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ABSTRACT

MODELLING OF SOIL STRUCTURE BEHAVIOUR DURING MONOTONIC AND CYCLIC LOADING

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Several studies have already been published in order to better understand the behaviour of interfaces. Different experimental methods, including direct shear tests, simple shear test, and torsional ring test, and also various constitutive models were presented to modelize the behaviour of the interface. These studies revealed that the main factors that affect the behaviour of the interface include the roughness of the interface, the soil mineralogy, the soil density, and the normal stress applied. This work was therefore directed primarily to better understand the overall behaviour of the interface and the influence of these factors in a monotonic and cyclical solicitation. Through the simulation of a direct shear test at constant normal stress (CNL) in FLAC 5.0, several typical behaviours, including degradation of shearing resistance and contractancy-dilatancy, have been observed and modelled. At first, the law of Mohr-Coulomb and its correspondent failure criterion have been implemented. Then several models have been proposed to model more precisely the behaviour. Finally, two cyclical laws, the law of Ramberg-Osgood law and Byrne, originally developed for the soil, have been implemented in this model. This study has verified the consistency of the results and has determined whether the injection of such laws is sufficient to modelize the behaviour of the interface under cyclic loading.