

Out-of-plane principal stress in plane strain/stress failure investigations – an overview of its relevance for various failure criteria

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Abstract: The paper exposes the role of the out-of-plane principal stress in the investigations of (brittle) failure of isotropic linear elastic continuum using plane strain (or plane stress) approximations. The plots in (σ_m, τ_m) , (σ_3, σ_1) spaces for each of the examined criteria: the two-dimensional: Coulomb, Tresca, Hoek-Brown, and the three-dimensional ones: Drucker-Prager and linear Mogi, give an insight into the interplay of Poisson ratio and the material parameters involved in the respective criterion formula.

Key words: plane strain, plane stress, out-of-plane principal stress, Mohr circle, brittle failure criteria

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