

Roads to Rubble

De-Paving a Half-Century of Progress

As road funding dries up, many rural road managers can no longer maintain all the paved roads in their systems, but gravel roads present their own problems, including cost-effectiveness, performance, and safety.

by Kirk Landers

Late in 2009, many American news organizations picked up an Associated Press feature gleefully titled, "Roll up the pavement: Gravel is making a comeback." The article detailed an emerging trend in rural counties and small towns that no longer have the financial resources to maintain paved roads and are therefore returning some lane miles to unbound gravel roads.

By July, 2010, even news media like the *Wall Street Journal* picked up on the trend. In "Roads to Ruin: Towns Rip up the Pavement," *WSJ* writer Lauren Etter cited examples of de-paving roads in the Dakotas, Michigan, Alabama, Pennsylvania, and Ohio. Experts in rural road management say the trend is national in scope.

While the regions and terrain differ, the causes are the same. Rural America is where the country's legacy of underfunded roads is becoming most visible.

"Our total annual highway budget is \$7 million," Jan Weismantal said last year in a presentation to her county road management colleagues in the South Dakota Local Technical Assistance Program (LTAP). Weismantal, the Brown County (SD) Highway Superintendent, estimated that the cost of repairing and maintaining all 650 miles of paved roads in her county would require an estimated \$40 million annually.

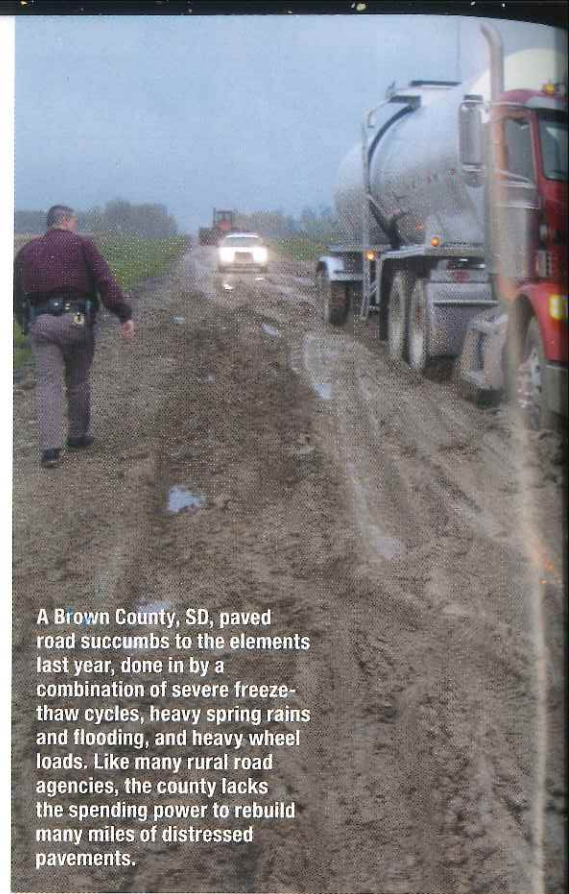
"We can maintain 150 miles of pavement with our current budget," said Weismantal.

She and her staff have defined 150 miles of critical routes that will be maintained as paved surfaces. Maintenance on the other 350 miles of paved roads will be limited to gravel patching—a full-depth reclamation process in which the afflicted section gets new aggregate and is shaped and compacted, but not overlaid.

"Brown County has had a bad experience previously with turning asphalt surfaces back to gravel," says Weismantal. "Public reaction was extremely negative. So no large sections are being milled up and immediately returned to gravel."

In other rural counties the challenges are the same. In Stutsman County, ND, which was featured in the *WSJ* article, Highway Superintendent Mike Zimmerman has convinced the county to purchase a full-depth reclamation machine to de-pave dozens of miles of rural blacktop that can no longer be maintained.

His decision was dictated by economics. Zimmerman's total pavement management budget last year was about \$1.28 million, while the cost of just one reconstruction project – a nine-mile section of Old Highway 10 which was featured in the *Wall Street Journal*



A Brown County, SD, paved road succumbs to the elements last year, done in by a combination of severe freeze-thaw cycles, heavy spring rains and flooding, and heavy wheel loads. Like many rural road agencies, the county lacks the spending power to rebuild many miles of distressed pavements.



A heavily laden tandem trailer rig makes its way along a country road. Relatively few rural roads are designed to support heavy truck loads, but such loads are an integral part of modern agriculture and rural industry.



A tandem trailer rig awaiting its load in a South Dakota field illustrates the challenge rural road managers face today. Big rigs like this, a common sight on rural roads today as they haul material from field to farm and from farm to market, dramatically increase the load capacity requirements for country roads.



article—would have cost \$1.4 million per mile all by itself, wiping out the county's pavement budget for years to come.

Many of the county's paved roads carry very low volumes, says Zimmerman, and the cost of maintaining them is considerably higher than for unpaved roads. Stutsman County's general cost estimates for pavement rehabilitation repair and maintenance averages about \$32,000 per mile per year over a 20-year lifecycle. The county estimates reclaimed roads cost about \$4,300 per mile per year, and traditional gravel roads just under \$1,700 per mile per year over the same 20-year span.

Economics and Politics

While many rural counties and small townships have already converted problem sections of paved roads to gravel, and many more are considering it, the total number of de-paved road miles is thought to be small. Residents living on these roads generally oppose going back to gravel because of the dust and the damage to vehicles from flying stones, and many rural roads carry too much truck traffic for unbound gravel to be viable.

Still, the funding crisis that is driving the trend has road managers concerned on several levels.

"This has been a trend for about a decade, but it has really accelerated in the last two years," says Ken Skorseth, current president of the National Local Technical Assistance

Program Association (NLTAPA) and program manager for South Dakota's LTAP association.

Skorseth, one of the country's leading authorities on unpaved road construction and management, says the leading cause for the interest in pavement devolution is long-term inadequate funding for roads. It has impacted pavement maintenance, and it has had a devastating effect on rural road highway departments' ability to rehab old pavement. "Here in South Dakota we have many 30-year-old pavements that had projected lifecycles of 20 or 25 years," Skorseth points out as an example. Pavements now at or past the end of their service lives are coming due for rehab at a time when public funds are critically short and the cost of construction and maintenance is higher than it has ever been, says Skorseth.

Adding to the perfect storm of the rural road crisis is the changing face of American agriculture. "Today we have big farms and big yields," notes Skorseth. "Our farmers may move product more than 10 miles just from field to bin—and that's on public roads."

He adds that it's not uncommon today to see a tandem-trailer rig coming out of a wheat field to haul huge loads to a staging area. "No local road is designed for that kind of load," he comments.

In an interview posted on the National LTAP Web site, John Habermann, Program Manager for the Indiana LTAP association, echoes Skorseth's observations and points out that the periods of heavy road usage include those marked by heavy moisture and freeze-thaw cycles.

Both Habermann and Skorseth feel this is a critical moment in U.S. infrastructure. Skorseth, who has been involved in road management since 1969, says, "I've never seen the deterioration curve drop as rapidly as I have in the past two years."

Road managers are being cautioned by Habermann and Skorseth to be very cautious about returning improved roads to gravel, because it's not always cost-efficient and there are safety considerations.

Traffic volume and tire loads are primary considerations. "Gravel roads are economically feasible up to about 170 ADT (average daily traffic)," says Skorseth, quoting from a major 2002-10 study done by the South Dakota DOT. "If you have higher traffic volumes, gravel might seem like a cheaper alternative, but at 300 ADT or more, it can be more expensive than asphalt or other treatments," he says.

Cost factors for an overloaded gravel road include dramatic loss of aggregate and fines (it can be "a tremendous loss," says Skorseth) and hyper-frequent grading, which drives up machine usage, maintenance costs (especially blade sharpening), and operator costs. The SDDOT study of local road surfacing found that an asphalt

surface treatment locally referred to as "Blotter" (a deep aggregate base topped by a prime coat of asphalt, then a chip seal) was the most cost-effective alternative for traffic volumes of 170 to about 650 ADT, while asphalt pavement was the most cost-effective alternative above 650 ADT.

But within those parameters are many variables.

Habermann points out that road departments set up for maintaining paved roads will have to invest in graders and grader operators to support the return to gravel, and those investments can skew cost efficiencies considerably. In addition, gravel road maintenance requires motor grader operators with a very advanced skill set, and these operators have become hard to find.

Other variables include the quality of the road base and subgrade, and proximity to a source for quality aggregate. If the old asphalt pavement was built on a marginal base, many inches of new aggregate may be required for the gravel road to stand up to loads, says Skorseth. And if the subgrade is weak, he adds, the amount of total aggregate required for an unbound gravel road can be very high. For example, he notes that the SDDOT Rural Road Design, Maintenance & Rehabilitation Guide suggests a road with a weak subbase carrying 25 to 50 trucks per day will need 14.5 inches of gravel to handle the load.

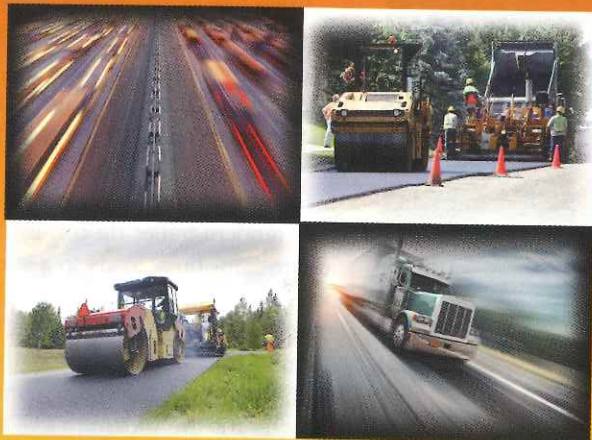
Even with a good subgrade and pre-existing base, gravel roads require regular deposits of new aggregate, so haul distances can have a major effect on maintenance costs.

"Here in South Dakota," says Skorseth, "Parts of the state don't have local sources of good aggregate. If you're trucking aggregate 50 miles one way, your costs go way up and that can greatly change the economics of a gravel road."

The funding crisis has forced many rural road departments to explore new options, some of which show real promise. South Dakota has seen good results from the combination of deep base and Blotter on a road serving an ethanol plant, for example. Other areas employ Otta Seal, a similar technology developed in Norway that employs a damp aggregate base covered by an emulsion. But, Skorseth cautions, these technologies require a deep base to perform well.

Stabilized gravel technologies are also showing promise for gravel roads that carry demanding loads. Liquid magnesium chloride has been very successful as a stabilizing additive in South Dakota, says Skorseth, while Michigan and other states are using calcium chloride in its dry form to accomplish the same thing. "The chlorides are hygroscopic," explains Skorseth.

Committee Meetings: January 21-22 • Program: January 22-25



JW Marriott Desert Springs • Palm Desert, CA

NAPA 2012

57th Annual Meeting

Strategizing for Success Now and Down the Road



"They pull moisture from the air and keep the natural clay binder in the road damp enough to retain cohesiveness. That reduces loss of fines and gravel, especially in long periods of dry weather."

No miracles

"Go into this with your eyes wide open," Ken Skorseth cautions rural road managers contemplating the de-paving of asphalt roads. Alternatives to pavement can turn out to be far more expensive in the long run if managers underestimate tire loads, traffic volume, or the base and sub-base conditions of any given road.

Unfortunately, no one is yet predicting a miracle solution to the economic conditions that spawned the rural road crisis, either. Most of the affected roads are local or county roads and derive most of their funding from

state and local coffers, which have been devastated by the recession.

Ironically, many rural roads in crisis serve the one area of the U.S. economy that has been strong in recent years--farms producing record levels of exports—but that has actually made the crisis worse. In most parts of the country, farm acreage produces a fraction of the road tax revenue that homes and commercial entities produce, even though they have far more road frontage. So even as agriculture's use of the roads increases, its contribution to their maintenance and repair does not offset the tax revenues lost from other parts of the economy.

But it would be a mistake to think the de-paving of some rural roads—and the economic conditions that are driving the trend—are unique to rural America. Reams of data have been published showing a chronic underinvestment in primary and secondary roads, too. What's special about the rural road crisis is that it comes first and it illustrates how ugly pavement management decisions become when the life of a paved road ends and there is no money to rehabilitate it.

HMAT

Kirk Landers is a contributing editor to HMAT.

What can be done about the crisis in road funding? Make your voice heard – tell Congress that it's time to enact a robust, multi-year highway bill! Attend the Transportation Construction Coalition's 2011 Legislative Fly-In, May 24-25 in Washington, DC. Visit www.hotmix.org for details.

**You make the way smoother.
So do we.**



An insurance program for asphalt contractors that's free of bumps and potholes — what a concept! We've called ourselves Bituminous for more than 80 years. We didn't name the company specifically to honor our friends in asphalt, but we did develop an insurance program especially for you.

Get together with your independent insurance agent and verify our industry knowledge, quality coverages and outstanding financial security. Cover our consistent and constructive risk control attention and our expert and timely responses in claims situations. Bituminous, the insurance company that makes the way smoother, all the way to the bank.



- FULL SERVICE BRANCH OFFICES :**
- | | | | |
|-----------|--------------|-------------|---------------|
| Atlanta | Denver | Little Rock | Oklahoma City |
| Baltimore | Des Moines | Milwaukee | Pittsburgh |
| Charlotte | Indianapolis | Nashville | St. Louis |
| Dallas | Kansas City | New Orleans | San Antonio |

Home Office: Rock Island, Illinois 61201
Phone 1-800-475-4477 www.bituminousinsurance.com