Principles and Practice of Ground Improvement

Description: Gain a stronger foundation with optimal ground improvement

Before you break ground on a new structure, you need to analyze the structure of the ground. Expert analysis and optimization of the geo-materials on your site can mean the difference between a lasting structure and a school in a sinkhole. Sometimes problematic geology is expected because of the location, but other times it's only unearthed once construction has begun. You need to be able to quickly adapt your project plan to include an improvement to unfavorable ground before the project can safely continue.

Principles and Practice of Ground Improvement is the only comprehensive, up-to-date compendium of solutions to this critical aspect of civil engineering. Dr. Jie Han, registered Professional Engineer and preeminent voice in geotechnical engineering, is the ultimate guide to the methods and best practices of ground improvement. Han walks you through various ground improvement solutions and provides theoretical and practical advice for determining which technique fits each situation.

- Follow examples to find solutions to complex problems
- Complete homework problems to tackle issues that present themselves in the field
- Study design procedures for each technique to simplify field implementation
- Brush up on modern ground improvement technologies to keep abreast of all available options

Principles and Practice of Ground Improvement can be used as a textbook, and includes Powerpoint slides for instructors. It's also a handy field reference for contractors and installers who actually implement plans. There are many ground improvement solutions out there, but there is no single right answer to every situation. Principles and Practice of Ground Improvement will give you the information you need to analyze the problem, then design and implement the best possible solution.

Contents:

Preface xiii

CHAPTER 1 INTRODUCTION 1

1.1 Introduction 1

1.2 Problematic Geomaterials and Conditions 1

1.2.1 Problematic Geomaterials 1

1.2.2 Problematic Conditions 1

1.3 Geotechnical Problems and Failures 2

1.4 Ground Improvement Methods and Classification 2

1.4.1 Historical Developments 2

1.4.2 Classification 3

1.4.3 General Description, Function, and Application 5

1.5 Selection of Ground Improvement Method 5

1.5.1 Necessity of Ground Improvement 5

1.5.2 Factors for Selecting Ground Improvement Method 10

1.5.3 Selection Procedure 12
CHAPTER 2 SLOPE STABILITY 51

2.6.1 Introduction 55
2.6.2 Methods for Slope Stability Analysis 55

2.7 Earth Retaining Wall Analysis 61

2.7.1 Type of Wall 61
2.7.2 Lateral Earth Pressure Coefficient 61
2.7.3 Rankine’s Theory 61
2.7.4 Coulomb’s Theory 63

2.8 Liquefaction Analysis 64

2.8.1 Liquefaction Potential 64
2.8.2 Earthquake-Induced Settlement 66

Problems 67

References 70

CHAPTER 3 SHALLOW AND DEEP COMPACTION 73

3.1 Introduction 73

3.2 Densification Principles 73

3.3 Conventional Compaction 73

3.3.1 Introduction 73
3.3.2 Principles 74
3.3.3 Design Considerations 77
3.3.4 Design Parameters and Procedure 80
3.3.5 Design Example 80
3.3.6 Construction 81
3.3.7 Quality Control and Assurance 82

3.4 Intelligent Compaction 82

3.4.1 Introduction 82
3.4.2 Principles 83
3.4.3 Design Considerations 86
3.4.4 Construction 88
3.4.5 Quality Control and Assurance 88

3.5 Deep Dynamic Compaction 89

3.5.1 Introduction 89
5.2.2 Densification 136
5.2.3 Load Transfer Mechanisms 137
5.2.4 Failure Modes 140
5.3 Design Considerations 141
5.3.1 General Rules 141
5.3.2 Densification Effect 142
5.3.3 Bearing Capacity 143
5.3.4 Settlement 145
5.3.5 Consolidation 148
5.3.6 Stability 151
5.3.7 Liquefaction 152
5.3.8 Design of Geosynthetic-encased Granular Columns 153
5.4 Design Parameters and Procedure 156
5.4.1 Granular Columns 156
5.4.2 Concrete Columns 157
5.4.3 Geosynthetic-encased Granular Column 157
5.5 Design Examples 158
5.6 Construction 163
5.6.1 Sand Compaction Columns 163
5.6.2 Stone Columns 163
5.6.3 Rammed Aggregate Columns 164
5.6.4 Vibro-Concrete Columns 164
5.6.5 Controlled Modulus (Stiffness) Columns 165
5.6.6 Geosynthetic-encased Granular Columns 165
5.7 Quality Control and Assurance 165
5.7.1 Locations and Dimensions 165
5.7.2 Fill Material 165
5.7.3 Installation Parameters 166
5.7.4 Performance Evaluation 167
Problems 168
References 170
CHAPTER 6 DRAINAGE AND DEWATERING 173
6.1 Introduction 173
6.2 Principles of Water Flow in Geomaterial 174
   6.2.1 Bernoulli’s Equation 174
   6.2.2 Flow Net 175
   6.2.3 Pore Water Pressure and Uplift Force 176
   6.2.4 Stresses Due to Seepage 176
6.3 Filtration 177
   6.3.1 Introduction 177
   6.3.2 Principles 178
   6.3.3 Design Considerations 180
   6.3.4 Design Parameters and Procedure 184
6.3.5 Design Example 185
   6.3.6 Construction 185
6.3.7 Quality Control and Assurance 185
6.4 Drainage 185
   6.4.1 Introduction 185
   6.4.2 Principles 187
   6.4.3 Design Considerations 188
   6.4.4 Design Parameters and Procedure 193
6.4.5 Design Examples 194
   6.4.6 Construction 195
6.4.7 Quality Control and Assurance 195
6.5 Dewatering 196
   6.5.1 Introduction 196
   6.5.2 Principles 199
   6.5.3 Design Considerations 200
6.5.4 Design Parameters and Procedure 202
   6.5.5 Design Example 205
   6.5.6 Construction 206
6.5.7 Quality Control and Assurance 206
Problems 206
Order by Post - print the order form below and send to

Research and Markets,
Guinness Centre,
Taylors Lane,
Dublin 8,
Ireland.
Fax Order Form
To place an order via fax simply print this form, fill in the information below and fax the completed form to 646-607-1907 (from USA) or +353-1-481-1716 (from Rest of World). If you have any questions please visit http://www.researchandmarkets.com/contact/

Order Information
Please verify that the product information is correct.

<table>
<thead>
<tr>
<th>Product Name:</th>
<th>Principles and Practice of Ground Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Address:</td>
<td><a href="http://www.researchandmarkets.com/reports/2638584/">http://www.researchandmarkets.com/reports/2638584/</a></td>
</tr>
<tr>
<td>Office Code:</td>
<td>SCDKW31U</td>
</tr>
</tbody>
</table>

Product Format
Please select the product format and quantity you require:

<table>
<thead>
<tr>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard Copy (Hard Back):</td>
</tr>
</tbody>
</table>

* Shipping/Handling is only charged once per order.

Contact Information
Please enter all the information below in **BLOCK CAPITALS**

<table>
<thead>
<tr>
<th>Title:</th>
<th>Mr ☐</th>
<th>Mrs ☐</th>
<th>Dr ☐</th>
<th>Miss ☐</th>
<th>Ms ☐</th>
<th>Prof ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Last Name:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email Address: *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job Title:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postal / Zip Code:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone Number:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fax Number:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Please refrain from using free email accounts when ordering (e.g. Yahoo, Hotmail, AOL)
Payment Information

Please indicate the payment method you would like to use by selecting the appropriate box.

☐ Pay by credit card: You will receive an email with a link to a secure webpage to enter your credit card details.

☐ Pay by check: Please post the check, accompanied by this form, to:
Research and Markets,
Guinness Center,
Taylors Lane,
Dublin 8,
Ireland.

☐ Pay by wire transfer: Please transfer funds to:
Account number 833 130 83
Sort code 98-53-30
Swift code ULSBIE2D
IBAN number IE78ULSB98533083313083
Bank Address Ulster Bank,
27-35 Main Street,
Blackrock,
Co. Dublin,
Ireland.

If you have a Marketing Code please enter it below:

Marketing Code: ______________________________________

Please note that by ordering from Research and Markets you are agreeing to our Terms and Conditions at http://www.researchandmarkets.com/info/terms.asp

Please fax this form to:
(646) 607-1907 or (646) 964-6609 - From USA
+353-1-481-1716 or +353-1-653-1571 - From Rest of World