

Availability of Metals in Fired Bricks Incorporating Harbour Sediments

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Abstract : Alternative solutions to immersion at sea are searched for the huge amounts of dredged sediments around the world that might contain various types of contaminants. Possible re-uses of such materials in civil engineering appear as sustainable solutions. The French SEDIBRIC project (valorisation de SEDiments en BRIQues et tuiles) aims to replace a part of natural clays with dredged sediments in the preparation of fired bricks. The potential environmental impact of this re-use is explored to complete the technical and economic feasibility of the study. As part of the project, we investigate the environmental availability of metallic elements (Al, Ca, Cd, Co, Cr, Cu, Fe, Ni, Mg, Mn, Pb, Ti, and Zn) initially present in the dredged sediments selected for the project. Leaching tests (with H₂O, HCl, or EDTA) are conducted in the sediments than in the final bricks in order to evaluate the possible influence of some steps of the bricks manufacturing (desalination pre-treatment, firing, etc.). The desalination pre-treatment using tap water has no or few impacts on the environmental availability of the studied elements. On the opposite, the firing process (900°C) affects the value of the total content of elements detected in the bricks but also the environmental availability for various elements. For instance, Cd, Cu, Pb, and Zn are stabilized in the bricks, whereas the availability of some other elements (i.e., Cr, Ni) increases, depending on the nature of the extracting solution.

Keywords : availability, bricks, dredged sediments, metals

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