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## **A STUDY ON EFFECT OF AGGREGATE GRADING ON COMPRESSIVE STRENGTH AND WORKABILITY OF FLY ASH BASED GEOPOLYMER CONCRETE TOTALLY USING STEEL SLAG AGGREGATE**

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### **Abstract**

*Steel slag and fly ash are industrial by-products in steel refining process and in thermal power plants respectively, but they can be used potentially as sustainable construction materials. Fly ash combining with alkaline activator are new binder used in manufacturing fly ash based geopolymer concrete, an eco-friendly alternative for traditional concrete using Portland cement binder. Besides, granular steel slag has properties similar to conventional aggregate, so it is used as a replacement of the aggregate in concrete mixes. As a result, fly ash-based geopolymer concrete using steel slag aggregate is an effective solution utilized by-product to minimize environment pollution. This paper presents the experimental results of effect of aggregate gradings on compressive strength of fly ash based geopolymer concrete entirely using steel slag aggregate including fine and coarse aggregate. Steel slag aggregate was selected, crushed and screened by the standard sieve system and then blended into 9 different gradings. All of specimens were manufactured similar to ordinary Portland concrete and cured at ambient condition (temperature  $t = 22 \pm 4$  oC, moisture  $w = 60 \pm 20\%$ ). Based on these laboratory test results, the different gradings of steel slag aggregate significantly effect on the compressive strength at 28 days and workability of fly ash based geopolymer concrete from which the reasonable grading could be chosen as a basis for the proportion mix design of fly ash based geopolymer concrete totally using steel slag aggregate.*

### **Author Keywords**

Grading, Steel slag aggregate, Fly ash based geopolymer concrete, Compressive strength, Workability

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