

Optimum concrete mixture design using locally available ingredients

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Abstract:

Water/cement ratio, coarse aggregate/total aggregate ratio and total aggregate/cement ratio are the key parameters affecting design of a concrete mixture. For specified strength and durability requirements, a water/cement ratio has to be selected and should be kept constant. However, coarse aggregate/total aggregate ratio and total aggregate/cement ratio may be varied to minimize the cement content within constraints resulting in optimum design of a concrete mix. This paper presents a laboratory trial procedure for optimum design of concrete mixes using locally available ingredients. The optimization procedure is formulated as finding the minimum cost of a concrete mix by trying different combinations of coarse aggregate/total aggregate ratio and total aggregate/cement ratio within their reported optimum ranges, keeping water/cement ratio constant, and using the absolute volume method of concrete mix design.