DUBAI ACCREDITATION CENTER

REPORT ON 155TH LABORATORY PROFICIENCY TESTING DETERMINATION OF COMPRESSIVE STRENGTH AND DIMENSION OF RECTANGULAR PAVING BLOCK

7 AUGUST 2007

1. INTRODUCTION

This document presents the results of the 155th inter-laboratory proficiency-testing program conducted during the month of June involving the **Determination of Compressive Strength and Dimension of Uni-shape Paving Block** with twenty one laboratories participating.
This program is part of the Inter-laboratory Comparison Programs organized by the Accreditation Center of 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 Participants:

Eighteen private laboratories and three governmental laboratories (twelve of them are accredited by DM for construction materials testing) participated in this program.

2.2 Samples tested:

Four (4) samples of Uni shape paving block 60* mm Thick, Grey color, each sample consisting of ten specimens, which were distributed to 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.

4. TEST METHOD

Instructions were given to the participants to test the samples for:

4.1 BS 6717:1993 Part 1 Annex A & B.
4.2 BS 6717:1993 Part 1 Annex A.

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.

Note:
Two Laboratories (Lab 16 & Lab 20) did not provide the results for the thickness; therefore Z-Score for this parameter was calculated for nineteen laboratories only.

6. EVALUATION OF RESULTS

6.1 METHOD OF ANALYSIS

Please refer to document **DAC-G3-03** Robust Z-Score Analyses for the methodologies of analysis that can be downloaded from our website www.dac.gov.ae

6.2 CALCULATIONS OF Z- SCORES

Appendix B gives the details of the calculation of the Z-Scores from the raw data. The Z-Score analysis is based on an internationally accepted procedure being used by accreditation bodies implementing Inter-laboratory comparison programs.

6.3 OUTLIER RESULTS

Test	Labs outside the z-scores ±3	Type of Outlier
Compressive Strength	Lab 20-1 Lab 20-2 Lab 21-1 Lab 14-2 Lab 18-1 Lab 18-2	Between Labs
	Lab 8-2 Lab 20-1 Lab 20-2	Within Labs

7. CONCLUSION AND RECOMMENDATIONS

The test results provided by the abovementioned 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 Center to the following address lmqudah@dm.gov.ae.

8. APPENDICES

7.1 Appendix A: Raw Data
7.2 Appendix B: Calculation of z-scores and other statistics
7.3 Appendix C: Charts

Compressive strength, N/mm2

Sample 1

Lab #	1	2	3	4	5	6	7	8	9	10	Ave
Lab1	57.1	56.7	66.2	64.7	63.7	66.7	63.7	66.6	52.2	60.6	62
Lab2	53.9	63.4	62.7	58.2	67.6	64.4	61.1	60.3	57.7	59.5	61
Lab3	63.4	61.8	63.1	60.0	50.3	60.5	62.3	64.4	58.1	55.5	60
Lab4	57.9	59.1	54.9	53.3	54.9	58.5	58.2	60.6	58.8	57.4	57
Lab5	53.9	53.4	54.2	57.5	53.3	56.5	62.6	64.5	63.7	49.6	57
Lab6	58.0	58.6	57.3	58.2	57.7	59.3	57.6	57.1	58.1	57.7	58
Lab7	55.0	58.0	58.0	56.0	55.0	59.0	56.0	59.0	63.0	63.0	58
Lab8	60.6	57.7	58.2	68.3	62.1	64.0	65.9	66.1	58.2	64.2	63
Lab9	58.8	60.4	61.4	58.1	56.6	58.9	59.9	57.6	58.4	59.7	59
Lab10	60.6	65.3	61.4	55.8	54.4	60.1	56.6	59	62.6	61.7	60
Lab11	56.8	64.9	62.5	63.6	58.7	61.5	55.8	55.4	51.7	58.0	59
Lab12	63.7	55.3	62.8	56.5	60.7	61.0	60.0	59.4	62.9	61.7	60
Lab13	55.8	56.2	61.6	61.2	53.9	56.1	59.4	61.0	60.0	62.1	59
Lab14	70.9	66.3	60.5	68.8	61.4	64.8	65.8	62.2	63.0	53.4	64
Lab15	72.1	64.6	61.6	65.8	62.3	67.3	59.5	64.9	58.0	66.0	64
Lab16	68.0	69.0	62.0	56.0	61.0	60.0	62.0	60.0	60.0	63.0	62
Lab17	54.0	59.0	59.0	51.0	53.0	59.0	51.0	60.0	58.0	64.0	57
Lab18	73.6	74.8	72.9	65.4	66.3	70.2	66.6	74.1	73.7	66.5	70
Lab19	61.0	59.0	57.0	60.0	61.0	59.0	62.0	58.0	59.0	60.0	60
Lab20	16.5	16.6	16.6	16.5	16.9	17.0	16.6	16.4	16.8	16.6	17
Lab21	48.3	39.6	48.3	46.6	54.1	46.5	44.8	46.0	43.3	43.5	46

Sample 2

Lab #	1	2	3	4	5	6	7	8	9	10	Ave
Lab1	57.8	60.0	63.7	65.9	70.8	70.5	68.4	60.2	64.4	61.7	64
Lab2	50.5	55.4	58.4	60.6	58.8	61.2	52.5	58.9	57.3	59.1	57
Lab3	64.5	60.2	60.6	59.3	62.5	59.7	57.9	60.6	61.3	65.5	61
Lab4	56.9	62.8	54.8	56.9	53.7	55.3	55.1	50.2	51.8	60.2	56
Lab5	55.2	56.7	61.8	69.9	53.1	58.3	61.7	53.4	53.1	59.0	58
Lab6	58.0	59.1	59.6	60.1	60.7	59.2	58.6	58.3	59.1	58.9	59
Lab7	56.0	61.0	63.0	62.0	61.0	64.0	61.0	56.0	52.0	57.0	59
Lab8	70.5	68.8	70.7	61.5	59.5	58.9	56.2	65.3	67.9	57.3	64
Lab9	60.8	58.5	59.0	61.7	59.5	59.7	58.6	60.3	59.0	61.3	60
Lab10	63.8	59	53.2	58.2	57.1	54.4	56.8	58.7	58.5	67.9	59
Lab11	65.2	59.3	65.6	61.2	58.5	62.4	55.5	56.9	54.1	52.7	59
Lab12	56.8	53.8	56.9	60.9	46.8	59.5	61.4	63.1	63.6	69.2	59
Lab13	59.7	59.5	60.4	61.9	60.6	62	59.8	58.6	60.5	60	60
Lab14	63.6	71.6	74.4	71.6	70.2	64.3	63.9	58.7	61.5	64.4	66
Lab15	53.4	56.3	59.6	58.9	56.6	58.3	62.4	66.2	68.3	70.3	61
Lab16	51	49	57	61	49	63	53	53	63	51	55
Lab17	63	68	61	64	66	69	55	59	60	61	63
Lab18	81.6	83.5	82.7	81	77.4	72.2	77.5	74.2	74.2	71.3	78
Lab19	58	62	59	60	57	58	60	58	57	61	59
Lab20	17.6	16.6	16.6	16.4	16.7	16.3	16.3	17.6	16.6	16.4	17
Lab21	58.5	60.9	43.4	62.4	63	66.1	57.6	62.9	52.9	49.6	58

Sample 3											
Lab #	1	2	3	4	5	6	7	8	9	10	Ave
Lab1	37.9	42.2	48.4	45.6	49.6	52.3	46.0	49.2	45.5	46.2	46
Lab2	45.8	51.0	49.4	51.7	47.5	48.4	51.2	44.4	49.7	48.7	49
Lab3	45.0	39.2	39.0	40.4	39.7	38.7	41.2	40.9	43.5	40.9	41
Lab4	35.9	38.7	44.6	43.2	43.9	47.8	43.6	50.1	40.1	46.6	43
Lab5	44.7	47.0	43.0	47.8	44.9	47.0	50.3	48.5	50.7	50.9	47
Lab6	44.0	44.5	45.1	43.6	43.4	43.7	44.8	43.8	43.3	44.0	44
Lab7	46.0	46.0	45.0	45.0	47.0	45.0	40.0	46.0	42.0	41.0	44
Lab8	42.7	42.8	41.3	40.9	43.4	36.9	45.3	42.4	38.9	35.7	41
Lab9	44.8	46.9	44.0	49.4	46.2	46.7	45.7	48.0	44.3	46.6	46
Lab10	42.1	40	42.4	43.5	39	42.6	41.3	45.6	41.3	49.6	43
Lab11	54.4	42.0	48.7	41.2	46.6	43.7	44.5	48.7	41.1	50.4	43
Lab12	41.8	46.4	49.1	42.7	50.3	45.2	42.6	42.9	42.3	43.4	45
Lab13	41.1	45.2	47.6	46.5	42.2	45.4	42.8	42.8	42.2	45.7	44
Lab14	53.7	48.3	53.3	49.6	50.6	49	46.9	41.2	49.3	43.9	49
Lab15	48.9	42.5	41.7	44.4	48.5	45	44.1	46.8	46.2	49.9	46
Lab16	52.0	41	49	50	49	41	46	39	39	40	45
Lab17	42.0	54	43	47	51	46	46	46	43	42	46
Lab18	48.2	51.3	60.1	62.8	62.5	54.4	65.2	63.4	53.6	59.9	58
Lab19	45.0	47	44	46	45	45	43	46	47	47	46
Lab20	17.8	17.6	17.5	16.4	17.8	16.2	16.3	16.3	17.7	17.5	17
Lab21	31.9	26.4	38.3	39.1	47.7	41.3	31.1	48.1	39.5	50.6	39

Sample 4											
Lab #	1	2	3	4	5	6	7	8	9	10	Ave
Lab1	49.9	47.1	53.0	54.6	53.3	52.3	46.4	40.7	43.1	43.5	48
Lab2	42.2	39.1	45.1	48.7	52.7	48.7	46.7	50.2	48.9	47.9	47
Lab3	36.7	39.4	44.9	44.1	43.5	41.9	34.9	40.6	42.8	44.0	41
Lab4	51.3	43.1	49.9	49.9	50.4	44.0	40.8	38.9	41.1	40.0	45
Lab5	52.6	43.8	46.3	48.4	49.5	50.8	43.6	49.1	40.6	45.4	47
Lab6	43.7	43.1	42.3	42.0	44.5	42.3	43.6	43.2	42.9	42.9	43
Lab7	46.0	39.0	46.0	43.0	43.0	44.0	47.0	46.0	53.0	49.0	46
Lab8	37.7	35.3	43.7	33.8	42.3	43.4	40.0	38.5	40.3	41.8	40
Lab9	44.6	47.4	43.6	45.7	46.6	44.8	45.3	46.7	45.5	44.4	45
Lab10	46	44	42.1	43.9	44.1	45.2	43.8	43.5	46.3	42.4	44
Lab11	38.8	42.1	49.9	49.7	45.9	53.6	45	46.5	45.7	47.4	46
Lab12	39.5	41.8	44.7	51.5	41.6	41.4	47.9	49.9	40.3	41.9	44
Lab13	47.5	43.7	46.3	46.8	48.8	46.8	44.3	41.8	40.1	44.3	45
Lab14	58.1	51.4	54.8	55.8	59	55.9	50.1	62.4	54.7	54	56
Lab15	40.8	39.2	48.6	44.5	48.2	48.3	55.1	45.2	50.1	49.2	47
Lab16	44	38	34	43	45	40	46	39	36	33	40
Lab17	46	42	44	45	50	46	52	50	50	43	47
Lab18	51.8	62.3	63.4	60.7	67.9	62	58.5	61.1	56.5	58.2	60
Lab19	45	44	46	44	46	45	44	43	42	43	44
Lab20	17.7	17.6	17.6	17.4	17.3	17.5	17.3	16.2	16.2	17.6	17
Lab21	48.4	54	54.2	43.9	40.9	44.6	41.9	42.8	41.4	39.2	45

Average thickness, mm											
Sample 1											
Lab #	1	2	3	4	5	6	7	8	9	10	Ave
Lab1	60.0	59.0	60.0	61.0	61.0	61.0	61.0	60.0	59.0	60.0	60
Lab2	59.0	59.0	60.0	60.0	61.0	60.0	60.0	59.0	59.0	60.0	60
Lab3	60.0	60.0	60.0	59.0	59.0	60.0	60.0	60.0	60.0	59.0	60
Lab4	60.0	61.0	61.0	61.0	61.0	61.0	62.0	61.0	61.0	60.0	61
Lab5	60.0	60.0	61.0	62.0	61.0	62.0	61.0	60.0	60.0	60.0	61
Lab6	60.0	61.0	61.0	60.0	61.0	61.0	60.0	60.0	60.0	60.0	60
Lab7	60.0	61.0	60.0	61.0	61.0	61.0	61.0	60.0	61.0	61.0	61
Lab8	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60
Lab9	60.0	60.0	60.0	59.0	60.0	59.0	59.0	58.0	59.0	59.0	59
Lab10	58.0	59.0	60.0	60.0	59.0	60.0	60.0	58.0	60.0	60.0	59
Lab11	60.0	60.0	60.0	60.0	60.0	61.0	60.0	58.0	59.0	61.0	60
Lab12	60.0	60.0	60.0	59.0	60.0	60.0	60.0	60.0	60.0	60.0	60
Lab13	58.0	59.0	60.0	60.0	60.0	60.0	59.0	61.0	61.0	61.0	60
Lab14	57.0	58.0	59.0	59.0	61.0	59.0	60.0	60.0	60.0	60.0	59
Lab15	61.0	61.0	61.0	60.0	61.0	61.0	60.0	60.0	60.0	60.0	61
Lab17	59.0	59.0	59.0	61.0	61.0	61.0	60.0	60.0	61.0	62.0	60
Lab18	59.0	60.0	60.0	61.0	60.0	60.0	60.0	60.0	61.0	60.0	60
Lab19	60.0	60.0	60.0	60.0	61.0	61.0	60.0	61.0	61.0	60.0	60
Lab21	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60
Sample 2											
Lab #	1	2	3	4	5	6	7	8	9	10	Ave
Lab1	59.0	60.0	60.0	61.0	61.0	61.0	61.0	60.0	60.0	60.0	60
Lab2	59.0	59.0	59.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60
Lab3	59.0	60.0	60.0	60.0	61.0	61.0	60.0	60.0	59.0	60.0	60
Lab4	61.0	61.0	60.0	62.0	61.0	60.0	61.0	61.0	61.0	62.0	61
Lab5	61.0	61.0	62.0	62.0	61.0	61.0	61.0	60.0	60.0	60.0	61
Lab6	60.0	60.0	61.0	61.0	62.0	62.0	61.0	61.0	61.0	61.0	61
Lab7	60.0	60.0	61.0	61.0	61.0	61.0	61.0	60.0	60.0	61.0	61
Lab8	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60
Lab9	60.0	60.0	60.0	61.0	61.0	61.0	61.0	60.0	61.0	61.0	61
Lab10	60.0	60.0	60.0	61.0	61.0	60.0	59.0	59.0	59.0	60.0	60
Lab11	61.0	61.0	61.0	61.0	61.0	60.0	60.0	60.0	60.0	58.0	60
Lab12	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60
Lab13	60.0	60.0	60.0	61.0	61.0	60.0	60.0	60.0	61.0	61.0	60
Lab14	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	62.0	61.0	61
Lab15	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60
Lab17	59.0	60.0	61.0	61.0	60.0	60.0	60.0	60.0	61.0	61.0	60
Lab18	59.0	60.0	60.0	61.0	60.0	60.0	61.0	60.0	62.0	61.0	60
Lab19	60.0	60.0	61.0	61.0	61.0	60.0	60.0	60.0	60.0	60.0	60
Lab21	60.0	60.0	60.0	61.0	61.0	60.0	60.0	60.0	60.0	60.0	60

Sample 3

Lab #	1	2	3	4	5	6	7	8	9	10	Ave
Lab1	63.0	63.0	63.0	64.0	64.0	64.0	63.0	63.0	64.0	64.0	64
Lab2	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64
Lab3	64.0	64.0	64.0	64.0	64.0	64.0	65.0	65.0	65.0	64.0	64
Lab4	61.0	61.0	61.0	60.0	61.0	60.0	61.0	61.0	60.0	61.0	61
Lab5	64.0	64.0	64.0	64.0	65.0	65.0	65.0	65.0	65.0	65.0	65
Lab6	62.0	63.0	63.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64
Lab7	64.0	64.0	64.0	64.0	64.0	63.0	63.0	64.0	64.0	64.0	64
Lab8	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62
Lab9	62.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	64.0	64.0	63
Lab10	63.0	63.0	63.0	63.0	64.0	64.0	64.0	64.0	63.0	64.0	64
Lab11	65.0	64.0	63.0	63.0	64.0	63.0	64.0	63.0	63.0	64.0	64
Lab12	62.0	63.0	63.0	62.0	62.0	62.0	63.0	63.0	62.0	62.0	62
Lab13	63.0	63.0	64.0	64.0	64.0	64.0	64.0	63.0	64.0	64.0	64
Lab14	63.0	63.0	63.0	63.0	64.0	64.0	62.0	62.0	63.0	62.0	63
Lab15	64.0	63.0	64.0	64.0	63.0	63.0	63.0	63.0	63.0	64.0	63
Lab17	63.0	63.0	63.0	63.0	63.0	63.0	65.0	62.0	63.0	62.0	63
Lab18	65.0	65.0	66.0	66.0	67.0	63.0	63.0	63.0	66.0	66.0	65
Lab19	63.0	62.0	63.0	62.0	62.0	62.0	62.0	63.0	62.0	62.0	62
Lab21	62.0	62.0	63.0	63.0	64.0	64.0	64.0	64.0	63.0	66.0	64

Sample 4

Lab #	1	2	3	4	5	6	7	8	9	10	Ave
Lab1	63.0	63.0	63.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64
Lab2	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64
Lab3	63.0	63.0	64.0	64.0	64.0	64.0	63.0	63.0	64.0	64.0	64
Lab4	61.0	61.0	61.0	60.0	61.0	61.0	61.0	60.0	60.0	60.0	61
Lab5	65.0	64.0	65.0	64.0	64.0	64.0	64.0	64.0	63.0	64.0	64
Lab6	63.0	63.0	64.0	64.0	64.0	64.0	64.0	65.0	64.0	64.0	64
Lab7	64.0	64.0	63.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64
Lab8	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62
Lab9	63.0	63.0	63.0	63.0	64.0	63.0	63.0	64.0	64.0	64.0	63
Lab10	61.0	61.0	62.0	62.0	61.0	61.0	62.0	62.0	64.0	63.0	62
Lab11	63.0	63.0	64.0	64.0	64.0	64.0	64.0	64.0	63.0	63.0	64
Lab12	63.0	62.0	63.0	62.0	63.0	62.0	63.0	62.0	62.0	62.0	62
Lab13	64.0	64.0	64.0	64.0	64.0	63.0	63.0	63.0	64.0	64.0	64
Lab14	63.0	63.0	63.0	63.0	63.0	66.0	65.0	61.0	64.0	64.0	64
Lab15	64.0	64.0	64.0	64.0	63.0	63.0	63.0	63.0	63.0	63.0	63
Lab17	62	62	63	64	64	64	64	63	63	63	63
Lab18	65	66	66	66	67	66	66	65	66	65	66
Lab19	62	63	62	62	63	62	63	63	62	62	62
Lab21	63	64	64	64	64	63	63	63	63	63	63

Appendix B: Calculation of z-scores

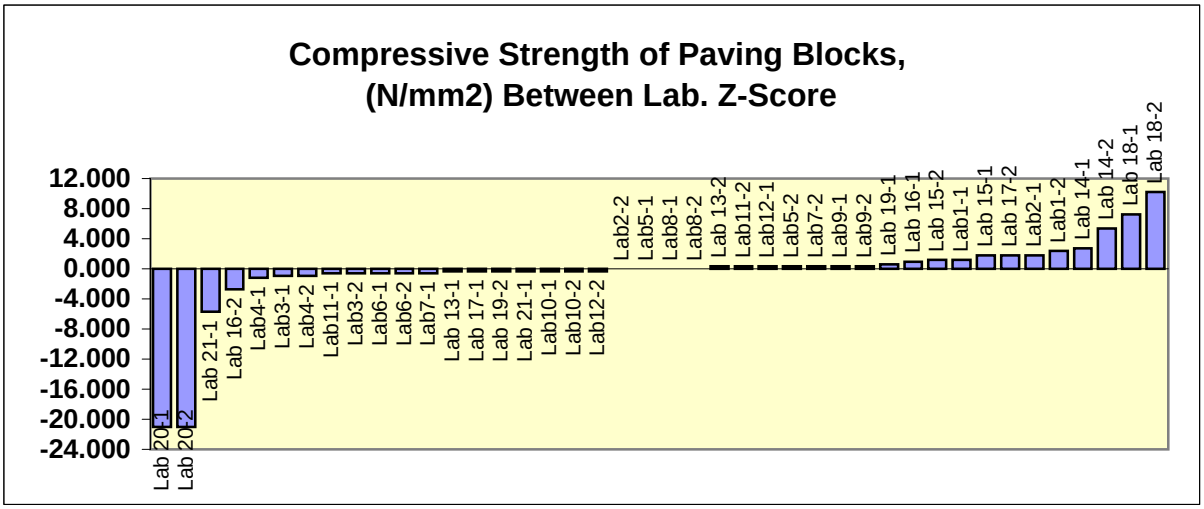
Compressive strength, N/mm^2

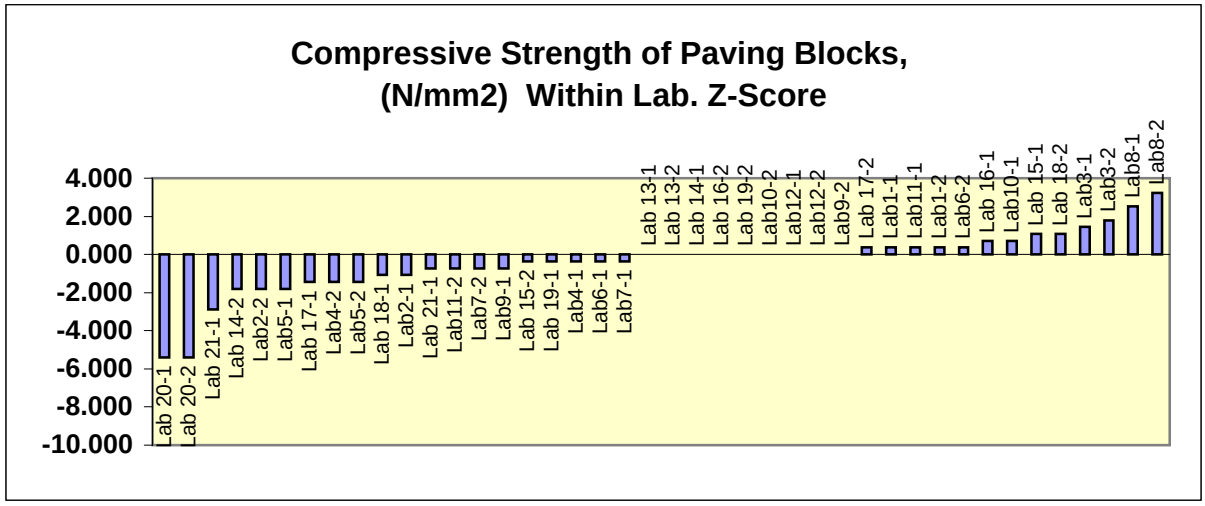
Result#	S1 S2	S3 S4	S1+S3 S2+S4	S1-S3 S2-S4	Between Labs z-score	Within Labs z-score
Lab1-1	62	46	108	16	1.199	0.360
Lab1-2	64	48	112	16	2.398	0.360
Lab2-1	61	49	110	12	1.799	-1.079
Lab2-2	57	47	104	10	0.000	-1.799
Lab3-1	60	41	101	19	-0.899	1.439
Lab3-2	61	41	102	20	-0.600	1.799
Lab4-1	57	43	100	14	-1.199	-0.360
Lab4-2	56	45	101	11	-0.899	-1.439
Lab5-1	57	47	104	10	0.000	-1.799
Lab5-2	58	47	105	11	0.300	-1.439
Lab6-1	58	44	102	14	-0.600	-0.360
Lab6-2	59	43	102	16	-0.600	0.360
Lab7-1	58	44	102	14	-0.600	-0.360
Lab7-2	59	46	105	13	0.300	-0.719
Lab8-1	63	41	104	22	0.000	2.518
Lab8-2	64	40	104	24	0.000	3.238
Lab9-1	59	46	105	13	0.300	-0.719
Lab9-2	60	45	105	15	0.300	0.000
Lab10-1	60	43	103	17	-0.300	0.719
Lab10-2	59	44	103	15	-0.300	0.000
Lab11-1	59	43	102	16	-0.600	0.360
Lab11-2	59	46	105	13	0.300	-0.719
Lab12-1	60	45	105	15	0.300	0.000
Lab12-2	59	44	103	15	-0.300	0.000
Lab 13-1	59	44	103	15	-0.300	0.000
Lab 13-2	60	45	105	15	0.300	0.000
Lab 14-1	64	49	113	15	2.698	0.000
Lab 14-2	66	56	122	10	5.396	-1.799
Lab 15-1	64	46	110	18	1.799	1.079
Lab 15-2	61	47	108	14	1.199	-0.360
Lab 16-1	62	45	107	17	0.899	0.719
Lab 16-2	55	40	95	15	-2.698	0.000
Lab 17-1	57	46	103	11	-0.300	-1.439
Lab 17-2	63	47	110	16	1.799	0.360
Lab 18-1	70	58	128	12	7.195	-1.079
Lab 18-2	78	60	138	18	10.192	1.079
Lab 19-1	60	46	106	14	0.600	-0.360
Lab 19-2	59	44	103	15	-0.300	0.000
Lab 20-1	17	17	34	0	-20.984	-5.396
Lab 20-2	17	17	34	0	-20.984	-5.396
Lab 21-1	46	39	85	7	-5.696	-2.878
Lab 21-1	58	45	103	13	-0.300	-0.719
No. of Results	42	42	42	42		
Median	59	45	104	15		
Q 1	59	43	102	12		
Q 3	62	47	107	16		
Inter Q Range	3	4	5	4		
Normalzd IQR	2.04	2.59	3.34	2.78		
Robust CV,%	3.46	5.77	3.21	18.53		
Minimum	17.0	17.0	34.0	0.0		
Maximum	78.0	60.0	138.0	24.0		

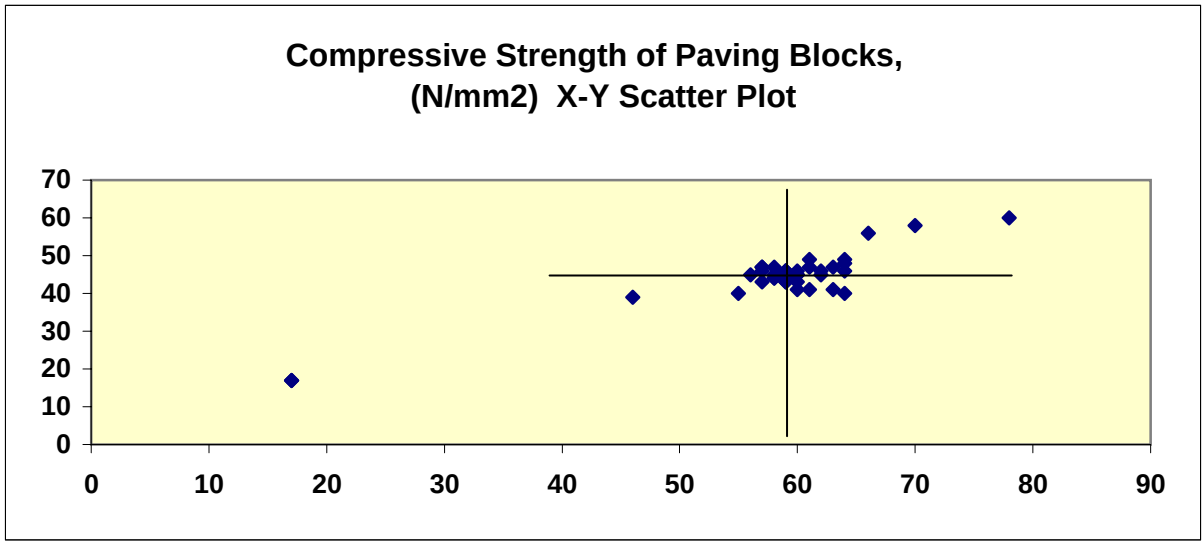
Range	61.0	43.0	104.0	24.0

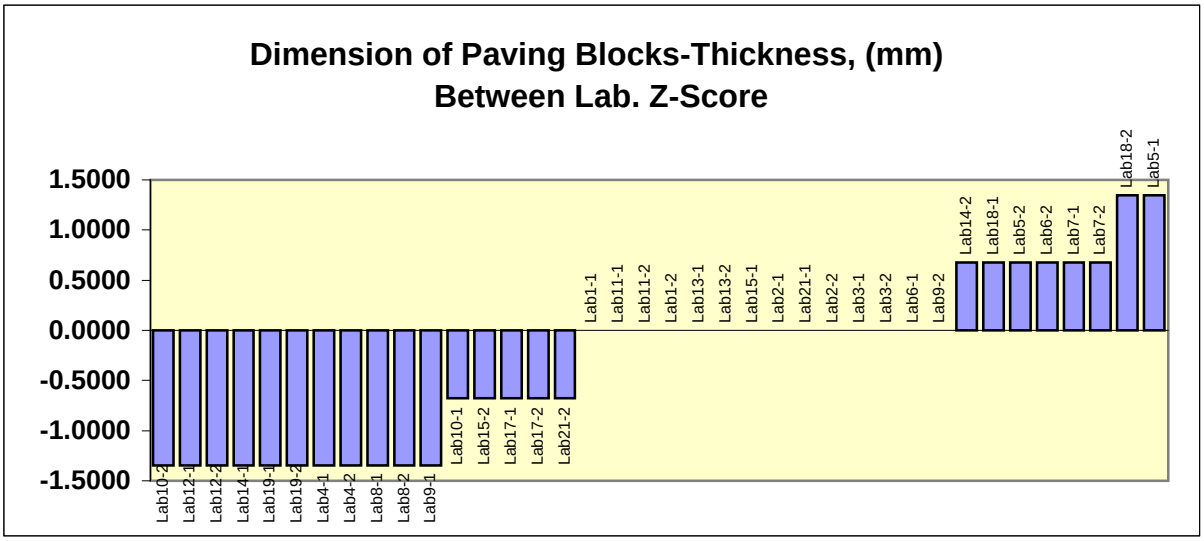
Average Thickness (mm)

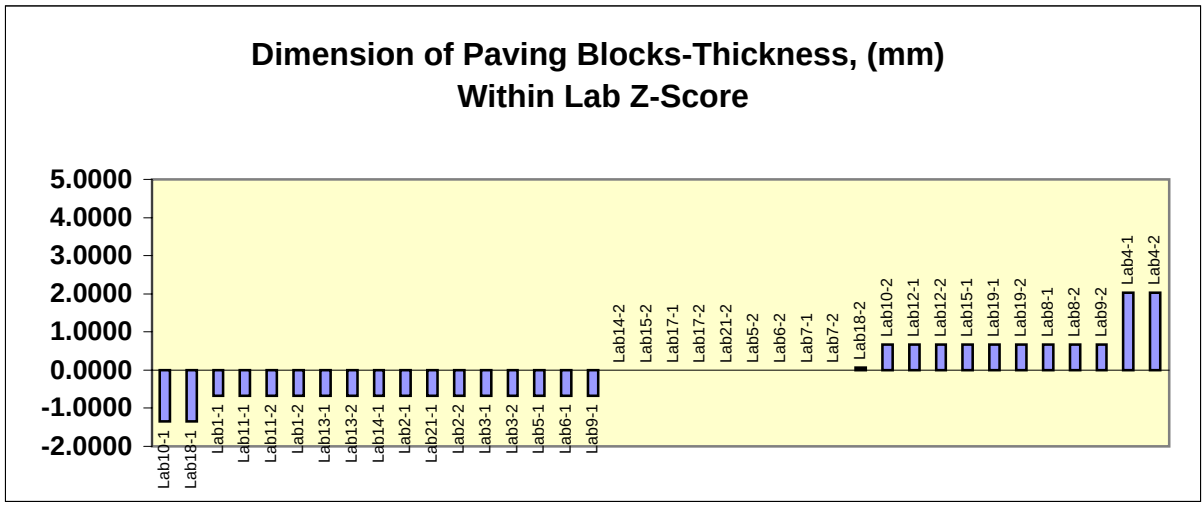
Result#	S1 S2	S3 S4	S1+S3 S2+S4	S1-S3 S2-S4	Between Labs z-score	Within Labs z-score
Lab1-1	60	64	124	-4	0.0000	-0.6745
Lab1-2	60	64	124	-4	0.0000	-0.6745
Lab2-1	60	64	124	-4	0.0000	-0.6745
Lab2-2	60	64	124	-4	0.0000	-0.6745
Lab3-1	60	64	124	-4	0.0000	-0.6745
Lab3-2	60	64	124	-4	0.0000	-0.6745
Lab4-1	61	61	122	0	-1.3490	2.0235
Lab4-2	61	61	122	0	-1.3490	2.0235
Lab5-1	61	65	126	-4	1.3490	-0.6745
Lab5-2	61	64	125	-3	0.6745	0.0000
Lab6-1	60	64	124	-4	0.0000	-0.6745
Lab6-2	61	64	125	-3	0.6745	0.0000
Lab7-1	61	64	125	-3	0.6745	0.0000
Lab7-2	61	64	125	-3	0.6745	0.0000
Lab8-1	60	62	122	-2	-1.3490	0.6745
Lab8-2	60	62	122	-2	-1.3490	0.6745
Lab9-1	59	63	122	-4	-1.3490	-0.6745
Lab9-2	61	63	124	-2	0.0000	0.6745
Lab10-1	59	64	123	-5	-0.6745	-1.3490
Lab10-2	60	62	122	-2	-1.3490	0.6745
Lab11-1	60	64	124	-4	0.0000	-0.6745
Lab11-2	60	64	124	-4	0.0000	-0.6745
Lab12-1	60	62	122	-2	-1.3490	0.6745
Lab12-2	60	62	122	-2	-1.3490	0.6745
Lab13-1	60	64	124	-4	0.0000	-0.6745
Lab13-2	60	64	124	-4	0.0000	-0.6745
Lab14-1	59	63	122	-4	-1.3490	-0.6745
Lab14-2	61	64	125	-3	0.6745	0.0000
Lab15-1	61	63	124	-2	0.0000	0.6745
Lab15-2	60	63	123	-3	-0.6745	0.0000
Lab17-1	60	63	123	-3	-0.6745	0.0000
Lab17-2	60	63	123	-3	-0.6745	0.0000
Lab18-1	60	65	125	-5	0.6745	-1.3490
Lab18-2	60	66	126	-6	1.3490	0.0607
Lab19-1	60	62	122	-2	-1.3490	0.6745
Lab19-2	60	62	122	-2	-1.3490	0.6745
Lab21-1	60	64	124	-4	0.0000	-0.6745
Lab21-2	60	63	123	-3	-0.6745	0.0000
No. of Results	38	38	38	38		
Median	60	64	124	-3		
Q 1	60	63	122	-4		
Q 3	61	64	124	-2		
Inter Q Range	1	1	2	2		
Normalzd IQR	0.56	0.74	1.48	1.48		
Robust CV,%	0.93	1.16	1.20	-49.42		
Minimum	59.0	61.0	122.0	-6.0		
Maximum	61.0	66.0	126.0	0.0		
Range	2.0	5.0	4.0	6.0		

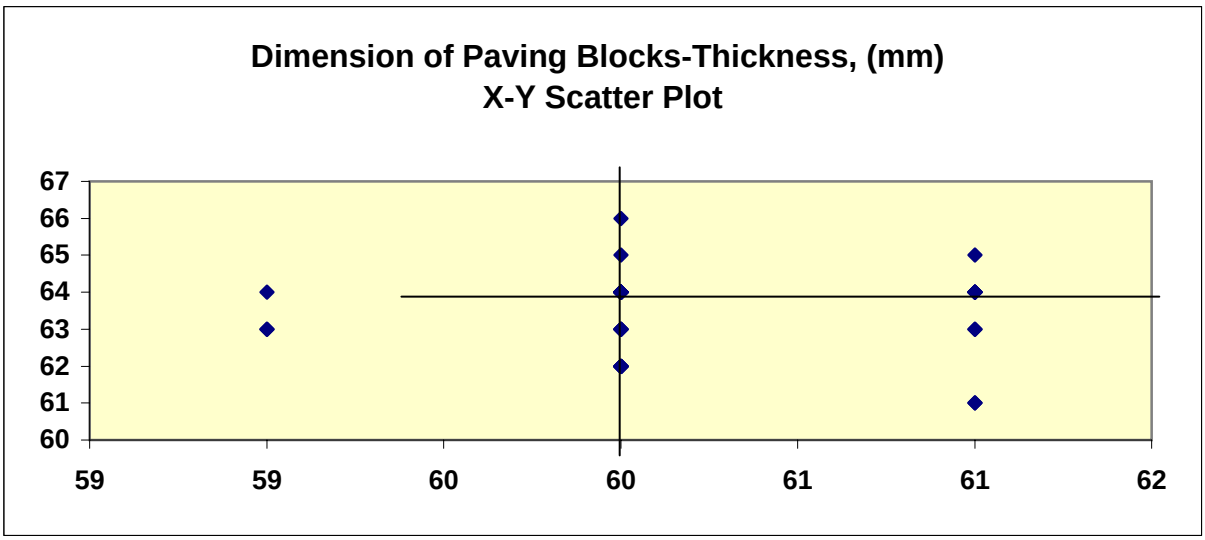

Compressive Strength of Paving Blocks,
(N/mm2) Between Lab. Z-Score
12.000
8.000
4.000
0.000
-4.000
-8.000
-12.000
-16.000
-20.000
-24.000
Lab 20-1
Lab 20-2
Lab 21-1
Lab 16-2
Lab4-1
Lab3-1
Lab4-2
Lab11-1
Lab3-2
Lab6-1
Lab6-2
Lab7-1
Lab 13-1
Lab 17-1
Lab 19-2
Lab 21-1
Lab10-1
Lab10-2
Lab12-2
Lab2-2
Lab5-1
Lab8-1
Lab8-2
Lab 13-2
Lab11-2
Lab12-1
Lab5-2
Lab7-2
Lab9-1
Lab9-2
Lab 19-1
Lab 16-1
Lab 15-2
Lab1-1
Lab 15-1
Lab 17-2
Lab2-1
Lab1-2
Lab 14-1
Lab 14-2
Lab 18-1
Lab 18-2


Compressive Strength of Paving Blocks,
(N/mm2) Within Lab. Z-Score
4.000
2.000
0.000
-2.000
-4.000
-6.000
-8.000
-10.000
Lab 20-1
Lab 20-2
Lab 21-1
Lab 14-2
Lab2-2
Lab5-1
Lab 17-1
Lab4-2
Lab5-2
Lab 18-1
Lab2-1
Lab 21-1
Lab11-2
Lab7-2
Lab9-1
Lab 15-2
Lab 19-1
Lab4-1
Lab6-1
Lab7-1
Lab 13-1
Lab 13-2
Lab 14-1
Lab 16-2
Lab 19-2
Lab10-2
Lab12-1
Lab12-2
Lab9-2
Lab 17-2
Lab1-1
Lab11-1
Lab1-2
Lab6-2
Lab 16-1
Lab10-1
Lab 15-1
Lab 18-2
Lab3-1
Lab3-2
Lab8-1
Lab8-2


Compressive Strength of Paving Blocks,
(N/mm2) X-Y Scatter Plot
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90


Dimension of Paving Blocks-Thickness, (mm)
Between Lab. Z-Score
1.5000
1.0000
0.5000
0.0000
-0.5000
-1.0000
-1.5000
Lab10-2
Lab12-1
Lab12-2
Lab14-1
Lab19-1
Lab19-2
Lab4-1
Lab4-2
Lab8-1
Lab8-2
Lab9-1
Lab10-1
Lab15-2
Lab17-1
Lab17-2
Lab21-2
Lab1-1
Lab11-1
Lab11-2
Lab1-2
Lab13-1
Lab13-2
Lab15-1
Lab2-1
Lab21-1
Lab2-2
Lab3-1
Lab3-2
Lab6-1
Lab9-2
Lab14-2
Lab18-1
Lab5-2
Lab6-2
Lab7-1
Lab7-2
Lab18-2
Lab5-1


Dimension of Paving Blocks-Thickness, (mm)
Within Lab Z-Score
5.0000
4.0000
3.0000
2.0000
1.0000
0.0000
-1.0000
-2.0000
Lab10-1
Lab18-1
Lab1-1
Lab11-1
Lab11-2
Lab1-2
Lab13-1
Lab13-2
Lab14-1
Lab2-1
Lab21-1
Lab2-2
Lab3-1
Lab3-2
Lab5-1
Lab6-1
Lab9-1
Lab14-2
Lab15-2
Lab17-1
Lab17-2
Lab21-2
Lab5-2
Lab6-2
Lab7-1
Lab7-2
Lab18-2
Lab10-2
Lab12-1
Lab12-2
Lab15-1
Lab19-1
Lab19-2
Lab8-1
Lab8-2
Lab9-2
Lab4-1
Lab4-2


Dimension of Paving Blocks-Thickness, (mm)
X-Y Scatter Plot
67
66
65
64
63
62
61
60
59
59
60
60
61
61
62