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Design and Characterization of Ecological Materials Based on Demolition and Concrete Waste, Casablanca (Morocco)

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Abstract : The Cities are the urbanized territories most favorable to the consumption of resources (materials, energy). In Morocco, the economic capital Casablanca is one of them, with its 4M inhabitants and its 60% share in the economic and industrial activity of the kingdom. In the absence of legal status in force, urban development has favored the generation of millions of tons of demolition and construction waste scattered in open spaces causing a significant nuisance to the environment and citizens. Hence the main objective of our work is to valorize concrete waste. The representative wastes are mainly concrete, concrete, and fired clay bricks, ceramic tiles, marble panels, gypsum, and scrap metal. The work carried out includes: geolocation with a combination of artificial intelligence, GIS, and Google Earth, which allowed the estimation of the quantity of these wastes per site; then the sorting, crushing, grinding, and physicochemical characterization of the collected samples allowed the definition of the exploitation ways for each extracted fraction for integrated management of the said wastes. In the present work, we proceeded to the exploitation of the fractions obtained after sieving the representative samples to incorporate them in the manufacture of new ecological materials for construction. These formulations prepared studies have been tested and characterized: physical criteria (specific surface, resistance to flexion and compression) and appearance (cracks, deformation). We will present in detail the main results of our research work and also describe the specific properties of each material developed.

Keywords : demolition and construction waste, GIS combination software, inert waste recovery, ecological materials, Casablanca, Morocco
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