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

Instabilities and nonlocal multiscale modelling of materials
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AVVISO DI SEMINARIO

Si comunica che **giovedì 07 agosto 2017 a partire dalle ore 15.30**
si terrà presso l'aula **R2** (via Mesiano 77) il seguente seminario

Defect tolerance and design principles for bio-inspired fibrillar dry-adhesives

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Bio-inspired fibrillar dry-adhesives have been prototyped to mimic the extraordinary reusability of natural adhesive systems such as the ones observed in insects and geckos. These adhesives rely on the utilization of short-range intermolecular (Van der Waals) forces harnessed by intimate contact at the tips of small interfacial structures called fibrils. The quality of the adhesive bond in these systems is related to the load distribution at the interface and it should be observed at multiple length scales. The goal for an optimal adhesive strength is to obtain equal load sharing (ELS) across the whole interfacial area. The physical and geometrical properties of the whole fibrillar system are key features to determine the global adhesive strength of it. While there have been extensive investigations on obtaining ELS within the tip of a single fibril, very limited attention has been dedicated to obtaining ELS across a whole array of fibrils, focusing on the mutual interaction among them. We simulated the detachment mechanism in such a system and developed a simple mathematical model to account for load redistribution among fibrils. Finally, we calculated the ideal distribution of fibril properties to obtain ELS at the fibrillar array length scale. The design criterion that emerges from this is tested in the presence of contact defects in the form of (i) interfacial misalignment and (ii) localized regions of contact failure. In these cases, we evidence how the compliance of the backing layer, considered detrimental for the overall performance of the adhesive system, can be exploited to gain improved defect tolerance.

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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