

Evaluation of Deteriorated Fired Clay Bricks Based on Schmidt Hammer Tests

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Abstract : Although past research has focused on parameters influencing the vulnerability of brick and its decay, in practice ancient fired clay bricks are usually replaced without any particular assessment of their characteristics. This paper presents results of non-destructive Schmidt hammer tests performed on ancient fired clay bricks sampled from historic masonry. Samples under study were manufactured between the 18th and 20th century and came from facades and interior walls. Tests were performed on three distinct brick surfaces, depending on their position within the masonry unit. Schmidt hammer tests were carried out in order to measure the mean rebound value (R_n), which refers to the resistance of the surface to successive impacts of the hammer plunger tip. Results indicate that rebound values increased with successive impacts at the same point. Therefore, mean Schmidt hammer rebound values (R_n), limited to the first impact on a surface minimises the estimation of compressive strength. In addition, the results illustrate that this technique is sensitive enough to measure weathering differences, even for different surfaces of a particular sample. Finally, the paper also highlights the relevance of considering the position of the brick within the masonry when conducting particular assessments of the material's strength.

Keywords : brick, non-destructive tests, rebound number, Schmidt hammer, weathering grade

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