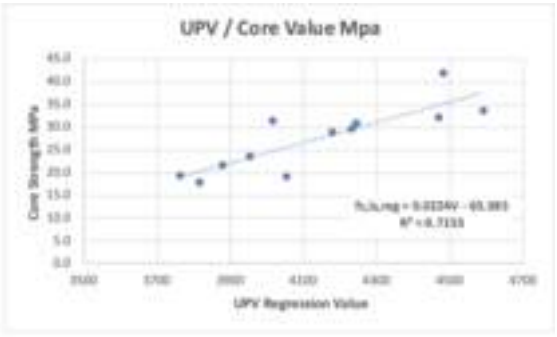
Estimation de la résistance à la compression du béton par la méthode SONREB

Test Location	Rebound value	Core Value Mpa	Regression value $f_{c,i,reg}$
TL 1	38.9	29.6	32.8
TL 5	33.6	23.7	23.8
TL 6	36.5	32.1	28.7
TL 7	34.4	29	25.2
TL 12	38.8	31.5	32.6
TL 13	38.3	31	31.7
TL 16	37.7	33.7	30.7
TL 22	31.4	18	20.1
TL 34	43.8	42	41.0
TL 36	31.3	21.7	19.9
TL 42	34.1	19.4	24.7
TL 43	30.9	19.1	19.3

86% **Coefficient of determination**

Coefficient data from the rebound hammer alone

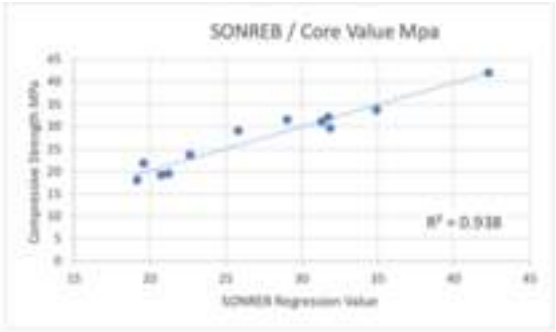
Test Location	UPV	Core Value Mpa	Regression value $f_{c,i,reg}$
TL 1	4231	29.6	29.4
TL 5	3955	23.7	23.2
TL 6	4470	32.1	34.7
TL 7	4180	29	28.2
TL 12	4016	31.5	24.6
TL 13	4246	31	29.7
TL 16	4591	33.7	37.5
TL 22	3817	18	20.1
TL 34	4482	42	35.0
TL 36	3880	21.7	21.5
TL 42	3762	19.4	18.9
TL 43	4055	19.1	25.4



72% **Coefficient of determination**

Coefficient data from UPV alone

Test Location	UPV Value	Rebound value	Regression value fc_is_reg	Core Value Mpa
TL 1	4131	38.9	31.866053889	29.6
TL 5	3955	33.6	22.61017706	23.7
TL 6	4470	36.1	31.73061728	32.1
TL 7	4180	34.4	25.79139461	29
TL 12	4016	38.8	29.01653111	31.3
TL 13	4246	38.3	31.20698765	31
TL 16	4091	37.7	34.93106233	33.7
TL 22	3617	31.4	19.13014605	18
TL 34	4482	43.8	42.29329808	42
TL 36	3880	31.3	19.59972166	21.7
TL 42	3762	34.1	21.2269598	19.4
TL 43	4055	30.9	20.72692844	19.1



94% **Coefficient of determination**

Coefficient data from the rebound hammer + UPV

Pulse velocity measurements recorded in a grid to see variations

S-wave Velocity	Corresponding P-wave Velocity	Concrete Quality Classification
> 2'800 m/s	> 4'500 m/s	Excellent
2'100 – 2'800 m/s	3'500 – 4'500 m/s	Good
1'700 – 2'100 m/s	3'000 – 3'500 m/s	Medium
< 1'700 m/s	< 3'000 m/s	Doubtful

Simple concrete quality classification based on pulse velocity

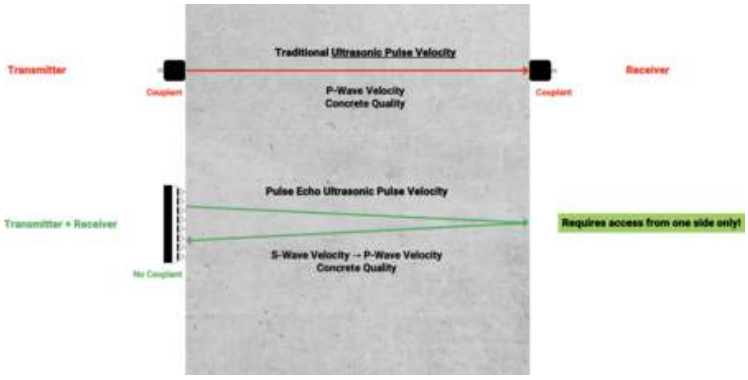

Traditional Ultrasonic Pulse Velocity
Transmitter
Couplant
P-Wave Velocity
Concrete Quality
Couplant
Receiver
Pulse Echo Ultrasonic Pulse Velocity
Transmitter + Receiver
Requires access from one side only!
S-Wave Velocity → P-Wave Velocity
Concrete Quality
No Couplant

TABLE 1: Raw Data for the Sonreb Method

	Compressive Strength fck (MPa or PSI)	Pundit 200 /Lab+ Ultrasonic Pulse Velocity (V) (m/s or ft/s)	Silver-/Original Schmidt Rebound-Values (S)
Sample 1	29.6	4231	38.9
Sample 2	23.7	3955	33.6
Sample 3	32.1	4470	36.5
Sample 4	29	4180	34.4
Sample 5	31.5	4016	38.8
Sample 6	31	4246	38.3
Sample 7	33.7	4591	37.7
Sample 8	18	3817	31.4
Sample 9	42	4482	43.8
Sample 10	21.7	3880	31.3
Sample 11	19.4	3762	34.1
Sample 12	19.1	4055	30.9
Sample 13			
Sample 14			
Sample 15			
Sample 16			
Sample 17			
Sample 18			
Sample 19			
Sample 20			

Constant a	6.33034E-08
Constant b	1.719667885
Constant c	1.550755756
R-Square Value	0.92545377

Step 1: Select up to twenty (20) test points from different areas that you want to include in the Sonreb calculation. (minimum of five (5) test points required, may also be used on standard cubes or cylinders)

Step 2: Obtain pulse velocities and rebound values at these points

Step 3: Extract concrete core samples from the selected test areas. The concrete cores should not have any reinforcing bars within the core.

Step 4: Perform compressive strength test method on the cores under similar field conditions.

Step 5: Input the obtained Compressive Strength, Pundit Lab Ultrasonic Pulse Velocities and the rebound values into Table 1. Input at least five rows of data.

Step 6: Once the input data is complete, press control - q (CTRL-q) to obtain constants a, b, c and the R-Square value.

Step 7: Once you have the constants, you can create the correlation curve using the Proceq Link software and download it to your Pundit 200 or Pundit Lab+. Alternatively use Sheet "Obtain Comp. Strength", where you have to manually input the pulse velocity reading (V) and the reading from the SilverSchmidt (Q) (or Original Schmidt - R Value) to obtain the compressive strength at that test point.