INVESTIGATING THE PACKING CONDITION OF POROUS ASPHALT MIXTURE (PAM) USING DISCRETE ELEMENT METHOD (DEM)

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ABSTRACT
Packing condition is an important factor to asphalt mixture's mechanical performance. Porous Asphalt Mixture (PAM), with a characteristic feature of open-graded design, is beneficial for driving safety and environment. However, current gradation design methods are mostly based on dense gradations, and little research has been conducted in providing explicit and direct parameters to represent the packing condition in a mixture. In this study, six PAM gradations were designed and relevant parameters were obtained from both laboratory experiments and Discrete Element Method (DEM) simulation. Simulation results showed that the development of packing condition is not only related to the percentage of fines fraction, but also the proportions of particles within various size ranges, which corroborated with laboratory measurements. Hence DEM is an effective tool in analysing the packing condition in a mixture, and the findings should be a useful guide in PAM gradation design.