A Comprehensive Guide to Top-Down Construction Design and Execution

In the name of Allah the most compassionate, ever compassionate

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Publisher's Foreword

Environmental, economic, and social incentives have led to a prevalence of underground development in recent years and earthscrapers, also known as underground complexes, gradually replace skyscrapers in many parts of the world. In Iran, too, as the populations grow and cities develop, issues such as providing enough parking space, growing prices of land, and high-rise building limitations, leave developers with no option but to turn to underground alternatives. In the last two decades, urban excavations have become deeper and more numerous than ever and ill-advised attempts have led to lamentable results in many cases. Consequently, a systematic approach was adopted to regulate urban excavations in Iran, and new methods, including nailing and anchoring, were introduced to prevent further unfortunate incidents. However, safety and reliability concerns as well as legal implications of encroachment on a project's neighboring properties put an end to these methods' decade-long ubiquity in Iran.

In their attempts to find alternatives, developers have considered a wide range of approaches, chief among which are the top-down method, the strut method, and the soldier pile method. The top-down method is widely used in developed countries for soil retention in metro stations and other underground structures and excavations. It is safe as well as time- and cost-effective. Conventionally, using the top-down method involves the construction of a diaphragm wall. In Iran, however, where the soil is usually compacted and cemented, partition walls are rarely used. As such, developers have adjusted the top-down method in accordance with local needs. The apparent simplicity of the method, however, has led to high-risk execution attempts.

In response to the pressing need for a domestic method in compliance with technical principles, our center prioritized devising guidelines to provide developers and engineers with a sound technical template. We hope this guidebook can help unify current approaches, transfer local knowledge, mitigate risks associated with existing methods, and reduce legal issues inherent in excavations so that the groundwork for the preparation of top-down design standards and regulations can be firmly established.

Ghazal Raheb

President of Road, Housing, and Urban Development Research Center (BHRC)

2026

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Translator's Foreword

This guide to top-down design and construction was developed in response to growing demand in Iran, coinciding with the method's rising popularity in the country's construction industry in spring 2023. During its preparation, extensive efforts were made to collect and draw upon all available global resources and publications related to top-down construction. However, the authors found no comprehensive or unified reference on the subject—only fragmented materials addressing specific subtopics. Following the successful release of the Persian edition, the Road, Housing, and Urban Development Research Center decided to translate and publish the guide in English, offering it as the first integrated and comprehensive resource on top-down building design and construction for engineers worldwide. It is hoped that this guide will serve as a valuable and practical reference for its readers.

The authors welcome all feedback, suggestions, and critiques of this work. Comments can be submitted to the following address:

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Finally, we extend our sincere gratitude to all those who contributed to the authorship and translation of this work, with special appreciation for *Mr. Pouyan Assar*'s invaluable assistance in translating the book into English

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