
# COUPLED PROBLEMS IN BUILDING MATERIALS: FROM CONSTITUTIVE LAWS TO MULTIPHYSICS

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## ABSTRACT

Coupled problems arise in many aspects of computational mechanics applied to building materials, both at the strictly mechanical level, or in multiphysics applications. In the first case coupling affects the constitutive modeling, typically, when addressing numerically the post-peak behaviour of certain building materials via the elasto-plasto-damage theory, or the visco-plasto-damage theory, in simulating the failure process.
More widely, coupling can involve a plethora of aspects of physics, when the scenario of study becomes more complex. For example, the mechanical field may be strongly related to the thermal field, in the case of not-negligible heat diffusion processes, or to humidity diffusion, in the case of materials where porosity plays a crucial role. More unconventional couplings may be necessarily considered in some case, e.g. with the radio-chemical field, or with the electro-magnetic field. In all these cases strong or weak formulations may be conveniently defined to allow for predictive modeling of complex phenomena.

The aim of this Mini Symposium is to gather researchers/scientists/experts in the field of computational mechanics applied to building materials both at the material and structural scale, with novel approaches on the most challenging coupled formulations related to these materials in an efficient way.
Authors are encouraged to present their innovative contributions in the field of theoretical and numerical coupled models applied to building materials like steel, concrete, reinforced concrete, FRP, wood, asphalt, mixed concrete-steel, but not exclusively, under service and ultimate scenarios. The studies are not limited to conventional materials but are open to their use in combinations with polymers, metallic fibers, improved mixtures/components, as well as eco-sustainable materials. The modeling approaches may pertain to the framework of continuous or discrete mechanics, phase-field modeling, poro-mechanics or homogenized scale methods, among others. They can extend to all scales from nano- to the homogeneous macroscale. Both probabilistic and deterministic approaches are welcomed. The coupling may be restricted to one field only, or it may extend to multiphysics, in relation to the specific application field.