UNIVERSITÀ DEGLI STUDI DI TRENTO

Dipartimento di Ingegneria Civile, Ambientale e Meccanica

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AVVISO DI SEMINARIO

Si comunica che **giovedì 01 giugno 2017 a partire dalle ore 11.00**
si terrà presso l'aula **R2** (via Mesiano 77) il seguente seminario

Crack penetration or deflection at an interface: a new framework based on the phase field approach for brittle fracture and the interface cohesive zone model

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The problem of a crack impinging on an interface has been thoroughly investigated in the last three decades due to its important role in the mechanics and physics of solids. In this investigation, this problem is revisited in view of the recent progresses on the phase field approach to brittle fracture. In this concern, a novel formulation combining the phase field approach for modeling brittle fracture in the bulk and a cohesive zone model for pre-existing adhesive interfaces is herein proposed to investigate the competition between crack penetration and deflection at an interface. The model, implemented within the finite element method framework using a monolithic fully implicit solution strategy, is applied to provide a further insight into the understanding of the role of model parameters on the above competition. In particular, the role of the fracture toughness ratio between the interface and the adjoining bulks and the characteristic fracture-length scales of the dissipative models are analyzed. In the case of a brittle interface, the asymptotic predictions based on linear elastic fracture mechanics criteria for crack penetration, single deflection or double deflection are fully captured by the present method. Moreover, by increasing the size of the process zone along the interface, or by varying the internal length scale of the phase field model, new complex phenomena are emerging, such as simultaneous crack penetration and deflection and the transition from single crack penetration to deflection and penetration with subsequent branching into the bulk. The obtained computational trends are in very good agreement with previous experimental observations and the theoretical considerations on the competition and interplay between both fracture mechanics models opens new research perspectives for the simulation and understanding of complex fracture patterns.

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Tutti gli interessati sono invitati a partecipare.

Il seminario è organizzato dal gruppo di Scienza delle Costruzioni
(D. Bigoni, L. Deseri, N.Pugno, A. Piccolroaz, F. Dal Corso, M.F. Pantano, R. Springhetti, D. Misseroni)

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