

Paper Title: Managing risk in geotechnical engineering

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Abstract:

This 3rd Casagrande Lecture builds on the theme of the “calculated risk” in Geotechnical Engineering originally considered by Casagrande in 1964. The current situations of quantitative risk analysis in geotechnical practice is surveyed and placed within the context of more traditional risk management procedures used within the profession.

Risk assessment concepts are summarized drawing on a standard recently adopted in Canada. The problem associated with establishing levels of acceptable risk are discussed and it is noted that agencies outside of the geotechnical community are developing acceptable risk criteria that influence the work of the geotechnical engineer and his professional liability. Examples and case histories are provided.

The role of uncertainty in quantified risk analysis is reviewed and a distinction is made between parameter uncertainty, model uncertainty and human uncertainty. Case histories are presented to illustrate separately the overwhelming influence of model uncertainty and human uncertainty.

A distinction is further made between quantitative and qualitative risk assessment and the problems associated with limited data in quantitative with assessment are discussed. It is recognized that the application of the Observational Method in geotechnical practice is a form of consequential risk analysis.

An enhanced understanding of risk management concepts, together with increased utilization of quantified risk assessment methods, are advocated in both the teaching and practice of Geotechnical Engineering.