



NON-DESTRUCTIVE CONCRETE TESTS

Ultrasonic pulse velocity test – Measurement Report

Type of construction _____

Date _____

Name of element _____

Probe type _____

Age of concrete _____

Relative humidity of concrete _____

Position	Length of wave	Travel time	Velocity of wave propagation	$V_i - \bar{V}$	$(V_i - \bar{V})^2$	Comment
	L mm	T μs	$V_i = \frac{L}{T}$ km/s			
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Arithmetic mean $\bar{V} =$

Standard deviation $s_V =$

Coefficient of variation $v_V =$

Mean compressive strength of concrete $f_{cm} =$ *MPa*

Final compressive strength of concrete $f'_{cm} =$ *MPa*



Arithmetic mean \bar{V}

$$\bar{V} = \frac{\sum_{i=1}^n V_i}{n}$$

Standard deviation s_V

$$s_V = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (V_i - \bar{V})^2}$$

Coefficient of variation v_V

$$v_V = \frac{s_V}{\bar{V}}$$

Regression analysis – according to The Building Research
Institute (ITB) instruction N^o 209

$$f_{cm} = \bar{V} \times 1,08 \times \left[2,75 \times \bar{V} \times (v_V^2 + 1) - 8,12 + \frac{4,83}{\bar{V}} \right]$$

Correction coefficient C

$$C = C_1 \times C_2 \times C_3 \times C_4 \times C_5 \times C_6 \times C_7$$

Final compressive strength of concrete f'_{cm}

$$f'_{cm} = f_{cm} \times C$$

CORRECTION COEFFICIENT

i			C_i
1	Water/cement ratio	1,0	0,88
		2,0	1,00
		3,0	1,21
2	Aggregate content by volume (in percentage)	60	1,20
		70	1,00
		80	0,81
3	Aggregate quality	good	0,84
		mediocre	1,00
		bad	1,22
4	Location of grain size distribution curve in the field of “good distribution” according to PN-88/B-06250	up	1,10
		middle	1,00
		down	0,92
5	Cement	32,5	1,00
		42,5	1,04
6	Age (days)	7	0,91
		14-20	1,00
		28	1,06
		90	1,13
		>360	1,19
7	Relative humidity	dry	1,10
		air-dry	1,00
		full water	0,90