

UNIVERSITY OF MINNESOTA



CENTER FOR TRANSPORTATION STUDIES

SPRING LOAD RESTRICTIONS

*Research Suggests Policy Change—
But Big Questions Remain*

**An analysis of research at the University of Minnesota
by the Center for Transportation Studies**

March 2005



SPRING LOAD RESTRICTIONS

*Research Suggests Policy Change—
But Big Questions Remain*

**An analysis of research at the University of Minnesota
by the Center for Transportation Studies**

March 2005

This analysis is based upon a research project titled “Cost/Benefit Study of Spring Load Restrictions,” by Assistant Professor David Levinson, principal investigator, and Assistant Professor Mihai Marasteanu, co-principal investigator, of the University of Minnesota Department of Civil Engineering. Information and comments of pavement experts from the Minnesota Department of Transportation and local government agencies were also incorporated. A report of the research project “Cost/Benefit Study of Spring Load Restrictions” will be published this month.

Contents

Introduction	1
Focus of the study	2
Public costs	4
Economic benefits	5
Benefits/costs comparison	6
Key concerns	6
Research validation	7
Recovering costs	8
Conclusion: Policy change—but only at a price	9

Center for Transportation Studies
University of Minnesota
200 Transportation and Safety Building
511 Washington Avenue S.E., Minneapolis, MN 55455
Phone: 612-626-1077 Fax: 612-625-6381
E-mail: cts@umn.edu Web: www.cts.umn.edu

SPRING LOAD RESTRICTIONS

Research Suggests Policy Change—But Big Questions Remain

An analysis of research at the University of Minnesota
by the Center for Transportation Studies

Introduction

Going all the way back to 1937,

Minnesota has posted rural roads with weight limits in the spring. The policy rests on the assumption that reducing loads on roads for the two months of spring thaw will significantly extend the life of county and local roads typically not built to 10-ton standards. A new body of research on spring load restrictions (SLR), conducted at the University of Minnesota, takes a contemporary snapshot of both benefits and costs, and suggests this policy creates a net loss, implying that the state and its economy would be better off lifting this restriction.

While the research findings on benefits and costs add to what has been known about the effects of SLR policy, the conclusion reached will not end the debate over whether seasonal restrictions are the most practical policy to further the public interest. Materials laboratory specialists at the Minnesota Department of Transportation (Mn/DOT) raise fundamental questions about the methodology used for this research. Those questions are incorporated into this summary report.

One could also argue that decisions cannot be driven solely by benefits/costs analyses because funding is not adequate to make every transportation investment where the benefits exceed the costs. For example, it is almost always cost-beneficial to perform construction and maintenance on major highways while leaving the highways open to traffic, yet Mn/DOT and local agencies rarely can afford to do this.

In the background of all such arguments is the reality that budgets for local roads have been squeezed to the point of compromising a normal schedule of maintenance. So, whether restrictions are maintained or changed, the issue of raising adequate revenue looms large. No one understands this better than local officials who levy local property taxes to pay for a major share of road

maintenance. Indeed, relieving industry of current restrictions would generate the need for even more revenue, since maintenance and replacement intervals would be shorter.

These spring load restrictions last about eight weeks. Like much in Minnesota, this policy has everything to do with weather. When winter releases its icy grip, the structure of roads, resting on a soil base, becomes weaker and more vulnerable to damage. During the weeks that roads are weakened, truck traffic with large loads accelerates damage and shortens pavement life. To avoid accelerated damage, current law directs that all county and local roads be limited to 5 tons during the spring restriction period unless otherwise posted.

Of course, maintaining SLR policy has always come at a cost to someone. The trucking industry—assuming carriers comply with law—absorbs a predictable cost premium to use roads at this time of year. Deliveries during the SLR period require more trucks with lighter loads, or more trips, or more miles traveled, to navigate around restricted roads. Those extra costs—whether on timber, windows, or dairy products—ripple through the Minnesota economy. Hence, the logic of asking for a study that compares the potential benefits of lifting the restrictions against the costs of increased pavement damage.

The results of this research study—which will be startling to some—certainly raise a fundamental policy question of how the state and local governments would pay for greater damage to roads if restrictions were lifted. Still, the results of this research suggest rather clearly that the benefits of lifting the SLR policy outweigh the costs of maintaining the road system without the protective seasonal weight limits.

The results of this research suggest rather clearly that the benefits of lifting the SLR policy outweigh the costs of maintaining the road system without the protective seasonal weight limits.

Focus of the study

Researchers focused analysis on three sample Minnesota counties—Lyon, Clay, and Olmsted—selected for intrastate geoclimatic diversity as well as for differences in commercial commodities transported over the roads.

This research about the SLR policy grew out of a major task-force effort authorized by the 1999 session of the Minnesota Legislature. That task force, which represented a range of public and private interests, called for research into the benefits and costs questions. This report summarizes those research findings—and the concerns that Mn/DOT specialists have about the conclusions reached.

University researchers set out specifically to estimate the potential benefits to industry if posted limits were lifted, and to compare those benefits with the costs associated with marginally greater damage to pavements during the thaw period. The resulting analysis produces a ratio of benefits to costs. This research defines the *benefits* as the value to (mostly private) industry of lifting the seasonal restrictions. The *costs* refer to what the (public) owners of roads will likely bear to maintain the roads if restrictions are lifted. When the study cites the costs of current policy to carriers, it is actually building an analysis of potential benefits of lifting the policy. The benefits, in effect, are avoided or reduced costs to freight haulers and shippers, and the costs are those public expenses not avoidable. If the benefits exceed the costs, or when the benefits/costs ratio is greater than 1.0, a reconsideration of this long-standing policy is suggested. A ratio less than 1.0 would tend to confirm the sensibility of present policy.

SLR's impact falls principally on 23,600 miles of county state-aided roads, 2,400 miles of municipal state-aided roads, and roughly 11,000 miles of other local roads. These roads are normally rated to handle 5, 7, or 9 tons per axle. Only 1,600 miles of the more than 12,500-mile state trunk highway system are subject to restriction; most of the trunk highway system is rated at 10 tons per axle and, thus, able to handle heavy loads.

Researchers focused analysis on three sample Minnesota counties—Lyon, Clay, and Olmsted—selected for intrastate geoclimatic diversity as well

as for differences in commercial commodities transported over the roads. (Roads in the city of Crystal were added to see if the findings would be similar for small cities). The SLR period, about eight weeks, starts and ends on different dates determined by geographic zones.

Bridges, while beyond the scope of this study, were assumed to be built for loads comparable to adjoining roads. Of course, the integrity of bridges is a matter of fundamental safety, as are smoothness or rutting conditions in wet weather on all roads.

Assumptions

In order to focus on the policy comparison, researchers further assumed:

- That current SLR postings are enforced, or that trucking companies substantially comply with SLR. Actual compliance levels are unknown. Researchers assumed that most counties or townships cannot afford or choose not to put resources into aggressive enforcement practices. (Informal data from industry interviews suggest that actual compliance may more likely be somewhere between 20 percent and 50 percent).
- That Lyon, Olmsted, and Clay counties represent a reasonable sample across Minnesota's regions and over-the-road industries. In addition, Crystal typifies a small city in which the major heavy traffic consists of school buses, waste haulers, and the occasional moving van.
- That roads in these counties, for purposes of analysis, last an average of 42.5 years and are, on average, at the midpoint of a 17-year cycle between major overlays. (While respecting the need for research to peg usable average points for analysis—which are consistent with the values used in pavement design—Mn/DOT specialists and county engineers regard these two assumptions as not real-world.) Obviously, in the full range of roads now posted for 5-

7-, or 9-ton limits, there is also a full range of points on the life cycle of those pavements. Some are in excellent condition; others are in advanced stages of deterioration.

Context

Minnesota is not alone in restricting loads during spring thaw. Restrictions are relatively common across the northern tier of the United States, Canada, and northern Europe. Some analysts point to a recent policy shift in Norway to support the case for policy change. Nine years after lifting spring load limits there, road damage is not significantly different. Much of the explanation, though, lies in budget increases for maintenance, more expensively laid road bases, and the proximity of most major roads to the sea, which has a moderating effect on temperatures. Also, restrictions continue on most low-volume roads. More research would be needed before drawing major lessons from recent Norwegian practices.

Pavements are designed to be sensitive to factors of underlying soil quality (uneven and not very good in many Minnesota counties), expected traffic loads (weight and volume), and the environment. Environment includes such variables as temperature, water-table levels, and rainfall patterns.

The other side of pavement management is identifying damage and its causes. County responses to state surveys on road distress typically

cite cracks as the main distress. Only 15 percent of counties point to rutting as the main distress condition, though it is often the harbinger of road failure during spring thaws. Rutting is caused by the variation that occurs in the quality of granular materials when moisture builds in spring thaws. Most county and local roads also experience various conditions of cracking—*longitudinal*, *transverse*, and *block*—all of which increase susceptibility to water-related spring damage. Obviously, the older a road is, the greater the likelihood of failure from all causes.

Predicting damage is difficult. Researchers chose to use the same modeling software that Mn/DOT employs as a professional development tool to understand specifications for mostly high-volume trunk highways. This software, called MnPAVE, models structure (number of layers, thickness, needed elasticity of materials) and is calibrated for Minnesota’s five seasons—the standard four plus spring thaw. By building in anticipated traffic loads, researchers saw MnPAVE’s potential to make general predictions about the rate that damage will undermine the condition of roads.

Mn/DOT specialists have serious reservations about using this modeling tool to assess damage potential on existing roads that are typically built to lower load limits. But researchers found MnPAVE to be the best available tool, particularly in the absence of any extensive data on the materials-characteristics, age, and condition of most county and local roads.



Public costs

What did the research show as the public costs of lifting the seasonal restrictions?

In their examination of the damage that would occur without restrictions, researchers found that road damage has the following characteristics:

1. The greatest damage seems to occur in early spring as the result of the material base weakening from water migrating during the thaw of the surrounding soils. As summer arrives, damage also results from the softer asphalt produced by higher temperatures.
2. The run-up in truck traffic volumes in summer, presumably related to shipment changes during spring restrictions, might inflict damage on some roads that offsets—at least partially—the benefits of spring restrictions.
3. The quality and thickness of road pavement materials directly affects the degree of damage. Just 2 inches more of thickness in asphalt reduces annual damage by 80 percent.
4. Spring restrictions do accomplish significant reductions in damage, though on an annualized basis, the percentage difference is somewhat smaller than expected. For example:
 - a. A 2-inch layer of asphalt on a 6-inch aggregate base, posted as a 7-ton road, sees daily damage reduction of 20 percent to 36 percent.
 - b. If the same road was posted for 5 tons, the daily damage reduction is 51 percent to 59 percent—seemingly clear evidence of the impact of load weights.
 - c. However, adjusting those daily damage-reduction quotients for a year-round impact brings the damage savings down to somewhere between 5 percent and 9 percent for a road limited to 7-ton weights, and 13 percent to 14 percent for the 5-ton posting.

Under any scenario of lifting seasonal restrictions, the predictable result is shorter pavement life. To calculate what that shorter pavement life would cost, researchers assumed an average cost of \$67,928 per mile for a thin overlay on 7-ton roads (and \$69,122 per mile for 9-ton roads). They also assumed that, on average, roads were in the middle of an overlay period, and that overlays would be needed no more frequently than every 17 years.

As expected, pavement life for most road links studied in the three counties was longer under a SLR policy than without such a policy. (A few road links benefit from the absence of SLR as traffic patterns change.) Without SLR, most roads would require that the next overlay during the pavement life would come sooner, thus driving up maintenance costs. Based on the proportion of roads likely to require the earlier overlay, researchers estimated the additional cost to be \$3,757 per mile.

In Lyon County, for example, the present value of those *additional* costs for roads (over a theoretically expected road life of 42.5 years) total \$438,642. *Present value* is an estimate of the value today of dollar costs (or benefits) occurring in the future (i.e., correcting for the time value of money). Since researchers acknowledge the absence of reliable data on the current condition of many of these roads, it is possible that accelerated damage would push a road's condition past the tipping point that invites total reconstruction of pavement, which would cost considerably more. In addition, Mn/DOT pavement experts, whose concerns are detailed on page 6, believe this study significantly underestimates these costs. The researchers, however, believe that the incremental cost attributed to lifting spring load restrictions is \$438,642.

Under any scenario of lifting seasonal restrictions, the predictable result is shorter pavement life.

What did the research show to be the economic benefits to shippers and carriers of lifting restrictions?

The economic impact of SLR on industry is the sum of all the behaviors and adjustments people make if they observe the restriction. Some shipments are delayed, resulting in a catch-up period in the summer. Some trucks run with lighter loads, even if that means making multiple runs. The large firms are more likely to have diverse fleets so that they can use fully loaded smaller trucks. Finally, drivers may simply navigate around restricted zones.

All behaviors and adjustments in response to a road restriction add to an economic impact borne by carriers and their customers. Researchers used two different approaches to estimate these economic impacts: an operating-expense-per-mile method and a value-of-time method.

To determine the increased operating expenses due to SLR (and thus the economic benefits of lifting SLR), researchers first conducted a freight-demand analysis to estimate the additional traffic borne by county and local roads as a response to prevailing SLR policy. Here are the estimates of increased traffic loads:

- 5-ton roads—30.4 percent
- 7-ton roads—30.9 percent
- 9-ton roads— 6.3 percent

Applying these estimates to Lyon County, as a prime example, researchers calculated that lifting SLR would result in carriers driving 4,439 fewer miles per day.

Previous research has found that the operating expense for carriers is \$1.11 per mile. Using this first approach, the total economic impact to shippers and carriers in Lyon County is \$4,927 per day. If the SLR period is eight weeks, that adds up to \$275,963, or a present value across the expected 42.5-year life of the Lyon County local roads of \$6,057,602.

In the second approach to calculating economic benefits of lifting SLR, researchers point out that time also has a value. During the interviews with industry representatives, researchers used a set of scenarios to measure trade-offs involving more or less travel time and lighter or heavier loads. They calculated the point at which drivers would likely risk a fine to carry a heavier load. The resulting estimate of the value of time was about \$52 per hour. Again using Lyon County as an example, carriers would collectively save an estimated 49 hours per day if SLR were not in effect for those eight weeks. These time savings produced a present value of \$4,548,419 over the life of all Lyon County roads.

Applying these estimates to Lyon County, as a prime example, researchers calculated that lifting SLR would result in carriers driving 4,439 fewer miles per day.



Benefits/costs comparison

Researchers essentially concluded that the benefits to industry from lifting restrictions significantly outweighed the costs of marginally higher damage to local roads.

What did researchers conclude in their comparison of the benefits of lifting restrictions with the increased public cost?

Researchers essentially concluded that the benefits to industry from lifting restrictions significantly outweighed the costs of marginally higher damage to local roads.

In the Lyon County example, the present value of the cost of increased damage to the roads due to lifting SLR is \$438,642. The economic benefits of lifting the restrictions to shippers and carriers considerably exceed the costs, regardless of which method of estimating benefits is used. The present value of the economic benefit of lifting SLR using the operating-cost method is \$6,057,602, resulting in a benefits/costs ratio of 13.8. The present value of the benefits using the value-of-time method is \$4,548,419, producing a benefits/costs ratio of 10.4.

The results in Lyon County were replicated in the other study areas, where the benefits of lifting

restrictions beat the cost of additional repairs by better than 1.0. Under all the scenarios examined in the sample counties, this ratio ranged from close to a break-even level to levels as high as 22:1.

Researchers also calculated the costs statewide of pavement damage if the spring load restrictions were lifted. Assuming again a 42.5-year road pavement life, two ranges emerge. For scenarios assuming present practices of maintenance (one overlay every 17 years, on average), the average annual costs statewide, attributable to lifting restrictions, range from \$3.5 to \$4.8 million. Funds to cover these costs would be needed to maintain roads if SLR was lifted. However, the statewide economic benefits—as shown in the analysis above—would far exceed these costs.

Under scenarios assuming upgrading pavements at the point when overlays would be scheduled, the costs rise to a range of \$42 million to \$58 million per year. This exceeds the benefits of lifting SLR but may be good public policy for other reasons.

Key concerns

Mn/DOT pavement experts have serious concerns about both the validity of the pavement modeling and the damage-cost estimates used in this research.

What do practitioners and materials specialists say about these findings?

Mn/DOT pavement experts have serious concerns about both the validity of the pavement modeling and the damage-cost estimates used in this research. Mn/DOT developed the MnPAVE modeling tool to support the professional development of engineers engaged in designing highways. As such, MnPAVE has not been used as a pavement design tool, and is not a reliable methodology for predicting existing pavement performance. Even in its limited role, this tool is focused on high-volume highways, certainly not existing county or local roads. It does not predict most pavement distress. Calibration of a design tool to real-world performance would require extensive verification.

Further, Mn/DOT pavement experts believe the study significantly underestimates the costs of repairing damaged roads. The primary repair assumed is a relatively thin structural overlay for all situations, a remedy too simple in view of the complex engineering usually focused on repairing a road section. Mn/DOT offers a list that shows the greater complexity of cost in repairing damaged roads:

- Defects from the existing pavement reappear quickly in thin overlays. Any increase in structural capacity is overwhelmed by existing distresses. Paint on an automobile provides a useful analogy. Additional layers of paint on a new car may lengthen the life of that surface. But merely painting over the surface after rust emerges is a short-lived remedy. Thin overlays

- on roads in varying stages of decay produce the same result.
- Many restricted roadbeds are built on weak subsoils, requiring excavation and complete reconstruction to get any performance gain—a remedy bearing substantially more expense than an overlay.
- An overlay often involves the necessity of other improvements simultaneously. Curbs, gutters, and storm sewers—all of which exist within or flush with the road—may need replacement to sustain drainage patterns.
- More right-of-way is sometimes required, particularly to improve drainage. Shoulders might be added or widened, or culverts replaced, or guardrails upgraded. None of these associated costs is reflected in the cost-modeling calculations.

Mn/DOT managers also point to the real-world constraints on funding, which have lengthened the maintenance intervals from the more idealized standards envisioned by the study.

Research validation

What measures did the researchers take to confirm the validity of their findings?

Several “sensitivity” tests were conducted in an effort to see if the principal finding of a favorable benefits/costs ratio would hold up. Four critical questions were posed:

Would upgrading roads at different intervals change the direction of the findings?

Researchers laid out five scenarios, ranging from overlays every 17 years to a very aggressive, up-front upgrading of all 7- and 9-ton roads. The amount of truck traffic associated with each scenario was assumed to be proportionate to the degree of SLR-policy flexibility.

The results generally did not suggest that upgrading all roads would be cost-effective. (The study did not determine which roads would benefit most from upgrading.) Of the three counties studied, only in Olmsted was there any indication that the benefits of upgrading all the roads would outweigh the costs. In Lyon and Olmsted counties, the scenario that lifted SLR on 7- and 9-ton roads and upgraded the 7-ton roads at the first overlay point produced respectable benefits, but still less than the costs. The most cost-effective scenario involved maintaining the load limits on all 5-ton roads (whether paved or not) but

lifting restrictions on all 7- and 9-ton roads, and observing the schedule for overlays assumed in this research. Researchers also suggest that upgrading selected roads might be cost effective.

Researchers were quick to point out that local roads are not all in the same condition. Though some roads are relatively new or upgraded, many others are aging, some even showing signs of neglect. Some roads—eventually all—require reconstruction, which comes at a much higher cost than overlays. Local county engineers are the best judges of whether that investment, on a case-by-case basis, would make a difference.

How firm is the benefits/costs finding when compared with different estimates of pavement-life savings attributable to the SLR policy?

To test this proposition, researchers took the differences between pavement life with and without the SLR policy, and then exaggerated them by multiplying the savings by 2, then 3, then 5, and 10. Even multiplying the savings attributable to the limits policy five-fold does not disturb the basic conclusion of the study. Only when exaggerating the SLR savings by 10, does the benefits/costs ratio drop to less than 1.0 in some of the study areas.

Several “sensitivity” tests were conducted in an effort to see if the principal finding of a favorable benefits/costs ratio would hold up. Four critical questions were posed.

The study relies on MnPAVE modeling of road life and damage rates. What about real-life observation of road failure?

Actually, a study more than 30 years ago relied entirely on physical examination of road failure in Minnesota. Data for what is still called “Investigation 183” was collected in the 1960s and 1970s. Even using this more empirical or field-based approach, the benefits/costs ratio for lifting SLR on 7- and 9-ton roads remains significantly better than 1.0.

Would these findings also apply in small cities?

The research applied the modeling to one small city, Crystal, which offered a typical set of conditions. Crystal has state highways that take most of the heavy commercial traffic. Its core street network accommodates school buses, waste hauling trucks, and the occasional moving van, in addition to regular car and light truck traffic. The benefits/costs ratio of lifting spring load limits applied with equal confidence in this setting.

Recovering costs

The researchers laid out some possibilities for how the public could recover the marginally higher costs of repairing roads without SLR.

How could costs of lifting seasonal restrictions be recovered?

Some groups will be enthusiastic about the prospect of lifting restrictions. Anticipating that, the researchers laid out some possibilities for how the public could recover the marginally higher costs of repairing roads without SLR.

Let’s say that for every dollar the public pays to maintain these roads at acceptable standards without SLR, the industry enjoys a two-dollar savings. So why not charge that dollar to industry, spreading it proportionately over all shipments? The public gets more support for roads that must be maintained, and the industry saves the other dollar.

How would new revenues be collected?

Most obvious seems to be a **diesel-fuel surcharge**, since it is a reasonable proxy for amount of travel. It is roughly proportionate to distance, and to the degree that heavier loads burn more fuel, somewhat related to weight as well. To recover costs of lifting SLR, the state would need to impose a surcharge of a half cent per gallon. For 6 to 8 cents a gallon, all 7-ton roads could be upgraded to 9 tons.

As with other fuel charges, point-of-purchase options complicate estimates. Would interstate truckers systematically constrain their fuel purchases if Minnesota exacted higher rates? Probably.

Another means of collection is the **annual registration**. This system would see charges ranging from \$42 to \$58 per unit, on average, to recover costs from additional damage due to lifting SLR. Researchers suggest that a fee from \$501 to \$690 annually would finance a structural overlay sufficient to upgrade all 7-ton roads to 9 tons.

A **weight-distance tax**, currently used by Oregon, is intriguing. It remains immensely controversial even there, but most economists consider a weight-distance tax the fairest and most rational approach to distributing the cost of road damage among users. Combining odometer and bill of lading readings, it is plausible to get fair measures of accuracy and compliance. Certainly emerging technology involving transponders and electronic bills of lading would enhance the efficiency of this scheme.

What’s left? Little, other than some sort of **permitting** scheme, the practicality of which depends on a level of information technology that may be beyond today’s norms of operations in the industry. Some operators have sophisticated systems; others, particularly small companies, may still hold bills of lading in shoeboxes. On the other hand, some firms, because of their specialized local needs, might underwrite local improvements themselves.

Policy change—but only at a price

Any shift in policy should benefit both taxpayers and the trucking industry. But what is critical is balancing policy change with adequate revenue to protect the public trust in maintaining Minnesota's local roads. Skeptics foresee a push to lift restrictions without a revenue plan to keep roads up-to-date. This research clearly shows that doing one without the other is a bad idea. Besides, these roads under SLR restriction are supported substantially from local property taxes. Not surprisingly, local officials might well want to reserve the last word on this issue for themselves. They're levying the taxes.

Inevitably, policy change will be debated without knowing some things at a comfortable level of confidence. Chief among the uncertainties is the rate of compliance with today's policy. Actual data not being known, researchers chose to assume 100 percent compliance. But since full compliance is unlikely in the real world, then it is fair to say that the estimates of the actual costs to carriers are somewhat overstated. If that is so, however, so are the benefits attributed to the SLR policy; damage is occurring anyway. Researchers built a case saying that even if compliance is less and damage commensurately higher, the benefits of lifting SLR still outweigh the costs.

Other matters not known with certainty should give lawmakers pause. Too little is known about the characteristics and condition of the roads now under SLR. Researchers found only marginal increases in the cost that might be generated by lifting restrictions. But no one knows how many miles of road are near the point that even marginal damage will push them into a category that requires major reconstruction.

Observing the objections and concerns of pavement specialists at Mn/DOT, the Minnesota Legislature might well call for additional research before

embracing a major shift in SLR policy. The researchers themselves expressed a need for more and better data on the age and condition of the roads on which the research focused. Their study used a modeling technique (corroborated with data from a 30-year-old study) to predict damage in part because resources were not available for more extensive field-based approaches.

Mn/DOT specialists say more research should be aimed at producing an accurate model for predicting pavement distress on low-volume roads. Local transportation experts should be directly involved in the development of a methodology that captures a realistic picture of the types of pavement repairs and pavement damage costs that would be generated by removing spring restrictions. The sample size, they emphasize, must be sufficient to assure a high level of confidence.

In the final analysis, it is still a matter of money. The logic of the policy shift collapses without a means of raising revenues sufficient to keep the roads intact and navigable for all carriers and travelers. The ultimate solution—improving materials to a strength point of 10 tons, for example, so that the weight of large trucks becomes irrelevant—makes sense to everyone involved, except to lawmakers who would have to write the check for the enormous up-front costs. There is currently no prospect of funding that assures that all loads could use all roads with no consequences to pavement life.

The challenge for Minnesota lawmakers is to obtain whatever further information is needed, and then debate the prospects of lifting these long-standing restrictions along with a practical mechanism to generate revenue sufficient to maintain the local roads that are so vital to Minnesota commerce. This research by the University of Minnesota is an important step in helping lawmakers address this challenge.

Skeptics foresee a push to lift restrictions without a revenue plan to keep roads up-to-date. This research clearly shows that doing one without the other is a bad idea.

The challenge for Minnesota lawmakers is to ... debate the prospects of lifting these long-standing restrictions along with a practical mechanism to generate revenue. ...



Center for Transportation Studies
University of Minnesota
200 Transportation and Safety Building
511 Washington Avenue S.E., Minneapolis, MN 55455
Phone: 612-626-1077 Fax: 612-625-6381
E-mail: cts@umn.edu Web: www.cts.umn.edu

The University of Minnesota is an equal opportunity educator and employer.

This publication is available in alternative formats.

Printed on paper with 30 percent postconsumer waste.