OPERA
Local Operational Research Assistance Program

Interim Report: Development of Aggregate Loss Factors for Rural Gravel Roads

Project Number 2011-01

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Problem Itasca County manages a transportation system that includes 750 miles of gravel roads. Producing aggregate for these roads, placing the aggregate on the roads, and maintaining the aggregate surfacing can be a significant budgetary challenge. Itasca County's annual budget for aggregate production, placement, and maintenance is approximately $2 million. In today's local government funding environment, county boards are requiring a more data-driven justification for such budgets. Unfortunately, there is no system available to help transportation departments build their aggregate budget requests.

Solution Itasca County began collecting field data to measure gravel loss caused by traffic and winter maintenance activities. The county plans to collect measurements on six different gravel road segments over the next four years. Each segment of road represents different combinations of three variables: traffic speed, roadway protection from the sun, and chloride. These generialzed identifiers will help categorize road segments and identify gravel needs on a system-wide basis. After four years, the county will convert the field data collected at the roadway sites into "aggregate loss factors" that can be used to predict annual gravel needs for a variety of roadway characteristics.

Procedure In spring 2012, Itasca County maintenance crews placed 6 inches of new aggregate surfacing on all six gravel road sites. Two permanent control points were established at each site. A field survey was conducted at each site, and the information was used to create a digital terrain model. Each segment was surveyed once a month from May to October. Gravel samples taken from each site were also analyzed to determine material properties and beginning particle size percentages.

Results So far, study results are inconclusive because only one year of information has been collected. Additional data are needed to indicate strong trends.

Approximate Cost $61,200

OPERA Funding $8,200

Implementation The first year of data collection has been completed. In the second year of the study, procedures for collecting and analyzing data will be reviewed and revised. In spring 2013, Itasca County also plans to use field measurements to review the potential loss of gravel from snowplowing operations.

Status The first year of the four-year project has been completed.

View the complete project report online at www.mnltap.umn.edu/opera.

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