Application of the ultimate limit states factored strength approach to design of cantilever walls in dry cohesionless soils

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Abstract

Geotechnical design is carried out according to one of two main methods; the Working Stress Design (WSD) and the Limit States Design (LSD) methods. The LSD can be carried out according to two main approaches; the Factored Strength Approach (FSA), and the Factored Resistance Approach (FRA). The use of LSD in Egypt is limited to the design of reinforced concrete structures. The geotechnical design is still based on the WSD method. The updated Egyptian Geotechnical Code will include both methods for a transition period before fully adopting the LSD. This study describes the methodology and results of determination of the partial factors for the limit states FSA for cantilever walls in dry cohesionless soils such that the LSD matches the WSD. These calibrated values are essential for the transition period when both the WSD and LSD design philosophies are applicable. The study recommends a partial factor of 1.25 in the future version of the Egyptian Code for the limit states FSA design of cantilever walls in dry cohesionless soils, which agrees with the current state of practice in different international codes.