A MIXED INTEGER LINEAR PROGRAMMING MODEL FOR LEAST COST DESIGN OF FLEXIBLE PAVEMENTS

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Abstract

An adequate and economical design for a pavement structure is just as important for any other engineering structure. A procedure is developed for selecting materials and thicknesses for the surface, base and sub base layers of flexible pavements. The problem is formulated as mixed integer linear programming model to determine the least cost flexible pavement design. The model identifies the number, type and thicknesses of paving materials required to meet the structural strength requirements of the pavement system at least cost to the highway agency. The structural layer co-efficient is accommodated in the model formulation to vary with the pavement configuration, including the number and type of constituent layers. In addition, minimum and maximum layer thicknesses are allowed to establish the variable minimum and maximum thicknesses based on the underlying materials. The model can be used to calculate a least cost function, which facilitates in the selection of cost effective materials and layer thicknesses for the pavement design. The use of the model is illustrated by an example solved using LINGO-8 optimization solver.