

Preface

This engineering manual is a compilation of material from recent journal papers, consulting reports, and Virginia Tech reports by the writers. Excerpts from previous publications have been included with minimal changes --only those which were needed to adapt them to the context of this manual. The objective of compiling this manual is to provide a single reference that documents a simplified approach to reliability studies in geotechnical engineering, and illustrates its use through examples.

The method described in this manual can be used to evaluate the reliability of any computed result, such as factor of safety, settlement, displacement computed from finite element analysis, etc. Applications to evaluate the reliability of factors of safety and computed settlements are illustrated by examples. The manual includes appendices that examine and document the accuracy of the method.

Of the many possible approaches to evaluating geotechnical reliability, this manual describes only one, which is believed to be as accurate as any other method that is sufficiently simple to be practically useful for a wide range of applications. The examples show clearly that the critical issue in reliability studies is evaluation of the standard deviations of the parameters involved in calculations. Because statistically significant quantities of data are seldom available in geotechnical engineering applications, standard deviations of parameters cannot be evaluated without the exercise of engineering judgement. Therefore, the end result of geotechnical reliability analyses will inevitably involve application of judgement, and should not be viewed as precise. This fact argues for use of a simple method, where the relationships between the data and results are clear.