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Investigation of the Effect of Excavation Step in NATM on Surface Settlement by Finite Element Method

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Abstract : Nowadays, using rail transport system (Metro) is increased in most cities of The world, so the need for safe and economical way of building tunnels and subway stations is felt more and more. One of the most commonly used methods for constructing underground structures in urban areas is NATM (New Austrian tunneling method). In this method, there are some key parameters such as excavation steps and cross-sectional area that have a significant effect on the surface settlement. Settlement is a very important control factor related to safe excavation. In this paper, Finite Element Method is used by Abaqus. R6 station of Tehran Metro Line 6 is built by NATM and the construction of that is studied and analyzed. Considering the outcomes obtained from numerical modeling and comparison with the results of the instrumentation and monitoring of field, finally, the excavation step of 1 meter and longitudinal distance of 14 meters between side drifts is suggested to achieve safe tunneling with allowable settlement.

Keywords : excavation step, NATM, numerical modeling, settlement.
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