

# Infrared thermography combined with geophysical techniques for the cultural heritage conservation

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## Abstract

Infrared thermography, as a remote imaging system, is a powerful tool of nondestructive evaluation. Unfortunately, it has some limitations when dealing with deep and low thermal resistance defects as in the case of thick walls of historic buildings and buried anthropic remains, which are important tasks of the cultural heritage field. Thus, it is evident the need of relatively high-depth inspection techniques such as the geophysical methodologies. The present study is concerned with the combined use of infrared thermography and geophysical methods in the conservation of architectural structures and art treasures. The main purpose of this study was to characterize the overlapping zone from low-to-high depth with the two different methodological approaches. The investigation was carried out on laboratory specimens, which were two-component structures including a plaster layer over a support of marble, brick, or tuff. Air bubbles were intentionally created inside each specimen to simulate detachments. Measurements were performed with infrared thermography and electric-type geophysical methods. Results prove that an integrated use of the two techniques supply also a detailed evaluation of the structure degradation as well as information about the related causes of degradation.

**Keywords:** Cultural heritage, nondestructive evaluation, infrared thermography, geophysical methods

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