EVALUATION OF CORRELATIONS BETWEEN SPT N AND UNDRAINED SHEAR STRENGTH FOR FINE GRAINED SOILS OF SRI LANKAN GEOLOGICAL CONDITIONS

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Degree of Master of Engineering

Department of Civil Engineering

University of Moratuwa

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Thesis submitted in partial fulfillment of the requirements for the degree Master of Engineering in Foundation Engineering and Earth Retaining Systems

Department of Civil Engineering

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Statement of Authentication

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Abstract

Undrained shear strength is one of the essential parameters in most of the applications of geotechnical engineering. Unconsolidated undrained (UU) triaxial test is the most commonly practiced method of determining the undrained shear strength which takes a considerable time and effort to produce its results, since the sampling stage. Such correlations seldom exist pertinent to Sri Lankan soils. Hence, it is important to have reliable correlations between easily executable, commonly used test results and undrained shear strength of Sri Lankan soils to easily and promptly predict the soil structure interaction phenomenon, especially in local geotechnical engineering applications.

Thus, in this study, an attempt has been made to correlate the standard penetration test (SPT) with experimentally determined unconsolidated undrained triaxial test parameters, and the undrained shear strength estimated from the field vane shear test data. This analysis consists of three main stages, namely analysis of the available correlations, analysis of the available data set based on the soil and sampling properties to develop a correlation and the analysis on a set of reliable data with a defined deviation factor.

A correlation between SPT N_{60} and undrained shear strength has been proposed for Sri Lankan silty soils. Further, possible analysis methods for developing correlations for other different soil types have also been addressed. In addition, existing drawbacks and difficulties associated with developing such correlations related to Sri Lankan context are also described.

***Key words**: Undrained Shear Strength, Standard Penetration Test, Fine grained Soils, Correlations, Sri Lanka*

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Table of Contents

Statement of Authentication i
Abstract ii
Acknowledgement iii
Table of Contents iv
List of Tables xi
List of Figures xiii
01. INTRODUCTION 1
1.1Background 1
1.2 Role of the Correlations in Geotechnical Engineering 1
1.3 Importance of having Reliable Correlations 3
1.4 In-situ and Laboratory Tests 3
1.5 Problem Statement 4
1.6 Scope of the Research 5
1.7 Objectives 5
02. APPRAISAL OF STUDIES ON CORRELATIONS BETWEEN STANDARD PENETRATION TEST AND UNDRAINED SHEAR STRENGTH OF FINE GRAINED SOILS 6
2.1 Introduction 6
2.2 Fine Grained Soils 6
2.2.1 Formation of Soil 6
2.2.2 Soil Categories 7
2.2.3 Classification of Soils 7
2.3 Shear Strength 8
2.3.1 Undrained Strength 9
2.4 Standard Penetration Test (SPT) 9
2.4.1 SPT Hammer Types 10
2.5 SPT related correlations to determine Undrained Shear Strength 11
2.5.1 Relationship proposed by Strouds 1974 11
2.5.2 Relationship proposed by Terzaghi & Peck 1967 13
2.5.3 Relationship Proposed by Sowers, 1979 14

2.5.4 Relationship proposed by Hara A., Ohta T., Niwa M., Tanaka S. and Banno T. (1974) 15
2.5.5 Relationship proposed by Sivikaya & Togrol (2007) 15
2.5.6 Relationship proposed by Décourt (1990) 17
2.4.7 Relationship proposed by Joseph E. Bowles 18
2.4.8 Other Available correlations available between Standard Penetration Test Results and Unconfined Compressive Strength of Fine grained soils. 18
3. METHODOLOGY 19
3.1 Stage 1: Literature Review 19
3.2 Stage 2: Data Collection 19
3.3 Stage 3: Data Preparation 20
3.4 Stage 4: Data Analysis 21
3.5 Stage 5: Discussion and Recommendations. 21
4. ANALYSIS AND RESULTS 22
4.1 Analyze the possibility of applying the available correlations for Sri Lankan Conditions 22
4.1.1 Analysis on available correlations between "SPT N'_{70} and C_u" 22
4.1.1.1 Relationship proposed by Joseph E. Bowles (1996) 22
4.1.1.1.1 Results on analysis of relationship proposed by Joseph E. Bowles, 1996 23
4.1.2 Analysis on available correlations between "SPT N60 and Cu" 23
4.1.2.1 Relationship proposed by Strouds, (1974) 23
4.1.2.1.1 Results on analysis of relationship proposed by Strouds (1974) 24
4.1.2.2 Relationship proposed by Hara A et al., (1974) 24
4.1.2.2.1 Results on analysis of relationship proposed by Hera A, et al. 24
4.1.2.3 Relationship proposed by Sivikaya & Togrol, (2007) 25
4.1.2.3.1 Results on analysis of relationship proposed by Sivikaya & Togrol (2007) 25
4.1.2.4 Relationship proposed by Décourt (1990) 26
4.1.2.4.3 Results on analysis of relationship proposed by Décourt, (1990) 26
4.1.2.5 Relationship proposed by Terzaghi & Peck, (1967) 26
4.1.2.5.1 Results on analysis of relationship proposed by Terzaghi & Peck, (1967) 27
4.1.3 Analysis on available correlations between "SPT N_{field} and C_u" 27
4.1.3.1 Relationship proposed by Terzaghi & Peck (1967) 27
4.1.3.1.3 Results on analysis of relationship proposed by Terzaghi & Peck (1967) 27
4.1.3.2 Relationship proposed by Sowers (1979) 28

4.1.3.2.1 Results on analysis of relationship proposed by Sowers, (1979) 28
4.1.3.3 Relationship proposed by Sivikaya & Togrol, (2007) 28
4.1.3.3.1 Results on analysis of relationship proposed by Sivikaya & Togrol (2007) 29
4.1.3.4 Relationship proposed by Décourt, (1990) 30
4.1.3.4.1 Results on analysis of relationship proposed by Décourt (1990) 30
4.1.4 Overall Analysis on the Available Correlations 30
4.2 Analysis using Undrained Shear Strength by Triaxial UU Tests 30
4.2.1 Analysis on Fine Grained Soils, Complete Set. 31
4.2.1.1 Results on Fine Grained Soils (Complete Set) 31
4.2.2. Analysis based on the variation of Liquid Limit. 31
4.2.2.1 Results of analysis based on the variation of Liquid Limit 32
4.2.3. Analysis based on the variation of Plastic Limit 32
4.2.3.1 Results of analysis based on the variation of Plastic Limit 33
4.2.4. Analysis based on the variation of Plasticity Index 34
4.2.4.1. Results of analysis based on the variation of Plasticity Index 34
4.2.5. Analysis based on the variation Fines Content. 35
4.2.5.1 Results of analysis based on the variation of Fines Content 35
4.2.6 Analysis based on the variation Clay Content. 36
4.1.6.1 Results of analysis based on the variation of Clay Content 37
4.2.7 Analysis based on the variation Sampling Depth. 38
4.2.7.1 Results of analysis based on the variation of Sampling Depth 39
4.2.8. Analysis based on the Unified Soil Classification System (USCS) 40
4.2.8.1 Results of analysis based on the Unified Soil Classification System (USCS) 41
4.3. Analysis using Undrained Shear Strength by Field Vane Shear Test 41
4.3.1. Analysis on Fine Grained Soils, Complete Set. 41
4.3.1.1 Results on Fine Grained Soils (Complete Set) 42
4.3.2 Analysis based on the variation of Liquid Limit. 42
4.3.2.1 Results of analysis based on the variation of Liquid Limit 43
4.3.3. Analysis based on the variation of Plastic Limit 43
4.3.3.1 Results of analysis based on the variation of Plastic Limit 44
4.3.4. Analysis based on the variation of Plasticity Index 45
4.3.4.1 Results of analysis based on the variation of Plasticity Index 45
4.3.5. Analysis based on the variation Fines Content. 46

4.3.5.1 Results of analysis based on the variation of Fines Content 47
4.3.6. Analysis based on the variation Clay Content. 48
4.3.6.1 Results of analysis based on the variation of Clay Content 48
4.3.7. Analysis based on the variation Sampling Depth. 49
4.3.7.1 Results of analysis based on the variation of Sampling Depth 50
4.3.8. Analysis based on the Unified Soil Classification System (USCS)..... 50
4.3.8.1 Results of analysis based on the Unified Soil Classification System (USCS)..... 51
4.4 Analysis Using Reliable Data 52
4.4.1 SPT N'70, SPT N60 & SPT Nfield Vs Undrained Shear Strength (Average)..... 53
4.4.1.1 Percentage of deviation less than 10% for SPT N'70. 53
4.4.1.2 Percentage of deviation less than 25%. 53
4.4.1.3 Percentage of deviation less than 35%. 54
4.4.2 Results of analysis based on the "Reliable Data" 54
4.4.3 Establishing a correlation 55
4.4.3.1 Further Analysis 56
5. DISCUSSION 58
5.1 Evaluation of available correlations. 58
5.2 Analysis of available data to develop a new correlation 59
5.3 Analysis on the reliable data set. 61
6. RECOMMENDATIONS 63
REFERENCE LIST 64
Appendix I : Complete Data Set 67
Appendix II : Graphs of Analyses on Existing Correlations 72
1. Relationship proposed by Joseph E. Bowles 72
1.1 Analysis between C_u (Triaxial) and C_u (Energy) by Bowles 72
1.2 Analysis between Cu (FVST) and Cu (Energy) by Bowles 72
2. Relationship proposed by Strouds, 1974 73
2.1 Analysis between C_u (Triaxial) and C_u (Energy) by Strouds 73
2.2 Analysis between C_u (FVST) and C_u (Energy) by Strouds (1984) 74
3. Relationship proposed by Hara A et al., (1974) 74
3.1 Analysis between C_u (Triaxial) and C_u (Energy) by Hara A et al. 74
3.2 Analysis between C_u (FVST) and C_u (Energy) by Hera A, et al. (1974) 75
4. Relationship proposed by Sivikaya & Togrol, (2007) 76

4.1 Analysis between C_u (Triaxial) and C_u (Energy / N_{60}) by Sivikaya & Togrol, (2007) 76
4.2 Analysis between C_u (FVST) and C_u (Energy / N_{60}) by Sivikaya & Togrol, (2007) ... 76
5. Relationship proposed by Décourt, (1990) ... 77
5.1 Analysis between C_u (Triaxial) and C_u (Energy / N_{60}) by Décourt, (1990) ... 77
5.2 Analysis between C_u (FVST) and C_u (Energy / N_{60}) by Décourt, (1990) ... 78
6. Relationship proposed by Terzaghi & Peck, (1967) ... 78
6.1 Analysis between C_u (Triaxial) and C_u (Energy / N_{60}) by Terzaghi & Peck, (1967) ... 78
6.2 Analysis between Cu (FVST) and Cu (Energy / N_{60}) by Terzaghi & Peck, 1967 ... 79
7. Relationship proposed by Terzaghi & Peck, (1967) ... 80
7.1 Analysis between C_u (Triaxial) and C_u (Energy / N_f) by Terzaghi & Peck, (1967) ... 80
7.2 Analysis between Cu (FVST) and Cu (Energy / N_f) by Terzaghi & Peck, (1967) ... 80
8. Relationship proposed by Sowers, (1979) ... 81
8.1 Analysis between Cu (Triaxial) and Cu (Energy / N_{field}) by Sowers, (1979) ... 81
8.2 Analysis between Cu (FVST) and Cu (Energy / N_{field}) by Sowers, (1979) ... 81
9. Relationship proposed by Sivikaya & Togrol, (2007) ... 82
9.1 Analysis between C_u (Triaxial) and C_u (Energy / N_{field}) by Sivikaya & Togrol,(2007) 82
9.2 Analysis between C_u (FVST) and C_u (Energy / N_{field}) by Sivikaya & Togrol, (2007) . 83
10. Relationship proposed by Décourt, (1990) ... 84
10.1 Analysis between C_u (Triaxial) and C_u (Energy / N_{field}) by Décourt, (1990) ... 84
10.2 Analysis between C_u (FVST) and C_u (Energy / N_{field}) by Décourt, (1990) ... 84
Appendix III : Graphs of Analysis using Undrained Shear Strength by Triaxial UU Tests. ... 86
1. Analysis on Fine Grained Soils, Complete Set. ... 86
1.1 SPT N'_{70} Vs Undrained Shear Strength by Triaxial UU Tests. (Complete Set) ... 86
1.2 SPT N_{60} Vs Undrained Shear Strength by triaxial UU tests (Complete Set) ... 87
1.3 SPT N_{field} Vs Undrained Shear Strength by Triaxial UU Tests (Complete Set) ... 87
2. Analysis based on the variation of Liquid Limit. ... 88
2.1 SPT N'_{70} Vs Undrained Shear Strength by Triaxial UU Tests. ... 88
2.2 SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests. ... 89
2.3. SPT N_f Vs Undrained Shear Strength by Triaxial UU Tests ... 90
2.4. C_u/SPT N Ratio against Liquid Limit. ... 90
3. Analysis based on the variation of Plastic Limit ... 91
3.1. SPT N'_{70} Vs Undrained Shear Strength by Triaxial UU Tests ... 91
3.2 SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests ... 92

3.3 SPT N_f Vs Undrained Shear Strength by Triaxial UU Tests 93
3.4 C_u/SPT N Ratio against Plastic Limit. 93
4. Analysis based on the variation of Plasticity Index 94
4.1. SPT N'$_{70}$ Vs Undrained Shear Strength by Triaxial UU Tests 94
4.2 SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests..... 95
4.3 SPT N_f Vs Undrained Shear Strength by Triaxial UU Tests 96
4.4. C_u/SPT N Ratio against Plasticity Index. 96
5. Analysis based on the variation Fines Content. 97
5.1. SPT N'$_{70}$ Vs Undrained Shear Strength by Triaxial UU Tests 97
5.2 SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests..... 98
5.3 SPT N_f Vs Undrained Shear Strength by Triaxial UU Tests 99
5.4 C_u/SPT N Ratio against Fines Content. 100
6. Analysis based on the variation Clay Content. 100
6.1. SPT N'$_{70}$ Vs Undrained Shear Strength by Triaxial UU Tests 100
6.2 SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests..... 101
6.3 SPT N_f Vs Undrained Shear Strength by Triaxial UU Tests 102
6.4 C_u/SPT N Ratio against Clay Content..... 103
7. Analysis based on the variation Sampling Depth. 103
7.1. SPT N'$_{70}$ Vs Undrained Shear Strength by Triaxial UU Tests 103
7.2 SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests..... 104
7.3 SPT N_f Vs Undrained Shear Strength by Triaxial UU Tests 105
7.4 C_u/SPT N Ratio against Sampling Depth..... 106
8. Analysis based on the Unified Soil Classification System (USCS)..... 106
8.1. SPT N'$_{70}$ Vs Undrained Shear Strength by Triaxial UU Tests 106
8.2 SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests..... 107
8.3 SPT N_{field} Vs Undrained Shear Strength by Triaxial UU Tests..... 108
Appendix IV : Graphs of Analysis using Undrained Shear Strength by Field Vane Shear Test. 110
1. Analysis on Fine Grained Soils, Complete Set. 110
1.1 SPT N'$_{70}$ Vs Undrained Shear Strength by Field Vane Shear Test. (Complete Set) . 110
1.2 SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Test. (Complete Set)... 111
1.3 SPT N_{field} Vs Undrained Shear Strength by field vane shear test (Complete Set) 111
2. Analysis based on the variation of Liquid Limit..... 112
2.1 SPT N'$_{70}$ Vs Undrained Shear Strength by Field Vane Shear Tests. 112

2.2 SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests. 113
2.3 SPT N_f Vs Undrained Shear Strength by Field Vane Shear Tests 114
2.4 C_u/SPT N Ratio against Liquid Limit. 114
3 Analysis based on the variation of Plastic Limit 115
3.1 SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests 115
3.2 SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests 116
3.3 SPT N_f Vs Undrained Shear Strength by Field Vane Shear Tests 116
3.4 C_u/SPT N Ratio against Plastic Limit. 117
4. Analysis based on the variation of Plasticity Index 118
4.1. SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests 118
4.2 SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests 119
4.3 SPT N_f Vs Undrained Shear Strength by Field Vane Shear Tests 120
4.4 C_u/SPT N Ratio against Plasticity Index. 120
5. Analysis based on the variation Fines Content. 121
5.1 SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests 121
5.2 SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests 122
5.3 SPT N_f Vs Undrained Shear Strength by Field Vane Shear Tests 123
5.4 C_u/SPT N Ratio against Fines Content. 124
6. Analysis based on the variation Clay Content. 124
6.1 SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests 124
6.2 SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests 125
6.3 SPT N_f Vs Undrained Shear Strength by Field Vane Shear Tests 126
6.4 C_u/SPT N Ratio against Clay Content. 126
7. Analysis based on the variation Sampling Depth. 127
7.1. SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests 127
7.2 SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests 128
7.3 SPT N_f Vs Undrained Shear Strength by Field Vane Shear Tests 129
7.4 Cu/SPT N Ratio against Sampling Depth. 130
8. Analysis based on the Unified Soil Classification System (USCS) 130
8.1. SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests 130
8.2 SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests 131
8.3 SPT N_{field} Vs Undrained Shear Strength by Field Vane Shear Tests 132
Appendix V : Reliable Data Set 134

List of Tables

Table 2-1:Average Energy Ratio based on SPT Hammer and Drop Type 11
Table 2-2: Approximated values for undrained shear strength for fine grained soils with respect to SPT N and consistency. 13
Table 2-3: Types of soils analyzed and respective number of tests results taken for the analysis. 15
Table 2-4: Result analysis and summary 16
Table 2-5: Consistency of Saturated Cohesive Soils 18
Table 2-6: Consistency of Saturated Cohesive Soils 18
Table 4-1: Results on analysis of relationship proposed by Joseph E. Bowles 23
Table 4-2: Results on analysis of relationship proposed by Strouds, 1974 24
Table 4-3: Results on analysis of relationship proposed by Hera A, et al. 24
Table 4-4: Results on analysis of relationship proposed by Sivikaya & Togrol, 2007. 25
Table 4-5: Results on analysis of relationship proposed by Décourt, 1990. 26
Table 4-6: Results on analysis of relationship proposed by Terzaghi & Peck, 1967. 27
Table 4-7: Results on analysis of relationship proposed by Terzaghi & Peck, 1967. 27
Table 4-8: Results on analysis of relationship proposed by by Sowers, 1979. 28
Table 4-9: Results on analysis of relationship proposed by Sivikaya & Togrol, 2007. 29
Table 4-10: Results on analysis of relationship proposed by Décourt, 1990. 30
Table 4-11: Results on Fine Grained Soils (Complete Set) 31
Table 4-12: Results of analysis based on the Liquid Limit variation 32
Table 4-13: Results of analysis based on the Plastic Limit variation 33
Table 4-14: Results of analysis based on the Plasticity Index variation. 34
Table 4-15: Results of analysis based on the Fines Content variation. 35
Table 4-16: Results of analysis based on the Clay Content variation. 37
Table 4-17: Results of analysis based on the Sampling Depth variation. 39
Table 4-18: Results of analysis based on the USCS. 41
Table 4-19: Results on Fine Grained Soils (Complete Set) 42
Table 4-20: Results of analysis based on the Liquid Limit variation 43
Table 4-21: Results of analysis based on the Plastic Limit variation 44

Table 4-22: Results of analysis based on the Plasticity Index variation. 45
Table 4-23: Results of analysis based on the Fines Content variation. 47
Table 4-24: Results of analysis based on the Clay Content variation. 48
Table 4-25: Results of analysis based on the Sampling Depth variation. 50
Table 4-26: Results of analysis based on the USCS. 51
Table 4-27: Results of analysis based on the “Reliable Data”. 54
Table I-1: Complete data set. 67
Table V-1: Reliable data set. 134

List of Figures

Figure 2-1: Plasticity Chart (USCS Classification), ... 8
Figure 2-2: The SPT Test: (a) General Arrangement, (b) UK Standard Hammer System, (c) Test Procedure 10
Figure 2-3: Types of SPT Hammers……..……..……...10
Figure 2-4: Comparison of London Clay, Graph 1: undrained triaxial shear strength results against depth and Graph 2: all N values with all and with mass shear strength estimated from deep loading testing against depth, after Stroud (1974) 12
Figure 2-5: Relationship between Plasticity Index and ratio of undrained shear strength to SPT N60 for several clay types……...……12
Figure 2-6 : Correlation between undrained shear strength and SPT N (Sowers, 1979) 14
Figure 2-7 : Variation of f1 (S_u/N_{feild}) and Ip by UU Tests 16
Figure 4-1 : SPT N'_{70}, SPT N_{60} & SPT N_{field} Vs Undrained Shear Strength (Average) with percentage of deviation factor 10% 53
Figure 4-2 : SPT N'_{70}, SPT N_{60} & SPT N_{field} Vs Undrained Shear Strength (Average) with percentage of deviation factor 25% 53
Figure 4-3: SPT N'_{70}, SPT N_{60} & SPT N_{field} Vs Undrained Shear Strength (Average) with percentage of deviation factor 35% 54
Figure 4-4 : SPT N_{60} Undrained Shear Strength (Average) with percentage of deviation factor 25% 55
Figure 4-5 : SPT N_{60} V Undrained Shear Strength (Average) with percentage of deviation factor 25% with upper and lower boundary 56
Figure 4-6 : SPT N_{60} V Undrained Shear Strength (UU Triaxial) for Silt material by grain size. 57
Figure II-1 : Cu (Triaxial) Vs Cu (Energy) by Bowles 72
Figure II-2 : Cu (FVST) Vs Cu (Energy) by Bowles 73
Figure II-3 : Cu (Triaxial) Vs Cu (Energy) by Strouds 73
Figure II-4 : Cu (FVST) Vs Cu (Energy) by Strouds 74
Figure II-5: Cu (Triaxial) Vs Cu (Energy) by Hera A, et al. 75
Figure II-6 : Cu (FVST) Vs Cu (Energy) by Hera A, et al. 75
Figure II-7 : Cu (Triaxial) Vs Cu (Energy / N_{60}) by Sivikaya & Togrol, 2007 76

Figure II-8 : Cu (FVST) Vs Cu (Energy / N_{60}) by Sivikaya & Togrol, 2007..... 77
Figure II-9 : Cu (Triaxial) Vs Cu (Energy / N_{60}) by Décourt, 1990..... 77
Figure II-10: Cu (FVST) Vs Cu (Energy / N_{60}) by Décourt, 1990..... 78
Figure II-11: Cu (Triaxial) Vs Cu (Energy / N_{60}) by Terzaghi & Peck, 1967..... 79
Figure II-12: Cu (FVST) Vs Cu (Energy / N_{60}) by Terzaghi & Peck, 1967 79
Figure II-13: Cu (Triaxial) Vs Cu (Energy / N_f) by Terzaghi & Peck, 1967 80
Figure II-14: Cu (FVST) Vs Cu (Energy / N_f) by Terzaghi & Peck, 1967 80
Figure II-15: Cu (Triaxial) Vs Cu (Energy / N_f) by Sowers, 1979..... 81
Figure II-16: Cu (FVST) Vs Cu (Energy / N_f) by Sowers, 1979..... 82
Figure II-17: Cu (Triaxial) Vs Cu (Energy / N_{field}) by Sivikaya & Togrol, 2007 82
Figure II-18: Cu (FVST) Vs Cu (Energy / N_{field}) by Sivikaya & Togrol, 2007 83
Figure II-19: Cu (Triaxial) Vs Cu (Energy / N_{field}) by Décourt, 1990..... 84
Figure II-20: Cu (FVST) Vs Cu (Energy / N_{field}) by Décourt, 1990..... 84
Figure III-1: SPT N'_{70} Vs Undrained Shear Strength by Triaxial UU Tests (Complete Set) 86
Figure III-2: SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests (Complete Set) 87
Figure III-3: SPT N_{field} Vs Undrained Shear Strength by Triaxial UU Tests (Complete Set) 88
Figure III-4: SPT N'_{70} Vs Undrained Shear Strength by Triaxial UU Tests (based on LL)..... 88
Figure III-5: SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests (based on LL)..... 89
Figure III-6: SPT N_f Vs Undrained Shear Strength by Triaxial UU Tests (based on LL)..... 90
Figure III-7: C_u/SPT N Ratio against Liquid Limit. 91
Figure III-8: SPT N'_{70} Vs Undrained Shear Strength by Triaxial UU Tests (based on PL)..... 91
Figure III-9: SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests (based on PL)..... 92
Figure III-10: SPT N_{field} Vs Undrained Shear Strength by Triaxial UU Tests (based on PL)..... 93

Figure III-11: C_u/SPT N Ratio against Plastic Limit. 94
Figure III-12: SPT N'_{70} Vs Undrained Shear Strength by Triaxial UU Tests (based on PI) 94
Figure III-13: SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests (based on PI) 95
Figure III-14: SPT N_{field} Vs Undrained Shear Strength by Triaxial UU Tests (based on PI) 96
Figure III-15: C_u/SPT N Ratio against Plasticity Index 97
Figure III-16: SPT N'_{70} Vs Undrained Shear Strength by Triaxial UU Tests (based on FC) 98
Figure III-17: SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests (based on FC) 98
Figure III-18: SPT N_{field} Vs Undrained Shear Strength by Triaxial UU Tests (based on FC) 99
Figure III-19: C_u/SPT N Ratio against Fines Content. 100
Figure III-20: SPT N'_{70} Vs Undrained Shear Strength by Triaxial UU Tests (based on Clay Content) 101
Figure III-21: SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests (based on Clay Content) 101
Figure III-22: SPT N_{field} Vs Undrained Shear Strength by Triaxial UU Tests (based on CC) 102
Figure III-23: Cu/SPT N Ratio against Clay Content 103
Figure III-24: SPT N'_{70} Vs Undrained Shear Strength by Triaxial UU Tests (based on Sampling Depth) 104
Figure III-25: SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests (based on Sampling Depth) 105
Figure III-26: SPT N_{field} Vs Undrained Shear Strength by Triaxial UU Tests (based on Sampling Depth) 105
Figure III-27: C_u/SPT N Ratio against Sampling Depth. 106
Figure III-28: SPT N'_{70} Vs Undrained Shear Strength by Triaxial UU Tests (based on USCS) 107

Figure III-29: SPT N_{60} Vs Undrained Shear Strength by Triaxial UU Tests (based on USCS) 108
Figure III-30: SPT N_{field} Vs Undrained Shear Strength by Triaxial UU Tests (based on USCS) 108
Figure IV-1: SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests (Complete Set) 110
Figure IV-2: SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests (Complete Set) 111
Figure IV-3: SPT N_{field} Vs Undrained Shear Strength by Field Vane Shear Tests (Complete Set) 112
Figure IV-4: SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests (based on LL) 112
Figure IV-5: SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests (based on LL) 113
Figure IV-6: SPT N_f Vs Undrained Shear Strength by Field Vane Shear Tests (based on LL)..... 114
Figure IV-7: C_u/SPT N Ratio against Liquid Limit. 115
Figure IV-8: SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests (based on PL) 115
Figure IV-9: SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests (based on PL) 116
Figure IV-10: SPT N_{field} Vs Undrained Shear Strength by Field Vane Shear Tests (based on PL) 117
Figure IV-11: C_u/SPT N Ratio against Plastic Limit. 118
Figure IV-12:SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests(based on PI) 118
Figure IV-13: SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests (based on PI) 119
Figure IV-14: SPT N_{field} Vs Undrained Shear Strength by Field Vane Shear Tests (based on PI) 120
Figure IV-15: C_u/SPT N Ratio against Plasticity Index. 121

Figure IV-16: SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests (based on Fines Content)..... 121
Figure IV-17: SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests (based on Fines Content)..... 122
Figure IV-18: SPT N_{field} Vs Undrained Shear Strength by Field Vane Shear Tests (based on Fines Content)..... 123
Figure IV-19 : C_u/SPT N Ratio against Fines Content. 124
Figure IV-20 SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests (based on Clay Content)..... 125
Figure IV-21 : SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests (based on Clay Content)..... 125
Figure IV-22: SPT N_{field} Vs Undrained Shear Strength by Field Vane Shear Tests (based on Clay Content)..... 126
Figure IV-23 C_u/SPT N Ratio against Clay Content..... 127
Figure IV-24: SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests (based on Sampling Depth)..... 128
Figure IV-25 : SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests (based on Sampling Depth)..... 128
Figure IV-26 : SPT N_{field} Vs Undrained Shear Strength by Field Vane Shear Tests (based on Sampling Depth)..... 129
Figure IV-27 Cu/SPT N Ratio against Sampling Depth. 130
Figure IV-28: SPT N'_{70} Vs Undrained Shear Strength by Field Vane Shear Tests (based on USCS)..... 131
Figure IV-29 : SPT N_{60} Vs Undrained Shear Strength by Field Vane Shear Tests (based on USCS)..... 132
Figure IV-30: SPT N_{field} Vs Undrained Shear Strength by Field Vane Shear Tests (based on USCS)..... 132