Ground Improvement by Deep Vibratory Methods
Klaus Kirsch and Fabian Kirsch
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With this work, Klaus Kirsch and Fabian Kirsch provide an in-depth reference for a complex (some would say highly esoteric) topic, yet the authors achieve a clarity of style and of presentation that is a welcome departure from what one would expect considering the highly specialized nature of the subject matter.

In the starting chapter, with a clear and condensed summary of the topic, the authors move on to a well-organized history of vibratory deep compaction, which found its impetus in Germany as part of the highway construction job programs that followed the Great Depression of the 1930's. Through a series of drawings, pictures, and historical references the authors navigate the reader from Europe to the US where similar technologies were being developed for the construction of structures as varied as large office buildings, dry docks for aircraft carriers and launching pads for NASA's space program. This historical trip continues to Africa, the Middle East, and Asia where in almost every instance, ground improvement was associated with mineral and oil exploration. The reading is very enjoyable as the authors strike the right balance between text and image and the case studies that are mentioned provide the reader with a global perspective regarding the importance of ground improvement methodologies.

The technical reference value of the book is contained in the next two chapters. In "*Vibro Compaction of Granular Soils*" the principles of the methodology are presented with the help of clear and effective figures and graphs. Although the units are missing on a couple of graphs the text is always explicit in referencing all of the plotted variables. *It is important to note that all graphs, equations, tables, etc… use the International System of Units (SI) and that no provision is made to accommodate the antiquated US system of measures and weights*. The authors achieve a nice balance between theoretical concepts and examples of practical applications. Equations are presented alongside tables showing ranges for the associated variables and parameters so it is quite easy to place the examples in the context of the underlying mathematical foundation. The topic grows more complex as the chapter progresses but the authors still manage to make the reading interesting, thanks to the quality of the writing and to the excellent layout of the book (most figures and charts are referenced on the page in which they appear and this facilitates the reading.) The chapter is as current as it is comprehensive, as the bibliography shows references as recent as 2009

"*Improvement of fine-grained and cohesive soils by vibro replacement stone columns*" follows the information built-up pattern established in the previous chapters. Starting with a general review of issues associated with such soils, clear and detailed drawings are provided along with field photographs in order to illustrate how various methodologies and equipment can be used for remediation. Once again, equations are provided along with graphs in a very unambiguous fashion and required derivation steps are included as well. Of particular interest is Sec. 4.6 (Case histories & computational examples) which literally walks the reader through a series of problems based on actual case studies.

The last three chapters of the book are quite short (15 pages total). In "*Method variations and related processes*" the authors offer a compendium of alternate methodologies; despite a lack of illustrations, the presentation is still very understandable as the topic is well-framed against the previously discussed methodologies. "*Environmental considerations*" addresses the issues of noise emissions, and environmental vibrations associated with the soil vibratory methods and very useful information is provided pertaining to applicable standards. The authors also present a compelling argument for the use of ground improvement technologies in the context of carbon dioxide emissions, and once again they demonstrate a commitment to making this book an up-to-date reference as the bibliography shows references dated 2010, an impressive feat considering that this is the publication year of the work!

All in all, this is a superb reference book. It may not belong in the library of every acoustical and noise control consultant, but anyone involved with structural work or with the design of buildings in areas where ground improvement is required should not think twice about purchasing this outstanding reference.

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