

Award-winning paper in 2010

Every year, the editorial advisory board selects the best paper published in *Magazine of Concrete Research*. All papers published in *Magazine of Concrete Research* are eligible for this award.

On Monday 24 October 2011, ICE president Peter Hansford presented the award for the best paper published in *Magazine of Concrete Research* in 2010, as selected by the editorial panel.

MCR Award

The MCR Award winner was: Bentz DP (2010) Blending different fineness cements to engineer the properties of cement-based materials. *Magazine of Concrete Research* **62(5)**: 327–338, <http://dx.doi.org/10.1680/mac.2008.62.5.327>.

Abstract

Concretes are designed to fulfil specific engineering requirements, commonly exemplified by slump, unit weight and compressive strength. One source of untapped potential for varying engineering properties of hardened concrete is the variation of the cement particle size distribution. In this study, the performance of cements prepared by blending a coarse ASTM C150 type I/II and a fine type III cement obtained from the same clinker in three different proportions is examined. Evaluated properties for pastes and mortars include compressive strength and a variety of early-age properties that can influence cracking, specifically isothermal and semi-adiabatic calorimetry, chemical shrinkage, setting times (Vicat needle) and autogenous deformation. Addition of a high-range water reducer to the type III cement and the two finest blends is investigated as a secondary variable. The properties of the blends are compared with those of the two pure starting materials using a law of mixtures. Some properties such as heat release (as assessed using isothermal calorimetry) and chemical shrinkage are predicted nearly perfectly by applying this simple law. Others such as peak temperature (as assessed using semi-adiabatic calorimetry) and compressive strength are adequately predicted for engineering purposes by application of the law. Finally, setting times and autogenous deformation, being dependent on both hydration rates and particle spacing, cannot be predicted by the simple law of mixtures. It is concluded that a wide range of performance properties can be achieved by the blending of a fine and a coarse cement in controlled proportions.



ICE President Peter Hansford presents the MCR Award to Dale Bentz