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RMi – a rock mass characterization system for rock engineering purposes

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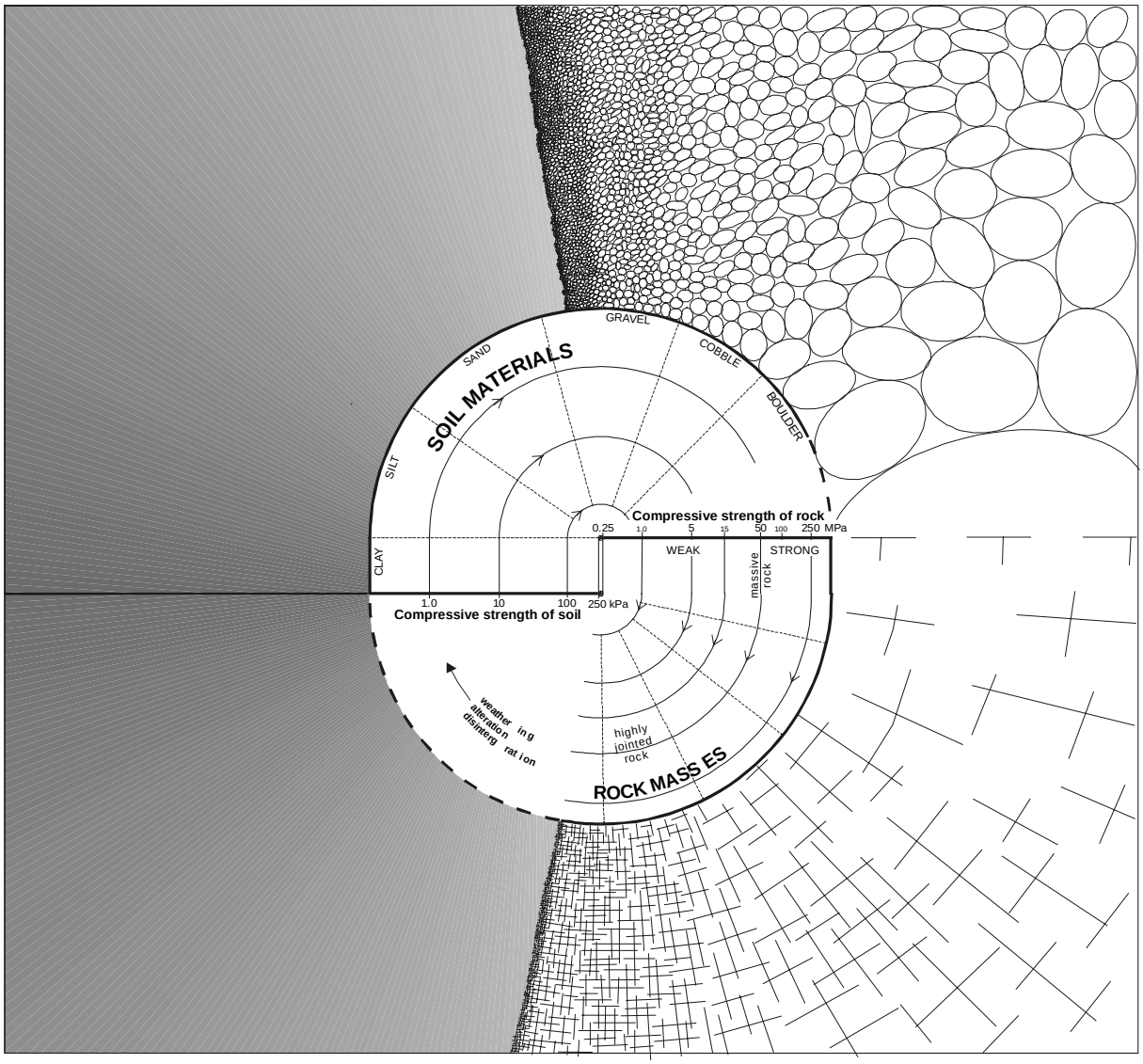
RMi – A ROCK MASS CHARACTERIZATION SYSTEM FOR ROCK ENGINEERING PURPOSES



In memory of prof. Rolf Selmer-Olsen (1919 - 1989)

Many of his ideas have been quantified in this work

PREFACE

This work is a contribution to the use of geological parameters in rock engineering and design. It introduces a new system for collecting and using these parameters. Block size is used as a main input parameter in a Rock Mass index (RMi), which characterizes the strength of rock masses. Several methods to measure block size and other jointing characteristics have been outlined, in addition to applications of the RMi in rock engineering.

The work is structured into the following main topics:

1. Description of important rock mass features and methods to characterize and quantify them. This is presented in Chapters 1 - 3 and Appendices 1 - 5.
   As much as possible of the existing methods for investigation and description have been used. A few improvements of methods to quantify rock masses have been developed. Correlations between the most common methods for joint measurements have been worked out, making acquisition of geological information easier.

2. Selected parameters are combined in a *general rock mass index (RMi)* which characterizes the compressive strength of continuous rock masses. This is found in Chapters 4 - 5 and Appendix 6.
   Although the profession has developed many qualitative and numerical methods for classification of rock masses to assist the rock engineer, few methods have been directed towards the material that rock masses constitute.

3. The *application* of RMi in various fields of rock engineering and rock mechanics is described in Chapter 6 - 8 and Appendix 7.
   RMi can be applied to assess rock support and tunnel boring (TBM) progress rate in various types of ground. Other applications of RMi are input to existing classification systems, as well as in rock mechanical calculations like the Hoek-Brown failure criterion and the ground response curves.

4. A contribution to *communication* between geologists, engineering geologists, rock mechanicians, and rock engineers by introducing defined rock mass descriptions is presented in part of Chapter 8.
   "This would permit correlation of geological conditions between different locations and eventually lead to more reliable methods of rock engineering. The common goal should be to provide practical and realistic input methods relating to rock mechanical and rock design works, which could convey the same meaning to those involved in rock construction and utilization, i.e., the contractor, the design engineer and the engineering geologist or geotechnical engineer." (Wickham et al., 1972).

5. Some guidelines to *quantify qualitative descriptions* of rock masses have been worked out in Appendix 3.
   It is shown how qualitative rock mass descriptions can be 'translated' into numbers which can be used in the RMi.

The RMi system, which has been used for different purposes during a couple of years, has shown promising results. It can, however, be further refined and developed to also cover other fields connected to rock engineering and construction. This opens for possible improvements in rock mass characterization, which give benefits in rock engineering used in planning, design and follow up of constructions in rock.

Acknowledgement

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