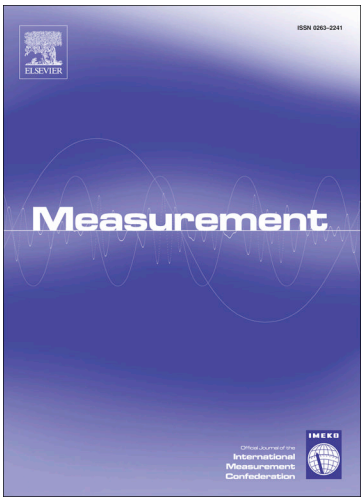

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An Empirical Model Design for Evaluation and Estimation of carbonation depth in concrete

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Abstract:
Carbonation is one of the major factors that reduce the durability performances of reinforced concrete (RC) structures. Carbonation contributes in lowering the pH (less than 12) of concrete which is susceptible for the steel in concrete. Lower pH value may break the protective film also known as passive film of steel and accelerate the corrosion process. Although many studies have been performed on carbonation and focused mainly on the mechanisms, sources, and features which promote concrete carbonation. However, as a critical factor influencing the rate of carbonation, concrete mix compositions which come into play during concrete fabrication have not been properly researched or modelled. In this paper, an empirical model was designed using an automated neural network search (ANS) to investigate the effect of concrete mix compositions, weathering effect and exposure time on carbonation depth in concrete. Experimental validation illustrates the reasonable accuracy and robustness of the ANS model. It was found that carbonation process can be controlled by choosing the right composition of concrete mix.

Keywords: Carbonation; Concrete; Corrosion; Durability and Automated Neural Network Search (ANS)

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