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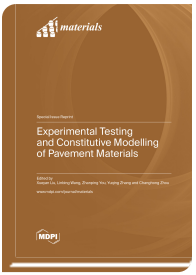
Special Issue Reprint

Experimental Testing and Constitutive Modelling of Pavement Materials



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Pavement materials such as asphalt mixtures, granular aggregates, and soils exhibit complex material properties and engineering performance under external loading and environmental conditions. For instance, the asphalt mixture shows highly nonlinear viscoelastic and viscoplastic properties at high temperatures, and it presents fatigue cracking damage and fracture properties at intermediate or low temperatures. Constitutive models based on mechanics theories have been the kernel of performance prediction of pavement infrastructures and materials. They lay down a solid foundation for material selection, design, pavement structural evaluation and maintenance decisions. Advances in mechanics modeling and associated experimental testing for pavement infrastructures and construction materials are emerging constantly, such as nonlinear viscoelasticity, viscoplasticity, fracture, and damage mechanics models. Meanwhile, various numerical modeling technologies are being developed and implemented to solve the multiscale and multiphysical equations. Examples include finite element, discrete element, and micromechanics or molecular dynamics simulations at different dimensions and scales. This reprint provides a unique platform, presenting novel studies and new discoveries in the areas of mechanics, numerical modeling and experimental testing of pavement infrastructures and

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