

Enhancing the pozzolanic reactivity of spent bleaching earth ash (SBEA) in binary blended cement mortar through calcination

ABSTRACT

The effects of calcination on spent bleaching earth ash (SBEA) were investigated in terms of its contribution to pozzolanic reactivity as well as the strength of blended cement mortar when used as partial cement substitution. SBEA waste, which is plentiful in the global stock, showed some potential as pozzolanic material to reduce reliance on the traditional clinker cement. However, actual research on its use as cement replacement and how it may benefit from calcination was still very limited. This paper can conclude that SBEA contains sufficient silica and alumina oxides as well as satisfactory levels of pozzolanic reactivity to be classified Class N natural pozzolan. By calcining SBEA up to a temperature of 700 °C, its pozzolanic reactivity was improved due to the amorphisation of its contents, leading to an increase in the allowable level of replacements from 30 to 40 % as well as the peak strength achieved. These findings allowed calcined SBEA to be used in greater volume in cement mortar compared to an untreated SBEA. It is also worth noting that an excessively high calcination temperature around 900 °C was found to be detrimental to both the pozzolanic reactivity and strength development of cement mortars.