Institute for the Protection of Cultural Heritage of Slovenia

DOCUMENTATION AND PROJECT OF PRESENTATION OF BLACK&WHITE MOSAIC FROM ROMAN *VILLA RUSTICA* NEAR MOŠNJE (SLOVENIA)

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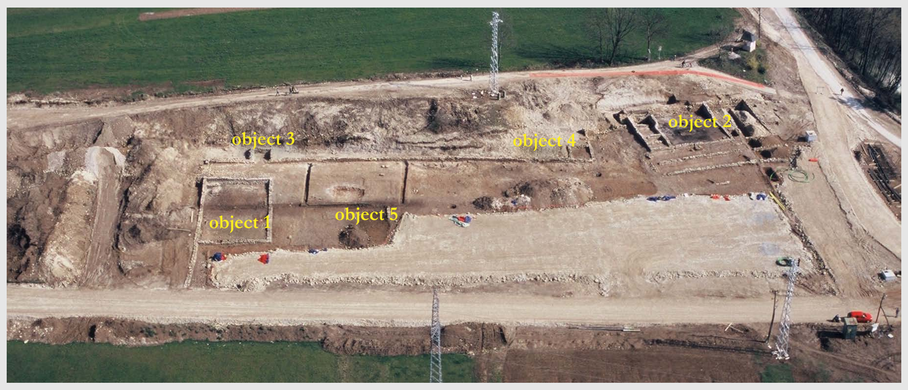
The Roman mosaic was discovered during the archaeological excavations in years 2006 and 2007 of *villa rustica* near Mošnje in the northwestern region of Slovenia.



Villa is dated in 1. and 2. Century AD, on the basis of small finds (coins, jewellery, pottery, etc).

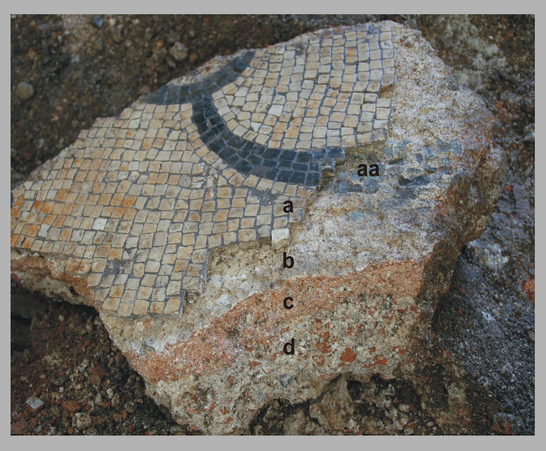
Mosaic was found in the *caldarium* (part of the *balneum*) in the object 2.
The room with an apse on the west side had a central heating system (*hypocaustum*) and walls covered with red and white wall paintings. Mosaic measured approximately 12,5 m². From the larger mosaic fragments it is possible to recognise motifs of sea animals – dolphins and vegetal motif of ivy or achantus, besides triangles and bordures. Especially interesting are semicircular parts of the mosaic with motif of triangles and other fragments that clearly show that also lower part of the wall was decorated with a mosaic.

Mosaic was found in *caldarium* (part of *balneum*) in the object 2 .

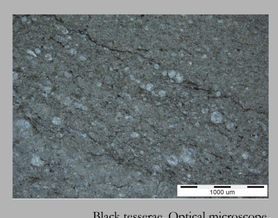
Mosaic found in the rubble layer of *caldarium* was completely destroyed, when the hypocaust collapsed.
Only some pieces of mosaic are relatively large (around 0.50 × 0.50 m), while about 400 fragments are of smaller dimensions (size from 2 × 2 cm to 40 × 40 cm). In addition, high quantities of *tesserrae* were found. Fragments of mosaic were in the rubble layer without any significant order. The documentation of fragments is based on use of total station combined with photography.

Fragments of mosaic found were in extremely poor condition. Due to the nature of excavation (protective, at the construction of highway) we decided for short temporary preservation of fragments that was not expensive and reasonably fast. Larger parts of the mosaic were wrapped with transparent foil, while smaller fragments were separated with protective paper and put into boxes and transferred to a restoration-conservation workshop.

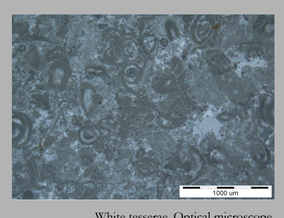
The mineralogical-petrographic investigation revealed that black and white *tesserae* were made of limestone; the black *tesserae* are made of laminated micrite limestone containing quartz grains and fossil radiolaria, whereas the white tesserae are made of biosparite limestone containing numerous fossil foraminifera. Aggregate of mortar layers consisted of local fluvioglacial deposits with predominant carbonate grains and addition of crushed brick. Brick powder into a mortar mixture conducted a pozzolanic reaction with lime and water.
The floor mosaic discovered in the caldarium consists of several layers, which we marked with letters and analysed independently:



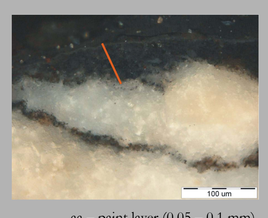
a – *tessellatum* with white and black mosaic cubes 1 × 1 × 0.5 cm in size and lime mortar filling the space between them. The black cubes are made of laminated micrite limestone containing quartz grains and fossil radiolaria. The white cubes are made of biosparite limestone containing numerous fossil foraminifera.



Black tesserae. Optical microscope, transmitted light



White tesserae. Optical microscope, transmitted light



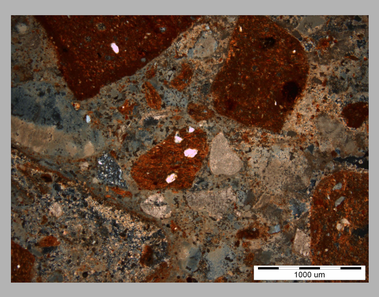
aa – paint layer (0.05 – 0.1 mm), pigment: carbon black

Paint layer. Optical microscope, reflecited light

b – the bedding layer is 1–2 mm thick. It consists of lime binder, lime aggregate and individual quartz grains. The fragments range from 0.06 to 0.39 mm in size. This mortar wasalso present between the mosaic cubes;

c – *nucleus* is 1.5 cm thick. Grains of ground brick predominate, i.e. the grains are sharp edged. The fine fraction of the aggregate is mainly represented by brick powder. Aggregate represent also rounded limestone grains and individual grains of quartz (monocrystalline and polycrystalline). The grains are medium sorted, and the binder is not cracked. In addition, individual clumps of lime are present. The individual areas with brick powder are very compact. The grains are between 0.05 to 6 mm in size, averaging about 2-3 mm. Porosity: 49.72 %, average pore diameter 66.4 nm, specific surface area: 51.14 ± 0.20 m2/g.

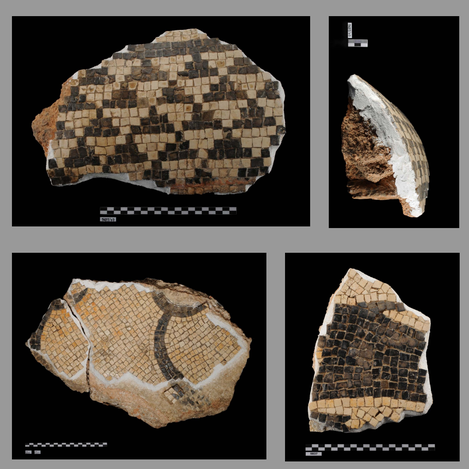
d – *rudus*. The exact thickness of this layer is hard to determine as the mosaic was discovered in a layer of ruins. The thickness of the preserved layer is > 5 cm. The aggregate is poorly sorted, the grains are large, ranging from 0.13 to 2.5 cm. The ratio of carbonate component to crushed brick is about 1 to 1. The carbonate component is represented by limestone and dolomite. Individual grains of magmatic rocks appear in places. The binder is lime and is a little cracked. A fine brick fraction is not present in this layer. Porosity: 41.76 %, average pore diameter 71.0 nm, specific surface area: 17.82 ± 0.09 m2/g.



Mortar. Optical microscope, transmitted light

A layer of plaster applied to tegulas was present at the mosaic covering the lower portion of the walls. It consists solely of fragments of ground brick. The fragments range from 0.2 to 2.2 mm in size, with individual grains of up to 6 mm. Lime was used as binder, which in contact with water and the added fine brick fraction (powder) it hardened into hydraulic plaster. Porosity: 46.57 %, average pore diameter 59.8 nm, specific surface area: 25.37 ± 0.15 m2/g.

The presentation proposed aims to ensure an adequate preservation of some parts of the mosaic floor from the archaeological site near Mošnje. Starting points for decision how the fragments would be presented to the public were the respect for the original materials (different layers of mortar) and the reversibility of choices. We have decided for the solution in which fragments are put on the supports that are in shape of the mortar of each mosaic fragment and assembled in a way to give the same height to all fragments. Advantage of this solution is also the possibility to change the location of the fragments on the ground of new reconstruction of the mosaic.
Smaller fragments that were wrapped on the excavation site well tolerated transfer to the restoration workshop, while larger fragments were somewhat damaged. Fragments of the mosaic were only partially consolidated and are now prepared for further process but not appropriate for public presentation.



The particular conditions in which the fragments in our possession have been preserved make the anchorage operations on new supports very complex. One of the main technical difficulties is the adjustment of the height of single mosaic fragments. Since all the mosaic fragments have significant differences in thickness of the preparatory layers, they cannot always be treated with conventional methods. So it is necessary to create a system specifically suited to the situation through the creation of a support capable to give the mosaic surface a coplanar structure and, at the same time, ensure a secure grip on the new support.

For this purpose we will use synthetic substrates made with a system based on epoxy Araldit SV427 and hardener HV 427. This product, as in the case of the mosaics of Padula, is particularly suitable for this type of intervention because it has a high dimensional stability and good mechanical strength, and allows easy processing even after hardening as well.
In this particular case, the designed methodology involves the installation of small magnets in the rudus of the mosaic. With this solution is possible to anchor the various portions of floor on the new supports.

It's a system that, while performing the necessary static-structural functions, has been also designed in such a way to have no contraindications for the future conservation of the mosaics. Moreover, the possibility to separate the fragments of mosaic from the supports without any shock for the ancient materials will allow, in the future, to display or move them (in or outside the museum) with very little physical and economic effort. The final presentation wants to privilege the technological aspect of flooring, thereby allowing access to the preparatory layers without complex and potentially traumatic operations for the mosaics. In this manner, the work is not aimed to conclude the study of these mosaics, but on the contrary it is intended as a prologue to new research.

Restoration project-proposal
On the one hand, the primary requirement of restoration is to preserve all ancient materials through operations targeted to inhibit all the degradations, on the other hand, final presentation of the mosaic has to be compatible with the data collected during preliminary studies.
For the anchorage on new support, has been taken into account the positive results of the restoration adopted for the mosaic fragments preserved in the Provincial Archaeological Museum of Western Lucania in the city of Padula, Italy.

The work will consist of at least 4 stages:
1. Cleaning of the surfaces of the pieces.
2. Pasting of the detached parts.
3. Consolidation of the mortars subject to the disintegration.
4. Anchoring on new support and final presentation.

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