

Maximizing volume of Spent Bleaching Earth Ash (SBEA) pozzolan used as cement replacement in mortar through mechanical activation

ABSTRACT

Spent bleaching earth ash (SBEA) is harmful waste from the oil refining industry that has previously exhibited pozzolanic properties and potential for use as cement replacement. Conventional pozzolanic replacements in cements are typically limited to 30 % only as excessive amounts have detrimental on cement strength. This research aimed to investigate the feasibility of increasing the level of replacement past 30 % through mechanical activation. Preliminary investigations revealed that SBEA contains sufficient silica and alumina oxides to be classified as Class N pozzolan in accordance with ASTM C618. As expected with pozzolans, the use of SBEA in cement mortar improved the 28 and 56-day compressive strengths up to 30 % substitution but at the same time also increased the water requirement. Mechanical activation was able to improve the level of substitution to 50 % through a mix of increasing pozzolanic reactivity of SBEA as well as increasing the specific surface area of its particles.