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Title:

Nonparametric Analysis of Pavement Reliability

Abstract

This paper presents a new probabilistic method of applying the nonparametric statistics to estimate the reliability of pavement. Reliability of pavement is defined as *the probability that a constructed pavement will not fail up to a certain point of time.*

Two different techniques to estimate reliability of pavement were introduced. The first technique considers the reliability as a function of time only as proposed by Kaplan and Meier (1958). While the second technique, suggested by Kalbfleisch and Prentice (1973) based on Cox's (1972) model, considers the reliability as a function of time for a given set of characteristic vectors associated with the observed failure times, such as pavement characteristics and environmental factors.

In case of large samples, the data is grouped into pre-specified intervals, and the reliability of pavement can be estimated using this grouped data.

As much as the theoretical development of the above new method of determining the reliability of pavement is sound, the verification of this theory requires estimating the reliability from real sets of data. Statistical tests of different hypotheses can then be undertaken and the asymptotic distributions of the estimated variables [can] be determined. The required data may include failure times of pavement from different areas and under different conditions as long as the values of the characteristic vectors, associated with the failure times, can be determined.

Degree

M.Eng Project

Date

December 1995

Supervisors

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