TECHNICIAN TRAINING FOR THE CONSERVATION OF MOSAICS

PART 3
THE CONSERVATION OF ARCHITECTURAL REMAINS AND THEIR DECORATIVE SURFACES

Structures and decorative surfaces: stabilization interventions and their documentation

Livia Alberti, Ermanno Carbonara, Thomas Roby
Stabilization

The aim of these interventions is to re-establish the structural stability of walls and their surface decorations with minimum interventions using mortar.
The principle stabilization interventions using mortar
The principle stabilization interventions using mortar

Structures

Repair of a structure with mortar and new elements of the wall, if needed.

Resetting in place of detached elements of the structure.

Surface Decorations

Repair of the surface decoration.

Grouting voids below the surface decoration.
**Structures**

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Repair of the surface decoration.

Grouting voids below the surface decoration.

The principle stabilization interventions using mortar
Characteristics of a mortar for the stabilization of Structures and Surface Decorations

Quality of the materials
For a mortar that is stable and durable over time, one should use binders and aggregates without soluble salts and that has only limited shrinkage and cracking while setting.

Compatibility with the original materials
A mortar should possess a hardness and porosity similar to the original materials.

Reversibility
A stabilisation mortar should be reversible, that is, it can be removed without damaging the original materials.

Visual impact
The color and texture of the mortar should be similar to the original materials in order that the original surface of the wall or surface decoration remains visually dominant.
The **Documentation** of Current Interventions
Data Form for the documentation of Current Interventions

**STRUCTURE**

**DECORATED SURFACE**

### DATA FORM – CONSERVATION OF STRUCTURES AND DECORATIVE SURFACES

**STRUCTURE/DECORATIVE SURFACE ID:**

Abbreviations: building / room / elevation / section

This form should be accompanied by an overall photograph of the structure or surface decoration before and after conservation treatment, and by a plan of the building, indicating the location of the room. Mark also the location of the wall elevation if the object is a vertical surface.

### PART OF THE STRUCTURE

- Wall
- Vault
- Steps
- Cistern/Basin
- Pavement

### CONSTRUCTION MATERIALS

- Dry Stone
- Stone and lime mortar
- Stone and earthen mortar
- Brick
- Earth
- Other:

### TYPE OF SURFACE DECORATION

- Wall Plaster
- Painted Wall Plaster
- Crushed Ceramic Mor.
- Marble Plaque
- Stone Slabs
- Tile/Zellij
- Stucco/gyps. plaster
- Other:

### PREVIOUS INTERVENTIONS

- Graphic documentation map attached

### CONDITION ASSESSMENT

- Loss of stones or mortar of the structure
- Cracks
- Detached stones of the structure
- Deformations (bulge or depression)
- Vegetation
- Loss of surface decoration of wall or pavement
- Micro-organisms
- Detachment of surface decoration of wall or pavement
- Incrustations
- Deteriorated surface decoration
- Efflorescences
- Deteriorated previous interventions

### CURRENT INTERVENTIONS

- Graphic documentation map attached

- Vegetation removal
- Cleaning
- Removal of modern repair mortars
- Repair of the structure with mortar and/or stones
- Resetting in place of detached stones
- Other interventions on the structure:

- Mortar compositions:

- Repair of the surface decoration with mortar (in-filling/edging repair)
- Grouting voids below the surface decoration
- Removal and resetting in place of parts of the surface decoration
- Reintegration of area of loss with:
- Other treatment of the surface decoration:

### PREPARED BY

Date
**CURRENT INTERVENTIONS**

<table>
<thead>
<tr>
<th>☑️ Vegetation removal</th>
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|Mortar compositions:|

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*Graphic documentation map attached*

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![Image of a structure with vegetation and a blue rope]
This form should be accompanied by an overall photograph of the structure or surface decoration before and after conservation treatment, and by a plan of the building, indicating the location of the room. Mark also the location of the wall elevation if the object is a vertical surface.

### Current Interventions

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<th>Notes</th>
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### Construction Materials

- Dry Stone
- Stone and lime mortar
- Stone and earthen mortar
- Brick
- Earth

### Type of Surface Decoration

- Wall Plaster
- Painted Wall Plaster
- Crushed Ceramic Mor.
- Marble Plaque
- Stone Slabs
- Tile/Zellij
- Stucco/gyps. plaster
- Other:

### Previous Interventions

- Graphic documentation map attached
- Repairs of the structure
- Repairs of the surface decoration of wall or pavement

### Condition Assessment

- Graphic documentation map attached
- Loss of stones or mortar of the structure
- Cracks
- Detached stones of the structure
- Deformations (bulge or depression)
- Vegetation
- Loss of surface decoration of wall or pavement
- Micro-organisms
- Detachment of surface decoration of wall or pavement
- Incrustations
- Deteriorated surface decoration
- Efflorescence
- Deteriorated previous interventions

### Current Interventions

- Graphic documentation map attached
- Vegetation removal
- Cleaning
- Repair of the structure with mortar and/or stones
- Resetting in place of detached stones
- Other interventions on the structure:
  - Mortar composition

- Repair of the surface decoration with mortar (in-filling/edging repair)
- Grouting voids below the surface decoration
- Removal and resetting in place of parts of the surface decoration
- Reintegration of area of loss with:
  - Other treatment of the surface decoration:
    - Mortar composition:

Prepared by: Ermanno Carbonara 2018 © J. Paul Getty Trust
**Current Interventions**

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**Currently Prepared by:**

Scott Warren 2011 © J. Paul Getty Trust
**Type of mortar**

Weakly hydraulic mortar with medium-sized aggregate. Workable, of similar hardness to the original mortar and of an appropriate color and texture.

**Binder : Aggregate ratio:**

1 : 2.5

**Mortar mix example:**

½ lime putty  
½ hydraulic lime  
1 white sand........... 0 – 2 mm  
1 ½ yellow gravel... 0 – 4 mm
**Type of mortar**
Lime-rich mortar, weakly hydraulic and lime-based with fine particle aggregates,
Good adhesion properties and very workable.

**Binder : Aggregate ratio:**
1 : 2

**Mortar mix example:**
½ lime putty
½ hydraulic lime
1 white sand...... 0 – 1 mm
1 yellow sand.... 0 – 2 mm
This form should be accompanied by an overall photograph of the structure or surface decoration before and after conservation treatment, and by a plan of the building, indicating the location of the room. Mark also the location of the wall elevation if the object is a vertical surface.

**CURRENT INTERVENTIONS**

- Vegetation removal
- Cleaning
- Removal of modern repair mortars
- Repair of the structure with mortar and/or stones
- Resetting in place of detached stones
- Other interventions on the structure:
  
  **wall capping with a layer of mortar**

- Graphic documentation map attached

**Mortar compositions:**

**Type of mortar**

Hydraulic mortar with large-sized aggregate to improve its mechanical resistance and reduce its shrinkage and cracking.

**Binder : Aggregate ratio:**

1 : 2.5

**Mortar mix example:**

1/2 lime putty
1/2 hydraulic lime
1 white sand................. 0 – 2 mm
1 yellow gravel............ 0 – 4 mm
1/2 crushed ceramic..... 3 – 5 mm
Type of mortar
Hydraulic or non-hydraulic mortar with medium-sized aggregates with good particle size distribution and appropriate colors.

Binder : Aggregate ratio:
1 : 2.5

Mortar mix example:
2 lime putty
1 white sand........ 0 – 1 mm
1 beige gravel ...... 0 – 1 mm
2 beige gravel ...... 1 – 3 mm
1 crushed ceramic .. 2 – 3 mm
Type of mortar
Liquid hydraulic mortar (grout) with very fine-sized aggregates and a larger quantity of water.

Binder : Aggregate ratio:
1 : 1

Mortar mix example:
1 hydraulic lime
1 stone powder.... 0 – 0.25 mm
Type of mortar
Lime-rich mortar, hydraulic and lime-based with fine particle aggregates.
Good adhesion properties and very workable.

Binder : Aggregate ratio:
1 : 2

Mortar mix example:
½ lime putty
½ hydraulic lime
1 white sand...... 0 – 1 mm
½ yellow sand... 0 – 2 mm
½ crushed ceramic .. 0 – 1 mm
- Repair of the surface decoration with mortar (in-filling/edging repair)
- Grouting voids below the surface decoration
- Removal and resetting in place of parts of the surface decoration
- Reintegration of area of loss with mortar
- Other treatment of the surface decoration:

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- Repaired by [Ermanno Carbonara 2018 © J. Paul Getty Trust](https://www.getty.edu)
Graphic documentation
**Legend**

- **Structure/Surface Decoration**
  - Not original parts of the structure
  - Repairs/reintegrations of surface decoration

**Previous Interventions Map**
- Edge of each repair mortar
- Overlapping between mortars (new → old)

**Condition Assessment Map**
- Edge of surface decoration of wall or pavement
- Loss of stones or mortar of the structure
- Detached stone of the structure
- Vegetation
- Micro-organisms
- Incrustations
- Efflorescences
- Cracks
- Deformations (bulge or depression)
- Detachment of the surface decoration of wall or pavement
- Deteriorated surface decoration
- Deteriorated previous interventions

**Current Interventions Map**
- Vegetation Removal
  - Repair of the structure with mortar and/or stones
  - Resetting in place of detached stones
  - Repair of surface decoration with mortar (in-filling/edging repair)
  - Grouting voids under the surface decoration or within the structure
  - Resetting in place of detached elements of the surface decoration
  - Removal and resetting in place of parts of the surface decoration with facing
  - Reintegration of areas of loss with:

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**Prepared By**

**Date**
Current Interventions Map

- Vegetation Removal
  - Repair of the structure with mortar and/or stones
    - Mortar composition:
  - Resetting in place of detached stones
    - Mortar composition:
  - Repair of surface decoration with mortar (in-filling/edging repair)
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  - Repair of surface decoration with mortar (in-filling/edging repair)
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  - Grouting voids under the surface decoration or within the structure
    - Mortar composition:
  - Resetting in place of detached elements of the surface decoration
    - Mortar composition:
  - Removal and resetting in place of parts of the surface decoration
    - Mortar composition:
  - Reintegration of areas of loss with:
Current Interventions Map

Vegetation Removal

Repair of the structure with mortar and/or stones
Mortar composition:

\[ \frac{1}{2} \text{ lime putty} \quad 1 \text{ white sand} \quad 0 - 2 \text{ mm} \]
\[ \frac{1}{2} \text{ hydraulique lime} \quad 1\frac{1}{2} \text{ yellow gravel} \quad 0 - 4 \text{ mm} \]

Resetting in place of detached stones
Mortar composition:

\[ \frac{1}{2} \text{ lime putty} \quad 1 \text{ white sand} \quad 0 - 1 \text{ mm} \]
\[ \frac{1}{2} \text{ hydraulique lime} \quad 1 \text{ yellow sand} \quad 0 - 2 \text{ mm} \]

Repair of surface decoration with mortar (in-filling/edging repair)
Mortar composition:

\[ 2 \text{ lime putty} \quad 1 \text{ white sand} \quad 0 - 1 \text{ mm} \]
\[ 2 \text{ beige gravel} \quad 1 - 3 \text{ mm} \]
\[ 1 \text{ yellow sand} \quad 0 - 2 \text{ mm} \]

Repair of surface decoration with mortar (in-filling/edging repair)
Mortar composition:

Grouting voids under the surface decoration or within the structure
Mortar composition:

\[ 1 \text{ hydraulic lime} \]
\[ 1 \text{ stone powder} \quad 0 - 0.25 \text{ mm} \]

Resetting in place of detached elements of the surface decoration
Mortar composition:

Removal and resetting in place of parts of the surface decoration
Mortar composition:

Reintegration of areas of loss with:

PREPARED BY: Mohamed Zaki

BASE MADE ON: 03/2018

TITLE: Current Interventions Map
DATE: June/2018
MOSAIKON 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.