



Towards a valorization of modern fine-grained sediment in the heavy-clay industry using new support-decision tool based on grain size and mineralogy – Application to the French territory.

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The heavy clay industry is classically using clay material extracted from the quarrying of fossil sedimentary successions. In a context of sustainable development, we evaluate the potential of modern fine-grained sediments from dam reservoirs, coastal bays, estuaries and sea ports of the French territory as alternative raw materials to produce bricks and tiles.

A first study was conducted on 41 natural samples from various geological settings of France using classical heavy clay industry analyzes (particle size distribution, geochemical composition, and technological tests such as shaping, measure of bending strength, shrinkage of dried and fired bars and water absorption of fired bars). Results are compared with those of 47 industrial mixtures ($\approx 90\%$ of the French production). Several sediment samples show properties close to those of the industrial references, in particular those from areas fed by mixed sedimentary and igneous sources.

Mineralogical analyzes allow the development of a new support-decision tool composed of ternary diagrams giving the particle size distribution (Winkler's diagram) and the mineralogy (Bulk sediment and clay minerals, Mineralogical Industrial Framework). Comparison of the plot of samples on the decision-support tool with results from the industrial technological tests shows that this decision-support tool is an alternative efficient way to evaluate the potential of sediment and to estimate how to improve its properties by mixtures with complementary materials (sediments, industrial mixtures or degreasing agents).

Following this work, an application case study, the SEDIBRIC project, is currently ongoing in the Seine river estuary. In this area, Le Havre and Rouen harbors dredge 6 to 7 Mm³ of sediments every year to maintain commercial waterways, and release it offshore because such materials are considered as wastes. Plot of different samples from Le Havre harbor indicates some areas where sediment characteristics nearly match those of the of tiles and bricks raw materials, despite high carbonates content. Technological tests on raw sediment and on mixtures are in progress to investigate the potential of an industrial use...