Getty













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 reestablish the structural stability of walls and their surface decorations with minimum interventions using mortar.



The principle stabilization interventions using mortar

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.



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.

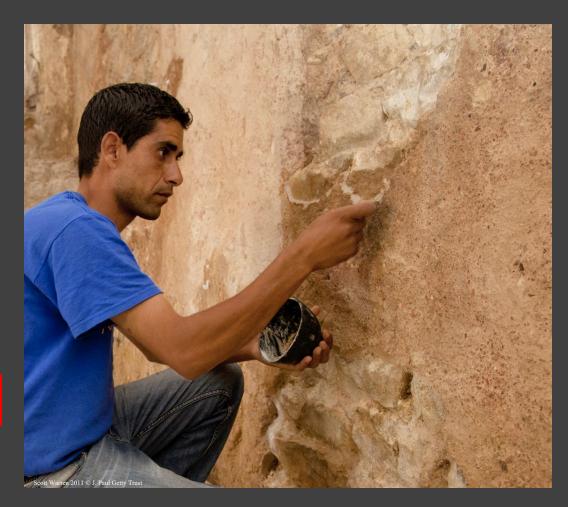


Repair of a structure with mortar and new elements of the wall if needed.

Resetting in place of detached elements of the structure.

Surface Decorations

Repair of the surface decoration.



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.



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 – CONSERVA		IRUCIU	KES AND DE	CORATI	VE SURFACES		
	Structure/Decorative \$	SURFACE ID:	Abbreviatio	ns / building /	room / space	elevation / section top		
	This form should be accompanied by an overal by a plan of the building, indicating the locatio							
	PART OF THE STRUCTURE							
	□ Wall □ Vault	☐ Steps	☐ Cister	n/Basin	☐ Pa	vement		
	Other:							
	Construction materials							
	☐ Dry Stone ☐ Stone and lim	ne mortar	☐ Stone	and earthen mort	ar 🗖 Br	rick		
İ	☐ Earth ☐ Other:					-		
	Type of surface decoration							
-	☐ Wall Plaster ☐ Painted Wall Plast	er		☐ Crushed Cera	amic Mor	☐ Marble Plaque		
-	☐ Stone Slabs ☐ Tile/Zellij	☐ Stucco/gy	ns plaster	Other:	anne mor.	■ Marbie Fraque		
	, ,	_ Staceorgy	po. piustei	_	:			
	PREVIOUS INTERVENTIONS Repairs of the structure		☐ Papaira	Graphic docum		wall or pavement		
rust	Repairs of the structure		■ Repairs	of the surface dec	Zoration or	wan or pavement		
omas Roby 2018 © J. Paul Getty Trust	CONDITION ASSESSMENT			☐ Graphic docum	nentation ma	p attached		
anl G	Loss of stones or mortar of the struc	ture	☐ Cracks					
J. P	Detached stones of the structure		Deformations (bulge or depression)					
018 €	☐ Vegetation		☐ Loss of surface decoration of wall or pavement ☐ Detachment of surface decoration of wall or pavement					
oby 2	☐ Micro-organisms ☐ Incrustations		Deteriorated surface decoration			wall or pavement		
nas R	☐ Efflorescences							
	☐ Efflorescences ☐ Deteriorated previous interventions							
Livia Alberti, T	CURRENT INTERVENTIONS			☐ Graphic docum	nentation ma	p attached		
ivia /	☐ Vegetation removal	☐ Cleaning	☐ Rem	oval of modern r	epair morta	rs		
_	☐ Repair of the structure with mortar	Mortar co	ompositions:					
	and/or stones							
	☐ Resetting in place of detached stone ☐ Other interventions on the structure							
	— other interventions on the structure							
	☐ Repair of the surface decoration wit	h Morter of	ompositions:					
	mortar (in-filling/edging repair)	n Wortan Co	ompositions.					
	☐ Grouting voids below the surface							
	decoration							
	Removal and resetting in place of particle of the surface decoration	arts						
	Reintegration of area of loss with:							
	Dod as a second							
	Other treatment of the surface decoration:							
	decoration .							
	PREPARED BY			DATE				

Data Form for the documentation of Current Interventions

STRUCTURE

DECORATED SURFACE

	CANCE	4
$o_1 c_2$	cence	/

☐ Graphic documentation map attached

CURRENT INTERVENTIONS
Vegetation removal

☐ Cleaning

 \square Removal of modern repair mortars

☐ Repair of the structure with mortar and/or stones

Mortar compositions:

☐ Resetting in place of detached stones

☐ Other interventions on the structure:



PREPARED

rescence	Deteriorated previous interventions	STRUCTURE	T.

☐ Removal of modern repair mortars

☐ Graphic documentation map attached





Cleaning

Mortar compositions:

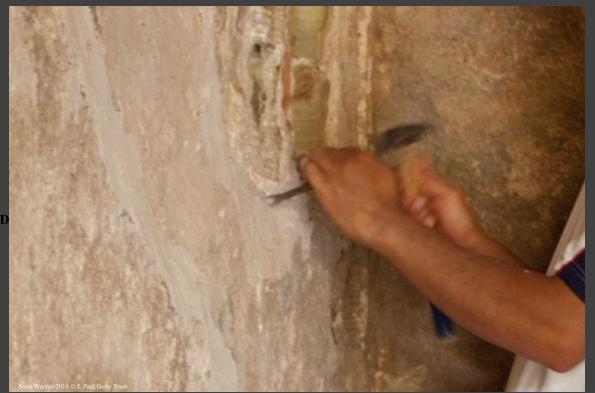
CURRENT INTERVENTIONS

☐ Repair of the structure with mortar

☐ Resetting in place of detached stones ☐ Other interventions on the structure:

☐ Vegetation removal

and/or stones



PREPARED

CURRENT INTERVENTIONS		☐ Graphic documentation map attached
☐ Vegetation removal	☐ Cleaning	☐ Removal of modern repair mortars
Repair of the structure with mortar and/or stones	Mortar con	npositions:
☐ Resetting in place of detached stone ☐ Other interventions on the structure:		



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 DATE

Mortar mix example:

½ lime putty

½ hydraulic lime

1 white sand...... 0-2 mm

 $1 \frac{1}{2}$ yellow gravel... 0 - 4 mm

CURRENT INTERVENTIONS		☐ Graphic documentation map attached
☐ Vegetation removal	Cleaning	☐ Removal of modern repair mortars
☐ Repair of the structure with mortar and/or stones	Mortar comp	ositions:
Resetting in place of detached stone Other interventions on the structure:		



Type of mortar

Lime-rich mortar, weakly hydraulic and limebased with fine particle aggregates. Good adhesion properties and very workable.

Binder: Aggregate ratio:

1:2

DATE

Mortar mix example:

½ lime putty

½ hydraulic lime

1 white sand..... 0-1 mm

1 yellow sand.... 0-2 mm

CURRENT INTERVENTIONS		☐ Graphic documentation map attached
☐ Vegetation removal	☐ Cleaning	☐ Removal of modern repair mortars
☐ Repair of the structure with mortar and/or stones	Mortar comp	positions:
Resetting in place of detached stones Other interventions on the structure:		
wall capping with a layer of mortar		



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

DATE

Mortar mix example:

½ lime putty

½ hydraulic lime

1 white sand...... 0-2 mm

1 yellow gravel..... 0 – 4 mm

 $\frac{1}{2}$ crushed ceramic..... 3 – 5 mm

	ŏ
	$\dot{\geq}$
	Ы
	οί
	≷
	٤l
	ا≥
	st
	2
	2
	E E
ζ	5
	= 1
	ಡ
	그
	<u></u>
	(C
9	\odot
	5
	<u>o</u> ,
	Ē
	Ę
	ns
	ι
	o
	31
	Š
	ž.
	ij.
	9
`	<u>ر</u>
	₽,
	g.
`	ر ا
	S
	<u>1</u>
	Sa
ķ	10
7 8	2
	o
	Ħ
	10
	ਯੂ
	Se
	OI
ζ)
	e
	≓
	or
	H bo
	มีน
	E
	<i>a</i> 1
	Ξ
	딮
	Sia
	31
	Ξ
	မ
	_
۲	Z
(0
È	4
4	₹

- 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 compositions:

PREPARED BY



DATE

Type of mortar

Hydraulic or non-hydraulic mortar with mediumsized 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

- 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 compositions:

PREPARED BY

DATE

Type of mortar

Liquid hydraulic mortar (grout) with very finesized 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



MOSAIKON Technician Training for the Conservation of Mosaics – Getty Conservation Institute, 2020 © J. Paul Getty Trust, www.getty.edu

- ☐ 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 compositions:

PREPARED BY



DATE

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

 $\frac{1}{2}$ yellow sand... 0-2 mm

 $\frac{1}{2}$ crushed ceramic .. 0 - 1 mm

$\ddot{\cdot}$	
21	
ь	
οï	
≱	
١	
≨	
st	
Ξ.	
Ξ.	
· >	
Ħ.	
Ŗ	
<u> </u>	
=	
ູສ	
\odot	
ā	
$\tilde{\sim}$	
\lesssim	
ē.	
Ħ	
Ξ	
JS	
二	
10	
$^{\mathrm{at}}$	
⋛	
cı	
1S	
5	
\circ	
>	
Ħ	
3	
g.	
. – Ge	
cs - Ge	
aics – Ge	
osaics – Ge	
Aosaics – Ge	
Mosaics – Ge	
of Mosaics – Ge	
n of Mosaics – Ge	
on of Mosaics – Ge	
tion of Mosaics – Ge	
vation of Mosaics – Ge	
ervation of Mosaics – Ge	
servation of Mosaics – Ge	
onservation of Mosaics – Ge	
Conservation of Mosaics – Ge	
e Conservation of Mosaics – Ge	
he Conservation of Mosaics – Ge	
r the Conservation of Mosaics – Ge	
or the Conservation of Mosaics – Ge	
g for the Conservation of Mosaics – Ge	
ng for the Conservation of Mosaics – Ge	
ning for the Conservation of Mosaics – Ge	
aining for the Conservation of Mosaics – Ge	
Fraining for the Conservation of Mosaics – Ge	
Training for the Conservation of Mosaics – Ge	
an Training for the Conservation of Mosaics – Ge	
cian Training for the Conservation of Mosaics – Ge	
nician Training for the Conservation of Mosaics – Ge	
hnician Training for the Conservation of Mosaics – Ge	
echnician Training for the Conservation of Mosaics – Ge	
Fechnician Training for the Conservation of Mosaics – Ge	
Nechnician Training for the Conservation of Mosaics – Ge	
N Technician Training for the Conservation of Mosaics – Ge	
ON Technician Training for the Conservation of Mosaics – Ge	
KON Technician Training for the Conservation o	
AIKON Technician Training for the Conservation of Mosaics – Ge	

- ☐ 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 :

Mortar compositions:

PREPARED BY DATE



Type of mortar

Hydraulic or non-hydraulic mortar with mediumsized aggregates with good particle size distribution. Workable, hardness similar to the original mortar and appropriate color and texture.

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 black gravel..... 2-3 mm

	-
7	┖
	ď
	P
	E
	C
	b
	ď
	B
	S
	ø
	⊱
	_
	ے
	7
	ř
	⋤
F	_
	⊳
	╘
	a:
	ř
	_
	Ξ
	π
۵	<u>১</u>
۲	=
	\supset
	_
¢	١
¢	
Ġ	$ \langle $
	ď
	É
	É
	╘
	Ε
	$\underline{\sigma}$
	두
7	
	₽
	c
	ř
	≂
	Š
	۲
	à
	Ū.
	₽
	c
(_
(_ >
,	2
:	→
;	Tell V
;	(Tello
ָ י	– (<u>⊤</u> ₽∏V (
:	- (reffy (onservation
ָ כ	
	100 — (Tell V)
	100 - 100
	SBICS - ITEM
	OSSICS $-$ (Tell Λ
	1089108 - 1010
	$N_{\text{OSSICS}} - 1000$
ر : ر د ا	1 NOSSICS - 1 Tell V
\ . \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Of Mossics – (refly (
	OT MOSSICS — (TETTA (
) : ()	n of Mosaics — (reffy (
() : () · · · ·	On OT MOSSICS — (Teffix (
	110th OT MOSSICS — (16TTV (
	31100001 MOSSICS $-(16110)$
	V2T10110T V V V V V V V V V V V V V V V V V V V
	Prvation of Mosaics — (reffy (
	Servation of Mosaics – (reffy (
(: (DSPIVATION OF MOSSICS — (TPTV (
	SUSPENSION OF MOSSICS — (TETTY (
	Onservation of Mossics – (reffy (
	Conservation of Viosaics — (refly (
, : T	\sim Chiservation of Mosaics – (refly (
	ie (Onservation of Mosaics — (reffy (
	the Conservation of Mosaics — (reffy (
	The conservation of Mosaics – (refly ϵ
	or the Conservation of Mosaics – (reffy (
	for the Conservation of Mosaics — (reffy (
	TOT THE CONSERVATION OF MOSSICS
	$K \cap K \cap$

☐ 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:

biocide treatment

Mortar compositions:

PREPARED BY DATE



Graphic documentation

LEGEND - STRUCTURE/SURFACE DECORAT	TION ID:///			
Previous Interventions Map				
Not original parts of the structure	Edge of each repair mortar			
Repairs/reintegrations of surface decoration	Overlapping between mortars (new -> old)			
Condition Assessment Map				
Edge of surface decoration of wall or pavement	Efflorescences			
Loss of stones or mortar of the structure	Cracks			
Detached stone of the structure	Deformations (bulge or depression)			
≯ ★ Vegetation	Detachment of the surface decoration of wall or pavement			
Micro-organisms	Deteriorated surface decoration			
++ Incrustations	Deteriorated previous interventions			
Current Interventions Map				
X X 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) Mortar composition:				
Repair of surface decoration with mortar (in-filling/edging repair) Mortar composition:				
Grouting voids under the surface decoration or with Mortar composition:	nin the structure			
Resetting in place of detached elements of the surface decoration Mortar composition:				
Removal and resetting in place of parts of the surface Mortar composition:	ce decoration with facing			
Reintegration of areas of loss with:				

DATE

PREPARED BY

The Legend for the graphic documentation of Current Interventions

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



PREPARED BY

50 cm

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

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

Resetting in place of detached elements of the sum of t

Removal and resetting in place of parts of the su Mortar composition:

Reintegration of areas of loss with:

PREPARED BY



Vol-MOr-02-d-2

BASE MADE ON: 03/2018

TITLE:

DATE:

PREPARED BY:

Current Interventions Map	
X X Vegetation Removal	
Repair of the structure with mortar and/o Mortar composition: //2 lime putty //2 hydraulique lime	1 white sand $0-2 \text{ mm}$
Resetting in place of detached stones Mortar composition: 1/2 lime putty 1/2 hydraulique lime	
Repair of surface decoration with mortar (in-filling/edging repair) Mortar composition: 2 lime putty $ \begin{array}{cccccccccccccccccccccccccccccccccc$	

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

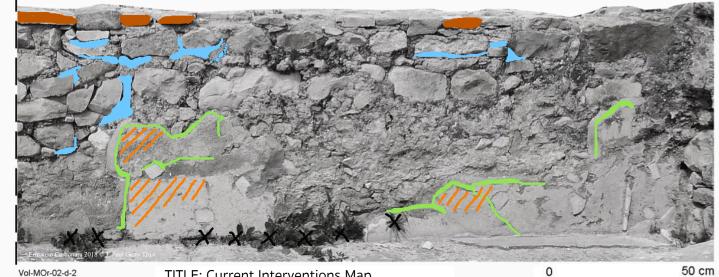
1 hydraulic lime

I stone powder 0 - 0.25 mmResetting in place of detached elements of the s Mortar composition:

Removal and resetting in place of parts of the si Mortar composition:

Reintegration of areas of loss with:

PREPARED BY



Vol-MOr-02-d-2

BASE MADE ON: 03/2018

TITLE: Current Interventions Map

DATE: June/2018

PREPARED BY: Mohamed Zaki

Getty













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.

