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Comparative study of shear strength characteristics of dry cohesionless sands from triaxial, plane-strain and direct shear tests
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Abstract
Knowledge of strength properties and deformational behaviour of soils under different loading conditions is necessary in the analysis of most of the geotechnical engineering problems. This paper presents a comparative study of shear strength characteristics of sands as obtained from triaxial, plane-strain and direct shear test results. The experimental results on shear strength characteristics of dry sands obtained from triaxial, plane-strain and direct shear tests, were analyzed in order to investigate the effect of soil relative density or soil porosity on the angle of shearing resistance, dilatancy factor, particles interlocking, and volumetric strain and axial strain at failure. Furthermore, the results were used to develop correlations connecting between the angle of shearing resistance of triaxial condition test and the direct shear test, and between the angle of shearing resistance of plane-strain and triaxial compression conditions. The correlations developed take into account the interaction between soil relative density, dilatancy factor and particles interlocking. Good agreement has been obtained between the predicted results values using the proposed methods and the results of the present experimental investigation and those available in the literature. © 2019, © 2019 Informa UK Limited, trading as Taylor & Francis Group.

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