Abstract

Blastfurnace and steel slag as aggregates: A review of their production and applications in construction

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Metallurgical slags are the non-metallic secondary products of the refining of metals from metallic ores. Those derived from the iron and steel industries are by far the most common type produced. The manufacture and use of these products as aggregates in construction are the main focus of this paper and of an Information Paper IP18/01, published by BRE.

Processed Blast Furnace and Steel Slags provide quality controlled manufactured aggregates for use in construction. They can be used in most applications that would otherwise require the use of natural aggregates. The principal applications include asphalts regulated by BS4987 and BS594, concrete, unbound sub-bases, cappings, fills and chippings for surface dressing. They can be blended to produce self-hardening bases and free draining support layers. Steel Slags are particularly well suited to the new generation of 'quiet' asphalt thin surfacings because of their high abrasion resistance and aggregate shape which contributes to surface texture which is a key requirement for providing high speed skidding resistance. Steel Slag has been extensively used as protective armour stone for river, sea and coastal erosion schemes because of its high density and has played a major role in land reclamation projects. The hard-wearing properties of steel slag make it suitable as railway track ballast.

Historically, blastfurnace and steel slags were frequently deposited in large quantities around iron and steel works, often in close association with one another and often with a mixture of other wastes. They have also been used as fill or hardcore beneath roads or buildings. These older slags are more variable in composition than modern slags and they can be dimensionally unstable. A current BRE project in collaboration with industry partners is seeking to improve guidance on assessing the risks associated with these sites.

Biographical Details

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Andrew is responsible for projects on a range of secondary materials in construction including ferrous and non-ferrous slags as well as ashes from various industrial processes. He manages three current DTI/industry collaborative projects on the use of non-ferrous wastes as aggregates, small volume waste streams in construction and the assessment of brownfield sites containing slags.

Andrew is an experienced concrete chemist with particular knowledge of the chemistry of concrete deterioration. His work in BRE's Centre for Concrete Construction has provided leading-edge knowledge in the performance of novel concrete systems, including Calcium Aluminate Cements. He is the author of the recent BRE Information Paper on blastfurnace slags and steel slags as aggregates.

He has managed and undertaken numerous research and specialist consultancy commissions concerned with the durability of CAC concrete, flooring finishes, concrete patch repairs and expansive slags.

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