

TRABZON: CASE STUDY

ConcTest Instrument Case Study: Kaya Mühendislik Laboratories



2017 CASE STUDY

Kaya Mühendislik
Machining manufacturer
Kaya Laboratory, Turkey
kayamuhendis.com

Our Objective

To test and verify the accuracy of our instrument's testing capabilities against BS EN 12390-3 standards, Turhan Sivrikaya of Kaya Mühendislik kindly arranged for us, their laboratory technical staff and invited independent material testing professionals from other Turkish regions to meet at their laboratory.

Kaya Mühendislik is a well-respected material testing laboratory with over 30 years of experience within the industry, located in Trabzon, North Turkey.

To determine the compressive strength of freshly mixed concrete with the ConcTest, the instrument requires 24g of concrete sample filtered through a 10mm sieve to be measured for conductivity in 500ml of deionised water solution.

Kaya Mühendislik cast three 150 mm edge cubes from concretes made from each of three separate trial mix designs. At the time of casting, slump tests and wet density tests were also performed.

To measure the capabilities and potential of our instrument, we conducted tests with the ConcTest of concrete compressive strength for 28 days, and also for 2, 3 and 7 days (our

2, 3 and 7 day testing methods are currently being developed for acceptable accuracy).

To demonstrate the instrument's range of testing capabilities, our tests were completed using CEM I- 52.5, CEM I-42.5 and CEM II-42.5 cements to produce trial mixes of common types of heavy concrete (C20, C25 and C30).

Laboratory testing of the concrete samples under BS EN 12390-3 standards were completed using 15cm cubes cured for comparison. We tested the same fresh mixed concrete used in the cubes with our ConcTest, and we performed these tests with the laboratory professionals and technical staff in attendance and asked for their participation.

By testing freshly mixed concrete with our ConcTest instrument for compressive strength to compare with BS EN 12390-3 standards, Kaya Mühendislik Laboratories was able to verify the accuracy of the instrument with suitable results.

Our Outcome

For the 2, 3 and 7 day compressive strength predictions using the ConcTest instrument, we received good feedback which is now being applied to revise the algorithms to enhance the early predictive abilities of our instrument (Shown in Table 1). However, the results for the 28 day predictions were exceptional, with every test performed falling within our current required tolerance of BS EN 12390-3 standards, having an average tolerance of less than 2% (Shown in Table 1).

Table 1. Collated Results

Test	Concr. Class	Rcem	Slump test	q Plast. impact	T Curing time	Q Cem. content	W Water content	Rconc.	Rconc. BS EN	Tolerance Term
2	C20	55	17	0.16	28	354.76	188.13	44.49	45	1.133333333
3		55	17	0.16	28	354.76	190.85	42.38	45	5.822222222
4	C25	55	16	0.2	28	336.53	178.75	46.29	46	0.630434783
5		55	16	0.2	7	336.53	178.75	25.11	36	30.25
6		55	16	0.2	3	336.53	178.75	13.9		
7	C30	55	23	0.2	28	370.06	191.14	48.24	49	1.551020408
8		55	23	0.22	28	370.06	186.36	50.05	49	2.142857143
9		55	23	0.19	7	370.06	193.53	25.7	37	30.54054054
15	C30	55.7	18	0.22	28	330.95	181.52	47.63	Error	
16		55.7	18	0.19	28	330.95	188.5	44.93	45	0.155555556
17		55.7	18	0.19	7	330.95	188.5	24.37	35	30.37142857

Average % Tolerance for 28 Days:

1.905903907

These results have not only enabled us to develop our instrument and testing capabilities to be more accurate, but also verifies our instrument to be within our specified tolerance and accuracy.

This has been verified by Turhan Sivrikaya of Kaya Mühendislik, who confirmed: "Test procedure is easy, quick, time and cost effective and so far, we are satisfied with its performance on 28 day results, testing samples from various sources.

However, it will need further trials and research data for early age (2, 3, 7 days strength) the ConcTest can and will obtain required ability to assist the industry."



KAYA MÜHENDİSLİK

Soil and Construction Materials Testing Laboratory

Our Development

Following these results, we have updated our instrument for the early stage testing algorithm to increase the accuracy of results. We look forward to soon publishing results which will show the improvement of our instrument on testing concrete strength earlier in the key stages of the setting process.



For more information on this case study and our instruments [contact us](#) or find more on our website!



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