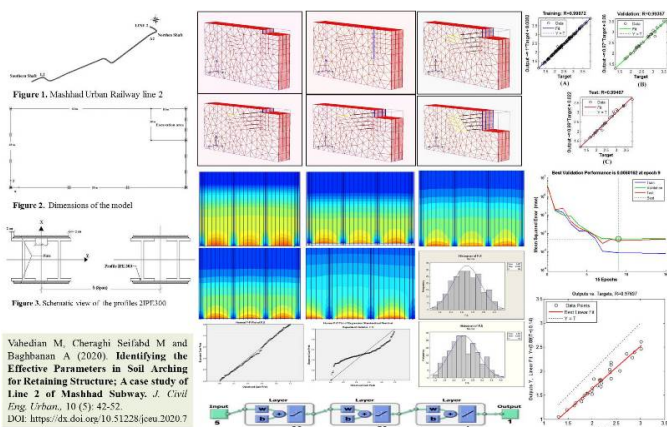


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Research Paper

Identifying the Effective Parameters in Soil Arching for Retaining Structure; A case study of Line 2 of Mashhad Subway.

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Abstract

The effective parameters on soil arching in retaining structures composed of the steel piles (2PIE300) and the steel anchors were considered using PLAXIS 3D TUNNEL for a three-dimensional numerical model. To better compare, it was assumed that external loading conditions and technical features of structural elements were the same. To determine the limits of effective parameters in fine (CL-ML) and coarse grains (SC-SM), according to the soil specifications of the stations A2 to L2 in Mashhad urban railway line 2 (Iran), Hardening Soil Model (HS) was used. Modeling started with a horizontal and vertical distance of 2 meters and increased to a distance of 4 meters. The parameters of the soils including angles of internal friction, cohesion, density and elastic modulus and the distance between anchors have been selected to present the prediction model. All parameters of the soils have been used for multiple regression and artificial neural network modeling statistical analysis. To present a prediction model, 5 parameters including internal friction angles of soil, cohesion, soil density, distance between anchors and elastic modulus have been selected and all of them except final parameter have been used to analyze multiple regression and artificial neural network modeling. The results showed that the best regression model that could be presented is the correlation of 94% between measured and predicted values. The prediction effectiveness of the neural network model has been found to be acceptable as they produced higher correlation coefficient (99%) between the variables and for the prediction of the factor of safety.

Keywords: Soil arching, Multiple regression, Artificial neural network, PLAXIS 3D TUNNEL, Line 2 of Mashhad urban railway, Excavation safety factor

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