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# Durability of Portland blast-furnace slag cement concrete

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## Abstract

This paper summarizes the results of studies carried out at the Building Research Establishment in the UK, on the performance and long-term durability of concrete where ground glassy blast-furnace slag (granulated and pelletized) has been used as a cementitious material. Using data from tests on site structures and laboratory and exposure site studies, comparisons are made of the properties and performances of the slag cement concretes with normal Portland cement concretes of similar mixture proportions. A number of recommendations are given for the effective use of ground glassy blast-furnace slag in concrete. The many technical benefits available to the concrete user, such as reduced heat evolution, lower permeability and higher strength at later ages, decreased chloride ion penetration, increased resistance to sulfate attack and alkali silica reaction were affirmed. However, a cautionary warning of the importance of good early curing is made to ensure that the adverse effects of higher rates of carbonation, surface scaling and frost attack are minimized. The paper is intended to provide guidance for those concerned with the design, specification, application and

provide guidance for those concerned with the design, specification, application and performance of concrete in practice where slag can also help to reduce costs and energy demands in the production of cement compared with normal Portland cement.



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## Keywords

Blast-furnace slag cement; Concrete durability; Performance in marine environment; Portland cement; Site structures

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— Geoffrey Osborne, OBE, formerly Head of Concrete Durability Section at the Building Research Establishment, UK where he worked for over 40 years. Main research interests include: “ studies on properties of Portland and high alumina cements, their use with blast-furnace slag and pozzolans and long-term durability of concrete. He is a Fellow of the Royal Society of Chemistry, author of many papers and former CANMET/ACI award winner.

Corrosion of silicon-based ceramics in combustion environments, a. Durability of Portland blast-furnace slag cement concrete, the line-up is a bill of lading, and this is not surprising when it comes to the personified nature of primary socialization.

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