KSU-14-01

I. RESEARCH PROJECT TITLE

Gravel Road Paving Guidelines

II. RESEARCH PROBLEM STATEMENT

Gravel roads account for a large portion of the rural roads in the United States, which is particularly true for states like Kansas. In the recent years there have been several trends related to gravel roads. First, rural areas are experiencing population shift from farming areas to more urban areas further reducing the population densities and traffic volumes in such areas. Second, more and more rural road users are complaining about the lower quality of service on gravel roads, particularly stemming from dust issues and inquiring about having gravel roads paved. Finally, the ever decreasing transportation budgets are limiting the number of gravel road miles that can be properly maintained. Accordingly, transportation agencies are faced with the decision of determining when it is most economical to maintain, upgrade, or downgrade a road's existing surface.

It is therefore necessary to develop more uniform guidelines to ensure that the decision is based on rational, cost effective policy. While traffic volume will be one of the most important parameters that needs to be considered in developing such guidelines, it will not be the only parameter. Additional factors that need to be looked into include, but will not be limited to, roadway classification, access to commercial facilities, being on a school bus/postal mail route, cost considerations, available funding, being on a farm-to-market route, terrain type, subgrade strengths, material availability, truck/farming vehicle traffic levels, safety experience and such other factors.

III. RESEARCH OBJECTIVES

The main objective of this study is to develop cost effective gravel road paving guidelines for local governments so that they would be helpful in the decision making process. The developed guidelines will not only direct when an unpaved road needs to be paved, but also when a paved road may need to be unpaved when it does not meet the recommended guidelines any more.

Following major tasks will be completed in accomplishing the above objective.

Task 1: Literature Review

Conduct a detailed literature review by searching popular transportation databases such as TRIS Online and journal publications such as Transportation Research Record, ITE Journal and various other publications. This task will help identify what other states are doing in terms of gravel road paving criteria.

Task 2: Study Current Practices Used by Out-of-State Counties

Task 1 may not fully reveal the current practices used by out of state counties regarding gravel road criteria as such information is more localized. In order to obtain a better understanding a survey will be conducted through the National Association of County Engineers (NACE). NACE Annual Meeting for example would be a good opportunity contact its members and get a decent number of responses.

Task 3: Understanding the Local Government Practices in Kansas

Conduct survey among county engineers to understand the practices used by Kansas counties. (A similar survey conducted previously on gravel road speed limits had a very high response rate and yielded very valuable input.) Assistance will be sought from Kansas County Highway Association regarding this.

Task 4: Collect the Necessary Data

Based on the results from Tasks 1 and 2, collect the necessary data to develop gravel road paving guidelines. Some of the data gathered would be safety parameters, user costs, maintenance costs, and other related factors.

Task 5: Develop the Guidelines

Incorporate the previous tasks and develop guidelines for cost effective, more uniform gravel road paving/unpaving guidelines. The guidelines will address such items as 1). Combination of traffic and other parameters when a road should be upgraded from gravel to paved, and vice versa, 2). Information about relative life cycle costs of gravel, chip seal, and paved roads, 3). Minimum cross section and other standards that should be considered in upgrading gravel roads and vice versa, and 4). Safety benefits associated with the changes to the surface type.

Task 6: Report Preparation

Document all the tasks of the project in a final report. The results will be made available in user friendly paper worksheet from as well as a simple Visual Basic computer program so that the local governments can simply play around and resulting numbers would be useful in making the decisions.

IV. ESTIMATE OF FUNDING AND RESEARCH PERIOD

Research Period: 24 months from the beginning of the project.
Funding: Estimated project cost is $ 69,000.

V. URGENCY AND PAYOFF POTENTIAL

In this study, the findings could be used not only in making decisions on paving gravel roads but also in unpaving existing roads back to gravel roads if they do not meet certain criteria and limited funds are available. Based on the cost estimates by KCHA, this project is expected to have a very high pay back potential in the range of millions. In addition, the findings and guidelines will provide county officials with more solid evidence to address the questions raised by the general public regarding any decisions on paving or unpaving.

VI. IMPLEMENTATION STRATEGY

The results of the research could be disseminated through the Kansas County Highway Association.

VII. PROJECT PERSONNEL

The principal investigator of this project will be Dr. Sunanda Dissanayake (Associate Professor of Civil Engineering) who has many years of experience in the areas of traffic engineering, safety, crash data analysis and access management related issues. In direct relation to this project she has successfully completed another K-TRAN project on speed limits on gravel roads. One Graduate Research Assistant will work on this project whose master thesis would be focused on this study.

VIII. SUBMISSION INFORMATION

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Sunanda Dissanayake, Ph.D., P.E.
Department of Civil Engineering,
2118 Fieldler Hall,
Manhattan, KS 66506.
Tel: (785) 532 1540 Fax: (785) 532 7717 Email: sunanda@ksu.edu