

## **Soluble pozzolanic materials from coal bottom ash as cement replacement material**

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### **ABSTRACT**

Nowadays, intensive research in production of highly reactive pozzolanic materials from industrial waste to replace cement is crucial. This action expected to increase industrial waste recycling rate and at the same time reduce extraction of non-renewable resources of limestone. Unique characteristics of coal bottom ash as one of the industrial based pozzolan gained less popularity because of its low reactivity and heavy metal leaching due to conventional method used for disposal. Therefore, an alternative approach was deliberated in this research to utilize coal bottom ash into soluble form and enhance the quality of bottom ash as pozzolanic material. Coal bottom ash after the acid washing with optimum parameter was then undergoes solution-gelification process with various alkali based solution for 2 hours soaking durations. The conversion of coal bottom ash into soluble silica in this study demonstrates good pozzolanic performance in a state of siliceous gel pozzolan compared to the raw ones. 5% of cement replacement by soluble silica from CBA shows good strength development from early and later age. The physical dispersion effect is the cumulative effect of enhancement cement hydration due to the availability of increased the nucleation sites on soluble silica particles.

### **KEYWORDS**

Cement replacement materials; Coal bottom ash; Pozzolanic materials; Soluble silica

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