

## حماية أخشاب المباني التراثية للمدينة القديمة غدامس, ليبيا

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### ملخص

ليبيا هي كنز من التراث والثقافات القديمة. تعد مدينة غدامس القديمة (OCG) إحدى مواقع التراث العالمي المسجلة من قبل منظمة اليونسكو و مثلاً رائعاً على التصاميم الهندسية الناجحة التي توفر الراحة الوظيفية والفعالية من حيث التكلفة بأسلوب فريد من نوعه في التصميم المعماري الغدامسي وتقنيات البناء التراثية. إلا ان ، لا يزال مستوى فهم حماية المباني التراثية في ليبيا محدود للغاية ، كما أن العديد من المباني التراثية تتعرض لخطر التدهور والذي يؤثر بدوره على القيمة العالمية البارزة (OUV) الخاصة بالمدينة القديمة في غدامس (OCG). علاوة على ذلك ، هناك نقص كبير في الأبحاث التي أجريت على المباني التراثية في ليبيا بشكل عام وفي OCG على وجه الخصوص. يهدف هذا البحث إلى توفير وتطوير إرشادات الحفظ الخاصة بإصلاح وحفظ الأخشاب لتلك المباني التراثية. تتضمن المنهجية المستخدمة في هذا البحث مراجعة الدراسات السابقة وتحليل دراسة الحالة. يستنتج البحث بعض المبادئ التوجيهية للحفاظ على الأخشاب المستخدمة في أسقف المباني التراثية السكنية في OCG. و أبرزها: يجب الحفاظ على الأخشاب جافة للحد من خطر تدهور الخشب نتيجة لهجوم الفطريات والحشرات. بالإضافة إلى ذلك ، يجب أن يتم فحص جميع المزاريب بانتظام. كما يجب استخدام الطلاء مثل الدهانات والورنيش والشموع والزيوت بانتظام لتحسين الأخشاب. كما وجد البحث أيضاً أنه يجب تطبيق الصيانة الدورية على الأقل كل ستة أشهر. ويجب فحص الخشب بانتظام. فإذا كانت الأخشاب غير قابلة للإصلاح يجب استبدالها بعنصر خشبي جديد يطابق الشكل الأصلي. يمكن استخدام نتائج هذا البحث لتحسين و تطوير قوانين تراثية جديدة يمكن لليبيا أن تأخذها في الاعتبار في الأطر القانونية الخاصة بمنطقة التراث المحمية وكذلك لتعزيز سياسات الحفظ وتحسين القيمة العالمية البارزة (OUV) الخاصة بـ OCG.

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lished by this research can assist management to achieve sufficient protection in the OCG. They offer suggestions for conservation of residential heritage buildings in the OCG and compatible new design to maintain buildings historic identity. The findings, i.e. timber conservation guidelines, have a positive impact on the OUV of the OCG. Timber conservation guidelines of residential heritage buildings of the OCG are a good tool to protect timber of those buildings. The absence of this tool leads to deterioration of these buildings which in turn affects the OUV of the OCG. There is a big problem if the OUV of the OCG is at risk, which in the end may lead to deletion the OCG from the World Heritage List. Accordingly, the findings of this research may enhance the OUV of the OCG.

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Based upon the above, the timber guidelines for residential heritage buildings of the OCG can be outlined in Table 6.12.

**Table 1: Proposed Timber guidelines for the RHB in the OCG**

Component	Item	(Proposed Timber Guidelines (PTG
<b>Timber</b>	Keeping timber	Keeping timber dry is very important to reduce the risk of wood deterioration as a result of an attack by fungus and insects. In addition, all spouts and gutters should be inspected regularly
	Coatings	Coatings such as paints, varnishes, waxes and oils should be used regularly to enhance timbers
	Routine maintenance	Regular maintenance should be applied at least every six months. Wooden should be inspected regularly. If they are beyond repair, replace them with a new wooden item that matches the original form

## 7. CONCLUSION

The main objective of this research is to provide and develop conservation guidelines for repairing and conserving timber of heritage buildings in the OCG. Based on the case study discussed in the previous context, some conclusions are drawn from this objective as follows:

i. Continuing use of local materials and methods of construction is a prerequisite to ensuring the city’s sustainability with emphasis on a) improving and upgrading them to overcome the inherent shortcomings and; b) transfer of traditional know-how from older to younger generations.

ii. With assured durability, conservation should be preferred to reconstruction as it is usually less costly and time saving.

iii. The research concludes some conservation guidelines and references for the conservation of timber residential heritage buildings in the OCG which are gazetted as national heritage buildings.

The findings of this research, timber conservation guidelines, help management to prevent the random works that have spread in the conservation projects of heritage buildings. Therefore, the conservation guidelines estab-

and floors in which the timber, made of palm trunks, is attacked by fungus and insects. Accordingly, the timber guidelines for the timber guidelines in the OCG should include:

“Keeping timber dry is very important to reduce the risk of wood deterioration as a result of an attack by fungus and insects. In addition, all spouts and gutters should be inspected regularly to determine any deterioration or failure” (Maitland City Council, 10 November 2018).

Additionally, the timber guidelines in the case of Maitland suggest using some coatings such as paints, varnishes, waxes and oils. Using of these coatings helps controlling swelling as well as protecting and enhancing timbers (Maitland City Council, 10 November 2018). As mentioned earlier that timber in the OCG suffer from some biological decay caused by fungus and insects. Therefore, these guidelines are suitable for the timber guidelines in the OCG. Then, the timber guidelines for residential buildings of the OCG should also include:

“Coatings such as paints, varnishes, waxes and oils should be used regularly to protect and enhance timbers” (Maitland City Council, 10 November 2018).

For the regular maintenance, the timber guidelines in the case of Maitland suggest that wooden items need regular maintenance and should be inspected every six months. Sub-floor spaces should be inspected for signs of rot and termites, and roof spaces for evidence of leaks which may lead to fungal growth. The guidelines suggest also replacement of deteriorated wood material with a new material that should be reconstructed in the original form of the damaged section so that the repair does not detract from the appearance of the original work (Maitland City Council, 10 November 2018). These guidelines are fitted for the residential heritage buildings of the OCG because they suffer from lack of the routine maintenance as it was indicated by the survey of the defects mentioned previously. Therefore, the timber guidelines in the OCG should also include:

“Regular maintenance should be applied at least every six months. Wooden items such as sub-floor spaces and roof spaces should be inspected regularly. If wooden items are beyond repair, replace them with a new wooden item that matches the original form of the damaged section” (Maitland City Council, 10 November 2018).



Figure 4: The Old City's Source Water  
Source: Municipality of Ghadames City, Libya

Qualitative comparative analysis is used in this research to the analysis of the case study, namely, the case of Maitland, Australia. The case study is explored and analysed to benefit from it to develop conservation guidelines for the timber of the residential heritage buildings in the old city of Ghadames.

## 6. ANALYSIS AND FINDINGS

As discussed previously, the case study: The city of Maitland, Australia is fitted for the derivation of the timber guidelines of residential heritage buildings in the OCG. The timber guidelines in the case of Maitland suggest to keep timber dry to reduce the risk of wood deterioration as a result of fungal rot, attack by borers and termites, and swelling and shrinkage cracking. To keep timber dry, the guidelines suggest to control and confirm that roof drainage, guttering and storm water drains are operating properly, and that surface sends off drained away from walls (Maitland City Council, 10 November 2018). In the residential heritage buildings of the OCG, there are some roofs

The case study chosen for this research was selected on the basis of the following considerations:

1. The success of the experience to resolve its problems, whereby the case chosen achieved considerable measures of success in its conservation activities but it also had to overcome myriad problems. Different conservation experiences have been observed and practiced successfully in the USA, Canada, the UK, Japan, Australia, Malaysia and Singapore (Nor Aini Yusof et. al., 2007).
2. There are some roofs and floors in which the timber, made of palm trunks, is attacked by fungus and insects. (See **Figure3**). According to A. Abufayed & A. Rghei (2005), water seepage from roofs, seepage of ground water from Ain Al-Faras (Source of Water- **Figure4**), water conveyance canals, and piped water cause some problems to roofs and floors. There are some roofs and floors in which the timber, made of palm trunks, is attacked by fungus and insects due to seepage of ground water from Ain Al-Faras, water conveyance canals, and piped water as well as high temperatures (**Figure4**).

Likewise this problem occurred also in Maitland, Australia. The case of Maitland suggests successful guidelines to overcome this problem. These guidelines adopted in Maitland can be developed to fit residential heritage buildings in the OCG.



Figure 3: Biological decay of palm in the OCG  
Source: Municipality of Ghadames City, Libya



Since late 1980s, several studies on the conservation of heritage building of the OCG have been undertaken with the assistance of the United Nations Development Programme (UNDP) and specialised United Nations Agencies (UNA) and other private or government entities. However, none of these studies have led to any concrete steps or conservation of heritage buildings in the OCG in translating the plans into specific actions (United Nations Development Programme and UNDP Office for Project Services, 2007).

Besides that there is a lack of expertise and specific conservation guidelines for residential heritage buildings in the OCG resulted of dilemma in the management of the municipality to preserve the residential heritage buildings. The level of understanding of the heritage buildings in Libya still remains very low. Without any documentation the beauty of the residential heritage buildings will be lost due to age factor and climate change. Lack of expertise in the maintenance of heritage buildings is also a source of beautiful heritage buildings are damaged or destroyed. There is a lack of technical knowledge to repair and maintain residential heritage buildings in the OCG. So far, no conservation guideline for preserving residential heritage buildings in the OCG has been established in spite of its importance to protect heritage buildings (Azzuz, 2000).

Based on the discussion above, the main issue of this research results from the lack of: (1) Studies conducted on conservation of heritage buildings in Libya, (2) expertise and specific guidelines for heritage buildings in the OCG, and (3) a fit system in force to discover and record the heritage buildings in Libya. Therefore, the current research attempts to suggest some conservation guidelines and references for the conservation of residential heritage buildings timber in the OCG.

## **5. METHODOLOGY AND DATA COLLECTION**

The data collected for this research includes the collection of secondary data. Namely, secondary data collected for this research includes all data gathered from research literature and case study. Literature review represents secondary data in this research. It is collected from different sources such as reference review and documentation published in journal, newspaper, manuscripts and patrols. Secondary data for this research is also gathered from case study. This research has made use of case study to develop conservation guidelines for timber of residential heritage buildings in the old city of Ghadames. The conservation guidelines are derived and developed from the case study: The city of Maitland, Australia (Maitland City Council, 10 November 2018).



## **2. Source: Municipality of Ghadames City, Libya** **THE RELATIONSHIP BETWEEN HERITAGE BUILDINGS AND CONSERVATION GUIDELINES**

Heritage buildings are existing buildings with significant cultural value to society. Existing buildings are subjected to processes of degradation with time, which leads to a situation in which they are not able to fulfil the purpose for which they have been built. Heritage buildings need an important tool to protect them. No protected heritage area will be secured over time without a supportive legal and policy framework (Lausche, 2011). Accordingly, conservation guidelines of heritage buildings are one of the proposed resolutions for protecting heritage buildings. Appropriate conservation guidelines usually serve as an important tool for the building conservators and building contractors. The absence of these guidelines leads inevitably to deterioration of heritage buildings. They must be created and developed to ensure that any important changes in conservation work are undertaken in the most ways possible to conserve the heritage structure's, historic character and features. Conservation guidelines prevent the random works that have spread in the conservation projects of heritage buildings. On this basis, conservation guidelines for developing and utilising these properties must be established.

The conservation guidelines are prepared to assist property owners, developers, architects and designers of projects. In other words, they are written to be used by the city planners, Landmarks Commission, architects and developers, and especially the property owners, tenants and construction trades who may be doing work on an older or heritage building in a city (Williams & Elmer, 2010).

### **3. THE OUTSTANDING UNIVERSAL VALUE (OUV) OF OCG**

A property must meet at least one of the criteria, the conditions of authenticity and integrity, as well as the requirement of protection and management (OG 2005, par. 78). These requirements which the heritage building must meet to inscribe it to the World Heritage List (WHL) are called the Outstanding Universal Value (OUV).

### **4. PROBLEM STATEMENTS**

There is a significant lack of researches conducted on the heritage buildings in the OCG in spite of its heritage importance. Although few studies were done in the old city and the modern city of Ghadames; however, none of them attempted to develop any conservation guidelines to protect the residential heritage buildings in the OCG in general and their timbers in particular. Some research studies were carried out by Chojnacki, (2003); Elwefati, (2007); and Nura S. et. al. (2006).

The Ghadames is lush with mud brick, stones, and gypsum materials, which are as whole, form the main construction materials in addition to palm trees and its derivatives. Therefore, Ghadamesians did not import them, but have developed their own local materials, and their own traditional methods to deal with them.

Many heritage buildings in the old city of Ghadames have decorative elements. **Figure 2** displays some interior wall designs and house decoration of the heritage houses. The interior space inside the residential heritage building in the old city is an artistic masterpiece. It is functional and culturally reflective of customs and traditions. The walls are heavily and brightly ornamented with mirrors, brass pots and weaved fabrics (**Figure 2**).



Figure 2: Interior wall designs and house decoration of the heritage houses

## 1. INTRODUCTION

This article attempts to provide and establish conservation guidelines for repairing and conserving timber of residential heritage buildings in the old city of Ghadames (OCG). The OCG was declared as a world heritage site by UNESCO in 1986 in recognition of its rich cultural heritage, preserved today in the city's unique and distinct architectural style, its highly organised social fabric and its attractive setting. **Figure 1** shows some examples of houses in the old city of Ghadames.



**Figure 1** : Some examples of houses in the old city of Ghadames

Source: Municipality of Ghadames City, Libya

The ability of Ghadames people to adapt to the harsh desert environment, and their reliance on local materials, reflected the skill of Ghadames craftsmen, and ensured the sustainability of the city more than a thousand years. (United Nations Development Programme and UNDP Office for Project Services, 2007).

# TIMBERS PROTECTION OF HERITAGE BUILDINGS IN THE OLD CITY OF GHADAMES, LIBYA

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## ABSTRACT

Libya is a treasure chest of heritage and ancient cultures. The old city of Ghadames (OCG), a UNESCO registered world heritage site, is an outstanding example of sound engineering practices providing comfort, functionality and cost-effectiveness in a uniquely Ghadamsi architectural style and traditional construction techniques. However, the level of understanding of the heritage buildings in Libya still remains very low and many heritage buildings are at risk from defects which in turn affects the Outstanding Universal Value (OUV) of the OCG. Furthermore, there is a significant lack of researches conducted on heritage buildings in Libya in general and in the OCG in particular. This research aims to provide and develop conservation guidelines for repairing and conserving timber of those heritage buildings. The methodologies used in this research include a literature review and analysis of case study.

The research concludes some conservation guidelines for the timber of the residential heritage buildings in the OCG; the most important of them were: Keeping timber dry is very important to reduce the risk of wood deterioration as a result of an attack by fungus and insects. In addition, all spouts and gutters should be inspected regularly. Coatings such as paints, varnishes, waxes and oils should be used regularly to enhance timbers. The research also finds that Regular maintenance should be applied at least every six months. Wooden should be inspected regularly. If they are beyond repair, replace them with a new wooden item that matches the original form. The research's findings may be used to identify new or strengthened legal elements that Libya should take into account in its protected heritage area legal frameworks as well as to enhance conservation policies and the OUV of the OCG.

**Keywords:** Libya, Old city of Ghadames (OCG), residential heritage buildings, conservation guidelines, Outstanding Universal Value (OUV).

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