

DUBAI ACCREDITATION DEPARTMENT

REPORT ON 202ND LABORATORY PROFICIENCY TESTING DETERMINATION OF IN-SITUE DENSITY BY SAND REPLACEMENT METHOD

Date: 8 February 2011

1. INTRODUCTION

This document presents the results of the 202nd inter-laboratory proficiency-testing program conducted during the month of January involving the **Determination of In – Situ Density by Sand Replacement Method** with twenty eight laboratories participating. This program is planned in February, but, it has been conducted one week earlier.

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 Law No.2/2010 and ISO/IEC 17011: 2004.

2. EXPERIMENTAL DESIGN

2.1 Homogeneity:

To ensure the homogeneity of the compaction in the selected area DAC has conducted 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 eight laboratories were participated in this PTP including:

- Two governmental laboratories.
- Twenty two are private laboratories operating in Dubai including accredited and registered laboratories.
- Four private laboratories are from other Emirates.

2.3 Samples Tested:

One sand sample (wet mix) had been taken from the location by all participating laboratories; the site was prepared in advance as per the conditions required for this proficiency testing program.

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.

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

6.3 Outlier Results

After evaluating the Z-Score, the test results from all participating laboratories are found within the Z-score limits of ± 3 , therefore, all the results are acceptable.

However, the Z-score value for one participating laboratory is 2.98 , although, this value is less than ± 3 and is not considered as **outlier**, but, it is a warning limit, this laboratory is advised to investigate the potential root cause of such result.

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 ----

The Determination of In –Situ Density by Sand Replacement Method

Appendix A: Raw Data

Degree of Compaction %

Lab #	Results
Lab G01	98
Lab3	99
Lab 39	99
Lab 4	99
Lab 56	99
Lab 21	98
Lab 7	99
Lab 9	99
Lab 28	99
Lab 23	99
Lab 57	99
Lab 58	98
Lab 64	99
Lab 68	97
Lab 66	100
Lab 72	100
Lab 67	99
Lab 71	99
Lab 74	99
Lab 79	100
Lab EX17	98
Lab 82	99
Lab 84	99
Lab 89	98
Lab EX11	99
Lab EX5	99
Lab EX22	99
Lab EX23	98

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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*	1.00	$(xi-x^*)^2$	1.01	$(xi-x^*)^2$	0.96	$(xi-x^*)^2$	0.94	$(xi-x^*)^2$	0.93	$(xi-x^*)^2$	0.92	$(xi-x^*)^2$	
$x^* - \delta$	---		98.00		97.85		97.89		97.90		97.91		97.91		
$x^* + \delta$	---		100.00		99.86		99.80		99.77		99.76		99.75		
Lab 68	97	2.00	98.00	0.74	98.00	0.72	98.00	0.71	98.00	0.70	98.00	0.70	98.00	0.70	-2.98
Lab 21	98	1.00	98.00	0.73	98.00	0.71	98.00	0.70	98.00	0.69	98.00	0.69	98.00	0.69	-1.35
Lab 58	98	1.00	98.00	0.73	98.00	0.71	98.00	0.70	98.00	0.69	98.00	0.69	98.00	0.69	-1.35
Lab 89	98	1.00	98.00	0.73	98.00	0.71	98.00	0.70	98.00	0.69	98.00	0.69	98.00	0.69	-1.35
Lab EX17	98	1.00	98.00	0.73	98.00	0.71	98.00	0.70	98.00	0.69	98.00	0.69	98.00	0.69	-1.35
Lab EX23	98	1.00	98.00	0.73	98.00	0.71	98.00	0.70	98.00	0.69	98.00	0.69	98.00	0.69	-1.35
Lab G01	98	1.00	98.00	0.73	98.00	0.71	98.00	0.70	98.00	0.69	98.00	0.69	98.00	0.69	-1.35
Lab 23	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 28	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 39	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 4	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 56	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 57	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 64	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 67	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 7	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 71	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 74	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 82	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 84	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 9	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab EX11	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab EX22	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab EX5	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab3	99	0.00	99.00	0.02	99.00	0.02	99.00	0.03	99.00	0.03	99.00	0.03	99.00	0.03	0.28
Lab 66	100	1.00	100.00	1.31	99.86	1.04	99.80	0.93	99.77	0.88	99.76	0.86	99.75	0.85	1.91
Lab 72	100	1.00	100.00	1.31	99.86	1.04	99.80	0.93	99.77	0.88	99.76	0.86	99.75	0.85	1.91
Lab 79	100	1.00	100.00	1.31	99.86	1.04	99.80	0.93	99.77	0.88	99.76	0.86	99.75	0.85	1.91
Average	98.82		98.86	9.44	98.84	8.54	98.84	8.17	98.83	8.01	98.83	7.94	98.83	7.91	
SD	0.67		0.59	0.35	0.56	0.32	0.55	0.30	0.54	0.30	0.54	0.29	0.54	0.29	
New x*	99	0.00	98.86	0.59	98.84	0.56	98.84	0.55	98.83	0.54	98.83	0.54	98.83	0.54	
New s*	0.67		0.67		0.64		0.62		0.62		0.61		0.61		
N	28														

Target value	99
Low Acceptable	97
High Acceptable	101
Acceptable Range	97 - 100

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Appendix C:Charts

