



REFERENCE SAMPLE PROGRAM

R-VALUE OF UNTREATED SOILS

2008 PROFICIENCY TEST RESULTS

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REFERENCE SAMPLE PROGRAM R-VALUE OF UNTREATED SOILS 2008 PROFICIENCY TEST RESULTS

1.0 OVERVIEW

The R-value of untreated soils proficiency tests started in January 2009. Eighty two (82) laboratories participated in an initial test. Test results were received between February and June and analyzed in accordance with Caltrans Independent Assurance Program Manual. For laboratories failed to achieve an acceptable score in the initial test, an additional sample was sent to the laboratories for a retest. This report presents test results from both the initial test and the retest.

2.0 ANALYSIS OF TEST RESULTS

2.1 EVALUATION CRITERIA

Test results were analyzed using a statistical evaluation system in which the means (X) and standard deviation (s) were calculated for each test parameter. A rating score was then given to the test result based on the criteria shown in Table 1. A test result with a score of 3 or greater was considered acceptable. A test result with a score of 2 or less was considered unacceptable and a retest was required.

Table 1: Evaluation Criteria

| Test Result | Rating | Interpretation of Results | Acceptance |
|--------------------|---------------|----------------------------------|-------------------|
| X ± 1.0s | 5 | Very Good | Acceptable |
| X ± 1.5s | 4 | Good | |
| X ± 2.0s | 3 | Fair | |
| X ± 2.5s | 2 | Poor | Unacceptable |
| X ± 3.0s | 1 | Very Poor | |

2.2 INITIAL TEST

A total of 82 laboratories participated in the initial test comprised of 58 public sector laboratories and 24 from the private sector. An analysis of outlying data, conducted by following ASTM E 178, indicated that the test result from one laboratory (Lab ID 80) was a possible outlier.

After removing the outlier, the mean value and standard deviation were re-calculated for determining the score for each participating laboratory. The analysis results are presented in Table 2. Detailed test results are provided in Appendix A.

Table 2: Summary of Initial Test Results

| Sector | # Lab | Average | Standard Deviation | Number of Labs Achieved Score of | | | | |
|------------|-------|---------|--------------------|----------------------------------|----|----|---|---|
| | | | | 5 | 4 | 3 | 2 | 1 |
| Private | 58* | 29.8 | 9.9 | 41 | 9 | 4 | 3 | 0 |
| % of Total | | | | 72 | 16 | 7 | 5 | 0 |
| Public | 24 | 31.3 | 11.6 | 14 | 5 | 4 | 1 | 0 |
| % of Total | | | | 58 | 21 | 17 | 4 | 0 |
| Combined | 82* | 30.2 | 10.4 | 55 | 14 | 8 | 4 | 0 |
| % of Total | | | | 68 | 17 | 10 | 5 | 0 |

* Test result from Lab 80 is considered as an outlier and it is not included in the summary.

Simple statistical analyses, F test on variance and t-test on means, suggest that the test results between the private and the public laboratories are statistically the same at a significance level of 5 percent.

2.3 RETEST

Two laboratories (Lab ID 80 and 144) that did not receive an acceptable score in the initial test submitted their test results from the retest. Lab 144 with an R-value of 17 received a satisfactory score and lab 80 with an R-value of 8 did not receive a satisfactory score.

2.4 OBSERVATIONS

A number of observations were made during the review of the test results. Laboratories:

- did not report results with required units or mixed use of units;
- did not report exudation pressure;
- did not report R-value by Stabilometer;
- did not report horizontal pressure (Stabilometer Ph) @8900 N;
- only reported 2 test results, should report 3 test results;
- reported R-value by Stabilometer but did not report final R-value at 2.07 MPa (300 psi) exudation pressure;
- reported R-value by Stabilometer as the final R-value; and
- reported R-value that could not be verified using the laboratory provided data.

Inconsistencies in the test data from various laboratories required a significant effort to evaluate the test results. A reasonable assessment was made to interpret the test data provided by each laboratory; in some cases, testing labs were contacted for additional information or clarification.

3.0 SUMMARY

Overall, 78 out of 82 laboratories (95%) received an acceptable score.

4.0 REFERENCES

ASTM, “Standard Practice for Dealing with Outlying Observations,” Designation E 178 – 80.

Caltrans, “Independent Assurance Manual,” Sacramento, July 2005.

APPENDIX – A

Test Results from Initial Test

| Private Laboratory | | | | | | Public Laboratory | | |
|--------------------|---------|-------------|---------|---------|-------------|-------------------|---------|-------------|
| Lab No. | R-Value | Final Score | Lab No. | R-Value | Final Score | Lab No. | R-Value | Final Score |
| 23 | 52 | 2 | 153 | 28 | 5 | 77 | 22 | 5 |
| 31 | 28 | 5 | 161 | 54 | 2 | 158 | 34 | 5 |
| 32 | 30 | 5 | 163 | 23 | 5 | 16 | 11 | 3 |
| 42 | 19 | 4 | 177 | 36 | 5 | 21 | 24 | 5 |
| 43 | 48 | 3 | 206 | 27 | 5 | 24 | 29 | 5 |
| 49 | 20 | 5 | 207 | 47.6 | 3 | 310 | 19 | 4 |
| 59 | 26 | 5 | 210 | 38 | 5 | 20 | 12 | 3 |
| 63 | 44 | 4 | 212 | 22 | 5 | 131 | 48 | 3 |
| 66 | 21 | 5 | 216 | 29 | 5 | 17 | 15 | 4 |
| 70 | 32 | 5 | 223 | 49 | 3 | 46 | 29 | 5 |
| 71 | 25 | 5 | 234 | 18 | 4 | 354 | 35 | 5 |
| 73 | 21 | 5 | 244 | 33 | 5 | 64 | 39 | 5 |
| 75 | 18 | 4 | 248 | 25 | 5 | 149 | 52 | 2 |
| 79 | 26 | 5 | 255 | 32 | 5 | 15 | 26 | 5 |
| 80 ¹ | 4 | O | 263 | 31 | 5 | 1 | 42 | 4 |
| 88 | 27 | 5 | 272 | 25 | 5 | 2 | 25 | 5 |
| 90 | 13 | 3 | 274 | 18 | 4 | 3 | 48 | 3 |
| 91 | 38 | 5 | 303 | 23 | 5 | 4 | 41 | 4 |
| 94 | 26 | 5 | 311 | 25 | 5 | 5 | 36 | 5 |
| 96 | 25 | 5 | 316 | 15 | 4 | 6 | 20 | 5 |
| 102 | 35 | 5 | 322 | 36 | 5 | 8 | 43 | 4 |
| 104 | 28 | 5 | 356 | 29 | 5 | 9 | 26 | 5 |
| 106 | 23 | 5 | 383 | 34 | 5 | 10 | 40 | 5 |
| 112 | 25 | 5 | 393 | 36 | 5 | 11 | 34 | 5 |
| 128 | 31 | 5 | 394 | 30 | 5 | | | |
| 131 | 16.6 | 4 | 447 | 38 | 5 | | | |
| 143 | 24 | 5 | 451 | 25 | 5 | | | |
| 144 ² | 54 | 2 | 581 | 18 | 4 | | | |
| 145 | 34 | 5 | 582 | 42 | 4 | | | |

O = Outlier

¹ Lab 80, with an R-value of 8 from the retest, received a score 2.

² Lab 144, with an R-value of 17 from the retest, received a score 4.