

# Equilibrium based evaluation of stress distribution under steel column base plates. I: Governing Equations

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## ABSTRACT

*The present paper, being the first part of two relevant studies, deals with the evaluation of the stress distribution under steel base-plate connections, acted upon statically by axial forces and bending moments. The whole approach is formulated on the basis of the proper equilibrium equations that are valid for both elastic and plastic plate behaviour adopting a nonlinear stress distribution function under the base plate of catenary type, depending on only one parameter. Taking into account the compatibility and geometric conditions valid for all the connection components, the aforementioned equations are fully assessed, considering the base-plate connection as semi-rigid. Numerical results, parametric studies and comparison with existing relevant investigations will be demonstrated in the companion paper, being the product of advances symbolic computations of the theoretical findings of the present work.*

## KEYWORDS

*Steel column base plate connections, stress distribution, equilibrium equations, symbolic computations*

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