

**INSTITUTE OF ARCHAEOLOGY
BELGRADE, SERBIA**

1ST INTERNATIONAL CONFERENCE WITH WORKSHOP

**SCIENCE FOR CONSERVATION
OF THE DANUBE LIMES**

*Mortar Design for Conservation – Danube Roman Frontier
2000 Years After*

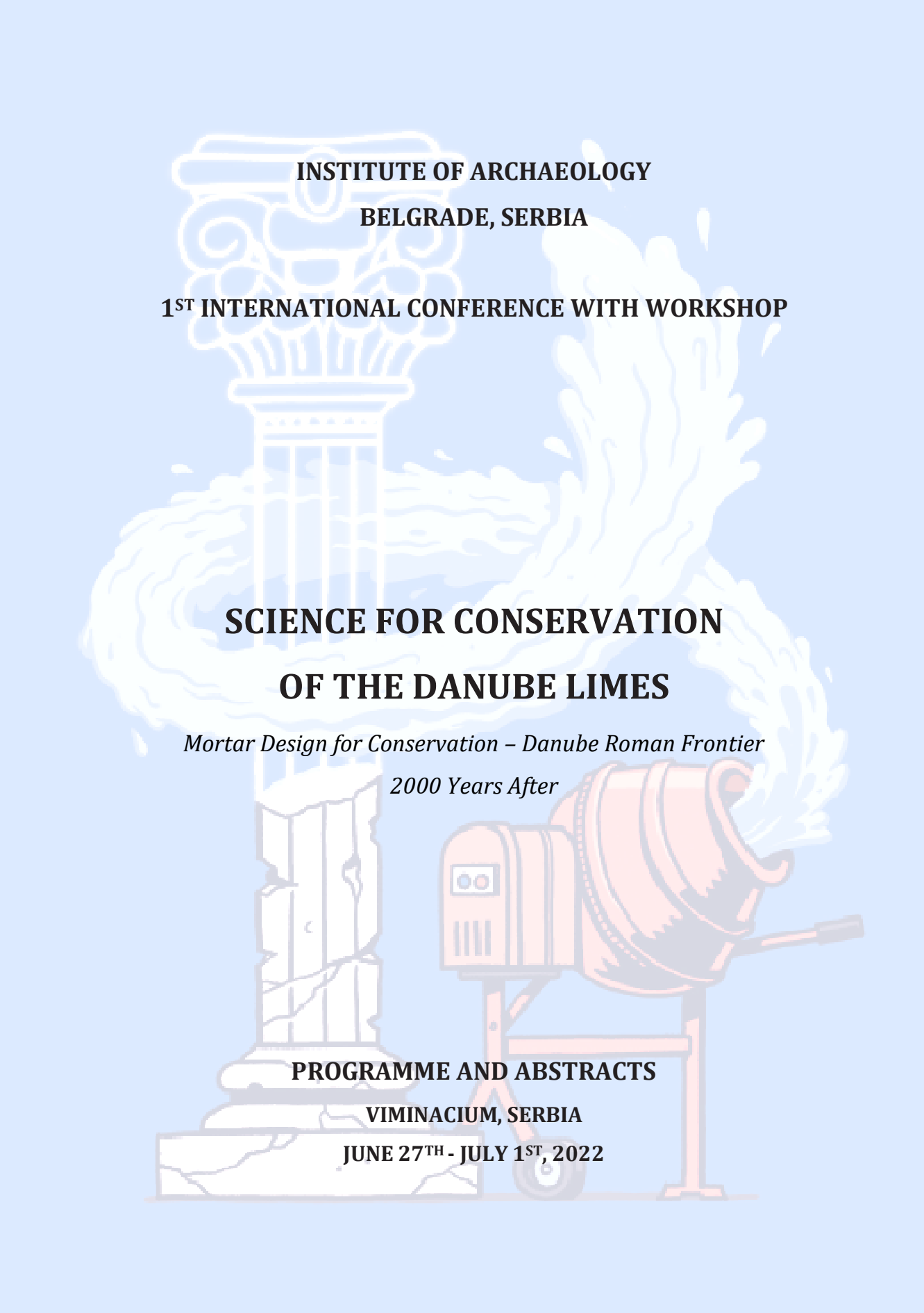


PROGRAMME AND ABSTRACTS

VIMINACIUM, SERBIA

JUNE 27TH - JULY 1ST, 2022





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Publisher:

Institute of Archaeology, Kneza Mihaila 35/IV, 11000 Belgrade, Serbia
institut@ai.ac.rs; <https://ai.ac.rs>; tel. +381 11 2637-191

Editor in Chief:

Miomir Korać, Institute of Archaeology, Belgrade, Serbia

Editors:

Emilija Nikolić, Institute of Archaeology, Belgrade, Serbia
Mladen Jovičić, Institute of Archaeology, Belgrade, Serbia

Graphic Design:

Emilija Nikolić, Institute of Archaeology, Belgrade, Serbia
Mladen Jovičić, Institute of Archaeology, Belgrade, Serbia

Proofreading:

Dave Calcutt

Book Illustration: Nikola Korać

Cover Photo: Photo-documentation of the MoDeCo2000 Project



ISBN 978-86-6439-072-9

This publication was created by the funding support of the Science Fund. The Institute of Archaeology is solely responsible for the content of this publication and it does not express the views of the Science Fund of the Republic of Serbia.

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RESEARCHING ROMAN MORTARS FROM THE DANUBE REGION - ARCHAEOLOGICAL PERSPECTIVE OF THE MODECO2000 PROJECT

MLADEN JOVIČIĆ

Institute of Archaeology, Belgrade, Serbia

mladen_jovicic@yahoo.com

Lime mortar is a building material that has been used since the 8th millennium BC. For thousands of years, people used it to make floors or plaster walls, while it was used as structural mortar from the period of the Roman Republic, after the beginning of the 2nd century BC (Artioli, Secco and Addis 2019: 172-173). The addition of pozzolanic materials enabled the development of Roman cement (*opus cementicium*) and the erection of monumental and durable buildings (Adam 2005: 116-156). The first constructions built with lime mortar on the territory of modern-day Serbia appear in the 1st century AD, after the Roman conquest of these areas and their inclusion into the Roman Empire. Historical sources and fresco depictions testify to the manner of preparation and use of lime mortar during Antiquity. However, these sources mainly refer to the territories of modern-day Italy. The only sources for studying the technology of making lime mortar and the use of raw materials in the

territory of *Moesia Superior* and *Pannonia Inferior* are the physical remains of the buildings built using this material, as well as the remains of the mortar-making process (e.g., lime slacking pits).

The area of the Danube region, where the Roman fortified border, or Limes, was located, was the area of the most intensive Romanisation and urbanisation in the territory of modern-day Serbia. On the right bank of the Danube, military camps, towns, villages, and villas were erected, which were connected by roads (Korać et al. 2014). Therefore, this area was the best source for the study of mortar with the application of modern archaeometric analyses.

During the previous decade, research on Roman lime mortar became relevant, so samples from Viminacium, for example, were the subject of several scientific papers (Nikolić, Rogić, and Milovanović 2015; Nikolić et al. 2016). However, the MoDeCo2000 project is, to date, the most comprehensive research of this construction material to have been conducted in the wider territory of our country. The research included 23 Roman sites and a large number of buildings, where over 100 samples of mortar from the period from the 1st to the 6th century were taken, which were then examined using modern laboratory analyses and a multidisciplinary approach. The character of the sampled buildings is diverse. Primarily, samples came from military buildings, both legionary camps in *Moesia Superior* - *Viminacium* and *Singidunum*, as well as medium-sized fortifications and smaller forts, such as *Lederata*, *Novae*, *Cuppa*, *Diana*, *Pontes*, etc. Finally, fortlets, such as Rtkovo, Mora Vagei, and Četaće, were also

sampled. In general, the samples were mostly structural mortars from the ramparts, towers, or gates of military fortifications, but also military facilities within the camp. The second category of sample sites includes civilian objects. Remains of the city walls in *Sirmium* and Prahovo, the walls of the imperial palace, the horeum and the Early Christian basilica in *Sirmium*, thermal baths and a villa in *Viminacium*, thermal baths in *Margum*, monumental tombs in Brestovik and *Viminacium*, etc. The most monumental building is certainly Trajan's Bridge, where samples were taken from the core of the supporting pillars.

The sampled material covers a large variety of buildings and all the centuries of Roman presence in the territory of modern-day Serbia. This created an excellent base for the reconstruction of the ancient technology of building and usage of raw materials.

Keywords – Roman mortars, Danube Limes, Roman construction, conservation science, raw materials

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Acknowledgments: This research was supported by the Science Fund of the Republic of Serbia, PROMIS, #GRANT No. 6067004, MoDeCo2000

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