Conference Abstract

The manufacture of metal foundry products requires the use of sand moulds which are destroyed, and new ones made each time metal is poured. However, recycled sand requires a regeneration process that produces a polluted fine mineral phase. Particularly rich in heavy metals and organic residues, this foundry co-product is disposed of in hazardous waste landfills and requires an expensive stabilisation process.

This paper presents the results of a research that valorises this fine fraction of foundry sands by inerting it in a cement phase. The fines are taken from the bag filter suction systems of a foundry. The sample is in the form of filler, with a fraction of less than 140µm, the D_{50} is 43µm. The Blaine fineness is 3120 cm^2/g, the fines are composed mainly of SiO_2, Al_2O_3 and Fe_2O_3. The loss on ignition at 1000°C of this material is 20%.

The chosen inerting technique is to manufacture cement pastes which, once hardened, will be crushed for use as artificial aggregates in new concrete formulations. Different percentages of volume substitutions of portland cement were tested: 30, 50 and 65%. The substitution rates were chosen to obtain the highest possible recycling rate while satisfying the European discharge limits (these values are assessed by leaching). They were also optimised by adding water-reducing admixtures to increase the compressive strengths of the mixes.