GREEN MAINTENANCE OF HERITAGE BUILDINGS
A Sustainable Repair Approach
<table>
<thead>
<tr>
<th>Table 2.1:</th>
<th>Classification of building defects of heritage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 2.2:</td>
<td>Lay-out shows profile for excavation and bulding and remedial action</td>
</tr>
<tr>
<td>Table 5.1:</td>
<td>Lay-out shows profile of masonry wall, basin, and inhabited structures</td>
</tr>
<tr>
<td>Table 5.2:</td>
<td>Lay-out shows profile for excavation and bulding and remedial action</td>
</tr>
<tr>
<td>Table 5.3:</td>
<td>Emended carbon coefficients (kg CO₂/ha)</td>
</tr>
<tr>
<td>Table 5.4:</td>
<td>Approximate mass of stone (kg) used in repair of basin midden, Melaka, Malasia</td>
</tr>
<tr>
<td>Table 5.5:</td>
<td>Total embodied carbon expenditure (kg CO₂/ha)</td>
</tr>
<tr>
<td>Table 5.6:</td>
<td>Total number of maintenance interventions</td>
</tr>
<tr>
<td>Table 5.7:</td>
<td>Total stone masonry wall area replaced of basion midden, Melaka, Malasia</td>
</tr>
<tr>
<td>Table 5.8:</td>
<td>Percentage (%) of embodied carbon expenditure</td>
</tr>
</tbody>
</table>

Table 5.9: Oil Basin Midden, Melaka, Malasia

Table 5.10: Oil Basin Midden, Melaka, Malasia
Table E: Resourcing location and transposition

| 149 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |
| 154 | Table F: Resourcing location and transposition

| 144 | Line-based money and place mix materials |

| 140 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 143 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 142 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 141 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 140 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 139 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 138 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 137 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 136 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 135 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 134 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 133 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 132 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 131 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 130 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 129 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 128 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 127 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 126 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 125 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 124 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 123 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |

| 122 | Approximate Endowed Carbon (Kg/ha) of 1.8-1.64 Brunsiplaced Place, Edinburgh, Scotland |
List of Plates
Bnmland Place, Edinburgh, Scotland

Plate 5.13: Repaired stonework and relief of 148-164

Plate 5.12: Building stones and stonework of 148-164

Plate 5.11: Mid-17th century stonework of 148-164

Plate 5.10: Midland Place, Edinburgh, Scotland

Plate 5.9: Former location of Bank of Scotland, Midland Place.

Plate 5.8: Midland Place, Edinburgh, Scotland

Plate 5.7: Bnmland Place, Edinburgh, Scotland

Plate 5.6: Plastic repair followed by stone replacement.

Plate 5.5: Edinburgh, Scotland

Plate 5.4: Using lime-based stone mix in situ.

Plate 5.3: Replacement of damaged stone.

Plate 5.2: Roof tiles for Bnmland Place, Edinburgh, Scotland.

Plate 5.1: Reconnaissance of damaged limestone stones.

Plate 3.1: Medieval history. France.

Plate 3.2: Heritage sites of UNESCO World Heritage Site.

Plate 3.3: The Iconic Louvre Museum, Paris, France.

Plate 3.4: Development of Heritage buildings.

Plate 3.5: Successful management of historic environment.


Plate 3.7: Historic city. Malaysia.

Plate 3.8: Heritage site. Penang, Malaysia.

Plate 3.9: Heritage site. Penang, Malaysia.


Preface
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Manuscript

Thanks to the University of Malaya for their enduring support and patience while I worked on this manuscript. My gratitude is to my family, friends, and colleagues for their encouragement and support. I am also grateful to the Associate Dean of the Faculty of Built Environment, University of Malaya, for his support and guidance during the writing of this book.

With regard to current maintenance policies and practices, the book provides guidelines on sustainable building management, highlighting the importance of efficient and effective maintenance strategies. The book also discusses the role of technology in improving maintenance management.

The book concludes with a comprehensive review of maintenance management practices and provides recommendations for future research in the field.
Introduction
The environmental impact of building new schools is significant and cannot be ignored. According to the Ministry of Environment, the construction of a new school can result in a significant increase in greenhouse gas emissions and other pollutants. Therefore, it is crucial to address the environmental impact of new school construction.

To mitigate the environmental impact, the Ministry of Environment recommends the following measures:

1. Design buildings with energy-efficient features to reduce energy consumption.
2. Use sustainable materials and construction practices to minimize environmental impact.
3. Incorporate green spaces and natural elements to improve air quality and aesthetic appeal.
4. Implement water-efficient systems to reduce water usage.
5. Promote recycling and waste reduction practices to minimize landfill waste.

These measures can help reduce the environmental impact of new school construction and contribute to a more sustainable future. It is essential to incorporate these recommendations into the planning and design process to ensure that new schools are built in an environmentally friendly manner.
The increased conductivity of the building materials can improve the energy efficiency and reduce the transmission of heat loss and associated heat loss.

1. Cogeneration: the thermal building fabric and structural buildings are better at reducing energy consumption and improving the thermal performance of the building.

2. The use of energy-efficient systems: the building can be made more energy-efficient through the use of energy-efficient systems, such as the installation of energy-efficient windows and insulation systems.

3. The use of renewable energy sources: the building can be powered by renewable energy sources, such as solar panels or wind turbines.

Therefore, it is common practice in LCA to specify the embodied carbon in the building materials.

...
2009 show that heritage buildings have the capability to gain optimum energy efficiency by retrofitting to contemporary building codes (TAPRASE, 2009). In addition, the Energy Performance of Buildings Directive (EPBD) (2002/91/EC) requires all member states to ensure that all new buildings and major extensions to existing buildings meet certain environmental standards. This is to be achieved by a mandatory requirement for energy performance of new buildings and major extensions to existing buildings to be assessed by an energy performance certificate (EPC).

In order to make low embodied carbon expenditure on repair, maintenance, and replacement of building components possible, various maintenance strategies may exist to maintain the building’s energy performance. These strategies include the use of low maintenance materials, the selection of low embodied carbon materials, and the use of low embodied carbon components. Low embodied carbon materials are those that have a lower environmental impact during their production, manufacturing, transportation, and disposal compared to conventional materials. These materials include low embodied carbon concrete, low embodied carbon steel, and low embodied carbon polymers. This is significant in terms of environmental impact because of the efficiency of repair techniques in terms of environmental impact. The efficiency of repair techniques is a function of the materials used, and the effectiveness of repair techniques depends on the quality of the repair materials and the methodology employed. Therefore, a more efficient repair technique can lead to a reduction in environmental impact and cost. This book evaluates selected repair techniques for heritage buildings with a special emphasis on determining their environmental impact and cost.
For heritage buildings.

Chapter 7: Assessing and communicating building performance and sustainability

Chapter 8: Building performance and sustainability

Chapter 9: Building materials and building characteristics

Chapter 10: Building appearance and aesthetics

Chapter 11: Building structure

Chapter 12: Building services

Chapter 13: Building materials and building characteristics

Chapter 14: Building appearance and aesthetics

Chapter 15: Building structure

Chapter 16: Building services

Chapter 17: Building materials and building characteristics

Chapter 18: Building appearance and aesthetics

Chapter 19: Building structure

Chapter 20: Building services

Chapter 21: Building materials and building characteristics

Chapter 22: Building appearance and aesthetics

Chapter 23: Building structure

Chapter 24: Building services

Chapter 25: Building materials and building characteristics

Chapter 26: Building appearance and aesthetics

Chapter 27: Building structure

Chapter 28: Building services

Chapter 29: Building materials and building characteristics

Chapter 30: Building appearance and aesthetics

Chapter 31: Building structure

Chapter 32: Building services

Chapter 33: Building materials and building characteristics

Chapter 34: Building appearance and aesthetics

Chapter 35: Building structure

Chapter 36: Building services
WHAT ARE HERITAGE BUILDINGS?

This chapter provides an appreciation of problems and difficulties in the maintenance of heritage buildings.
as well as their ecological purpose. Their architectural, artistic, cultural and environmental values for the success of places which require conservation and preservation (Kavanagh 2006). Heritage buildings many comprises one or more premises, but also show our the historical fabric and consultation of that era. The buildings shown in Plate 1.3 and 1.4; heritage buildings are not only a record of their time, but also a record of the people who lived in them. According to the National Trust for Scotland (NTS), heritage buildings are defined as those which are places of special architectural or historic interest, which includes archaeological, cultural, or natural heritage buildings. These buildings are also recognized by law (CA 1997) and are covered by the terms of the Planning (Listed Buildings and Conservation Areas) Act 1990). In addition, they may also be a national or local landmark or have significant historical or architectural importance. Plate 1.5 shows the listed buildings and conservation areas (HLPA) in Scotland. The listed buildings are usually accorded statutory protection, e.g., the legislature.
Green Maintenance of Heritage Buildings: A Sustainable Repair Approach examines current maintenance perspectives and repair practices of heritage buildings, and evaluates the efficacy of repair techniques using the Green Maintenance model, which promotes sustainable and environmentally efficient solutions. Using case studies of heritage buildings in both tropical and cold climates, the author's testing of the Green Maintenance model demonstrates that the selection of repair options can be based not only on cost and philosophy of heritage building conservation, but also how 'green' repair techniques are.

The book covers key aspects of the maintenance of heritage buildings, from dilapidation and environmental impact to the integration of a Conservation Plan and sustainable repairs, suitably illustrated with photographs. It also offers sound advice to all those involved in sustainable repair, and serves as a useful resource in heritage building conservation.