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Analyzing Uncertainty in Civil Engineering

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This volume addresses the issue of uncertainty in civil engineering from design to construction. Failures do occur in practice. Attributing them to a residual system risk or a faulty execution of the project does not properly cover the range of causes. A closer scrutiny of the adopted design, the engineering model, the data, the soil-construction-interaction and the model assumptions is required. Usually, the uncertainties in initial and boundary conditions are abundant. Current engineering practice often leaves these issues aside, despite the fact that new scientific tools have been developed in the past decades that allow a rational description of uncertainties of all kinds, from model uncertainty to data uncertainty. It is the aim of this volume to have a critical look at current engineering risk concepts in order to raise awareness of uncertainty in numerical computations, shortcomings of a strictly probabilistic safety concept, geotechnical models of failure mechanisms and their implications for construction management, execution, and the juristic question of responsibility. In addition, a number of the new procedures for modelling uncertainty are explained. The book is a result of a collaborate effort of mathematicians, engineers and construction managers who met regularly in a post graduate seminar at the University of Innsbruck during the past years.

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