Engineering Rock Mass Classification
Engineering Rock Mass Classification
Tunneling, Foundations, and Landslides

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The urgent need for this book, *Engineering Rock Mass Classification: Tunneling, Foundations, and Landslides*, was our motivation to write it. Many questions went through our minds: Is Classification reasonably reliable? Can it be successful in crisis management of geohazards? Can a single classification system be general enough for rock structures? Is classification a scientific approach? Laborious field research was needed to find answers to these vital questions.

By God’s grace, scientists of the Central Institute of Mining and Fuel Research (CIMFR), IIT Roorkee, Central Soil and Material Research Station (CSMRS), Irrigation Research Institute (IRI), and the Norwegian Geotechnical Institute (NGI) came together. These God-gifted ideas and the reliable field data made our task of interpretation less tortuous. Consequently, several improvements in correlations have been possible and practical doubts were erased. At this point, consultancy works were started in the previously mentioned institutions. The success in consultancy further boosted our morale. Finally, the research work for this book was systematically compiled to help a new confident generation. The aim of this book is to generate more creative confidence and interest among civil, mining, and petroleum engineers and geologists. This book is a comprehensive revision of our book, *Rock Mass Classification—A Practical Approach in Civil Engineering*, and includes rock mass characterization, examples, and modern classifications.

Based on research, many classification approaches are scientific. Nevertheless, the scientific spirit of prediction, check, and cross-check should be kept alive; thus, many alternative classification systems have been presented here for particular rock structures. In feasibility designs of major projects, the suggested correlations in this book may be used. For final designs of complex openings, rational approaches are recommended. In the design of minor projects, field correlations may be used. The notation for uniaxial compressive strength of rock material in this book is \( q_c \) instead of \( \sigma_c \). The engineering rock mass classification is an amazingly successful approach because it is simple, reliable, and time-tested for more than three decades.

Today the rational approach is becoming popular in consultancy on major projects. Our goal should be a reliable engineering strategy/solution of geological problems and not rigorous analysis. This should remove the prevailing dissatisfaction from the minds of designers. Thus, computer modeling may be the future trend of research at this time.

It appears that field testing and monitoring may always be the key approach to use in rock engineering projects, because all practical knowledge has been gained from interpretations of field observations.
The Himalayas provide the best field laboratory to learn rock mechanics and engineering geology because of complex geological problems. Further, the hypnotic charm of the upper Himalayas is very healing especially to concerned engineers and geologists. Natural oxygenation on hill tracking charges our whole nervous system and gives a marvelous feeling of energy and inner healing. So, working in the majestic Himalayas is a twin boon.
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We wish to encourage all enlightened engineers and geologists to kindly send their important suggestions for improving this book to us.