Proceedings of the 3rd Pan American Materials Congress

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The Minerals, Metals & Materials Series

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Preface

The Pan American Materials Congress (PAMC) is in its third iteration and was originally initiated from a partnership between the Associação Brasileira de Metalurgia, Materiais e Mineração (ABM) located in Brazil and The Minerals, Metals & Materials Society (TMS) located in the United States. This partnership produced two previously successful materials science and engineering conferences, titled "Pan American Materials Congress" occurring in 2010 and 2014 and held in conjunction with ABM's large annual conference. These events were co-chaired by Prof. Sergio Neves Monteiro, ABM's incoming President. The 3rd PAMC, hosted by TMS, includes nine participating professional societies, and is co-located with the TMS 2017 Annual Meeting & Exhibition. It is the first time that this international materials science and engineering conference is held in North America, with TMS in the role of host society. A program covering a variety of materials science topics has been created based on the input from leading scientists and engineers representing eight countries and nine international materials, metals, and minerals societies listed below:

1. Argentina: Asociación Argentina de Materiales (SAM)
2. Brazil: Associação Brasileira de Metalurgia, Materiais e Mineração (ABM)
3. Peru: Asociación Peruana de Metalurgia, Materiales Y Minerales (APMMM)
4. Colombia: Colombian Materials Society
5. Chile: Instituto de Ingenieros de Minas de Chile (IIMCh)
6. Canada: Metallurgy and Materials Society (MetSoc), Canadian Institute of Mining, Metallurgy, and Petroleum (CIM)
7. Chile: Sociedad Chilena de Metalurgia y Materiales (SOCHIM)
8. Mexico: Sociedad Mexicana de Materiales (SMM)
9. United States: The Minerals, Metals & Materials Society (TMS; Host Society)

The participation of additional materials societies throughout the Americas is being sought and is under discussion. The organizers of this congress seek to provide an international Pan American focused program to address the needs of the materials science and engineering communities as they relate to government, academic, and industrial institutions, while providing an intimate setting for professionals to interact with and form strategic partnerships with their peers. Student

participation is strongly encouraged and is a focus for the lead organizers of this event. Additionally, as far as we are aware, this is the only international materials science conference where the emphasis is exclusively on North and South America.

The 3rd PAMC technical programming encompasses a wide range of materials, metals, and minerals with applications specific to the international communities that are represented, including symposia on materials for transportation and infrastructure, materials for the oil and gas industry, and minerals extraction and processing. These proceedings contain the following sections, which correspond to the themes of the conference:

Advanced Biomaterials
Advanced Manufacturing
Materials for Green Energy
Materials for Infrastructure
Materials for the Oil and Gas Industry
Materials for Transportation and Lightweighing
Minerals Extraction and Processing
Nanocrystalline & Ultra-fine Grain Materials & Bulk Metallic Glasses
Steels

From this program, it is expected that rich discussions and collaborative opportunities will result, heavily focused on the Americas. The congress is scheduled to run for three consecutive days, with sessions in both the morning and afternoon. Special attention has been paid to communications and complementary planning between the congress organizers and TMS staff, and TMS 2017 symposia organizers and volunteers, to ensure that the sessions are synergistic and not duplicative of the TMS 2017 Annual Meeting & Exhibition programming.

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Contents

Performance of Hydraulic Mixes Manufactured with Electric Arc Furnace Slag Aggregates

Amaia Santamaría, Vanesa Ortega-López, Marta Skaf, Ignacio Marcos, José-Tomás San-José and Javier J. González

Abstract Electric arc furnace slag (EAFS) has for many years simply been dumped in landfill sites; over the past few decades many researchers have investigated its reuse in cement mortar and concrete. By doing so, a waste product may be converted into a useful material with added value as a substitute for natural resources, the consumption of which is also minimized. Hydraulic mixes manufactured with EAFS normally have similar or even better hardened properties than mixes manufactured with natural aggregates. One disadvantage in the use of EAFS has been the poorer workability of the mixes, due to its higher density, porosity and water absorption levels. In this research, different EAFS mixes are manufactured and their properties in the fresh and the hardened state are closely analyzed; the results were very promising. The aim of this research is to demonstrate that EAFS concrete can achieve an acceptable workability at the correct dosages.

Keywords Electric arc furnace slag · Self-compacting mixes · Workability · Strength

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- The durability tests performed on the mortars were successful, showing that the aggregates had no non-stable volumetric compounds.
- All the tests performed on the self-compacting concrete are very encouraging. The next step will be to perform durability tests and if the results are positive, then the challenge of manufacturing reliable self-compacting concrete with EAFS aggregate will in all likelihood have been reached.

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