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## Titre :

***A practical method to estimate crack openings in concrete structures***

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## Résumé :

umerical modelling of concrete cracking requires robust models able to describe opening and propaga-tion of cracks. Structural concrete codes provide practical relations to describe crack openings. However, these empirical methods were developed for specific structures and cannot be used for general appli-cations. Here, a continuous modelling approach based on damage mechanics is used to compute crack openings in a tie-beam concrete structure. We propose a post-processing method to extract crack openings from a continuum damage finite element computation. This method can be applied to all continuum damage/plasticity models. The tie-beam concrete is characterized by a weak stress gradient; this aspect complicates predictions of crack positions and number. A stochastic method is used to take into account the spatial variability in concrete properties and create a spatially correlated random property field. Copyright © 2010 John Wiley & Sons, Ltd.

## Mots Clés :

*Isolated zygotic embryo Germination Proliferation Micropropagat ion Culture medium Pistacia vera L*

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