

13TH ICCM CONFERENCE - INTERNATIONAL COMMITTEE FOR THE CONSERVATION OF MOSAICS - BARCELONA- October 2017

PRESERVATION AND PRESENTATION OF MOSAICS IN TYRE - WORLD HERITAGE SITE IN LEBANON

MINISTRY OF CULTURE - DIRECTORATE GENERAL OF ANTIQUITIES
SAMAR F. KARAM - ALI KHALIL BADAWI

DESCRIPTION

Tyre is an ancient Phoenician city located in the South of Lebanon, 83 km south of the capital, Beirut. The city reigned over the seas and founded prosperous colonies. The Historic site, City Site and EL Bass, was added to The UNESCO's list of World Heritage Sites in 1984. The City Site is composed of important archaeological vestiges, the Roman baths, the palaestra, the arena, the Roman colonnaded road, the residential quarter, and the remains of the cathedral built in 1127 and some of the walls of the ancient Crusader castle. The El Bass Site was the principal entrance to the town in antique times, and comprises the remains of the Necropolis, a Roman triumphal arch, an aqueduct and the hippodrome of the 2nd century, one of the largest of the Roman world. Both sites are rich of mosaics.

The presentation and the preservation of some mosaics in Tyre are implemented within the framework of the Cultural Heritage and Urban Development Project (CHUD) - BAALBEK AND TYRE ARCHAEOLOGICAL PROJECT. This poster illustrates the different interventions on the various mosaics and pavements on the two sites. The general objective of the project was: "Preservation of the significance of the cultural resource and sustainable use of the areas, based on restoration, conservation, and prevention from threats".

LOCATION



EL BASS



EL Bass- Area of intervention

- Church with Garden
- The Colombarium
- The Church near the Roman Arch

Cleaning

- Brushing
- Disinfections by biocide application
- Otracide 25% and hand removal of weeds
- Wet cleaning with steam cleaner
- Mechanical cleaning of crusts
- Mechanical removal of joint
- Removal of oxidized metalwork

Pre-Consolidation and Consolidation Measures

- Restoring the cohesion of tesserae with impregnation of calcol
- Filling hydraulic lime mortars to restore the adherence to the support
- Replacement of the parts detached during cleaning phase
- Reconstruction of missing parts with suitable material similar to original ones, and using tesserae spread in the excavation area.
- Mapping
- Lifting out fragmented stone slabs
- Consolidation of mortar (by Calosil)
- Leveling the underlying mortar with mortar mix to fit to the original mortar (NHL 5 - slaked lime mix with aggregates and hydraulic additives)
- Re-assembling the fragments of slabs by attaching their rear surfaces onto a fiber glass mesh and fixing with Epoxy adhesive, type EPO 121 (point gluing only)
- In-situ relocation of each slab onto mortar bed with a mortar mix to fit to the original (NHL 5 - slaked lime mix (2:1) with stone powder aggregates and brick and charcoal additives)
- Repeating the joints in between the slabs (2 grey fine limestone powder, 4 white fine limestone powder, 2.5 NHL5)
- Edging borders of opus sectile

Mixes for mosaic conservation

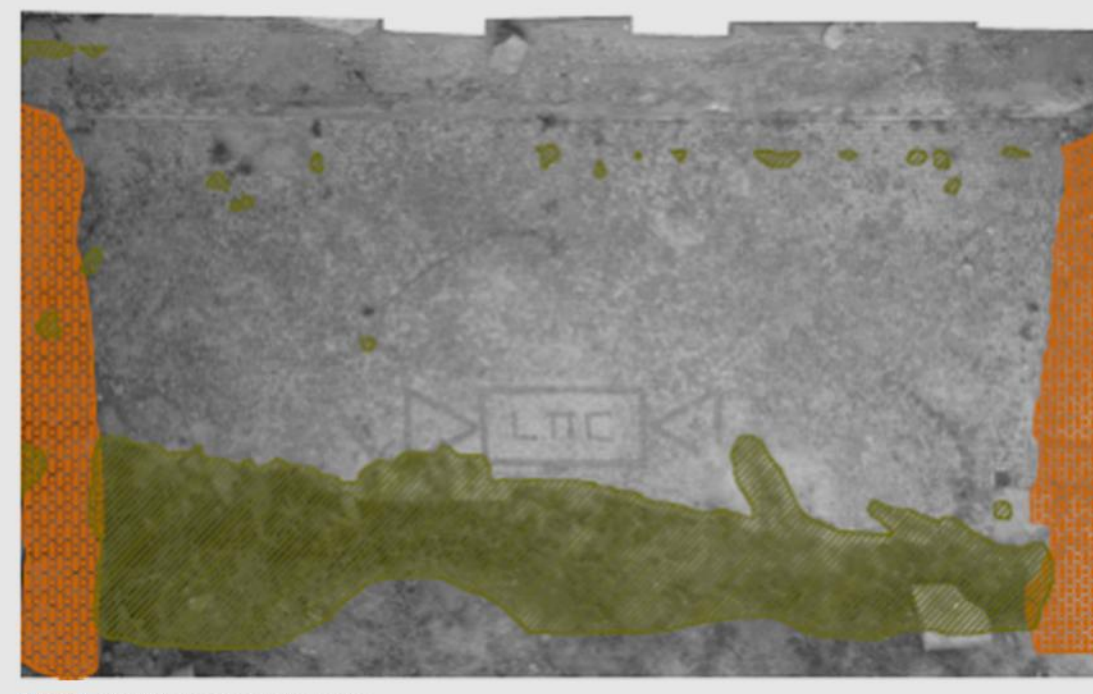
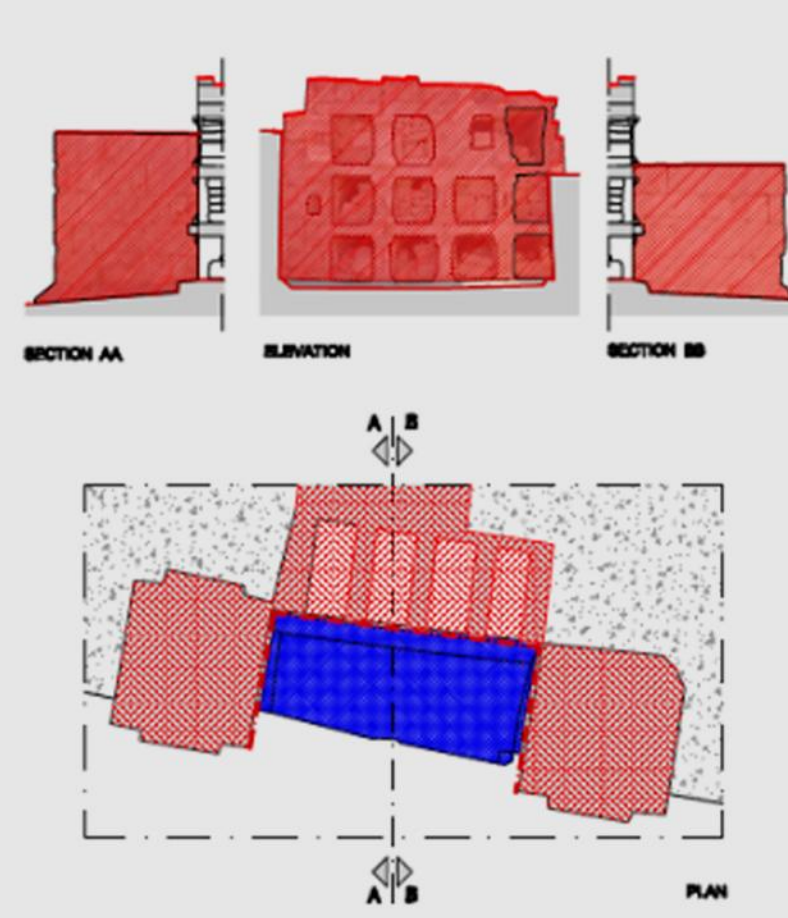
- Edging**
- 2 parts of grey coarse to fine mix of limestone powder
 - 2 parts of white limestone fine powder
 - 0.5 parts of brick medium size
 - 2.5 parts of NHL5
- Bedding for relocating tesserae**
- 2 parts of grey coarse to fine mix of limestone powder
 - 2 parts of white fine limestone powder
 - 1.5 parts of sand - 0.5 bricks burgul size
 - 2 parts of NHL5 0.5 NHL2
- Consolidation of in-situ mortar bed**
- 2 parts of PLM-SM
 - 8 parts of distilled water
 - 2 g parts of fine limestone powder

CHURCH NEAR THE ARCH:



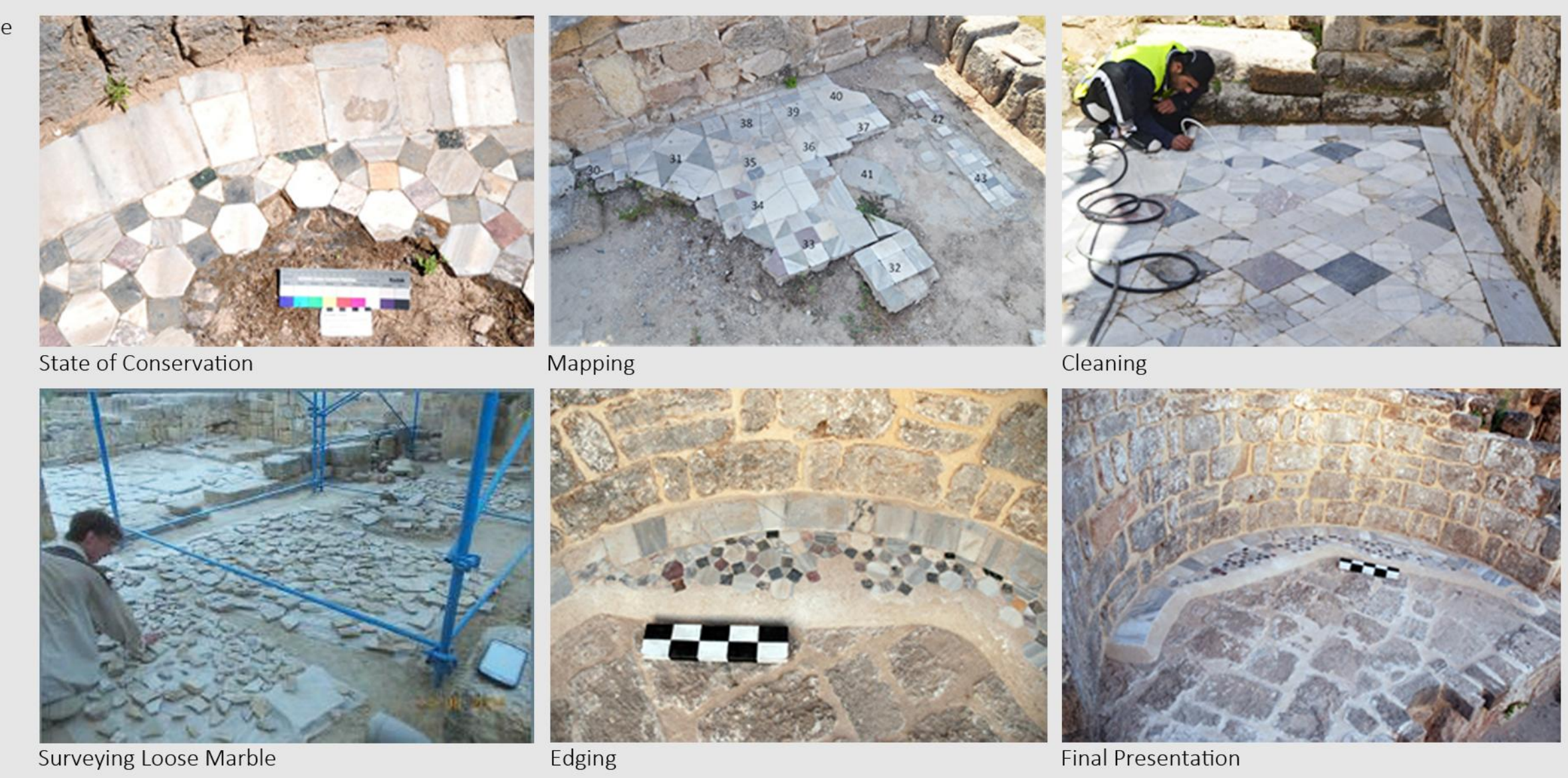
COLOMBARIUM

LOCATION OF INTERVENTIONS



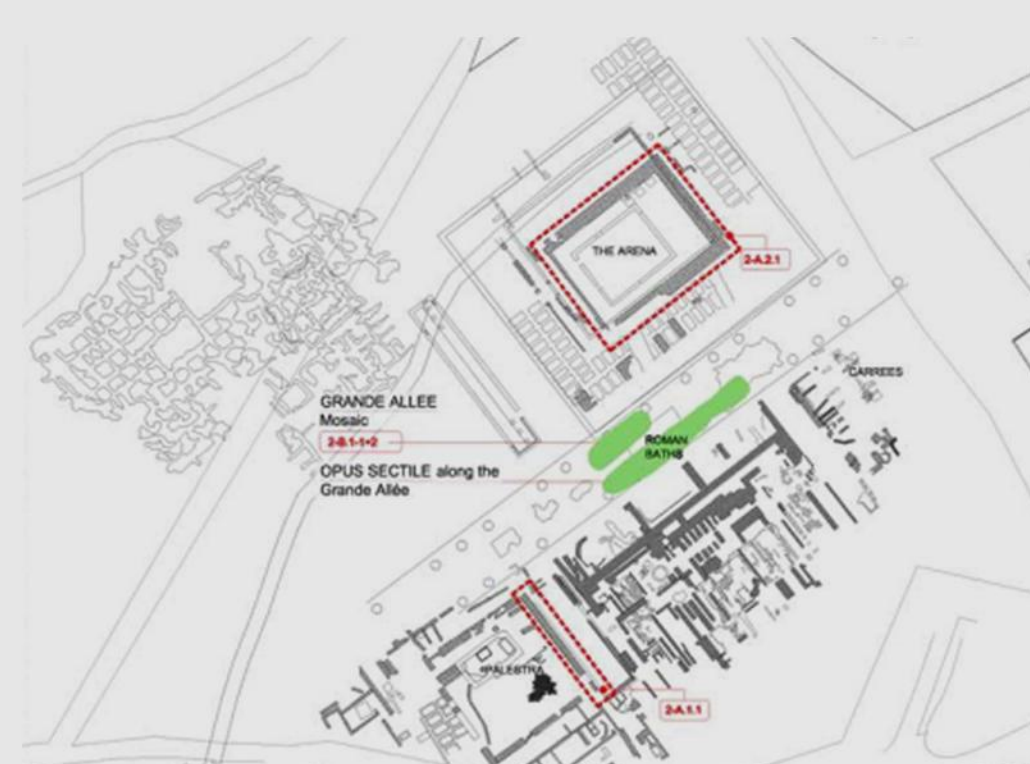
CHURCH WITH GARDEN

The opus sectile is frequently encountered in late imperial houses and public buildings. The extended presence of inappropriate materials, such as Portland cement and iron bars, associated with mechanical stress and salt efflorescence, required their urgent removal.



CITY SITE

Several important buildings (baths, glass workshop, palaestra, arena, etc.) were exposed to weather actions for many years and affected by severe phenomena of material deterioration. The residual parts of mosaics discovered were laid on slabs of reinforced concrete. Oxidation of reinforcing steel bars inside the concrete slabs is causing deep damage to the surfaces.



Cleaning

- Hand removal of small plants, followed by the removal of the big ones through injection of glyphosate in the roots
- Disinfection from autotrophic/heterotrophic organism colonies by spray/brush applied biocide (Otracide 25%)
- Brushing
- Mechanical cleaning of the back side of the opus sectile fragments and slabs
- Removing all debris and cleaning the underlying mortar

Pre-Consolidation

- Documentation and precise mapping of the intervention areas
- Numbering of fragments
- Removal of the loose opus sectile fragmented slabs from the original mortar bed or cutting away cement edging
- Bridging the fragments with animal glue and textile
- Application by means of animal glue and canvas layer bandage
- Biocide treatment to mortar
- Consolidation of original mortar by Calosil
- Hydraulic lime mortar levelling
- Arrangement of the fragments on fiberglass mesh with Epoxy Resin EPO121
- Replacement of the opus sectile on the mortar with modified hydraulic lime to suit the original mortar bed.
- Filling voids between sections with a suitable gravel mix on geotextile to accomplish its drainage

Mortar Mixes

- Bedding**
- Grey coarse to fine mix of limestone powder: 2 parts
 - White fine limestone powder: 2 parts
 - Sand: 1.5 parts
 - Brick (medium size powder): 0.5 parts
 - NHL 5: 2 parts
 - NHL2: 0.5 parts
- Edging and filling lacunae:**
- Grey coarse to fine mix of limestone powder 2 parts
 - White fine limestone powder 3.5 parts
 - Brick (medium size powder) 0.5 parts
 - NHL5 2.5 parts
- Pointing:**
- Grey fine limestone powder: 2 parts
 - White fine limestone powder: 4 parts
 - NHL5: 2.5 parts

ROMAN BATH

The area selected for the intervention is the central and largest room called Frigidarium. The intervention can be considered as a case for the conservation treatment of a large remain of the opus sectile. The Opus sectile between the Roman Baths and the Grande Allée required an overall consolidation with re-fixing of the much loose marble slabs, made of Proconnesian marble (from the Island of Marmara in Turkey) in a sufficiently good state of preservation. The total floor area of this section measures 114.07 sq.m, the area still covered with opus sectile measures 56.81 sq.m, the areas of voids are 57.27 sq.m.



LATRINA

The mosaic located in the Latrina was in a very bad state of conservation, totally covered by tall vegetation, grass, bushes and earth.

Intervention:

- Dried plants were removed manually
- During the cleaning in the lacks, many tesserae were recovered from the earth, and stored after marking their location
- Fixing the edges and all the sides more decayed of the mosaics by means of gauzes soaked in a water solution 6% with rabbit-skin glue (a natural adhesive).
- Reconnection of the mosaic tesserae
- Partial recovery of cohesion of the mosaic by impregnation of acrylic resin
- Reintegration of missing parts with hydraulic mortar
- In case of lacks, protection bandages with acrylic resin removed after the cleaning
- Reintegration of the lacks with layer of hydraulic mortar.



GRANDE ALLEE

The Mosaic- Opus Tessellatum- of the Grande Allée was in a very poor state of conservation, with diffused vegetation growth and abundant cracks produced by the rusting of the iron embedded in the concrete bed. Other serious problems were the de-cementation of tesserae which were detaching and being removed by tourists, and powdering of the original lime-ground.

