

Utilization of high-carbon content pulverized fuel ash (pfa) in civil engineering construction.

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ABSTRACT

Increasing momentum in research into sustainable infrastructure development has resulted in the need for a critical review of prevailing practices, techniques and sources of raw materials. Focus is turning to natural and/or industrial wastes and by-products that have previously received little or no attention. This paper reports on the utilization of a high-carbon content pfa from a coal power station in Aberthaw, South Wales, UK, in the construction of embankments.

The use of pfa in construction in the United Kingdom has predominantly been as partial replacement of Portland Cement (PC) in concrete, where the proportion of replacement has been typically in the range of 10-30% by weight. In recent years research has increased into the utilization of high volume pfa in concrete. In a relatively fewer cases, lime- and/or cement- stabilized pfa or clay-pfa mixtures have been used in the construction of embankments. In all these cases, low-carbon pfa has been the target waste material. Triggered by proximity of large supplies of high-carbon pfa at Aberthaw ash works in South Wales UK, this paper advances the scope of technological benefits of utilizing pfa waste streams that have hitherto received little attention. Compressive strength of compacted cylinder specimens incorporating stabilized high-carbon pfa will be monitored, together with linear expansion of cylinders soaked in water. Relevant analytical techniques will be used to monitor the hydration process, and performance compared with equivalent systems using standard pfa from UK Quality Ash Association (UKQAA), renowned suppliers of low-carbon pfa in the UK.

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