

Budgetary Performance Model for Managing Pavement Maintenance

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Abstract : An ideal maintenance program for an industrial road network is one that would maintain all sections at a sufficiently high level of functional and structural conditions. However, due to various constraints such as budget, manpower and equipment, it is not possible to carry out maintenance on all the needy industrial road sections within a given planning period. A rational and systematic priority scheme needs to be employed to select and schedule industrial road sections for maintenance. Priority analysis is a multi-criteria process that determines the best ranking list of sections for maintenance based on several factors. In priority setting, difficult decisions are required to be made for selection of sections for maintenance. It is more important to repair a section with poor functional conditions which includes uncomfortable ride etc. or poor structural conditions i.e. sections those are in danger of becoming structurally unsound. It would seem therefore that any rational priority setting approach must consider the relative importance of functional and structural condition of the section. The maintenance priority index and pavement performance models tend to focus mainly on the pavement condition, traffic criteria etc. There is a need to develop the model which is suitably used with respect to limited budget provisions for maintenance of pavement. Linear programming is one of the most popular and widely used quantitative techniques. A linear programming model provides an efficient method for determining an optimal decision chosen from a large number of possible decisions. The optimum decision is one that meets a specified objective of management, subject to various constraints and restrictions. The objective is mainly minimization of maintenance cost of roads in industrial area. In order to determine the objective function for analysis of distress model it is necessary to fix the realistic data into a formulation. Each type of repair is to be quantified in a number of stretches by considering 1000 m as one stretch. A stretch considered under study is having 3750 m length. The quantity has to be put into an objective function for maximizing the number of repairs in a stretch related to quantity. The distress observed in this stretch are potholes, surface cracks, rutting and ravelling. The distress data is measured manually by observing each distress level on a stretch of 1000 m. The maintenance and rehabilitation measured that are followed currently are based on subjective judgments. Hence, there is a need to adopt a scientific approach in order to effectively use the limited resources. It is also necessary to determine the pavement performance and deterioration prediction relationship with more accurate and economic benefits of road networks with respect to vehicle operating cost. The infrastructure of road network should have best results expected from available funds. In this paper objective function for distress model is determined by linear programming and deterioration model considering overloading is discussed.

Keywords : budget, maintenance, deterioration, priority

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