



Development of Self-Healing Concrete Blocks Utilizing Calcium Carbonate from Oyster Shell Waste

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Abstract

This project aims to 1) study the self-repairing properties of concrete blocks using calcium carbonate (CaCO_3) derived from oyster shells, and 2) compare the efficiency of self-repairing concrete blocks using calcium carbonate (CaCO_3) derived from oyster shells with the TIS standard criteria in terms of density, water absorption capacity, and compressive strength. The study was conducted on the properties of concrete blocks using natural materials, namely oyster shells instead of calcium carbonate (CaCO_3). Four formulas were studied: 0%, 5%, 10%, and 15% CaCO_3 . The TIS standard was used as the basis for the study and testing, focusing on mechanical properties: compressive strength, density, water absorption capacity, and self-repair capacity in humid environments. The experimental results showed that the formula containing 10% CaCO_3 had the most suitable properties, especially in terms of compressive strength, water absorption, and density, which were within the criteria that passed the TIS standard (TIS 109-2517), which is used to control the quality of concrete blocks used in general wall construction. It also has a self-repair percentage of approximately 40% and can cover an average of 40% of cracks within 28 days. This feature is an additional highlight that exceeds the minimum requirements of TIS.

Keywords: Self-Healing Concrete, Thai Industrial Standards