

## Cohesive-Frictional Crack Model Applied to Dam-Foundation Joint

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The most realistic method used today for the numerical simulation of concrete fracture is the cohesive crack model, introduced by Barenblatt (1962) and Dugdale (1960) for elasto-plastic materials and by Hillerborg et al. (1976) for quasi-brittle materials. When this model is used in a large scale problem the process zone is completely developed and very often the friction operates when the crack faces are opened. In this case phenomena occurring at various scales interact each other causing instabilities of various kind.

As an example, following the benchmark problem proposed by the International Commission on large Dams [3], the propagation of a crack along the interface between a gravity dam and the foundation rock is analysed.

In order to understand the physical meaning of this instabilities and to stabilize the equilibrium iterations executed according to the Newton-Raphson method, Barpi and Valente [2] show that the knowledge of the asymptotic expansion of the displacement and stress fields at the fictitious crack tip is a useful tool.

In this paper an asymptotic expansion similar to that proposed by Karihaloo and Xiao [1] is applied. In this way many commonly-used softening laws, e.g. rectangular, linear, bilinear and exponential, can be taken into account.

The hydromechanical coupling between subpressures induced by water penetration into the crack and displacement discontinuity is evaluated following the work of Reich et al [4]

### References

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