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FRACTURE PROPERTIES OF GEOPOLYMER CEMENT CONCRETE BASED ON METAKAOLIN, FLY ASH AND RICE RUSK ASH

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Despite the economic crisis, concrete production is growing worldwide, increasing demand for Portland cement, which contributes to about 5% of anthropogenic emissions of CO2 world, besides generating several other environmental damage. The geopolymers are exclusively of mineral nature and thus are considered an alternative to materials based on clinker Portland. It is possible to use themeven for structural applications. The geopolymer cement concrete (GCC) may be prepared from natural oxide -aluminosilicates such as metakaolin (MK), or synthetic, such as fly ash (FA) together with active silica contained in the rice husk ash (RHA). The fracture properties of the Portland cement concrete (PCC) with 25 MPa and 50 MPa, and of three different geopolymeric concretes with the same strength Classes were determined for comparative analysis with aim to provide support to initiative of use of geopolymers in the reinforced concrete precasting industry. Three-points bending tests of notched beams with a/W (notch depth/ beam depth) of 0.5, from RILEM TC80-FMT Recommendations, were used to determine the critical values of K, G, R and J-integral for crack propagation under mode I. The results showed that the geopolymeric concretes exhibit similar mechanical behavior and fracture properties higher that those determined in PCC, in the same strength Class.