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A Global Review of Metro Station Construction Projects

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ABSTRACT

Metro construction projects should technically and economically be optimized to achieve maximum efficiency. In this regard, selection of an excavation method is very important so as to not interfering available civil services and not imposing additional expenditures. Development of various new construction methods such as New Austrian Tunneling Method (NATM), Cut and Cover, Cover and Cut has provided a suitable environment for the design engineers to adopt the most appropriate excavation alternative. In this study, the most popular construction methods of underground metro stations are discussed. Also, different methods of ground pre-supporting systems for controlling instability of excavated underground space (convergence) and subsidence in urban area is explained.

KEYWORDS

Metro construction projects, NATM, Cut and Cover, Cover and Cut

1. INTRODUCTION

Metro with advantages such as high transportation capacity, low pollution, reasonable incurred resources, low energy consumption is a necessary infrastructure for metropolitan cities. It is also in conformity with the principle of sustainable development. At present, there are over 100 cities all over the world that have been operating metros.

The construction of metro in Iran is in a period of an unprecedented development in recent years. Large-scale metro constructions are ongoing in many cities such as Tehran, Isfahan, Mashhad, Shiraz, Tabriz and Ahvaz.

The method of construction of the metro stations is very sensitive to the surrounding area and therefore selection of the construction method is very important for such type of the

projects. Figure 1 depicts the effect of metro construction operation on the surface traffic.

There are two basic elements of subway construction – constructing stations and their entrances, and constructing the tunnels running between the stations. Generally, there are three methods for metro station construction:

1. New Austrian Tunneling Method (NATM)
2. Cut and Cover method
3. Cover and Cut method

In this study, the above mentioned methods are discussed in detail in which advantages and disadvantages of each method are explained. Also, application of the NATM for excavating