;
viii. Pemilihan warna, tekstur dan bahan binaan pembangunan baharu hendaklah harmoni dengan persekitaran dan seni bina bangunan Warisan atau Warisan Kebangsaan.
ix. Apa-apa pembangunan hendaklah mengambil kira pemajuan kesan trafik yang minimum ke atas bangunan warisan atau monumen tersebut.

Nota Tambahan : Bagi mana-mana cadangan pembangunan atau penambahan baharu terhadap bangunan Warisan atau Warisan Kebangsaan yang terletak dalam Tapak Warisan Dunia UNESCO, ianya adalah tertakluk kepada Garis Panduan Pengurusan Pemuliharaan serta Rancangan Kawasan Khas (RKK) Tapak Warisan Dunia tersebut.

BAHAGIAN TIGA



BAHAGIAN TIGA

3.0 KAEDAH DAN TEKNIK PEMULIHARAAN

Bangunan warisan mempunyai seni bina yang unik. Elemen seperti bumbung, dinding, lantai, tiang, bukaan, tangga dan dekorasi dapat menyumbang kepada karektor sesebuah bangunan warisan. Kesemua elemen bangunan warisan perlu dikekalkan sebagaimana bahan yang asal termasuk kedudukan elemen. Sebarang perubahan pada elemen akan memberi kesan kepada rupabentuk bangunan selain perubahan kepada keaslian karektor bangunan warisan. Setiap proses kerja memulihara bahagian dan elemen bangunan mestilah dimulakan dengan penyiasatan yang jujur dan cermat. Kerja-kerja merawat, membuka, mengeluar dan pemasangan semula mestilah dilakukan dengan gangguan yang minima.

Sebarang penggantian bahan baharu juga mestilah sepadan dengan yang asal. Keadaan bangunan mesti direkodkan sebelum, semasa dan selepas pemuliharaan.

Prinsip kerja perlu diikuti pada setiap peringkat kerja bangunan bagi memastikan bangunan warisan sentiasa terpelihara dan kukuh sepanjang projek pemuliharaan dilaksanakan. Garis panduan ini hanya menggariskan panduan kerja dari aspek prinsip pemuliharaan bangunan sahaja. Cadangan tatacara kerja dan teknik pemuliharaan yang terperinci mestilah disediakan oleh konservator yang dilantik serta mendapat ulasan Jabatan Warisan Negara sebelum sebarang kerja dilaksanakan.

Prinsip kerja dalam pemuliharaan bangunan warisan haruslah dipulihara bermula dari bahagian atas ke bawah yang merangkumi elemen bangunan berikut:

3.1 BUMBUNG

Bumbung dan kemasannya merupakan salah satu karektor bangunan warisan. Skala bumbung, bentuk, kecerunan dan jenis kemasan yang digunakan mempengaruhi gaya seni bina sesebuah bangunan. Kemasan bumbung menyumbang kepada warna, tekstur dan corak. Manakala pengaruh pembinaan dan pertukangan sama ada penduduk tempatan atau pendatang pula menyumbang kepada gaya persembahan bangunan.

Bumbung merupakan komponen bangunan yang paling utama bagi melindungi bangunan daripada hujan, panas dan angin. Pembinaan profil bumbung yang sesuai

akan menjadikan bangunan bukan sahaja tahan lebih lama malahan dapat mengurangkan perbelanjaan penyenggaraan bangunan. Pemilihan profil bumbung bukan sahaja mesti memenuhi keperluan struktur tetapi juga memenuhi aspek lain seperti tanggungan beban, estetika, ketahanan terhadap tekanan iklim, ketahanan bahan dan ketahanan kepada kebakaran.

Struktur bumbung terbahagi kepada dua (2) profil utama iaitu bumbung curam *(pitched roof)* dan bumbung rata (*flat roof*). Bentuk dan struktur bumbung curam dipengaruhi juga oleh gaya seni bina sesebuah bangunan seperti bumbung rumah Melayu Tradisional mempunyai pelbagai bentuk bumbung. Antara contoh profil bumbung ialah bumbung panjang, bumbung perabung lima dan bumbung perak.

Masalah yang sering berlaku pada struktur bumbung merangkumi pereputan kayu akibat kelembapan dan serangan anai-anai. Kecacatan ini boleh dijumpai pada kayu kasau, papan rasuk dan rangka atap atau pada mana-mana bahan kayu yang diletak, dipasang, dibina atau disambung kepada dinding bangunan yang lembap.

Foto 2: Serangan anai-anai pada kerangka bumbung
Sumber: Projek Baikpulih Rumah Penghulu Natar, Merlimau, Melaka, 2009

Prinsip Pemuliharaan

i. Merekod terlebih dahulu kaedah binaan struktur bumbung. Ini termasuk merekod elemen bumbung, jenis kayu, ukuran dan teknik pembinaan.
ii. Sebelum memulakan kerja pemuliharaan, penyiasatan ke atas struktur bumbung perlu dilakukan bagi mengenalpasti tahap kecacatan dan faktor penyebab seperti serangan anai-anai, kelembapan dan pertumbuhan kulat.
iii. Membuat penyiasatan kekuatan struktur kayu sedia ada dan mengenalpasti kayu yang memerlukan pemuliharaan secara in-situ.
iv. Sebelum kerja-kerja baik pulih dijalankan, pemasangan/pembinaan bumbung sementara perlu dilaksanakan bagi tujuan perlindungan ke atas bangunan.
v. Penggantian semula kayu yang telah rosak mestilah daripada jenis dan kekuatan yang sama.
vi. Penggantian dan penyambungan kayu baru hendaklah dengan teknik yang dapat meneguhkan keseluruhan struktur dan diberi label *(tagging)*.
vii. Membuat rawatan perlindungan pada keseluruhan struktur bumbung. Jika struktur kayu, pencegahan anai-anai perlu dilakukan, manakala struktur besi hendaklah dicat dengan jenis cat bersesuaian.

Foto 3: Pembinaan bumbung sementara perlu dibuat terlebih dahulu sebelum kerja pemuliharaan dilakukan
Sumber: Projek Pemuliharaan Masjid Ihsaniah Iskandariah, 2015

Terdapat pelbagai profil bumbung yang sinonim dengan sejarah dan seni bina bangunan. Binaan profil bumbung juga bersepadanan dengan kemasan atau genting yang akan dipasang. Kemasan bumbung terdiri daripada pelbagai jenis. Jenis kemasan bumbung bergantung kepada bentuk, bahan dan saiz. Jenis kemasan yang sama tidak semestinya sama bentuknya kerana produk adalah bergantung juga kepada tempat pengeluaran. Jenis-jenis kemasan bumbung yang biasa terdapat pada bangunan-bangunan warisan di Malaysia kebanyakkannya diperbuat dari tanah liat seperti genting Marseiles untuk bangunan era kolonial, genting bentuk V kebiasaannya digunakan untuk bumbung rumah kedai, genting senggora untuk bumbung rumah Melayu tradisional dan genting konkrit untuk binaan yang lebih moden.

(a) (b) (c)

Foto 4: Jenis-jenis genting.
a) Genting Marseiles, b) Genting bentuk V atau U (c) Genting Senggora,

Kemasan atau genting bumbung merupakan komponen yang paling terdedah, mudah rosak dan memerlukan penyenggaraan serta penggantian. Kecacatan yang biasa dialami ialah genting pecah, retak, berlubang, permukaan kotor, ditumbuhi kulat dan warna genting kusam. Pemuliharaan genting bumbung adalah bertujuan untuk menyelamat dan merawat genting yang asal supaya dapat digunakan kembali.

Tatacara Kerja

i. Membuat penyiasatan dan kenalpasti kemasan bumbung yang asal.

ii. Mengenalpasti jenis bahan, saiz dan ukuran, dan tempat pembuatan.

iii. Memberi rawatan pembaikan atau perlindungan ke atas kemasan bumbung asal dengan kaedah yang tidak merosak, cermat dan bahan rawatan telah terbukti berkesan.

iv. Apabila membuat penggantian semula, seboleh-bolehnya digantikan dengan bahan yang asal *(salvage)* atau dengan bahan baharu yang sepadan dari segi jenis, rupa, warna, saiz dan tekstur.

v. Pemilihan kemasan baru bagi menggantikan bumbung asal yang telah musnah sepenuhnya mestilah sepadan dengan keseluruhan rupa bumbung dan seni bina bangunan. Keputusan penggantian di peringkat ini mestilah berdasarkan penyelidikan sejarah dan bersesuaian dengan pemilihan era atau tahun binaan bangunan.

vi. Pemasangan dan penyusunan semula genting pada rangka bumbung mestilah dilakukan dengan kaedah penyusunan seperti yang asal. Pemasangan perlu dilakukan dengan teliti bagi memastikan kedudukan genting bumbung kemas dan tidak menyebabkan kebocoran.

Foto 5: Membawa turun genting untuk kerja-kerja pencucian
Sumber: Projek Baikpulih Rumah Penghulu Natar, Merlimau, Melaka, 2009

3.2 DINDING

Pemuliharaan bangunan warisan mestilah mengekalkan keaslian seni bina termasuk bahan binaan dan teknik pembinaan. Bangunan lama dan bersejarah di Malaysia dibina dari bahan tradisional iaitu batu bata, tanah liat dan kapur. Bangunan dibina dengan struktur dinding ikatan batu bata, tanah liat dan mortar kapur dapat membentuk dinding yang dapat bernafas (*breathable walls*). Dinding bata bangunan warisan menampilkan nilai estetik yang menarik dengan memberi karektor pada bangunan dari segi tekstur dan warna.

Antara faktor penyebab kecacatan pada dinding bangunan warisan adalah faktor alam sekitar serta usia bangunan. Berada di kawasan beriklim tropika menyebabkan Malaysia menerima curahan air hujan dan kelembapan yang tinggi. Curahan dan rembesan air hujan pada bangunan warisan yang telah berusia mengakibatkan lembapan menyerap dan tersejat terutamanya pada tekstur bahan yang berpori atau berliang. Kesan daripada masalah ini dapat dilihat pada elemen dinding yang berlumut, kusam, cat mengelupas, penggaraman, keretakan dan pelepa peroi atau rapuh.

Selain masalah kelembapan, kecacatan utama pada dinding bata bangunan warisan adalah keretakan sama ada secara menegak atau melintang di dinding. Masalah keretakan dinding mungkin berpunca dari pelbagai faktor seperti pergerakan tanah, kelemahan bahan binaan atau sambungan pembinaan, pengecutan atau perubahan termal pada bahan kayu yang bersambung pada dinding.

Foto 6: Tumbuhan lumut yang tumbuh pada permukaan dinding
Sumber : Projek Pemuliharaan HSBC, Melaka, 2009

Tatacara Kerja

i. Menyiasat keadaan struktur dinding dan kenalpasti kecacatan. Penyiasatan hendaklah dilakukan dengan cermat dan gangguan yang minima.

ii. Bahagian yang telah dikenalpasti melibatkan kerosakan struktur hendaklah diberi peneguhan dengan kaedah yang sesuai bagi mengurangkan gangguan dan kerosakan ke atas struktur dinding.

iii. Rawatan ke atas dinding bata yang mengalami masalah berpunca dari kelembapan seperti permukaan berlumut dan penggaraman hendaklah dilakukan dengan kaedah dan teknik yang terbukti berkesan.

iv. Penggantian semula bata yang rosak dengan bata baru hendaklah sepadan dengan bata yang asal dari segi warna, tekstur, saiz dan kekuatan bahan.

v. Sebaik-baik penggantian bata adalah menggunakan bata lama atau bata asal *(salvage)* yang masih kukuh dari segi kekuatan bahan.

vi. Bahan binaan baharu yang digunakan mestilah boleh dikembalikan semula untuk perawatan dan pemuliharaan pada masa akan datang.

vii. Penyambungan dan pemuliharaan keretakan hendaklah dilakukan dengan kaedah dan teknik yang terbukti berkesan, dan tidak merosakkan fabrik asal.

viii. Pembinaan dinding bata hendaklah mengikut bentuk dan susunan ikatan bata seperti yang asal.

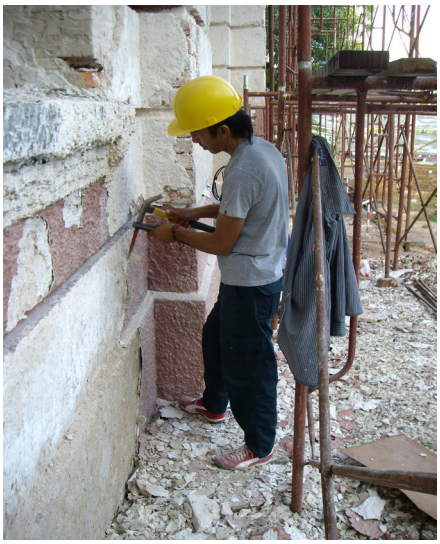


Foto 7: Kerja-kerja penggantian batu bata baru dan memecahkan lepaan yang rosak
Sumber: Projek Pemuliharaan HSBC, Melaka, 2009

Foto 8: Kerja-kerja "Stapling" pada permukaan dinding untuk mengukuhkan struktur
Sumber: Baikpulih Rumah Penghulu Natar, Merlimau, Melaka, 2009

Kegunaan utama mortar ialah untuk mengikat batu-bata atau blok pada dinding. Bangunan warisan banyak menggunakan kapur sebagai bahan untuk mortar dan lepaan *(plaster).* Kapur dihasilkan melalui pembakaran batu kapur atau kulit kerang. Campuran kapur bakar dengan air akan menghasilkan *calcium hydroxide,* juga dikenali sebagai *hydrated lime. Hydrated lime* apabila bercampur air dikenali sebagai *lime putty.* Mortar kapur adalah campuran *lime putty* dan pasir. Nisbah campuran kapur dan pasir adalah 1:3 atau dengan komposisi lain yang bersesuaian. Penyediaan bahan mortar kapur di tapak hendaklah dibuat dan digunakan dalam tempoh empat (4) jam bagi memastikan kualiti fungsi mortar diperolehi.

Pemuliharaan bahan mortar dan lepaan mestilah mengekalkan kandungan dan komposisi bahan yang asal. Prinsip pemuliharaan mortar adalah seperti berikut:

Tatacara Kerja

i. Kenalpasti mortar sedia ada bagi memastikan sama ada ianya yang asal dan bukan yang baharu.

ii. Kenalpasti komposisi mortar yang asal melalui ujian analisis makmal.

iii. Apabila menggunakan mortar untuk kerja-kerja pemuliharaan ia mestilah sepadan dengan mortar yang asal dari segi warna, tekstur, kekuatan dan kepadatan.

iv. Ujikaji bahan ditapak atau *'mock up test'* perlu dibuat terlebih dahulu bagi menentukan mortar yang sepadan dengan yang asal. Pemilihan berdasarkan kesepadanan tekstur, warna dan yang paling penting adalah kekuatan mampatan *'compression strength'* bahan.

v. Sebelum ikatan mortar dimasukkan, semua mortar sedia ada yang telah longgar atau peroi dan rosak hendaklah dikeluarkan. Kerja-kerja mengeluarkan mortar yang rosak mestilah dilakukan dengan cermat menggunakan alat yang tidak merosakkan.

vi. Mortar yang rosak hendaklah dikeluarkan pada kedalaman sekurang-kurangnya ¾ inci bagi membolehkan mortar baharu boleh masuk dan berupaya diikat dengan sempurna pada dinding bata.

vii. Sebelum memasukkan mortar baharu, bahagian yang telah dikeluarkan mortar lama mesti dibersihkan terlebih dahulu dan dibasahkan dengan air bagi memastikan bata lembap. Jika dinding bata terlalu kering, ia akan menyerap air daripada mortar baharu dan mengurangkan kekuatan mortar seterusnya melemahkan ikatan pada bata.

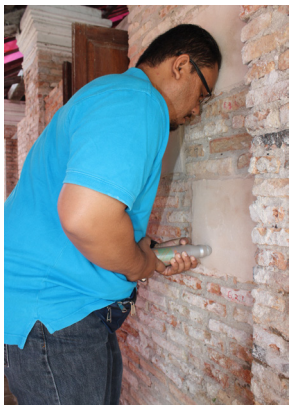


Foto 9: Membuat ujian lepaan ke atas beberapa sampel mortar menggunakan Hammer Rebound
Sumber: Projek Pemuliharaan Masjid Kakap,Kedah, 2015

Nota Tambahan:

Bagi bangunan yang dibina menggunakan lepaan kapur, penggunaan simen *Portland* adalah tidak dibenarkan sama sekali dalam kerja-kerja pemuliharaan bangunan warisan kerana ia adalah bertentangan dengan prinsip pemuliharaan. Antara kelemahan simen *Portland* adalah seperti berikut:-

i. Ia bahan yang tidak boleh dikembalikan. Apabila digunakan pada bangunan warisan ia berupaya merosakkan fabrik asal bangunan.

ii. Ia terlalu kuat dari segi kemampatan, perekatan dan tekanan. Oleh itu ia tidak sesuai dengan fabrik bangunan warisan yang lemah.

iii. Disebabkan kekuatannya yang tinggi, ia kurang keanjalan *(elasticity)* berbanding mortar kapur dan ini memberi tekanan serta mempercepatkan lagi kerosakan dinding.

iv. Ia tidak telap dan mempunyai kadar keporosan yang rendah, oleh itu ia memerangkap wap serta air dan memperlahankan proses pemejatan, seterusnya kelembapan dalaman akan berlaku.

v. Ia menyebabkan pengecutan pada permukaan serta mengakibatkan keretakan dan memudahkan air untuk memasukinya. Memandangkan ia tidak telap air, ini membuatkan air sukar untuk keluar dan mengakibatkan kerosakan yang berpunca dari kelembapan.

vi. Ia menghasilkan garam terlarut *(soluble salt)* pada permukaan dinding yang mungkin merosakkan liang-liang permukaan serta dekorasi atau ukiran yang terdapat pada permukaan dinding.

vii. Ia menyebabkan air tersejat dan meningkatkan resapan garam atau kapur yang terkumpul seterusnya menjadi keladak pada permukaan bangunan. Keladak ini bertindak balas dengan persekitaran dan membentuk kristal kalsium karbonat atau dikenali sebagai keladak batu kapur. Lapisan keladak batu kapur adalah bersifat alkali yang tinggi dan boleh menyebabkan pereputan pada bahan binaan bangunan.

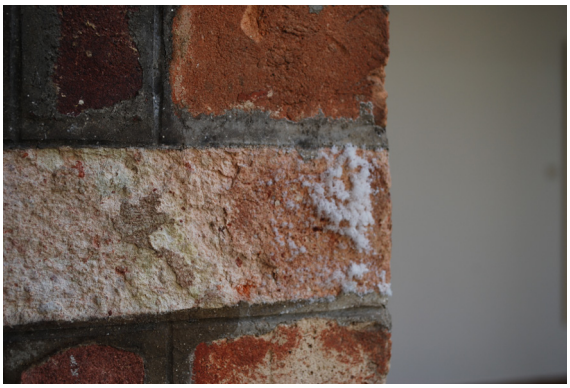


Foto 10: Kesan penggaraman pada permukaan diinding
Sumber: Projek Konservasi Fasad Bangunan Sultan Abdul Samad, 2009

3.3 SILING

Pembinaan siling dibuat di bawah bumbung untuk melindungi struktur kayu bumbung dari pandangan visual selain kemasan bahagian lelangit dalam bangunan. Siling kebiasaannya direkabentuk mengikut jenis bangunan. Siling bangunan warisan kebiasaanya adalah jenis siling tetap dan siling 'soffit' di mana lantai tingkat atas adalah siling untuk tingkat bawah. Terdapat bangunan warisan menggunakan kaedah siling gantung bagi tujuan melindungi sistem pendawaian eletrik baharu.

Kerosakan pada siling umumnya berpunca daripada masalah kelembapan yang datang daripada masalah bumbung seperti kebocoran. Lain-lain kerosakan yang berlaku adalah seperti papan siling lembab dan ditumbuhi kulat, papan siling pecah dan cat mengelupas.

Tatacara Kerja

i. Membuat penyiasatan punca kecacatan siling.
ii. Membuat peneguhan sementara kepada kayu struktur siling sebelum memulakan kerja baik pulih.
iii. Menggantikan papan siling yang rosak dan hilang dengan bahan yang sepadan.

3.4 LANTAI

Struktur Lantai

Lazimnya struktur lantai bangunan warisan adalah dari bahan kayu. Rasuk dan gelegar lantai merupakan komponen penting untuk menanggung papan lantai.

Kecacatan yang biasa ditemui adalah kayu patah, reput, permukaan haus atau terhakis, bercalar dan papan meleding. Punca utama kepada masalah pereputan dan kerosakan bahan kayu pada bangunan warisan adalah serangan serangga dan anai-anai. Serangan serangga dan anai-anai pada bahan kayu biasanya berlaku pada bahan kayu yang lembap. Punca kepada kerosakan permukaan lantai adalah disebabkan geseran atau seretan pergerakan diatasnya sama ada oleh manusia atau pun beban perabut.

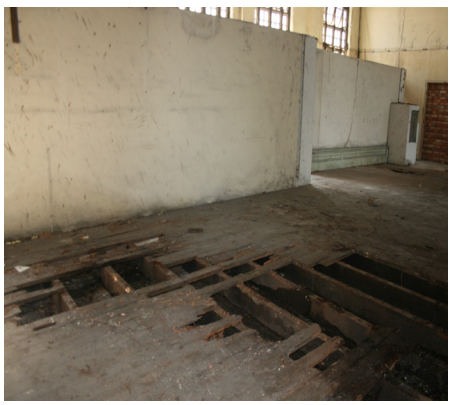


Foto 11: Kerosakan kayu akibat dimakan anai-anai dan mereput
Sumber: Projek Kerja-Kerja Konservasi Pejabat Pos Lama, Ipoh, Perak, 2009

Tatacara Kerja

i. Sebelum kerja pemuliharaan dilakukan, penyiasatan perlu dilakukan bagi mengenalpasti kecacatan dan serangan anai-anai pada gelegar dan papan lantai.
ii. Kayu lantai asal yang masih baik hendaklah dikekalkan.
iii. Mengenalpasti jenis kayu yang digunakan. Kebiasaannya kayu gelegar adalah dari spesis keras seperti balau dan cengal manakala untuk lantai adalah dari spesis meranti.
iv. Kekuatan kayu gelegar sedia ada menanggung beban perlu dikenalpasti.

v. Penggantian kayu gelegar dan papan lantai yang rosak mestilah menggunakan kayu yang sepadan dengan jenis dan kekuatan kayu yang sama. Kayu gantian (kayu baharu) hendaklah dirawat terlebih dahulu.

vi. Bagi kayu yang rosak sebahagian, bahagian yang rosak hendaklah dibuang atau dipotong dan disambung dengan kayu baharu yang sama dari jenis, kekuatan dan saiz.Teknik penyambungan mestilah bersesuaian dengan saiz, keadaan dan kaedah.

vii. Sebarang kerja baik pulih mestilah dengan kaedah dan teknik binaan tradisional. Jika sukar untuk membaik pulih, kaedah baru dengan kerosakan minima adalah dibenarkan.

viii. Membuat rawatan pencegahan anai-anai pada struktur lantai.

ix. Memberi lapisan pelindung (coating) yang bersesuaian pada permukaan lantai.

x. Memberi perlindungan sementara dengan menutup permukaan lantai sepanjang kerja-kerja pemuliharaan berjalan.

Foto 12: Kecacatan utama pada lantai adalah pereputan kayu akibat serangan anai-anai. Gambar kiri dan kanan; kerja-kerja mengeluarkan papan lantai dan gelegar lantai yang rosak Sumber: Projek Pemuliharaan Muzium Perak, Taiping, 2008

Kemasan Lantai

Kemasan lantai bangunan warisan umumnya menggunakan kemasan dari jenis tanah liat, terazo, marmar dan jubin seramik. Kemasan jenis tanah liat atau dikenali dengan 'terra cotta' menonjolkan tekstur dan warna tanah liat yang kemerahan, kemasan marmar juga mengikut warna asal marmar iaitu putih gading. Kemasan jubin seramik pula mempunyai corak yang pelbagai, kebiasaannya bercorak flora atau geometri.

Kecacatan yang biasa dialami pada kemasan lantai adalah permukaan terhakis dan warna luntur dan kusam akibat hakisan dari seretan beban, kemasan pecah, retak atau tercabut akibat usia bangunan yang lama dan bahan perekat telah peroi; permukaan kemasan dilekati kotoran dan lumut serta terdapat keladak kapur. Masalah ini berpunca daripada kelembapan dan kurang penyenggaraan.

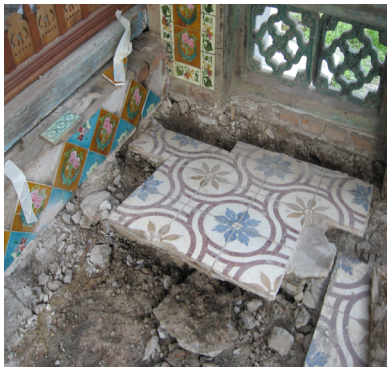


Foto 13: Kerja-kerja pemuliharaan jubin lantai yang rosak
Sumber: Projek Pemuliharaan Rumah Penghulu Natar, 2009

Tatacara Kerja

i. Jubin lantai asal hendaklah dikekalkan semaksima yang mungkin.

ii. Penambahan atau penggantian kepingan lantai baharu hendaklah sepadan dengan lantai asal.

iii. Kerja-kerja pembersihan dan melicinkan kemasan lantai hendaklah menggunakan kaedah dan bahan rawatan yang tidak merosakkan lantai asal.

iv. Memberi perlindungan sementara dengan menutup permukaan lantai sepanjang kerja-kerja pemuliharaan berjalan.

3.5 PINTU DAN TINGKAP

Pintu, tingkap dan bukaan seperti gerbang, sisip dan kekisi angin merupakan elemen bangunan yang dapat menonjolkan keunikan seni bina sesebuah bangunan warisan. Elemen-elemen pintu, tingkap dan bukaan pada sesebuah bangunan warisan mempunyai kepelbagaian bentuk dan gaya termasuk perincian bersesuaian dengan fungsi dan lokasi pemasangan. Elemen yang membentuk pintu dan tingkap ialah kerangka dan daun. Pintu dan tingkap kebiasaannya diperbuat daripada bahan kayu. Lain-lain bahan ialah logam, plastik dan aluminium.

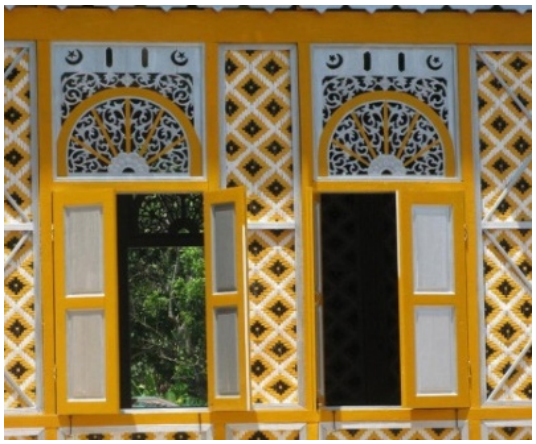


Foto 14: Tingkap Masjid Lama Kampung Kuala Dal, Kuala Kangsar, Perak.
Tingkap ini menampilkan keunikan kerawang pada bahagian atas tingkap
Sumber: Projek Pemuliharaan Masjid Kampung Kuala Dal, Perak,2015

Kecacatan yang biasa dialami pada pintu dan tingkap ialah kerangka reput dan patah akibat keusangan kayu, kelembapan atau kemungkinan serangan anai-anai. Daun pintu atau tingkap juga sering mengalami masalah tidak boleh dirapat (tutup). Masalah ini disebabkan pengecutan dan perubahan terma pada bahagian daun pintu, pengembangan pada sambungan kayu dan kemalangan yang menyebabkan kesan kerosakan pada kayu.

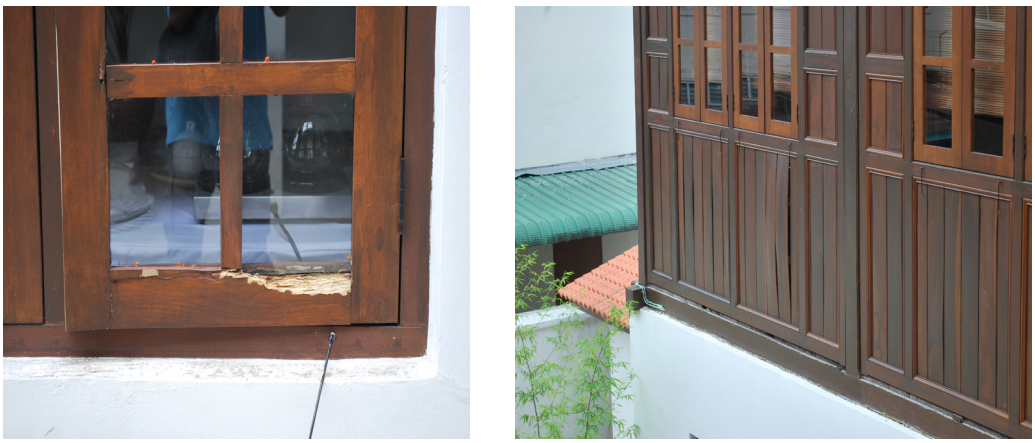


Foto 15: Kecacatan pada tingkap akibat serangan anai-anai dan papan meleding
Sumber: Projek Pemuliharaan Sanitary Board, Perak, 2008

Tatacara Kerja

Prinsip pemuliharaan pintu dan tingkap adalah untuk mengembalikan semula pintu dan tingkap kepada bentuk dan binaannya seperti yang asal.

i. Kerja-kerja pemuliharaan pintu dan tingkap dimulakan dengan membuat inventori dan melabel pintu dan tingkap yang rosak ke dalam pelan. Ini termasuk menandakan pintu dan tingkap yang akan dikeluarkan untuk kerja baik pulih.

ii. Pintu dan tingkap yang rosak seperti kerangka reput dan patah dikeluarkan dan dibawa ke bengkel kayu untuk kerja-kerja baikpulih.

iii. Penggantian kayu yang reput menggunakan kaedah potong dan sambung secara bertanggam. Kayu baharu yang digunakan untuk mengganti kayu lama adalah dari jenis dan kekuatan yang sama.

iv. Tampal semua lubang halus, rekahan dan permukaan tidak rata yang terdapat pada permukaan kerangka dan daun pintu serta tingkap bangunan dengan bahan *'putty'* yang bersesuaian.

v. Mengganti semua aksesori pintu seperti engsel, selak, tombol dan kunci pintu serta tingkap bangunan yang telah rosak dengan bahan baharu yang bersesuaian. Aksesori yang diganti sebaik-baiknya sepadan dengan jenis, bahan dan reka bentuk yang asal.

vi. Memasang semula kerangka dan daun pintu serta tingkap bangunan yang telah ditanggalkan dan dipulihara kembali pada kedudukan asalnya.

vii. Memberi perlindungan kepada pintu dan tingkap yang telah dipulihara dengan membalut pintu dan tingkap dengan plastik. Ini bagi mengelakkan kerosakan baharu pada kayu.

3.6 SALURAN PAIP AIR HUJAN DAN TALANG

Saluran paip air hujan dan talang merupakan sebahagian komponen bangunan yang mempunyai fungsi yang penting. Talang mengumpul air yang mengalir dari bumbung dan menyalurkannya melalui saluran paip air hujan. Saluran paip ini kebiasaanya dipasang menegak *(vertical)*, membawa air ke sistem perparitan aras tanah.

Masalah biasa yang berlaku pada komponen saliran air hujan antaranya ialah talang berkarat dan reput, bersaiz kecil menyebabkan limpahan semasa hujan lebat, talang tersumbat dengan kotoran, saluran paip air hujan pecah atau bocor, bengkok dan menyebabkan penyaliran air hujan tidak sempurna. Kecacatan dan kerosakan pada saluran paip air hujan dan talang menyumbang masalah kepada komponen bangunan yang lain seperti dinding dan lantai lembap dan berlumut.

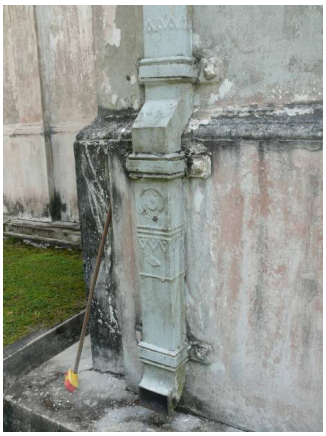


Foto 16: Saluran paip air tidak sempurna, corong air di atas lantai menyebabkan air tidak dapat disalurkan dengan baik.

Tatacara Kerja

i. Mendokumenkan terlebih dahulu saluran paip sedia ada dengan merekod saiz, jenis bahan dan sistem saliran.

ii. Sekiranya sistem saluran masih ada, dan boleh digunakan, pelihara dan senggara talang dan saluran paip yang sedia ada secara in-situ.

iii. Sekiranya telah rosak, dan tidak bersesuaian dengan penggunaan semasa penggantian talang dan saluran paip mestilah dengan ukuran yang tepat dan menggunakan fabrik yang sesuai.

iv. Penggantian talang dan saluran paip juga boleh mempertimbangkan aliran dan isipadu air. Talang bersaiz kecil boleh diganti dengan saiz yang lebih sesuai, manakala talang yang tidak sempurna pemasangan di keseluruhan cucur bumbung boleh dilengkapkan tanpa menjejaskan estetik bangunan warisan.

3.7 RAGAM HIAS

Ragam hias merupakan dekorasi tambahan bagi menghiasi permukaan fasad bangunan. Ia boleh dibahagikan kepada tiga komponen iaitu mural, ukiran dan corak lepaan atau 'plasterworks'. Ragam hias berfungsi bagi menampilkan gaya dan nilai estetika sesebuah bangunan warisan. Ragam hias bukan sahaja terdapat pada fasad atau permukaan dinding malahan pada tiang, pintu, tingkap dan siling bangunan.

Ragam hias bangunan-bangunan warisan khususnya bangunan kolonial dan rumah kedai lama lebih banyak menampilkan ragam hias corak lepaan kapur yang mempunyai motif atau corak mengikut pengaruh seni bina bangunan.

Foto 17: Lepaan bercorak atau plasterworks pada permukaan dinding Rumah Kedai Kampung Cina, Melaka

Sumber: Bahagian Konservasi, 2012

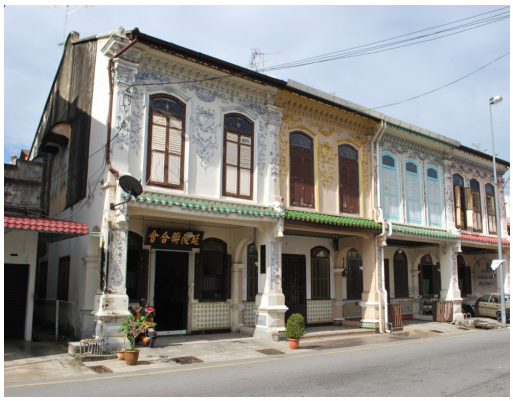


Foto 18: Deretan Rumah kedai di Kampung Cina, Melaka mempunyai elemen ragam hias yang unik pada fasad bangunan.

Sumber: Bahagian Konservasi, 2012

Kecacatan yang biasa dialami pada ragam hias khususnya pada corak lepaan *(plasterworks)* adalah lepaan pecah, rekahan halus, kekotoran dan ditumbuhi tumbuhan organik seperti kulat dan lumut. Kecacatan ini berpunca daripada faktor keusangan, kelembapan dan pencemaran alam sekitar. Selain daripada faktor persekitaran, kerosakan pada corak lepaan adalah disebabkan kerja-kerja baikpulih yang tidak sempurna seperti penggunaan bahan yang tidak sepadan dengan bahan asal.

Tatacara Kerja

i. Ragam hias yang asal hendaklah dikekalkan.

ii. Rupa bentuk dan motif ragam hias mestilah direkodkan dengan mengambil foto dan mencerap ukiran dan corak lepaan. Ini bertujuan untuk membuat replika rupa atau corak lepaan *(plasterworks)* yang asal.

iii. Sebelum memulakan kerja pemuliharaan, pemeriksaan yang teliti perlu dilakukan ke atas plasterworks untuk mengenalpasti kecacatan dan kerosakan lepaan.

iv. Kerja-kerja pencucian dan pembersihan ukiran lepaan mestilah dilakukan dengan hati-hati dengan menggunakan berus, pengikis dan semburan air secara manual *(hands spray)*. Semburan air *(water-jetting)* bertekanan tinggi tidak dibenarkan kerana ia akan merosakkan corak lepaan.

v. Pencucian menggunakan bahan kimia bagi membuang tumbuhan atau kotoran degil hendaklah dengan kadar minima yang tidak merosakkan fabrik lepaan. Bahan pencuci mestilah dari jenis kurang berbuih dan berasid.

vi. Kerja-kerja baik pulih lepaan untuk ragam hias mestilah dilakukan dengan cermat, sebaik-baiknya dilakukan oleh tukang yang mahir dengan kerja lepaan atau ukiran.

vii. Bahan untuk baik pulih lepaan yang rosak atau membuat semula corak lepaan baru mestilah menggunakan bahan yang sama seperti dengan yang asal.

Ukiran Kayu

Ukiran kayu merupakan salah satu keunikan ragam hias yang terdapat pada rumah Melayu tradisional. Ukiran kayu juga terdapat pada masjid dan istana. Umumnya kerosakan yang dialami dari bahan kayu adalah pereputan, lenturan dan patah akibat keusangan, kesan suhu persekitaran, pengaratan paku dan kelembapan.

Ukiran kayu mestilah dipelihara dan dikekalkan kerana ia mempunyai nilai seni dan budaya.

Tatacara Kerja

i. Motif dan corak ukiran mestilah direkodkan dengan mengambil foto dan mencerap ukiran. Ini bertujuan untuk membuat replika corak ukiran yang asal.

ii. Sebelum memulakan kerja pemuliharaan, pemeriksaan yang teliti perlu dilakukan keatas kayu untuk mengenalpasti kecacatan dan kerosakan.

iii. Membuat penyelidikan jenis spesis kayu ukiran.

iv. Kerja-kerja pencucian dan pembersihan ukiran yang bercat mestilah dilakukan dengan hati-hati menggunakan berus, pengikis dan kertas pasir secara manual.

v. Kaedah pembersihan permukaan yang telah dikikis mestilah kaedah kering.Tidak dibenarkan menggunakan air.

vi. Kerja-kerja baik pulih ukiran mestilah dilakukan dengan cermat, sebaik-baiknya dilakukan oleh tukang yang mahir dengan kerja mengukir.

vii. Kerja mengukir semula ukiran kayu pada panel kayu baharu mestilah menggunakan kayu dari spesis dan gred yang sama seperti kayu asal.

Foto 19: Mengukir kerawang tingkap.
Sumber: Projek Pemuliharaan Masjid Lama Kampung Kuala Dal, Perak, 2009

3.8 CAT

Cat memberi perlindungan kepada bahan seperti kayu dan dinding. Cat terbahagi kepada tiga komponen iaitu sebagai pengikat (*binder*), pencair dan pigmen. Sebagai bahan pengikat ia amatlah penting kerana dapat menentukan tempoh hayat cat. Oleh itu cat yang bersesuaian dan berkualiti hendaklah digunakan pada bangunan warisan.

Prinsip pemuliharaan bangunan warisan adalah memelihara bangunan sebagaimana bentuk yang asal. Ini termasuklah warna bangunan. Bagi mengenalpasti warna asal bangunan kaedah yang dilaksanakan adalah dengan mengikis lapisan cat.

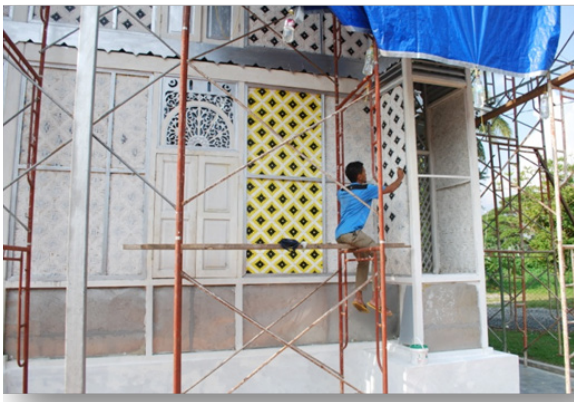


Foto 20: Kerja-kerja mengecat kelarai dinding
Sumber: Projek Pemuliharaan Masjid Ihsaniah Iskandariah, 2015

Tatacara Kerja

i. Kaedah mengikis cat hendaklah dilakukan dengan cermat tanpa merosakkan fabrik bangunan warisan.

ii. Sebelum membuat kerja-kerja mengikis keseluruhan dinding, kajian lapisan cat perlu dijalankan terlebih dahulu bagi mendapatkan warna asal bangunan. Kajian ini hendaklah dilakukan di beberapa lokasi bagi mendapatkan sampel warna cat asal.

iii. Kaedah mengikis cat bergantung kepada ketebalan cat pada permukaan dan jenis permukaan. Kaedah yang disyorkan ialah kaedah stim atau wap, teknik membakar, menggunakan peluntur cat dan kaedah manual dengan mengikis permukaan.

iv. Kaedah mengikis cat juga mestilah dilakukan dengan berhati-hati tanpa menjejaskan fabrik permukaan kayu atau dinding asal.

3.9 TANGGA

Tangga merupakan salah satu elemen bangunan yang menyambungkan aras atau lantai bangunan. Terdapat dua jenis tangga iaitu tangga larian terus dan tangga belok. Bahan untuk membina tangga adalah daripada kayu dan bata. Binaan tangga di bangunan-bangunan warisan kebiasaannya adalah tangga kayu dan ia menampilkan salah satu keunikan kaedah binaan. Butiran seperti tiang, susur tangga, anak tangga, paha tangga, gelegar dan rasuk dibina dengan kaedah bertanggam.

Memandangkan tangga merupakan struktur penting bagi tujuan menghubungkan antara lantai bangunan, jenis kayu yang digunakan adalah jenis keras dan mempunyai gred yang tinggi seperti kayu balau dan kempas. Ini merupakan salah satu faktor yang memberi ketahanan kepada bahan dan struktur tangga. Tangga kayu kebiasaanya dicat bagi tujuan estetik dan bagi memberi perlindungan pada kayu namun dalam konteks pemuliharaan, prinsip pengembalian semula dikehendaki. Oleh itu cat pada permukaan hendaklah dikikis.

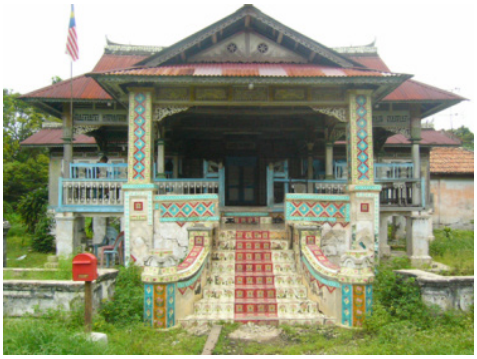


Foto 21: Tangga batu Rumah Penghulu Natar, Melaka. Tangga rumah ibu ini mempunyai binaan yang menarik dengan kemasan jubin bercorak. Sumber: Projek Pemuliharaan Rumah Penghulu Natar, 2009

Tatacara Kerja

i. Mengekalkan struktur tangga asal sebagaimana bentuk dan rupa.

ii. Menyiasat jenis kerosakan yang terdapat pada struktur tangga.

iii. Mengeluarkan sebarang lapisan baru pada permukaan kayu dengan cermat dan berhati-hati menggunakan kaedah yang tidak merosakkan.

iv. Mengenalpasti spesis dan kekuatan kayu tangga.

v. Penggantian mana-mana elemen tangga mestilah dari kayu yang sama seperti yang asal dengan kaedah pemasangan atau binaan seperti asal atau jika sukar kaedah baharu mestilah dapat memberi peneguhan.

vi. Memberi perlindungan pada keseluruhan tangga sepanjang kerja-kerja pemuliharaan.

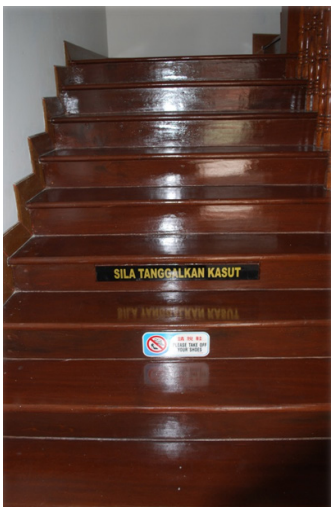


Foto 22: Tangga kayu di bangunan warisan mempunyai keunikan binaan dan kebiasaannya dari jenis kayu keras
Sumber: Projek Pemuliharaan Sanitary Board, Perak, 2008

3.10 SISTEM PERKHIDMATAN BANGUNAN

3.10.1 Pendawaian Elektrik

Sebelum kerja-kerja pendawaian dibuat, pendawai atau kontraktor hendaklah merancang dan mengenalpasti kerja-kerja yang hendak dilakukan supaya hasil kerja kemas, teratur dan selamat untuk digunakan serta hendaklah meminimakan kerosakan pada bangunan warisan.

Tatacara Kerja

Perkara yang perlu dipertimbangkan ketika penanggalan dan pemasangan sistem pendawaian elektrik:

i. Elakkan daripada menjejas dan merosakkan dinding bangunan.

ii. Penanggalan dan pemasangan sistem pendawaian yang lama dan baru perlu dilakukan secara berhati-hati supaya permukaan fasad bangunan tidak terjejas atau mengalami kerosakan.

iii. Pendawaian elektrik disyorkan dengan dipasang secara permukaan (*conduit*) dan disembunyikan dalam salur atau trunking mengikut kesesuaian bangunan.

iv. Merekod keadaan bangunan sebelum, semasa dan selepas pemasangan sistem elektrik.

v. Menyediakan senarai semak, pemeriksaan dan penyenggaraan sistem pendawaian elektrik.

iv. Pemasangan komponen pendawaian baru perlulah diletakkan di lokasi yang tersembunyi namun mudah dikesan bagi tujuan penyenggaraan.

v. Pengujian keselamatan elektrik mesti dilakukan dan disahkan oleh pegawai yang berkelayakan.

3.10.2 Sistem Penghawa Dingin

Sistem penghawa dingin di bangunan-bangunan warisan banyak menggunakan sistem penghawa dingin lama. Sistem ini sering dipasang pada dinding, siling dan lantai bangunan. Sistem ini dipengaruhi oleh penggunaan unsur air dan udara sebagai pengalir haba. Udara dingin dan kering yang dihasilkan oleh sistem penghawa dingin boleh menyebabkan penyusutan kualiti dan ketahanan bahan binaan bangunan. Salah satu kemungkinan ialah akan berlaku kondensasi pada permukaan atau dalam struktur, yang akhirnya membolehkan pertumbuhan kulat.

Tatacara Kerja

Pemasangan sistem penghawa dingin perlu dikaji daripada aspek kedudukan dan bagaimana sistem pembuangan air dan pengudaraan agar tidak memberi kesan kepada bangunan.

i. Pemasangan kemudahan sistem penghawa dingin perlu sensitif dan tidak mencacatkan seni bina bangunan kerana peralatan penghawa dingin bukan elemen asal bangunan warisan. Oleh itu unit penghawa dingin perlu dilindungi dari pandangan umum.

ii. Penggunaan jenis-jenis pelindung *(screening)* dibenarkan yang boleh memenuhi keperluan adalah seperti jejala *(trellises)*, sirip *(louvres)* dan panel berongga *(perforated panels)* atau lain-lain alternatif reka bentuk yang dapat memenuhi fungsi penutup visual dan tidak mengurangkan karektor seni bina bangunan warisan.

iii. Pemasangan peralatan penghawa dingin, pendawaian serta alat perlindungan mestilah tidak menjejaskan struktur asli bangunan warisan seperti dinding, tiang, lantai, bumbung atau merosak dan memindahkan elemen bangunan seperti ukiran, kerja lepaan (plasterworks), pintu dan tingkap asal serta tidak terlalu menonjol pada pandangan umum.

iv. Unit penghawa dingin (*indoor unit*) sama ada jenis almari berdiri atas lantai atau digantung pada siling adalah dibenarkan. Walau bagaimanapun pemasangan tidak digalakkan pada siling asal sebaliknya pemasangan hanya pada siling baru sahaja pada bangunan warisan. Unit penghawa dingin ini sebaik-baiknya disembunyikan dari pandangan umum dan tidak ketara.

v. Reka bentuk pelindung perlu sesuai dan harmoni dengan ciri-ciri reka bentuk dalaman.

vi. Unit hawa dingin jenis tingkap tidak digalakkan kerana ia akan merosakkan reka bentuk tingkap bangunan warisan.

3.10.3 Pencahayaan

Kaedah pencahayaan haruslah dilakukan dengan teliti dan tidak memberikan impak negatif kepada struktur warisan. Pemilihan kaedah pencahayaan mestilah mengambilkira faktor warna dan kadar tindakbalas yang ingin diperolehi terhadap permukaan bangunan warisan. Tujuan pencahayaan juga perlu diambilkira bagi mencapai objektif pencahayaan yang diharapkan.

Penggunaan kaedah pencahayaan mestilah tidak terlalu ketara dan mengganggu fasad bangunan, mudah dipasang dan diselenggara dan pada masa yang sama mesti menghormati fabrik bangunan warisan.

Sumber pencahayaan mestilah berupaya menonjolkan penampilan bangunan melalui penggunaan lampu putih LED (warm white LED) (kurang dari 3000 K) yang disyorkan dan bersesuaian dengan keperluan pencahayaan bangunan warisan.

Pencahayaan LED (melebihi 3000 K) mengeluarkan 470 nm yang berupaya memberi kesan yang tidak baik kepada kesihatan dan persekitaran yang mana ini perlulah dielakkan.

Penggunaan lampu limpah mesti mengambil kira faktor lokasi perletakan agar tidak merosakkan bangunan warisan serta mengganggu pandangan dan laluan penghuni mahupun pengunjung bangunan.

3.10.4 Papan tanda

Perletakan papan tanda pada bangunan warisan haruslah menghormati nilai warisan bangunan terbabit. Perletakan mestilah pada permukaan bangunan yang dikhususkan dan sesuai dengan tujuan perletakan contohnya di bahagian hadapan fasad bangunan, kebiasaannya di bahagian atas bukaan dan lebih rendah dari ‘cornice’ bangunan.

Rekabentuk papan tanda yang ringkas adalah digalakkan kerana ia lebih berkesan dan pada masa yang sama menghormati nilai warisan sesebuah bangunan. Saiz papan tanda mestilah tidak terlalu besar dan tidak menutup elemen penting pada fasad bangunan. Bahan yang digunakan untuk papan tanda mestilah menggunakan bahan yang berkualiti tinggi dan bersesuaian dengan bangunan warisan. Penggunaan papan tanda dari bahan plastik atau neon mestilah dielakkan kerana ia terlalu moden dan tidak bersesuaian dengan elemen dan nilai sesebuah bangunan warisan.

Papan tanda mestilah menghormati rekabentuk keseluruhan dan integriti fizikal bangunan, landskap jalan dan kawasan persekitarannya. Papan tanda yang digunakan mestilah tidak menghalang elemen warisan pada fasad bangunan. Rekabentuk papan tanda yang digunakan mestilah bersesuaian dengan nilai dan karektor bangunan warisan terbabit.

Papan tanda mestilah tidak memberikan sebarang impak negatif sama ada secara langsung atau tidak langsung kepada bangunan, ini termasuklah kerosakan dan pengaratan. Untuk bangunan bata dan lepaan, teknik pemasangan pengikat atau pemegang anti-karat perlu digunakan dan pemasangan dilakukan pada bahagian lepaan. Sebarang pengikat atau pemegang tidak dibenarkan dibuat ke atas permukaan unit bata kerana ini akan merosakkan unit bata tersebut.

Kaedah pemasangan pengikat atau pemegang mestilah mendapat kebenaran daripada Jabatan Warisan Negara.

3.10.5 Keselamatan Kebakaran

Bagi kerja-kerja menaik taraf dan mengubah suai keselamatan kebakaran sesebuah bangunan warisan ia perlu dilakukan dengan teliti untuk menjamin keberkesanannya. Berikut adalah antara beberapa langkah yang perlu dilakukan dalam memastikan bangunan warisan supaya dapat mematuhi keperluan peraturan keselamatan kebakaran yang munasabah:

Langkah 1: Memahami kepentingan bangunan warisan

Langkah yang perlu diambil sebelum kerja-kerja meningkatkan tahap keselamatan kebakaran untuk sesebuah bangunan warisan adalah dengan memahami kepentingan sejarah bangunan terbabit dan latar belakangnya. Ini adalah kerana kebanyakan bangunan warisan kebiasaannya telah melalui beberapa proses pengubahsuaian sama ada dalaman mahupun luaran. Dengan demikian kita dapat mengenal pasti tindakan pengubahsuaian yang boleh dan tidak boleh dilakukan ke atas bangunan terbabit dengan mengambil kira kesan tindakan tersebut terhadap kepentingan sejarahnya.

Langkah 2: Menjalankan audit keselamatan kebakaran sedia ada

Audit keselamatan kebakaran yang lengkap mesti dilakukan terhadap bangunan warisan oleh mereka yang berkelayakan atau bertauliah. Ini adalah untuk mengenal pasti tahap risiko kebakaran dan peralatan pencegahan kebakaran sedia ada bangunan terbabit. Sekiranya bangunan tersebut ada mempunyai kelengkapan keselamatan kebakaran, proses ini dapat menilai sama ada ia masih berfungsi dengan baik atau tidak.

Langkah 3: Mengenal pasti kehendak keselamatan kebakaran

Kehendak-kehendak keselamatan kebakaran mestilah berdasarkan kepada penggunaan sesebuah bangunan itu. Secara umumnya, terdapat dua jenis sistem pencegahan kebakaran untuk bangunan iaitu sistem pencegahan pasif dan sistem pencegahan aktif.

Kebiasaannya gabungan kedua-dua sistem tersebut boleh memberikan perlindungan yang optima. Pelbagai kaedah terkini berada di pasaran oleh itu pandangan pihak perunding dan mereka yang berkelayakan perlu diperolehi untuk mengenal pasti kaedah yang bersesuaian dengan keperluan dan kepentingan bangunan terbabit. Perlu diingat bahawa setiap pemasangan peralatan keselamatan kebakaran itu perlu mengambil kira kesannya terhadap keaslian dan fabrik bangunan warisan itu. Kaedah pemasangan sistem keselamatan kebakaran untuk bangunan warisan disarankan mengikut prinsip-prinsip berikut:

i. **Perubahan Minima:** Sebarang perubahan ke atas bangunan warisan mesti hanya menyebabkan kesan yang minima terhadap bangunan dan fabriknya.

ii. **Tidak kekal:** Sebarang perubahan ke atas bangunan warisan seboleh-bolehnya di pasang secara boleh ubah, dengan kata lain menggunakan pendekatan tidak kekal.

iii. **Bersesuaian:** Kaedah pencegahan kebakaran yang ingin digunakan mesti bersesuaian dengan tahap risiko, jenis kemasan, kegunaan, isi bangunan dan saiz ruang.

Langkah 4: Penilaian cadangan pilihan

Apabila kehendak keselamatan kebakaran telah dikenal pasti, beberapa pilihan kaedah keselamatan kebakaran yang bersesuaian dengan bangunan itu boleh dicadangkan. Sebelum sebarang pemilihan dibuat setiap pilihan tersebut perlu dikenal pasti kebaikan dan keburukannya dan yang paling penting pilihan yang mana dapat memberikan kesan yang paling sedikit terhadap fabrik bangunan terbabit tetapi boleh memberikan pelindungan yang optima. Sebagai contoh bangunan warisan yang digunakan sebagai muzium, sistem penyembur air automatik adalah sistem yang dianggap baik untuk mengawal kebakaran tetapi air boleh mendatang kerosakan ke atas artifak-artifak bersejarah seperti manuskrip, pakaian lama, perabut antik dan sebagainya.

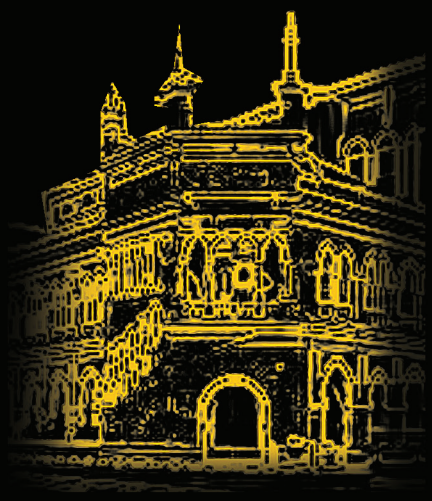
Antara faktor-faktor yang perlu dipertimbangkan di dalam mengenal pasti keperluan keselamatan kebakaran yang dikehendaki untuk bangunan warisan adalah:

i. Usia bangunan dan jenis pembinaannya, keunikannya dan kesan kehilangannya kepada negara jika musnah atau rosak akibat kebakaran.
ii. Lokasi bangunan.
iii. Kategori penghuni atau pengguna bangunan.
iv. Jenis dan nilai isi bangunan.
v. Saiz dan ketinggian bangunan.
vi. Tahap pencegahan dan keselamatan kebakaran sedia ada di bangunan.

Foto 23: Pemasangan Sistem Pencegahan Kebakaran Serbuk Kering
Sumber: Bahagian Konservasi , 2015

Nota Tambahan : Aspek keselamatan kebakaran perlulah mendapat khidmat nasihat dan kelulusan daripada Jabatan Bomba dan Penyelamat Malaysia

BAHAGIAN EMPAT



BAHAGIAN EMPAT

4.0 PENDOKUMENTASIAN

Dokumentasi merupakan proses penting dalam pemuliharaan bangunan warisan. Kepentingan dokumentasi telah dinyatakan dalam banyak dokumen berkaitan pemuliharaan tapak warisan seperti Venice Charter (1964) yang telah menyatakan di dalam artikel 16 *"..in all works of preservation, restoration or excavation, there should always be precise documentation in the form of analytical and critical report, illustrated with drawings and photograph..".* Ini kerana kejayaan sesuatu projek pemuliharaan adalah bergantung kepada ketepatan keputusan yang telah dibuat dengan merujuk kepada maklumat-maklumat tertentu. Sementara itu maklumat-maklumat yang diperlukan dalam membuat keputusan ini pula pada dasarnya diperolehi melalui kaedah-kaedah dokumentasi atau teknik merekod tertentu.

Pada asasnya penentuan kaedah dan teknik pendokumentasian bagi sesuatu projek pemuliharaan adalah bergantung kepada sifat dan ciri-ciri bangunan atau tapak yang hendak didokumentasikan. Selain itu beberapa aspek lain juga perlu diambil kira seperti tujuan dokumentasi, kesediaan teknologi dan tenaga mahir, peruntukan kewangan, konteks budaya dan sumber-sumber maklumat sedia ada. Selain itu proses dokumentasi juga seboleh-bolehnya dilaksanakan menggunakan teknik *non-destructive* bagi memastikan struktur atau fabrik subjek yang didokumentasi tidak rosak atau terganggu. Walaubagaimanapun, sekiranya pihak perunding *(konservator)* yang dilantik merasakan terdapat keperluan bagi melakukan ujian bersifat '*destructive*', maka ianya perlu dimaklumkan kepada Pesuruhjaya Warisan secara bertulis dengan menyatakan justifikasi terhadap keperluan terbabit.

Dalam menjalankan proses dokumentasi ini, terdapat 4 prinsip asas pendokumentasian yang perlu diberi perhatian iaitu;

1. **Prinsip 1 – Mempamerkan /Menunjukkan Kepentingan atau Nilai Warisan**

   Dokumentasi yang dilaksanakan perlu menunjuk dan memperjelaskan nilai kepentingan (*significant value*) sesuatu tapak atau bangunan warisan yang terlibat seperti aspek berkaitan sejarah, seni bina, kejuruteraan dan kebudayaan.

2. **Prinsip 2 - Maklumat yang Tepat dan Berkualiti**

   Dokumentasi perlu dilaksanakan secara jujur dan berkualiti bagi memastikan data atau maklumat yang direkodkan adalah sahih dan dapat digunakan. Hal ini sangat penting bagi memastikan maklumat yang tepat dan berkualiti disediakan kepada mereka yang memerlukan terutamanya yang terlibat dalam membuat keputusan berkaitan pemuliharaan mahupun untuk rujukan di masa hadapan.

3. **Prinsip 3 - Kebolehsampaian**

   Dokumentasi hendaklah dihasilkan menggunakan medium yang mudah dirujuk, disalin semula dan disimpan dengan memenuhi kualiti pengarkiban. Hasil dokumentasi juga perlu disediakan secara teratur, menggunakan format yang memudahkan kefahaman dan lengkap dengan rujukan-rujukan berkaitan bagi membolehkan kandungan maklumat disampaikan dengan mudah.

4. **Prinsip 4 –Kejelasan Maklumat**

   Segala maklumat yang terkandung dalam sesuatu hasil dokumentasi perlu jelas dan dapat menyampaikan maklumat dengan berkesan. Maklumat berkaitan bangunan atau tapak seperti lokasi, ukuran, jenis bahan dan skala perlu ditunjukkan dengan jelas bagi memudahkan kefahaman.

Keperluan dokumentasi Jabatan Warisan Negara dibahagikan kepada tiga (3) bahagian iaitu Sebelum, Semasa dan Selepas. Sebelum kerja-kerja pemuliharaan dimulakan, perunding Arkitek (konservator perunding) yang dilantik perlu menyediakan kajian dilapidasi yang merangkumi kajian sejarah dan nilai warisan, lukisan terukur, kajian kecacatan bangunan dan cadangan kerja-kerja pemuliharaan beserta anggaran kos. Apabila kontraktor telah dilantik bagi melaksanakan kerja-kerja pemuliharaan, terdapat tiga (3) komponen dokumentasi yang perlu disediakan oleh konservator iaitu Laporan Sebelum Kerja Pemuliharaan, Laporan Semasa Kerja Pemuliharaan dan Laporan Selepas Kerja Pemuliharaan. Selain itu, laporan akhir dan penyediaan rakaman video bagi keseluruhan kerja pemuliharaan juga perlu disediakan. Penyediaan dokumen yang dinyatakan boleh dilakukan secara bersama di antara konservator perunding dan konservator kontraktor sekiranya terdapat keperluan. Perkara ini perlulah mendapat persetujuan bersama di antara pihak yang terlibat. Komponen dan kandungan dokumentasi yang diperlukan oleh Jabatan Warisan Negara adalah seperti Rajah 1.

Setiap dokumen mestilah disertakan dengan salinan PDF dalam bentuk CD yang menyatakan tajuk projek terlibat.

Semua dokumentasi mestilah disediakan dalam **BAHASA MALAYSIA**. Penggunaan Bahasa Inggeris boleh dibenarkan dalam keadaan tertentu sahaja dan mestilah mendapat kebenaran bertulis daripada pihak JWN.

Rajah 1: Keperluan Dokumentasi Jabatan Warisan Negara

Bil	Nama Dokumentasi	Peringkat	Kandungan (Bullet Points)	Disediakan
1.	Laporan Kajian Awalan	Sebelum kerja pemuliharaan	Kajian latar belakang bangunan • Reka bentuk • Sejarah • Kepentingan warisan dan keadaan sediada bangunan	Konservator (Perunding)
2.	Laporan Kajian Dilapidasi dan Cadangan Kerja Pemuliharaan	Sebelum kerja pemuliharaan (diperlukan bagi penetapan skop kerja pemuliharaan yang diperlukan)	Kajian sejarah dan nilai warisan • Laporan kecacatan bangunan • Lukisan terukur • Inventori elemen • Kaedah rawatan • Pendekatan dan cadangan pemuliharaan • Kajian saintifik dan ujian makmal	Konservator (Perunding)
3.	Laporan Sebelum Kerja Pemuliharaan (HABS I)	Sebelum kerja pemuliharaan	• Merekod fabrik bangunan semasa jumpaan dengan kaedah dan teknik yang dapat menunjukkan reka bentuk, ukuran melalui teknik fotografi yang bersesuaian.	Konservator (Perunding/ Kontraktor)
4.	Laporan Semasa Kerja Pemuliharaan (HABS II)	Semasa kerja pemuliharaan	Merekod proses kerja pemuliharaan sepanjang projek. Disediakan melalui teknik fotografi yang bersesuaian dan laporan bulanan. • 2 aspek yang perlu diberi penekanan adalah i.Tatacara kerja ii.Laporan semasa keadaan bangunan	Konservator (Kontraktor)
5.	Laporan Selepas Kerja Pemuliharaan (HABS III)	Semasa kerja pemuliharaan	Merekod keseluruhan fabrik bangunan setelah selesai kerja pemuliharaan termasuk menunjukkan bahagian yang terlibat dengan perubahan seperti penambahan dan penggantian. • Perekodan boleh dilakukan melalui teknik fotografi yang bersesuaian	Konservator (Kontraktor)
6.	Laporan Akhir Kerja Pemuliharaan		Merekod keseluruhan maklumat berkaitan projek dan semua proses kerja pemuliharaan yang terlibat sepanjang kerja dijalankan. • Perekodan boleh dilakukan melalui teknik fotografi yang bersesuaian	Konservator (Perunding/ Kontraktor)
7.	Rakaman video	Semasa dan selepas kerja pemuliharaan	Merakam atau merekod menggunakan video keseluruhan proses kerja pemuliharaan bangunan warisan dengan menggunakan kepakaran juru video profesional. • Rakaman perlu menggambarkan perjalanan keseluruhan projek dan memberi penumpuan terhadap kerja-kerja yang bersifat kritikal dan memerlukan kemahiran kerja pemuliharaan khusus. • Rakaman juga perlu menumpu ke atas kerja-kerja yang melibatkan bahagian dan elemen bangunan yang menjadi ciri-ciri penting nilai warisan.	Konservator (Perunding/ Kontraktor)

4.1 KOMPONEN DOKUMENTASI

4.1.1 Kajian Awalan

Kaji selidik di peringkat permulaan dan dokumentasi secara menyeluruh terhadap sejarah dan latar belakang tapak atau bangunan dikenali sebagai kajian awalan.

Komponen Dokumen
Laporan yang dipersembahkan perlu mengandungi maklumat seperti berikut:

i. Sejarah tapak dan kaitan dengan orang-orang tertentu seperti pemerintah, pemilik, penghuni, pengurus dan orang yang membinanya.
ii. Tujuan dan fungsi dibina, dan sejarah perkembangan pembinaan.
iii. Gambaran sejarah tapak melalui bahan-bahan visual seperti gambar foto, lukisan atau pelan-pelan lama.
iv. Reka bentuk bangunan, gaya seni bina dan pengaruh.
v. Tarikh dan sejarah perkembangan termasuk ubahsuai bangunan dan kegunaannya sehingga masa kini.
vi. Nilai warisan dan kepentingannya kepada komuniti dan persekitaran dan penyataan kaedah bagi perlaksanaan pemuliharaan yang bersesuaian.
vii. Lain-lain ujikaji/siasatan mengikut keperluan dan kepentingan bangunan.

4.1.2 Kajian Dilapidasi

Kajiselidik keadaan bangunan dan kerosakan yang dialami dikenali sebagai Kajian Dilapidasi.

Tujuan
Kajian dilapidasi adalah satu proses mengenalpasti dan merekod keadaan atau tahap kecacatan bangunan.

Kaedah
Peringkat berikut perlu diikuti apabila memulakan kaji selidik atau kajian lapangan:

i. Mendapatkan pelan bangunan atau menyediakan lukisan terukur bangunan.
ii. Menyediakan satu sistem pengkodan komponen dan elemen bagi semua bahagian bangunan dalam dan luar dengan memasukkan kod untuk elemen, lokasi, jenis dan bahan, dan kerosakan.
iii. Memasukkan sistem kod komponen dan elemen di atas lukisan (pelan) untuk kerja tapak.
iv. Lukisan atau pelan yang digunakan dalam kerja memplot kecacatan adalah pelan asas dari lukisan terukur yang telah disiapkan *(Defect Mapping).*

v. Menandakan kod elemen pada permukaan dinding elemen.

vi. Menyediakan borang kajiselidik kajian dilapidasi.

vii. Mencatat keadaan dan tahap kerosakan bangunan ke dalam borang dengan memenuhkan laporan dengan butir-butir utama:

- Nama perekod
- Tarikh merekod
- Elemen bangunan
- Lokasi/zon/kod/grid elemen
- Jenis kerosakan
- Tahap kerosakan
- Punca kerosakan
- Cadangan pemuliharaan

viii. Mengambil gambar foto setiap elemen yang dikaji.

ix. Gambar setiap elemen mengikut grid dan lokasi hendaklah disimpan didalam album dan disusun dengan sistematik mengikut sistem pernomboran yang sama seperti borang dilapidasi.

Komponen Dokumen

Menyediakan laporan bertulis dan bergambar kajian dilapidasi yang mengandungi perkara-perkara berikut:

i. Tajuk projek
ii. Sejarah dan latarbelakang bangunan bersejarah
iii. Aspek seni bina
iv. Jenis-jenis dan punca kerosakan bangunan
v. Kajian dan ujian saintifik
vi. Cadangan kerja-kerja pemuliharaan
vii. Kesimpulan
viii. Lampiran

4.1.3 Penyediaan Lukisan Terukur *(Measured Drawing)*

Tujuan

Menghasilkan dokumen lukisan terukur (*measured drawing*) melalui kerja-kerja merekod, mengukur atau mencerap ukuran bangunan dan tapak tanah bersejarah. Lukisan terukur dibuat berdasarkan cerapan ukuran sebenar bangunan dan sekiranya terdapat dinding yang condong, retak dan elemen-elemen yang hilang ia perlu direkodkan ke dalam lukisan. Dalam kerja-kerja pendokumentasian bangunan warisan, bahan dokumentasi perlu disokong dengan gambar bagi merakamkan keadaan semasa jumpaan. Ini juga bertujuan merekodkan keadaan yang sukar dibuat pengukuran.

Aspek Dokumentasi

Kerja-kerja dokumentasi bangunan melibatkan kerja-kerja pengukuran dan perekodan butiran bangunan semasa jumpaan. Ini meliputi pengukuran dari aspek:

i. Mengukur dan merekod bangunan, tapak dan bahagian-bahagian elemen bangunan sebagaimana jumpaan.
ii. Mengukur dan merekod struktur sejarah yang mempunyai keunikan seni bina dan kejuruteraan yang mana sebahagiannya telah runtuh atau hilang.
iii. Mengukur dan merekod mana-mana bukti sejarah bangunan yang asal dan bukti-bukti yang menunjukkan perkembangan.
iv. Mengukur dan merekod elemen ragam hias yang terdapat pada permukaan dinding dan bukaan seperti corak lepaan *(plasterworks)* dan ukiran kayu.

Komponen Lukisan Terukur

Lukisan Terukur yang perlu disediakan mestilah mengandungi

i. Lukisan pelan lantai
ii. Lukisan pandangan sisi
iii. Lukisan pandangan hadapan dan belakang
iv. Lukisan keratan
v. Lukisan bumbung
vi. Lukisan terperinci elemen
vii. Lukisan aksonometrik

4.1.4 Penyiasatan dan Uji Kaji Bahan

Penyiasatan dan uji kaji bahan penting dilaksanakan bagi mengenalpasti bahan binaan yang asal di samping mengetahui ketahanan bahan binaan. Hasil daripada penyiasatan bahan, bekalan sumber untuk menyediakan semula bahan binaan baharu kepada bentuk dan komposisi kandungan asal dapat diketahui atau diperolehi. Bagi mendapatkan maklumat yang berbentuk saintifik tentang bangunan bersejarah dan ianya hanya boleh diperolehi melalui analisis sampel bahan binaan.

4.1.5 Kajian Arkeologi

Ekskavasi Arkeologi

Survei dan ekskavasi arkeologi memainkan peranan yang penting dalam kerja-kerja pemuliharaan sesebuah tapak warisan. Namun pelaksanaan ini adalah bergantung kepada keperluan tapak. Kerja-kerja ini perlu dilaksanakan bagi tujuan :-

Mengesan Struktur Yang Tertimbus

Seringkali terdapat penemuan struktur yang terkambus apabila kerja-kerja penggalian dilaksanakan ke atas tanah tapak warisan. Ini adalah berkemungkinan binaan yang ada sekarang didirikan di atas tapak bangunan lama ataupun sebahagian dari binaan yang ada sekarang didirikan di atas tapak bangunan lama ataupun sebahagian dari binaan yang ada telah tertimbus setelah ianya runtuh.

Justeru dengan pengesahan melalui proses ekskavasi ini kajian dengan lebih teliti dapat dilakukan kepada struktur tersebut yang memungkinkan untuk memperolehi rekabentuk, jenis bahan dan cara pembinaannya dengan lebih tepat.

Mengesan Artifak Arkeologi
Di dalam sesebuah tapak warisan memang telah pasti akan jumpaan artifak arkeologi yang mempunyai hubungkait yang rapat dengan monumen tersebut. Malahan melalui penemuan seperti ini ianya akan dijadikan fakta pelengkap kepada sejarah yang berkait rapat dengan monumen tersebut.

4.1.6 Dokumentasi Bangunan – Sebelum Kerja Pemuliharaan

Dokumentasi bangunan merupakan aktiviti merekod bangunan warisan sebelum sebarang kerja-kerja pemuliharaan dibuat. Melalui dokumentasi bangunan, keadaan dan kaedah pembinaan bangunan dapat diterokai. Ini termasuklah gaya seni bina, rupa bentuk, kemasan dan perincian ragam hias dan keadaan bangunan sebagaimana jumpaan. Dokumentasi bangunan diperingkat ini dikenali sebagai *Laporan Sebelum Kerja Pemuliharaan.*

Kandungan
Keadaan rupabentuk dan keadaan bangunan semasa hendaklah direkodkan melalui permerhatian visual dan kaedah fotografi bersesuaian.

Format
Format laporan boleh diperolehi daripada Jabatan Warisan Negara untuk rujukan.

4.1.7 Dokumentasi Bangunan – Semasa Kerja Pemuliharaan

Laporan Mingguan dan Bulanan – Semasa Kerja Pemuliharaan
Melaporkan kerja-kerja pemuliharaan yang dilaksanakan. Laporan mesti menghuraikan kaedah dan teknik pemuliharaan pada setiap bahagian bangunan. Laporan mesti disokong dengan gambar foto, pelan menunjukkan lokasi kerja dan sekiranya perlu disertakan juga lukisan binaan.

Kandungan

Keseluruhan proses kerja hendaklah direkodkan melalui laporan bertulis serta gambar foto yang mengandungi kaedah dan tata cara kerja bagi setiap kes atau skop pemuliharaan. Keseluruhan proses kerja yang didokumenkan ini merupakan komponen dokumen peringkat ini. Dokumen yang perlu disediakan ialah:

i. Rekod fotografi yang bersesuaian.

ii. Laporan mingguan – catatan aktiviti harian kerja-kerja pemuliharaan bangunan bersejarah termasuk keadaan cuaca harian dan peratus kemajuan projek.

iii. Laporan bulanan – Mengumpul bahan-bahan dari laporan mingguan dan menghasilkannya pada setiap akhir bulan.

Format
Format laporan boleh diperolehi daripada Jabatan Warisan Negara untuk rujukan.

4.1.8 Dokumentasi Bangunan – Selepas Kerja Pemuliharaan

Memplot butiran bangunan selepas pemuliharan dengan melengkapkan 'a*s-built drawing*' bahagian yang dibuat tambahan atau perubahan ke atas struktur sedia ada. Lukisan ini juga perlu dilengkapkan dengan skima warna bagi butiran dinding, bukaan termasuk dekorasi bahagain luar dan dalam.

Kandungan
Keadaan rupabentuk dan keadaan bangunan hendaklah direkodkan melalui pemerhatian visual dan kaedah fotografi bersesuaian.

Format
Format laporan boleh diperolehi daripada Jabatan Warisan Negara untuk rujukan.

4.1.9 Dokumentasi Bangunan - Laporan Akhir

Melaporkan kerja-kerja pemuliharaan yang telah dilaksanakan dari peringkat permulaan projek sehingga tamat projek. Laporan kerja-kerja pemuliharaan merupakan sebahagian daripada proses pemuliharaan warisan. Laporan ini merupakan bukti dan rekod sejarah yang berlaku pada bangunan dan tapak warisan. Laporan ini akan menjadi rujukan untuk kerja-kerja pemuliharaan pada masa hadapan.

Kandungan
Laporan mesti mengandungi perkara berikut:

i. Tajuk projek
ii. Pengenalan
iii. Latar belakang projek
iv. Latar belakang sejarah bangunan dan tapak
v. Seni bina bangunan
vi Keadaan bangunan
vii. Uji kaji bahan dan struktur
viii Kerja-kerja pemuliharaan
ix. Kerja-kerja baharu
x. Rujukan
xi. Lampiran - pelan 'as built', lukisan binaan, tata cara kerja dan alamat pembekal

Format

Format laporan boleh diperolehi daripada Jabatan Warisan Negara untuk rujukan.

4.1.10 Dokumentasi Video

Dokumentasi Video berdurasi sekurang-kurangnya 30 minit perlu disediakan. Kandungan video merangkumi keseluruhan proses kerja pemuliharaan dari peringkat awal hingga siap. Penyediaan dokumentasi video perlu diperhalusi dan diteliti kandungannya agar keseluruhan video dapat memberi informasi yang berguna. Kandungan video perlu disahkan oleh konservator dan penyediaan video berkualiti tinggi haruslah dihasilkan.

4.1.11 Kelulusan Tatacara Kerja

Penyediaan tatacara kerja yang tepat perlu disediakan oleh pihak konservator (kontraktor) bagi mana-mana skop kerja konservasi bangunan Warisan atau Warisan Kebangsaan. Penyediaan tatacara kerja diperolehi melalui persetujuan dan perbincangan di antara konservator (kontraktor) dan konservator (perunding). Pihak konservator perlu memastikan setiap tatacara kerja yang dicadangkan adalah merupakan tatacara kerja yang telah terbukti keberkesanannya dan bersesuaian dengan keperluan struktur bangunan.

Setiap tatacara kerja perlu dikemukakan kepada Pesuruhjaya Warisan bagi mendapatkan ulasan dan kebenaran menjalankan kerja sebelum tatacara kerja tersebut mendapat kelulusan Pegawai Penguasa projek. Berdasarkan penyataan di dalam dokumen kontrak bagi mana-mana projek pembinaan, kelulusan bagi sebarang pelaksanaan kerja perlu diperolehi daripada Pegawai Penguasa projek. Ulasan dan kebenaran dari Pesuruhjaya Warisan adalah amat penting memandangkan bangunan telah diwartakan di bawah Akta 645 yang mana menjadi tanggungjawab Pesuruhjaya Warisan bagi memastikan setiap kerja pemuliharaan yang dilakukan, perlu selaras dan mematuhi kehendak di dalam Garis Panduan Pemuliharaan Bangunan Warisan ini.

BAHAGIAN LIMA

BAHAGIAN LIMA

5.0 KESIMPULAN

Garis Panduan Pemuliharaan Bangunan Warisan adalah merupakan salah satu instrumen penting dalam memastikan segala kerja pemuliharaan terhadap tapak Tapak Warisan/Warisan Kebangsaan dapat dijalankan selaras dengan kehendak Akta Warisan Kebangsaan 2005 (Akta 645). Secara ideal, garis panduan ini wajar dibaca bersama Akta Warisan Kebangsaan yang merupakan nadi kepada perlindungan tapak-tapak yang telah diwartakan di seluruh Malaysia.

Garis panduan ini dibahagikan kepada beberapa kandungan utama iaitu: Pengenalan, Prinsip dan Proses Pemuliharaan, Kaedah dan Teknik Pemuliharaan, Pendokumentasian, serta Kesimpulan. Setiap bahagian menerangkan secara khusus dan terperinci berkenaan kehendak dan keperluan Jabatan Warisan Negara dalam menjalankan kerja-kerja pemuliharaan bangunan warisan di tapak yang telah diwartakan di bawah Akta Warisan Kebangsaan. Isi kandungan yang menyeluruh dan mudah difahami diharap dapat memberi impak langsung dalam menentukan kaedah serta teknik konservasi yang bersesuaian terhadap sesuatu elemen bangunan.

Selain itu, garis panduan ini turut merujuk kepada garis panduan antarabangsa seperti Piagam Burra dan Piagam Australia serta disesuaikan dengan amalan pemuliharaan yang dilaksanakan oleh Jabatan Warisan Negara. Hal ini adalah untuk menjamin piawaian yang terbaik di samping memastikan amalan pemuliharaan semasa di Malaysia adalah setaraf dengan amalan antarabangsa.

Garis Panduan Pemuliharaan Bangunan Warisan wajib dipatuhi oleh semua agensi (swasta dan kerajaan)/persatuan/individu yang berhasrat untuk melaksanakan kerja-kerja memulihara dan membaikpulih di tapak yang telah diwartakan di bawah Akta Warisan Kebangsaan. Walaubagaimanapun, garis panduan ini juga sesuai untuk dijadikan rujukan bagi tapak dan bangunan bersejarah yang tidak diwartakan di seluruh Malaysia.

GUIDELINES OF HERITAGE BUILDING CONSERVATION

NATIONAL HERITAGE DEPARTMENT 2017
MINISTRY OF TOURISM AND CULTURE MALAYSIA

NOTICE

This Guideline replace the former Guideline on Heritage Building Conservation, versions 2012, 2014, 2016 which were then prepared by the National Heritage Department, Malaysia.

This Guideline should be read in context with the National Heritage Act 2005 (Act 645), regulations and policies at Federal and State levels, as well as any other known Guideline that may have been prepared by related Departments or any other technical agencies.

Preface

Since the establishment of the National Heritage Department in the year 2006, the Conservation Division of the National Heritage Department has devised several improvements to the guidelines on Heritage Building Conservation in 2016 as a guide for the implementation of heritage building conservation works in Malaysia and to ensure that all of the conservation efforts are being carried out in line with the requirements and would satisfy the needs of the National Heritage Act 2005(Act 645). In accordance with the vision and mission of the National Heritage Department in the preservation and conservation of the nation's heritage treasures, the preparation and publication of this Guideline on Heritage Building Conservation 2016 were made in tandem with the role of the Heritage Commissioner in promoting and were uphold in high standards and practices expected in heritage preservation and conservation.

As part of the effort, the Conservation Division of the National Heritage Department has taken the proactive step of conducting reviews on the Guidelines on Heritage Building Conservation in cooperation with various academicians and professionals who possess the expertise and experience in fields related to conservation, to ensure that the contents and requirements in this Guideline is fulfil the principles and the needs of heritage building conservation.

The Guidelines on Heritage Building Conservation 2016 will be published in both (Bahasa Melayu and English) in the effort to promote preservation and conservation in order to enhance and lengthen the lifespan of buildings that have undergone conservation, so that they may be continuously known and appreciated by future generations.

The objectives of the preparation and publication of the Guidelines on Heritage Building Conservation are as follows:

- As a basic guide for parties who are responsible in the compliance of principles and implementation of procedures that are applied in building conservation in Malaysia, so that the provisions of the National Heritage Act 2005 (Act 645) are followed; and referring correspondingly to heritage building conservation principles as contained in international charters and guidelines such as from UNESCO and ICOMOS.
- As guidelines for the ethics and instructions on conservation that consist of requirements and limitations on works and interventions that are permitted in the implementation of conservation efforts.

These reviews on the Guidelines on Heritage Building Conservation are the current initiatives that include several other proactive steps being taken such as registering an approved list of Conservators with the National Heritage Department and appointing a Registered Conservator therefrom in assisting with heritage building conservation works in Malaysia. Conservators registered under the National Heritage Department, the Department hopes that Conservators will ensure that all activities and works related to heritage building conservation will adhere to principles and procedures contained in these Guidelines.

Guidelines on Heritage Building Conservation by the National Heritage Department, and other Guidelines by other local authorities, it will help to give a clear set of guiding points and procedures in the implementation of heritage building conservation works.

The highest appreciation is accorded to the Heritage Commissioner and to those who have done their best in coming up with this Guideline on Heritage Building Conservation especially on this updated version. Appreciation is recorded to: -

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CONTENTS

PART 1

PART ONE

1.0 INTRODUCTION

This Guideline on Heritage Building Conservation are prepared as an essential guide for the implementation of conservation works in Malaysia. The preparation of the Guideline refers to the National Heritage Act 2005 (Act 645) and conservation guidelines at the international level such as under the United Nations Education, Scientific and Cultural Organisation (UNESCO) and charters under the International Council on Monuments and Sites (ICOMOS) including the Burra Charter, Australia Charter 1999 (Charter for the Conservation of Places of Cultural Significance). The reference to guidelines from UNESCO and ICOMOS in this Guideline is more towards building conservation principles. Apart from Act 645 and the international guidelines, the preparation of this Guideline is also based on practices and experiences that have been implemented by the National Heritage Department (JWN). With the establishment of this Guideline all activities and works related to the conservation of heritage buildings or structures and their sites must adhere to the principles and procedures contained in this Guideline.

The content of this Guideline are divided into four (4) main parts, namely:

PART 1: Introduction
PART 2: Conservation Principles and Processes
PART 3: Conservation Methods and Techniques
PART 4: Documentation

1.1 Definition of Heritage

Heritage is generally defined as something of significance or value that is inherited from one generation to another. It encompasses culture and tradition, historic sites and places of buildings or structures, as well as archival and printed or written material such as letters, books and manuscripts. Such cultural heritage as aforementioned are precious assets because they embodied the nation's cultural, historical, archaeological, architectural, aesthetic, scientific, social, spiritual, linguistic or technological values and records. Specifically, the United Nations Education, Scientific and Cultural Organisation (UNESCO) defined Heritage Buildings as encompassing the following aspects:

- **Monuments**: architectural works, works of monumental sculpture and painting, elements or sculptures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art and science;

- **Groups of buildings**: groups of separate or connected buildings which,because of their architecture, their homogeneity or their place in the landscape, area of outstanding universal value from the point of view of history, art and science;

- Sites: works of man or the combined works of nature and man,and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view.

The National Heritage Act 2005 (Act 645) interprets Heritage Building as follows:

- **Building**
  "Building" means a building or groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science;

- **Site**
  "Site" includes any area, place, zone, natural heritage, monument or building attached to land, archaeological reserve and any land with building, garden, tree or archaeological reserve;

- **Cultural Heritage**
  "Cultural heritage" includes tangible or intangible form of cultural property, structure or artefact and may include a heritage matter, object, item, artefact, formation structure, performance,dance,song,music that is pertinent to the historical or contemporary way of life of Malaysians, on or in land or underwater cultural heritage of tangible form but excluding natural heritage;

- **Zone**
  "Zone" means an area or part of an area for the purpose of preservation and restoration in respect of rural and urban landscapes whether natural or man-made, which embraces any cultural heritage significance;

- **Heritage site**
  "Heritage site" means a site designated as a heritage site under section 24.

1.2 CONSERVATION CONCEPT

The heritage conservation concept that is universally accepted and practiced is "Authenticity in Heritage Conservation". Authenticity itself can be considered as an aesthetic aspect while the process of regaining or conserving it is an ethical concerned. In the context of heritage building conservation, the aspects that are most important are adherence and compliance with the builders' or its society's heritage values.

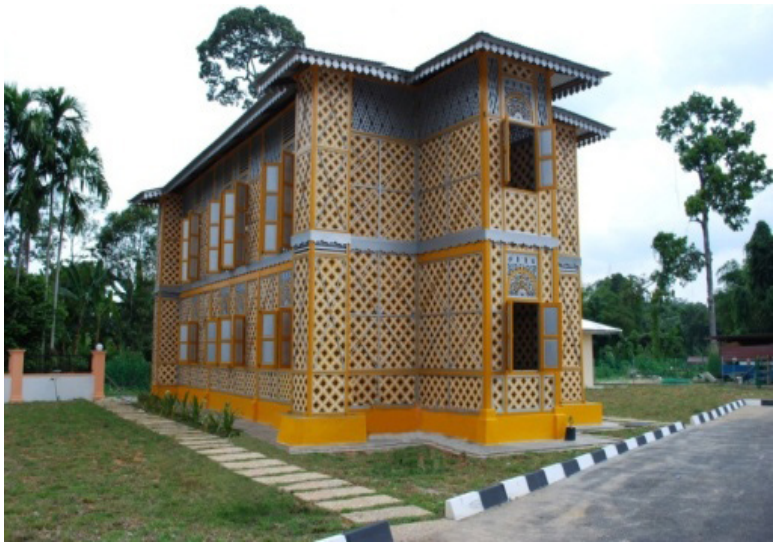


Photo 1: Ihsaniah Iskandariah Mosque, Kampung Kuala Dal, Kuala Kangsar, Perak is a building made of kelarai or woven bamboo strips constructed in 1938.
Source: conservation project of Masjid Kampung Kuala Dal, JWN 2009

Authenticity of Building Materials

Material authenticity in conservation is of paramount aspect. Original materials are considered as critical values in heritage buildings because they carry the historical record and qualities from the past. Building materials contain evidence of the origin and knowledge of materials, the existence of ideas and construction ingenuity that may cease to exist. Heritage building materials are mostly sourced from nature such as timber, bamboo, stone, and lime. The objective of retaining authentic materials is not only for historical or cultural value purposes but usage of the same material or at least the closest available would be more suitable in material reaction as well as in appearance and texture.

Authenticity of Design

Every ancient building has its history of construction development. Buildings that exist today may have gone through various changes in their fabric following the change of time and occupants. In this situation, the concept of authenticity would be more difficult in ascertaining the most relevant design, within the identification and selection of which actual era of the building's existence and design should be conserved. For design conservation, it is incumbent to also study the building's history, original structure, architectural style, and relationship to the surrounding environment.

Authenticity of Building Works/Craftsmanship

Heritage buildings may contain uniqueness in terms of construction technology or skill of the craftsmen in the olden days. The building techniques and craftsmanship must be maintained in conservation works and any repairs of damaged elements must be restored to the closest original condition or if unsalvageable or lost, replaced by the similar materials using the same techniques or craftsmanship as per the original. Rehabilitation works must combine workmanship, material and form that result in harmony between the old and the new.

Authenticity of Placement /Layout

The forms of buildings and their placements including the area's building layout must be retained as per the original. Maintaining the original forms and building layout will generate the actual overview regarding the original building forms and connect them to the historic context that they went through. Usually the authenticity of form and layout is ascertained after historical and archaeological investigations have been carried out.

1.3 CONSERVATION APPROACH

Conservation is the process of maintaining and protecting heritage buildings from being damaged, destroyed, changed or even restored without proper planning and management according to approved guidelines. Conservation involves works that maintain the original condition of the heritage buildings and sites, in which the effort is in fact the process of extending the lifespan of the building so that it continues to exist and serve a future generations. The efforts to conserve and preserve heritage buildings involve several approaches. These approaches are the various types of actions that affect or shape the process and result of the building preservation. The conservation approaches are based on the **National Heritage Act 2005 (Act 645) Part I, Section 2.**

Preservation

Preservation is defined as the works carried out to maintain the building, structure or monument in its original form, and needs to be implemented where necessary in the effort to prevent damage or deterioration in future. Preservation is an action to ensure that the fabric of a place is maintained in the original condition and prevent dilapidation. Normally preservation involves monitoring and maintenance to the historic monument and its surrounding so that it is not damaged and preserved using systematic and scientific methods in line with the conservation principles.

Prevention

Prevention is defined as the effort to protect a historic entity or monument through controlling its environment, which directly or indirectly prevents damaging agents or conditions from becoming active and causing adverse effects. Prevention involves controlling factors such as external and internal humidity, temperature and light intensity or pests including actions to prevent fire, theft, attack and vandalism by affording a comprehensive system of management and overall protection. Prevention also includes security and monitoring, scheduled inspections, cleaning and maintenance to preclude deterioration and damage from occurring.

Consolidation

Consolidation is defined as any addition whether in physical form or application using a supportive method especially to the original structure of a historic building in order to strengthen its structure and integrity, in the effort to prevent structural damage while maintaining its original form and material(s). In other words, not a single element within the structure's historical context may be removed or changed in the consolidation process. Any additional or supporting method must also be as non-intrusive as possible while at the same time not pretending to be part of the original fabric.

Restoration

Restoration is defined as the action to restore or bring back the authentic condition or also reinstate or revitalise an original concept of a historic building. Normally it entails a detailed study of the history, design, materials and functions of the building taking into consideration all aspects including archaeological evidence, design and material authenticity from authentic sources and reference documentation. Restoration also normally involves efforts to find, confirm and reinstate the authentic design or form and even accurate details at an identified or agreed period in the building's history, through the removal of non-authentic additions and reinstatement or replacement of items or conditions as close to the original as possible. Thus, restoration also would require restorative works in maintaining or bringing back the authentic architectural design and materials and even function at a certain chosen period that conforms as best as possible to its original condition or heyday.

Rehabilitation

The process of rehabilitation or re-energising a historic building or property to a condition of usability, usefulness and functionality through restoration, improvement and even renovation that will help allow efficient contemporary usage while maintaining authentic characteristics, parts and aspects that are important to its original architecture and history.

Reproduction

Reproduction is defined as the copying or re-making of especially an artefact or element, which is normally to replace a component or part that is lost, damaged or rotted away, so that the aesthetic value and/or the original artistic/architectural design as a whole is preserved. Reproduction involves the overall study including detailed dimensions, material(s) and production method of the artefact, element or decorative item that is threatened with damage in order to reproduce the item in the effort to maintain the overall harmony, aesthetic value and authenticity as closely as possible.

Reconstruction

Reconstruction is the process of rebuilding or constructing back a structure, meaning a new construction of its form and all details of the structure that is lost or damaged beyond repair, or else part(s) of such structure, as determined at a point in time. This can mean a totally new reconstruction or only that of any damaged section(s) as necessary. Reconstruction has to faithfully follow the same design and material(s) of the original building or structure as closely and authentically as possible, and can be considered as a replica of a building or part of its structure.

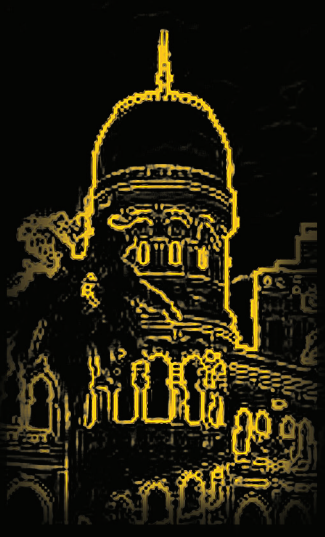
Adaptation / Adaptive Reuse

Adaptation and/or adaptive reuse would involve works to change the function and usage of an old building into something else, but preserving or maintaining the same form and characteristics of the original structure. Before adaptatively works to change the function are begun, the details of the original building including all spaces and their functions as well as characteristic elements must be properly recorded. Comprehensive measured drawings including structural system as well as the drawings and documentation of the new adaptive structure must be prepared to record the building's history and its changes.

Maintenance

Maintenance is defined as the carrying out of monitoring and maintenance works to prevent damage and/or repair wear and tear to a historical structure or building in a continuous manner, including to be done after conservation or reconstruction works are completed and to a satisfactory level as part of continuing efforts to prevent deterioration.

PART 2



PART TWO

2.0 CONSERVATION PRINCIPLES AND PROCESSES

The principles that drive the establishment and implementation of these Heritage Building Conservation Guidelines are embodied in the statements and requirements contained herewith that lay out the guidelines, instructions and ethics of conservation, which also consist of certain limits to works, as well as disturbances or disruptions that are allowed as needed in the implementation of conservation works.

Where a heritage building is to be conserved, the main aspects of the goals and values of the project are the significance and authenticity in the context of the culture, history and architecture of the building. Heritage buildings should be restored to its original form and condition. It encompasses the authenticity of the building in various aspects including its architecture, building materials, construction methods and techniques right up to details in elevation/façade, appearance/texture and even colour. In order to achieve the objective(s) of conservation, the work processes carried out must be guided by principles as shown by these Guidelines, which would ensure that the heritage building constantly maintains its authentic characteristics throughout the project until the building is completely restored and is sustainable.

The principles of conservation must also be applied in the conservation process as well. It encompasses all aspects related to the values that consist of the characteristics and ethics of authenticity and aesthetic quality in the implementation of conservation works. The ethics in conservation principles strongly advocate a positive professional attitude that is appropriate for heritage buildings in which the aesthetic quality is on maintaining the architectural integrity as per the authentic original. In order to achieve good results in work quality, the National Heritage Department strongly stresses on compliance with accepted conservation principles. The conservation principles applicable in Malaysia are guided by the National Heritage Act 2005 (Act 645) and also refer to heritage building conservation principles as contained in international charters and guidelines from, for example, UNESCO and ICOMOS.

2.1 CONSERVATION PRINCIPLE

Among the basic principles of conservation that are incorporated in international charters include that the conservation works should:

i. Be able to extend the lifespan of the building.
ii. Respect the history and intrinsic quality of the property.
iii. Prioritise the original form/design, material(s) and even authentic craftsmanship.
iv. Be cautious and comprehensive in carrying out investigations and documentation before any work that may be disruptive is done.
v. Be aware that conservation may involve works that could disturb the integrity, fabric or characteristics of the building. Therefore, any disturbance where necessary for investigations and conservation works from start to finish must be minimised.
vi. Tolerance in the interpretation and usability of the building/structure.
vii. Minimum risk for the loss of parts of the important and unexpected damages during tests on building materials.
viii. Ensure that any disturbance or disruption can be corrected or made good.
ix. Minimize any changes or amendment to the building fabric.
x. Can distinguish between the old and new material
xi. Provides maximum reinforcement to the original structure.
xii. Provides documentation before, during and after conservation work.

2.2 CONSERVATION PROCESS

Conservation is a process of protecting and maintaining a heritage building and/or site from damage or from undergoing works without proper planning and management that systematically and sympathetically upholds its heritage. Conservation involves the aim of preserving the original condition of a heritage building or site together with its historic and cultural importance. This process includes conservation, repairs, controlled renovation, and adaptive reuse while in many cases a combination of several approaches and actions are required. The conservation process essentially aims to lengthen the lifespan of a heritage building so that it will also always be able to function.

The main objective of conservation is to protect the historic record and cultural legacy by using proper conservation methods in preserving the overall fabric, and so the life of a heritage building is prolonged and it can function properly. The conservation process for heritage buildings is often divided into five (5) levels or phases as follows:

Preliminary Studies
To carry out a Preliminary Study to obtain information on the building, location, construction and usage encompassing its background and history, importance and heritage values, contemporary condition and ownership/user's details.

Dilapidation Studies
To carry out a Dilapidation Study to identify the types and levels of damage and disturbance to the building and to propose the necessary remedies and repairs including conservation methods.

Preparation of Tender Documents

To prepare tender or quotation documents in order to determine the scope of works, conservation methods or techniques and building materials required, and the overall cost estimate for the call for tender/quotation and tender process.

Maintenance Plan

The Maintenance Plan is prepared to ensure that the building is monitored, managed and maintained well over time using proper methods and techniques. It will be an overall plan for the scheduled maintenance of the property.

Conservation Works

To carry out the building conservation works based on these Guidelines, including issuing the Pre-Conservation Report, On-going Conservation Report, Post-Conservation Report plus the Video Recording of works throughout the conservation process.

2.2.1 Conservator

Conservation works must be carried out and managed by those who possess the technical qualifications and professional experience in the field of heritage building conservation. Therefore, the Superintending Officer/Architect Consultant/Contractor would need to appoint a Conservator for each party in the monitoring and management of works to be implemented. Based on contemporary practice, each project would need to have two (2) Conservators; one Conservator for the Consultant/project owner and the other Conservator for the Contractor with their own roles and responsibilities.

The scope of responsibilities of a Conservator include as follows:

i. Researching and comprehending the history and technology of a heritage monument, building or site in order to ascertain the identity, values and needs, and to interpret the research results towards proper conservation of the property.
ii. Studying and understanding the layout and placement of heritage monuments, buildings or sites, including their components and elements as well as surroundings relating to the structure and landscape.
iii. Analysing and understanding the characteristics of the heritage monuments, buildings and sites.
iv. Investigating the causes of damage and other threats to the building, and proposing conservation approaches, remedial action and preventive measures to ensure long term preservation.
v. Diagnosing investigations and issuing written reports supported with photographs and/or elutriations including video if needed, for record and action.
vi. Arriving at decisions based on ethics and principles in a responsible manner towards long-term cultural and built heritage conservation.
vii. Explaining the situation and giving informed opinions and advice to other experts in particular fields where further study is needed such as period sculpture, wall paintings or objects as well as sites that have specific cultural or historic values.
viii. Providing professional advice on strategies, policies and framework regarding conservation, maintenance and management for the built cultural heritage and preservation of monuments, buildings and sites including their environments.
ix. Documenting all the works and processes for future reference.
x. Collaborating well in a team with other experts in various fields/disciplines.
xi. Working professionally with all parties whether administrators, managers and planners in order to formulate strategies and implement conservation works as well as resolving conflict, if any.

The appointment of a Conservator in a conservation project for any National Heritage or Heritage Building (which has been gazetted under the National Heritage Act 2005) must refer to the list of Registered Conservators under the National Heritage Department and receive the consent of the Heritage Commissioner.

2.2.2 Appointment of Contractor

For any conservation works that involve a Heritage Building or National Heritage, the Superintending Officer must ensure that the contractor to be appointed is registered with CIDB under code B03 (Rehabilitation and Conservation) in order to assure that the works would be carried out by parties with proper qualification and achieve required objectives. The Superintending Officer must obtain written consent from the Heritage Commissioner before appointing the Conservator and contractor to ensure that the appointment is made in line with the requirements of the National Heritage Department.

2.3 GUIDELINES ON CONSERVATION WORKS

Protection
The structure and components of a heritage building must be protected at all times during conservation works so that no additional damage occurs. More often the components of a heritage building cannot be detached and repaired elsewhere, and thus need to be conserved in their original location. Therefore, it needs to be protected in order to preserve the building component or element while conservation works are being done. An example is to construct a strong temporary canopy that completely protects the whole roof structure which is being repaired or replaced.

Identifying and Preserving Elements
Each building part and element that is to be preserved including the roof, walls, floors, columns, doors, windows as well as all decorative components and fittings should be identified from their elemental characteristics, and all the original characteristics that have cultural and/or historic value be preserved. Through the identification of all the elemental characteristics that are important to the history of the building, the authorities and consultants involved would be able to project and plan the needs and procedures for the conservation of the building including all components and elements.

Replacing Damaged Elements
Elements that suffer irreparable damage including disintegration, rotting and attack by termites or mould and cannot be saved need to be replaced with material(s) of same origin and design, and must be marked with permitted tag that shows the date of conservation/replacement. This is to differentiate between the old and the new. The overall replacement works must be recorded by marking the elements and locations on plans/drawings as well as photographs.

Protection and Maintenance During the Work Process
Items and materials that have been repaired and conserved must be protected and maintained properly throughout the conservation works process. Elements or parts that could be exposed to new damage, such as dirt clinging on the surface or mechanical effects including scaring from being hit or grazed by passing heavy items, need to be

covered or protected. Wooden materials would need to be treated with approved chemicals or be put through a proper drying process off-site if permissible, with the whole process properly recorded. Usage of any potentially dangerous chemicals must follow safety procedures, and expert services may be required.

Renovation and Addition

Any renovation or addition including the installation of new building services, facilities or equipment in or around the building such as electrical wiring or air-conditioning as well as addition of new functions such as new car porch, new glass walls or windows must not alter the original form and function or defile the original building elements, and must use materials that look harmonious with the overall appearance of the building in all aspects including design and even colour.

New or Additional Buildings

Any new or additional buildings that are close to the heritage building or are within the heritage building site must adhere to the following principles:

i. Any new construction such as additional structure at a heritage site would be permissible if it does not damage or disturb the heritage and cultural significance of the site or blur the interpretation or appreciation of its authenticity.

ii. Any new building or structure to be located close to an existing heritage building must take into consideration the architectural characteristics of the heritage building, the integrity of the site and its historic spatial layout.

iii. The new construction must not in any way disturb or undermine the original structure, architecture and design or components that form the heritage building.

iv. No new construction can obscure or block, whether vertically or horizontally, the views towards a National Heritage or Heritage Building. The construction of any new structure in a heritage building site cannot dominate the design or the size, width or height of the existing structure(s).

v. The height, sizing and distances of new buildings/structures from a heritage building must produce a harmony to the existing layout and existing heritage structure(s). The developer/builder/designer in a heritage site needs to be creative in interpreting all aspects to arrive at a harmonious architectural result with the existing heritage building, or else the new construction may be differentiated but still be sympathetically harmonious.

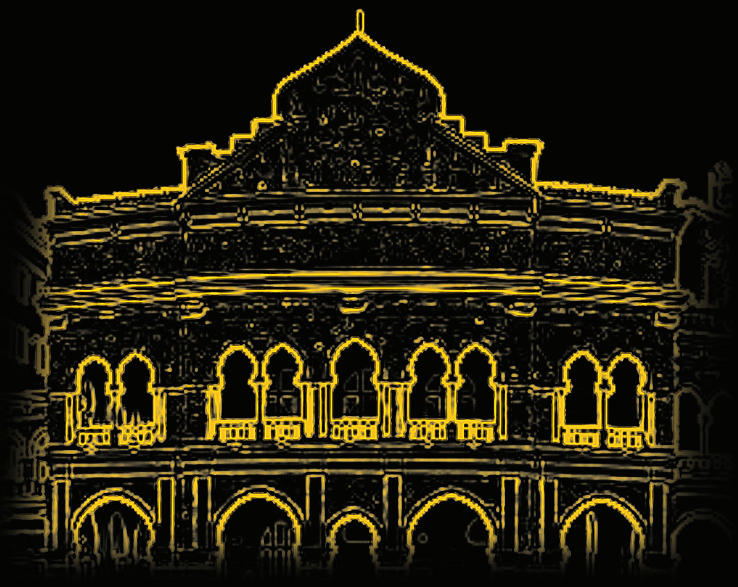
vi. The proposed new design/construction must take into account factors such as the character, scale and elements of the existing heritage building and surrounding site, and not submerge the identity, architecture and cultural qualities of the existing National Heritage or Heritage Building, while not confusing the public or observers in identifying the original heritage building.

vii. The selection of building material, colours and textures of the new construction must be harmonious with the architecture and surroundings of the National Heritage or Heritage Building.

viii. Any construction must address all traffic impact and minimise traffic disruption around the site of the heritage building or monument.

Reminder: For any proposed development or new additions to the Heritage or National Heritage building, located in a UNESCO World Heritage Site, it is subject to the Guidelines for the Conservation and Management of Special Area Plan (SAP) is a World Heritage Site.

PART 3



PART THREE

3.0 CONSERVATION METHODS AND TECHNIQUES

Heritage buildings possess unique architecture. Elements such as the roofs, walls, floors, pillars, openings, staircases and decorative components contribute to the character of the heritage building. All elements of a heritage building should be maintained as per their original materials and positions. Any changes done to any part of the elements can have an effect on the building's original character besides changing its authentic qualities. Each conservation work process on any part and element of the building must be preceded by an honest and meticulous investigation. Works involving treating, opening, removing and reinstalling must be done with minimum disturbance to the original building fabric. Any replacements with new materials must be identical to the original.

The progress of works and condition of the building must be recorded before, during and after conservation.

The work principles and procedures must be complied with at every stage of the work process in order to ensure that the heritage building is protected and sturdy throughout the entire conservation project. These Guidelines only underscore the direction of works from the aspect of building conservation principles only. Accurate and detailed proposals for conservation work procedures and techniques must be prepared by the appointed Conservator and approved by the National Heritage Department before any work is commenced.

The principle of work in conservation is that generally a heritage building must be conserved starting from the upper part downwards, encompassing the following elements of the building:

3.1 ROOF

The roof and roofing finishes embody a large part of the character of a heritage building. The scale of the roof, its form, gradient and type of finishes used will form part of the architectural style of a building. The roofing finishes contribute to the effectiveness, colour, texture and pattern of the roof, whereas the construction and craftsmanship whether by local builders or external input contributes to the overall quality, style and look of the building's presentation.

The roof is the preponderant component of the building which protects the building from weather effects such as rain, heat and wind. Suitable and proper construction of the roof can not only ensure the longevity of the building but also reduce the cost of maintaining the building later on. The selection of the roofing details not only must fulfil the structural needs and aesthetics but also fulfil other aspects such as the durability/strength of material, load bearing, protection against the pressures of weather and fire.

Roof structures are divided into two (2) main profiles, namely the pitched roof and the flat roof. The shape and structure of pitched roofs are influenced by the type of building and its architectural style. For example, the roofs of traditional Malay houses come in many styles, shapes and sizes. Among traditional Malay roof profiles are the long-ridge roof (bumbung panjang), five-ridge roof (perabung lima), gabled roof (bumbung limas), Perak-style roof (bumbung potong Perak) and pyramidal multi-tiered roof (bumbung meru/bumbung tumpang).

The common problems faced by roof structures are wood rot or decay due to humidity/ climate and termite attack. These problems can occur on timber beams, wooden rafters and roof trusses i.e. any type of wood that is placed, installed, built or attached to the wall or any part of the building that is under frequent humidity.

Photo 2: Termite attacks on the roof frame
Source: Penghulu Natar House Rehabilitation Project, Merlimau, Melaka, 2009

Principles of Conservation

i. Firstly, record the building's roof structure construction type and techniques. This includes recording the elements of the roof frame/truss, species (if wooden), measurements and construction methods.

ii. Before commencing conservation works, the whole roof structure must undergo thorough investigation to ascertain the severity of any damage suffered and to determine its causes such as termite attack, humidity and/or mould growth.

iii. Conduct investigation on the strength of the current wood frame/structure and pinpoint the parts that need to undergo conservation in situ.

iv. Before any actual conservation work is executed, the construction/installation of the temporary roof must be completed in order to protect the building.

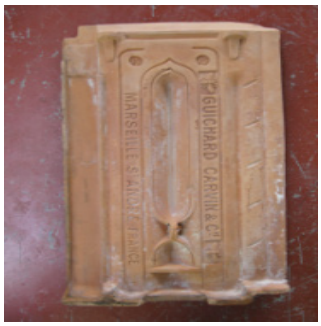
v. The replacement of damaged wood must be from the same species with the same strength. A timber specialist must be consulted before any decision is made.

vi. The replacement and extension with new wood must use a technique that can strengthen the overall structure and be tagged with a mark/label.

vii. Conduct treatment on the overall roof structure. For wooden roof structure, termite prevention treatment should be carried out.

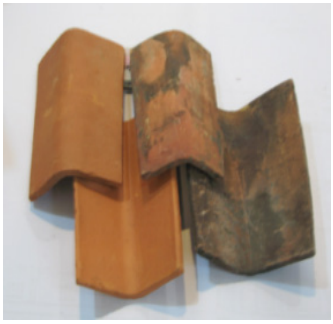
Photo 3: Temporary roof needs to be constructed before any conservation works commence
Source: Masjid Ihsaniah Iskandariah Conservation Project, 2015

There are various roof profiles that are synonymous with the history and architecture of local buildings. The roof profile construction must match the roof finishes or tiles that would be installed. Roof finishes come in many different types. These roof finishes vary according to material, shape and size. The type of material of the roof finishes commonly found in heritage buildings around Malaysia are typically made of clay such as the senggora tiles found in traditional Malay houses, French or Marseilles tiles in many colonial era buildings, whereas V- or U-shaped tiles are commonly used in shophouses and concrete tiles are found in newer buildings. Besides that, traditional Malay and other Bumiputra houses used woven nipah or rumbia palm fronds, and in some cases overlapping wooden shingles.



(a)

(b)



(c)

Photos 4: Types of roof tiles.
a)Marseilles tile, b) 'V' atau 'U' shaped tiles (c) Malay senggora clay tiles

Roof finishes or tiles are building components that are the most exposed, easily damaged and need frequent maintenance and replacement. The damage that will typically occur are tiles getting cracked, broken, holed, dirt-stained, fungus-infested, discoloured, faded or dulled. The first aim of roof finishes conservation is to salvage and treat the old roof tiles so that they could be reused, failing which use replacement with the most similar finishes available.

Work Procedure

i. Conduct an investigation to identify the original roof finishes' type and condition.

ii. Ascertain the details of the material's type, size/measurements, the manufacturer/ producer and/or date and place of fabrication.

iii. Provide rehabilitative and protective treatment on the original roof finishes in a systematic and non-damaging way using methods that are proven effective.

iv. If roof finishes replacement is required, as far as possible reuse as much of the original material that can be salvaged and the rest replaced with materials that bear exactly or the most similarity in type, appearance, colour, size and texture of the original finishes.

v. The finishes to be used in the replacement of the original roofing that could not be salvaged must be identical to the overall qualities and look of the building's original roof and architecture. This replacement must be based on historical research and match the identified era or even year of construction.

vi. The installation and arrangement of tiles on the roof frame must be done according to the original placement layout and technique. The installation must be done with utmost care in order to avoid damage and to ensure that the position of the roof tiles is precise and will not suffer any leakage or defects in function and appearance.

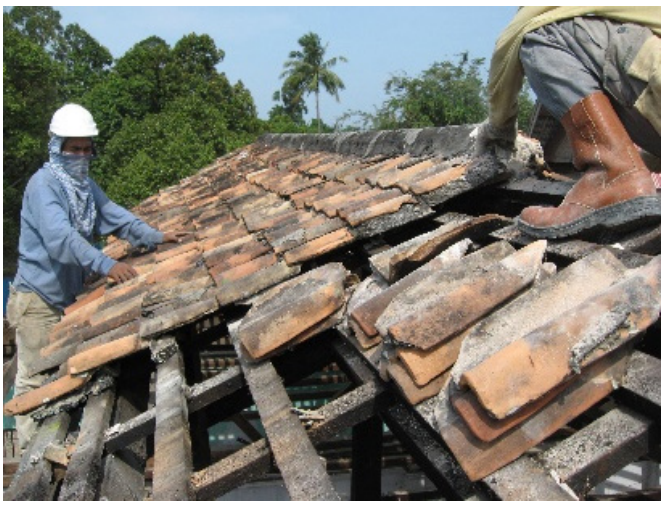


Photo 5: Disassembling the roof tiles for cleaning works
Source: Penghulu Natar House Conservation Project, Merlimau, Melaka, 2009

3.2 WALLS

The conservation of heritage buildings must retain the originality of the architecture including the building materials and construction techniques. The walls of old and historic buildings in Malaysia were mostly built from traditional materials such as clay bricks. Buildings having walls built with clay bricks and lime mortar would have breathable walls. Exposed brick walls on heritage building display attractive aesthetics and imbue character to the building in terms of its texture and colour.

Among the factors known to cause defects on walls of heritage buildings are the environmental factor and the aging process. Being located in the tropics causes Malaysia to receive great amounts of rain showers, high humidity and heat throughout the year. The splashing and seepage of rain water on ageing heritage buildings cause dampness with water absorption and evaporation especially on porous materials or cracked surfaces. The results of this problem are mouldy or damaged wall elements with peeling paint, efflorescence, growing cracks and thinning or brittle wall plaster or rendering.

Besides humidity/dampness and related effects, a main problem on brick walls of heritage buildings is cracking, be it vertical, horizontal or diagonal. The problem of cracked walls may be caused by varying factors such as ground movement, weak or weakened building materials or construction joints, shrinkage and temperature changes on disparate materials of mixed elements such as timbers that are built or attached to brick walls.

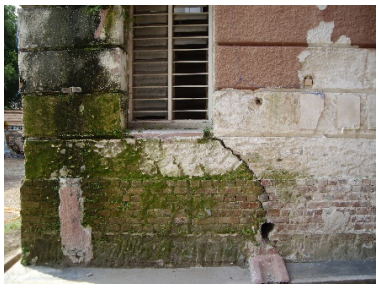


Photo 6: Moss and/or mould growth on wall surfaces
Source: HSBC Building Conservation Project, Melaka, 2009

Work Procedures

i. Investigate the condition of the wall structure and identify any defects.The investigation must be done thoroughly and with minimum disturbance.

ii. Parts that have been identified to have structural defects must be strengthened using suitable methods in order to arrest the deterioration and defect of the wall structure.

iii. Treatment on the brick walls having problems caused by humidity/dampness such as mossy surfaces and efflorescence must be carried out using methods and techniques that are approved and proven effective.

iv. Replacement of damaged bricks with new ones must use bricks that are identical to the original in all aspects including size, colour, texture and material strength.

v. The best brick replacement is by using old stock or other salvaged bricks that are in good condition and retain their qualities such as material strength.

vi. New replacement building materials used must be planned to enable conservation treatment in future.

vii. The conservation or remedial methods on for example cracked walls must be executed using techniques that are proven effective and will not damage the original fabric.

viii. The reinstallation or laying of brick walls must follow the original order and brick bond.

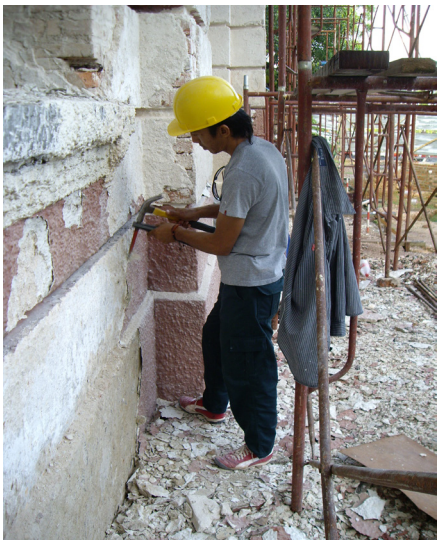


Photo 7: Brick replacement and repairing of damaged plaster
Source: HSBC Building Conservation Project, Melaka, 2009

Photo 8: Conservation stapling works on the wall surface to strengthen the structure
Source: Penghulu Natar House Conservation Project, Merlimau, Melaka, 2009

The main use of mortar is to bind bricks or blocks for the wall. Heritage buildings use a lot of lime as material for mortar and plaster. Lime is made through the burning of limestone or shells. The mixture of burned lime with water will form calcium hydroxide, also known as hydrated lime. When hydrated lime is mixed with water, it is known as lime putty. Lime mortar is a mixture of lime putty and sand. The ratio of the mixture of lime and sand is 1:3 or in other suitable composition. The preparation of lime mortar material at site must be done and used within a duration of four (4) hours in order to ensure that the quality and function of the mortar is at its best.

Conservation work for mortar and plaster must follow the original contents and composition as the original. The principle of mortar conservation is as follows:

Work Procedures

i. Investigate the existing mortar to check if it is the original and not new.

ii. Ascertain the original mortar composition through laboratory test analysis.

iii. When new mortar is used in conservation works, it must be identical to the original mortar in terms of composition, density, strength, colour and texture.

iv. On-site mock up tests must first be done to ensure that the mortar is the most identical to the original. Mortar selection must be according to the correspondent texture, colour and most importantly, the material's compression strength.

v. Before the new mortar bond is applied, all existing mortar that is damaged, lose or brittle must be removed. The damaged mortar must be removed carefully using non-damaging techniques/tools.

vi. Damaged mortar must be removed at least ¾ inches in depth to allow the new mortar to be applied and to bond properly on the brick wall.

vii. Before applying the new mortar, parts where the old mortar has been removed must first be cleaned and soaked with water to ensure the bricks are damp. If the brick wall is too dry, it will absorb the water from the new mortar and lessen the strength of the mortar and result in the weakening of the brick bond.

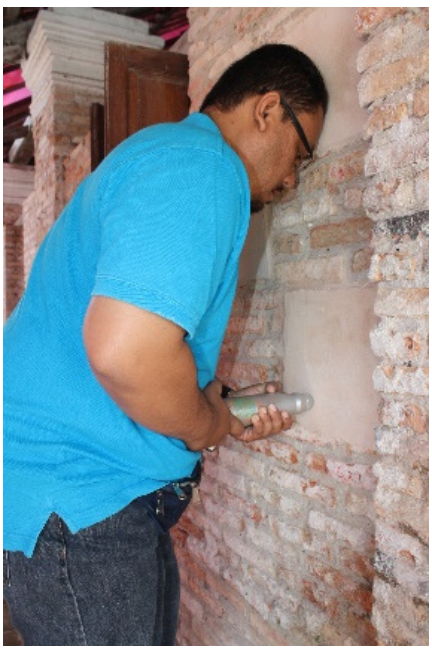


Photo 9: Conducting a test on plaster/mortar samples using the hammer rebound test
Source: Kakap Mosque Conservation Project, Kedah, 2015

Reminder:
The use of Portland cement is strictly not allowed in conservation works on heritage buildings because its characteristics are not in line with conservation principles. Among the weaknesses of Portland cement on heritage buildings are as follows: -

i. It is a material that cannot be reverted. When used on heritage buildings, it can thus damage the original fabric of the building.

ii. It is too strong in terms of density, adhesion and pressure. Therefore, it does not suit the lesser or weakened fabric of heritage buildings.

iii. Due to the high strength level, it lessens the elasticity compared to lime mortar and this imparts pressure and would accelerate the damaging process of the wall.

iv. It is not permeable and has a low level of porosity, thus, it traps water/vapour and slows down the evaporation process, after which internal dampness will occur.

v. It causes shrinkage of the surface and also results in cracks which allow water to seep in easily. Since that as a whole it does not permeate water, this makes the seeped water unable to leach out easily causing damage due to collected humidity.

vi. It produces soluble salt on the wall surface that could damage the surface as well as decorations or carvings on the walls.

vii. It causes evaporation and enables residue of salts or lime to collect and becomes a type of sediment on the walls/building surfaces. These residues react with the surroundings and form crystalized calcium carbonate (in Bahasa Melayu 'keladak batu kapur' or calcite). This layer of crystalized calcium carbonate is highly alkaline and can cause damage and defacement on walls and building materials.

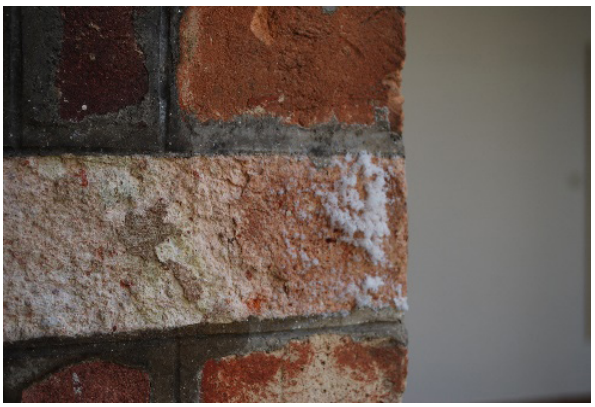


Photo 10: The effect of salting or efflorescence on wall surfaces
Source: Sultan Abdul Samad Building Façade Conservation Project, 2009

3.3 CEILING

The construction of the ceiling is done under the roof to hide or cover the wooden roof structure from view besides become the overhead finishes of the building space. Ceilings are usually designed according to the type of function of the building. Ceilings in heritage buildings are commonly the fixed ceiling i.e. the soffit type whereby the floor of the upper level is the ceiling for the level below. There are heritage buildings that install the hanging ceiling type in order to hide or protect new electrical wiring and other new M&E systems.

Damages to the ceiling generally occur because of the humidity/dampness caused by roof problems such as leakage. Other damages that occur are damp/discoloured ceiling boards and mould growth, broken ceiling frames and boards, and peeled surfaces.

Work Procedures

i. Conduct investigation on the factors that causes ceiling defects.

ii. Create temporary supports on the ceiling's wood or other structure before actual conservation works.

iii. Replace the broken frames or missing ceiling boards with same materials.

3.4 FLOORS

Floor Structures

Customarily the floor structure of Malaysian heritage buildings is made of wooden materials especially for raised or upper floors. The ceiling beam and floor joists are important components to support the floor boards.

Commonly found defects are broken timber elements, wood rot and worn, eroded or scratched wooden surfaces and warped boards. The main cause of wood rot problem and damaged wood materials in heritage buildings are insect attacks such as by termites. The insect or termite attacks on wooden materials most likely occur where there is dampness. Meanwhile damaged floor surfaces are a result of friction or dragging movements on them, whether by humans or from furniture loading.

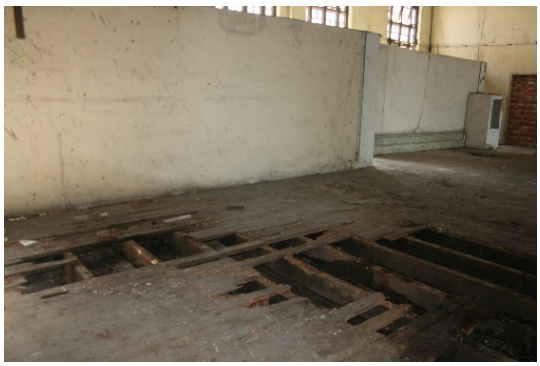


Photo 11: Damaged wood caused by termite attack and wood rot
Source: Old Post Office Conservation Works Project, Ipoh, Perak, 2009

Work Procedures

i. Before any conservation works begin, investigation must be done to identify the factors that cause defects such as termite attacks on floor joists and floor boards.

ii. Original floor timbers that are still in good condition must be retained.

iii. Identify the type/species of wood that is used. Usually a hard wood species such as *balau* or *cengal* are used for floor joists whereas *meranti* is used for floor boards.

iv. Identify the strength of the current floor structure as used to support expected loading.

v. The replacement of damaged floor joists or floor boards etc. must use the same species and strength rating as the original. The replacement or new timber must have undergone prior approved treatment.

vi. For timber elements that are partly damaged, the damaged part must be cut off and replaced with new wood joined to the old using the same species, strength and size. The timber joinery technique must suit the needs of the characteristics, size and condition of the individual timbers.

vii. Any remedial works must use the same traditional construction method or technique. If it is proven difficult to repair by such, new construction method may be allowed, but with minimum disruption to the authenticity of the building.

viii. Conduct treatment for termite prevention on the wooden floor structure/elements.

ix. Apply a suitable type of protective coating layer on the floor and/or other surfaces.

x. Provide temporary protection by safely covering over the floor surface throughout the execution of conservation works.

Photo 12: The main damage to the floor is wood rot which is due to dampness and termite attack. Left and right photos are works on removing damaged floor joists and floor boards

Source: Taiping Museum Conservation Project, Perak, 2008

Floor Finishes

Floor finishes in heritage buildings generally use finishes made of clay, marble, terrazzo or ceramic tiles. The clay-type floor finishes or better known as 'terra cotta' displays a reddish colour with texture; marble finishes follows the intrinsic colour of the marble such as ivory white, whereas terrazzo finishes has varying composite appearance, patterns and colours. Ceramic tiles finishes come in a large variety of sizes and patterns but are typically either plain-coloured, or with floral or geometric patterns.

Some of the most common damages that floor finishes suffer from are eroded surfaces and faded or dulled colour due to ageing and feet or load dragging; and broken, cracked or loose finishes due to aged buildings and weakened adhesive material; or dirt, moss/ mold and residues defacing the surfaces of finishes. This problem is largely caused by humidity or dampness and inadequate maintainence or cleaning.

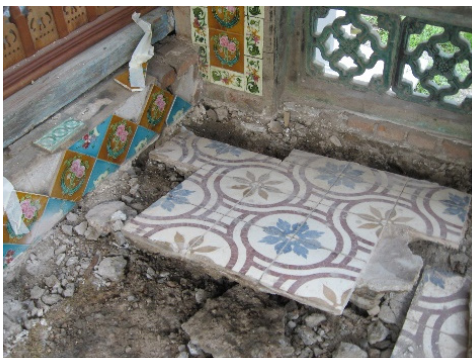


Photo 13: Conservation works on broken floor tiles
Source: Penghulu Natar House Conservation Project, 2009

Work Procedures

i. Original floor tiles must be salvaged and retained as much as possible.

ii. Addition or replacement of new pieces of floor finishes must be identical to the original floor finishes.

iii. Works involving cleaning and smoothening the floor finishes must use methods and treatment materials that are non-damaging to the original floor.

iv. Provide temporary protection by covering over the floor surfaces throughout the execution of conservation works.

3.5 DOORS AND WINDOWS

Doors, windows and openings such as doorways/gateways, carved and lattice screen openings are building elements that can accentuate the unique architecture of a heritage building. The doors, windows and fenestration elements of heritage buildings show various shapes and styles including details that suit the function and location of any fenestration. Elements that make up the doors and windows are the frames and door/window leaves. Traditional doors and windows are usually made of wood. Other materials especially in newer buildings are made of metals such as iron or aluminium, and now plastic.

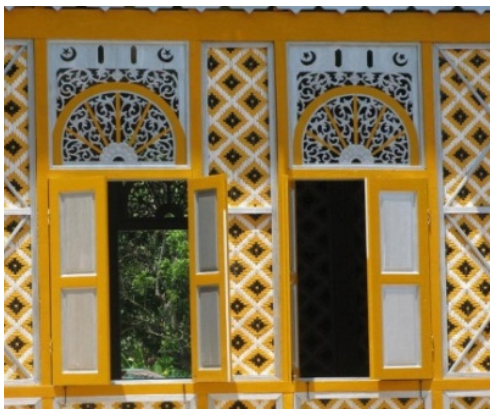


Photo 14: Windows of Ihsaniah Iskandariah Mosque, Kampung Kuala Dal, Kuala Kangsar, Perak
This window displays the uniqueness of the wooden carved filigree panel on its upper part
Source: Masjid Kampung Kuala Dal Conservation Project, Perak, 2015

The most common damage suffered by doors and windows are rotten or broken woodwork of frames or leaves due to wood ageing, humidity or termite attacks. Old doors or windows may have a problem of not being able to shut properly. This problem is usually caused by wood expansion and shrinkage or warping due to uneven shifts of temperature or humidity content on frames and leaves or the joinery, or accidents that hit and damage the timbers.

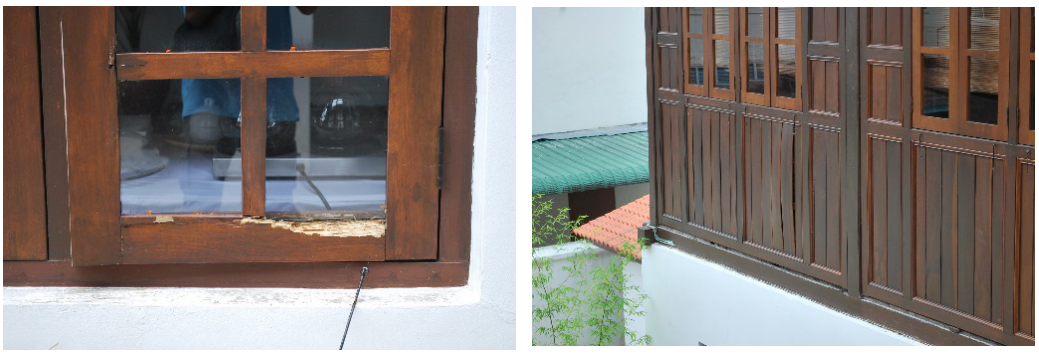


Photo 15: Damages suffered by windows as a result of termite attacks and warping
Source: Sanitary Board Conservation Project, Taiping, Perak, 2008

Work Procedures

The conservation principles for doors and windows basically aim to restore doors and windows to their original condition and ensure that they can be used properly.

i. Conservation work on doors and windows must begin by inspecting and recording an inventory with the labelling of all doors and windows and their defects onto the plan. This includes marking the doors and windows that will be removed for conservation works or replacement.

ii. The damaged door and window elements such as rotting or broken framework should be unhinged and brought to a wood workshop for repairs.

iii. When replacing rotten wood, a cut and joint method by for example dovetailing ('bertanggam') should be used to make it stronger, and the new wood replacing the old must be of the same species with the same strength rating.

iv. Cover all fine holes, cracks and uneven surfaces on the framework surface as well as doors and window leaves of the building using suitable wood putty material that has the same type and colour as the original wood.

v. Replace all door/window accessories that can no longer be used such as hinges, bolts, knobs and keys with suitable replacement/new materials. Accessories which are replaced must as far as possible match the type, material and design of the original.

vi. Reinstall the framework and leaves of doors or windows of the building which were previously removed for conservation/repair and place them in their original position.

vii. Protect all door and window elements that are being conserved by wrapping them with plastic. This is to prevent any new damage to the wood.

3.6 RAIN WATER GUTTER AND PIPING/DOWNPIPES

The rain water piping and gutter system is a component part of the building which carries a very important function. The gutter collects rainwater that flows down from the roof and channels it down through the rain water piping or downpipes. This piping is usually installed vertically, bringing water down to the drainage system at ground level.

Common problems that occur with rain water drainage system include gutters rusting and decaying causing leakage or breakage, its small size causing overflow during heavy downpours or getting clogged with leaves or dirt; rain water piping/downpipes getting broken or bent and leakage causing inefficient rain water flow. Defects and damages of the rain water piping and gutter can affect other parts of the building with problems such as walls and floors becoming wet and getting dirty, mouldy/mossy or weakened.

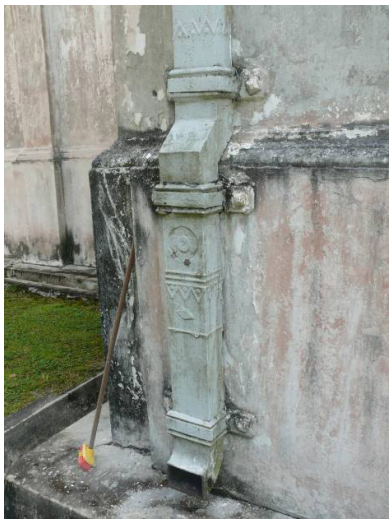


Photo 16: Inefficient water drainage due to improper water funnel design or damage inhibits water flow

Work Procedures

i. Inspect and document the existing piping and gutter system beforehand by recording its sizing, material types, water drainage system and condition.

ii. If the rain water piping system is still intact and can be used, protect and maintain the existing gutters and piping/downpipes in-situ through normal cleaning.

iii. If broken, and not suitable for continued current use, replace the damaged gutters and piping using the correct measurements and most suitable material.

iv. The replacement gutter and piping can also consider the current or expected rain water flow and volume, considering weather changes and greater precipitation. Small gutters can be replaced with a more suitable size, whereas gutters on roof eaves and downpipes that are not functioning perfectly can be replaced in a way that does not unduly affect the original aesthetics of the heritage building.

3.7 DECORATIVE ELEMENTS

Decorative elements refer to the additional elements such as mouldings that embellish the façade of a building, both exterior and interior parts. It can be divided into three broad components namely, murals, carvings and moulded plaster works. These decorative items help to imbue a sense of style or identity and aesthetic values in a heritage building. Decorative elements are found not only on the façade or wall surfaces but also on pillars, doors, windows and ceilings of the building.

Decorative elements in heritage buildings especially colonial buildings and old shophouses are usually more of decorative lime plaster mouldings which display motifs and patterns that reflect the influence and aesthetic values of the time.

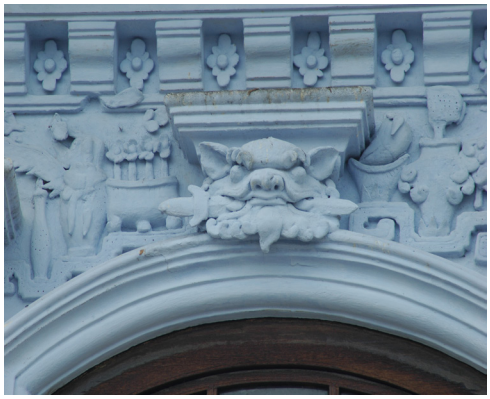


Photo 17: Decorative moulded plaster works on the façade of a shophouse, Kampung Cina, Melaka
Source: Conservation Section, 2012

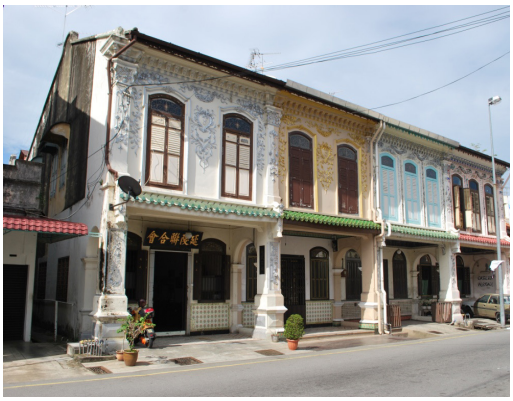


Photo 18: A row of shophouses displaying unique decorative mouldings on the façade, Kampung Cina, Melaka
Source: Conservation Section, 2012

Some of the most common damages suffered by decorative elements in buildings are mainly moulded plaster works or carvings in also stone or concrete that are broken, cracked, disfigured or dirt-stained. The dirt may be inorganic minerals or organic dirt such as fungus and mould growth. These defects are usually the result of high humidity and ambient pollution factors. Besides environmental reasons, decorative elements also suffer damage due to improper conservation works such as the use of additional material which may be incompatible with the original.

Work Procedures

i. The original decorative elements must be maintained.

ii. The design and motif of all decorative elements must be recorded by taking photos and measurements of the moulded plaster works or carvings etc. This record will allow the replication of the design and pattern, where necessary.

iii. Before commencing conservation works, a thorough inspection must be conducted on the elements to identify any defects or damages and how to repair each.

iv. Cleaning and remedial works on the moulded plaster or carvings must be done manually using suitable brush, dirt scraper and hand water-spray. High pressure water-jetting must not be used as it will damage the delicate mouldings.

v. Cleaning that involves chemical substances to remove any growth or stubborn stains must use the bare minimum amount as to not damage the fabric of the plaster works. All cleaning agents must be foam minimal and non-acidic.

vi. Repairing of plaster works and other decorative elements must be carried out with great care and best done by an artisan or craftsman who is skilled in plaster works or carvings.

vii. The materials used in the repair of damaged decorative elements or the replication of lost or irreparable items must be identical to the original materials.

Wood Carvings

Wooden carvings are one of the most unique decorative elements in Malay traditional architecture. Various wood carvings can be found in houses, mosques, palaces and other types of buildings. Generally, defects suffered by wooden materials are rot, warping, fractures or breakage due to ageing, temperature or heat coupled with humidity, nail corrosion, insect or pest attacks and accidents.

Timber carvings must be preserved and maintained because they have high artistic and cultural value while becoming very rare.

Work Procedures

i. The design and motifs of the wood carvings must be recorded by taking photos and measurements as well as noting the motif's background information such as the pattern inspiration and colour. These records will enable an authentic replication of the original design of the carving.

ii. Before starting conservation works, thorough inspection must be done on the condition of the wood carvings to identify any defects or damages.

iii. Research/analysis must be done to ascertain the timber species of the wood carvings.

iv. Cleaning and restoring of wood carvings requires great care, even more so if the carving is painted, and must be done manually using brush, dirt scraper and sandpaper.

v. The cleaning method on wood carvings must use the dry technique. The usage of water is strictly not allowed.

vi. Repair/restoration works on carvings must be done carefully and is best done by an artisan or craftsman who is skilled in wood work and carving.

vii. The replacement of damaged wood carvings or replication with new wood carving panels must use wood of the same species and grade as the original items.

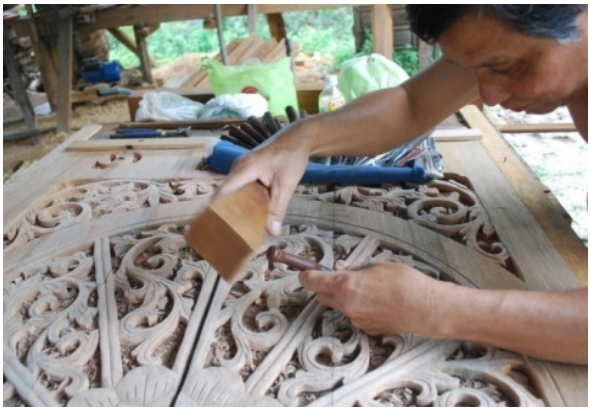


Photo 19: Carving wood filigree (kerawang) on a window panel
Source: Ihsaniah Iskandariah Mosque Conservation Project, Kampung Kuala Dal, Perak, 2009

3.8 PAINT

Paint gives protection to building elements such as walls and wood. Paint can be divided into three components which are the binder, solvent and pigment. The binder component is very important in determining the lifespan of the paint. Thus, suitable paint type with high quality binder must be used on heritage buildings.

The basic principle of conservation of heritage buildings is to preserve the buildings in its original form. This includes the colour(s) of the building. In order to identify the original colour of a building that may have been repainted, the conventional technique is to scrape the current layer of paint or plaster until the original paint layer is seen underneath.

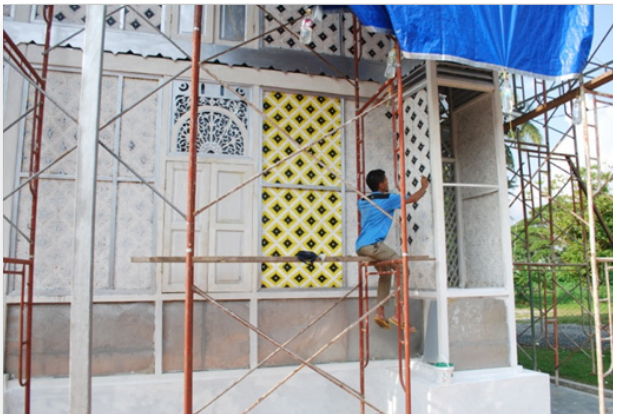


Photo 20: Painting work on the 'kelarai' woven bamboo wall
Source: Ihsaniah Iskandariah Mosque Conservation Project, Kampong Kuala Dal, Perak, 2015

Work Procedures

i. The method of investigating or uncovering the original paint must be done carefully so that it doesn't damage the fabric of the heritage building.

ii. Before scraping an entire wall, investigation on the paint layer must be conducted first in order to find out the original colour of the building. This research must be done at several points in order to get a consistent and accurate colour sampling of the original paint.

iii. The method of scraping off paint depends on the thickness of the paint layer and the type of material/surface. Techniques that are approved are steam or vapour method, heating technique and using paint solvent, besides the manual scraping technique

iv. The paint scraping technique must be done carefully without affecting the fabric of the original surface, be it the wall or wooden elements etc.

3.9 STAIRS

The staircase is one of the building elements that connects between floors or levels of a building. There are a few types of stairs such as the full-flight staircase, the turning staircase and the spiral staircase. The materials used to build staircases are wood, brick, concrete, or combination. The staircases commonly found in heritage buildings are wooden staircases and these showcase the uniqueness of heritage building construction. The elements of the traditional wooden staircase such as the stair posts, railing, steps, landing, beam and joists are usually built using the dovetailing method ('bertanggam').

Considering that staircases are an important structure that connects between levels/ floors of a building, the type of wood used must be the hardwood type and of high grade such as *cengal*, *balau* and *kempas* timber species. This is one of the factors that gives strength to the structure of the staircase. Wooden staircases are usually painted for the purpose of aesthetics and also to provide protection to the wood but in the context of conservation, the principle of authentic reinstatement is used; therefore, the paint on the surface of the wooden stairs must be scraped off if it is known that the original was not painted.

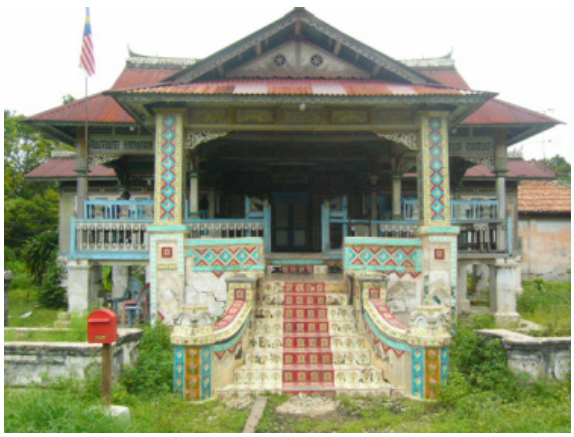


Photo 21: The stone staircase at the Penghulu Natar House, Melaka. The staircase of this 'rumah ibu' or main house section has an attractive traditional staircase with patterned tile finishes
Source: Penghulu Natar House Conservation Project, Melaka, 2009

Work Procedures

i. Maintain the structure of the staircase exactly as per the original look and details.

ii. Investigate the type of damage found on the structure of the staircase and its components.

iii. Identify the timber species and strength of the wooden staircase.

iv. Remove any new layer of paint on the wooden surface carefully and cautiously by using approved method that is non-damaging.

v. Replacement of any of the staircase's components must be of the same wood species as the original and using the same construction method as the original. If this is difficult, the new method used must be able to give the staircase better strengthening.

vi. Provide protection to the entire staircase throughout the conservation works.

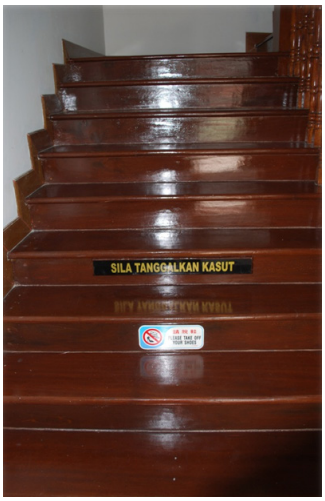


Figure 22: The wooden staircase in a heritage building portrays unique construction and is usually made of local hardwood species
Source: Sanitary Board Building Conservation Project, Taiping, Perak, 2008

3.10 BUILDING SERVICES SYSTEM

3.10.1 Electrical Wiring System

Before commencing any wiring works, the contractor and/or electrician must identify and plan the proposed works to ensure an organised, efficient, tidy and safe work result and to minimise any damage to the heritage building including avoiding any new installation from becoming an eyesore.

Work Procedures

Factors that must be considered when de-installing and installing the electrical wiring system:

i. Avoid affecting and damaging the walls and other parts of the building.

ii. De-installing and installing the old and new wiring system respectively should be done with care and caution so that façades or walls are not defaced or damaged.

iii. Electrical wiring should be carried out through surface installation and neatly hidden in conduits or trunking.

iv. Record the building condition before, during and after the installation or rewiring of the electrical system.

v. Prepare a check list for and carry out inspection and maintenance of the electrical system.

vi. Window type air-conditioning is not encouraged because it would damage the original design of the window.

3.10.2 Air-Conditioning System

Air-conditioning systems in heritage buildings usually use older air-conditioning types. These are normally installed on the walls, ceiling and floor of the building. Those systems are dependent on usage of water and air as heat conductors. The cold and dry air produced by the old air-conditioning systems can result in deterioration and damage to the building elements and materials, especially when reacting to the surrounding heat and humidity. Condensation can happen on surface and structures, which can cause fungus or mould growth. Many heritage buildings originally do not have air-conditioning systems and new installations must be well thought out and planned carefully.

Work Procedures

The installation of an air-conditioning system must be thought out early on and planned so that the physical installation, ventilation flows, water and heat dispersal etc. do not cause detrimental effects on the building.

i. Installation of air-conditioning facilities should be sensitive and not defile the building's heritage architecture because air-condition equipment is not an original part of the building. Therefore, air-conditioning units need to be discreet from public view.

ii. Permissible usage of screening types that can help hide air-conditioning equipment include trellises, louvres, perforated panels or other alternative designs that fulfil the function of visual damper yet not influence the character of the building's heritage.

iii. Installation of air conditioning equipment, conduits as well as screening must not affect the original structure of the heritage building such as walls, pillars, floors or roof nor destroy and alter elements of the building including carvings and plaster works, original doors and windows or be too obvious to public view.

iv. For indoor units, the standing or floor type, or hanging from ceiling is allowed. However, ceiling units are not encouraged on the original ceiling or soffit but only on the new hanging ceiling structures of the building. In any case, air-conditioning units should be discreet and not be too disruptive to the building's heritage character.

v. Internal screening design should be suitable and harmonious with the character of the building and its interior architecture.

vi. Window type air-conditioning is not encouraged because it would damage the original design of the window.

3.10.3 Lighting/Illumination

Lighting or illumination of heritage buildings should be implemented carefully and should not have a negative impact on the heritage structure. The selection of lighting method should consider colour factors and rate of reflectivity that is desired on the surface of the heritage building. The objective of the lighting exercise should be clear in order to achieve the desired results.

The usage of lighting method and equipment must not be too obvious and should not detract from the façade and looks of the building. It should be easy to install and maintain and at the same time must respect the heritage building's overall fabric.

The lighting source must have the ability to highlight the building's image through the use of warm light LED that is less than 3000 K using methods or brands that are recommended and suitable with the lighting needs of heritage buildings.

The use of floodlights must take into consideration the location and orientation vis-a-vie the building's surroundings so that it highlights relevant features while not being too glaring nor disturbing to occupants and visitors.

3.10.4 Signboards/Signage

The placement of signboards on heritage buildings should respect the values of the particular building. Signage placement must be on the specific and suitable surface of the building where it is intended to be, for example normally at the front façade section of the building above the opening/doorway and below the building cornice line.

The type of signboard used must not detract from the heritage characteristics of the building. Simple signage designs are encouraged because they are more effective and at the same time respect the heritage value of the period. Signboard size should not be too big and must not cover important elements of the building façade. Materials used for the signboard must be of high quality and befitting the building's heritage architecture.

Usage of signboard materials that are too modern such as plastic or neon lights must be avoided because they are not suitable with the values of a heritage building.

The signboard/signage must not give any negative effects whether directly or indirectly to the building, this includes damage and rusting or staining. For buildings in brick and plaster, the installation must use anti-rust fixing technique and material with the signboard fixed to the plaster. No fixing or attaching is allowed on brick surfaces because it can damage the brick units. The signboard and method of fixing must obtain approval from the National Heritage Department.

The JWN work procedure approval form must be submitted for JWN comment feedback to obtain approval from the Heritage Commissioner/project Superintending Officer before commencing on site.

3.10.5 Fire Safety

In the conservation of heritage buildings, fire safety upgrading and renovation must be done with care to ensure its effectiveness. Below are several steps that should be taken to ensure that heritage buildings comply with reasonable fire safety codes:

Step 1: Understanding the importance of heritage buildings

The steps to be taken before undergoing works for upgrading the fire safety level of a heritage building essentially are to understand the significance of the particular building's history and background. This is because many heritage buildings were built before current safety requirements or codes were introduced or that heritage building may have undergone renovations whether externally or internally. Therefore we should understand which renovative actions are permissible or not on a particular building and take into account the effect the action would have towards its heritage significance compared to its safety requirements.

Step 2: Auditing existing fire safety

A comprehensive audit of the fire safety of heritage buildings should be done by those who are qualified or authorised. This step is to identify the level of risk of fire and status of fire prevention measures in the building. If the building is already equipped with some form of fire safety, the audit process can evaluate whether it is still acceptable or functioning appropriately.

Step 3: Identifying the fire safety requirements

Fire safety requirements must be based on the particular building and its function. In general, there are two types of fire prevention systems for buildings which are the passive fire safety prevention system and active fire safety prevention system. Usually, a combination of these two systems are used for optimum protection. Various up-to-date methods are present in the market today, therefore the professional input of consultants and qualified persons should be obtained in order to identify methods that best suit the needs and concerns of the particular building. It is pertinent to note that the installation of fire safety systems must take into consideration the authenticity and fabric of the heritage building. The method of fire safety installation system for heritage buildings is advised to follow these principles:

i. Minimal changes/effects: Any changes done to a heritage building must whave minimal effects on its original fabric.

ii. No permenant changes: Any changes done to a heritage building must as far as possible be such that they are reversible, in other words, it can be uninstalled.

iii. Suitable: Fire safety prevention methods that are to be used must be suitable to its level of risk, usage or function, building content, spatial sizing, materials and types of building finishes.

Step 4: Evaluation of fire saftey proposals

When the fire safety systems are being proposed, several fire safety methods that are deemed suitable for the building would be considered. Before making any decision on the options, it is vital to identify both the benefits and potential harm and ultimately which option would bring optimal results. For example, an automatic water sprinkler system is considered good to control fire, but for heritage buildings that are used as museums, water can cause great damage to highly valuable historical and cultural artifacts such as priceless manuscripts, rare old fabrics, organic matter such as stuffed endangered animals, antique furniture and other treasures. Alternative and/or innovative but equally effective methods must be used

Some of the factors to be considered in identifying the fire safety needs as required in heritage buildings are:

i. Age of the building and type of construction, its uniqueness and the effect of its loss to the nation if consumed by fire

ii. Location of building

iii. Size and height of building

iv. Category or level of occupancy and effectiveness for building function

v. Type and value of buildinng content

vi. Extent of fire prevention and safety level in the building.

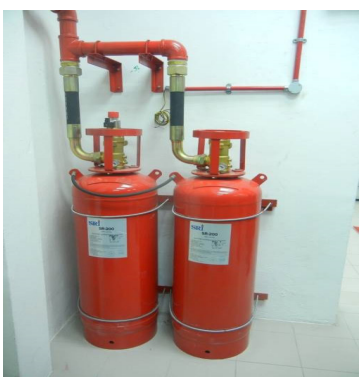
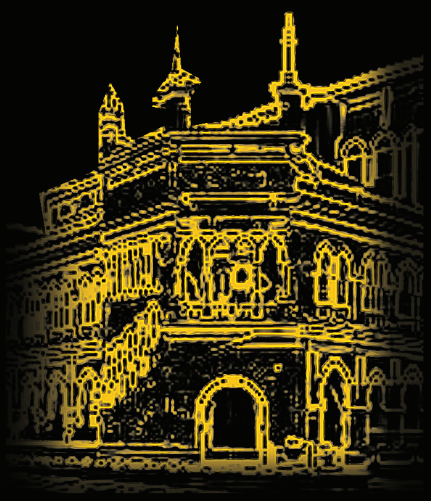


Photo 23: Dry Powder Fire Prevention System Installation
Source: Conservation Division, 2015

Reminder: Fire safety aspects should be consulted and approved by the Fire and Rescue Department of Malaysia.

PART 4



PART FOUR

4.0 DOCUMENTATION

Documentation is an essential process in the conservation of heritage buildings. The importance of documentation has been stated in many documents related to the conservation of heritage sites such as the Venice Charter (1964) which, as mentioned in article 16, states *"...in all works of preservation, restoration or excavation, there should always be precise documentation in the form of analytical and critical reports, illustrated with drawings and photographs..."*. This is because the success of a conservation project depends on the effectiveness of decisions that are made upon referencing certain information. At the same time, the information needed in order to arrive at correct decisions are obtained through accepted documentation methods and recording techniques.

The determination of the methods and techniques for documenting a conservation project basically depend very much on the features and requirements of the building or site intended for documentation. Other aspects also need to be considered such as the exact purpose of documentation, the availability of technology, expertise and labour, also importantly the funds, as well as the cultural context and sources of information. Besides that, the process of documentation, if possible, should be done using the non-destructive approach and techniques in order to ensure that the structure and fabric of the building, artefact or subject intended for documentation is not damaged or altered in any way. However, if the appointed consultant (Conservator) considers that there is an unavoidable necessity to carry out tests that have a destructive element, then the proposal should be forwarded to the Heritage Commissioner in writing before any work is done with the justifications for the proposed necessity.

During the carrying out of the documentation process, there are four basic principles of documentation that must be paid attention to, namely:

1. **Principle 1 – Recording/Illustrating the Heritage Values and Importance**

   The documentation, especially the final record, must demonstrate the significant values of the heritage site and building involved including aspects related to history, culture, architecture, engineering, and many other matters.

2. **Principle 2 – Accurate and Quality Information**

Documentation must be done honestly and holistically to ensure that the data or information recorded is authentic and usable. This matter is especially vital in ensuring that accurate and detailed information is available to people who need it, especially those involved in the decision-making of conservation-related projects or for future referencing.

3. **Principle 3 – Accessibility**

Documentation must be executed using a medium that is easily accessed, duplicated, and stored in a way that maintains the quality of archiving. The final outcome of documentation must also be presented in an orderly manner, using easily-understandable format and complete with related citations to allow the information content to be understood, verified, and delivered with ease.

4. **Principle 4 – Clarity of Information**

All information contained in the final documentation must be clear and be able to be delivered and comprehended effectively. Information related to sites or buildings such as exact location, measurements, scales, and specific material types must be shown clearly to ensure good understanding and usage.

The requirement for documentation by the National Heritage Department is divided into three parts, namely Before, During and After the project. Before conservation works begin, the appointed Consultant Architect (Consultant Conservator) must prepare a Dilapidation Study which includes the research on the history, heritage values, architectural design and structural systems, investigation on the building's defects and suggestions for conservation and remedial works. When a Contractor is hired to execute the conservation works, there are three (3) components of documentation that must be prepared by the Contractor (Conservation Contractor) which are the Pre-Conservation Works Report, On-going Conservation Works Report, and Final Conservation Works Report. On top of that, video footage throughout the entire conservation works must also be taken. The preparation of the documentation can be done jointly between the consultant's Conservator and the contractor's Conservator if the need arises. This must be mutually agreed by all parties involved. The contents of documentation needed by the National Heritage Department are as shown in Diagram 1.

Each document must be attached with a PDF copy in the form of a CD that is labelled with the full title of the project.

All documentation must be done in **BAHASA MALAYSIA**. The usage of the English language is allowed in certain situations and must receive written permission from the National Heritage Department. If English or any other language is used in any part, a Malay translation must be included at latest by the submission of the Final Report.

Diagram 1: Documentation Requirements of the National Heritage Department (2015)

No	Documentation Name	Stages	Content (Bullet Points)	Prepared by
1.	Initial Study Report	Before conservation works (for early evaluation)	Building and site's background research • History related to • Architecture / design • Heritage values and significance, and • Building's current condition	Conservator (Consultant)
2.	Dilapidation Study Report and Proposal on Conservation works	Before conservation works (to determine the scope of conservation works needed)	Research on history and heritage values • Building defects/dilapidation report • Measured drawings • Element inventory • Approach and proposals for conservation • Treatment methods • Scientific studies and laboratory tests	Conservator (Consultant)
3.	Pre-Conservation Works Report (HABS I)	Before conservation works	To record the fabric of the building as it was found (contract began), through methods and techniques that show the design, measurements and current physical condition of the building including photography and other suitable means	Conservator (Consultant/ Contractor)
4.	On-going Conservation Works Report (HABS II)	During conservation works	To record the conservation works process throughout the project execution. Prepared in the form of monthly reports including photography or other suitable recording means. • Two aspects that must be given priority are i.Work procedures ii.Up-to-date reports on the building and site's condition	Conservator (Contractor)
5.	Post Conservation Works Report (HABS III)	After conservation works	To record the whole fabric of the building as soon as conservation works are complete, including showing parts involved in alterations such as addition or replacements. Records must include photography, video, or other suitable means.	Conservator (Contractor)
6.	Final Report of Conservation Works	After all conservation works and related final matters are completed	To record every aspect of information related to the project and all conservation work processes involved till all works were completed. • Records included must use photography, video, and other suitable recording means.	Conservator (Consultant/ Contractor)
7.	Video Recording	Before, During and After conservation works	To film or record using high video quality for the entire conservation works process done on the heritage building using the expertise of a professional videographer. • Recordings must portray the entire progress of the project following a straightforward sequence of procedures. • Video recording must also highlight the critical tasks that demand skills/expertise in specific conservation works and/or jobs that involve parts and elements of the building that carry significant heritage values.	Conservator (Consultant/ Contractor)

4.1 CONTENTS/COMPONENTS OF DOCUMENTATION

4.1.1 Initial Study Report

Research done in the beginning stage and the general documentation which is done holistically, on the history and background of a site or building is known as Initial Study Report.

Documentation Components

Reports presented must contain the following information:

i. The history of the site and associated communities or ethnicities found in the area at the time; the leaders, owners, residents, managers and builders/craftsmen who built the place.

ii. The purpose and function(s) of the site/structure, and its development history.

iii. The historic overview of the site through visual materials including old photographs/ pictures, drawings or blueprints, also reports from books and publications.

iv. The building design(s), architectural style(s) and influences.

v. Date of construction and development history including any renovations done on the building and its function up to the present.

vi. Heritage values and its importance to the country, community and/or the surroundings.

vii. Proposal statements on suitable methods of execution for the conservation project works.

viii. Other investigations/tests according to the needs and requirements of the building/ project.

4.1.2 Dilapidation Study Report

The investigations done on the current condition of the building and any damage(s) it has is known as Dilapidation Study.

Objective

Dilapidation Study is a process to determine and record the condition and severity of any damage to the building.

Method

The following stages/procedures must be followed through when commencing the research or study of the site/building:

i. To produce a set of plans or the measured drawings of the building.

ii. To prepare a coding system and an element table as well as the components for all interior and exterior parts of the building by including the code for elements, location, types and materials, and damages to them, if any.

iii. To include coding system for the components and elements into the plans/drawings for the works on site.

iv. Drawings or plans for plotting defects use the basic plan extracted from measured drawings, and this is referred to as (‘*Defects Mapping’).*

v. To mark the element code on the surface of the element, using non-destructive marking

vi. To prepare a survey form for the project's Dilapidation Study

vii. To fill up the form with major details and the condition plus severity of damage of the building. Details include:
- Name of the person who surveyed/recorded it
- Record date
- Building elements
- Location/zone/grid/code/element
- Type of damage
- Severity of damage
- Cause of damage
- Suggestions for conservation

viii. To capture in photographs the condition of each element surveyed

ix. Photos of each element following the grid and location must be kept in an album and arranged systematically, following the same numbering system as that of the dilapidation survey form/report.

Documentation Components

To prepare a written report inclusive of photos for the Dilapidation Study which consists of the following particulars:

i. Project Title

ii. History and background of the heritage building

iii. Architectural design and aspects

iv. Types and causes of the building's damages

v. Scientific research and/or laboratory tests

vi. Proposals on conservation works

vii. Conclusion

viii. Appendix

4.1.3 Producing Measured Drawings

Objective

To produce the measured drawings documentation by measuring, recording or surveying the dimensions of the heritage site and building. Measured drawings are made based on the actually measured building dimensions and measurements and if there are for example slanting walls or elements, cracks or missing portions, it must be recorded in the drawings as well. In the documentation works of a heritage building, documentation materials must be backed up with photos in order to capture the current condition of the building as it was found. This is also done for the purpose of recording the conditions that are difficult to measure or describe and thus tricky to be put into measurements.

Documentation Aspects

The task of documenting a building requires solid measuring and recording of details of the building's current condition when and as it was found. This covers measurements from the aspects of:

i. Measuring and recording the building, site and component parts of the building's elements exactly how they were found.

ii. Measuring and recording the heritage structure's parts or elements that possess unique architectural and/or engineering qualities regardless whether certain parts of them have collapsed or gone missing.

iii. Measuring and recording any historical evidences of the original building and evidences showing historic progression towards the current building status.

iv. Measuring and recording all decorative elements that exist, for example on walls or fenestrations such as plasterworks or carvings whether in wood or other material.

Components of Measured Drawings

Final Measured Drawings must have:

i. Drawing(s) of all floor plans

ii. Drawing(s) of the front and back elevations

iii. Drawing(s) of the side elevations

iv. Sectional drawings through key areas (horizontal, and vertical if need be)

v. Drawing(s) of the roof plans

vi. Drawings of detail elements

vii. Axonometric drawings

4.1.4 Investigation and Analysis of Materials

The investigation and tests on materials are paramount in determining the original building materials, their sources and durability, or causes of damage. The results obtained from the investigation of materials and source of supplier can be used to reproduce a new batch of the building materials, following the same type and composition of the original. This investigation is also for the purpose of gathering scientific information on the building's history that can only be obtained through analysis of building material samples.

4.1.5 Archaeological Research

Archaeological Excavation

Archaeological research is a crucial task to be carried out on a heritage site that is intended for conservation. However, this implementation is dependent on the requirement. The purpose of this excavation is to:

Detect any Buried Structures

Often times, there would be buried structures found during an excavation of a historical site. This might be because the currently existing building was constructed on top of an older site or building or maybe even a part of the existing building may have been buried because it collapsed.

Therefore, through confirmation from a survey or excavation process, more detailed research can be carried out on the newly-discovered structure so that the design, type of material, and method of construction can be precisely known, for further knowledge, record and conservation purposes.

Detect Archaeological Artefacts

At a heritage site, there is a high possibility of finding archaeological or historical artefacts that relate to the building intended for conservation. This discovery may even be the missing link or the filler puzzle pieces in the history that correlates strongly with the building or site.

4.1.6 Building Documentation – Before Conservation works

Building documentation before conservation works is an activity aimed at recording the heritage building before any conservation works are done onto it. Through this building documentation, the condition and method of construction of the building can be confirmed. This includes the existing architectural style, physical shape, structure, decorative elements and condition of the building when it was found. The building documentation at this stage is known as Pre-Conservation Works Report.

Contents

The current condition of the building and the contemporary physical shape of the building must be recorded through the visual observation method using suitable photography

Format

The report format is available at the Conservation Division, National Heritage Department, for reference use.

4.1.7 Building Documentation – During Conservation works

Weekly and Monthly Reports – During Conservation works

To report all conservation works carried out. The report must elaborate the method and techniques of conservation that were used on every part of the building. The report must have visual support in the form of photos, plans showing locations of progressive works and if necessary, diagrams and/or drawings of construction work.

Contents

The entire work process must be recorded in a written report form attached with photos that depict the work methods and procedures for every conservation case or scope. The entire work processes as recorded make up the documentation components for this stage. Documentation required includes:

i. Appropriate illustrations/photography records.

ii. Weekly Reports - Activity logs on the daily progress of the historical building's conservation aworks, including the daily weather conditions and the progress percentage of the project.

iii. Monthly Reports – Gathering materials from the weekly reports and compiling them into a single summary and a work record by the end of each month.

Format
The report format is available at the Conservation Division, National Heritage Department, for reference use.

4.1.8 Building Documentation – After Conservation Works

To plot the final details of the building after undergoing conservation by completing the 'as-built drawings' with additions or changes made on the existing building. The drawings should also record the exact colour scheme codes used and all details of elements such as walls and fenestrations, as well as interior and exterior embellishments/elements.

Contents

The completed condition of the building and its latest physical shape must be recorded also through the visual observation method using suitable photography and video.

Format

The format for the report is available at the Conservation Section, National Heritage Department, for reference use.

4.1.9 Building Documentation - Final Report

To report all conservation works from the earliest stage of the project until the end when the project is certifiably completed. The final conservation works report is a critical part of the heritage conservation process. This report will be the full and final record and evidence in history of what has been done for the heritage building and site. This report will become the reference for any future concerns or conservation works.

Contents

The report must include the following particulars:

i. Title of the project
ii. Introduction
iii. Background of the project
iv. Historic background of the building and site
v. Architecture and design aspects of the building
vi. Original condition of the building
Investigations on structure and materials
vii. Conservation works
viii. New or additional work
ix. References
x. Appendix – As-built plans/drawings, supplementary illustrations, schedule/ procedures of work and full addresses of the material suppliers or other support services, also detailed reports such as laboratory tests etc.

Format
The report format is available at the Conservation Division, National Heritage Department, for reference use.

4.1.10 Video Documentation

The documentation video must have a minimum duration at least of 30 minutes. The contents of the video should encompass the entire process of all conservation works from beginning to end. Preparation of the video must be well planned and carefully thought out in order to produce a recording that conveys useful information covering all aspects of the conservation. The video content needs to be created with the cooperation and validation of the Conservator. The preparation and the recording arrangement of the video should also be of excellent quality with high definition clarity.

4.1.11 Work Procedure Approval

The preparation of detailed/exact work procedures must be prepared by the Conservator (contractor) for any scope of work in the conservation of Heritage Buildings or National Heritage. The preparation of the work procedures is done through agreement from discussions between the Conservator (contractor) and the Conservator (consultant). The Conservator must ensure that each work procedure that is proposed is a work procedure that is proven effective and suitable with the building structure.

Each work procedure needs to be submitted to the Heritage Commissioner to obtain comment and approval to proceed with work before said work procedure gets the approval of the Superintending Officer. Based on the statements/clauses in the contract document for construction contracts, approval for any implementation of work must be obtained from the project Superintending Officer. The comment and approval of the Heritage Commissioner is very important considering that the building has been gazetted under Act 645, in which it is the responsibility of the Heritage Commissioner to ensure that each conservation work carried out must be in line and comply with the provisions in these Guidelines on Heritage Building Conservation. Each work procedure that is proposed must receive permission comment and approval before it is implemented. The preparation and delivery of the work procedure must be vis submission to the Heritage Commissioner using the Work Procedure Approval Form.

PART 5

PART FIVE

5.0 CONCLUSION

The Guideline on Heritage Building Conservation is one of the most important instruments in ensuring that all conservation works on the Heritage/National Heritage site(s) can be carried out in accordance with the requirements of the National Heritage Act 2005 (Act 645). Ideally, these guidelines should be read together with the National Heritage Act which is the legal source for the protection of gazetted sites throughout Malaysia.

This guideline is divided into several main contents that includes: Introduction, Conservation Principles and Processes, Conservation Methods and Techniques, Documentation, and Conclusion. Each section describes in detail the requirements and needs of the National Heritage Department in carrying out the conservation work of heritage buildings on sites gazetted under the National Heritage Act. A comprehensive and easy-to-understand content is expected to have a direct impact on determining suitable conservation technique for a particular building element.

In addition, this guideline also refer to international guidelines such as the Burra Charter and the Australia Charter while adapting these charters to the conservation methods practiced by the National Heritage Department. This is to ensure the highest standards of conservation practices as well as to ensure that these current practices in Malaysia are on par with the international community.

All agencies (private and government)/associations/individuals who intend on doing restoration and repair works on sites gazetted under the National Heritage Act must comply with The Heritage Building Conservation Guideline. This guideline could also be used for conservation works on heritage sites/buildings throughout Malaysia that are not gazzeted under the act.