



شبكة المعلومات الجامعية  
التوثيق الإلكتروني والميكروفيلم

# بسم الله الرحمن الرحيم



**MONA MAGHRABY**



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# جامعة عين شمس

## التوثيق الإلكتروني والميكروفيلم

### قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها  
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



### يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



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Faculty of archaeology  
Conservation department



# **Study of Various Deterioration Phenomena in Archaeological Stone Minbar, Its Causes and Treatment Methods**

## **Applied on a selected object**

Thesis presented for the fulfillment of M.SC in Conservation of Monuments

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## Background

Minbar is a raised platform in the front area of a mosque, from which sermons or speeches are given. The speaker walks up the steps and either sits or stands on the minbar while addressing the congregation. The minbar is usually made of carved wood, stone, or brick. The minbar includes a short staircase leading to the top platform, which is sometimes covered by a small dome.

Stone minbar is considered one of the most interested elements that back to Mamluk and Ottoman period. That often made of carved limestone, marble and alabaster. To understand the deterioration mechanisms firstly we must study lithology and petrography description of minbar building materials and realizing physical, mechanical and other properties of these materials.

Study of deterioration factors in addition to determination minbar building materials properties contributing to understand the nature of deterioration phenomena.

Evaluation of Physical and chemical Properties of proposed Reinforcement, Stabilization and Joining Materials, cleaning materials and methods and Consolidation, filling cracks and completion materials through an experimental study are very interested to have a satisfied results for carrying out an active conservation process.

Finally, conservation and preservation applications related to the present study depending on the previous studies to perform an effective conservation plan. Archaeological stony minbars has been affected the last conservation works which were not effective. Preventive conservation is considered the important method to protect such archaeological elements.

## **Key Words**

- **Carrara Marble**
- **Citadel of Salah Al-Din**
- **Nano-Lime**
- **Nano-Titanium**
- **Physical Properties**
- **Sariat El-Gabal minbar**
- **Stone minbar**
- **Ultrasonic Pulse Velocity**
- **Wacker OH 100**
- **Wrong Conservation**

# **Dedication**

I would like to dedicate this work to our deceased professor

**Mohamed Abd El-Hadi**

**To my parents, sisters, my wife and my daughter Hoor**



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## Objectives and Scope

The decision of selecting this study was extremely difficult since there is lack of studies for this important archaeological stony minbars. Minbars are considered one of important elements in Islamic mosques so this study aims at: -

- Revealing archaeological and atheistic importance of the stony minbars
- Studying the characteristics of stone and other building or construction materials of these minbars.
- Providing integrated information on disintegration mechanisms, quantification of disintegration characteristics and forms.
- Evaluating of proposed conservation strategy for such minbars which usually exposed to incorrect conservation works in the past.
- Evaluation of the modern materials for the conservation of the stone minbars, in particular the nano materials and nano compounds.
- Suggest new conservation strategy for the stone minbar.

## Summery

The present work deals with the study on various deterioration factors and novel materials used for conservation of stone minbar. the results of the present study are summarized in five chapters that are given as following: -

### **Chapter one: Archaeological and Technical Study of Archaeological Stone Minbars**

This chapter recognizes historical background of minbar, definitions and its importance as ritual furniture, symbolism and features. On the other hand, the second section of this chapter introduces the used technical and decoration techniques. It also sheds light on the most important samples of stone minbar in Egypt and all-over Islamic world.

### **Chapter Two: Physiochemical, Mechanical Properties of construction Materials of Archaeological Stone Minbars.**

This chapter deals with the physical, chemical and mechanical properties of construction materials of stone minbar. the methods of the investigations and analyses such as (XRF – XRD – PLM – DLM – SM – SEM – TEM) used to determine the composition of construction materials of stone minbar also for characterization of deterioration aspects.

### **Chapter Three: Factors and Mechanisms of Deterioration of Archaeological Stone Minbars**

This chapter presents the most important factors and its mechanisms of deterioration on stone minbar. The wrong conservation interventions are the most obviously factor.

### **Chapter Four: The Experimental Study of Archaeological Stone Minbars Materials**

In this chapter recognize the laboratory studies, as several experiments have been carried out to evaluate the efficiency of treatment materials. Many novel consolidants enhanced with nano materials proposed according to previous studies, before and after consolidation processes of aged specimens physical and mechanical properties characterized to choose the best and the most effective consolidant.

### **Chapter Five: Conservation of Sariet Al-Gabal Stone Minbar**

Stone minbar of Sariet Al-Gabal selected to apply the most effective enhanced consolidant with nano materials. the conservation intervention like cleaning, completion, insulation. we reduce the intervention to achieve good maintenance. Seleted area of minbar cleaned physically and chemically and consolidated to be approved to apply to all minbar.

# Table of Content

<b>Background</b> .....	II
<b>Key words</b> .....	III
<b>Dedication</b> .....	IV
<b>Acknowledgment</b> .....	VI
<b>Objective and Scope</b> .....	VII
<b>Summery</b> .....	VIII
<b>Table of content</b> .....	IX
<b>List of Figures</b> .....	XII
<b>List of Tables</b> .....	XVI
<b>Literature Review</b> .....	XVII

## **Chapter one : Archaeological and Technical Study of Archaeological Stone Minbars**

1. Introduction .....	1
2. The Minbar: Definition, Historical Background .....	1
3. The Minbar as Ritual Furniture, Symbolism and Features. ....	2
4. The History of the Function of the Minbar .....	4
5. The Symbolism of the Step .....	5
6. Friday Prayer Speech (The Khutba) .....	6
7. Technical and Decoration Techniques of Stone Minbar .....	6
7.1 Stander proportion of minbar .....	6
7.2 Construction materials and methods .....	8
7.3 Decorative elements of archaeological minbars.....	12
8. Some Example of Stone Minbars all over Islamic World.....	14
9. Stone Minbar in Egypt .....	16
10. References: -.....	18

## **Chapter Two: Physiochemical, Mechanical Properties of Construction Materials of Archaeological Stone Minbars**

2.1.Introduction .....	20
2.2.Lithology and Petrographic Description of Construction Materials .....	20
2.3.Chemical, Physical, Mechanical, Dynamic properties of Construction materials .....	22
2.4.Marble Quarries in Egypt.....	25
2.5.Examples of Historically Notable Marble Varieties and Locations:.....	27
2.6.Devices and Methods used to Determine Construction Materials Properties of Stone Minbar..	28
1) Visual examination.....	28
2) Digital light microscope .....	28
3) Stereomicroscope .....	28
4) Polarized light microscope (PLM) .....	29
5) Scanning electron microscope coupled with EDX unit.....	29
6) Transmission electron microscope (TEM) .....	29

7) X-ray diffraction.....	30
8) X-ray florescence .....	30
2.7.Characterization of Stone (Safia Queen - Sariat AlGabal) Minbar in Egypt .....	31
• Microscopic investigation.....	31
• Analytical characterization.....	33
2.8. Disscusion and Results .....	34
2.9.References .....	35

### **Chapter Three: Factors and Mechanisms of Deterioration of Archaeological Stone Minbars**

3.1. Introduction.....	37
3.2. Factors and Mechanisms of Deterioration of Archaeological Stony Minbars .....	38
3.2.1. Endogenous Factors: - .....	39
3.2.1.1. Defects of stone composition: - .....	39
3.2.1.2. Defects of employed stone: - .....	40
3.2.2. Exogenous factors.....	40
3.2.2.1. Mechanical factors.....	40
3.2.2.2. Physio-chemical factors: - .....	42
3.2.2.3. Human factors.....	50
3.2.2.4. Biological factors.....	50
3.3.Phenomena of Stone Minbar Deterioration .....	51
3.3.1. "Sugaring" or granural disaggregation of marble crystals.....	51
3.3.2. Deposits of air pollutants - Incrustations .....	51
3.3.3. Brown paint.....	52
3.3.4. Fractures, cracks and delamination.....	52
3.3.5. Disintegration and flaking .....	53
3.3.6. Failure of earlier conservation interventions .....	53
3.3.7. Biodeterioration .....	54
3.4.References .....	55

### **Chapter Four: The Experimental Study of Archaeological Stone Minbars Materials**

4.1.Introduction.....	59
4.2.Preparation of Samples and Consolidation Materials:.....	59
1) Marble samples:-.....	59
2) Proposed traditional and nanomaterials of consolidation process.....	60
4.3.Determination of physical properties.....	67
4.3.1. Determination of physical properties before consolidation process.....	68
4.3.2. Application of Consolidation processes for marble samples.....	71
4.3.4. Determination of physical properties after consolidation process.....	72
4.4.Mechanical properties stone samples.....	74
4.5.Examination and chemical analysis of consolidated samples.....	78
4.6. Reference.....	85

## **Chapter Five: Conservation of Sariat Al-Gabal Stone Minbar**

5.1 Introduction.....	88
5.2. History of the Mosque and Minbar of Soliman Pasha Al-Khadim.....	88
5.3. Documentation Works of Marble Minbar of Soliman Pasha Al-Khadem.....	90
5.3.1. Historical and architectural description of minbar of Soliman pasha Al-khadem.....	91
5.3.2. Documentation by (Photography- Autocad- Sketch Up).....	92
5.3.3. Deterioration aspects of the minbar of Soliman Pasha Al-Khadim.....	94
5.4. Conservation and treatment Processes of Minbar Soliman Pasha Al-khadim.....	100
5.4.1. Cleaning processes.....	101
5.4.2. Consolidation process.....	102
5.5. References.....	104
• <b><u>Conclusions and Recommendation</u></b> .....	105

# List of Figures

## **Chapter one : Archaeological and Technical Study of Archaeological Stone Minbars**

<b>Figure 1.1.</b> shows equation of golden ratio .....	7
<b>Figure 1.2.</b> proportion of minbar components and golden ratio in designing of minbar .....	7
<b>Figure 1.3.</b> the isolated footing under stone minbar.....	7
<b>Figure 1.4.</b> steps of creation and building stone minbar through project .....	12
<b>Figure 1.5.</b> first level of IGP classification. ....	13
<b>Figure 1.6.</b> complicated 10 -fold rosetta .....	13
<b>Figure 1.7.</b> a combination of the seven shapes of the stalactites, which decorate the entrance of minbars .....	13
<b>Figure 1.8.</b> shows complication and high accuracy of curving and interesting with details (minbar of ibn barqoq) .....	14
<b>Figure 1.9.</b> golden vegetable paints in back of door of (minbar sariet algabal).....	14
<b>Figure 1.10.</b> enameling with colored stone and marble in AK Sonkor minbar sides (a), vegetable decorations behind seat of Khateb in Ebn Parkok minbar (b) and Hollow marble motifs applied on sides of minbar of Safia queen.....	14
<b>Figure 1.11.</b> famous stone minbar in Islamic world (a) minbar of tillia kari (b) minbar of al-aqsa (c) minbar of Schafia mosque (d)minbar of Bayrakli mosque(e) minbar of Sulaymaniyah mosque(f) minbar of St. Sophia church .....	15
<b>Figure 1.12.</b> Show Sultan Hassan minbar (A), Ak-Sonkor minbar (B), shikho minbar(c) and remains of Al-khotiri minbars at Islamic Art Museum(D) .....	16
<b>Figure 1.13.</b> show examples of stone minbars such as (A) Safia queen minbar (B)Saryet Al-Gabal minbar (C)Mohamed Ali minbar (D) Al-Fath minbar .....	16

## **Chapter Two: Physiochemical, Mechanical Properties of Construction Materials of Archaeological Stone Minbars**

<b>Figure 2.1.</b> shows (A) white marble (B) micrograph of marble under polarizing microscope.....	21
<b>Figure 2.2.</b> Location of marble quarries ( M ) and factories( F ) in Egypt .....	26
<b>Figure 2.3.</b> cross thin section graph of marble samples collected from (A) Sariet AlGabal (B) Safia queen minbar, calcite and dolomite as principal minerals and exfoliation of sample structure.....	32
<b>Figure 2.4.</b> shows cross- thin section under stereo microscope explain substrate formation and its thickness.....	32
<b>Figure 2.5.</b> micrograph of SEM of sample .1 shows the impact of thermal expansion on the crystals of calcite.....	32
<b>Figure 2.6.</b> micrograph of SEM of sample .2 shows the presence of salts crystalline on sample surface.....	32
<b>Figure 2.7.</b> the elemental composition of the investigated marble sample.1 by EDX , such as Ca, Mg, C, O andSi.....	33
<b>Figure 2.8.</b> the elemental composition of the investigated marble sample.2 by EDX, such as Ca, Mg, Na, C, Al and S...33	33
<b>Figure 2.9.</b> XRD pattern of investigated marble sample .1 such as calcite (80.2%) and dolomite (19.8%) .....	34

## **Chapter Three: Factors and Mechanisms of Deterioration of Archaeological Stone Minbars**

<b>Figure 3.1.</b> microcracks generated by chisels work .....	40
<b>Figure 3.2.</b> shows stress caused by traffic.....	42
<b>Figure 3.3.</b> sharp change in temperature during noon period.....	44
<b>Figure 3.4.</b> the maximum temperature recorded during 2018 and the high temperature through summer .....	44
<b>Figure 3.5.</b> shows the average degree of temperature .....	44
<b>Figure 3.6.</b> annual RH degree changes for four years .....	46
<b>Figure 3.7.</b> explain steps of reaction between building materials and atmospheric pollutants.....	48
<b>Figure 3.8.</b> Five-year monthly averaged concentrations for the four representative stations for .....	49
<b>Figure 3.9.</b> the presence of sugaring aspect in behind cornice above door minbar Sariet AlGabal .....	51
<b>Figure 3.10.</b> the dust crusts that discolored the marble surface of Safia queen minbar .....	52
<b>Figure 3.11.</b> the brown patina due to polishing marble surface with bad varnish applied on minbar of Sariet Al-Gabal..52	52