

The Conservation of the Mosaic Floor of Swaifieh Church, Amman, Jordan

*Mahmoud Arinat **

ABSTRACT

This paper aims to describe the conservation of the mosaic floor of the Swaifieh church in Jordan, which is one of the few remaining byzantine mosaics in Amman region. The mosaic was discovered in 1970. Since then the mosaic floor has been exposed to the different deterioration forms such as lacunae, incrustation, depressions, swelling, detachment between preparatory layers, salt efflorescence, and biological activity. The study confirms that it is necessary to conserve the mosaic floor in order to avoid further damage.

The conservation activities carried out on the mosaic floor included documenting the mosaic by photographs and drawings, replacement the cement from lacunae and filling lime mortar, consolidating the mosaic edges and the preparatory layers with lime mortar, mechanical cleaning and replacement of the old shelter plates with new one to avoid rainwater from reaching inside the building.

Keywords: Mosaic, Conservation, Documentation, Consolidation, Lime-mortar, Tesserae.

Introduction

Swaifieh is a low-lying *tell* located about half a kilometer south of Wadi Seer Road between Amman and Wadi Seer (Fig. 1).

The excavation on the *Tell* started in 1970 by the American Center for Oriental Research (ACOR) with the cooperation of the Jordanian Department of Antiquities (DOA) under the directorship of Dr. Bastian Van Elderen. However, excavation results indicated that this site has been settled during Roman, Byzantine and Islamic periods.

When the entire preserved area of the mosaic floor was uncovered, it was possible to identify the floor as part of a byzantine church.

The mosaic covered the floor of a rather atypical byzantine church, which had a single internal chamber, rather than the usual arrangement of a nave separated from two side aisles by colonnades. Traces of structures along the north and west walls may have been rooms used by the clergy (Fig. 2) (Van Elderen, 1970).

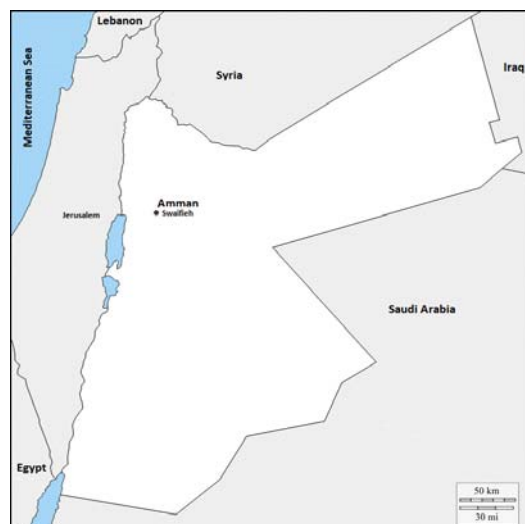


Figure 1. Map of Jordan showing the location of Swaifieh

* Department of Cultural Resources Management and Conservation, School of Archaeology and Tourism, The University of Jordan. Received on 19/3/2018 and Accepted for Publication on 18/3/2019.

In the eastern edge of the mosaic was a Greek inscription of two lines, the preserved text reads" In the time of the holy Thomas, Bishop.....of the holy church, with zeal and labors....."

A comparison of the designs and techniques in the mosaic with other dated mosaic in the Madaba area would date this church in the sixth century A.D.(Piccirillo, 1993;Azar,1980).

The mosaic floor of Swaifieh was discovered in 1970. The mosaic floor is one of the few remaining byzantine mosaics in Amman region.

Only the northern half of the mosaic floor is preserved. The outside measurement of the mosaic floor are almost 9.5 meters by 5 meters.

The rectangular field is surrounded by an acanthus border with foliate heads in the corner scrolls. The other scrolls are filled with a variety of birds and animals; these include two gazelles and a dog barking at a wild boar. A hare, a deer, a bull, guinea-hen and two aquatic birds are also depicted.

Within the border, two vine shoots issue from an amphora placed on the west side; six rows of vine scrolls fill the field. A fantastic wild beast faces the amphora. In the second row, a young man leading a donkey with a basket of grapes; in the third row, a bearded camel driver transports stones for construction. In the fourth row, a horned animal is showed near a shepherd leaning on his staff, and in the fifth row, there are a horse and a hunter with a bow in his hand. A gazelle facing an eagle with spread wings closes the composition to the east. The surround between the central carpet and the walls is decorated with floret crosses and diamonds. Outside the eastern border of the mosaic floor, a two line inscription mentions the name of Bishop Thomas. At the western end of the mosaic floor two pheasants face a tree. This appears to have been in the entrance of the church and a few stones of the threshold were found at the edge of the mosaic(Fig. 3) (Piccirillo, 1993; Azar, 1980; Van Elderen, 1970).



Figure 2. General View of the church with shelter



Figure 3.General view of the mosaic floor

The mosaic floor was lifted and relayed on a new bedding layer *in situ* in 1995. After this major intervention was performed, there is no conservation and maintenance works took place until 2017.

This paper describes the *in situ* conservation of the mosaic floor of Swaifieh church in Jordan. The conservation process included documentation, condition assessment, cleaning, consolidation and treatment of lacunae.

The aforementioned activities were carried out after 22 years from the last intervention.

In the past, mosaic lifting as a conservation method was a common practice, cement was advocated as a material for conservation, as well as documentation was lacking.

Numerous studies performed in mosaic conservation have stated the importance of preserving mosaics in their original context. In addition, international charters have stated the importance of preserving monumental artifacts *in situ*.

According to research done by Getty Conservation Institute (GCI) affirmed that the lime-based hydraulic injection method is the most suitable for consolidating the mosaic (GCI, 2013).

The documentation is today recognized as an essential tool for the development of a strategy that aims at the conservation and long-term protection of cultural heritage. Nardi (1996) reported that the documentation continues throughout the interventions, entering the operations carried out and the areas treated and will go throughout maintenance.

According to Nardi (1996) the conservation process includes the following steps: documentation and study; actual treatment and other steps taking for protection.

PREVIOUS INTERVENTIONS

The first activity to preserve the mosaic was conducted in 1970, the interventions include the edging repair with cement and restoring of lacunae through fillings with cement and randomly with original tesserae. In 1970, a new shelter was built over the mosaic. The shelter has been in position for about 47 years (Fig.2).

In 1995, the mosaic was lifted and re-laid over a new bed and put back *in situ*, using the flowing method:

The first action carried out on the mosaic floor has been the cleaning of the entire surface by chisels and scalpels to remove incrustation. As well as the cement which used in the previous interventions in edging repair was removed in order to facilitate the lifting process. Injection grouts using *Palapond* were used in some areas of the mosaic which showed swellings.

The mosaic was divided into sections. Two layers of textile were glued with PVA glue over the various sections of mosaic. The lifting was carried out using big chisels, hammers, and metallic pincers (Fig. 4). All the mosaic sections were numbered. After the lifting, the mosaic sections were located upside-down over wooden boards, in order to facilitate the cleaning of their back. After the cleaning of the back of the mosaic by chisels and hammers, the ancient mosaic layers were removed until arrived to the last layer (*statumen*) The relaying of the mosaic was carried out using mortar made of quartz, cement, and hydraulic lime in ratio of (1,5:1:1).The textiles over the mosaic sections, used to lift them, were then removed and the surface has been cleaned(Fig. 5) (Hunaiti ,1995).



Figure 4. Lifting the mosaic (Hunaiti ,1995)



Figure 5. Relaying the mosaic (Hunaiti ,1995)

conservation steps

Condition Assessment

Condition assessment is a fundamental component in establishing sound conservation programs, based on accurate priorities of intervention (Steward, 2011).

Nearly half of the mosaic was already lost before it was discovered, it could have been destroyed in antiquities. Also the mosaic floor its self was found covered by thin plastic sheet (Fig.6). Despite the protection, the mosaic floor suffering from various deteriorations forms. These deteriorations are presented in the next paragraphs.



Figure 6.The plastic sheet over the mosaic

The mosaic floor shows a number of lacunae in some areas of the mosaic were filled with black cement mortar to the level of *tessellatum* in the previous intervention(Fig.7). Moreover, areas which had been probably redone in the past were easily detected on account of the fact that the *tesserae* had been set without following the original *andamnato*(Fig.8).

Only a few areas of the mosaic affected by the phenomenon of depression, especially in the northeast corner (Fig.9). The mosaic also affected by different forms of swellings, which concentrated in the area beyond the main entrance. This condition is associated with the new bedding layer in cement, which produced swellings and depressions.

To assess the state of mosaic layers, manual percussion and rubber hammer were used. This examination has been detected that many areas of the mosaic have affected by deferent level of detachment between its layers, which can probably be related to percolation of the rainwater coming from the roof and affected the foundations layers especially the cement layer which used in the past intervention. In addition, only a few tesserae are affected by the phenomenon of disintegration.

Furthermore, various cracks are clearly visible in some areas of the mosaic surface, especially in the area near the Greek inscription, which may also penetrate into its bedding layer(Fig.10). Cracks can be induced by water infiltration and thermal expansion and contraction of the cement base into which the mosaic laid(Roby et al; 2010; GCI,2012).



Figure 7.Lacuna filled with cement

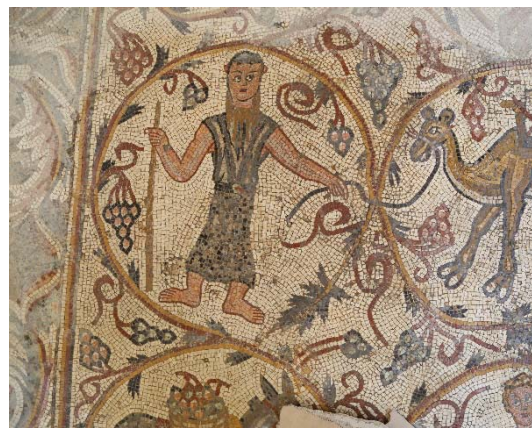


Figure 8.Lacuna filled randomly with original tesserae



Figure 9. Depression



Figure 10. Cracks

After the removing of the plastic sheet, green algae growth and white powdery salt efflorescence were evident on the *tessellatum* (Fig. 11 and 12). These phenomenon are associated with the percolation of rainwater coming from the roof. However, all of them were easily removable by hand tools, brushes and water.

The whole mosaic surface was covered with different forms of incrustations (Fig. 13). Some of them were a thick hard white mineral crust, the others were in form of dirt and soil. Also there are some areas of the mosaic surface were obscured by black cement used in the previous interventions to fill the lacunae and to fix the border of the mosaic and was not cleaned. This greatly effects on the aesthetic of the mosaic (Fig. 14). This is result of poor workmanship during the relaying of the mosaic.

In the joints and the surface of individual tesserae there were visible remains of the old glue which was not completely removed after the relaying of the mosaic.

Visual examination of the tesserae established various forms of deterioration such as fracture, exfoliation, pitting and eroding (Fig. 15). Moreover, permanent color alterations were also presented in some areas of the mosaic, especially in white tesserae, it was probably caused by ancient fire (Fig. 16).

Finally, rust stains and bird droppings were observed in a few areas of the mosaic.



Figure 11. Microorganism



Figure 12. Efflorescence

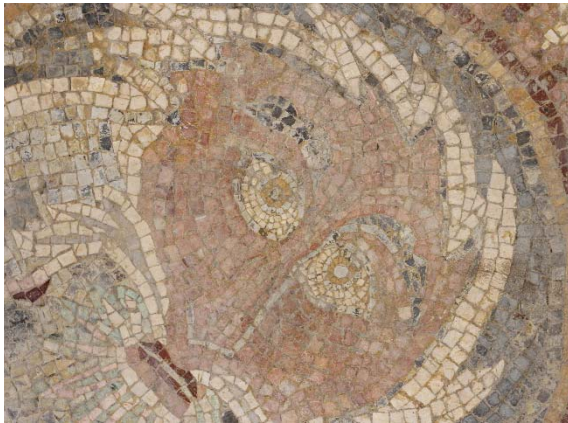


Figure 13. Incrustation



Figure 14. Cement over the mosaic surface



Figure 15. Tesserae deterioration(eroded tesserae)



Figure 16. Color alteration (fire damage)

Most of these conditions are either directly or indirectly related to the water infiltrations from the current shelter. The holes and cracks are visible in many of the shelter plates(Fig. 17). This condition allows rainwater to infiltrate through into the mosaic. It was noticed a concentration of water in many areas of the mosaic especially in the southwest corner. Furthermore, the spaces and gaps between plates are sufficiently large to allow birds to enter to the building.

Moreover, the salt efflorescence observed on the mosaic surface indicates that water is getting through the cement bedding layer and the fact that, salt crystalizes in the micr-cracks of the mortar and the tesserae, and with expansion leads to cracking and major damage to all layers of the mosaic. This occurs because of the ability of the cement to attract and retain moisture(Santopuoli et al; 2012; Zizola, 2008; Ugriyol, 2013).

These bad conditions caused many problems to the mosaic, which need urgent intervention.



Figure 17. Holes and gaps in the roof

Documentation

In mosaic conservation, documentation is an indispensable instrument, it provides a better understanding of a mosaic and its condition before work is begun, and makes it possible to record all the conservation intervention carried out on the mosaic (Cobau and Nardi 2011; GCI, 2011; De Felice, 2005).

For these purposes and after cleaning the mosaic surface by using just water and plastic brushers, the mosaic was photographed from the same height, square by square, and then re-assembling these photos using Photoshop in order to developing base map. All observed deteriorations and conservation steps were photographed and marked on this map. Also, the entire mosaic floor has been drawn on scale 1:1 over polyethylene sheets (Fig. 18). A general view of the mosaic was taken before and after conservation using digital camera (Fig. 19 and 20).



Figure 18. Documentation



Figure 19.The mosaic floor before conservation



Figure 20.The mosaic floor after conservation

Cleaning

The first action carried out on the mosaic has been the cleaning of the entire surface by brooms and brushes. This action aims to clear them from dirt and dust accumulated in order to enable better assessment of the mosaic's condition (GCI, 2011; Montana et al; 2018).

Mechanical cleaning with scalpels and small chisels were used to remove the incrustations. This operation has been carried out after wetting the surface with distilled water (Fig.21).

To remove the previous restoration cement and mortar from the surface, mechanical method was used by light scalpel, chisels and a hammer (Fig.22). The operation started brushing up the mosaic surface with water to increase the hardness of the cement layer. For cleaning away the remains of the glue and the rust stains it was enough the use of blades.

Lacunae Treatment

The lacunae were treated by removing the cement which was used in the past interventions, and then the lacunae filled with mortar made of hydraulic lime, limestone powder and marble powder in 1:1:1 proportions (Fig.23). Before the use of mortar, a several of mortar samples in different ratio were prepared in order to select the appropriate one.

Consolidation

In order to consolidate the mosaic layers where voids and detachment occurred, injection grouts method where used. The aim of this intervention is to improve the mechanical endurance of the mosaic and its chemical resistance (Arinat, 2014; GCI, 2013; Mora, 1986).

Fluid mortar made of hydraulic lime, limestone powder and marble powder in ratio of 1:1:1 were used for this treatment.

The voids and the detached areas where detected and marked, then one or two tesserae where removed in order to create access points. Then a small hole was made using long slender chisels. The hole was wetted by injection a mixture of alcohol and water, and finally fluid mortar was injected using a syringe. The removal tesserae where put back in their original location (Fig.24).



Figure 21. Mechanical cleaning



Figure 22. Cement removal with chisel and scalpel



Figure 23. Filling the lacuna with lime mortar



Figure 24. Consolidation by injection of lime mortar

Interventions around the mosaic

Because the shelter plates are noticeably old and require replacement. It was necessary to replacement the old plates with new one, to avoid rainwater from reaching inside the building.

CONCLUSION

The mosaic floor of Swaifieh church is very important, because this mosaic is one of the few remaining byzantine mosaics in Amman region. The long period of exposure of the mosaic floor to the different deterioration forms led to poor preservation condition. So, the implementation of the conservation interventions were essential to avoid a lot of damage. For this purpose, a serious of interventions were carried out in order to preserve the mosaic floor. These *in situ* conservation works generally consisted of documentation, condition assessment, consolidation, cleaning and treatment of lacunae.

Moreover, the study confirms that the most deterioration forms related to both the current shelter and the new bedding layer in cement.

Finally, in order to preserve the restored mosaic, a regular maintenance program of the shelter and the mosaic floor is necessary.

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صيانة وترميم الأرضية الفسيفسائية في كنيسة الصوفية، عمان، الأردن

محمود عرينات *

ملخص

تهدف هذه الدراسة إلى وصف أعمال الصيانة والترميم التي تمت على الأرضية الفسيفسائية في كنيسة الصوفية في الأردن، التي تعدّ واحدة من الأرضيات الفسيفسائية البيزنطية النادرة في منطقة عمان. تم اكتشاف الأرضية الفسيفسائية عام 1970. منذ ذلك الوقت تعرضت الأرضية الفسيفسائية إلى أشكال مختلفة من التلف مثل الثغرات، والترسبات، والهبوط، والانتفاخ، وانفصال ما بين الطبقات الداعمة، وتزهر الأملاح ونمو الكائنات الحية الدقيقة. تؤكد الدراسة على أنه من الضروري القيام بأعمال الصيانة والترميم لهذه الأرضية الفسيفسائية وذلك لتفادي المزيد من التلف. حيث تضمنت أعمال الصيانة والترميم هذه على توثيق الأرضية الفسيفسائية باستخدام التصوير الفوتوغرافي والرسم، وإزالة الإسمنت من الثغرات واستبداله بالملاط الجيري لسد الثغرات، وتدعيم أطراف الأرضية الفسيفسائية والطبقات الداعمة باستخدام الملاط الجيري، والتنظيف الميكانيكي، بالإضافة إلى استبدال سقف غطاء الحماية واستبداله بجديد وذلك لتفادي وصول مياه الأمطار إلى الأرضية الفسيفسائية.

الكلمات الدالة: فسيفساء، حفاظ، توثيق، تدعيم، ملاط جبيري، مكعبات فسيفسائية.

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