# Optimum penetration depth of cantilever sheet pile walls in dry granular soil based on reliability analysis concept and its impact on the shoring system cost

*Ahmed M. Ebid,Ibrahim Mahmoud Mahdi Mostafa*

**Abstract**

These instructions provide you guidelines for preparing papers for International Journal of Application or Innovation in Cantilevered sheet pile walls are commonly used in shoring systems of deep excavation down to about 5.00 m. The most common design procedure for this type of flexible retaining structures is to determine the required penetration depth for stability and then increasing the calculated penetration depth by 20% to 40% to achieve a factor of safety of about 1.5 to 2.0. This procedure has two disadvantages; first, the procedure does not give accurate values for penetration depth or corresponding factor of safety, second, it ignores the effect of uncertainty in the used geotechnical parameters. The first aim of this study is to overcome those two disadvantages by introduce an alternative formula to determine the optimum penetration depth of cantilever sheet pile walls in dry granular soil based on reliability analysis concept, while, the second aim is to study the impact of using the optimum depth on the cost of the shoring system. The study results assure the validity of provision of increasing the calculated penetration depth by (20% to 40%) and introduced a formula to calculate the required penetration depth to achieve probability of failure of 0.1% and proved that using this optimum depth can reduce the direct cost of the shoring system by 5% to 10% based on internal friction angle of soil

*International Journal of Application or Innovation in Engineering & Management (IJAIEM) 2017, July*





Copyright É 2026 [Future University in Egypt]. All rights reserved.