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*PD en Ingeniería de Materiales Avanzados***PERFORMANCE OF SELF-COMPACTING HYDRAULIC MIXES WITH ELECTRIC ARC FURNACE SLAG AS AN AGGREGATE**

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The electric steelmaking industry has a great importance in the economy of the Basque Country. More than 4 million tons of steel are produced in this way every year. This means that more than 600.000 tons of electric arc furnace slags are generated. Rowing in the same direction of Horizon 2020, this research group wants to transform this waste into a useful resource. One of the uses of this material is as an aggregate in hydraulic mixes. It have been demonstrated that mortar and concrete manufactured with this type of slag has at least the same mechanical and durability behavior comparing with natural aggregates concrete, improving them in most of the cases. Its higher density and its influence in the workability of the mixes, getting it worse, could be the reason because nowadays this by product is mostly landfilled. With this research the author wants to demonstrate that manufacturing slag concrete with the needed workability is possible, using the appropriate mix design. In my doctoral Thesis the objective is manufacturing self-compacting hydraulic mixes using slag as aggregate. Self-compacting fresh concrete could be considered as a two phase material, a coarse aggregate in a matrix of mortar. So, several mortars were manufactured, to verify the relation between fines and water, and the effect of the admixtures. The fresh properties, the physical characteristics, the mechanical behavior and the durability of this mixes have been tested. The internal structure of the resultant mixes was characterized by Mercury Intrusion Porosimetry. The performance of mortars was good in terms of acceptable mechanical and durability properties. After getting successful results in mortars, two different kinds of concrete were manufactured, verifying their workability characteristics. The fresh properties and mechanical behavior of these concretes have been verified and some conclusions will be stablished.