

DUBAI ACCREDITATION DEPARTMENT

REPORT ON 160TH LABORATORY PROFICIENCY TESTING DETERMINATION OF IN-SITUE DENSITY BY SAND REPLACEMENT METHOD

30 April 2008

1. INTRODUCTION

This document presents the results of the 160th inter-laboratory proficiency-testing program conducted during the month of April involving the **Determination of In –Situ Density by Sand Replacement Method** with twenty five 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 three private laboratories and two governmental laboratories (twelve of them are accredited by DAC for construction materials testing) participated in this program.

2.3 Samples Tested:

One sand sample (wet mix) shall be 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. For this particular program participating Laboratories are requested to contact Dr. Yaser Rahaq (Tel No.: 302 7074) to know their code number.

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4. TEST METHOD

Instructions were given to the participants to test the samples for 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. 24

7. CONCLUSION AND RECOMMENDATIONS

The test results provided by the above mentioned laboratories are outside the Z - score limits of ± 3 , the abovementioned laboratories are requested to investigate the root cause of the outlier results, implement corrective action and email a report within 2 weeks to Accreditation Decisions Section of the Dubai Accreditation Department to the following address msrassol@dm.gov.ae

8. APPENDICES

8.1 Appendix A: Raw Data

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

8.3 Appendix C: Charts

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Our Vision : To create an excellent city that provides the essence of success and comfort of living.

Appendix A: Raw Data

Degree of Compaction %

Lab #	Sample No.	Results
Lab 1	16001	97
Lab 2	16002	97
Lab 3	16003	98
Lab 4	16004	100
Lab 5	16005	97
Lab 6	16007	97
Lab 7	16008	96
Lab 8	16009	99
Lab 9	16010	99.6
Lab 10	16011	97
Lab 11	16013	97
Lab 12	16014	97
Lab 13	16015	98.38
Lab 14	16016	98
Lab 15	16017	100
Lab 16	16019	98
Lab 17	16021	97
Lab 18	16023	95
Lab 19	16024	97
Lab 20	16025	98
Lab 21	16027	97
Lab 22	16028	99
Lab 23	16029	97
Lab 24	16030	91
Lab 25	16032	98

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*	2.22	(xi-x*) ²	2.03	(xi-x*) ²	1.87	(xi-x*) ²	1.81	(xi-x*) ²	1.80	(xi-x*) ²	1.79	(xi-x*) ²	
x* - δ	94.78		95.45		95.65		95.72		95.74		95.75				
x* + δ	99.22		99.50		99.38		99.35		99.34		99.33				
LAB 1	97	0.00	97.00	0.22	97.00	0.27	97.00	0.29	97.00	0.29	97.00	0.29	97.00	0.29	-0.46
LAB 2	97	0.00	97.00	0.22	97.00	0.27	97.00	0.29	97.00	0.29	97.00	0.29	97.00	0.29	-0.46
LAB 3	98	1.00	98.00	0.28	98.00	0.23	98.00	0.22	98.00	0.21	98.00	0.21	98.00	0.21	0.38
LAB 4	100	3.00	99.22	3.07	99.22	2.91	99.22	2.86	99.22	2.84	99.22	2.83	99.22	2.83	2.06
LAB 5	97	0.00	97.00	0.22	97.00	0.27	97.00	0.29	97.00	0.29	97.00	0.29	97.00	0.29	-0.46
LAB 6	97	0.00	97.00	0.22	97.00	0.27	97.00	0.29	97.00	0.29	97.00	0.29	97.00	0.29	-0.46
LAB 7	96	1.00	96.00	2.17	96.00	2.30	96.00	2.35	96.00	2.37	96.00	2.38	96.00	2.38	-1.29
LAB 8	99	2.00	99.00	2.33	99.00	2.20	99.00	2.15	99.00	2.13	99.00	2.13	99.00	2.12	1.22
LAB 9	99.6	2.60	99.22	3.07	99.22	2.91	99.22	2.86	99.22	2.84	99.22	2.83	99.22	2.83	1.73
LAB 10	97	0.00	97.00	0.22	97.00	0.27	97.00	0.29	97.00	0.29	97.00	0.29	97.00	0.29	-0.46
LAB 11	97	0.00	97.00	0.22	97.00	0.27	97.00	0.29	97.00	0.29	97.00	0.29	97.00	0.29	-0.46
LAB 12	97	0.00	97.00	0.22	97.00	0.27	97.00	0.29	97.00	0.29	97.00	0.29	97.00	0.29	-0.46
LAB 13	98.38	1.38	98.38	0.82	98.38	0.74	98.38	0.72	98.38	0.71	98.38	0.70	98.38	0.70	0.70
LAB 14	98	1.00	98.00	0.28	98.00	0.23	98.00	0.22	98.00	0.21	98.00	0.21	98.00	0.21	0.38
LAB 15	100	3.00	99.22	3.07	99.22	2.91	99.22	2.86	99.22	2.84	99.22	2.83	99.22	2.83	2.06
LAB 16	98	1.00	98.00	0.28	98.00	0.23	98.00	0.22	98.00	0.21	98.00	0.21	98.00	0.21	0.38
LAB 17	97	0.00	97.00	0.22	97.00	0.27	97.00	0.29	97.00	0.29	97.00	0.29	97.00	0.29	-0.46
LAB 18	95	2.00	95.00	6.12	95.45	4.29	95.65	3.54	95.72	3.31	95.74	3.23	95.75	3.20	-2.13
LAB 19	97	0.00	97.00	0.22	97.00	0.27	97.00	0.29	97.00	0.29	97.00	0.29	97.00	0.29	-0.46
LAB 20	98	1.00	98.00	0.28	98.00	0.23	98.00	0.22	98.00	0.21	98.00	0.21	98.00	0.21	0.38
LAB 21	97	0.00	97.00	0.22	97.00	0.27	97.00	0.29	97.00	0.29	97.00	0.29	97.00	0.29	-0.46
LAB 22	99	2.00	99.00	2.33	99.00	2.20	99.00	2.15	99.00	2.13	99.00	2.13	99.00	2.12	1.22
LAB 23	97	0.00	97.00	0.22	97.00	0.27	97.00	0.29	97.00	0.29	97.00	0.29	97.00	0.29	-0.46
LAB 24	91	6.00	94.78	7.28	95.45	4.29	95.65	3.54	95.72	3.31	95.74	3.23	95.75	3.20	-5.49
LAB 25	98	1.00	98.00	0.28	98.00	0.23	98.00	0.22	98.00	0.21	98.00	0.21	98.00	0.21	0.38
Average	97.40		97.47	34.10	97.52	28.88	97.53	27.25	97.54	26.73	97.54	26.56	97.54	26.51	
SD	1.79		1.19	1.42	1.10	1.20	1.07	1.14	1.06	1.11	1.05	1.11	1.05	1.10	
New x*	97	1.00	97.473	1.19	97.518	1.10	97.534	1.07	97.540	1.06	97.54	1.05	97.54	1.05	
New s*	1.48		1.352		1.244		1.208		1.197		1.19		1.19		

N 25

Target value	98
Low Acceptable	94
High Acceptable	101
Acceptable Range	94 - 101

Appendix C:Charts

