UNIVERSITÀ DEGLI STUDI DI TRENTO
Dipartimento di Ingegneria Civile, Ambientale e Meccanica

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AVVISO DI SEMINARIO

Si comunica che **giovedì 21 novembre a partire dalle ore 15.00** presso l'aula **R2** (via Mesiano 77) si terrà il seguente seminario

Interaction of Cracks with Dislocations in Couple-Stress Elasticity

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The interaction between cracks and dislocations is a fundamental problem of fracture mechanics, since this interaction determines, in many cases, the macroscopic brittle or ductile material response. In the present work, we study the interaction of a single crack with a single dislocation or a dislocation dipole within the framework of the generalized continuum theory of couple-stress elasticity. The standard couple-stress theory (with no independent rotation) is the simplest theory of elasticity in which couple-stresses arise.

Our approach is based on the distributed dislocation technique. The cracks are modeled either by a continuous distribution of dislocations or by a continuous distribution or infinitesimal dislocation dipoles. In the case of the interaction of a crack with a climb dislocation, rotational defects have to be distributed as well (constrained wedge disclinations) to satisfy the boundary conditions along the crack faces. The final results are obtained by numerically solving a system of coupled singular or hypersingular integral equations. The interaction or a crack with a glide or a screw dislocation is modeled by a single singular or a single hypersingular integral equation.

The results for the near-tip fields differ in several respects from the predictions of the classical fracture mechanics. In particular, the present results indicate that a cracked solid governed by couple-stress elasticity behaves in a more rigid way (having increased stiffness) as compared to a solid governed by classical elasticity. Also, the stress level at the crack-tip region is appreciably higher, within a small zone adjacent to the tip, than the one predicted by classical elasticity while the crack-face displacements and rotations are significantly smaller that the respective ones in classical elasticity. In all cases the *J*-integrals in both crack tips and the configurational (Peach-Koehler) forces on the defects are calculated.

Tutti gli interessati sono invitati a partecipare.

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

Solid and Structural Mechanics Group
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