

MIX DESIGN AND PERFORMANCE CHARACTERIZATION OF BITUMINOUS MIXTURES WITH ELECTRIC ARC FURNACE STEEL SLAGS

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ABSTRACT

The use of the metallurgical slags in substitution of the natural aggregates, is a consolidated reality in the field of the road construction, by now from several years. Several international studies can document the positive performances of the mixtures realized with such marginal material, in particular for what concerns the Blastfurnace slag (BF) and the Basic Oxygen Steel slag (BOS), that are widely used in European and extra-European countries, while is still subject of research the evaluation of the potential of the Electric Arc Furnace Steel slag (EAFS), that vice versa are finding a greater success in Italy.

Due to the increasing interest for such particular type of material, the Authors present an experimental study on the composition, performance and mechanical characteristics, of both traditional and high performance bituminous mixtures (porous asphalt and stone mastic asphalt) made with EAFS slag, for road flexible pavements. The experimental trial has been articulated in a preliminary study of the chemical, physical-geotechnical and leaching properties of the EAF steel slag and in a mechanical characterization of the bituminous conglomerates, in terms of Marshall tests and Indirect Tensile Strength test. Afterwards, the performance behaviour of the mixtures has been investigated in terms of permanent deformations, stiffness modulus at various temperatures, fatigue and water resistance.

KEY WORDS: Steel slag, leaching, asphalt concrete, performance test.