Deltares

Reliability and Risk in Geotechnical Engineering

Applied theory and practical tools

Academy

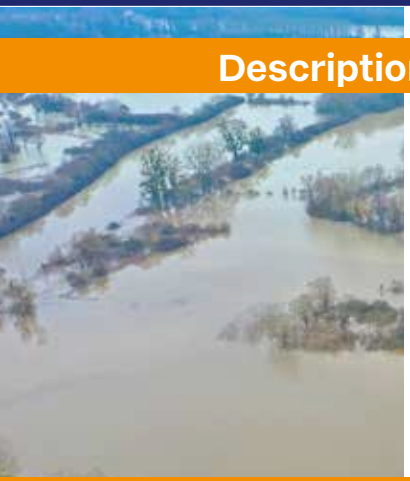
Course

Geotechnical engineers increasingly use reliability-based methods to optimize the design of geotechnical structures and for the assessment of existing ones. In some fields of application, reliability analysis has become the standard rather than exceptional use, as for example with flood defenses in the Netherlands. Other geotechnical structures now follow. The second generation Eurocodes will have more provisions for reliability-based verification of limit states, accompanied with a guideline specifically for Eurocode 7. In this course you will learn the basics on reliability and risk analysis, and you will get practical tools and hands-on exercises for application in your daily practice.

10-11 October 2024

Location: Deltares in Delft

Description



This course provides geotechnical practitioners and (graduate) students with the basics of reliability and risk analysis applied to geotechnical engineering, as well as an overview of recent applications and developments. Course participants will be able to carry out basic reliability analyses of geotechnical applications themselves using the Probabilistic Toolkit (free Deltares software), and they will be enabled to critically judge and interpret the results of reliability analyses carried out by others. Our aim is to provide a stepping stone to use reliability concepts to your advantage in your geotechnical engineering practice, providing added value to your clients and stakeholders.

Main lecturers:

- Dr.ir. Timo Schweckendiek (Deltares & TU Delft, specialist geotechnical reliability assessment)
- Dr.ir. Wim Kanning (Deltares, specialist geotechnical reliability and flood defenses).

For whom?

The course is targeted at practicing engineers who would like to extend their toolbox by developing and enhancing their probabilistic skills, as well as (PhD)students working in geotechnical reliability and risk. The course starts with the basics of reliability analysis extending further to advanced applications. Participants are expected to have undergraduate-level knowledge of statistics and probability theory (will be recapped briefly).

Program

Day 1 – Theory and exercises	Thursday 10 October 2024
Probability basics (recap)	Basic probability calculus, Bayes'rule
Uncertainty modeling for geotechnical structures	Probability distributions, spatial variability and averaging, characteristic values
Reliability analysis	Reliability fundamentals, analysis levels I/II/III, Monte Carlo simulation (MCS), FORM
Hands-on exercises	Probabilistic Toolkit (PTK), simple component reliability example
System reliability	Series and parallel systems, fault and event trees, system reliability with MCS
Hands-on exercises	Uplift and piping example, event tree on pipeline in dike

Day 2 – Applications and advanced topics	Friday 11 October 2024
Reliability in Eurocode 7	Reliability in next-generation EN1990 and EN1997, reliability targets, time-dependence, guideline
Case study (hands-on)	Basal heave metro station North-South Line Amsterdam
Bayesian updating	Theory, example pile capacity, hands-on example
Demo Probabilistic Toolkit with external software	How to setup PTK with external model, demo application: D-Stability
Probabilistic Site Characterization	Data-driven probabilistic ground models and parameter estimation

Registration https://academy.deltares.nl/en/home

- The course will be given at Deltares, Boussinesqweg 1, 2629 HV Delft, Netherlands.
- Walk-in from 8:30h, start time is 9:00h. Detailed program follows in due course.
- The course fee for the 2 day course is € 1259.- (excl. VAT). 50% discount for lecturers at centers of education.

If you have any further questions, please do not hesitate to contact academy@deltares.nl | T +31(0)88 335 8188.

Deltares

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