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Multidisciplinary Approaches to the Conservation of the Archeological Material

A case study on Museum Storage at the National Archeological Museum "Dinu Adamesteanu" in Potenza

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INTRODUCTION

The National Archaeological Museum "Dinu Adamesteanu", housed in the sixteenth-century Loffredo's palace, is currently undergoing a new phase of structural interventions and museographic reinstallation. The museum's storage areas, are located in the underground levels and the former cistern of the palace. These spaces are subject to structural vulnerabilities, unstable and unmonitored microclimatic conditions, and a substantial accumulation of materials from currently archaeological excavations. Preliminary technical assessments have highlighted the requirement for timely corrective action to replace degraded containers and inadequate storage support, and to implement both direct and indirect conservation measures within the storage facility. The comprehensive architectural redesign has been strategically postponed to a subsequent phase in order to give priority to the implementation of immediate conservation and risk mitigation measures In this context, the doctoral research focusing on the archaeological materials from the site of Rossano di Vaglio has been adopted as a pilot case for developing a methodological model applicable to other contexts preserved in the Palazzo Loffredo storage. A combined preventive and remedial conservation strategy has been implemented at the Museum of Potenza to enhance the long-term preservation of archaeological materials. The project integrates innovative conservation strategies, digital asset management, and enhanced preventive protocols, supported by environmental monitoring. In the context of archaeological museums, such measures are essential for ensuring collection stability and reducing the rates of material degradation, thereby supporting the planning and execution of informed conservation treatments.

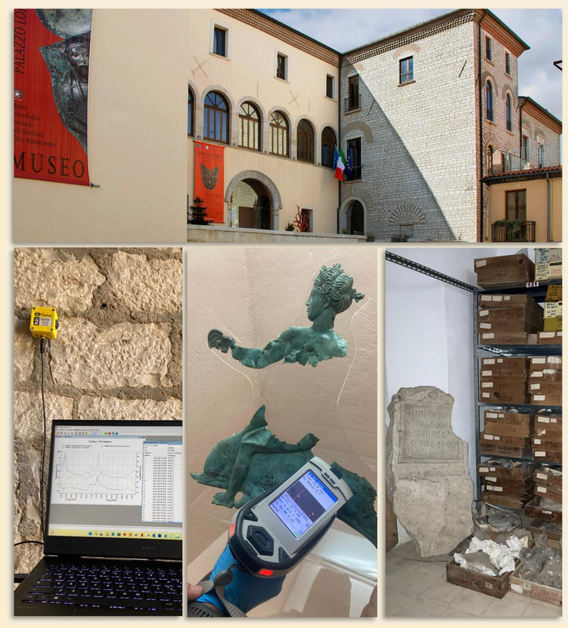

Fig.1 General view of the National Archaeological Museum (Potenza). Project phases summarized in the sequence of images below.

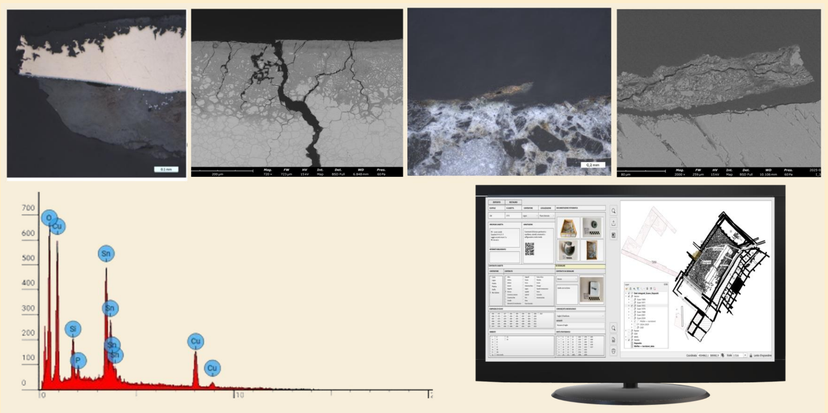

Fig.2 Direct conservation phases, with examples of the digital platform and results of archaeometric analyses (SEM-EDX images and spectra).

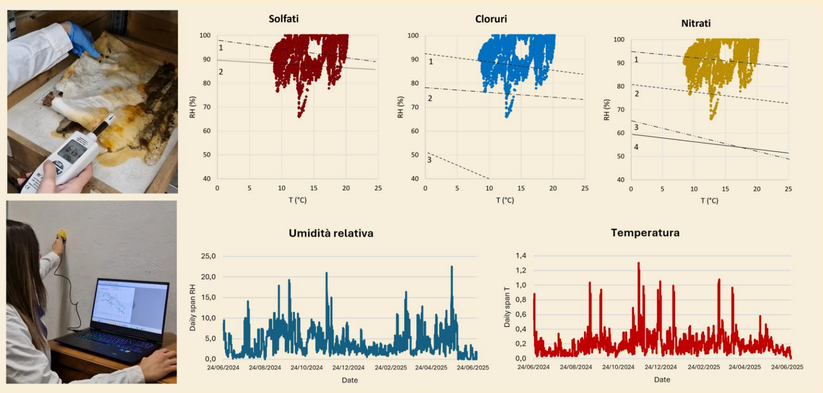

Fig.3 The second project phases highlight chemical risk analysis and temperature and relative humidity trends over time.

OBJECTIVES

The project is articulated in two primary objectives. The initial purpose is to conduct a comprehensive survey and typological classification of the collections, using a thorough, multidisciplinary approach that involves diagnostic analyses, archival cataloguing, and GIS-based digitalization. The result of this process is a multilayered digital database that allows for three-dimensional mapping, systematic recording, and georeferencing of artefacts in relation to their original excavation contexts. By integrating artefact data with provenance information, the collection is strengthened in its interpretative and conservation potential. A central aspect of the project involved archaeometric analyses, employing Hand-held Energy Dispersive X-Ray Fluorescence, Polarizing Light Microscopy, X-Ray Powder Diffraction, and Scanning Electron Microscopy coupled with Energy Dispersive X-ray Spectroscopy techniques. Bronze, stone, ceramic, and plaster artifacts are analyzed to detect the mineralogical and chemical composition and degradation products, to understand how materials react when exposed to environmental factors, thus providing precise conservation strategies. The second phase focused on microclimatic monitoring of the storage environment using portable instruments and continuous data logging. The collected data were analyzed to evaluate chemical, physical, and biological risks, such as soluble salt crystallization, fungal growth, and xylophagous insect activity linked to variations in temperature and relative humidity. By integrating these datasets, advanced management protocols can be established, making the museum storage an active environment for both conservation and scientific research. Therefore, the project aims to provide a model for the preventive conservation of archaeological materials through improving environmental stability, optimizing restoration processes, and promoting and improving both digital and physical collections.

CONCLUSIONS

The project enabled a detailed classification and the identification of the main conservation risks that affect the collections. The conservation condition of the archaeological materials was thoroughly assessed and, through direct conservation actions, proper handling and storage interventions standards were implemented. The development of an integrated digital system, supported by GIS, improved the archiving, georeferencing, and cross-referencing of data, enhancing data management and conservation planning. The use of long-term measurements and portable sensors to monitor microclimatic conditions provided important information about temperature and humidity fluctuations, soluble salts, and biological activity, which are key factors in material deterioration. This project allowed for the mapping of environmental conditions, calculation of risk indices, and identification of critical zones requiring immediate interventions features to be taken into account in the upcoming structural design. By integrating diagnostic, environmental, and risk data, targeted, material-specific conservation strategies could be supported, and the importance of a multidisciplinary methodology was brought into focus. Overall, the results provide a strong methodological framework for planning mitigation measures aimed at stabilizing storage conditions and minimizing mechanical and chemical stress on the collections. The redesign of the Palazzo Loffredo storage aims not only to enhance preservation, but also to transform the space into an active center for research, study, establishing a model of museum storage as a dynamic, knowledge-generating environment that enhances conservation, accessibility, and scientific engagement.

Fig.4 Render of the proposed redesign for the museum storage exhibition

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