

# The Properties of Crumb Rubber Loading on Fly Ash Based Geopolymer Mortar

## Abstract

By replacing traditional Portland cement (OPC) with crumb rubber in fly ash-based geopolymer mortar, waste tyre disposal and natural mineral aggregate use can be reduced, resulting in lower CO<sub>2</sub> emissions. Crumb rubber geopolymer mortar is formed when sodium hydroxide (NaOH) and sodium silicate (Na<sub>2</sub>SiO<sub>3</sub>) are mixed with fly ash (class F) to make aluminosilicate gel. All of the fly ash geopolymer preparations followed the same ratio of solid to liquid (2:1) and the same ratio of NaOH solution (12M) to Na<sub>2</sub>SiO<sub>3</sub> solution (2.5). Different amounts of crumb rubber (0%, 5%, 10%, 15%, and 20% by weight of solid) were added to the mixture. The results show that the compressive strength of the geopolymer mortar decreased with increasing crumb rubber loading. The results of the analysis show that the compressive strengths of CR-0%, CR-5%, CR-10%, CR-15%, and CR-20% are 25.59, 14.31, 11.19, 10.38, and 8.16 MPa. The strength is diminished because of inadequate interfacial adhesion between the crumb rubber and geopolymer paste. As the sample weight fell, the percentage of crumb rubber in the geopolymer mortar increased, but the density decreased.

## Keywords

Compressive; Crumb Rubber; Density; Fly Ash; Geopolymer Mortar; Water absorption