

## The Characteristics of Settlement Owing to the Construction of Several Parallel Tunnels with Short Distances

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**Abstract :** Since most tunnels are built in crowded metropolitan settings, the excavation process must take place in highly condensed locations, including high-density cities. In this way, the tunnels are typically located close together, which leads to more interaction between the parallel existing tunnels, which in turn leads to more settlement. This research presents an examination of the impact of a large-scale tunnel excavation on two forms of settlement: surface settlement and settlement surrounding the tunnel. Additionally, research has been done on the properties of interactions between two and three parallel tunnels. The settlement has been evaluated using three primary techniques: theoretical modeling, numerical simulation, and data monitoring. Additionally, a parametric investigation on how distance affects the settlement characteristic for parallel tunnels with short distances has been completed. Additionally, it has been observed that the sequence of excavation has an impact on the behavior of settlements. Nevertheless, a comparison of the model test and numerical simulation yields significant agreement in terms of settlement trend and value. Additionally, when compared to the FEM study, the suggested analytical solution exhibits reduced sensitivity in the settlement prediction.

**Keywords :** parallel tunnels, settlement, FEM, analytical Solution

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