World Academy of Science, Engineering and Technology
International Journal of Geotechnical and Geological Engineering
Vol:16, No:07, 2022

# Evaluation of Deformation for Deep Excavations in the Greater Vancouver Area Through Case Studies

**Authors :** Boris Kolev, Matt Kokan, Mohammad Deriszadeh, Farshid Bateni

**Abstract :** Due to the increasing demand for real estate and the need for efficient land utilization in Greater Vancouver, developers have been increasingly considering the construction of high-rise structures with multiple below-grade parking. The temporary excavations required to allow for the construction of underground levels have recently reached up to 40 meters in depth. One of the challenges with deep excavations is the prediction of wall displacements and ground settlements due to their effect on the integrity of City utilities, infrastructure, and adjacent buildings. A large database of survey monitoring data has been collected for deep excavations in various soil conditions and shoring systems. The majority of the data collected is for tie-back anchors and shotcrete lagging systems. The data were categorized, analyzed and the results were evaluated to find a relationship between the most dominant parameters controlling the displacement, such as depth of excavation, soil properties, and the tie-back anchor loading and arrangement. For a select number of deep excavations, finite element modeling was considered for analyses. The lateral displacements from the simulation results were compared to the recorded survey monitoring data. The study concludes with a discussion and comparison of the available empirical and numerical modeling methodologies for evaluating lateral displacements in deep excavations.

**Keywords :** deep excavations, lateral displacements, numerical modeling, shoring walls, tieback anchors
**Conference Title :** ICLEPDE 2022 : International Conference on Lateral Earth Pressure and Deep Excavation
**Conference Location :** Tokyo, Japan
**Conference Dates :** July 21-22, 2022