



Discussion

A discussion of the paper “Effect of aggregate particle size and composition on expansion of mortar bars due to delayed ettringite formation” by P.E. Grattan-Bellew, J.J. Beaudoin, and V.-G. Vallée¹

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There seems to be both stated and implied reasons why the paper does not really address the issue as to whether different rock types and particle sizes of aggregates have influence on the amount of cracking in field concrete that has been shown to be affected by DEF. The authors themselves state (p. 1148) about the chosen experimental test procedure that “This method appears to be the most practical of the methods used. However it has not yet been demonstrated that cements causing expansion in the accelerated test would in fact cause deleterious expansion in incorrectly steam-cured concrete.” Actually, the results of the tests used seem to suggest that it is not the cement, but the use of quartz as aggregate in the mortar bars, that caused the measured linear expansions in combination with the applied devastating, arbitrary exposure. Presumably the authors would agree that the findings do not justify obligations for the cement industries to develop new cement types which can prevent “deleterious expansions in incorrectly steam-cured concrete.”

A step further toward possibly explaining why mortar bars with quartz alone among the chosen aggregates showed linear expansions under the given circumstances might be to apply lengthwise thin-sectioning and optical microscopy of the mortar bars. The complete features of microcracking and of any secondary compound, including ettringite, can be surveyed, and interesting details might be obtained for special examination and identification by scanning electron microscopy and energy dispersive X-ray analysis [1]. Such supplementary information might become useful in examinations of field concrete that may have suffered damage by overheating steam-curing.

References

- [1] C. Pade, U.H. Jakobsen, V. Johansen, 13. Internat. Baustofftagung, Bauhaus-Univers. Weimar. Tagungsbericht—Band 1, Ramboll Bulletin, 67 (1997) 521–533.

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¹ Cem Concr Res 28 (1998) 1147–1156.