

# A linear complementarity approach for mixed beam-solid contact problem

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## Abstract

A mathematical formulation of a Linear Complementarity Problem (LCP) is presented for the 3D mixed beam-solid contact problem with the Mohr-Coulomb friction. The contact problems arising from the pile base and shaft are of linear and nonlinear complementarity problems, respectively. First, the latter is transformed into two LCPs, and then, all the LCPs are recast into a system of Fischer-Burmeister functions. Therefore, the mixed beam-solid contact problem can be solved by Newton's method. The proposed method is validated by the numerical examples of a pile under axial compressive and tensile loads, which clearly shows that the numerical results are in good agreement with the field test results.

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