

Abstract

Soil Stabilisation with Ground Granulated Blastfurnace Slag

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In the UK, ground granulated blastfurnace slag (ggbS) is used as an addition for concrete and is widely available. Ggbs has only slight cementitious properties and in conventional concrete, is used in combination with Portland cement whose alkalinity provides the catalyst to activate the cementitious properties of the ggbs. Lime (calcium oxide) can also provide the necessary alkali for activation.

Worldwide, cement and lime are commonly used to stabilise soil, and produce sub-bases for highway and foundation construction. The main properties of soil that may require alteration by stabilisation are:

- strength - to increase the strength and bearing capacity,
- volume stability - to control the swell-shrink characteristics caused by moisture changes,
- durability - to increase the resistance to erosion, weathering or traffic loading.

In South Africa, ggbs activated by lime, has a long history of use, for stabilising soils. More recently, this combination has also become popular in Australia. Prompted by these Southern Hemisphere experiences, we investigated the potential of lime/ggbs for use in soil stabilisation in the UK. These investigations involved several full-scale site trials, combined with extensive University research.

The site trials demonstrated that stabilisation with separate application of lime followed by ggbs worked well. The initial application of the lime 'modified' and broke down clayey soils and subsequent application of ggbs gave increased strength. The University research demonstrated a significant advantage of ggbs over conventional lime or cement stabilisation. Ggbs was very effective in counteracting the swelling that can occur when sulfate-containing clays are stabilised with either cement or lime.

As a result of these investigations, lime/ggbs stabilisation of soils is becoming an established technique in the UK and is a preferred option where there are sulfates present in the soil.

Biographical Details

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Denis Higgins is Director General of the Cementitious Slag Makers Association, a Trade Association, which promotes the use of ggbs in the UK. Previously he was Business Development Director of Civil & Marine Slag Cement Ltd.

His experience has concentrated on concrete technology, and includes positions as:

- senior materials advisor with the Cement and Concrete Association,
- head of concrete technology at the Research and Technology Centre for Redland
- physicist at the Research Centre for Blue Circle Cement

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