

Drying Shrinkage of Concrete Containing Calcium Stearate, (Ca(C₁₈H₃₅O₂)₂), with Ordinary Portland Cement (OPC) as a Binder: Experimental and Modelling Studies

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First Author	Maryoto, Agus; Setijadi, Rachmad; Widyaningrum, Arnie; Waluyo, Sugeng;
Last Author	
Authors	Maryoto, A; Setijadi, R; Widyaningrum, A; Waluyo, S;
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Abstract	<p>This work investigates the effect of calcium stearate (Ca(C₁₈H₃₅O₂)₂) on concrete shrinkage behaviors by using experimental testing. The test specimens are cubes with each dimension given as 100 x 100 x 285 mm for shrinkage tests and cylinders with 150 mm diameter and 300 mm height for compressive strength tests. The calcium stearate with fractions of 0, 0.1, 0.2, and 0.3% from the weight of cement are used in the tests. The results showed that the shrinkage occurred in amounts of 0.079, 0.062, 0.065, and 0.060 mm for the specimens containing calcium stearate of 0, 0.1, 0.2, and 0.3%, respectively. Moreover, we also perform shrinkage modelling to explore a possibility to incorporate the calcium stearate fraction into the standard concrete shrinkage model. There are three well-known shrinkage models used here, i.e., the Sakata, the Japan Standard and the Bazant-Baweja models, where only the latter one is capable to capture our experimental results very well for different fractions of calcium stearate.</p>
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Author	Dr.-Ing SUGENG WALUYO, S.T, M.Sc.