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RKGP JOURNALS

Replacement of cement with molten plastic and sand with mine tailings for the production of non-structural interlocking blocks

Mary Aghaibe

Department of Civil Engineering, Faculty of Engineering and Engineering Technology, Alex Ekwueme Federal University Ndufu-Alike, Ikwo, Ebonyi State, Nigeria.

Corresponding author. Email: aghaibem@gmail.com.

This study investigates the use of molten plastic as a partial or full replacement for cement and mine tailings as a substitute for sand, in the production of non-structural interlocking blocks. The increasing accumulation of plastic waste and the environmental issues associated with mine tailing's disposal have created an urgent need for sustainable construction solutions. In this work, waste plastics were collected, melted, and combined with varying proportions of mine tailings to produce interlocks suitable for pedestrian and light-traffic applications. The produced samples were tested for impact test, durability, and water absorption to assess their performance. Preliminary results show that molten plastic provides adequate binding properties, while mine tailings improve the overall density and stability of the blocks. The combination significantly reduces reliance on traditional cement and sand, leading to lower carbon emissions and improved waste management. This research demonstrates that plastic waste and mine tailings can be transformed into valuable construction materials for non-structural applications.

Keywords: Molten plastic, mine tailings, interlocking blocks, sustainable construction, waste recycling, alternative binders.