CHAPTER I

INTRODUCTION

1.1 General

From time immemorial men have chiselled and hammered their way into the earth's rocky surface; to bury their dead; to take their enemies by surprise; to mine minerals and precious metals; to transport men or vital natural resources, such as water, by more direct or therefore cheaper routes. An area of great concern and interest in surface mining is the geotechnical stability of the natural and man-made geo-structures. Evaluation of slope stability is often an inter-disciplinary effort requiring contributions from engineering geology, soil mechanics and rock mechanics.

The subject of slope analysis is a fascinating one, both from theoretical and practical points of view, and has attracted the attention of researchers [9, 20, 21, 35, 45, 97]* and scholars in diverse fields; such as civil [40, 74, 82, 134] and mining engineers [19, 23, 42, 46, 47, 51, 52, 61, 64, 83, 93, 110, 111]; engineering geologists [72, 95]; applied geomorphologists [79, 109, 124, 125, 141]; soil [73] and rock scientists [24, 55, 63, 84, 98, 105, 118]; and environmental managers.

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*Numerals in parantheses refer to the literature cited at the end in APPPENDIX I. In order to keep the number of pages in the thesis within a reasonable limit, they have been restricted to mostly of last decade.

Because the rock mass behind each slope is unique, there are no standard or routine solutions which are guaranteed to produce the right answer each time they are applied. A practical solution, suitable for each case, is built up from the basic geological data (frequency, orientation and inclination of structural discontinuities like faults, joints, planes of weaknesses, bedding planes, etc.); rock strength information (density, cohesion, angle of internal friction, shear strength of the planes or discontinuity patterns, upon which or through which failure is like to occur); ground water observation and a good measure of engineering common sense.

It is emphasized that; regardless of the sophistication of the method of analysis, and capacity of the computing facilities, available for stability analysis; the reliability of the result (that is, calculated factor of safety), is governed primarily by the degree to which input parameters are representative, of the actual conditions, within the embarkment and its foundation.

Over the last few decades a great deal of progress has been made towards better understanding of the behaviour of real rockmasses. It has sometimes been stated that, many slope problems defy a theoretical or analytical treatment. While such statements, emphasize the complexity of factors, which influence the performance of slopes, they also indicate the need, for refinements in available methods of analysis and, for the developments of new concepts and approaches [127].