

RISK & RELIABILITY IN GEOTECHNICAL ENGINEERING

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Sources and types of uncertainties associated with geotechnical analysis, importance of probabilistic methods and reliability based analysis in geotechnical engineering Review of probability and statistics: Discrete and continuous random variables, parameter estimation, testing of hypothesis, regression analysis Fundamentals of reliability analysis: First Order Second Moment (FOSM) method, First Order Reliability Method (FORM), Second Order Reliability Method (SORM), Monte Carlo simulation Application towards geotechnical problems: Characterization of uncertainty in field measured and laboratory measured soil properties, uncertainty in interpretation techniques Spatial variability of soil properties, scale of fluctuations, estimation of autocorrelation and autocovariance Probabilistic groundwater modeling, flow through earth dams Probabilistic slope stability analysis Fundamentals of LRFD design methodology, reliability based design of shallow and deep foundations, settlement analysis Reliability based liquefaction analysis, lateral spreading Development of fragility curves for geotechnical problems.