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Formulation of Mortars with Marine Sediments

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Abstract : The transition to a more sustainable economy is directed by a reduction in the consumption of raw materials in equivalent production. The recovery of byproducts and especially the dredged sediment as mineral addition in cements matrix represents an alternative to reduce raw material consumption and construction sector’s carbon footprint. However, the efficient use of sediment requires adequate and optimal treatment. Several processing techniques have so far been applied in order to improve some physicochemical properties. The heat treatment by calcination was effective in removing the organic fraction and activates the pozzolanic properties. In this article, the effect of the optimized heat treatment of marine sediments in the physico-mechanical and environmental properties of mortars are shown. A finding is that the optimal substitution of a portion of cement by treated sediments by calcination at 750 °C helps to maintain or improve the mechanical properties of the cement matrix in comparison with a standard reference mortar. The use of calcined sediment enhances mortar behavior in terms of mechanical strength and durability. From an environmental point of view and life cycle, mortars formulated containing treated sediments are considered inert with respect to the inert waste storage facilities reference (ISDI-France).

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