

A MATHEMATICAL MODEL FOR BLENDING OF AGGREGATE BY WEIGHT

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In highway constructions and many engineering applications, strength, durability and reliability are considered as the three main quality characteristics. Therefore, design engineers use these three quality characteristics as the dimensions to measure the quality of the construction. In order to maintain the quality, these dimensions must be in accordance with the specifications set by the engineering staff. Specifications can be defined as written technical directions and requirements for the work.

In this project we discuss a method to find the optimal-mix proportion of materials to obtain a desired specification. Initially, the optimal-mix was formulated as a mathematical model. The problem was identified as a multi-objective non-linear integer programming problem. The multi-objective function was written as a single-objective function by making use of weighted sum strategy.

Branch-and-Bound enumeration algorithm is used to solve the problem. The algorithm was coded in LINGO mathematical programming language.

The solution obtained by the proposed method is analysed and shown that it satisfies the specifications better than the solution obtained by the existing method adopted by the Road Development Authority in Sri Lanka.