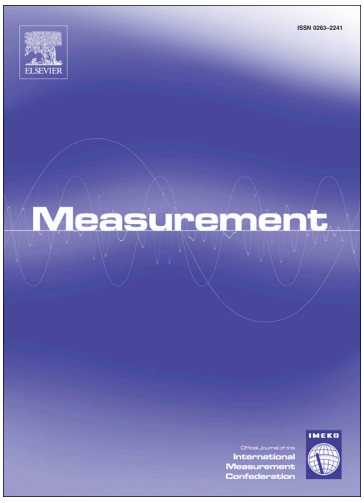


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PII: S0263-2241(18)30447-0
DOI: https://doi.org/10.1016/j.measurement.2018.05.057
Reference: MEASUR 5558

To appear in: *Measurement*

Received Date: 9 April 2018
Revised Date: 14 May 2018
Accepted Date: 15 May 2018

Please cite this article as: M. Lezzerini, S. Simona Raneri, S. Pagnotta, S. Columbu, G. Gallello, Archaeometric study of mortars from the Pisa's Cathedral Square (Italy), *Measurement* (2018), doi: https://doi.org/10.1016/j.measurement.2018.05.057

# Archaeometric study of mortars from the Pisa's Cathedral Square (Italy)

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**Abstract**

The present work is focused on the study of forty-two mortars used in the construction of both Roman buildings, old Pisa's Cathedral and Modern structures in the Miracles Square (Italy). This area, included since 1987 in the World Heritage List of the UNESCO, is famous for the presence of an important historical complex built in the Middle Ages (the Cathedral, the Baptistery, the Leaning Tower and the Monumental Cemetery). The archaeologists discovered some structures related to more ancient periods: the Roman *domus* ($1^{st}$ – $5^{th}$ centuries) and the older cathedral with its foundations and crypt ($10^{th}$ century). Based on OM, XRF, XRPD, TG-DSC and SEM-EDS analyses, the main characteristics of binder and aggregate of the mortars have been determined, and some raw materials used for the production of the analysed binding materials have been identified.

**Keywords**

mortar, binder, aggregate, Applied Petrography, building phase, raw materials.

## 1. Introduction

The study of ancient mortars has an important role in the knowledge of complex archeological sites, providing essential information about building technologies used in the past [1-5], construction phases [6-9] building materials features [10-12] provenance issues [13-15], technology [16] as well composition for restoration aims [17-19]. The use of mortars in architecture was carried out since prehistoric time until the present days [20-24]. Lime mortars had a very important key function in Roman architecture; in fact, Romans used mortars to make the load-bearing walls and partition