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3D full field study of drying shrinkage of foam concrete

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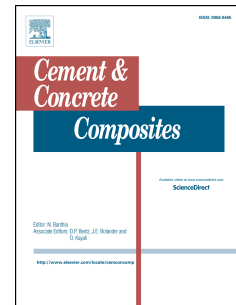
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3D Full field study of drying shrinkage of foam concrete

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Abstract

Drying shrinkage (DS) of concrete is important. The graded and heterogeneous DS inside the concrete may lead to cracking and further deteriorate the mechanical and durability properties. To elaborate the drying gradient and deformation heterogeneity, the full field DS distributions of foam concrete have been studied using an expanded Digital Volume Correlation method, which has a high precision of 0.01 voxel (about 0.6 μm) in displacement. The effectiveness of DS in local sub-volume is verified from bulk shrinkage of the whole specimen. The DS gradient due to drying is clearly revealed, and DS heterogeneity in spatial domain and in frequency domain is identified. A full view of foam concrete's drying processes is built. At the middle drying stage, three different states exist simultaneously, especially a drying front arises with high drying shrinkage.

Keywords: Drying shrinkage; Full field; Digital volume correlation; Foam concrete

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