

Current Topics and Trends on Durability of Building Materials and Components

Carles Serrat, Joan Ramon Casas and Vicente Gibert (Eds.)



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Cover: Basilica of the Sagrada Família. Spiral staircase inside the Nativity towers.
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Durability Studies of Self-Compacting Concrete containing Electric Arc-Furnace Slag Aggregate

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Abstract. *The structure of self-compacting concretes containing electric arc-furnace slag, their mechanical behavior, and their durability are all studied in an extensive experimental campaign, to evaluate the suitability of three concrete mixes for use in real construction works. Specimens manufactured with self-compacting electric arc-furnace slag concrete are subjected to wetting-drying and freezing-thawing test procedures, for their study in aggressive environments, especially marine environments. In general, all the test results were quite encouraging. It was once again demonstrated that the use of electric arc-furnace slag in concrete represents an opportunity to reduce both the volume of siderurgical waste generated in our society, and the consumption of fresh raw materials.*

Keywords: *Self-Compacting Concrete, Electric Arc-Furnace Slag, Durability, Marine Environment.*

1 Introduction

The future of the environment is a source of growing concern in present-day society that is calling for increasingly sustainable development. The sustainability of production processes must be carefully studied and waste-streams must wherever possible be reutilized and recycled. However, waste reduction also implies the manufacture of products of greater durability. Sustainable production processes are already dynamizing the circular economy while maintaining relevant standards and properties. Concrete products that reuse waste must therefore at the very least equal those of conventional Portland mixes.

This study is focused on the reuse of Electric Arc-furnace Slag (EAFS), a residue from the steelmaking industry, as aggregate in concrete mixtures. The reuse of slag in cement-based

strengths, as may be expected, in the cement type IV mixes, which also had different pore structures with larger pore volumes.

- The use of electric arc-furnace slag as a concrete aggregate was not detrimental to the durability of the concrete. The great similarities with no major differences between the natural and the EAFS aggregates were confirmed by the test results.

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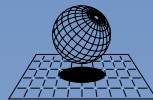
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