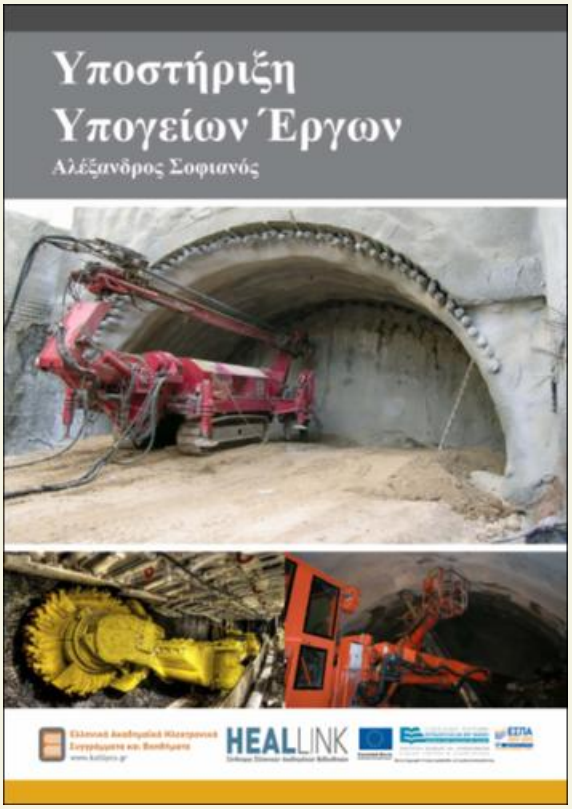

METADATA

Title: Support for underground works

Other Titles: -

Language: Greek

ISBN: 978-960-603-459-6

Subject: ENGINEERING AND TECHNOLOGY

Keywords: Rockbolts / Steel Ribs / Shotcrete / Wedges / Stratified Roofs

Bibliographic Reference: Sofianos, A. (2015). Support for underground works [Undergraduate textbook]. Kallipos, Open Academic Editions. http://dx.doi.org/10.57713/kallipos-660

Abstract

The stability control of underground openings requires knowledge of the natural and induced stress field, the mechanical behavior of the surrounding rock, and the response of the measures taken to support them. Support measures widely used in conventional construction of both longitudinal and spatial underground openings are grouting, steel frames, concrete lining, and advance elements. These interact with the surrounding rock after installation. Since hard, soft, or crushing soil around underground longitudinal openings behaves macroscopically as a continuous medium, the assessment of the stress state is achieved by considering its interaction with the support. The behavior is assessed and, based on this, the support measures are selected and, where appropriate, displacements, overload or relaxation zones, the suitability of the cross-section shape, and the required and available support force with the stages of its application are calculated. If the rock behaves as a discontinuous medium, failure mechanisms are assessed. The following possibilities are identified: fall-sliding of individual blocks formed by combined joint systems in fragmented rocks, sliding-separation between layers formed by the distinct parallel layers commonly found in sedimentary rocks, or rock sliding-ejection in the particularly sensitive area of the tunnel face, due to discontinuous structures or overloading. Calculation methods and diagrams for estimating the required support are provided. Finally, specific stabilization measures applied in conventional underground mining are presented, such as natural rock support for mining with chambers and pillars, artificial support by filling empty faces for exploitation with alternating cuts and fillings, and hydraulic support for exploitation with long faces. Consolidation is achieved by selecting appropriate measures.

The Project is funded by the National Development Programme 2021-2025 of the Ministry of Education and Religious Affairs and implemented by the Special Account for Research Funds of the National Technical University of Athens and the Hellenic Academic Libraries Link.