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RUBBERCRETE INTERLOCKING BRICK PROPERTIES

A research study on the properties and structural behaviour of rubbercrete interlocking brick was carried out. The study shows encouraging results and confirmed that the newly developed rubbercrete interlocking brick exhibits acceptable physical and mechanical properties. The proposed research helps to solve problems associated with scrap tire management. The research is intended to provide new technology in concrete industry where scrap tires can be used to construct rubbercrete interlocking walls and act as load bearing and non-load bearing walls.

OPTIMIZATION ANALYSIS BY RSM FOR MIXTURE DESIGN

Optimization tools had been conducted to obtain the optimum design mixture proportion by using response surface methodology (RSM) and proven with analysis of variance (ANOVA) acquired from the analysis. Based on the experimental compressive strength result, 10% of crumb rubber replacement and 57% of fly ash replacement have been proposed by RSM analysis in order to acquire compressive strength of 15 MPa. The brick is considered as the load bearing masonry unit only when the compressive strength is more than 11.7 MPa. Rubbercrete brick with 10% crumb rubber and 57% fly ash replacement has been tested and proven that and the compressive strength recorded a value of 15.84 MPa, almost similar to the predicted compressive strength of RSM analysis. It

also exceeded the minimum compressive strength limit requirement for load bearing masonry unit application, which is 11.7 MPa in accordance with ASTM C 90.

PHYSICAL AND MECHANICAL PROPERTIES OF RUBBERCRETE INTERLOCKING BRICK

The physical and mechanical properties of the rubbercrete interlocking bricks have been extensively discussed to determine the applicability of the bricks as part of the structural element. The experimental tests include dimensions, initial rate of suction, water absorption, density, compressive strength, modulus of rupture, efflorescence, thermal conductivity and elevated temperature tests were conducted after 28 days of dry curing period.

Rubbercrete interlocking brick exhibit uniform size and shape within the dimension tolerance, thus make it easier to lay in masonry. Based on the density test, rubbercrete interlocking brick is also considered as medium-weight concrete, as crumb rubber exhibit a low specific gravity (0.95) compared to the specific gravity of fine aggregates (2.71). The lower density of the bricks contributed to the reduction in the dead load for load bearing unit. The hydrophobic behaviour of crumb rubber particle that traps air around its surface and repels water lead to a reduction in compressive strength, modulus of rupture, and density, as well as higher water absorption, initial rate of suction and better thermal conductivity. Elevated temperature shows the effect of temperature on the compressive strength and porosity of the rubbercrete interlocking brick.

STRUCTURAL BEHAVIOUR OF RUBBERCRETE INTERLOCKING PRISMS AND WALL

The bricks were further investigated in the form of prisms and walls in order to comprehend their structural behaviour. The