CST CASE STUDY
Issue No.003

GEO LAFARGE: CASE STUDY

ConcTest Instrument Case Study: Using the ConcTest Instrument as an extra measure for Quality Control

Our Objective

CST Instruments were invited by Lafarge-Georgia's Quality Control Plant Manager, Zurab Bekurishvili, to the opening day of their new joint venture concrete plant.

At the event were representatives from the head office of Lafarge Ltd from France, representatives of Georgian government from the infrastructure development department, construction business professionals, building material company representatives and TV and press.

While in conversation with company management, we introduced CST Instrument's invention, the ConcTest, to rapidly test freshly mixed concrete for its compressive strength.

We suggested to set up a trial test series with the ConcTest instrument as an extra measure for quality control of concrete, to demonstrate the benefits of our instrument to the construction industry. The management and French side of owners agreed with enthusiasm and interest.

At the trial test series, we explained our goals and objectives to the company's laboratory professionals and gave them a practical demonstration of how to use the ConcTest instrument.

Lafarge-Georgia used the ConcTest instrument independently of CST Instruments to produce their own test results to compare to EN 12390-1 standards. Lafarge-Georgia oversaw producing a log for test results and providing us data of comparison with standard test results.

LAFARGE GCC GEORGIAN CONCRETE COMPANY

Lafarge-Georgia Beton Company ran a series of comparison tests between the ConcTest instrument (accelerated testing method of freshly mixed concrete) and standard EN 12390-1 cube tests, providing us with valuable user insights.

Our Outcome

The test series provided us with excellent feedback and a confirmation to Lafarge-Georgia that our instrument provides great value in being an early warning indicator for concrete compressive strength.

Table 1 shows the first independent test trial results from Lafarge-Georgia, and Table 2 shows test results carried out 4 months later by the same laboratory professionals. It is key to note that between these two test results, Lafarge-Georgia's laboratory professionals became more proficient with the instrument.

Table 1. First Independent Test Trial Results

Test N	Concr. Class	R Cem	Slump Test	q. Plast. Impact	T Curing time	Q. Cem. Content	W Water Content	R Concr. Expect.	Rconc ConcTest	Rconc BS EN	Tolerance %
20	C30/C37	53	20	0.2	28	326.43	188.35	32.7	37.55	35.71	5.152618314
23	C25/C30	53	20	0.2	28	320	187.84	29.4	36.54	35	4.4
25	C30/C37	53	20	0.2	28	350.77	191.55	32.7	41.02	41.4	0.917874396
30	C30/C37	59.3	20	0.2	28	338.46	188.07	32.7	46.6	45.6	2.192982456
32	C30/C37	58	20	0.2	28	338.58	189.32	32.7	45.13	43	4.953488372
35	C30/C37	58	18	0.2	28	338.46	194.63	32.7	43.21	45.35	4.718853363
38	C30/C37	36.8	16	0.2	28	489.11	201.57	32.7	43.43	40.26	7.873820169
40	C30/C37	58	20	0.2	28	323.53	196.42	32.7	39.62	43.6	9.128440367

Average Tolerance % (28 Days):
4.91725968

Table 2. Second Independent Test Trial Results

Test N	Concr. Class	R Cem	Slump Test	q. Plast. Impact	T Curing time	Q. Cem. Content	W Water Content	R Concr. Expect.	Rconc ConcTest	Rconc BS EN	Tolerance %
1	C30/37	40	20	0.2	28	387.27	195.73	32.7	36.21	36.8	1.60326087
12	C30/37	40	20	0.2	28	380	197.7	32.7	34.72	33.3	4.264264264
18	C30/37	40	20	0.2	28	363.33	196.37	32.7	33.2	32.79	1.250381214
21	C30/37	38	20	0.2	28	376.67	191.13	32.7	34.21	32	6.90625
26	C30/37	45.9	20	0.2	28	391.3	189.47	32.7	36.55	34.5	5.942028986
63	C35/45	37	16	0.2	28	428	188.86	39.3	40.24	36.8	9.347826087
70	C30/37	37	16	0.2	28	431.25	189.12	32.7	40.56	40.5	0.148148148
72	C30/37	50.5	18	0.2	28	343.75	188.7	32.7	40.43	40.1	0.822942643

Average Tolerance % (28 Days):
3.785637776

From comparing Tables 1 and 2, we can see a clear improvement in the Average Tolerance % from 4.9% down to 3.8% in comparison to the EN 12390-3 tests (an overall improvement of over 1 percentage point).

These results are not only all highly satisfactory but also demonstrates a clear improvement over a short time period.

Our Development

This improvement in tolerance percentage has revealed two things:

1) As the user becomes more familiar with operating the instrument, tests can be performed much more confidently and comfortably, therefore reducing human error and the tolerance %.
2) As more tests are performed, more data is gathered about the real characteristics of the concrete aggregates being tested. Therefore, if the concrete composition remains unchanged, the test results will improve, and tolerance % will also reduce.

The data we have gathered from this case study has allowed our Research and Development team to adjust the instrument's algorithms and alter how the user inputs data to make the instrument easier to use.

For more information contact us or visit our website!

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