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Effects of Nails Skew Angle on Soilnailing Systems Performance

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Nowadays, rapid development on engineering science and construction, increase the requirement of excavation and soil structures. In this way, modern technologies and methods to design and execution are considered.
Soil nailing is one of soil in-situ reinforcing methods which lead to imporving system stability by increasing shear resistance in failure surface. In this way, nails play an important role and change in their properties have a great effect on systems performance. One of the most important geometric properties of nails is skew angle to the horizon. In this regard, nails angle is changed and effect of this event is observed on system performance. The aim of this research is to find optimum nail angle which causes the most improve on soil nailing system stability.
In this paper, numerical method, finite element method, is used to analyze and investigate. In this regard, 15 node triangular elements are used to modeling soil elements, plane elements with equivalent rigidity for facing model and linear elements for modeling nails.
The results show that changes in nails angle lead to change in systems engineering and mechanical characteristics. Also, it considers that for a certain nails angle, which named optimum angle, system have maximum safety factor and minimum deformation.

Keywords: Soilnailing, Nail, Skew angle, Numerical methods