

## Comparing Field Displacement History with Numerical Results to Estimate Geotechnical Parameters: Case Study of Arash-Esfandiar-Niayesh under Passing Tunnel, 2.5 Traffic Lane Tunnel, Tehran, Iran

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**Abstract :** Underground structures are of those structures that have uncertainty in design procedures. That is due to the complexity of soil condition around. Under passing tunnels are also such affected structures. Despite geotechnical site investigations, lots of uncertainties exist in soil properties due to unknown events. As results, it possibly causes conflicting settlements in numerical analysis with recorded values in the project. This paper aims to report a case study on a specific under passing tunnel constructed by New Austrian Tunnelling Method in Iran. The intended tunnel has an overburden of about 11.3m, the height of 12.2m and, the width of 14.4m with 2.5 traffic lane. The numerical modeling was developed by a 2D finite element program (PLAXIS Version 8). Comparing displacement histories at the ground surface during the entire installation of initial lining, the estimated surface settlement was about four times the field recorded one, which indicates that some local unknown events affect that value. Also, the displacement ratios were in a big difference between the numerical and field data. Consequently, running several numerical back analyses using laboratory and field tests data, the geotechnical parameters were accurately revised to match with the obtained monitoring data. Finally, it was found that usually the values of soil parameters are conservatively low-estimated up to 40 percent by typical engineering judgment. Additionally, it could be attributed to inappropriate constitutive models applied for the specific soil condition.

**Keywords :** NATM, surface displacement history, numerical back-analysis, geotechnical parameters

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