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Consideration of the effect of interlayer spatial distribution on the mechanical behaviour of porous media

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In the process of forming porous media by deposition of particles, due to factors such as deposition rate, gravity sorting effect and fragmentation of coarse particles, different structures of interlayers are usually formed, and the form of distribution of interlayers has an important effect on the stress distribution, structural strength and deformation properties of the porous media. However, existing structural parameters such as voidness, coordination number and friction angle cannot fully characterise the effect of interlayers on the structural stability and contact anisotropy of porous media under stress. In carrying out the research on the structural stability of porous media interlayer, the discrete element method is used to simulate the mechanical behaviour of particles in the process of compaction under triaxial stress servo, to reveal the mechanism of the influence of different interlayer parameters on the overall structure of the porous media, and to analyse the influence of the thickness and quantity of the interlayer on the mechanical behaviour and structural deformation of porous media according to the structural parameters of the formation of the porous media and the parameters of the interlayer particles. Based on the structural stability and stress anisotropy of porous media, the mechanical properties of the intercalation were found to have a particularly significant effect on the macroscopic strength and structural stability of porous media, taking into account the inter-particle contact force, contact direction, and peak stress correlation.

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Primary authors: LIU, Mingxin (China University of Petroleum(East China)); Prof. YANG, Yongfei (China University of Petroleum (East China))

Presenter: LIU, Mingxin (China University of Petroleum(East China))

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