

Rubber Crumbs in Alkali Activated Clay Roof Tiles at Low Temperature

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Abstract : The continuous increase in vehicle uptake escalates the number of rubber tyre waste which need to be managed to avoid landfilling and stockpiling. The present research focused on the sustainable use of rubber crumbs in clay roof tiles. The properties of roof tiles composed of clay, rubber crumbs, NaOH, and Na₂SiO₃ with a 10% alkaline activator were studied. Tile samples were fabricated by heating the compacted mixtures at 50°C for 72 hours, followed by a higher heating temperature of 200°C for 24 hours. The effect of rubber crumbs aggregates as a substitution for the raw clay materials was investigated by varying their concentration from 0% to 2.5%. X-ray diffraction (XRD) and scanning electron microscopy (SEM) analyses have been conducted to study the phases and microstructures of the samples. It was found that the optimum rubber crumbs concentration was at 0.5% and 1%, while cracks and larger porosity were found at higher crumbs concentrations. Water absorption and compressive strength test results demonstrated that rubber crumbs and clay satisfied the standard requirement for the roof tiles.

Keywords : rubber crumbs, clay, roof tiles, alkaline activators

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