



# Centrifuge Modelling for Civil Engineers

By Gopal Madabhushi

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**Centrifuge Modelling for Civil Engineers** By Gopal Madabhushi

## *Solve Complex Ground and Foundation Problems*

Presenting more than 25 years of teaching and working experience in a wide variety of centrifuge testing, the author of **Centrifuge Modelling for Civil Engineers** fills a need for information about this field. This text covers all aspects of centrifuge modelling. Expertly explaining the basic principles, the book makes this technique accessible to practicing engineers and researchers.

## *Appeals to Non-Specialists and Specialists Alike*

Civil engineers that are new to the industry can refer to this material to solve complex geotechnical problems. The book outlines a generalized design process employed for civil engineering projects. It begins with the basics, and then moves on to increasingly complex methods and applications including shallow foundations, retaining walls, pile foundations, tunnelling beneath existing pile foundations, and assessing the stability of buildings and their foundations following earthquake-induced soil liquefaction. It addresses the use of modern imaging technique, data acquisition, and modelling techniques. It explains the necessary signal processing tools that are used to decipher centrifuge test data, and introduces the reader to the specialist aspects of dynamic centrifuge modelling used to study dynamic problems such as blast, wind, or wave loading with emphasis on earthquake engineering including soil liquefaction problems.

- Introduces the equipment and instrumentation used in centrifuge testing
- Presents in detail signal processing techniques such as smoothing and filtering
- Provides example centrifuge data that can be used for sample analysis and interpretation

Centrifuge Modelling for Civil Engineers effectively describes the equipment, instrumentation, and signal processing techniques required to make the best use of the centrifuge modelling and test data. This text benefits graduate students,

researchers, and practicing civil engineers involved with geotechnical issues.

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## Editorial Review

### Review

"The author, who is the current Director of the Schofield Centre, has summarised his experience of over 25 years and the wealth of knowledge in this specialist area accumulated at that institution into this book. Traditionally imparted exclusively for institutions with research centres of excellence in centrifuge modelling, this book makes this knowledge and know-how of modern geotechnical centrifuge modelling technology readily accessible to the wider civil engineering community... graduate students would find it an essential reference when embarking on their centrifuge modelling research. Practicing engineers who wish to learn about centrifuge modelling or who are about to launch into solving complex geotechnical problems would find this book readable and informative. Certainly, a worthwhile investment..."

*?Proceedings of the Institution of Civil Engineers*

"This book will be very useful for research students. In most of the other books, very few topics are covered related to centrifuge modelling. However, in this book, a lot of important topics such as basic principles, limitation of centrifuge modelling, sample preparation, in-flight sample property determination, data acquisition, and applications in various areas are discussed. In this respect, the book is a complete package to researchers in this area as well as civil engineers who are keen to learn advanced physical modelling techniques."

?Dr. Pradipta Chakraborty, Indian Institute of Technology Patna

"It is written in an engaging and accessible manner that will be particularly useful in making non-specialists aware of the benefits and applicability of centrifuge modelling to problems of geotechnics and soil-structure interaction. In this way, I believe it will play an important role in increasing the visibility of the technique and its use by the civil engineering industry."

?Jonathan Knappett, University of Dundee, UK

### About the Author

**Dr Gopal Madabhushi** is a professor of civil engineering at the University of Cambridge, UK and the director of the Schofield Centre. He has over 25 years of experience in the area of soil dynamics and earthquake engineering. His expertise extends from dynamic centrifuge modelling to the time domain finite element analyses of earthquake engineering problems, and has an active interest in the areas of soil liquefaction, soil-structure interaction, and liquefaction-resistant measures and their performances. Among other works he authored the geotechnical chapters in the book *Seismic Design of buildings to Eurocode 8* (also published by Taylor & Francis).

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