A 3D coupled hydromechanical model for dam foundation analysis in small displacements

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ABSTRACT

The explicit formulation of a small displacement model for the coupled hydro-mechanical analysis of concrete dam foundations based on interface finite element technology is presented. The proposed 3D hydromechanical coupled model is based on the 2D coupled model recently proposed [1].

This 3D model, as in the 2D version, requires a thorough pre-processing stage in order to ensure that the interaction between the various blocks which represent both the rock mass foundation and the dam is always face to face. The mechanical part of the model, though limited to small displacements, has the advantage of allowing an accurate representation of the stress distribution along the interfaces, such as rock mass joints. The hydraulic part and the mechanical part of the model are fully compatible.

The verification and application examples presented in this paper show that the proposed 3D hydromechanical coupled model allows seepage flow through rock masses to be accurately simulated.

REFERENCES

[1] M.L. Farinha, N.M. Monteiro Azevedo and M. Candeias, "Small displacement coupled analysis of concrete gravity dam foundations: Static and Dynamic Conditions", *Rock Mechanics and Rock Engineering*, published online (2016).