

Production of concrete paving blocks using electroplating waste – Evaluation of concrete properties and solidification/stabilization of waste

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Abstract. The determination of the effectiveness of the immobilization of blasting dust (waste generated in galvanic activities) in cement matrix, as well of mechanical, physical and microstructural properties of concrete paving blocks produced with partial replacement of cement was the objective of this work. The results showed that blasting dust has high percentage of silica in the composition and very fine particle size, characteristics that qualify it for replacement of cement in manufacturing concrete blocks. The replacement of Portland cement by up to 5% residues did not cause a significant loss in compressive strength nor increase in water absorption of the blocks. Chemical tests indicated that there is no problem of leaching or solubilization of contaminants to the environment during the useful life of the concrete blocks, since the solidification/stabilization process led to the immobilization of waste in the cement mass. Therefore, the use of blasting dust in the manufacture of concrete paving blocks is promising, thus being not only an alternative for proper disposal of such waste as well as a possibility of saving raw materials used in the construction industry.

Keywords: blasting dust; concrete paving block; stabilization; solidification

1. Introduction

Industrial activities are the main generators of waste both in quantity and in danger. Their waste, if managed incorrectly, constitutes one of the main causes of environmental and human health damages due to their toxicity and diversity of chemical composition.

Electroplating is a branch of the metalworking industry in which is performed the treatment of surfaces, metallic or otherwise, by depositing a thin layer of metal or alloy through electrolytic and chemical processes, giving a dense, uniform and adherent coating on the surface.

The solid waste generated in electroplating processes consist largely of dust and particulate

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