

# **Effect of slag and siliceous additions on the performance of stabilized coal waste backfill**

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## **ABSTRACT**

Coal mine waste rejected from the coal mining process has remained unused due to difficulties in stabilizing it using traditional methods and practices, leading to poor performance. However, the abundance of the waste has enormous potential for application in certain areas, such as for road base or subbase construction, which require relatively lower strength and reactivity.

This paper presents experimental results of a study on the mechanical and hydration properties of cementitious materials prepared by stabilizing coal mining waste from South Wales, UK using various slag-based binders. The coal mine waste comprised of a 50-50 blend of fine and coarse-grained mine wastes, compacted into cylinders of 50mm in diameter and 100mm in height. The binder comprised of either quicklime or Portland cement (PC) blended with varying amounts of ground granulated blastfurnace slag (GGBS). Parallel mixes were also prepared with classified fine pulverized fuel ash (PFA) or kaolinite clay soil as extra siliceous additions. Results have indicated that the mine waste generally has almost no improvement when quicklime alone was used. By blending the lime or PC with GGBS, or when extra siliceous matter was added, the strength and hydration was significantly accelerated. The results of the compressive strength measurement correlated nicely with the results showing the degree of hydration.

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