

# ON THE SOLVABILITY OF DYNAMIC ELASTIC-VISCO-PLASTIC CONTACT PROBLEMS WITH ADHESION\*

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## Abstract

We consider a dynamic contact problem between an elastic-viscoplastic body and an obstacle, the so-called foundation. The contact is frictionless and is modelled with normal compliance of such a type that the penetration is restricted with unilateral constraint. The adhesion of contact surfaces is taken into account and the evolution of the bonding field is described by a first-order differential equation. We provide a weak formulation of the contact problem in the form of an integro-differential system in which the unknowns are the displacement, the stress and the bonding fields, then we present an existence result for the solution. We consider a sequence of penalized problems which have a unique solution, derive *a priori* estimates and use compactness properties to obtain a solution to the original model, by passing to the limit as the penalization parameter converges to zero.

**MSC:** 74M15, 74H20, 49J40

**keywords:** elastic-visco-plastic material, dynamic process, frictionless contact, normal compliance, Signorini condition, adhesion, variational formulation, weak solution, *a priori* estimates

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\*Accepted for publication in revised form on 12.08.09

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