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Experimental and semi-analytical multiscale approaches for the characterization of the elastic and viscoelastic behavior of polymer-modified cement-based materials

Polymer-modified cement concrete (PCC) is a heterogeneous building material with a hierarchically organized microstructure. Therefore, continuum micromechanics-based multiscale models represent a promising method to estimate the mechanical properties. By means of a bottom-up approach, homogenized properties at the macroscopic scale are derived considering microstructural characteristics. The extension of existing multiscale models for the application to PCC is the main objective of this work. For that, cross-scale experimental studies are required. Both macroscopic and microscopic mechanical tests are performed to characterize the elastic and viscoelastic properties of different PCC. The comparison between experiment and model prediction illustrates the success of the modeling approach.

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Bauhaus-Universitätsverlag

1. Auflage 2019

Band 19 Schriftenreihe des DFG
Graduiertenkollegs 1462 Modellqualitäten

Softcover

21×29,7cm • 980 g

260 Seiten

85 figures & 29 tables

Buchausgabe (D): 36,00 €

ISBN: 978-3-95773-269-9