Dipartimento di Scienze e Metodi dell'Ingegneria

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SSD: CEAR-06/A - Scienza delle Costruzioni

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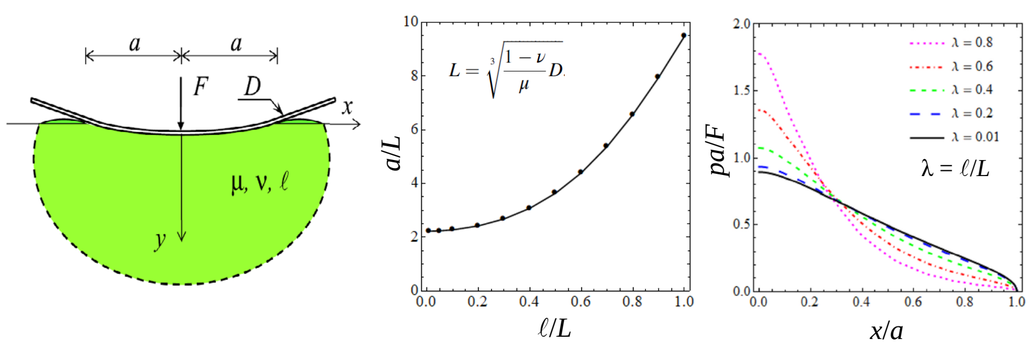
The research activity mainly concerns problems of material mechanics and structures. The results obtained are documented by the produced publications (ORCID: 0000-0002-7410-3008). A common characteristic of the work carried out is the attempt to develop sufficiently general formulations and analysis methodologies suitable for addressing problems of scientific and technical interest, principally through analytical procedures, often supplemented by experimental verifications.

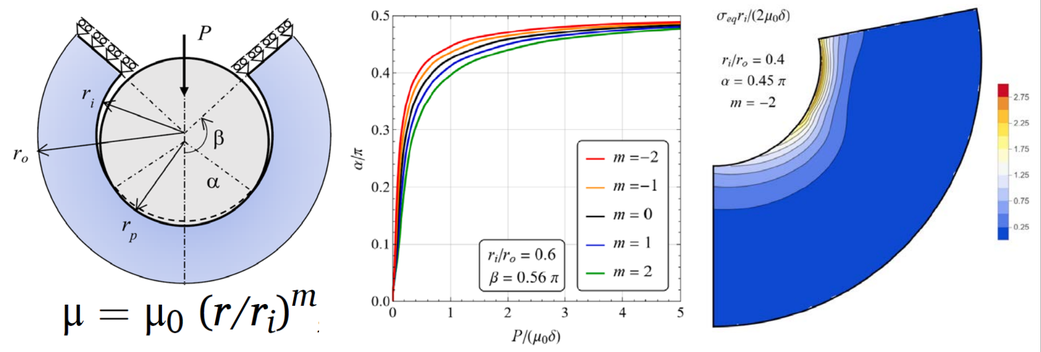
Contatct problems with microstructure

Analytical study of the contact plane problem with separation between an elastic beam and an elastic material with microstructure, and of the adhesion problem between a thin elastic film and an elastic substrate with microstructure.



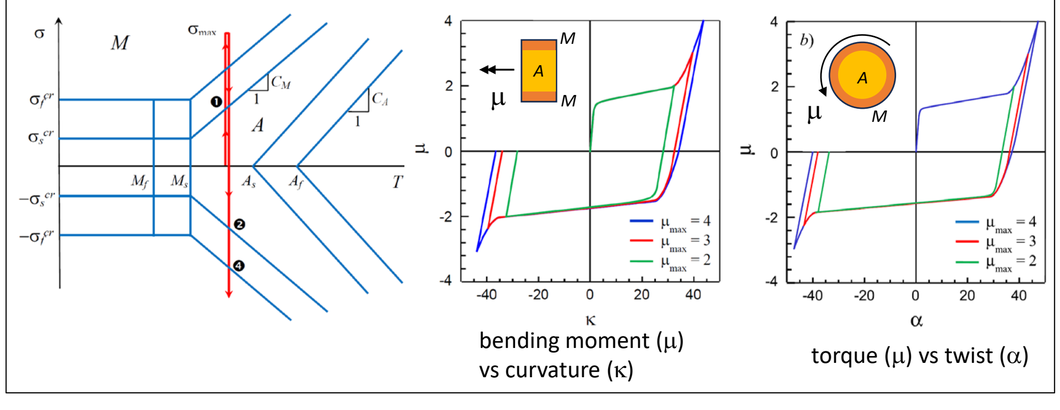
Progressive contatct problems in FGMs

Analytical study of progressive contact problems between a rigid cylinder (shaft) and a curved beam (hub) made of functionally graded material (FGM) and in an elastic disc compressed between two rigid jaws of lower curvature.



Shape memory alloys beams

Analytical models for shape memory alloy beams (NiTiNol) subjected to direct and reverse bending or torsion at temperatures below the austenitic transformation, considering two martensitic variants and different elastic moduli for the austenitic and martensitic phases.

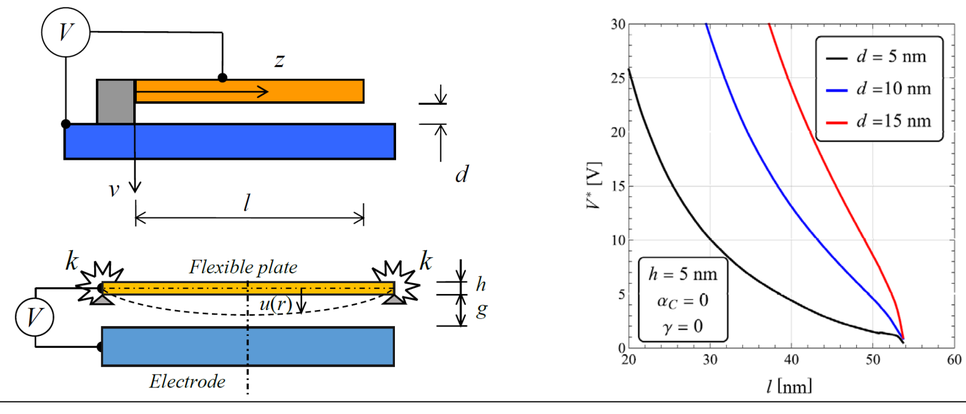


bending moment (μ) vs curvature (κ)

torque (μ) vs twist (α)

Pull-in instability in MEMS e NEMS

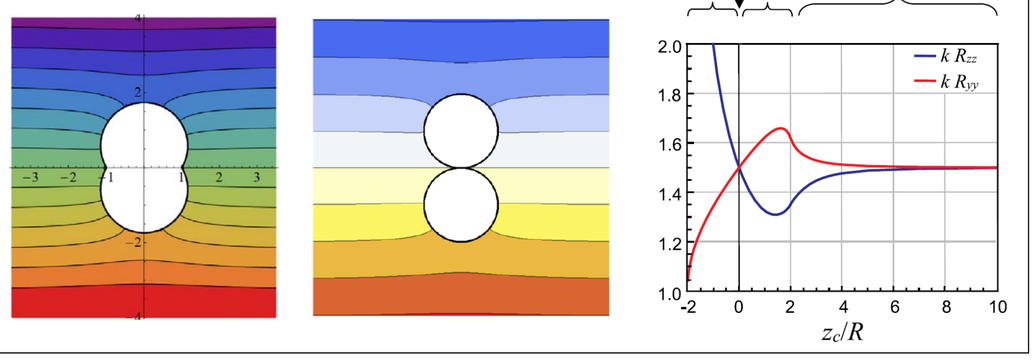
Analytical estimates of the pull-in voltage of micro and nano cantilevers and circular plates subjected to electrostatic and intermolecular forces (van der Waals or Casimir), considering the effects of the microstructure, surface elastic energy, and residual stresses.



Effective properties of composite materials

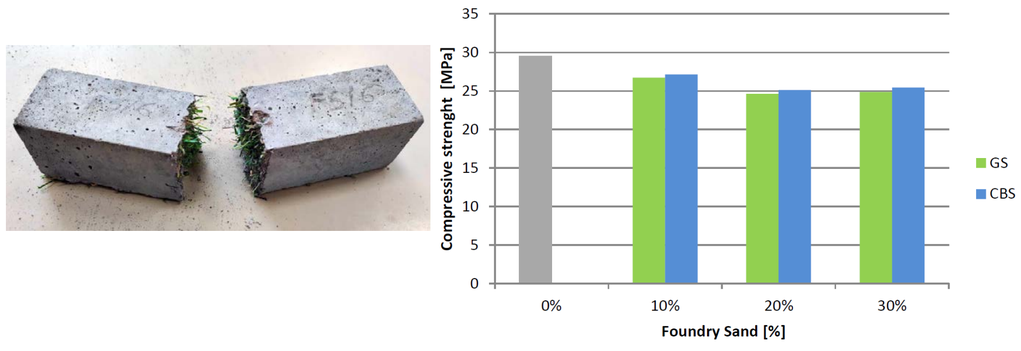
Effective thermal and elastic properties of isotropic elastic thermo-conductive materials containing voids or rigid/ insulating inclusions of toroidal shape, fibers whose cross section is confined by two circular arcs, circular voids or spherical porosities in coalescence.

coalescence of spherical pores



Eco-sustainable concrete and mortar

Within the framework of two POR-FESR projects, the mechanical properties of concrete reinforced with synthetic fibers derived from the recycling of sports fields were studied, as well as mortars and concretes made with recycled exhausted sands from local foundries. The environmental impact resulting from their use was also evaluated..



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