Software-enhanced Method for Rapid Determination of the Early Heat of Hydration of Cement CEM II/A and B–S to Predict the 28-Day Compressive Strength

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The paper investigates the possibility to predict the 28-day compressive strength by using a rapid method of determining the early heat of hydration of cement. The early heat of hydration and the standard strength of cement being determined on a population of cements may serve for establishing a correspondence relation to the purpose of predicting the 28-day strength. Further, the relation needs validating on a greater number of cements of the same type and from the same manufacturer. The investigations involved the following steps: i) determination of the standard strength as per EN 196–1, ii) rapid determination of the heat of hydration by using a calorimeter prototype enhanced by a software application program for monitoring 1-minute temperature increments, iii) establishing the correspondence relation, and iv) validation of the correspondence relation on a number of 70 cements CEM II/A and B–S. The rapid estimation of the 28-day compressive strength of cement CEM II/A and B–S with a precision of $\pm$2.5 MPa is a versatile tool in the cement manufacturing process. The same algorithm may be applied and validated for any cement sorts.