

SUMMARY REPORT 207-2(S)

**MEASUREMENTS OF PAVEMENT PERFORMANCE USING
STATISTICAL SAMPLING TECHNIQUES**

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SUMMARY REPORT
of
Research Report Number 207-2
Study 2-8-75-207

FEB 6 1979

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**Cooperative Research Program of the
Texas Transportation Institute
and the**

**State Department of Highways and Public Transportation
In cooperation with the**

U. S. Department of Transportation, Federal Highway Administration

March, 1978

**TEXAS TRANSPORTATION INSTITUTE
Texas A&M University
College Station, Texas**

Measurements of Pavement Performance Using Statistical Sampling Techniques

by

J. P. Mahoney and R. L. Lytton

This report gives the results of a study of the optimum sampling frequency to use in obtaining pavement data. The report should be a valuable reference in planning Statewide and District pavement condition surveys.

Cost-effective, objective performance information obtained on a highway network better enables highway maintenance managers to make informed decisions. Three methods which can be used to obtain such objective information are: mass inventory, partial, and sampling surveys. Of the three, sampling surveys and a mass inventory of data available from District 21 are examined in depth.

Five types of sampling surveys are described including examples for each. Of the five, a stratified two-stage sample survey was elected for use in Texas. The sampling was obtained by first randomly selecting counties within each highway district then randomly selecting two-mile highway segments within each county. Approximately one percent of the total statewide centerline mileage was sampled using this technique.

Various kinds of data were obtained for each of the sampled highway segments with Serviceability Index, Pavement Rating Score, and Surface Curvature Index examined.

Available data from District 21 were used in conjunction with a simulation procedure to obtain the optimum sampling frequencies for each kind of data. The simulation study results and a utility theory analysis procedure revealed that two-stage sample sizes of about two percent of the total centerline mileage provided optimally cost-effective estimates for determining roughness, visual condition, deflection and skid data.

An extensive examination of performance related data obtained in District 21 and two procedures which can be used to determine the required data sampling frequency within highway segments are provided to assist in the planning and development of the statewide condition inventory currently being planned by the SDHPT.

The published version of the report may be obtained by addressing your request as follows:

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