

# Illustrated Glossary

## Technician Training for the Maintenance of In Situ Mosaics



The Getty Conservation Institute



Institut National du Patrimoine



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## Technician Training for the Maintenance of In Situ Mosaics

The Getty Conservation Institute, Los Angeles  
Institut National du Patrimoine, Tunis

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The Institut National du Patrimoine of Tunisia is a governmental and administrative institution with civil and financial autonomy. It works under the aegis of the Ministry of Culture and Protection of Heritage. The Institute's mission is both scientific and technical, and focuses on the inventory, study, protection, and presentation of the cultural, archaeological, historical, human, and artistic heritage of Tunisia.

MOSAİKON is a partnership of four institutions: The Getty Conservation Institute, The Getty Foundation, ICCROM, and ICCM. The aims of the project are to strengthen the network of professionals concerned with the conservation, restoration, maintenance, and management of mosaic heritage in the southern and eastern Mediterranean region; provide training to a variety of individuals involved in mosaics conservation and, more generally, with the management of archaeological sites and museums with mosaics; work with national and international bodies to provide a more favorable legislative, regulatory, and economic environment for the conservation of mosaics in the Mediterranean; and promote the dissemination and exchange of information.

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# INTRODUCTION

## **Definitions of terms used for the documentation of in situ mosaics**

The objective of this glossary is to establish a common vocabulary for the documentation of construction techniques, previous interventions, mosaic condition and current interventions carried out on a mosaic. The glossary is illustrated with photographs and drawings to make the definitions more clear.

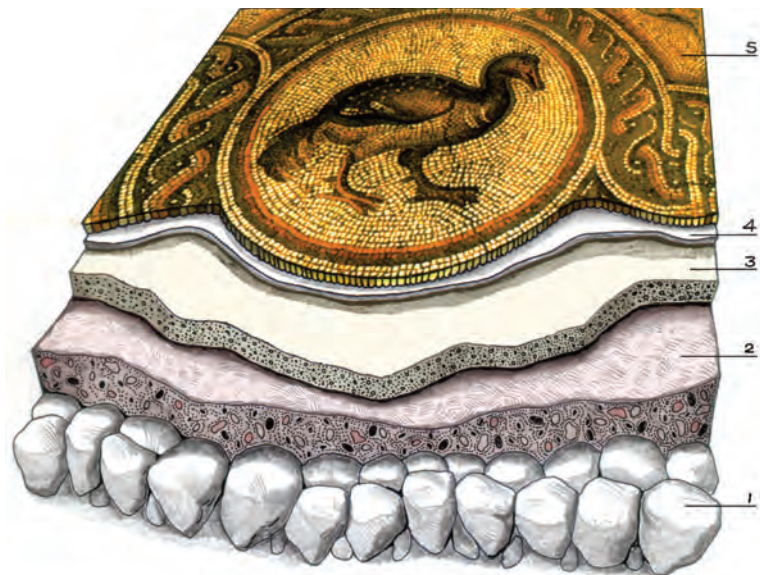
For the identification of mosaic construction techniques, a reference stratigraphy is provided and the most common types of mosaic floors are presented.

Terms pertaining to mosaic condition have been divided into four categories: structural deterioration, surface deterioration, presence of bio-deterioration agents and deterioration of interventions. This glossary has been developed to achieve consistent and objective recording. The written descriptions do not refer to the causes of deterioration, but only to the visual evidence observed on site.

For the current interventions section, illustrations have not been supplied to clarify the written definitions in order to avoid being a prescriptive manual for treatments, and having the images simply copied in practical work.



# 1. MOSAIC STRATIGRAPHY



The following stratigraphy is adapted from ancient literary sources. Not all mosaics in practice necessarily display this complete stratigraphy. It should only be used as a general reference.

A mosaic can be built on natural ground made of soil or rock, or on top of a previous pavement. The mosaic itself is composed of several preparatory layers supporting the decorative layer of tesserae.

**1 - Statumen** - First preparatory layer made of large stones inserted into the ground or with a coarse mortar to create a leveled surface and to stabilize the soil to avoid settlement and deformation.

**2 - Rudus** - Second preparatory layer spread over the statumen. This layer is made of a lime mortar with large aggregates.

**3 - Nucleus** - Third preparatory layer spread over the rudus. This layer is thinner than the previous one and is made of a lime mortar with fine aggregates.

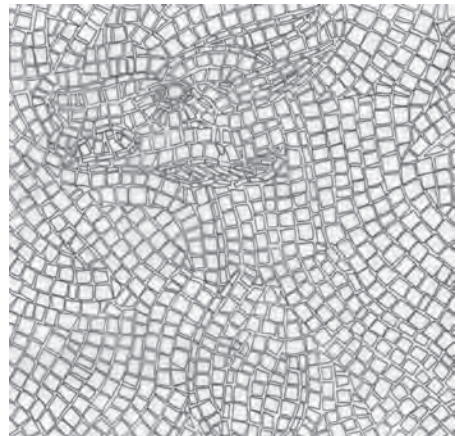
**4 - Bedding layer** - Thin layer of mortar, very rich in lime, applied in small sections over the nucleus. Tesserae are inserted in this layer before the mortar sets.

**5 - Tessellatum** - Layer constituting the mosaic surface and composed of the tesserae and the mortar filling the interstices between them.

## 2. MOSAIC FLOOR TYPES

### OPUS TESSELLATUM

Pavement made of small, regularly shaped, usually quadrangular, elements (generally 4 to 20 millimetres wide) placed side by side in rows. These elements, called tesserae, are obtained by cutting different materials such as stone (often marble or limestone), ceramic or glass.



### Monochrome opus tessellatum



**Bi-chrome geometric opus tessellatum**



**Bi-chrome figurative opus tessellatum**



**Polychrome geometric opus tessellatum**



**Polychrome figurative opus tessellatum**



**Polychrome geometric and figurative opus tessellatum**

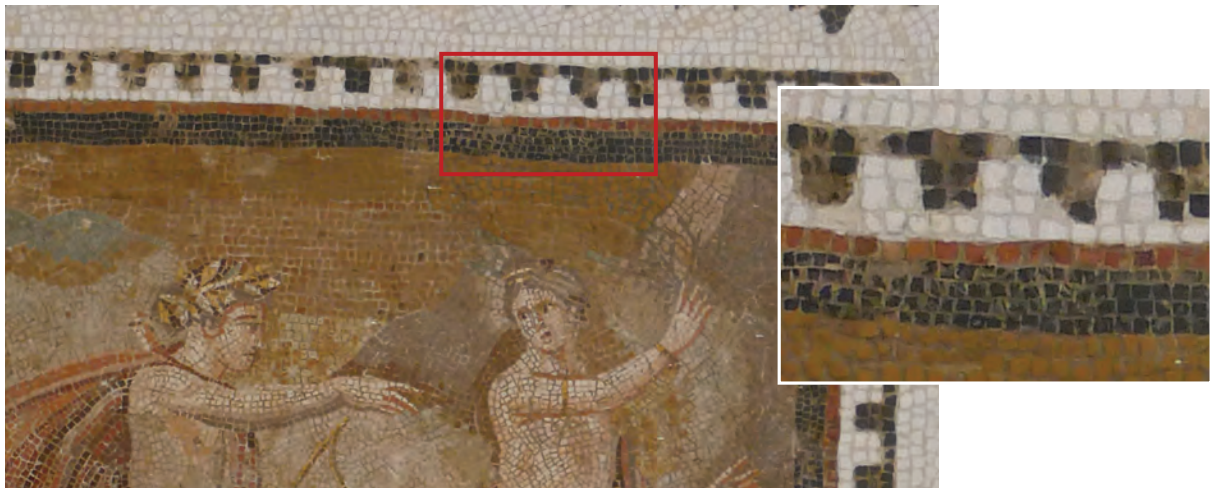


## OPUS VERMICULATUM

Type of *opus tessellatum* made of tesserae of very small dimensions (generally less than 4 mm wide).

A small mosaic panel (usually less than a square meter) made in *opus vermiculatum* and inserted in a mosaic pavement (or sometimes on a vertical surface) is called an *emblema*. It is generally made separately on a stone slab or large ceramic tile in a workshop prior to the making of the mosaic into which it is inserted. This type of mosaic was also made as a portable work of art, independent from any building.

### Emblema in opus vermiculatum



## PSEUDO-FIGLINUM

Type of *opus tessellatum* pavement made of stone tesserae of different colors, all of the same size and rectangular shape. As with *opus figlinum* (page 14), the placement of the tesserae creates a visual impression of a basket weave pattern.





## PEBBLE MOSAIC

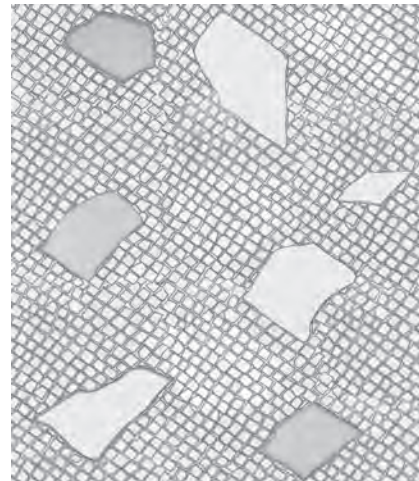
Pavement, generally bi-chrome, more rarely polychrome, made of natural pebbles of different sizes and placed on their edge, side by side, to create figures or geometric motifs.



## OPUS SCUTULATUM

Pavement combining an *opus tessellatum* background, frequently monochrome, and small stone slabs, often in fragments, generally aligned in rows. The slabs are of different forms, colors, and dimensions.

### Opus scutulatum with white background

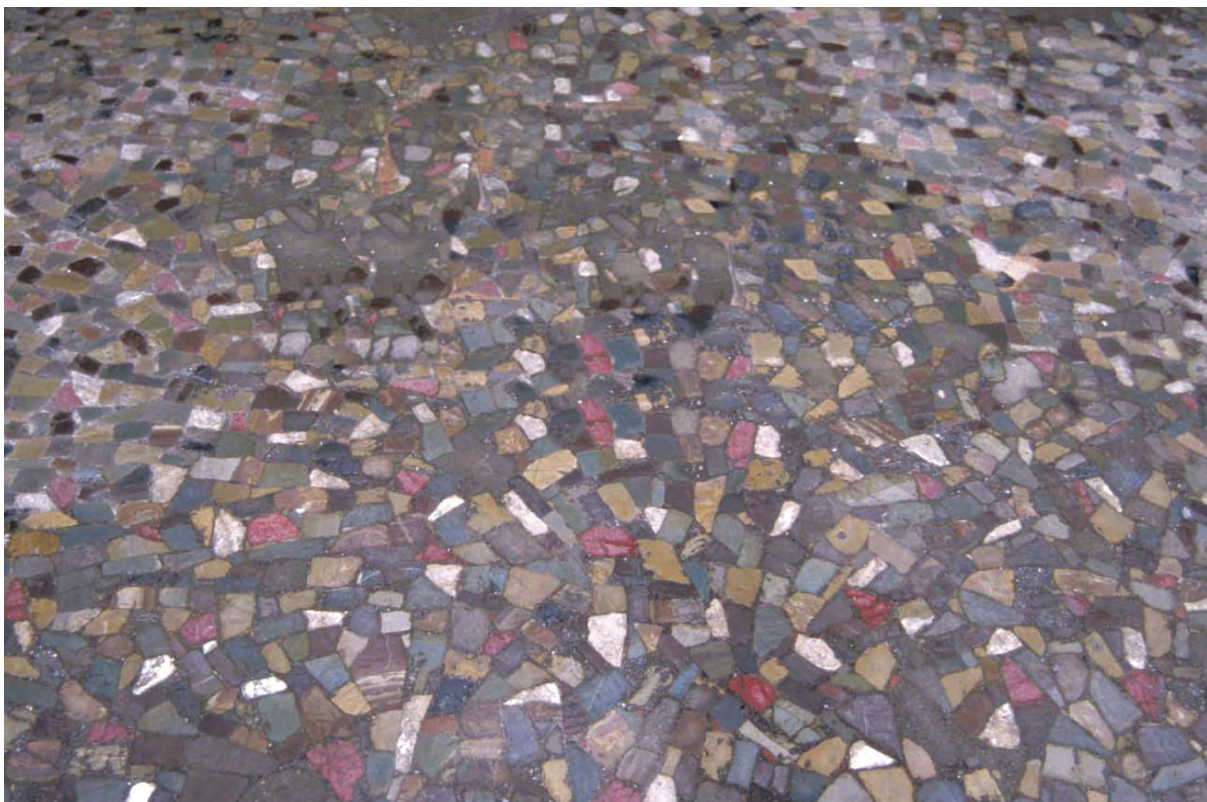
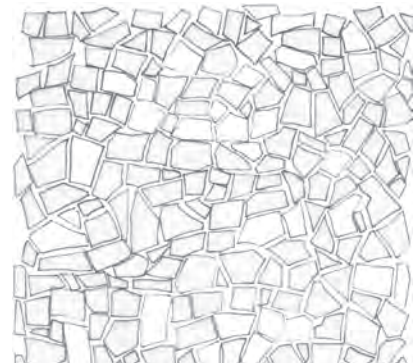


### Opus scutulatum with black background



## OPUS SEGMENTATUM

Pavement made of stone slab fragments, most commonly marble, of different colors, cut in irregular shapes and placed side by side without creating any geometric or figurative motif.



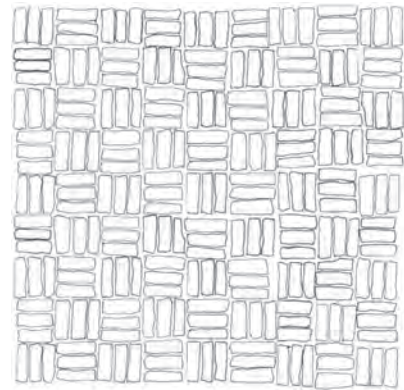
## OPUS SECTILE

Pavement made of stone slabs, most commonly of different colored marble, cut in regular shapes and placed side by side to create a geometric pattern or figurative motif.



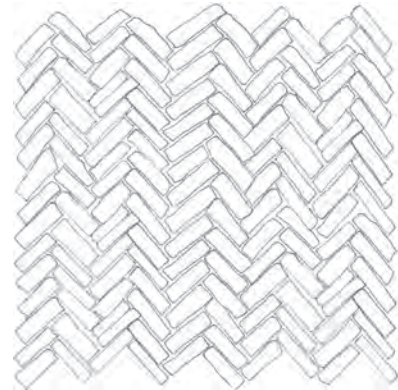
## OPUS FIGLINUM

Pavement usually made of same-sized rectangular ceramic fragments, inserted on their smaller side and assembled together in groups of a few elements. The orientation of adjacent groups is alternated so that their juxtaposition creates the visual impression of a basket weave pattern.



## OPUS SPICATUM

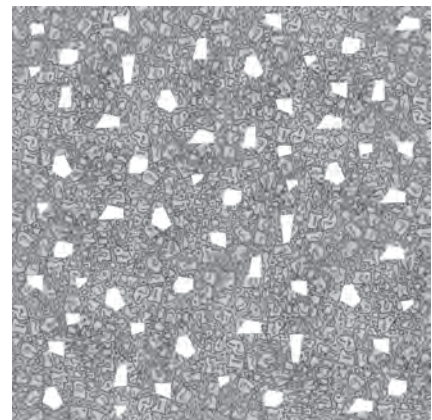
Pavement made of ceramic elements, usually of the same size and rectangular shape, arranged in a herringbone pattern.



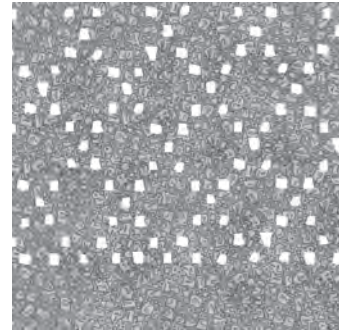
## OPUS SIGNINUM

Pavement made of lime mortar mixed with ceramic fragments into which quadrangular tesserae or small stone fragments are inserted, either randomly or to form geometric designs.

### Opus signinum using randomly placed tesserae



**Opus signinum using tesserae to form geometric designs**

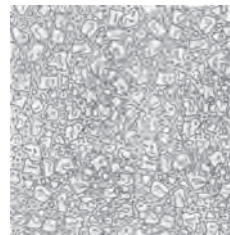




## COCCIOPESTO AND OTHER MORTAR PAVEMENTS

Pavement made of lime mortar mixed with ceramic or stone fragments without the insertion of other elements.

### Cocciopesto



### Mortar pavement with stone fragments



### 3. PREVIOUS INTERVENTIONS

#### MORTAR REPAIRS

**Lacuna fill:** An area of the pavement where the original tessellatum is missing and has been replaced with a repair mortar.

In addition to the tessellatum, a lacuna fill can also be used to fill loss in preparatory layers below.



**Edging repair:** An area of the pavement where part of the mosaic is missing and the edge of the mosaic has been contained and supported on the side by applying a layer of repair mortar along it.



**Filling of interstices between tesserae:** An area where the original mortar in the interstices between the tesserae is missing, and has been replaced with a repair mortar.



Mortar filling of interstices between tesserae (diagonal lines)

## REINTEGRATION OF LACUNAE

**Reintegration with tesserae:** An area of the pavement where a tessellatum lacuna has been filled with original tesserae which have been reused, or with new tesserae.



**Reintegration with pieces of stone, brick or other materials:** An area of pavement where a tessellatum lacuna has been filled with a layer of mortar, on the surface of which are inserted slabs or fragments of stone, ceramic, or brick.



## SURFACE TREATMENTS

**Chemical cleaning:** Visible effects of the application of chemicals used to clean the tessellatum, such as whitening, pitting, etc.



**Mechanical abrasion:** Presence of marks left by abrasive tools or materials used to make the surface of the tessellatum flat and smooth again.



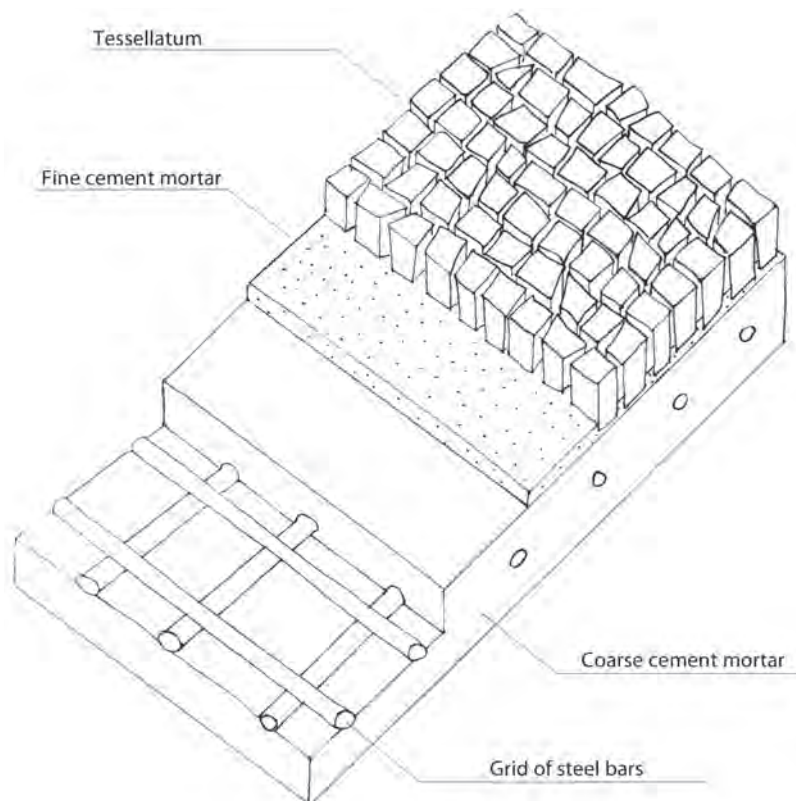
**Application of a surface product:** Presence on the surface of the tessellatum of natural or synthetic products, such as wax or resin, applied to protect the surface and/or enhance the colors of the tessellatum.



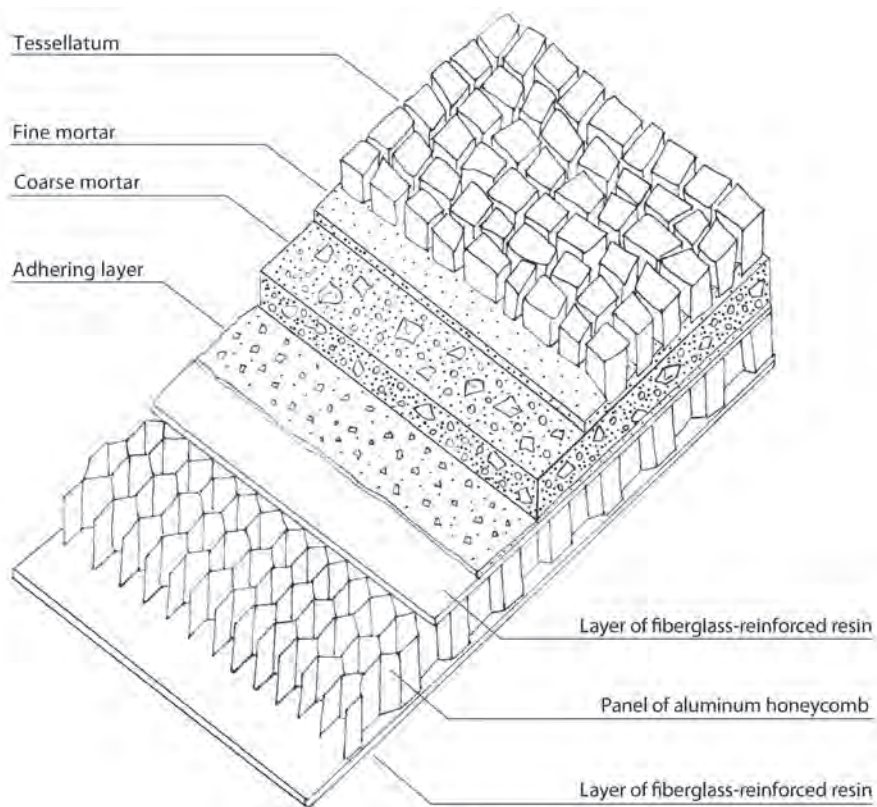


## LIFTING AND RE-LAYING ON A NEW SUPPORT

**Reinforced concrete support:** The part of the mosaic which was detached from its preparatory layers, in sections or in one piece, and then re-laid on a new backing made of cement-based mortar reinforced with steel bars, generally laid out as a grid.



**Modern synthetic materials support:** The part of the mosaic which was detached from its preparatory layers, in sections or in one piece, and then re-laid in situ on a new backing made of synthetic materials. A common support is made from an aluminum honeycomb panel sandwiched between two layers of resin reinforced with fiberglass.



## OUTLINE OF THE SUPPORT PANEL OF A DETACHED MOSAIC RE-LAID IN SITU

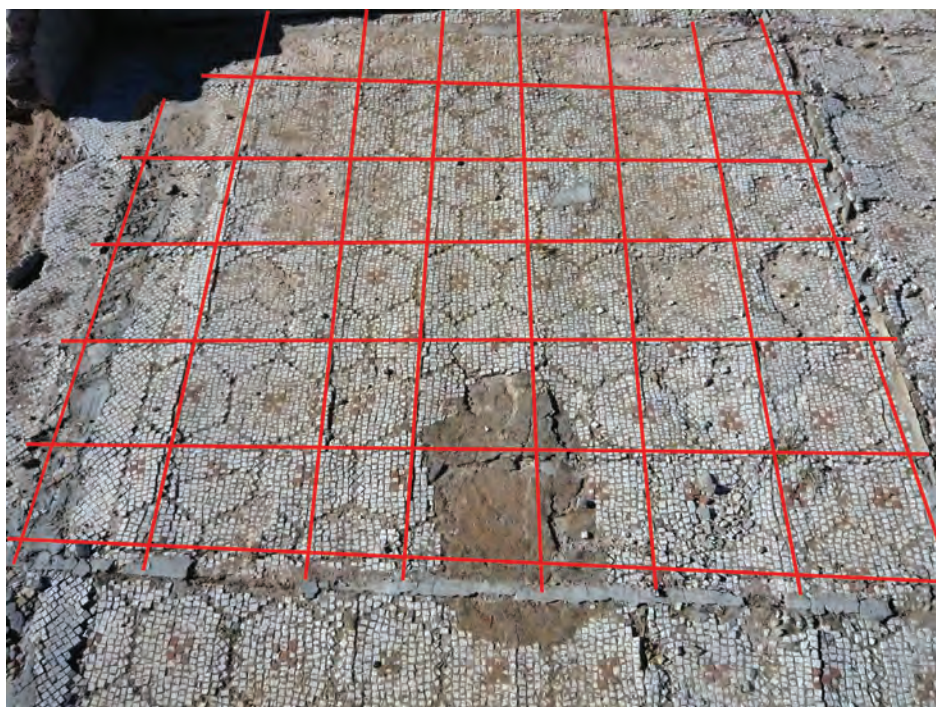
The outer edges of each section of a mosaic that has been cut, lifted, re-laid on a modern support and replaced in situ.

The cutting lines may follow the mosaic's decorative design (bottom photo), or they may not (top photo). The joints between the panels are generally filled with materials such as mortar (top photo) or tesserae to restore the continuity of the mosaic surface.



## **PRESUMED LOCATION OF THE METAL REINFORCEMENTS OF THE SUPPORT PANELS**

Probable location of the steel bars which structurally reinforce the support panels of a re-laid mosaic. The bars, positioned within the concrete panels, are not necessarily visible, but their presence may be suspected, for example, due to a surface deformation. In the bottom photo, the position of the steel bars is indicated with red lines.



## PART DETACHED AND STORED ELSEWHERE

The section of the mosaic surface that has been detached from the rest of the mosaic and removed from its place of origin (top photo) to be kept in a museum (bottom photo), or in storage.



## DRAINAGE

System created to drain water away from the surface of the mosaic, such as a drainage pit (top photo), or channel or an opening in a wall adjacent to the mosaic (bottom photo).



## REBURIAL

The part of the mosaic which has been re-covered by using fill materials such as sand (middle photo) and gravel (top and bottom photos) to protect it.

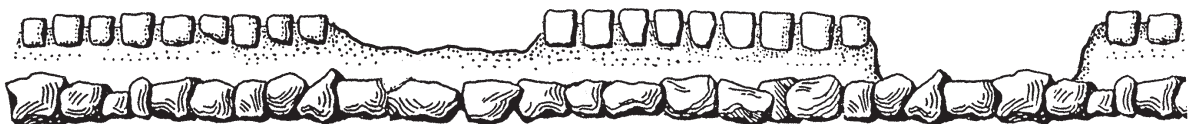


## 4. CONDITION ASSESSMENT

### 4.1. STRUCTURAL DETERIORATION

#### TESSELLATUM LACUNA

An area of a mosaic where the tessellatum is missing.



Different levels of lacunae in a mosaic



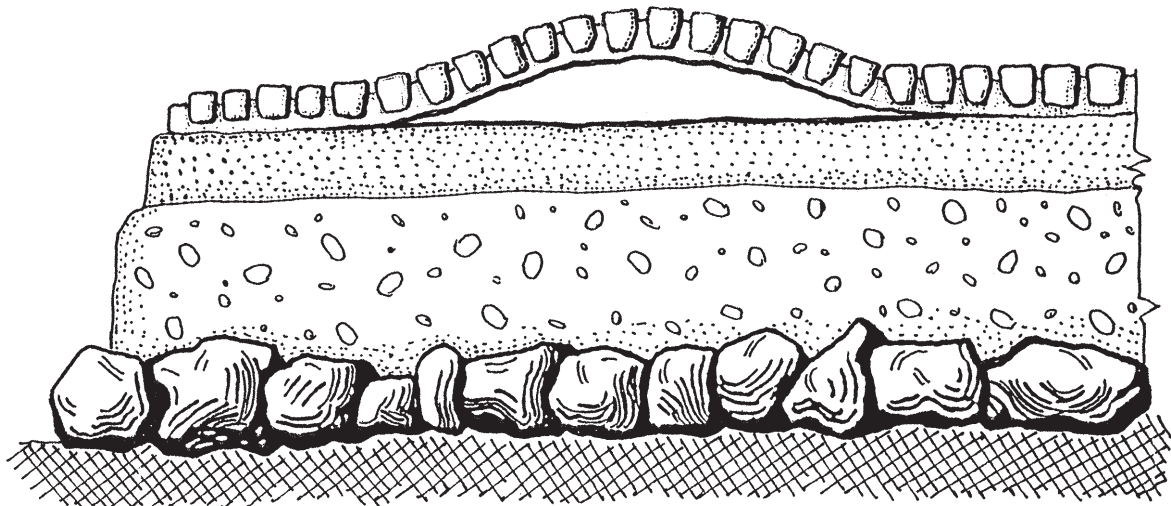
## CRACK

A linear break that is visible on the surface of the mosaic and may also penetrate into its lower layers.

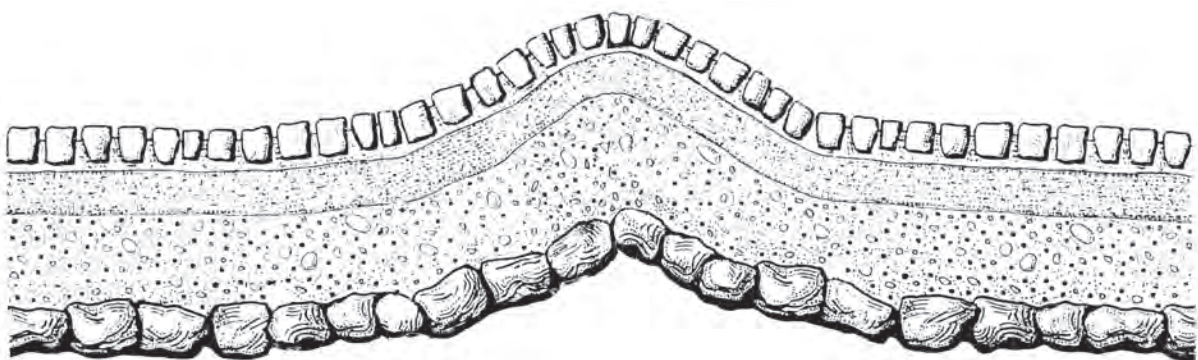


## BULGE

An upward deformation of the mosaic above its original surface level.



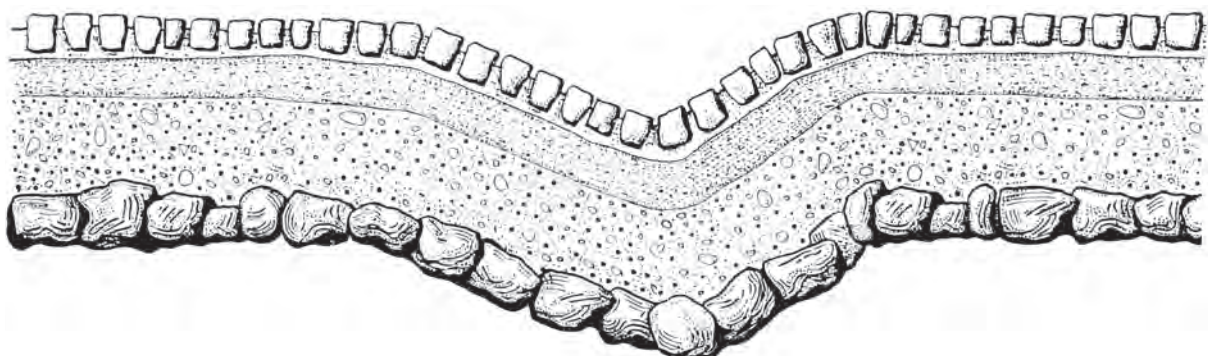
Bulging with detachment



Bulging without detachment

## DEPRESSION

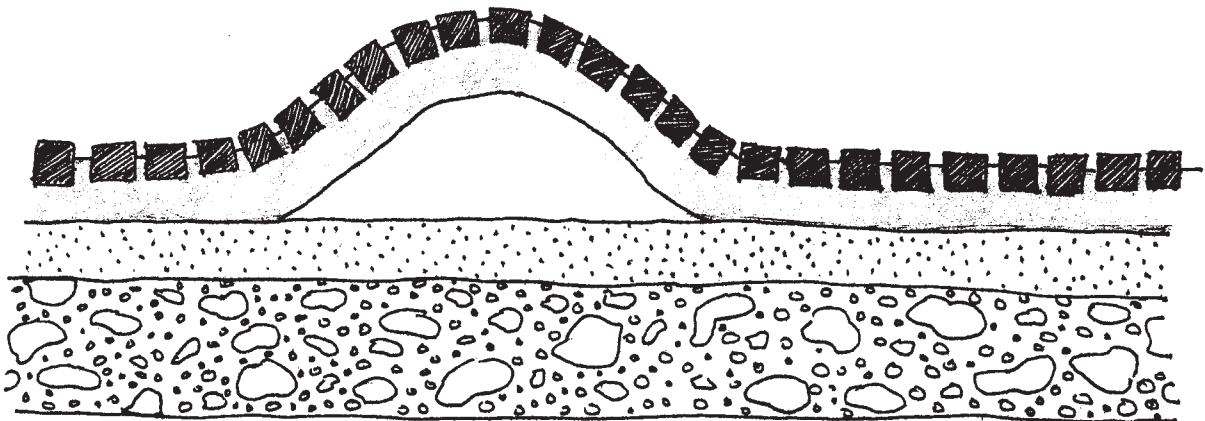
A downward deformation of the mosaic below its original surface level.



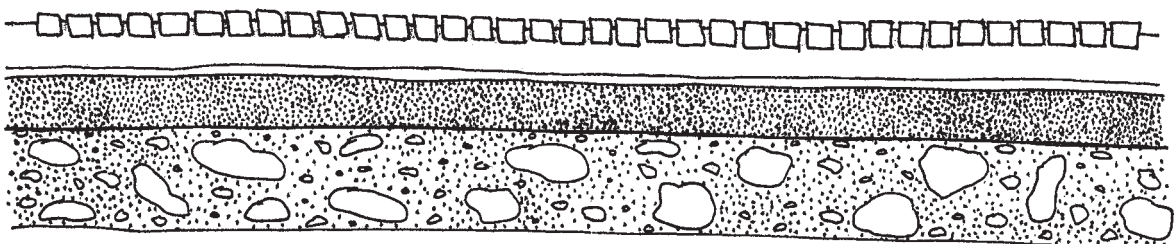
Depression

## DETACHMENT BETWEEN MOSAIC LAYERS

Separation or void between two layers of the mosaic. A detachment is generally not visible and can be detected by the corresponding hollow sound produced when the surface of the mosaic is tapped.



Detachment with bulging

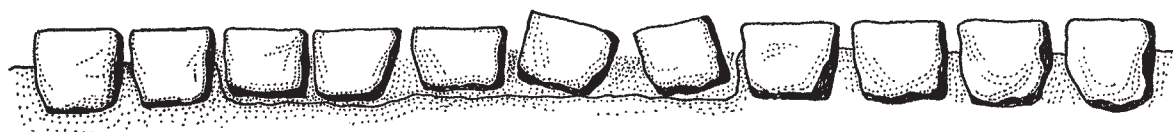


Detachment without bulging

## 4.2. SURFACE DETERIORATION

### DETACHED TESSERA

A tessera which is still in its original location, but which is no longer adhered to the bedding layer, and, as a result, moves when lightly touched.



Detached tesserae from the bedding layer and with a change of their original position (middle)

## DETERIORATED TESSERA

Tessera which is no longer in good condition. A deteriorated tessera can be broken, fractured, eroded, or otherwise damaged.



Disaggregation of tesserae



Delamination of tesserae

## **DETERIORATED MORTAR BETWEEN TESSERAE**

Mortar located in the interstices between the tesserae which is lost or no longer in good condition.



## STAIN

Localized change in color of the mosaic surface.





## INCRUSTATION

Mineral crust of variable thickness and area, that is often hard and compact, located on the surface of the mosaic.



## **EFFLORESCENCE**

Generally a white and crystalline substance, which adheres loosely to the mosaic surface, and is powder-like or whisker-like in appearance.



### 4.3. PRESENCE OF BIO-DETERIORATION AGENTS

#### MICRO-ORGANISMS

Small organisms varying in color and shape, alive or dead, such as algae (top photo), lichens (middle photo), or mosses (bottom photo) that adhere to the mosaic surface.



## VEGETATION

Plants such as grasses, weeds, bushes, as well as trees and their associated roots growing under, inside, or on top of the mosaic.



## TUNNEL OR ENTRANCE HOLE MADE BY INSECTS OR OTHER ANIMALS

An area of the mosaic where insects or other animals have burrowed.



## 4.4. DETERIORATION OF INTERVENTIONS

### DETERIORATED MORTAR REPAIRS

**Lacuna fill or edging repair or mortar fill between tesserae** in poor condition, presenting cracks, erosion or other types of damage.



## **RE-DETACHED TESSERA OR DETACHED TESSERA OF A RE-LAID MOSAIC**

A tessera already reset during a previous intervention, which is no longer adhered, or a detached tessera of a section of the mosaic that has been lifted and re-laid on a new support.



## DETERIORATED SUPPORT PANEL

**Deformed support panel:** Modern support panel of a re-laid mosaic whose shape has changed, part of its surface being located above or below its original level.





**Detachment between the tessellatum and the support panel:** Separation of the tesserae layer of a modern support panel of a re-laid mosaic. A detachment is often accompanied by a bulge visible on the surface.



**Crack in support panel:** Linear break in the modern support panel of a re-laid mosaic that can traverse all or only part of its thickness.



## DETERIORATED METAL REINFORCEMENT IN THE SUPPORT PANEL

Structural reinforcement in the new support of a re-laid mosaic that is in poor condition.



## 5. CURRENT INTERVENTIONS

### **VEGETATION REMOVAL**

Cutting or removal of weeds, grasses, bushes and trees by mechanical means using tools.

### **CLEANING**

Removing, with or without water, substances such as dirt, debris or micro-organisms, which have accumulated on the mosaic surface.

### **REMOVAL OF MODERN MORTAR REPAIRS**

Removing mortar applied during previous interventions, such as a lacuna fill or an edging repair.

### **RESETTING A TESSERA**

Placing a detached tessera back in its original position and with its original orientation using mortar.

### **FILLING INTERSTICES BETWEEN TESSERAE**

Applying mortar in the interstices between tesserae.

### **GROUTING VOIDS BETWEEN PREPARATORY LAYERS**

Introducing a grout (liquid mortar) into a void caused by detachment between preparatory layers.

### **LACUNA FILL**

Filling a lacuna in the mosaic surface with mortar.

## **EDGING REPAIR**

Applying a layer of mortar along the edge of an incomplete mosaic.

## **FACING WITH ADHESIVE**

Temporarily attaching a piece of fabric to the surface of a mosaic using glue.

## **REMOVAL AND RESETTING TESSERAE USING FACING**

Temporarily lifting part of the tessellatum using a piece of fabric glued to its upper surface, then re-laying the tessellatum on a new mortar bedding.

## **REMOVAL OF METAL REINFORCEMENT IN SUPPORT PANEL**

Removing permanently part or all of a steel bar located within a reinforced concrete support panel of a re-laid mosaic.

## **TREATMENT OF METAL REINFORCEMENT IN SUPPORT PANEL**

Removing corrosion products (rust) from an exposed steel bar of a reinforced concrete support panel of a re-laid mosaic and applying an anti-rust or protection product on its surface.

## **DRAINAGE**

Creating a system for draining water away from the surface of the mosaic, such as a drainage pit or channel or an opening in a wall adjacent to the mosaic.

## **REBURIAL**

Re-covering a mosaic using fill materials such as soil or sand to protect it.

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