Putting Research into Practice: A Guide to Dust Control Options for Aggregate Roads

What Was the Need?
Representing more than half of U.S. roadways, gravel roads are a major part of the country’s road network. Dust produced by cars as they drive on unpaved roads is a major and growing complaint nationwide and among Minnesota landowners near these roads. This dust can negatively affect air quality, crop yields, quality of life and even driver safety through impaired vision.

Many local agencies apply dust suppressants on gravel roadways. While calcium chloride and magnesium chloride are the most common choices, many other products are used as well. Information about the breadth of options, including their benefits and drawbacks, was not readily available. This information needed to be collected and disseminated to help local agencies make informed decisions about dust control on aggregate roads and save money on related maintenance costs.

What Was Our Goal?
This project sought to develop an easy-to-use document highlighting available dust control options for gravel roads, with the advantages and disadvantages of each, to help local agencies identify the best product for their unique needs.

What Did We Implement?
Investigators developed a guide based on data collected from two online surveys and a literature search that identified additional resources for local agencies to use in making dust control decisions.

How Did We Do It?
Investigators sent the first survey to county engineers in Minnesota and nationally through the Local Technical Assistance Program. This survey asked whether respondents had a dust control program and what products they have used. Investigators received 253 responses: 72 from Minnesota and 181 nationwide.

Next, investigators distributed the second survey to 47 respondents of the first survey who indicated they had a dust control program. Representatives from 39 local agencies provided feedback about the dust control products they have used. One of the TAP members also sent this survey to local agencies in Iowa, which led to an additional 29 responses.

What Was the Impact?
Results from the first survey showed that calcium chloride and magnesium chloride are, by far, the most commonly used dust suppressants. Among the 134 respondents who had a dust control program, 56 percent have used calcium chloride brine and flakes, and 50 percent have used magnesium chloride. No other option had been used by more than 20 percent of respondents. However, a large number of options are available; more than 20 dust suppressants have been used by at least one responding agency.

Dust produced by vehicles driving on gravel roads is a growing complaint from landowners in Minnesota and nationwide.

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Data from the second survey suggested that the choice of dust suppressant was based primarily on previous experience and cost rather than existing guides or other resources. Respondents did, however, share pros and cons about the chemicals they use, which are detailed in the report. Notable attributes of magnesium chloride include a residual effect that reduces the rate of application needed after the first year, its effectiveness even after a light grading and cost savings from a reduced need for blading. Limitations include potential vehicle corrosion, vegetation damage and the tendency to run off when the road is saturated with water. Calcium chloride can also be corrosive and can cause gravel loss during the winter if applied in late fall, although users reported that it successfully suppresses dust.

The literature search generated a number of useful resources, but investigators identified three as particularly valuable: Unpaved Road Dust Management: A Successful Practitioner’s Handbook, a newly released Federal Highway Administration handbook based on a scan tour that observed real-world dust control issues; Unpaved Road Chemical Treatments: State of the Practice Survey, a nationwide survey that accompanied the FHWA handbook; and Dust Palliative Selection and Application Guide, which, despite being published in 1999, is still considered an accurate assessment of the attributes, limitations and impacts of various dust suppressant categories. Results from the FHWA survey are summarized in the current report; they largely parallel information found by the Minnesota survey.

**What’s Next?**

By using the guide produced in this project to select the best possible dust suppression materials, counties could realize a significant cost savings through reduced blading, gravel loss and maintenance costs. The guide will be sent to local agencies in Minnesota as part of the Local Road Research Board newsletter; the research will also be presented at state meetings of county and city engineers.

The LRRB has begun planning a gravel road management research project. The scope for that project is currently being developed, but will likely include dust control.