Title : Development of alkaline-activated lignite bottom ash for use as supplementary cementing materials

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ABSTRACT

This study investigated the utilization of lignite bottom ash, a by-product from Mae Moh Power Plant, as an alternative cementitious material. The lignite bottom ash was mechanically and chemically activated. Different grinding durations of 8, 10, and 12 hours were employed to obtain different fineness. 4 types of alkali solutions were also used to activate the starting material. The specimens were kept at the same condition; 60 °C for 7 days prior to compressive strength testing. The results showed that increasing the grinding duration reduced particle size and significantly improved compressive strength. Among the alkaline activators, alkali solution type 1 yielded the highest compressive strength. In addition, cement paste specimens were prepared by partially replacing ordinary Portland cement with lignite bottom ash ground for 12 hours and activated with each alkaline solution at a replacement level of 30% by weight. The cement paste incorporating sodium hydroxide type 1–activated lignite bottom ash exhibited the highest compressive strength. These findings demonstrate the potential of ground and alkali-activated lignite bottom ash as a supplementary cementitious material for sustainable construction applications.

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