

Effects of interior stone waste sludge on the mechanical properties and microstructure of cement mortar

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ABSTRACT

In the construction industry, there is an increasing emphasis on eco-friendly approaches to safeguard the environment and promote sustainable development. This trend has led to a growing interest in recycling and utilizing waste materials in construction. This study investigates the performance of mortar incorporating waste sludge generated from the manufacturing process of interior stone. The research evaluated the flowability, compressive strength, and initial and final setting times of mortar samples with varying proportions of waste sludge replacing fine aggregate. The findings indicate that an optimal amount of waste sludge can enhance the hydration process and improve the compressive strength of the mortar. The study also explored the micro-filling effects of waste sludge on mortar's pore structure through mercury intrusion porosimetry. Furthermore, the mechanisms behind the increased compressive strength of the mortar samples were analyzed using molecular dynamics simulation.

ACKNOWLEDGEMENTS

This work was supported by a National Research Foundation of Korea (NRF) grant funded by the Korean government (MSIT) (2020R1C1C1005063 and 2022R1A4A3029737).

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