

Quantitative Risk Assessment in Geotechnical Engineering

D.V. Griffiths
Colorado School of Mines

December 14th, 2022, Room: X204, Nupace, University of Newcastle, Australia
Hunter St &, Auckland St, Newcastle NSW 2300

PROGRAM

9.00am – 10.30am	<p>Introduction to risk assessment in geotechnical engineering</p> <ul style="list-style-type: none">• Motivation for the course• Fundamentals of loads and resistances• Basic probability theory• Set theory and Venn diagrams• Conditional probability and total probability theorem• Bayes' theorem
10.30am-10.45am	Break
10:45am-12.15pm	<p>Introduction to random variables</p> <ul style="list-style-type: none">• Discrete and continuous random variables (RVs)• Common probabilistic density functions• Identities relating to Expectation and variances (linear functions of RVs)• Covariance and correlation• Example calculations for linear functions
12.15pm-1.15pm	Lunch

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1.15pm-2.45pm	<p>Simple tools for probabilistic analysis</p> <ul style="list-style-type: none">• The First Order Second Moment (FOSM) Method<ul style="list-style-type: none">○ Example of earth pressure• The First Order Reliability Method (FORM)<ul style="list-style-type: none">○ Example of bearing capacity
2.45pm-3.00pm	Break
3.00pm-4.30pm	<p>More advanced tools for probabilistic analysis</p> <ul style="list-style-type: none">• Monte-Carlo (M-C) methods• Using single random variables<ul style="list-style-type: none">○ Repeat the same bearing capacity example• Introduction to random fields• The Random Finite Element Method (RFEM)<ul style="list-style-type: none">○ Software demos of settlement and slope stability analysis
4.30pm-4.45pm	<ul style="list-style-type: none">• Questions and discussion

Course Instructor: D.V. Griffiths, PhD, DSc, CEng, FICE, D.GE, PE, Dist.M.ASCE

Vaughan Griffiths's interests lie in application of finite element and risk assessment methodologies in civil engineering. His numerous research papers include some of the most highly cited in the geotechnical engineering research literature. He is the co-author of three textbooks that have gone into multiple and foreign language editions on "Programming the Finite Element Method", "Risk assessment in Geotechnical Engineering" and "Numerical Methods for Engineers". He gives regular short-courses on *Risk Assessment in Geotechnical* engineering for practitioners both in the USA and overseas, with recent offerings in China, New Zealand, Australia, Colombia, Norway, and Canada. Professor Griffiths is a former ASCE Director and in 2020 was elected a Dist. M.ASCE. He has given several named lectures including Suzanne Lacasse (2016), H Bolton Seed (2017), TH Wu (2021) and Wilson Tang (2022). He was previously an editor of *Computers and Geotechnics* and *J Geotech Geoenviron Eng*, and was on the Advisory Panel of *Géotechnique*. In 2017, he was the Cross-Canada Lecturer for the Canadian Geotechnical Society.

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