

AUTHOR'S PREAMBLE

*[This is a **must-read** for all those who intend to make use of this e-book, or those who wish to merely browse through it.]*

This e-book under the title, **Concepts and Techniques in Geotechnical and Foundation Engineering**, launched on the Internet, for *free* downloading by anyone who is interested, is meant to brush up the student's understanding of the subjects of **geotechnical engineering** and its corollary, **foundation engineering**, especially for those having undergone or are undergoing courses covering these subjects. It is divided into three parts which are: **Part I – Geotechnical Engineering**, **Part II – Foundation Engineering** and **Part III – Advanced Topics in Geotechnical and Foundation Engineering**. *Part I* is specifically aimed at *undergraduate* students, whereas *Part II* is essentially meant for *postgraduate* students. Professionals and research scholars pursuing higher degrees are expected to benefit from *Part III* which introduces advanced topics covering both geotechnical and foundation engineering. Part I may be treated as *prerequisite* for Part II, while Parts I and II are to be considered as *prerequisites* for Part III. This picture is, however, not rigid; there can be *overlaps* in the sense, some portions under Part II may be part of the syllabus for undergraduate students, and similarly, some portions under Part III may be part of the syllabus for postgraduate students.

By an e-book is typically meant the e-version of a book which is available in print as a hard copy. It is identical with the latter in all respects except that it is in the 'soft' form. As against that, this book is *fully launched* on the e-platform, and being purely in the e-format, it does not and cannot have a hard copy equivalent. The latter aspect is due to the fact that it leverages some of the special possibilities – such as *animation* – inbuilt in the electronic mode of communication.

Contents

This e-book consists of *text* and *figures*, supplemented by audio and video clippings, the latter wherever necessary and possible. (The present version (edition) of the book does not make substantial use of the same; they will be added on a continuous basis as and when they become available.)

In tune with the objectives of NPTEL, the book incorporates several technology-enhanced learning features, which should make it more user-friendly. *Text* and *figures* make use of **colour schemes** to differentiate and highlight parts in the order of importance and emphasis. It is expected that this would considerably add to the *communicative* and *retentive* value of the book's contents. As regards the use of **colour**, it have been sought to maintain consistency even across *Topics*, to the extent possible, notwithstanding the fact that only a few basic colours have been used. As a next step, *italics* have been used extensively in the text – more than what one would be tempted to do in a hard copy book – for the same purpose.

The main distinguishing feature of the book is *figures in animation* (now 2D) incorporated in most of them. Animation is a *multimedia* tool. Here it takes *three* forms: 1) In x-y plots,

the variation of the plotted quantity is made to move along its course, rather than being presented statically, 2) Parts (segments) of figures are made to appear in their right *sequence* and occupy their respective positions making up the final figure when all the segments are brought in and assembled, 3) In some figures certain parts – sometimes arrows - are made to *blink/move* to convey the message more graphically. The sequencing of segments of figures mentioned above actually provides a *conceptual journey* to the student, helping him through the maze of details present in a full figure. One would unhesitatingly agree that all these features, besides *colour*, add immensely to the communicative and retentive value of the figure. This is clearly beyond the capability of a hard copy figure, in black and white, which is treated as the traditional ‘language of engineering.’ Besides everything else, it qualifies it to be called *technology enhanced learning* by imbibing the true value and spirit of the same.

Engineers are aware of the old adage that ‘a figure is worth a thousand words of text.’ If that applies to hard copy figures in black and white, each of the present figures in colour and animation is worth several folds of that word equivalent.

As far as the author’s knowledge goes, this is the first attempt of its kind at the *international level* in the subject area covered by this book.

A word to be added with regard to *figures* is that the reader should not look for exact proportion in figures. Proportion has to be sacrificed in favour of exaggeration, as it were, to enhance the *communicative value*, particularly where *animation* has been resorted to.

Detailed *instructions* are provided, in a user-friendly manner, for accessing and using text and, especially figures, by assembling successive segments to form the full figure. A separate list of Figures is also provided for *direct downloading*, either in the sequential or full form. The list is complete with Charts and Tables. The *enlargement/reduction* facility for text and figures should considerably help readers of all ages, especially those who are visually challenged, who may find it a highly user-friendly feature, compared to the same in small print in the hard copy form.

Modules and Topics

The book presents 50 *Topics* grouped under 48 *Modules* (The closeness of these figures is purely coincidental.) besides 3 *extra Topics* under 3 *Modules*. Topics of varying lengths (some with 17 pages of text and 31 figures – others with 1 page of text and 1 figure) are grouped into the above number of *Modules* of nearly similar lengths that can be covered in the same unit of time, say one hour, by the teacher for presentation in the class. In other words, *topic* homogeneity is sacrificed for length and time in deciding the contents of the *modules*. In the case of long topics, on the other hand, a single topic (e.g. *Topic 3*) is covered in two, or sometimes even three, *modules*. *Modules* and topics are numbered continuously irrespective of the parts of the book. The teacher may find it difficult in some cases to restrict himself to one hour, but he is free to enlarge the time slot depending upon the course he handles. No such limitation is, however, present on the part of the student, who can repeat it any number of times until he has fully comprehended and assimilated the contents of the topic concerned. The teacher should indeed *supplement* each topic with questions of different types and

formats, besides numerical examples. Answering these questions will only make the learning process complete on the part of the student. In essence, the book is conceived as a **teaching aid** in the hands of the teacher and a **learning aid** in the hands of the student. (The teacher is perceived as a ‘facilitator’ here, in line with the modern concept of pedagogy.)

Coming to think of the above at a different pitch, the following thought strikes the author’s mind. The material covered being *voluminous*, what with the long text and the vast number of figures, in colour and animation, one may advise that the same be offered as *twocourses* rather than one. In this event, the following division may be found appropriate.

Course I: Part A – **Geotechnical engineering:** *Modules 1 – 21, 51 - 52*

Part B - **Foundation Engineering:**

Course II: Part C - **Advanced Topics in Geotechnical** *Modules 22 - 50*

and Foundation Engineering:

The above division is perfectly justified since each *Module* (see the Table of Contents) cannot be covered in one hour, but will need at least two hours, if not more, for any meaningful student-friendly presentation, leading to better assimilation by them.

References

References are listed alphabetically (by the surname of the author) at the end of each Topic. These include books and papers with full bibliographic details.

As regards books by this author, from which extensive citations have been made, a separate list is included which can be retrieved from the *Order of Presentation* (Opening page).

An **e-book’s format** makes it free from many of the constraints of a printed book. *Flexibility* of presentation is a hallmark factor which differentiates an e-book from the rigid format of a hard copy book. A hard copy book is *close-ended* and changes are possible only with the arrival of a new edition. In contrast, an **e-book** is *open-ended* and is happily free from this limitation as modifications of, addition to or deletions from the original matter can be incorporated on a *continuous basis* as and when the need arises.

This **e-book** is the outcome of a long cherished desire entertained by the author to undertake a book project, by venturing into the realm of the **e-format**. Quoted below is a statement from his most recent book, “An Introduction to Advanced Techniques in Geotechnical and Foundation Engineering” (see his list of books from the *Order of Presentation*).

“Authors like me who are strongly convinced of the ever-present, ever-expanding and never-ending need for improving and enhancing the *quality of technical communication*, would lament the lack of powerful media such as *animation* and *video* which can explain and illustrate technical material far more efficiently and effectively than the printed word, the

functioning of *new technologies*, e.g. the plug formation in under-mud concreting protecting the fresh concrete below and the rising plug wiping off the mud coating on the reinforcement. Such media would instruct not only the students, but also old professionals, enabling the latter *to learn* the same, as it were, and take technically more informed decisions. (The example of the drilling mud is quoted here because the author has heard of a senior chief engineer for whom it is nothing but dirt and mud which would only ‘spoil’ his concrete! And if he thought so, he is indeed not to blame for it.) These media can illustrate the theory in the first place, followed by video clippings from field examples. They supplement the communicative value of the written word and can be attached to books such as the present one. (The author’s book “Design of Foundation Systems – Principles and Practices” carries a versatile and powerful *design software* on a CD which plays a similar supplementary role.)”

The material presented in this book has been prepared under the auspices of the *National Programme on Technology Enhanced Learning* (NPTEL). The production and launching of the material on the Internet in the NPTEL Website has been possible by the generous financial support from the NPTEL.

The author takes great pleasure in expressing his sincere thanks and gratitude to Prof. Bhaskar Ramamurthi, Director and Chairman, PIC, NPTEL Project, Indian Institute of Technology, Madras, and Prof. Mangala Sunder Krishnan, Chief Coordinator of NPTEL at Indian Institute of Technology, Madras, where the author served earlier as professor, for the grant of funds and for their unstinted support. Thanks are also due to Prof. S. Neelakrishnan, who is the local Coordinator of NPTEL at the PSG College of Technology in Coimbatore, Tamil Nadu, which is a partner Institution of NPTEL, for all the administrative support rendered by him.

Since the author is based outside Chennai (formerly Madras), he could not avail of the studio facilities of NPTEL at IIT Madras. As a result, the work of production had to be necessarily outsourced locally in Coimbatore where he is presently based. He wishes to place on record his deep sense of gratitude to Mr. T. Nataraj, a professionally acclaimed graphic artist who came forward to undertake this gruelling task especially with regard to **animation** of figures with the **colour scheme** incorporated in both figures and text. The author cannot indeed thank him enough for readily undertaking a very painstaking job and completing it admirably in time in spite of several hurdles and time constraints. The author also wishes to thank Ms. V. Kavitha (Mastermind Solutions, Coimbatore) for the help rendered in presenting the Introduction in the Video format.

Many of the *figures*, and even *text*, used in this book have been adapted from the author’s own drawings and text used in his earlier books (see list under *Order of Presentation*). In all cases the serious reader’s attention has been invited to the relevant sections of these books for more detailed reference and study. As regards pictures (halftones), the originals in colour (mostly pictures from technical pamphlets issued by firms) have been made use of in this book. *Sources* are indicated under all relevant figures and the author’s sincere thanks are due to these firms for the courtesy of adoption. The same also applies to the sources from which Pictures and Video clips have been collected and reproduced.

Because of time constraints in the production phase, the work had to be rushed through in the final stages which would have resulted in errors creeping in many places in spite of conscious effort to avoid them. The author will be very pleased if discerning readers take the trouble of bringing the same to his attention (see *e-mail Id* on title page) so that corrections can be promptly attended to when the need for revision arises.

Readers are cordially invited to communicate with the author, by e-mail, their general views and suggestions which when duly incorporated will indeed go a long way in enhancing the *communicative value* of the material presented.

Finally, if the book fulfils its avowed objectives as set out in this *Preamble*, at the hands of the user community, even if it is to a limited extent, the author will consider his efforts worth the while and none will be happier than him for taking the plunge.

Coimbatore, Dec. 2014

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