



TECHNICAL REPORT ON
CLAY INDEX TEST PROFICIENCY 2015

CETANZ Technical Report	TR 7
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Associated Test Method(s)	NZS4407:1991 Test 3.5

CLAY INDEX TEST PROFICIENCY 2013

1. Introduction

In 2013, CETANZ organised and ran an inter-laboratory proficiency scheme on the Clay Index test, designed to achieve the following outcomes:

1. Provide results that should enable participants to improve their performance.
2. Provide information relevant for calculation of uncertainty.
3. Identify problems with, or between, laboratories.
4. Potentially identify needs for test method improvement.

The following Laboratories participated in the scheme:

Perry Resources (2008) Ltd
OPUS International Consultants - Tauranga
Fulton Hogan Laboratory - Waikato
Stevenson Laboratory Ltd
OPUS International Consultants - Whangarei
Civil Engineering Laboratory Services Ltd
Fulton Hogan Laboratory - Nelson
Higgins - Palmerston North
OPUS International Consultants - Auckland
OPUS International Consultants - Hamilton
Fulton Hogan Laboratory - Dunedin
Fulton Hogan Laboratory - Auckland
Holcim Bombay Laboratory
Downer - Auckland
OPUS International Consultants - New Plymouth
Winstone Aggregate Ltd - Auckland Laboratory
Coffey Information - East Tamaki
Materials Advisory & Testing Services Ltd
Envirolab Geotest Ltd
Central Testing Services - Alexandra
OPUS International Consultants - Wanganui
OPUS International Consultants - Napier
Winstone Aggregate Ltd - Waikato Laboratory
OPUS International Consultants - Dunedin
Fulton Hogan Laboratory - Canterbury
Downer - Christchurch
Northland Soils Mechanics and Testing Laboratory Ltd

To ensure anonymity of results each laboratory was assigned a unique identifier by Keith Towl of IANZ.

2. Sample Preparation & Instruction

Three aggregates from different quarries were selected representing three different Clay Index levels. Each aggregate was sampled using standard random representative sampling techniques from well-mixed stockpiles to ensure homogeneity. Each bulk sample was separated into smaller test portions.

Each Laboratory was sent three different <6.7mm aggregate test samples of approximately 1kg each, enough for a technician to complete two Clay Index tests for each aggregate sample provided.

The samples supplied were labelled Sample 1, Sample 2 and Sample 3:

Laboratories were instructed to split each sample into two, air dry and carry out further preparation and testing in duplicate following NZS 4407:1991: test method 3.5. Results were to be labelled SPL 1A, SPL 1B, SPL 2A, SPL 2B etc.

3. Results

Lab ID	Balance	Water	Age of Chemicals days			Methylene Blue Type & Brand	Material 1		Material 2		Material 3	
			Hydrogen Peroxide	Sulphuric Acid	Methylene Blue		SPL1A	SPL1B	SPL2A	SPL2B	SPL3A	SPL3B
1	0.001g	Distilled	Not Given	Not Given	7	Gurr Certistan	2.250	2.075	0.800	0.825	6.850	6.975
2	0.001g	Distilled	Not Given	Not Given	7	Unilab CI 52015	2.925	2.875	1.125	1.200	7.600	7.625
3	0.001g	Distilled	Not Given	Not Given	0	Lab Serve	2.650	2.650	1.100	1.100	6.300	6.300
4	0.01g	Distilled	Not Given	Not Given	15	CI 52015	2.675	2.650	0.950	1.025	6.800	7.575
5	0.001g	Distilled	Not Given	Not Given	0	Merck	2.850	2.825	0.675	0.750	7.350	7.425
6	No Results Submitted											
7	0.001g	Deionised	Not Given	Not Given	5	Merck ART 645	2.800	2.825	0.900	0.925	6.750	6.675
8	0.01g	Distilled	Not Given	Not Given	13	Fisher Reagent Grade	2.475	2.550	1.025	1.050	6.100	6.050
9	0.001g	Deionised	Not Given	Not Given	86	BDH Curr Certistain	2.450	3.100	0.925	0.900	7.800	8.825
10	0.001g	Distilled	350	835	1	BDH Curr Certistain	2.945	3.025	1.070	1.330	7.495	8.025
11	0.001g	Distilled	Not Given	Not Given	0	Merck Microscopy C152015	3.400	3.400	1.350	1.350	9.400	9.400
12	No Results Submitted											
13	0.0001g	Deionised	Not Given	Not Given	20	Unilab CI 52015	2.850	2.775	0.750	0.875	6.600	6.900
14	0.001g	Tap	Not Given	Not Given	14	Merck Microscopy C152015	2.100	2.225	0.800	0.775	6.175	6.225
15	0.0001g	Distilled	Not Given	Not Given	0	Merck Microscopy C152015	2.850	2.950	0.800	0.875	8.500	8.400
16	0.001g	Distilled	Not Given	Not Given	3	Merck ART 645	2.650	2.675	2.600	2.750	7.950	8.100
17	0.0001g	Deionised	Not Given	Not Given	58	BDH Curr Certistain	2.725	2.825	1.025	0.975	8.050	8.125
18	0.001g	Distilled	Not Given	Not Given	127	BDH Curr Certistain	3.000	3.050	1.275	1.225	7.750	7.800
19	0.001g	Deionised	68	68	68	Merck CI 52015	2.350	2.400	0.800	0.950	7.975	7.825
20	0.001g	Distilled	Not Given	Not Given	3	Merck	2.688	2.650	1.038	1.025	6.975	7.150
21	0.001g	Distilled	Not Given	Not Given	18	Merck Microscopy	3.150	2.900	0.975	0.950	7.200	7.300
22	0.01g	Distilled	60	60	70	Gurr Certistan Microscopy	2.350	2.475	1.050	1.050	6.875	6.100
23	0.001g	Distilled	18	Not Given	116	Fisher Scientific Liquid	2.325	2.825	1.000	1.000	5.825	5.875
22A	0.01g	Distilled	Not Given	Not Given	90	Not Given	2.900	2.800	2.150	2.750	8.650	8.150
25	0.01g	Distilled	Not Given	Not Given	8	Merck ART 64045	3.075	3.050	1.400	1.350	10.450	10.575
26	0.01g	Distilled	Not Given	Not Given	7	Microscopy CI 52015	2.400	2.400	0.900	0.900	6.650	6.525
27	0.001g	Distilled	Not Given	Not Given	3	Unknown	2.850	2.700	1.000	0.863	8.188	8.400

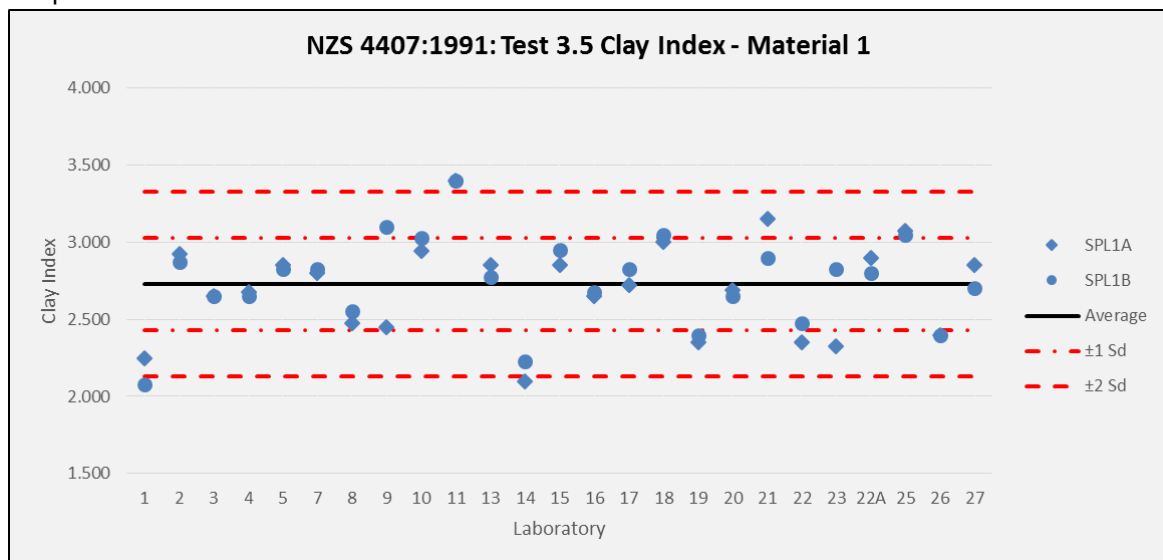
4. Analysis

For the purpose of analysis, all results, including the possible outliers, have been tabulated. Each participant will need to undertake their own analysis on the data provide to gauge their own performance.

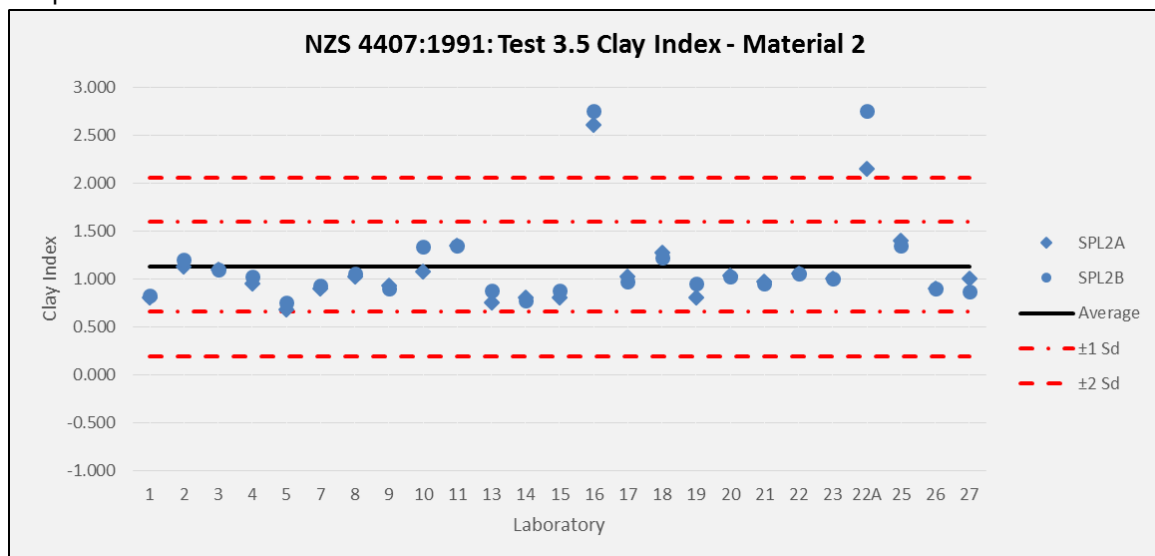
The graphs provided, only display result plots versus simple Average, ± 1 Standard Deviation and ± 2 Standard Deviation limits.

Laboratories 6 and 12 did not return results, however one result return form was labelled "22A" and is likely from one of these two laboratories.

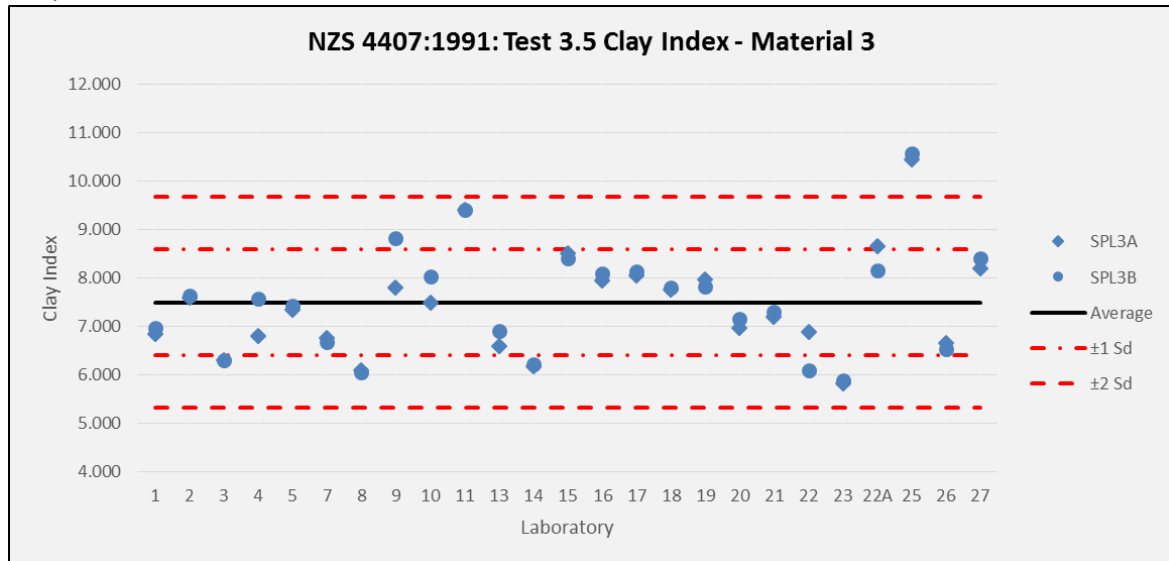
Graph 1



Graph 2



Graph 3



5. Conclusions

The results seem to indicate the possibility of a relatively small amount of variation for all types of sample tested when compared to the respective average. More advanced analysis is required, but initial indications are that the variation or reproducibility could be as low as 20% of Clay Index. Given that current Clay Index Limits for premium basecourse are "3.0 Maximum", this data would seem to indicate that in some cases with borderline aggregates there is a likelihood that a small amount of laboratories would fail the sample compared to the majority.

6. Further action

Advise stakeholders of proficiency data and arrange for more in-depth analysis and publication of results.

7. Referenced Documents

NZS 4407:1991: Part 2 tests 3.5.

8. Disclaimer

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