

An Experimental Study to Evaluate Alternative Supports Used for the Treatment of Archaeological Marble Mosaics

Researcher. Rabea Radi Abdel Kader

Researcher and General Manager of Presidential Museums and Palaces Restoration

Authority – Ministry of Antiquities- Egypt.

Dr. Shaimaa Sayed Mohamed El – Sayed

Lecturer, Conservation Department, Faculty of Archaeology, Luxor University, Egypt.

Egyptianconservators2013@gmail.com

Abstract:

The study included the following points:

1- An Introduction:

A- Mosaics ' history and origin:

Mosaics appeared in ancient Iraq in the Warka area in southern Iraq in the form of wall cladding, where the earliest evidence of the wall mosaic dating back to the Sumerian era, was made of clay burned pieces of various sizes, where artists excelled in the formation of scenes of these forms by fixing the pieces on a surface covered with bitumen, the implementation in this manner is more pronounced than similar scenes recorded on stone slabs. The ancient Egyptian knowledge of the style of mosaics was proved by the monuments found in Saqqara, which dates back to the First Dynasty, made of black stone and inlaid with alabaster models, as well as some walls and claddings in the corridors of the southern tomb of King Djoser of the Third Dynasty.

The development of mosaic art in the modern state, especially in the era of Akhenaten, as well as the late times as it was during the reign of King Senusense I, where he found a gold dish decorated with mosaic shells from the center and is currently in the Egyptian Museum in Cairo, the mosaics in the Greek, Greek and Roman era For the Byzantine, we find that they used it as a wall cladding as well as floors, and in the Greek era they used mythology and images as represented by many models of the Greco-Roman Museum in Alexandria, as well as the images of the Greeks forms and superstitious persons and overlapping geometric decorations.

In Roman and Greek periods, portraits of daily life were painted in mosaic style with meticulous quality, Mythological subjects, Satyrs, Nymphs, and Landscapes.

B- Deterioration factors of the archaeological marble mosaics and compulsive cases that require their detachment:

1- Where the walls bearing the ancient marble mosaic are likely to fall in the case of the wall mosaic, and there is no other possible treatment for these walls.

2- When an archaeological building containing an archaeological mosaic is not adequately protected from the risk of earthquakes, floods or wars, there is therefore grave danger if left in place.

3- When there is a permanent source of moisture inside the archaeological building, such as: ground water, and its extreme impact on the destruction of mosaics of the floor as well as mural.

- 4- When there are paintings above paintings that are removed due to previous eras.
- 5- The removal process is also carried out when major national projects, such as the High Dam, are transferred and the temples of Abu Simbel and Amada.

C- Examples of archaeological marble mosaics detachment all over the world.

D- The required cautions before mosaics detachment.

E- The most important international charters which involved the detachment of archaeological marble mosaics.

F- The implementation methods of mosaics alternative supports.

G- Alternative supports types (traditional and modern supports).

2- Materials and methods:

It is based on the experimental study on some traditional and modern alternative supports for archaeological marble mosaics, where cubes of alternative supports of both types were prepared size $5 \times 5 \times 5$ cm, and subjected to many experiments and studies to measure the physical and mechanical properties and the best statement, to be applied to the marble mosaic which was detached due to the damage of the original support.

A- Traditional alternative supports preparation:

- 1- Gypsum support.
- 2- Lime support.

B- Recent alternative supports preparation:

- 1- Honey comb support.
- 2- Glass fibers support.
- 3- Fire Coremat Support.

C- Measurement of physical and mechanical properties of traditional and modern alternative supports:

- 1- Density.
- 2- Porosity.
- 3- Water absorption.
- 4- Compressive strength.

3-Results:

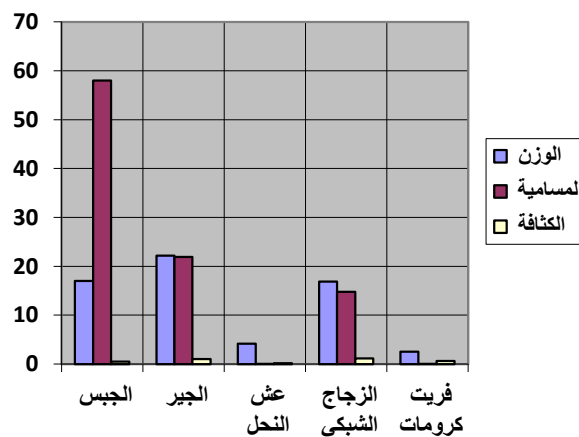


Figure 1: Graph of weight, porosity and density values of alternative supports.

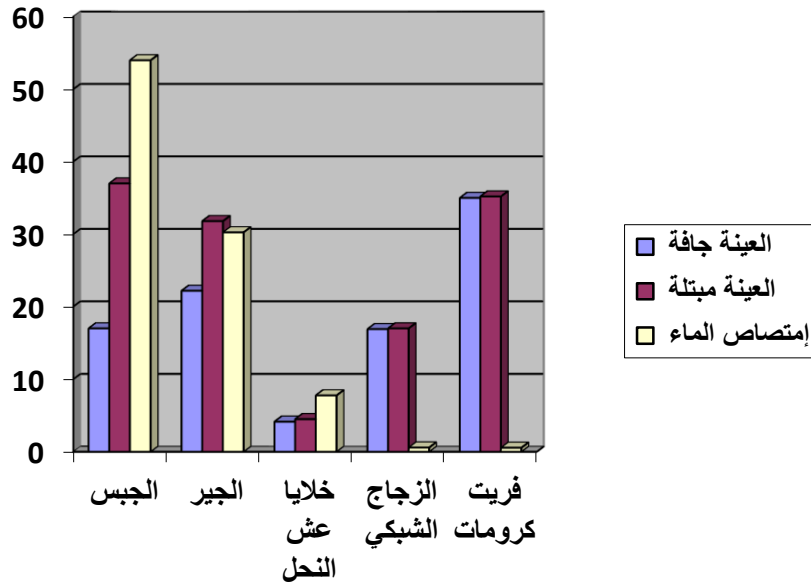


Figure 2: Graph of water absorption values of alternative supports.

Table 1: Compressive strength values of the selected alternative supports

Compressive strength (Kg/Cm ²)	Support
5	Gypsum
8	Lime
21.8	Honey comb
29	Glass fibers
100	Fired coremat

4- Discussion:

By examining the different physical and mechanical properties of traditional and modern alternative supports for application to the deteriorated archaeological marble mosaics, it is clear from the following:

A- The incompatibility of the traditional supports, namely gypsum and lime, for application to the archaeological marble mosaics, due to the high porosity and water absorption rates and the low compressive strength values, in addition to the high weight of the support.

B - Fired Coremat support is the best among modern alternative supports, it has recorded the best results in measuring all the physical and mechanical properties, followed by the support of synthetic resin and reinforced with glass fibers (Fiber glass), and then honey comb support.

Thus, from the above it is clear that the best support for the application of the archaeological marble mosaic (Fired Coremat support).

5- Conclusion.

6- Acknowledgment.

7-References:

- 8- (1) بظاظو، إبراهيم وآخرون، تطور فن الفسيفساء، معهد مادبا لفن الفسيفساء والترميم، الأردن، 2008.
- 9- Bazazo, Ibrahim wa akharon, Tator fan el phosiphisa, Mahad Maadaba li Fan el phosiphias wal tarmim, Jordon, 2008.
- 10- (2) حسن، إبراهيم، وسائل وأساليب ترميم وصيانة الآثار ومقتنيات المتاحف الفنية، عمادة شؤون المكتبات، الرياض، 1979.
- 11- Hassan, Ibrahim, Wasel wa asaleeb tarmim wa sayant el athar wa moktaniat el Mataheef alfaneea, Emadat shoaon al maktabat, El-Reiad, 1979.
- 12- (3) Sease, C., Conservation of wall paintings in "Conservation manual for the field archaeologist", institute of Archaeology, Los Angeles, 1994.
- 13- (4) عمران، هزار - دبورة، جورج، المباني الأثرية ترميمها وصيانتها والحفاظ عليها، وزارة الثقافة، دمشق، 1997.
- 14- Omran, Hizar – Dabora, George, El mabany al atharia tarmimaha wa sayantah wa el-hefaz aliha, wezart el thaqafah, Damascus, 1997.
- 15- (5) شاهين، عبد المعز، ترميم وصيانة المباني الأثرية والتاريخية، مطابع المجلس الأعلى للآثار، القاهرة
- 16- ، 1994.
- 17- Shaheen, Abdel Moez, Tarmim wa sayant el mabany el atharia wal tarekhia, matabaa el magless el alaa le athar, Cairo, 1994.
- 18- (6) Innemee, C.K., A Newly discovered mural painting in Deir al- Surian (in) Eastern Christian Art- in its late Antique and Islamic Contexts- ECA1-PEETERS-LEUVEN,2004.
- 19- (7) علي، منى فؤاد، ترميم الصور الجدارية، مكتبة زهراء الشرق، القاهرة، 2003.
- 20- Ali, Mona Fouad, Tarmim el Sowar el gedareeha, maktabet zahraa el sharq, Cairo, 2003.
- 21- (8) بظاظو، إبراهيم وآخرون، الخرائط وأهميتها في الترميم والصيانة، معهد مادبا لفن الفسيفساء والترميم،
- 22- الأردن، 2008.
- 23- Bazazo, Ibrahim wa akharon, El Khareet ahamitaha fi el tarmim wa al sayanah, Mahad Maadaba li Fan el phosiphias wal tarmim, Jordon, 2008.
- 24- (9) بظاظو، إبراهيم وآخرون، التعامل مع المناطق الأثرية المحتوية على الفسيفساء، معهد مادبا لفن
- 25- الفسيفساء والترميم، الأردن، 2008.
- 26- Bazazo, Ibrahim wa akharon, El Taamol maa el manatek al atharia el mohtaweea al phosiphisa, Mahad Maadaba li Fan el phosiphias wal tarmim, Jordon, 2008.
- 27- (10) بظاظو، إبراهيم وآخرون، تقنيات توثيق الأرضيات الفسيفسائية، معهد مادبا لفن الفسيفساء والترميم،
- 28- الأردن، 2008.
- 29- Bazazo, Ibrahim wa akharon, Teknayat tawotheek al ardeet al phosiphisaeaa, Mahad Maadaba li Fan el phosiphias wal tarmim, Jordon, 2008.
- 30- (11) Anmis, S.B., Conservation and restoration of the wall painting transferring "in "The conservation of cultural property", UNESCO Press, Rome,1995.
- 31- (12) علي، منى فؤاد، مرجع سابق، 2003.

- 32- Ali, Mona Fouad, Margeea thabeek, 2003.
- 33- (13)"International charter for the conservation and restoration of monuments and sites (The Venice charter 1964).
- 34- (14)"ICOMOS principles for the preservation and conservation – restoration of Wall paintings, Zimbabwe, 2003.
- 35- (15) عبد المنعم، منال، الحوامل البديلة وإستخداماتها في إعادة عرض اللوحات الجدارية المنزوعة، رسالة دكتوراة، قسم الترميم، كلية الآثار، جامعة القاهرة، القاهرة، 2008.
- 36- Abdel Moniem, Manal, El Hawameel el Badeelah wa estkhdemateha fi eadaat araad el lawhat el gedareeh el manzooah, resaleet doctorah, qesm el tarmim, kolyat el athar, gameet el Kaheera, Cairo, 2008.
- 37- (16) علي، منى فؤاد، المرجع نفسه، 2003.
- 38- Ali, Mona Fouad, El margea nafsooh, 2003.
- 39- (17) زكريا، وائل، دراسة تحليلية لترميم الفسيفساء الأرضية البيزنطية، رسالة دكتوراة، قسم الترميم، كلية الآثار، جامعة القاهرة، القاهرة، 2010.
- 40- Zakaria, Wael, Derassah tahleeleh li tarmim al phosiphisa al ardeeah el byzanteeah, resaleet doctorah, qesm el tarmim, kolyat el athar, gameet el Kaheera, Cairo, 2010.