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Stability Analysis and Design for Mechanized Tunneling

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Preface

The field of application of mechanized tunneling has been extended in recent years. In jointed rock mass especially shielded tunneling machines are used, although as a rule a support is required in the machine area under these ground conditions at least over considerable tunneling sections.

The problems which are associated with this kind of tunneling have been studied intensely by the "WBI-TBM-Team". With this volume, published within the WBI-PRINT series, the experience gained is presented to the technical community.

Essential for the success of mechanized tunneling in rock are an extensive site investigation and a substantial experience with regards to the in-situ ground conditions, as I like to point out as the editor of this series. Also, modeling of the constitutive laws accounting for the relevant properties of the ground as well as a corresponding analysis method play an important role. This is the only way to obtain reliable predictions regarding the stability of the rock mass and the need of support measures within the machine area. This applies also to the safe and economic design and dimensioning of the segmental lining.

I like to focus the reader's attention in particular to the chapter concerning the interaction between the ground and the tunnel boring machine. In this chapter, new approaches regarding the conditioning of the intact rock, the rotation of shield machines and the transmission of the gripper forces of hard rock tunnel boring machines can be found.

Vibrations and ground-borne noise arising from mechanized tunneling become more and more important particularly in urban areas. Risk analyses in tunneling are also considered to be more and more important. Also with regards to these topics, the book provides interesting approaches. The book closes with some case studies.

Walter Wittke

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