Full Factorial Design of Eco-Mortars Properties Formulated by Polystyrene and Mixed Sand

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Résumé

The objective of this work consists to improve the granulometry of dune sand (DS) by adding crushed sand (CS) , reducing the weight of the mortar with the addition of polystyrene (PL) and improving the fluidity and the mechanical resistance of the mortar hardened by the incorporation of adjuvant. The general full factorial design method has been used in this study. Thus, the DS content of the binder and the percentage of PL was chosen as the main variable influencing factors. Compressive strength (CS) and density (γ) were taken as responses. The DS and PL (mass%) replacement levels were set at 10% to 100% by mass, and the SP were kept at 1 %, 1.5% and 2% . Analysis of variance (ANOVA) was performed on the test results to analyze the significance of the effect factors and their interactions on the selected responses. The results drawn from this research work confirm that the rate of 50% of crushed sand improves the compactness of mortars and increases their resistance, the rate of 2% of superplasticizer gives a better resistance to the mortar and the addition of 10% of polyester makes it possible to reduce the density of the mortar without much influence on its mechanical properties.

Mots-Clés: Full Factorial Design, Crushed sand, polystyrene, additive, fluidity, mechanical behavior

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