

Effect of the Soil-Foundation Interface Condition in the Determination of the Resistance Domain of Rigid Shallow Foundations

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Abstract : The resistance domain of a generally loaded rigid shallow foundation is normally represented as an interaction diagram limited by a failure surface in the three dimensional (3D) load space (N, V, M), where N is the vertical centric load component, V is the horizontal load component and M is the bending moment component. Usually, this resistance domain is constructed neglecting the foundation sliding mechanism that take place at the level of soil-foundation interface once the applied horizontal load exceeds the interface frictional resistance of the foundation. This issue is translated in the literature by the fact that the failure limit in the (2D) load space (N, V) is constructed as a parabola having an initial slope, at the center of the coordinate system, that depends, in some works, only of the soil friction angle, and in other works, has an empirical value. However, considering a given geometry of the foundation lying on a given soil type, the initial slope of the failure limit must change, for instance, when varying the roughness of the foundation surface at its interface with the soil. The present study discusses the effect of the soil-foundation interface condition on the construction of the resistance domain, and proposes a correction to be applied to the failure limit in order to overcome this effect.

Keywords : soil-foundation interface, sliding mechanism, soil shearing, resistance domain, rigid shallow foundation

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