Preface

Increasingly sophisticated tools are becoming available to the rock engineer and yet many fundamental design questions remain - how does one decide on the acceptable risk of an open pit slope failure, the amount of deformation that can be tolerated in the foundation of an arch dam, the allowable loads in the reinforcing cables in an underground cavern or whether a tunnel should be constructed using drill and blast methods or by tunnel boring machine?

Questions such as these, which are of great practical significance in civil and mining engineering, are addressed in these notes which are based on a number of case histories - each carefully chosen to illustrate the concepts and practical approaches used. The tools and techniques covered range from simple 'back of the envelope' estimates to the most sophisticated numerical models currently available. The discussion includes the selection of appropriate input data, use of sensitivity studies and probabilistic approaches and the iterative use of observed performance to calibrate and refine models during design and construction.

These notes have been prepared as material to be used during courses and also to provide a reference volume after the completion of the courses. It is emphasised that these are notes and that the volume is not a formal text. It has not been and will not be published in its present form and the contents will be revised from time to time to meet the needs of particular audiences. The notes were updated and corrected in December 2000.

Readers are encouraged to send their comments, corrections, criticisms and suggestions to me at the address given below. These contributions will help me to improve the notes for future courses.

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Dr Evert Hoek

Dr Hoek was born in Zimbabwe and graduated in mechanical engineering from the University of Cape Town in South Africa in 1955. For his post-graduate work he specialised in experimental stress analysis and obtained a master's degree for his work on three-dimensional photoelastic techniques. In 1958 he jointed the South African Council for Scientific and Industrial Research and became involved in the application of stress analysis techniques to the study of rock stress problems in deep level gold mines. He was awarded a PhD in 1965 by the University of Cape Town for a thesis on brittle fracture in rock.

In 1966 he accepted an invitation from the Imperial College of Science and Technology, one of the colleges of the University of London, to establish an interdepartmental centre of research and teaching in rock mechanics. He was appointed Professor of Rock Mechanics in 1970 and awarded a DSc in Engineering by London University in 1975.

In 1975 he moved to Canada as a Principal of Golder Associates, an international geotechnical consulting firm. In 1987 he accepted the post of Industrial Research Professor of Rock Engineering in the Department of Civil Engineering at the University of Toronto.

Dr Hoek returned to a full time consulting practice in Vancouver in 1993. He is now an independent consultant and is a member of a number of consulting boards and a technical review consultant on several major civil and mining engineering projects. He has recently worked on projects in Canada, Greece, India, Venezuela, Chile, Hong Kong, Indonesia, Australia and the Philippines.

He has published numerous technical papers and three books. His most recent book on rock support for hard rock excavations, co-authored with Professors P.K. Kaiser and W.F. Bawden, was published in January 1995. Amongst the awards which he has received are the E. Burwell Award from the Geological Society of America (1979), Elected a Fellow of the Royal Academy of Engineering, UK (1982), Rankine Lecturer, British Geotechnical Society. (1983), The Gold Medal of the Institution of Mining and Metallurgy, UK, (1985), The Müller Award, International Society of Rock Mechanics (1991), William Smith Medal, Geological Society of London, (1993), the award of an honorary DSc in Engineering by the University of Waterloo, Canada (1994) the presentation of the Glossop Lecture to the Geological Society in London (1998) and the presentation of the Terzaghi lecture for the ASCE in Seattle (2000).