

بيانات عن بحث (3) مقدم للترقية

Predicting the Strength of Cement Mortars Containing Natural Pozzolan and Silica Fume Using Multivariate Regression Analysis

In this study, mortars containing locally available natural pozzolan (NP) in Almadinah Almunawara, Kingdom of Saudi Arabia, were investigated as a partial substitute for sand or cement in mortars and silica fume (SF). The benefit of using local NP powder as a replacement for cement is that it reduces the carbon dioxide emission during the cement manufacturing process, whereas the benefit of using local NP as fine aggregates is that it reduces the density of the produced mortars and improves its properties because of its pozzolanic effect. Because of these reasons, there is a need to develop an effective predictive model to estimate the compressive strength of mortars with partial replacement of cement or sand with NP and with SF as a replacement for cement at 28 days. Data of 68 cubic specimens of 50 mm were established through experimental work with other researchers, and they were chosen to create a database for the proposed model. There were three input parameters: a) level of partial substitution of cement with NP powder, b) level of partial substitution of sand with NP, and c) level of partial substitution of cement with SF. The output parameter was compressive strength. Best correlations were obtained between the compressive strength and sand replacement with NP. To predict the compressive strengths of cement mortars containing NP and SF, multivariate regression models were proposed and compared to find the best one. It was concluded that the full quadratic model was the best model with highest correlation when compared with other proposed models.