

Discrete Element Modelling of Idealised Asphalt Mixtures

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Project Details

This is the 3rd NARC-sponsored studentship undertaken at the University of Nottingham between Oct. 2002 and Sept. 2005.

Project Description

The aim of this project is to use Discrete Element Modelling (DEM) to investigate the deformation behaviour of simplified asphalt mixtures. These materials comprise 3 phases: bitumen, aggregate (graded), and air and it is therefore important to understand the micromechanics of asphalt behaviour.

DEM models a particle as a sphere, or a number of spheres bonded together. The program PFC-3D was used in this research.

Work Involved

- Develop a numerical sample preparation procedure that replicates the packing characteristics.
- Investigate the effect of the number and properties of the particles on bulk material behaviour.
- Introduce time and geometry dependent contact stiffnesses.
- Simulate uniaxial and triaxial compressive creep tests over a range of temperatures and stress levels.
- Validate the models using previously obtained experimental data.

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