

## عنوان مقاله:

Distinct element modelling of the mechanical behaviour of intact rocks using voronoi tessellation model

## محل انتشار:

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## خلاصه مقاله:

This paper aims to study the mechanical behaviour and failure mechanism of intact rocks under different loading conditions using the grain based model implemented in the universal distinct element code (UDEC). The grain based numerical model is a powerful tool to investigate complicated micro-structural mechanical behaviour of rocks. In the UDEC grain based model, the intact material is simulated as assemblies of a number of polygonal blocks bonded together at their contact areas. To investigate the ability of such a numerical framework, uniaxial and triaxial compression tests as well as direct tensile test were simulated in UDEC and then the results were compared with the laboratory experiments undertaken on Hawkesbury sandstone. There was a good agreement between the experimental and numerical under different loading conditions. In order to investigate the effect of micro-properties of the grain based model, blocks and contacts, on the laboratory scale intact rocks, a set of parametric study was undertaken. The results from this analysis confirmed that the block size is an intrinsic characteristic of a model which has significant effects on the mechanical behaviour of the numerical models. Also, it was concluded that the cohesion and friction angle of contact surfaces control both uniaxial and triaxial compressive strengths. Finally, it was found that in the triaxial compression test, as the applied confining pressure increases, the effect of contact cohesion on the .strength decreases while the effect of friction angle increases

## کلمات کلیدی:

Voronoi model, Grain based model, UDEC, micro-parameters, Failure mechanism

## لینک ثابت مقاله در پایگاه سیویلیکا:

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