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Carbon uptake can be measured and estimated

Numerical models exist since 1960s for carbon uptake estimation

Numerical modeling based on Fick's first law of diffusion:

$$D_{c} = k\sqrt{t}$$
Equation $\frac{k}{d = At^{n}}$

$$d = At^{n}$$

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$$d = carbonation depth$$

$$t = time in years$$

$$A = 1.0 \text{ for external exposure}$$

$$B = 0.07 \text{ to } 1.0 \text{ depending on surface finish}$$

$$C = R(wc - 0.25)/(0.3(1.15 + 3wc))^{1/2}$$
for vater cement ratio (wc) ≥ 0.6

$$C = 0.37R(4.6wc - 1.7) \text{ for wc} < 0.6$$

$$R = coefficient of neutralization, a function of mix design and additives$$

$$d = 0.43(wc - 0.4)(\sqrt{2}(t - 1))^{0.5} + 0.1$$

$$d = 0.43(wc - 0.3)(21)^{0.5} + 0.1$$

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$$d = 0.53(wc - 0.3)(\sqrt{2$$

















































