

The Hoek-Brown Failure criterion—From theory to application

Jianping Zuo · Jiayi Shen

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Jianping Zuo
School of Mechanics and Civil Engineering
China University of Mining &
Technology-Beijing
Beijing, China

Jiayi Shen
Institute of Port, Coastal and Offshore
Engineering
Zhejiang University
Hangzhou, China

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*Path is shown up only when thousands of
people walk through.*

Sir Lu Xun

*To practitioners of rock mechanics and
mining engineering.*

Preface

The Hoek-Brown (HB) failure criterion is one of the most broadly adopted failure criteria to estimate rock mass strength in rock mechanics and mining engineering. Over the past 40 years, the HB criterion has been applied successfully to a wide range of intact and fractured rock types.

The book aims to help researchers, engineers and research students who work in the area of rock mechanics and mining engineering. By reading this book, readers can get to know the theory and principle of the HB failure criterion, methods or guidelines for estimating the HB input parameters, and the methodology of application of the HB criterion in rock engineering projects.

The historical development of the HB failure criterion and associated rock mass properties are presented in Chap. 1. The state of the art of the theoretical deviation of the HB criterion from micro-mechanics principles is introduced in the Chaps. 2–4. It is proved that the constant m_i in the HB has physical meaning and is able to relate the microscopic damaged crack characteristics to macro-failures successfully. After that, methods and guidelines for estimating the HB input parameters (the unconfined compressive strength σ_{ci} , the constant m_i , Geological strength index GSI and blasting damage factor D) are introduced in Chaps. 5–7. Finally, five cases about the implementation of the HB criterion into coal mining engineering, rock engineering structure and rock slope stability analysis are presented in Chaps. 8–12.

The book is written in an easily readable style. Academics can quickly obtain an overview of the state of the art of the theory of the HB criterion by reading the book before they advance their researches on the topics related to rock failure criteria. Geotechnical engineers can select appropriate HB input parameters for the design and analysis of rock engineering projects with the help of the principles introduced in this book. Research students may use the book as a textbook to learn the principle of rock mechanics related to rock mass properties.

Beijing, China
Hangzhou, China

Jianping Zuo
Jiayi Shen

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About the Authors

Jianping Zuo obtained his Ph.D. from China University of Mining and Technology (Beijing), China in 2006. He is a full Professor of Engineering Mechanics and the Dean of School of Mechanics and Civil Engineering in CUMTB. He has visited Brown University as a senior visiting scholar and Lawrence Berkeley National Laboratory as a visiting scholar. He has been involved in rock mechanics and mining engineering research, consulting and teaching for more than 13 years. He is in charge of and/or participates in 12 scientific research projects, funded by National Natural Science Foundation of China, National Basic Research Program of China (973 Program), Beijing Major Scientific and Technological Achievements into Ground Cultivation Project, the 111 Project and Coal Mines Corporations. He is the author or co-author of more than 130 peer review journal papers and 20 conference papers. He has applied for 28 patents, and received 12 Natural Science and Technology Progress Awards.

Jiayi Shen received his Ph.D. in rock mechanics at The University of Adelaide (U of A) in Australia. After his Ph.D., he worked as a research associate in mining rock mechanics in U of A for a short period. Then, he was employed as a Lecturer of rock mechanics in the Zhejiang University in 2013 and then Associate Professor in 2015. Dr. Shen has more than 10 years of experience in rock mechanics for mining and civil engineering. His major interests are stability of rock masses and failure mechanics of rock masses. He has more than 20 scientific publications to his name. Dr. Shen has practical expertise in stability rock slopes and underground excavations, in situ measurements and interpretations.