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Estimating the Properties of Polymer Concrete Using the Response Surface Method

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Abstract : With the increase in human population, expansion, and renovation of cities, infrastructure systems today need to be manufactured to be more durable and long-lasting. The most cost-effective and durable manufacturing of components is a general problem of all engineering disciplines. Therefore, it is important to determine the most optimal components. This study mainly focuses on the most optimal component design of the polymer concrete. For this purpose, the lower and upper limits of the three main components of the polymer concrete are determined. The effects of these three principal components on the compressive strength, tensile strength, and unit price of polymer concrete are estimated using the response surface method. Box-Behnken Design is used in designing the experiments. Compressive strength, tensile strength, and unit prices are successfully estimated with variance ratios (R^2) of 0.82, 0.92, and 0.90, respectively, and the optimum mixture quantity is determined.

Keywords : Box-Behnken Design, compressive strength, mechanical tests, polymer concrete, tensile strength
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