

عنوان مقاله:

Multivariate Adaptive Regression Splines for Compressive Strength of Self-Compacting Concrete Modeling and Prediction

محل انتشار:

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خلاصه مقاله:

Concrete is one of the most important materials in construction. In recent years, researchers have conducted various investigations on different types of concretes [1]. Introduction of self-compacting concrete has brought huge technological advances. Use of SCC facilitated the concrete placing between the rebars, without need of external vibration, and just through the weight of concrete itself. Utilizing self-compacting concrete results in reducing construction time and cost in addition to reducing the noise in construction sites [2]. Concrete workability is an important factor for proper execution, which after widespread application of reinforcing bars in concrete in the beginning of the 20th century and necessity of utilizing high workability concrete, it was maintained for a long time by addition of water to the cement. But in latter research it was found that use of high amounts of the water and cement would bring about negative results [3]. In selfcompacting concrete, super plasticizers and binder materials are important to achieve high workability and proper viscosity while eliminating the separation, and some solutions for optimal mix design of concrete like reducing the aggregate to cement materials ratio, increase in the amount of cement- paste with a certain water to cement ratio, and control of the largest coarse aggregate size have been proposed [4]. The volume of binder materials used in self-compacting concrete, in comparison to conventional concretes, is higher and this indicates the importance of utilizing proper type of the material and weight combination of these materials to provide higher durability and strength of concrete and also its corresponding effects like reduced generation of pollutant gases during cement production and participation in the sustainable development [5]. With respect to this issue that consumption of high amounts of cement and super plasticizers requires huge expenses, utilization some alternative supplementary cementitious materials (SCMs) like metakaolin as a replacement for Portland cement has been in consideration. The environmental concerns over extraction of raw materials and emission of CO₂ during cement production; urge us to reduce the amount of consumed cement by application of additives. Utilizing metakaolin increases the concrete strength and durability against chemical attacks, alkali silica reaction and freeze-thaw cycles. Metakaolin also is effective in some mechanical properties of concrete including ... compressive strength, early age and flexural strength [6-12]. The wide range of materials and

کلمات کلیدی:

