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TECHNICIAN TRAINING FOR THE CONSERVATION OF MOSAICS

PART 2
THE CONSERVATION OF DETACHED MOSAICS

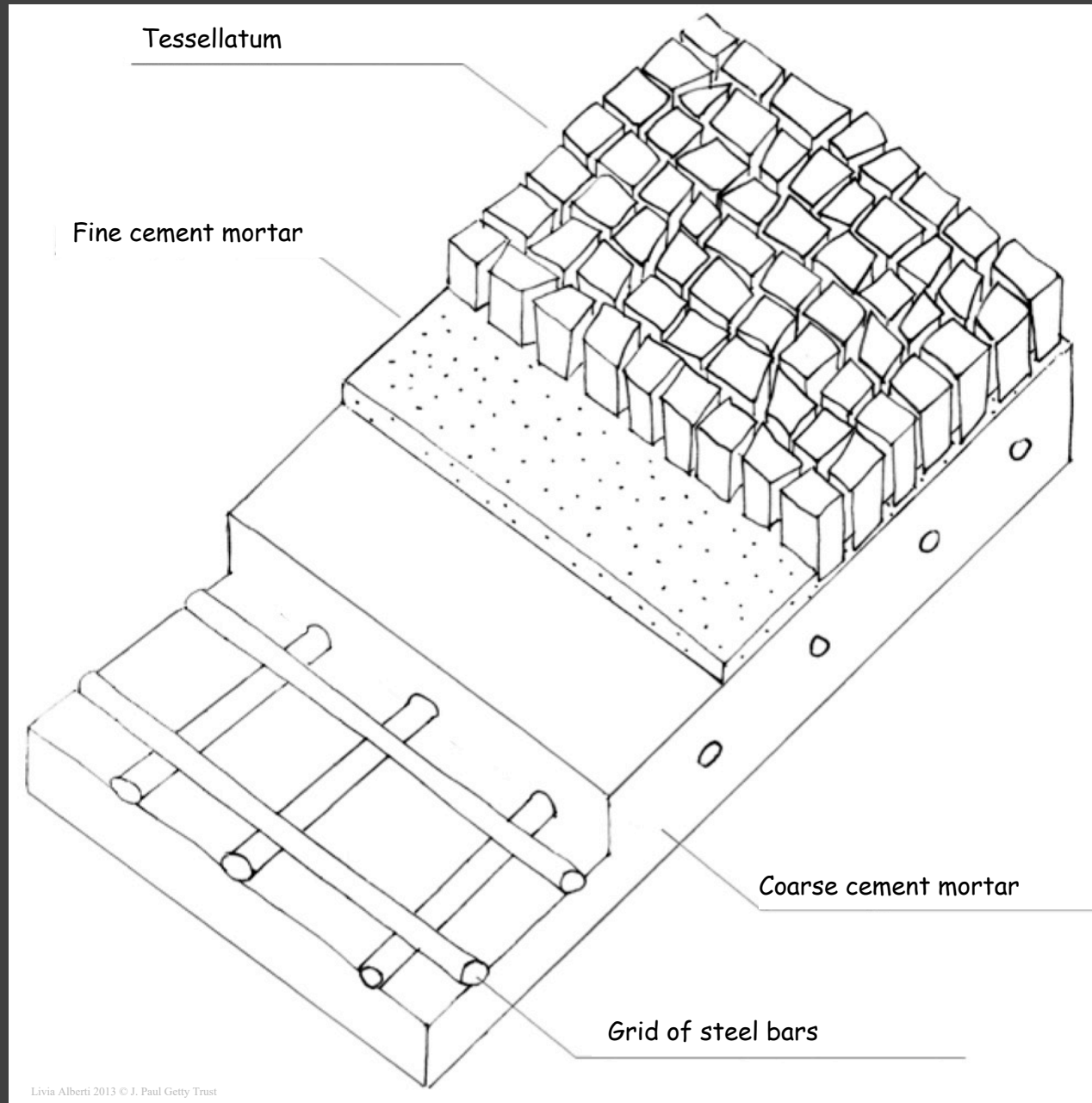
Mosaics detached and relaid in situ on
reinforced concrete:
their deterioration, in situ maintenance treatments
and documentation

Livia Alberti, Ermanno Carbonara, Thomas Roby



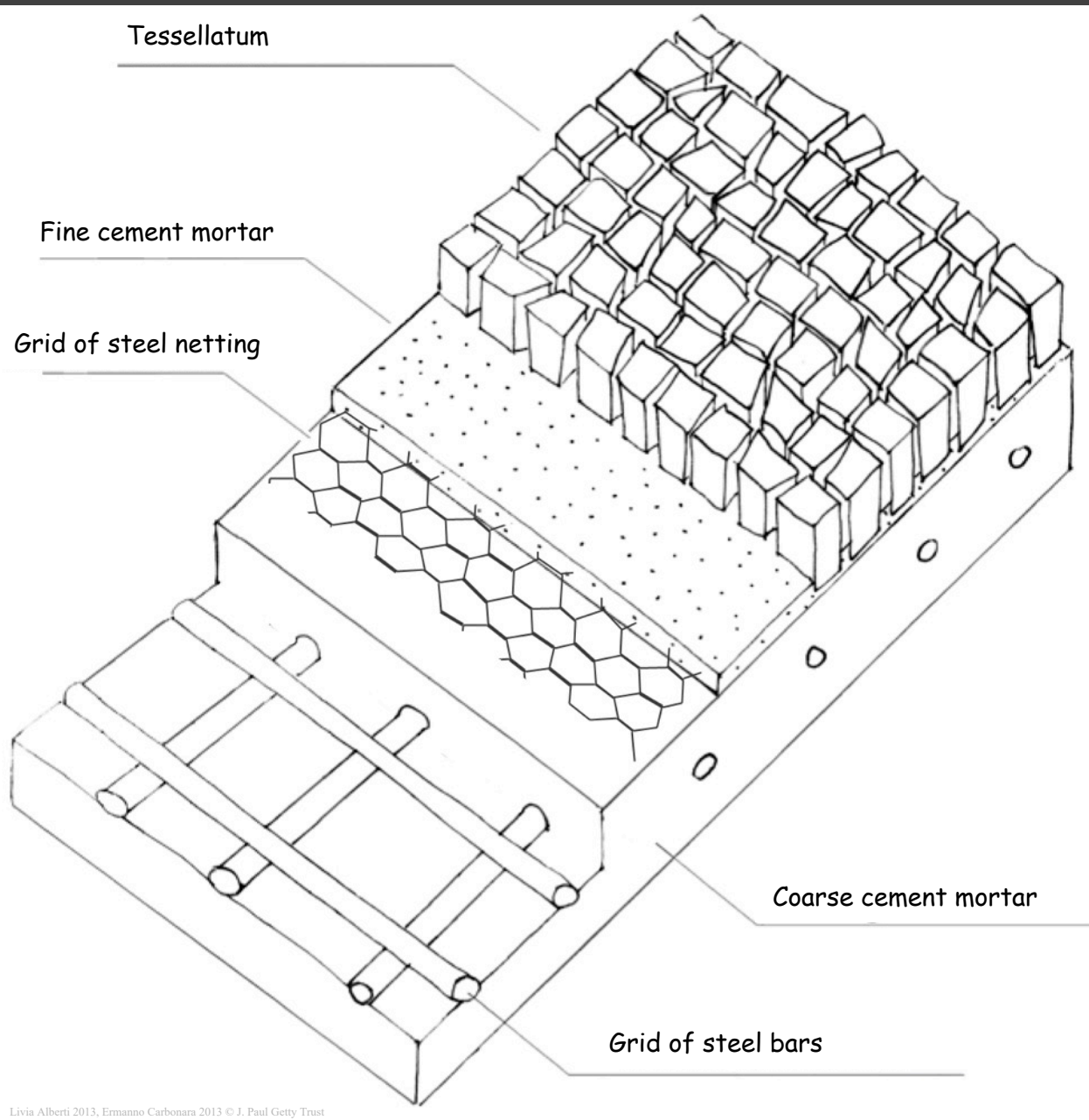
Examples of reinforced concrete panels

Panel reinforced with steel bar grid



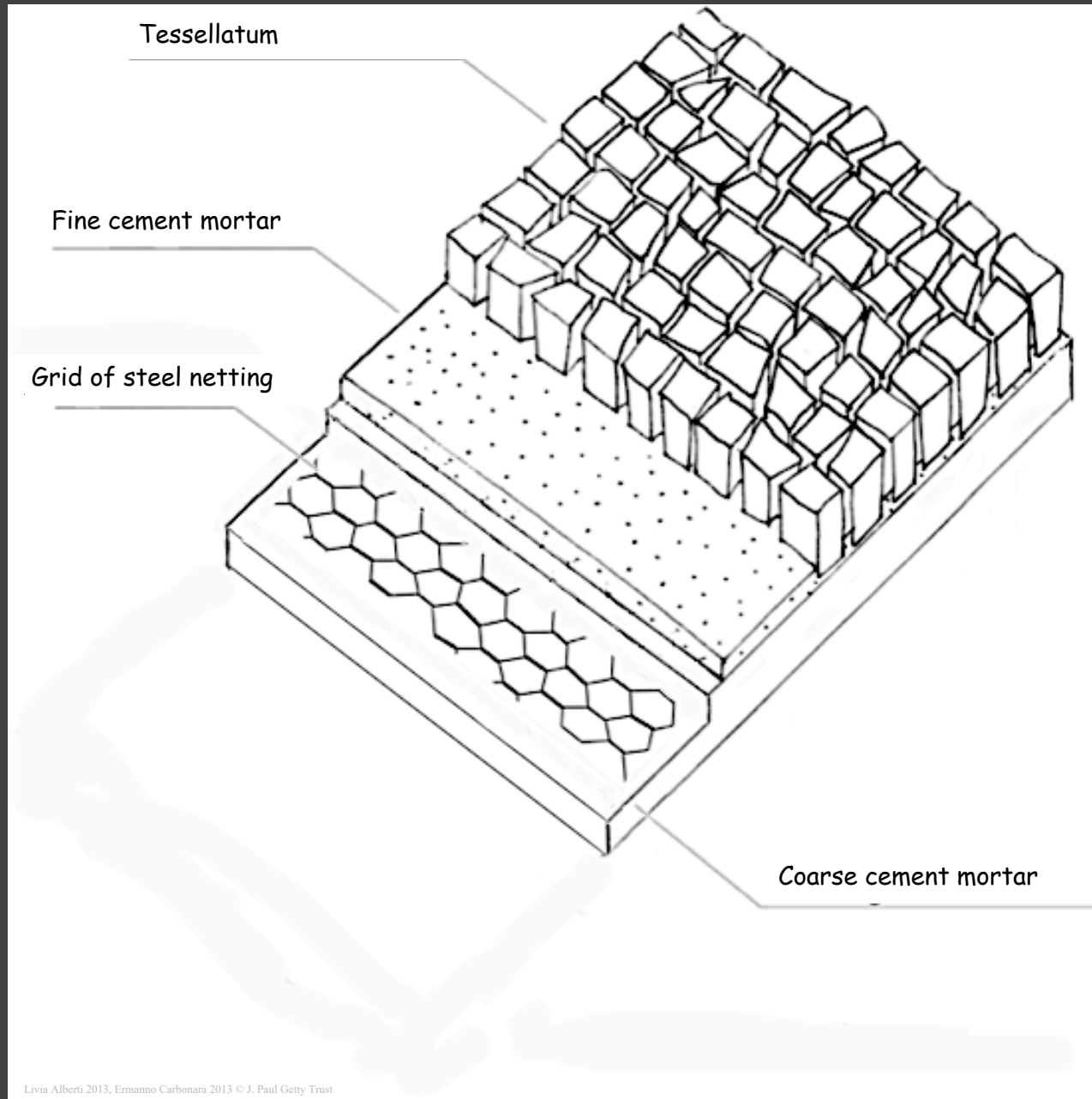
Livia Alberti 2013 © J. Paul Getty Trust

Panel reinforced with steel bar grid and wire



Livia Alberti 2013, Ermanno Carbonara 2013 © J. Paul Getty Trust

Panel reinforced with steel wire

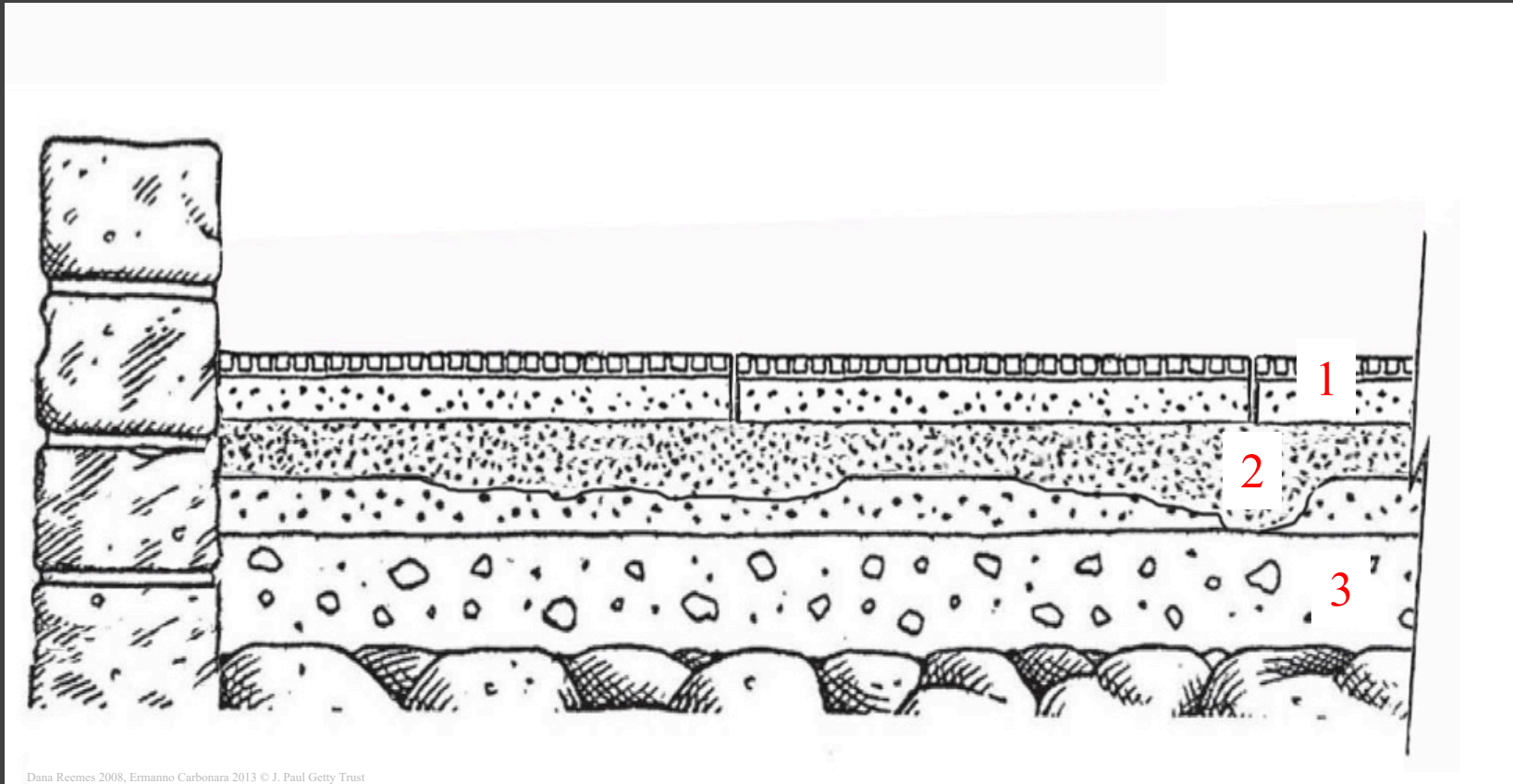


Example of on-site installation of reinforced concrete panels

1 Mosaic panels

2 Layer of sand

3 Original preparatory layers of mortar

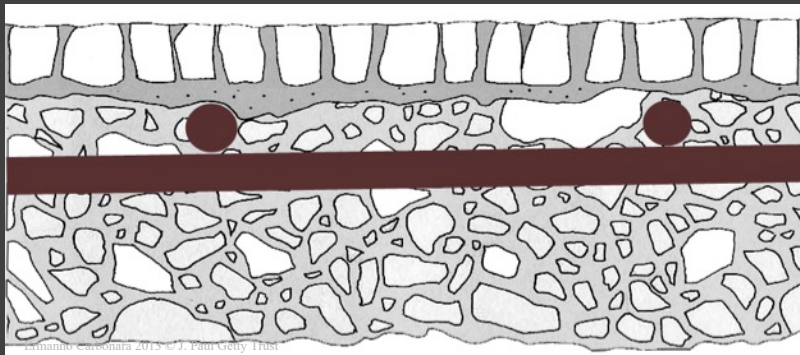


Dana Reemes 2008, Ermanno Carbonara 2013 © J. Paul Getty Trust

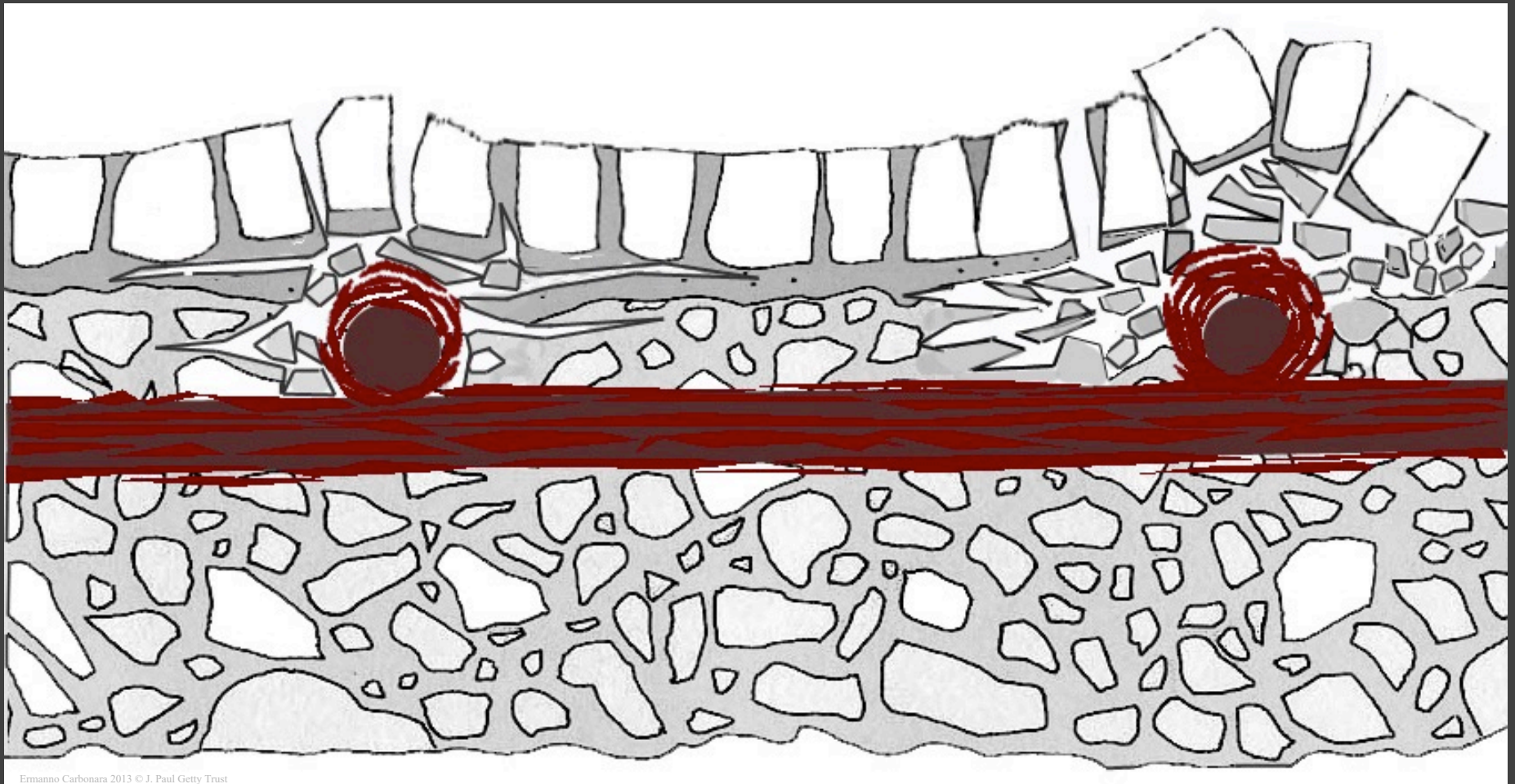
Main deterioration phenomena

Corrosion of steel bars in the concrete

Deformation of mosaic support panels



Corrosion of steel bars in the concrete





Ermanno Carbonara 2010 © J. Paul Getty Trust



Ermanno Carbonara 2010 © J. Paul Getty Trust



Ermanno Carbonara 2010 © J. Paul Getty Trust



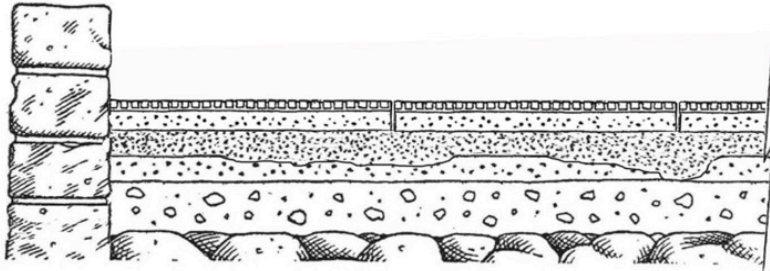
Ermanno Carbonara 2010 © J. Paul Getty Trust



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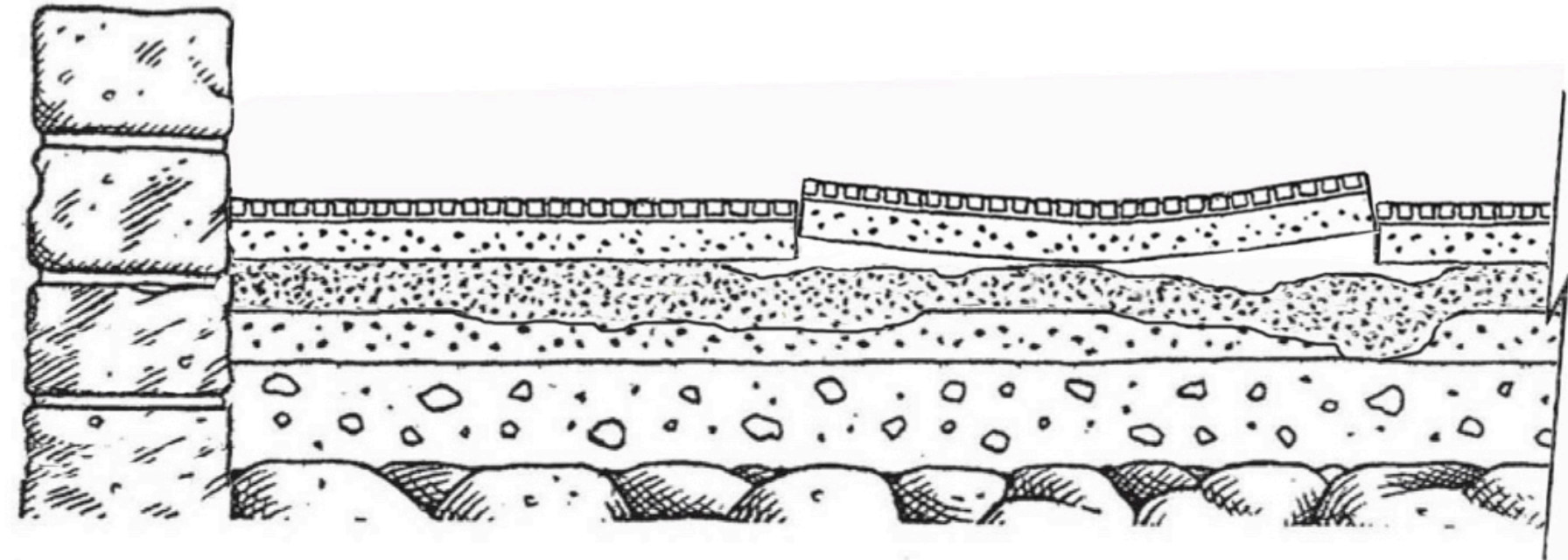


Ermanno Carbonara 2010 © J. Paul Getty Trust



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Deformation of mosaic support panels



Dana Reemes 2008, Ermanno Carbonara 2013 © J. Paul Getty Trust



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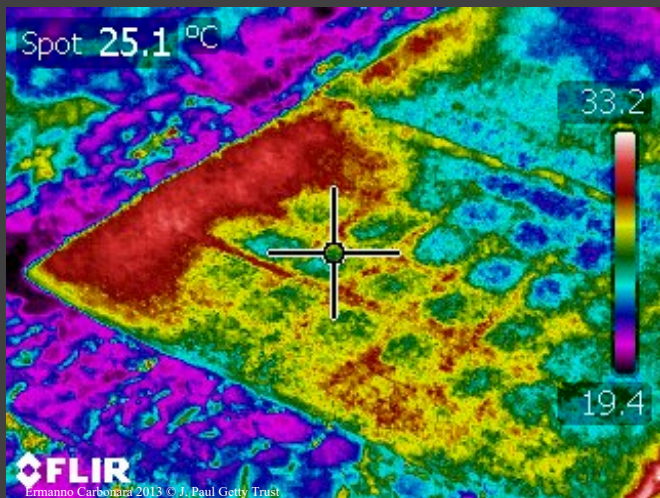


Ermanno Carbonara 2013 © J. Paul Getty Trust

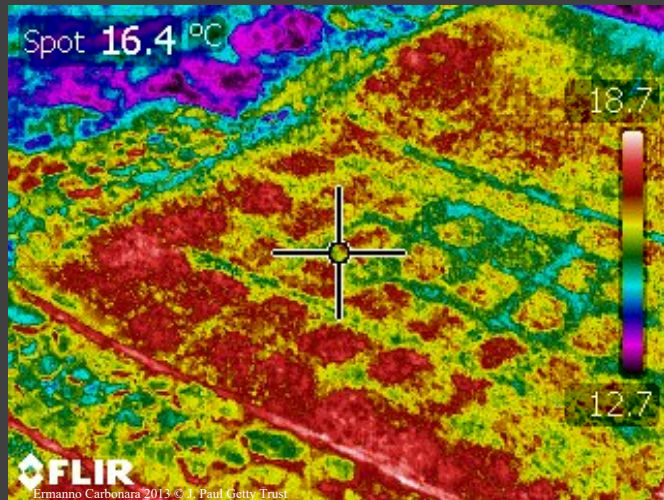
The effects of solar radiation on deteriorated and exposed panels of mosaics relaid on site.



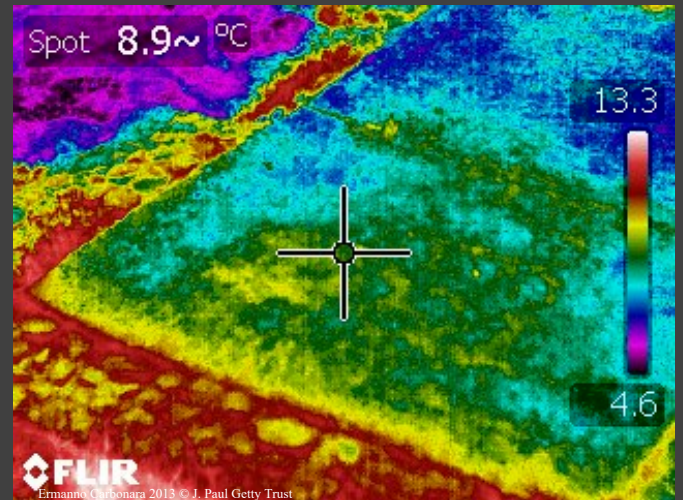
Ermanno Carbonara 2013 © J. Paul Getty Trust



15:00



18:00



07:00

In situ maintenance treatments

Stabilization by removing sections of the tessellatum using protective facing.

Stabilization by removing the individual tesserae with the use of “working aid” photograph.

Stabilization by removing sections of the tessellatum using protective facing



Before stabilization

Livia Alberti 2007 © J. Paul Getty Trust



Livia Alberti 2007 © J. Paul Getty Trust

Complete cleaning of the area of the mosaic panel affected by corrosion of rebar



Livia Alberti 2007 © J. Paul Getty Trust



Livia Alberti 2007 © J. Paul Getty Trust

Protection of the area with facing



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Temporary removal of the section of tessellatum located above the corroded bar



Livia Alberti 2007 © J. Paul Getty Trust

Removal of the bar remains and cleaning of the area to remove debris



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Cutting the steel bar



Livia Alberti 2007 © J. Paul Getty Trust

Filling with mortar the space left by the removed bar and concrete debris



Livia Alberti 2007 © J. Paul Getty Trust

Resetting the previously removed tessellatum section



Livia Alberti 2007 © J. Paul Getty Trust



Livia Alberti 2007 © J. Paul Getty Trust

Resetting the previously removed tessellatum section



Livia Alberti 2007 © J. Paul Getty Trust

Removal of the facing, including the adhesive, and filling interstices, cracks and lacunae with mortar

Stabilization by manually removing the tesserae using a “working aid” photograph



Livia Alberti 2007 © J. Paul Getty Trust

Before stabilization



Livia Alberti 2007 © J. Paul Getty Trust



Livia Alberti 2007 © J. Paul Getty Trust



Livia Alberti 2007 © J. Paul Getty Trust

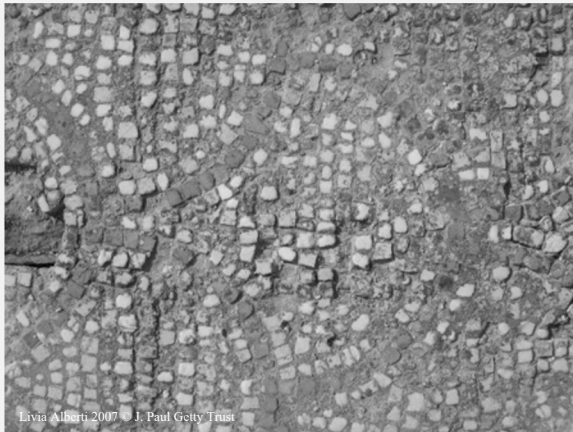


Livia Alberti 2007 © J. Paul Getty Trust

Removing and placing the detached tesserae on temporary sand bedding

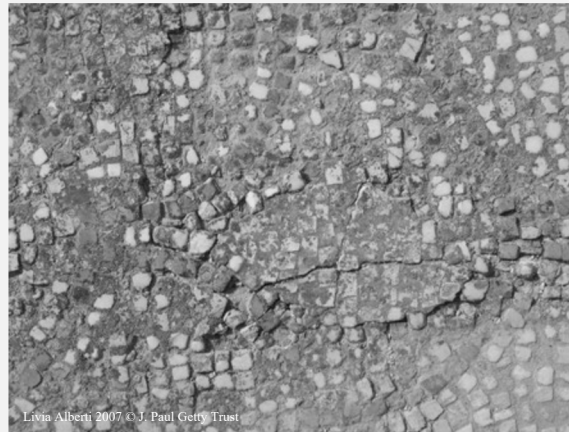


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TS-M1-28_2007-04-06_6AT_Section1



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TS-M1-28_2007-04-06_6AT_Section2



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TS-M1-28_2007-04-06_6AT_Section3

Using a “working aid” photograph



Livia Alberici 2007 © J. Paul Getty Trust

Resetting the tesserae, filling interstices, cracks and lacunae with mortar

Documentation of mosaics lifted and relaid on reinforced concrete

DATA FORM NO. 2 – PREVIOUS INTERVENTIONS

STUDY PHASE

MOSAIC ID ____/____/____/____

PREVIOUS INTERVENTIONS ON THE MOSAIC

Mortar repairs

- Infilling of lacunae
- Edging repair
- Filling of interstices between tesserae
- Grouting of voids between preparatory layers

Reintegration of lacunae

- with tesserae
- with pieces of stone, brick or other material inserted into the mortar

Lifting and relaying on a new support

- Reinforced concrete/cement support
- Other type of support: _____

Surface treatment

- Chemical cleaning
- Mechanical abrasion
- Application of a surface product (resin, wax, etc.)
- Other: _____

Parts detached and stored elsewhere

- Reburial *(Draw a vertical section of the reburial; describe the fill materials and separation membranes used, provide the total thickness and the thickness of each layer)*

PREVIOUS INTERVENTIONS AROUND THE MOSAIC

- Drainage
- Open shelter
- Wall stabilization
- Removable cover
- Closed shelter
- Other: _____
- Access barrier: _____

DATES OF PREVIOUS INTERVENTIONS CARRIED OUT AND INFORMATION SOURCES

PREPARED BY

DATE

LEGEND – PREVIOUS INTERVENTIONS MAP

MOSAIC ID ____/____/____/____

Mortar repairs



Infilling of lacunae



Edging repair



Outline of each infilling or edging mortar



Overlapping between mortar layers (new → old)



Filling of interstices between tesserae



Reintegration of lacunae



Reintegration with tesserae



Reintegration with :

Detached mosaics



Outline of the support panels of a detached mosaic re-laid in situ



Location of the metal reinforcements of the support panels



Parts detached and stored elsewhere

Other types of interventions



Reburial outline



Drainage openings



PREPARED BY

DATE

DATA FORM NO. 3 – CONDITION ASSESSMENT

STUDY PHASE

MOSAIC ID ____/____/____/____

INSPECTION TYPE Initial inspection Maintenance cycle

PRESENT EXPOSURE CONDITIONS

- In open air Reburied Under an open shelter
- Walked on Under a removable cover Under a closed shelter
- Parts not excavated or inaccessible

During the initial inspection, check the boxes of all the deterioration phenomena that are present. During maintenance cycles, only indicate new deterioration phenomena that have occurred since the last inspection or last intervention.

STRUCTURAL DETERIORATION

(Condition Assessment Map No. 1)

- Tessellatum lacunae Depressions
- Cracks Detachments between mosaic layers
- Bulges

SURFACE DETERIORATION

(Condition Assessment Map No. 2)

- Detached tesserae Stains
- Deteriorated tesserae Incrustations
- Deteriorated mortar between tesserae Efflorescence

PRESENCE OF BIO-DETERIORATION AGENTS

(Condition Assessment Map No. 3)

- Micro-organisms Tunnels or entrance holes made by insects and other animals
- Vegetation

DETERIORATION OF INTERVENTIONS

(Condition Assessment Map No. 4)

- Deteriorated lacunae fills or edging repairs
- Deteriorated mortar between tesserae
- Re-detached tesserae
- Deteriorated support panels
- Deteriorated support metal reinforcements

Reburial:

- Presence of vegetation
- Loss of fill materials
- Deteriorated separation membranes

DETERIORATION OF INTERVENTIONS AROUND THE MOSAIC

- Clogged drainage Deteriorated cover or shelter
- Stabilized walls with new deterioration Damaged access barrier
- Other: _____

OBSERVATIONS ON THE CONDITION ASSESSMENT

GENERAL CONDITION OF THE MOSAIC

Good **Fair** **Bad**

Date recommended for next inspection: _____
(No intervention required)

Date recommended for intervention: _____
(Intervention required)

PREPARED BY _____

DATE _____

LEGEND – CONDITION ASSESSMENT MAP NO. 4

DETERIORATION OF INTERVENTIONS

MOSAIC ID ____/____/____/____



Deteriorated lacunae fills or edging repairs



Deteriorated mortar between tesserae



Re-detached tesserae or detached tesserae of a re-laid mosaic



Deformed mosaic support panels



Bulging areas in support panels



Visible deterioration of metal reinforcements in support panels



Detachment between tessellatum and support panels



Cracks in mosaic support panels



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Livia Alberti, Elsa Bourguignon, Thomas Roby 2008, 2011, 2013 © J. Paul Getty Trust and Institut National du Patrimoine de Tunisie

DATA FORM NO. 5 - CURRENT INTERVENTIONS

INTERVENTION PHASE

MOSAIC ID _____ / _____ / _____ / _____

INTERVENTION TYPE

Initial intervention

Maintenance cycle

DATE OF PREVIOUS INTERVENTION

DATE OF PREVIOUS INSPECTION

DATE AND LENGTH OF CURRENT WORK

DATE RECOMMENDED FOR THE NEXT INSPECTION

TREATMENTS CARRIED OUT ON THE MOSAIC

- Vegetation removal
- Cleaning of the entire surface
- Cleaning of part of the surface
- Removal of modern repair mortars
- Resetting tesserae
- Filling interstices between tesserae
- Grouting voids between preparatory layers
- Infilling lacunae and/or edging repairs
- Removal and resetting tesserae with facing
- Removal of metal reinforcements in support panels
- Treatment of metal reinforcements in support panels
- Drainage
- Reburial *(Draw a vertical section of the reburial: describe the fill materials and separation membranes used, provide the total thickness and the thickness of each layer)*

INTERVENTIONS CARRIED OUT AROUND THE MOSAIC

- Wall stabilization
Notes:
- Other: _____
Notes:

NAMES OF THE TECHNICIANS WHO CARRIED OUT THE WORK

PREPARED BY

DATE

LEGEND - CURRENT INTERVENTIONS MAP

MOSAIC ID _____ / _____ / _____ / _____



Vegetation removal



Cleaning of part of the surface



Resetting tesserae

Mortar composition:



Filling interstices between tesserae

Mortar composition:



Grouting voids between preparatory layers

Mortar composition:



Infilling of lacunae and/or edging repair

Mortar composition:



Infilling of lacunae and/or edging repair

Mortar composition:



Infilling of lacunae and/or edging repair

Mortar composition:



Facing with adhesive:



Removal and resetting tesserae with facing



Removal of metal reinforcements in support panels



Treatment of metal reinforcements in support panels



Drainage openings



Reburial of a part of the surface

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DATE

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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.

