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## CHARACTERIZATION OF ROMAN MORTARS FROM TWO ARCHEOLOGICAL SITES: TRAJAN'S BRIDGE AND ROMAN CASTRUM DIANA, KARATAS

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Historical mortars are composite materials made of binders and aggregates that were used in the construction of water tanks, Roman baths, mosaics, aqueducts, frescoes, etc. Due to the specific composition, Roman mortars are characterized by excellent strength and durability, as evidenced by numerous Roman buildings that have been preserved to this day. During the restoration and conservation of cultural heritage buildings, it is necessary to use compatible materials with appropriate physical, chemical, mechanical and aesthetic properties, which could be used for conservation of the original historical materials without compromising the durability and specificity of the analyzed building. [1-3].

The aim of our work was the examination of the composition, properties, and production technology of Roman mortars from two archeological sites in Serbia (Trajan's Bridge and Karatas, Diana). Trajan's Bridge was constructed between 103 and 105 AD by the order of Roman emperor Trajan. Diana was an auxiliary fort located near Danube cataracts 8 km upstream from present-day Kladovo. [4,5]. The used methods were: optical microscopy, drilling resistance measurements, XRD, TG, TG-MS, water absorption, mercury porosimetry, SEM-EDS, chemical separation of binders and aggregates, and FTIR analysis. The gained results revealed interesting facts about how advanced the Romans were in the production technology of mortars, which has been stable from the 2nd century until now.

Key words: materials engineering, applied chemistry, chemical-mineralogical composition, historical mortars, Roman architecture.

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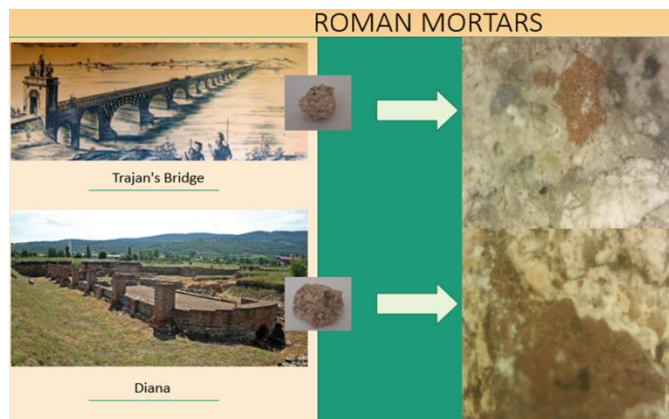
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# CHARACTERIZATION OF HISTORICAL MORTARS AND IDENTIFICATION OF THEIR PREPARATION TECHNOLOGY: ROMAN MILITARY CAMP VIMINACIUM

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Recent technological developments in the field of material science and applied chemistry have led to the fact that technological research is an inevitable procedure and first step in the diagnosis of historical buildings state. This research required a multidisciplinary approach and brought very valuable scientific knowledge and data for conservation practice [1,2]. The aim of our research paper was detailed characterization of historical mortars from the Roman period: Roman military camp Viminacium [3]. In situ and laboratory examination of the sampled materials included: visual observations, stereo-optical and digital microscopy, spectrophotometry and colorimetry, mineralogical and petrological analyses, physical-mechanical tests, thermal characterization, mechanical and chemical separation of aggregates and binders, and characterization of samples, binders and aggregates. These examinations of historical mortar samples gave information about mortars composition, their technology of preparation, as well as information about their degradation. Data obtained through mortar analyses. Moreover, the obtained results contribute to the knowledge base about Roman mortars on the Danube Limes in Serbia. Furthermore, gained results were taken as the starting point in designing compatible restoration mortar.

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