

DUBAI ACCREDITATION DEPARTMENT

REPORT ON 173RD LABORATORY PROFICIENCY TESTING DETERMINATION OF IN-SITUE DENSITY BY SAND REPLACEMENT METHOD

Date: 26 March 2009

1. INTRODUCTION

This document presents the results of the 173rd inter-laboratory proficiency-testing program conducted during the month of March involving the **Determination of In – Situ Density by Sand Replacement Method** with twenty six laboratories participating.

This program is part of the Inter-laboratory Comparison Programs organized by the Dubai Accreditation Department (DAC) of Dubai Municipality (DM) for monitoring the validity of test results of laboratories operating in Dubai as a requirement of the Local Order 52/1990 and ISO/IEC 17011: 2004.

2. EXPERIMENTAL DESIGN

2.1 Homogeneity:

DAC ensure the homogeneity of the samples prior to their distribution to the participating laboratories by conducting homogeneity test on six samples (randomly selected). Based on the test results the homogeneity is statistically evaluated as per *ISO 13528:2005 as explained in DAC-G3-03*.

2.2 Participants:

Twenty five private laboratories and one governmental laboratory (fourteen of them are accredited by DAC for construction materials testing) participated in this program.

2.3 Samples Tested:

One sand sample (wet mix) had been taken from the location by all participating laboratories.

3. CONFIDENTIALITY

Each laboratory is given a code number to maintain confidentiality of results and to protect their identities. Only the concerned laboratory knows its code number.

If you have doubt about your code number please don't hesitate to contact Dr. Yaser Saleh Rahag (Tel: 302 7074) to know your code number

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4. TEST METHOD

Instructions were given to the participants to test the samples as per BS 1377: Part 9: 1990: Cl. 2.2 AMD 8264: 1995.

5. TEST RESULTS

The test results submitted by the participating laboratories are presented in Appendix A. In order to protect the identity of the participating laboratories, each one was assigned a code number. The numbers in the column headings, Lab #, of the tables represents the code numbers for the participating laboratories.

6. EVALUATION OF RESULTS

6.1 Method of Analysis

The analysis of the participant's results is based on *ISO 13528:2005 (Statistical Methods for the Use in Proficiency Testing by Inter-laboratory Comparisons)*

6.2 Calculations of Z- scores

Appendix B gives the details of the calculation of the laboratories results and their Z-Scores which are obtained from the raw data. Also Z- Score and participant's results are represented in a bar chart and X-Y scattered plots C. The Z-Score analysis is based on an international Standard (*ISO 13528:2005*).

6.3 Outlier Results

Test	Labs outside the z-scores ± 3
In -Situ Density by Sand Replacement Method	Lab No. 164

After evaluating the Z-Score the test results provided by the above mentioned laboratory is outside the Z - score limits of ± 3 , the above mentioned laboratory is requested to investigate the root cause of the outlier results, implement corrective action and a report shall be available for checking by assessment team during the nearest assessment visit.

7. APPENDICES

7.1 Appendix A: Raw Data

7.2 Appendix B: Calculation of z-scores and other statistics

7.3 Appendix C: Charts

---- End of Report ---

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Determination of In –Situ Density by Sand Replacement Method

Appendix A: Raw Data

Degree of Compaction %

Lab #	Results
Lab 1	95
Lab 3	95
Lab 39	95
Lab 4	95
Lab 56	95
Lab 21	97
Lab 9	95
Lab28	95
Lab 23	94
Lab 57	95
Lab 68	97
Lab 66	95
Lab 160	96
Lab 74	95
Lab 79	97
Lab 71	95
Lab 63	97
Lab 64	96
Lab 124	97
Lab 67	93.64
Lab 136	94.1
Lab 78	95
Lab 58	94.6
Lab 7	95
Lab 164	91
Lab 147	95

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Appendix B: Calculation of z-scores and other statistics

Iteration	0		1		2		3		4		5		6		Z Score
$\delta = 1.5 s$	---	xi-x*	0.00	(xi-x*) ²	0.00	(xi-x*) ²	0.00	(xi-x*) ²	0.00	(xi-x*) ²	0.00	(xi-x*) ²	0.00	(xi-x*) ²	
$x^* - \delta$	---		95.00		95.00		95.00		95.00		95.00		95.00		
$x^* + \delta$	---		95.00		95.00		95.00		95.00		95.00		95.00		
Lab 164	91.00	4.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	-3.12
Lab 67	93.64	1.36	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	-1.06
Lab 23	94	1.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	-0.78
Lab 136	94.1	0.90	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	-0.70
Lab 58	94.6	0.40	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	-0.31
Lab 1	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 147	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 3	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 39	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 4	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 56	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 57	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 66	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 7	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 71	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 74	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 78	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 9	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab28	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.00
Lab 160	96	1.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.78
Lab 64	96	1.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	0.78
Lab 124	97	2.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	1.56
Lab 21	97	2.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	1.56
Lab 63	97	2.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	1.56
Lab 68	97	2.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	1.56
Lab 79	97	2.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	1.56
Average	95.17		95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	
SD	1.28		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
New x*	95	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	95.00	0.00	
New s*	0.00		0.00		0.00		0.00		0.00		0.00		0.00		

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Target value	95
Low Acceptable	91
High Acceptable	99
Acceptable Range	91 - 99

Determination of In –Situ Density by Sand Replacement Method

Appendix C:Charts

