

Geotechnical Assessment of Dewatering in Cairo (Case Study)

ABSTRACT

The impact of groundwater on underground construction projects can be enormous. It may affect the design of structure, construction method and cost. A high portion of claims and delays during construction are because of groundwater problems. Its presence may require redesign of structure or even abandoned in some cases.

The objective of this research is to narrow the gap between the design and construction of dewatering process in order to decrease cost and minimize time losses in construction industry. This can be achieved through monitoring the discharge and drawdown during construction from multiple wells and comparing them with the expected values from the empirical calculations and numerical analysis.

In this thesis, the case study is the dewatering system employed during construction of Wady El-Nile Hospital located north-east of Cairo. The site exists at an urban area which forced the contractor to monitor the drawdown and ground settlement during construction due to dewatering process. The project constructed on four stages to make the dewatering process more feasible and to reduce the groundwater table drawdown effect on the surrounding buildings. The dewatering system composed of twenty two deep well and fifteen piezometers.

The numerical analysis was conducted using a finite difference method program called MODFLOW. It is specialized in the analysis of the groundwater flow. This research focuses on feasibility of using such numerical technique for the design of dewatering systems.