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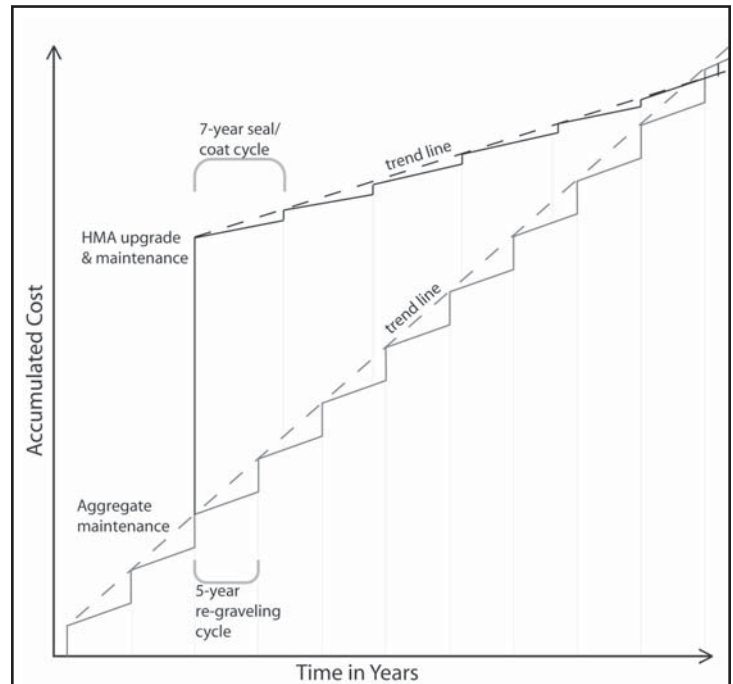
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If/When to pave a gravel road

County officials have to decide if and when a road should be upgraded. Regarding aggregate roads, many Iowa agencies struggle to answer, When is it appropriate to upgrade to pavement?

Chuck Jahren, ISU professor of civil engineering, and Duane Smith, Iowa LTAP director, recently studied this question for the Minnesota DOT Local Roads Research Board. Their research was conducted on Minnesota roads, but their conclusions and suggestions are useful for Iowa's local agencies as well.



The initial investment of an upgrade to pavement is steep but may eventually be balanced by lower maintenance costs.

Pressures to upgrade

Iowa's transportation agencies may consider paving gravel roadways for many reasons, usually related to increasing traffic and/or loads due to development.

For example, the number of requests for rural subdivisions near cities like Des Moines and Iowa City is skyrocketing. Commercial industrial developments (e.g., ethanol plants and animal confinements) are cropping up on gravel roads throughout the state.

In addition,

- More houses and cabins are being built near natural geographical features.
- More people are visiting Iowa's recreational areas.
- Rural residents are taking more trips for work and pleasure.

With these changes, the public's expectations regarding roads' level of service may increase. Local officials are often pressured to increase the level of service by paving.

Developers generally finance all or most of the cost of streets within new developments. They rarely fund improvements to surrounding low-service public roads experiencing increased traffic volume or loads from rural homeowners and employees/suppliers of rural industries.

In general, Jahren and Smith recommend that gravel roads with volumes of 200 vehicles per day be upgraded. However, due to persistent budget limitations, Jahren and Smith suggest that agencies begin planning to upgrade a gravel road when traffic volumes reach 100 vehicles a day and are expected to continue increasing. This gives the agency a few years to plan, finance, and carry out a construction program.

Acronyms in Technology News

AASHTO	American Association of State Highway and Transportation Officials
APWA	American Public Works Association
CTRE	Center for Transportation Research and Education (at Iowa State University)
FHWA	Federal Highway Administration
Iowa DOT	Iowa Department of Transportation
ISU	Iowa State University
LTAP	Local Technical Assistance Program
MUTCD	Manual on Uniform Traffic Control Devices
NACE	National Association of County Engineers



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Evaluating costs

Jahren and Smith offer tools for forecasting and comparing gravel-versus-paving investment costs. They also suggest that agencies consider the potential benefits of paving to both road users and owner-agencies.

To make an accurate financial comparison, agencies need to forecast costs of pavement and gravel alternatives over a long time, perhaps 30 years.

The projections for paving a gravel road should account for likely traffic redistribution from neighboring gravel roads to the newly paved road. Motorists often prefer driving on pavement. When a gravel road is paved, traffic volumes on nearby aggregate roads are likely to decrease, reducing their potential maintenance costs.

Projections should also consider potential hidden costs that can come with paving:

- A higher level of service, including snow/ice removal and brush control, will likely be expected.
- More signs and pavement markings may be required.
- More lights may have to be installed at intersections.

At the same time, cost projections for a road that is not paved should account for expected traffic volume increases. To ensure a road holds up to the wear and tear of more traffic, a five-year re-graveling cycle may need to be changed to two or three years. Re-graveling more frequently not only consumes more person-hours but also increases material costs.

Reliable cost projections are based on route-specific historical data on maintenance costs.

Jahren and Smith recommend keeping accurate records of the amount of labor and material, as well the purchase price and depreciation of equipment, required to keep aggregate roads at a reasonable level of service.

As the line chart on page 1 indicates, large up-front investments for paving may eventually be offset by potential savings in long-term maintenance.

Other factors

Budget should not be the only factor. Jahren and Smith encourage agencies to consider potential benefits to road users and indirect benefits to agency-owners of paving a gravel road.

Road users will likely experience

- Safer driving surface, due to better skid resistance and stopping distance.
- Reduced wear on tires and vehicle suspensions.
- Increased travel speeds (time savings).
- Reduced air pollution.

Agencies may be able to

- Redirect employee efforts from grading, graveling, and applying dust suppressants to other tasks.
- Reduce administrative time handling complaints.
- Collect more property tax if the corridor along the paved road attracts developers.

Each case is unique

There is no magic formula for if and when to upgrade a gravel road. The costs, benefits, traffic volumes, and political pressures of each project need to be weighed.

For more information

Contact Duane Smith, 515-294-8103, desmith@iastate.edu, or Chuck Jahren, 515-294-3829, cjahren@iastate.edu.

See their final report online, www.lrrb.org/PDF/200509.pdf.

See also *To Pave or Not to Pave*, a brochure, www.mnltap.umn.edu/pdf/2006PavingGuide.pdf ■