Abstract

Two artificial neural networks (ANN) models are developed to predict the evolution of group velocity and peak to peak amplitude of an ultrasonic wave propagate in mortar, also we these models use it to know the acoustic impedance during hydration of mortar specimen. The useful data bases to train and to test the performances of the models are collected from the experiences done on the mortar dough.

In this study, the temperature, the mass reports of cement on sand, water on cement and the time of the manipulation, are retained like relevant entries of our models. Several network configurations are evaluated. For the two architectures of models, the optimal model selected is an ANN with only one hidden layer. These models are able to predict respectively group velocity, acoustic impedance and peak to peak amplitude evolution with the means relative errors (MRE) of 0.29% and 0.35% and 4%.

References

**Index Terms**

Computer Science:

Artificial Intelligence:

**Keywords**

Group velocity; Acoustic impedance; Peak to peak amplitude; Neural network; Back-propagation algorithm