NED UNIVERSITY JOURNAL OF RESEARCH

STRUCTURAL CHALLENGES IN ADVANCED ANALYTICAL TECHNIQUES FOR CHARACTERISING MODERN BUILT HERITAGE IN EGYPT

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https://doi.org/10.35453/NEDJR-ASCN-2023-0041.R1

Volume: **XXII**

No: **1-2**

Pages: **83-119**

Date: **March 2025**

Abstract:
This paper presents a comprehensive structural evaluation of Sakakini Palace in Cairo. The investigation covers the physical properties and origins of the building materials, the geological context, damage assessment, petrographic analysis and the physical and mechanical characterisation of the stones and structural mortar. Advanced laboratory and in situ testing techniques, including three dimensional laser scanning microscopy, non-destructive X-ray fluorescence and porous media characterisation using a surface area analyser (which employs liquid nitrogen to measure surface area, micro-porosity, total pore volume and Brunauer-Emmett-Teller surface area) are utilised. Mechanical testing of the building materials is performed using uniaxial and triaxial compression tests (in combination with RocLab software to determine the strength parameters of the stones) based on the latest generalised Hoek-Brown failure criterion. The results are presented, discussed and analysed concerning potential risks to built heritage.

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