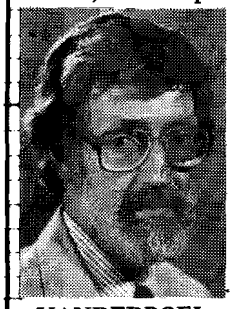
Use Road Revenues For The Roads That Are Used

Minnesota should reduce the size of its trunk highway system, re-examine and possibly eliminate the use of salt as a deicer, and adopt a weight-mile method for taxing heavy trucks, according to the CL Roads and Bridges Committee report adopted by the board last week.



VANDERPOEL

The committee was chaired by Peter Vanderpoel. The following persons served on the committee: Emil Brandt, W. Scott Carlson, James Denn, David Ekern, Janet Estep, Dean Fenner, A. Edward Hunter, Robert Johnson, Norma Lorshbough, Susan McCloskey, Palmer Peterson, Harry Reed, Mary Sullivan, Robert Teetshorn, Jane Tschida, Joane Vail and Erling Weiberg.

Overall, Minnesota maintains an extensive system of highways and roads–the fifth largest in the nation–and the system is in good shape, the committee found. 1981 Highway sufficiency figures supplied by the Minnesota Department of Transportation (MNDOT) show 61 percent of the state's trunk highways are in good or excellent condition.

The condition of the state's road system has not been deteriorating in recent years, the committee found. In 1975, 62 percent of the system was judged to be good or excellent, using the same measures. In addition, the sections of the road and highway system that are somewhat more deteriorated are the least-used portions of the system.

A 1981 MNDOT report showed 67 percent of the principal arterial roads as being in good or excellent condition.

The trunk highway and county state aid highway systems account for 79 percent of the miles traveled and contain only 32 percent of the deficient bridges, the committee said. This 32 percent of deficient bridges represents 71 percent of the estimated repair costs anticipated, the committee found.

The most frequent causes of bridge deficiencies are inadequate load carrying capacity and width, not structural condition, the committee said. Of the 4,325 bridge deficiencies found by MNDOT in July 1982, only 935 (21.6%) have to do with condition, with 2,574 load deficiencies (59.5%), and 2,197 width deficiencies (50.8%) cited. Some bridges have more than one deficiency.

"Although the trunk highway system is in good condition today, Minnesota faces a major decision as to how to best use its highway dollars in the future," the committee concluded. Demand exists in the Legislature, in the business and labor communities, and other communities of interest to continue building new roads and to upgrade the carrying capacity of existing routes, the committee said.

Evidence suggests that Minnesota's investment in the road system is already too thinly spread, the committee said.

"Based on the Department of Transportation's data, an ideal replacement cycle for a 12,000 mile trunk highway system would be to resurface, recondition, or reconstruct 675 miles per year," the committee said. "In 1981 and 1982 the state was able to maintain only 522 miles and 550 miles respectively in these catagories."

Projections show fewer miles will be rebuilt each year, the committee said. Similar problems exist with bridges.

"To maintain all of the existing state trunk highway bridges on a regularly scheduled cycle of maintenance would require the repair or replacement of 90 bridges per year," the committee said. "In 1981 and 1982 the state was able to repair or replace only 50 and 60, respectively."

It will be impossible for the state to maintain the system at its present large size and capacity, the committee concluded, so a way must be found to reduce the system to a size which can be maintained and which also meets the basic transportation needs of the state.

"Those trunk highways that are principal arterials, serve major economic centers, cities over 1,000 population and have average daily traffic volumes over 2,000 vehicles per day should be retained as part of the core highway network," the committee recommended. Using these criteria, a system of 6,875 miles would be required, not the current 12,000 mile system.

State trunk highways which do not meet the criteria should be turned back to local jurisdictions, the committee said. Local units of government should decide whether to retain roads currently under their jurisdiction in addition to former trunk highways, the committee said. Counties and cities should also decide on improvements and the level of services on these roads.

"Several sources of revenues should be used to return state trunk highways serving local purposes back to local governments," the committee said.

The committee recommended that a portion of the state share of the Highway Users Fund be set aside to upgrade roads currently on the state system which would be turned over to the counties so that when the roads are turned over they are in good condition. Additionally, the committee said the counties should be directed to use the special fund which is used to upgrade county roads to repair roads on the county system which would be turned over to cities and townships.

The committee recommended the Legislature establish a special commission to develop plans for the turnback to local units of roads which will be taken off the state system. One of the items the commission should study is changing the

TRUNK HIGHWAY SUFFICIENCY RATINGS BY MILES

Year	Excellent	Good	Fair	Poor	Total
1975	3,830 (32%)	3,660 (30%)	2,890 (24%)	1,740 (14%)	12,120 (100%)
1979	3,720 (31%)	3,230 (27%)	2,820 (23%)	2,310 (19%)	12,080 (100%)
1980	4,000 (33%)	3,090 (26%)	2,790 (23%)	2,220 (18%)	12,100 (100%)
1981	4,349 (36%)	2,990 (25%)	2,696 (22%)	2,037 (17%)	12,082 (100%)

SOURCE: MNDOT

existing highway allocation formula which dedicates 62 percent of gas taxes and other user fees to the state, 29 percent to the counties, and nine percent to the cities and townships for road spending.

The commission should be composed of legislators, representatives of local governments, and citizens appointed by the Governor, the committee recommended.

Salt Use a Problem

"The 1983 Legislature should direct MNDOT to perform a cost-benefit study of salt as opposed to other deicers," the committee recommended. "The study should account for all costs, not merely purchase price, and render an opinion on the feasibility of substituting another deicer for salt. MNDOT should make its report to the 1984 Legislature. If feasible, the Legislature should ban the use of salt by June 30, 1985."

The use of salt to remove ice from roads and bridges is common here and elsewhere. Other deicers are available to accomplish the same function, the committee said, but they are typically initially more expensive. For example, road salt costs roughly $20 per ton and prilled urea—the substance used by the Metropolitan Airports Commission to clear airport runways—costs $235 per ton. Prilled urea is used at the airport because the Federal Aviation Administration prohibits the use of salt having determined salt will damage aircraft hydraulic systems and create a safety hazard.

A report prepared for the House Transportation Committee in 1978 pegged the cost of structural deterioration to roads and bridges at anywhere from $70 to $500 million annually. Using these figures, the committee calculated the average annual cost per car in Minnesota to be $10.07 if prilled urea were used and between $21.12 and $143.99 for the total public cost of using salt, including the direct costs of buying the salt and the indirect cost of the damage done to roads by salt.

In addition, there are private costs to car owners for rustproofing and rust repair which are attributable to salt use, the committee said.

Truck Weight Mile Tax Adoption Urged

Federal and state studies have shown that a disproportionate amount of damage to roads is done by trucks, especially heavy trucks, although the relative damage by trucks compared to cars is difficult to measure exactly, the committee said. Truck size and weight limits have been increased in recent years and the number of five-axle trucks increased by more than 800 percent between 1960 and 1980. Truck traffic has been increasing more rapidly than general traffic, the committee said.

Trucks are carrying an increased proportion of the state's grain shipments, the committee said. In 1975, roughly 30 percent of the grain shipped out of the Duluth-Superior harbor was brought in by truck; by 1979, that percentage had increased to 50 percent.

Many of the deficiencies in Minnesota's road system identified by MNDOT relate to insufficient load carrying capacity or bridge width, the committee said, and the correction of these deficiencies would mainly help truckers.

Adoption of a truck mile tax would more fairly spread the cost of repairing and maintaining the road system, the committee said.

Under a weight-mile tax, trucks weighing more than 20,000 lbs. would be exempt from existing registration fees and fuel taxes. Instead, the trucks would pay quarterly fees based on the weight of cargo hauled and the distance covered. Weight and distance would be calculated on the basis of bills of lading which must be filed with the Interstate Commerce Commission.

A weight-mile tax would tax heavy trucks on the basis of damage they actually do to the roads. Trucks which travel few miles and carry relatively lighter loads would pay less than those which run long distances and are full most of the time.

Farm-to-market trucks would pay based on the grain actually carried, not on the presumed carrying capacity or full-load capacity of the vehicle.

The committee recommended that the Legislative Auditor be charged with determining a system of weight-mile taxes which would bring in no less than the current system but apportion the burden so that the heaviest and highest-use vehicles pay more of the costs.

A minority report objecting to the recommendation for a weight-mile tax was filed by committee member James Denn. Committee members David Ekern and Robert Johnson dissented from the report but did not file minority reports.

Copies of the full report and the minority report are available from the CL office. Write Citizens League, 84 South Sixth Street, Minneapolis, MN 55402 or call 338-0791.

ROAD SYSTEM RECOMMENDED BY CL COMMITTEE

	MILEAGE	ACCUMULATIVE TOTAL
All rural principal arterials & all urban trunk	5,150	5,150
Wholesale-retail center (9)	---	5,150
Complete shopping centers (35)	---	5,150
Partial shopping center (55) (17 not served by principal arterials)	950	6,100
Population center of 1,000 (144) (25 not served by principal arterials)	510	6,610
Agribusiness (32)	15	6,625
Mileage of 2,000 Average Daily Traffic	250	6,875

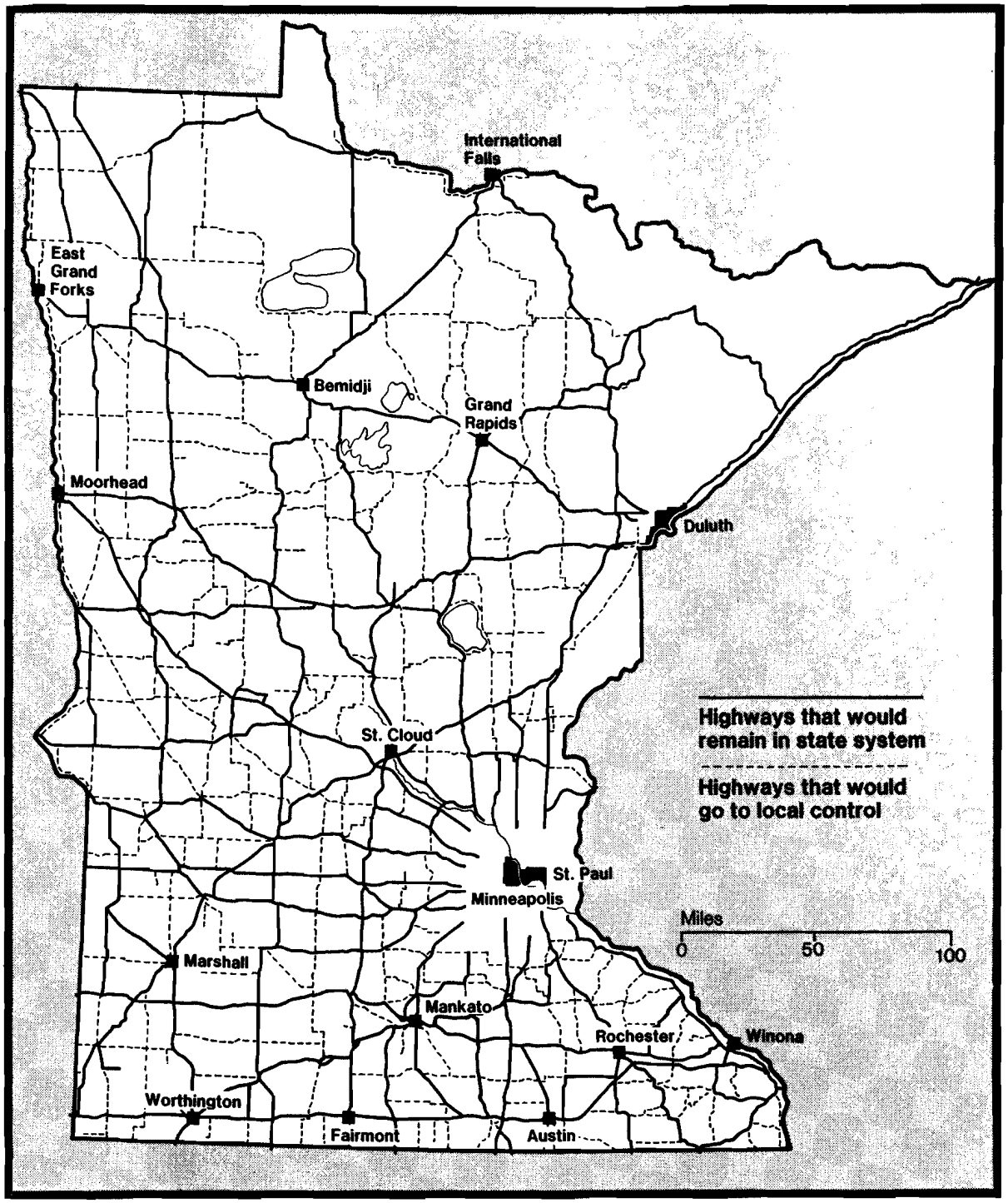
NOTE:

1) Does not include seasonal peak average daily traffic routes
2) Does not address county and city routes which carry traffic volumes over 2,000 average daily traffic
3) All mileages are approximate

The chart above shows the approximate mileage which the state highway system would have using the criteria recommended by the League. The column at the left shows the types of roads and types of population centers which would be maintained on the state system.

Citizens League Report

Use Road Revenue for the Roads That Are Used



Citizens League non-partisan public affairs research and education in the St. Paul-Minneapolis metropolitan area. **84 S. 6th St., Minneapolis, Mn. 55402 (612) 338-0791**

Citizens League Report

USE ROAD REVENUE FOR THE ROADS THAT ARE USED

Prepared by
Roads & Bridges Committee
Peter Vanderpoel, Chairman

Approved by
Citizens League Board of Directors
March 2, 1983

Citizens League
84 South Sixth Street
Minneapolis, MN 55402
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INTRODUCTION

This study represents the first of two major efforts by the Citizens League to review the condition of the state's major public works investments. A second study, already begun, will analyze other areas including sewer and water systems.

In this report we have examined the condition of the state's trunk highways and bridges. Although some evidence is presented on the condition of county state-aid and municipal state-aid roads, they were not the focus of this study. Because so much national and local attention has been focused on the "infrastructure crisis," our committee wanted to understand exactly what local data showed the condition of the state's roads and bridges to be. In doing so, we tried to comprehend exactly what was "deficient" about the present system and on which roads such "deficiencies" lay.

Minnesota's roads and bridges are in better condition today than we expected, although careful study renders a mixed prognosis. While two-thirds of the state trunk highway system is in good condition, at least one-third is not. Although the trunk highway system and state-aid roads contain only a minority of the state's deficient bridges, they are responsible for over two-thirds of the reported costs of bridge repair.

The committee concluded that the condition of Minnesota's roads and bridges will be a continuing problem. But the larger problem is how Minnesota spends its highway user revenues. Minnesota faces a choice. It can either continue to make incremental improvements to the entire trunk highway system or it can act to preserve the integrity of a core system of highways. It cannot do both.

The committee tried to look at the problems of the state's highway system from a statewide perspective rather than a parochial one. The issues which surfaced during our deliberations were of a statewide nature and we addressed them as such.

The committee recommended that the state trunk highway system be substantially reduced, moving from a 12,200 mile system to one no larger than 7,000 miles. Highways which are principal arterials, major economic centers, serve cities with populations of over 1,000 and have average daily traffic volumes of 2,000 or more should remain as part of the core state highway system. All of the others should be returned to local levels of government.

The issue, for us, is not so much whether additional revenues are raised but how they would be spent. From our perspective any state tax increases resulting in higher highway user fees should be strictly tied to reduction of state trunk highway miles and ongoing reconstruction aimed at preserving a core system. Beyond that the only other appropriate use of such revenues would be in the correction of structural problems and the elimination of serious safety hazards. We could not support new construction designed to increase the capacity of the system.

Our criteria for a reduced state trunk highway system was patterned after the Minnesota Department of Transportation (MnDOT) backbone plan of the early 1970s. One of the goals of that plan was outstate economic development. We believe our plan would facilitate that goal as well. There can be no doubt that the existing state trunk highway system is a rural network. Fully 92 percent of the mileage on the system is rural. In a state like Minnesota, with its dispersed population, the trunk highway system should remain largely rural.

Roads taken off of the trunk highway system would not be abandoned. Instead, they would be turned over to local governments for whom they would likely become a higher priority for reconstruction and regular maintenance than they are now as part of the state system. In that sense, rural areas could experience better service on these roads under our plan than they currently enjoy.

FINDINGS

Minnesota is beginning to move from increasing the capacity of its state trunk highway system to simply preserving the existing system. As priorities change, new options are being examined, including the possibility of reducing the size of the system.

In the 1960s and 1970s Minnesota completed the construction of its trunk highway system and began to improve it in other ways.

For the last 60 years Minnesota has been slowly, methodically building up its road system. Having finished the trunk highway system, the state moved to improve it by increasing its traffic capacity and ability to carry heavier commercial loads.

Concurrently, state and national standards increased. Lanes became wider and the state added more of them. Four-lane highways and even six-lane highways were built to handle increased traffic volumes and minimize congestion.

To enable highways to withstand heavy loads from trucks, standards on pavement depth increased. Where years ago the depth of concrete pavement sections varied from the edges of the road inward, today's highways are of a uniform thickness. Because of these changes the highways can now handle much heavier loads. Years ago, Minnesota state highways were built to handle five-ton loads. Slowly that shifted upward, first to seven tons, then to nine tons; finally, in the late 1970s, MnDOT began designing some roads for 10 tons. (In 1977 MnDOT calculated that redesigning the system to a 10-ton standard would cost about $3.1 billion.)

In the late 1960s, an American Association of State Highway Officials report found that most off-the-road accidents occurred within 30 feet of the highways and recommended new standards to improve the safety of the roads. The slope of road embankments became more important. They had to be graded to the point where the driver, if he went off the road, could safely recover with minimum damage to himself or his vehicle. Trees were cut along highways in order to remove potential hazards and ditches were bottomed out to allow drivers to regain the highways.

Consequently, the definition of what a "road" is has changed. A "road" today is not simply a paved pathway for vehicles, but rather a structure of a certain width and depth, able to carry a specific load.

And as roads have expanded in definition so has the idea of maintenance. Maintenance includes much more than simply the road itself. It includes, for example, the shoulders of the road, its slope, the slope of the embankment and the depth of any ditch alongside the roadway.

All these changes provided more "service". They provided maximum amounts of safety, thereby minimizing risk and personal responsibility. They minimized inconvenience and congestion by providing conditions in which traffic could move at higher speeds.

Special interest groups supported increases in these standards. Insurance companies, for example, were interested in having the safest roads possible in order to reduce risk. Truckers and, increasingly, farm-truckers sought to increase load carrying capacity to even higher weights. The construction industry gained new opportunities to sell its products.

These groups, while not determining the standards directly, often affected the substance of road standards and design specifications. Their interests, on one pivotal point all coincided with those of the highway engineer–to build the most "modern" roads possible in order to provide more "service".

As the state assumed more miles and more responsibilities, it added staff. This staff build-up began in the 1950s when interstate construction began. MnDOT had an authorized staff complement of 6,403 employees and 5,510 actual employees.

But as the state's role increased, so did the demands on it. In the early 1970s the department began to realize that a backlog of improvement projects existed which could not be financially realized. So it proposed a "backbone plan" of improvements which would make the most long term sense to the state and its economy. The impetus for this plan came from several key developments. According to the backbone plan these were:

- Demands and requests for highway improvements throughout the state far exceeded the Department of Transportation's ability to finance them.
- Road improvements contained in the department's high-

way program surpassed available finances.

- Construction standards had been increased by the federal government for all projects involving federal funds, resulting in sharply increased costs.

- Inflationary forces had reduced the amount of construction that could be obtained.

- Revenues had not been increased for state highway construction by the 1971 state legislature.

Although the department realized that funding all of the requests from local communities for road improvements was impossible, it programmed many of them. That allowed state monies to be spent for engineering studies, cost estimates and the like. Since there was usually a lead time of six to eight years from conception of a project to the letting of contracts, state engineers believed there was always the possibility that the funding would be provided. The net result, however, was that the state found itself promising more improvements to local communities than it could produce.

By the end of the 1970s, Minnesota's financial ability to make improvements had tapered off.

When Richard Braun became commissioner in 1979, the backlog of promised projects still existed. As he later described it in an interview with *Corporate Report* (October 1982):

> "About a year or two ago, we prepared a list of projects that the Department had spent money on. We genuinely felt that some day those projects were going to be built. The list totalled $1.2 billion. That's trunk highway work, not interstate work. Well, there's no way you're going to build those kinds of facilities in today's climate. If you look ahead, you'll see that we are just not going to build those facilities. We're just leading the public on."

Despite the decline in public resources, by the end of the decade, the Department of Transportation increased the number of four-lane state expressways, resulting in a six percent increase in the number of lane miles of highways on the state system. From 27,074 lane miles in 1970, the system grew to 28,719 lane miles in 1983, partially as a result of the interstate completion. During the same period, the state increased the number of interchanges from 206 to 468, a 125 percent increase.

In recent years, however, the state has been forced to cut back—on staff, on program improvements, and on standards.

- **Staff cutbacks.** From 1970 to 1983 MnDOT has experienced a six percent cut in its number of maintenance workers. Overall MnDOT staff has been cut back by 30 percent from 5,510 actual employees in 1970 to 4,280 in 1982.

- **Program cutbacks.** According to Commissioner Richard Braun, MnDOT has cut "over $350 million out of the highway program since 1979."

- **Standards.** According to a recent design manual, the Minnesota Department of Transportation has mandated that different levels of standards will be applied to two-lane rural highways depending upon the function they serve. The new standards indicate that only "critical deficiencies" will be corrected. The design manual appears to indicate that the state can no longer afford to improve all of its trunk highways at equivalent standards.

Now there is growing talk of reducing the state's trunk highway system.

Both the Minnesota Business Partnership and the Minnesota Taxpayers Association have urged the state to reduce the number of miles on its trunk highway system. Many of the resource people who testified before our committee urged this direction as well. Former MnDOT Assistant Commissioner Peter Fausch questioned, "Ultimately, do we need a 12,200 mile system?" MnDOT Commissioner Richard Braun was even more forthcoming. Braun indicated that the entire road system in Minnesota is too large—"perhaps twice as large as it should be." Turning specifically to the trunk highway system, Braun stated that the state could no longer afford to rebuild or reconstruct the entire trunk highway system to present standards. When asked what the appropriate size of the state trunk highway system should be, Braun responded by stating that a reduced state system should be "between 5,500 and 7,000 miles."

Professor Jerry Fruin at the University of Minnesota's Department of Agriculture and Applied Economics stated:

> "Our rural road system was built during the 1920s and 30s when the average farm was less than 200 acres and farm trucks had gross weights of six or seven tons. In fact, 70 percent of U.S. rural bridges were constructed by 1935. About 50 percent of all the U.S. rural roads were improved before 1950.
>
> "Rural transportation needs have changed considerably since the 1930s. Crop yields have ballooned, U.S. farm size has doubled, and our markets have shifted off the farm into national and international channels.
>
> "Traffic characteristics have followed suit. Tandem-axle trucks with gross weights of 23 tons have become common on rural roads. A farm tractor and two wagons loaded with soybeans can weigh up to 28 tons. These vehicles are traveling over bridges built when eight tons was considered a big load!

"Obviously we must maintain an adequate rural road system to cope with these changes. However, in many parts of the Upper Midwest, we have too many rural roads to maintain efficiently. We no longer need roads that were plotted at one-mile intervals to serve 160-acre farms with horses.

"If we were to lay out a road system today, we could put roads two miles apart and still have better access to towns and markets than we had 60 years ago. If the excess roads were eliminated, the number of intersections and grade crossings would be reduced and the remaining land could be farmed."

Reducing Minnesota's trunk highway system has been recommended repeatedly in the past.

Historically, this idea has come up more than once.

1953 In 1953 there were 11,850 miles on the state trunk highway system. A report to the Minnesota Highway Study Commission, however, recommended a 40,100 mile system composed of 8,750 miles of state trunk highways, 30,500 miles of county state-aid highways and 850 miles of municipal state-aid streets.

1963 A consultant's study recommended reducing the state trunk highway system from 12,100 miles to 8,300. A second study, in the early 1970s, performed at the request of the federal government, made a similar recommendation.

1972 Charles Burrill, former Assistant Commissioner of Highways suggested a "backbone plan" because demands and requests for highway improvements far exceeded the department's ability to finance them. While the backbone plan did not suggest a reduction in the state trunk highway system, it did attempt to prioritize the state's investment in that system by placing high emphasis on trunk highway miles that:

- Promoted outstate economic development (the plan identified 30 to 40 major urban centers and routes which connected them with the Twin Cities).
- Satisfied travel demands of major recreation routes (i.e., those routes which carried more than 70 percent more traffic in the summer than winter).
- Served a maximum number of highway users (i.e., had an average annual daily traffic [ADT] volume of 3,000 or more).

The backbone plan would have limited MnDOT improvement investments to freeways, expressways and select two-lane highways of economic significance to the state.

Other states are actively seeking jurisdictional change. . .turnbacks and system reduction.

Here are some examples with which we are familiar:

- Colorado has state control of jurisdictional change. In 1952, its State Legislature gave the State Department of Highways the authority to return 5,000 miles of state highways to the counties. In Colorado, state control includes the right of the state to unilaterally abandon state trunk highways. In the case of such abandonment, the county has the option of adding the route to its system or of letting it revert to private ownership. If the road is added to the county system, the county would receive additional aid based on how the additional mileage affects its allocation through the normal state aid program.

- Florida is in the process of completing a three-step plan for jurisdictional change and redefinition of the state highway system by: 1) classifying all highways according to function; 2) assigning jurisdictional responsibility based on functional classification; 3) assessing the ability of various jurisdictions to support their highway responsibilities. In turn, this was to have resulted in a reallocation of state highway aids.

  At present about 50 percent of the total first round turnbacks have been made. Completion was scheduled for 1982.

  Florida state legislation also requires that functional classifications, based on quantifiable criteria, be reviewed every five years.

- New York DOT officials began jurisdictional planning efforts based entirely on the functional classification system that was required by the 1973 Federal Highway Act. Implementation requires the agreement of both state and local officials, changes will be made on a one-for-one lane mile basis, and no improvements will be made for realignment unless the project can compete for normal funding.

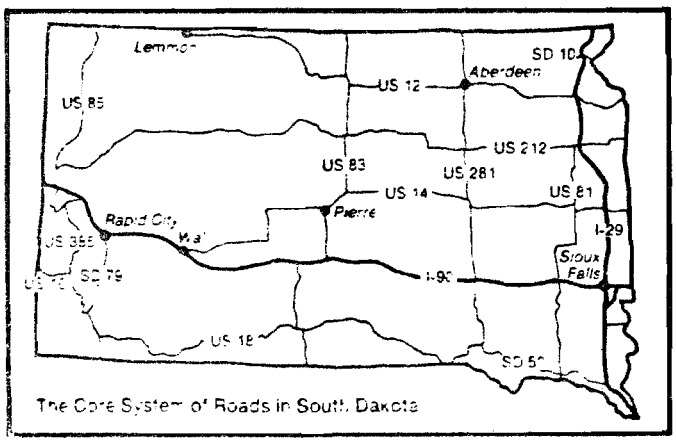
- Arizona has identified a "core" system of state highways which is identical to those highways that the state would retain after realignment. The state concentrates its resources on this core system and expands improvement funds on non-core highways only when there is agreement for turnback.

- Pennsylvania is seeking to return 13,000 miles of the state's 45,000-mile road system back to the local governments. Control of the turnbacks would be vested in an indepen-

dent board appointed by the legislature. The board would have representatives of the Pennsylvania DOT and local governments; it would decide, among other things, the level of roadway improvement before turnback.

- Illinois has identified 5,000 miles of its 17,000-mile system as prime targets for turnbacks to counties. It has adopted a piece-meal approach in not improving low priority roads unless the county agrees to accept the roadway.

- Last year, some members of the South Dakota State Highway Commission launched a proposal to shrink the state's 9,000-mile trunk highway system into a core network about half that size. What would be left, according to commission members, would be highways connecting communities larger than 2,600 population and 60 percent of those between 450 and 2,600. Such roads are said to carry 50 percent of all traffic in the state. The following map appeared in the February 1982 edition of the *Construction Bulletin* and depicts the proposed South Dakota core sytem of trunk highways.



The Core System of Roads in South Dakota

The Metropolitan Council and a regional development commission have initiated discussions of jurisdictional change.

Region 7E in central Minnesota and the Twin Cities metropolitan area have both begun to assess the need for jurisdictional change. In the Twin Cities, a study of this issue is being done by the Metropolitan Council's Transportation Advisory Board (TAB).

The Transportation Advisory Board's *Background Report on Jurisdiction of Highways,* March 1980, contained these major findings:

- All or most governmental units in the metropolitan area could be affected by the implementation of recommendations from a jurisdictional planning study. Several hundred miles of roadway would be affected.

- A jurisdiction study based on a functional classification system would likely recommend that:

  - Principal and intermediate arterials are the responsibility of the state.

  - Minor arterials are primarily the responsibility of counties.

  - Collector and local roads are primarily the responsibility of cities and townships.

- Most jurisdictional changes would likely result in downgrading the jurisdiction of a facility (i.e., from state to county, county to city or township).

- Jurisdictional changes between units of government have been occurring for some time without any formal plan or program and will continue to do so and probably at an increasing rate, as higher levels of government attempt to pass down facilities of lower priority as financial resources become more scarce.

The report concluded:

"The current highway system in Minnesota has developed over a period of 60 years; however, with the exception of the freeway system, most of the major decisions relative to jurisdictional matters were made almost 50 years ago or more. All of the roadways currently under the jurisdiction of the state are responses to Constitutional and Legislative Route descriptions. Almost all of these route descriptions were enacted in 1920 (Constitutional Amendment) and in 1933 (Legislative action). With a few notable exceptions, no new routes other than interstate have been added to the system since 1933. However, things have changed dramatically since the system was established. The seven-county metropolitan region has more than doubled in population. The (region's) 1920 population of approximately 750,000 has now reached approximately two million. The interstate system has been developed and forms an overlay on the trunk highway system. In many cases interstate routes serve the purpose that one or more trunk highways formerly served.

"As long as roadway funding kept pace with road construction and maintenance needs, the existing jurisdictional arrangements presented few practical problems. However, times are changing, roadway funds and all public revenues are becoming more scarce, it is appropriate to review the existing jurisdictional arrangements at this time to insure that they are adequate to meet the existing and future transportation needs of the state and the region."

However, a variety of barriers stand in the way of system reduction and jurisdictional change in Minnesota.

Principally, these barriers consist of the following:

1. **Constitutional barriers.** Essentially there are two of these:

   - Specific trunk highway (TH) routes are designated in the state constitution.

   - The allocation formula for road and bridge funding is fixed in the state constitution.

2. **Turnback standards.** Current statutes require that roads designated for turnback must be brought up to a reasonable standard for future use. Often this is prohibitively expensive because not enough road turnback money is available.

3. **Financing turnbacks.** Local governments will be reluctant to accept former trunk highways unless they receive money to maintain them. Without some additional revenues, possibly on an ongoing basis, local officials will strongly object to turnbacks.

4. **Statutory barriers.** The barriers place legal restrictions on the number of miles which are eligible to be placed on the state aid system. The County State Aid System is limited to 30,000 miles plus trunk highway turnbacks.

   Additions to and deletions from the systems are made by the county boards and governing boards of cities subject to rules and regulations promulgated by the Commissioner of Transportation.

MnDOT data suggest that most of Minnesota's trunk highway roads and bridges are in good condition.

Newspaper articles in recent months have commented on the state's decaying infrastructure. In particular, these articles have focused on the state's trunk highways and bridges–perhaps because potholes are often interpreted as the most visible sign of this problem.

Our committee sought the best information available on the condition of the trunk highways and state aid roads. The Minnesota Department of Transportation generously provided us with such data. We also sought to gain some understanding of the trends affecting these roads over time.

The data which we received from MnDOT show that:

- There has been little change in the condition of the state's trunk highway system in the last five years.

- Those state trunk highway miles that carry the greatest amount of travel are in the best condition.

- The rural trunk highway system, which has the vast majority of total trunk highway miles, is in better condition than the urban system.

- Minnesota has fewer deficient bridges today than it did five years ago.

- The majority of Minnesota's deficient bridges are on roads that carry the least amount of traffic.

- The vast majority of deficient bridges do not have structural problems.

Let's explore each of these points in more detail.

There has been little change in the condition of the state's trunk highway system in the last five years.

The Minnesota Department of Transportation uses two kinds of classification systems in evaluating the condition of its roads. The *sufficiency rating system* assesses the condition of the entire roadway on a scale of 1 to 100, starting with the pavement itself and moving on to evaluations of the width of the road, its shoulders, stopping and sight distance, the ability to pass, the smoothness of the ride and traffic capacity. Load capacity is another key variable in this assessment method. The higher the cumulative rating is, the better the road. (See Table 1)

The second method is called the *condition rating system.* It is a subcomponent of the sufficiency rating method but it is also used as a separate rating system because it renders a good view of the condition of the actual road surface itself. In general, the higher the numerical value, the better the condition of the road. Ratings of 3.6 or greater indicate a new or nearly new surface with a number of years of useful service life available. Ratings of 2.8 or less indicate a need for immediate improvement. (See Table 2)

According to a spokesman for MnDOT, the "sufficiency rating system is used when the goal is to *improve* the system and the condition rating system is used when the goal is to prioritize the preservation of the existing system."

TABLE 1

TRUNK HIGHWAY SUFFICIENCY RATINGS BY MILES

Year	Excellent 80-100	Good 70-79	Fair 60-69	Poor 0-59	Total
1975	3,830	3,660	2,890	1,740	12,120
	(32%)	(30%)	(24%)	(14%)	(100%)
1979	3,720	3,230	2,820	2,310	12,080
	(31%)	(27%)	(23%)	(19%)	(100%)
1980	4,000	3,090	2,790	2,220	12,100
	(33%)	(26%)	(23%)	(18%)	(100%)
1981	4,349	2,990	2,696	2,037	12,082
	(36%)	(25%)	(22%)	(17%)	(100%)

SOURCE: MN Department of Transportation, January 1982

TABLE 2

TRUNK HIGHWAY CONDITION RATINGS BY MILES

Year	Excellent 3.6 or Greater	Good 2.9 To 3.5	Poor 2.8 or Less	Total
1975	2,760	6,940	2,420	12,120
	(23%)	(57%)	(20%)	(100%)
1979	1,850	7,920	2,310	12,080
	(15%)	(66%)	(19%)	(100%)
1980	2,240	7,570	2,290	12,100
	(18%)	(63%)	(19%)	(100%)
1981	2,921	7,024	2,235	12,082
	(25%)	(58%)	(17%)	(100%)

SOURCE: MN Department of Transportation, January 1982

Recent trends in both the trunk highway sufficiency ratings and condition ratings show that the state has been able to keep up with repair work on this system.

The data above indicate that the surfaces of the most state trunk highway roads are in good condition. But it does not show that *all* roads are in good condition. Nearly one-third of the trunk highways are in poor condition. Nor does the data reveal the condition of the underlying roadbed or substructure. Although the committee did receive testimony from MnDOT engineers who feel that the subbase is deteriorating beneath these roads, there is no empirical evidence to decide this point either way.

Those state trunk highway miles which carry the greatest amount of traffic are in the best condition.

Careful examination of trunk highway sufficiency and condition ratings over time give us the "macro" picture of the system. But it would also be helpful to understand the "micro" situation. What condition is the interstate system in? Are the state's most heavily traveled roads seriously deteriorated? How does the condition of the rural trunk highway system compare with the urban network?

Applying sufficiency and condition ratings to what is referred to as the functional classification system can help provide the answers to these questions.

Functional classification groups streets and highways into classes, or systems according to the type of service they provide. Each class performs a different function. *Arterials* serve long distance through trips providing a high degree of mobility. *Collectors* gather traffic from local roads or streets and connect it to arterials. Collectors provide a balance between mobility and access by providing commuters the ability to travel within or between adjacent communities. *Local roads* serve local land use with very little emphasis on longer range trips.

Tables 3 and 4 show how these three basic classes of roads serve various functions in rural and urban areas.

TABLE 3

URBANIZED AND SMALL URBAN AREA FUNCTIONAL SYSTEM CHARACTERISTICS

Functional System	General Characteristics
Principal Arterial	1. Serves the major traffic movements within urbanized areas such as between central business districts and outlying residential areas, between major intercity communities, or between major suburban centers. 2. Serves a major portion of the trips entering and leaving the urban area, as well as the majority of the through traffic desiring to bypass the central city. 3. Provides continuity for all rural arterials which intercept the urban area.
Minor Arterial	1. Serves trips of moderate length at a somewhat lower level of travel mobility than principal arterials. 2. Provides access to geographic areas smaller than those served by the higher system. 3. Provides intracommunity continuity but does not penetrate identifiable neighborhoods.
Collector	1. Collects traffic from locals and channels it into the arterial system. 2. Provides both land access and traffic circulation within the residential neighborhoods, commercial and industrial areas.
Local	1. Comprises all facilities not on higher systems. 2. Provides access to land and higher systems. 3. Through traffic usage discouraged.

SOURCE: Federal Highway Administration

In terms of expected traffic volumes, roads may be divided as follows:

- **Principal arterials** which combine the interstate system and some urban and rural trunk highways are expected to carry 40 to 65 percent of all vehicle miles traveled according to federal specifications.
- **Minor arterials** are expected to carry between 15 to 25 percent of all urban travel and 6 to 12 percent of all rural travel.
- **Collectors and local roads** carry the remainder of the travel.

In tables 5 and 6, 1981 average state highway sufficiency and

TABLE 4

RURAL FUNCTIONAL SYSTEM CHARACTERISTICS

Functional System	General Characteristics
Principal Arterial	1. Serves statewide and interstate travel. 2. Serves virtually all urbanized areas. 3. Provides an integrated, continuous statewide network.
Minor Arterial	1. Links cities and towns and forms an integrated network providing interstate and intercounty service. 2. Spaced at proper intervals so that all developed areas of a state are within a reasonable distance of an arterial highway.
Major Collector	1. Serves urban areas and other traffic generators of intracounty importance that are not served by higher systems. 2. Links these places with nearby towns and cities or with routes of higher classification.
Minor Collector	1. Spaced at intervals, consistent with population density, to collect traffic from locals. 2. Serves all remaining smaller communities. 3. Connects the locally important traffic generators with the less developed parts of the state.
Local	1. Provides access to adjacent land. 2. Serves travel over relatively short distances as compared to collectors or other higher systems. 3. Comprises all facilities not on higher systems.

SOURCE: Federal Highway Administration

condition ratings are presented by functional classification for the state trunk highway system. (Principal arterials have been divided into two groups to provide data on the condition of Minnesota's Interstate System.)

Both tables clearly indicate that the principal arterial system, which carries the greatest share of the state's travel, is in the best condition. Minor arterials, which carry the second greatest share of travel, are in slightly better condition than the collector system.

Given these data, what can we learn?

1. **Minnesota's rural and urban interstate highways, which carry the greatest percentage of total vehicle miles traveled (VMT), are in very good shape.**

   - According to 1981 MnDOT sufficiency ratings, fully 91 percent of this 866-mile system is in excellent (74 percent) or good (17 percent) shape.

   - In terms of actual condition of the pavement itself, MnDOT condition ratings show that 96 percent of the state's interstate system is in either excellent (19 percent) or good (77 percent) condition.

   - Within this system, however, rural interstate highways are in better condition than their urban counterparts. The entire rural interstate system (which comprises the bulk of all Minnesota interstate mileage at 685 miles versus 181 for urban) is rated as being in either excellent (86 percent) or good (14 percent) shape. According to MnDOT sufficiency ratings, the urban interstate system has only 61 percent of its total mileage rating as excellent (31 percent) or good (30 percent).

TABLE 5

1981 AVERAGE STATE TRUNK HIGHWAY SUFFICIENCY RATINGS BY FUNCTIONAL CLASSIFICATION

Roadway Classification	Mileage	Excellent 80 Above	Good 70-79	Fair 60-69	Poor 0-59
Principal Arterial					
Urban Interstate	181	31%	30%	30%	6%
Rural Interstate	685	86%	14%		
Interstate Total	**866**	**74%**	**17%**	**7%**	**1%**
Principal Arterial					
Urban Trunk	523	26%	31%	23%	20%
Rural Trunk	3,440	42%	21%	20%	17%
Remaining Total	**3,963**	**40%**	**22%**	**20%**	**18%**
Principal Arterial System Total	**4,829**	**46%**	**21%**	**18%**	**15%**
Minor Arterial					
Urban	279	10%	28%	17%	45%
Rural	5,383	31%	27%	25%	17%
Total	**5,662**	**30%**	**27%**	**25%**	**18%**
Collector					
Urban	19	11%	5%	37%	47%
Rural	1,546	27%	27%	27%	19%
Total	**1,565**	**27%**	**27%**	**27%**	**19%**
Local Roads					
Urban	9	45%	22%	22%	11%
Rural	17	18%	29%	53%	
Total	**26**	**27%**	**27%**	**42%**	**4%**
Total All Systems	**12,082**	**36%**	**25%**	**22%**	**17%**

SOURCE: MN Department of Transportation, September 1982

TABLE 6

1981 AVERAGE STATE TRUNK HIGHWAY CONDITION RATINGS BY FUNCTIONAL CLASSIFICATION

Roadway Classification	Method	Excellent 3.6 or Greater	Good 2.9-3.5	Poor 2.8 or Less
Principal Arterial				
Urban Interstate	181	31%	64%	5%
Rural Interstate	685	16%	80%	4%
Interstate Total	**866**	**19%**	**77%**	**4%**
Principal Arterial				
Urban Trunk	523	21%	57%	22%
Rural Trunk	3,440	25%	57%	18%
Remaining Total	**3,963**	**24%**	**57%**	**19%**
Principal Arterial System Total	**4,829**	**23%**	**61%**	**16%**
Minor Arterial				
Urban	279	13%	56%	22%
Rural	5,383	24%	56%	20%
Total	**5,662**	**23%**	**56%**	**22%**
Collector				
Urban	19	21%	58%	21%
Rural	1,546	29%	59%	12%
Total	**1,565**	**29%**	**59%**	**12%**
Local Roads				
Urban	9	11%	56%	33%
Rural	17%	23%	54%	23%
Total	**26%**	**19%**	**54%**	**27%**
Total All Systems	**12,082**	**25%**	**58%**	**17%**

SOURCE: MN Department of Transportation, September 1982

2. **The majority of Minnesota's principal arterials are in either excellent or good condition.**

   - According to 1981 MnDOT sufficiency ratings, fully 67 percent of the state's 4,829-mile principal arterials were ranked as being in either excellent (46 percent) or good (21 percent) shape. Of the rest, 18 percent were rated as fair and 15 percent as poor.

   - 1981 MnDOT condition ratings, which examine the condition of the pavement itself showed that 84 percent of the state's principal arterials were in excellent (23 percent) or good (61 percent) condition. Sixteen percent were found to be in poor condition.

3. **Minnesota's minor arterials are in good condition even though they are not in as good condition as the principal arterials.**

   - 1981 MnDOT sufficiency ratings show that 57 percent of all minor arterials were in either excellent (30 percent or good (27 percent) condition as compared to 67 percent of the state's principal arterials. Approximately 43 percent of all minor arterials were rated as being in fair (25 percent) or poor (18 percent) condition as compared to 33 percent of the state's principal arterials. (Eighteen percent of all principal arterials were ranked as fair and 15 percent as poor.)

   - In terms of the condition of the roadway surfaces themselves, 1981 MnDOT condition ratings show that 78 percent of the state's minor arterials were in either excellent (23 percent) or good (56 percent) condition. Twenty-two percent were in poor condition.

   - Although the urban share of the minor arterial system is small (279 miles as opposed to 5,383 rural miles) urban minor arterials are far more seriously deteriorated than their rural counterparts. Approximately 45 percent of urban minor arterials are rated in poor condition as opposed to only 17 percent of all rural minor arterials. Condition ratings show that 33 percent of urban pavement surfaces were rated as poor as opposed to 20 percent in rural areas.

4. **Collectors and local roads appear to be in relatively good condition.**

   - Sufficiency ratings show that 54 percent of collectors and local roads on the state trunk highway system were rated either excellent or good in 1981.

   - Condition ratings indicate that 88 percent of the road surfaces on the collector system were rated as either excellent (29 percent) or good (59 percent).

   - Approximately 73 percent of the surfaces of local roads were rated as either excellent (19 percent) or good (54 percent) condition.

The rural portion of the state's trunk highway system is in better condition than the urban trunk highway network.

This finding is significant since the rural portion of the state trunk highway system accounts for 92 percent of the system's total miles. (See Tables 7 and 8)

TABLE 7

1981 RURAL-URBAN SUFFICIENCY RATING COMPARISON

System	Mileage	%	Excellent	Good	Fair	Poor
Urban	1,011	8%	22%	29%	23%	25%
Rural	11,071	92%	37%	24%	22%	16%
TOTAL	12,082	100%	36%	25%	22%	17%

SOURCE: MN Department of Transportation, September 1982

TABLE 8

1981 RURAL-URBAN CONDITION RATING COMPARISON

System	Mileage	%	Excellent	Good	Poor
Urban	1,011	8%	21%	57%	22%
Rural	11,071	92%	25%	58%	17%
TOTAL	12,082	100%	25%	58%	17%

SOURCE: MN Department of Transportation, September 1982

Minnesota has fewer deficient bridges today than it did five years ago.

Table 9 shows that there were 456 fewer deficient bridges on all Minnesota roadway systems in 1982 than there were in 1978.

The table also indicates that in 1981, for the first time, the number of bridges which became deficient exceeded those which were repaired or replaced. Approximately 228 bridges were replaced or repaired in 1981 while an additional 260 became deficient. It is too early to tell whether this represents a reversal of the past few years in which the state was generally capable of repairing or replacing considerably more bridges than became deficient.

It is important to understand exactly what the term "deficient" means. As a recent article in the *St. Paul Pioneer Press* put it, "deficient does not mean that bridges are swaying in the wind and in imminent danger of collapse." Rather, the article continued, "deficient bridges have less than the standard weight capacity of 23 tons or are simply antiquated in design." Thus, "deficiencies" are more often related to state standards or expectations than to physical problems with roads and bridges. As state standards increase, many structures become classified as deficient. For example, as state standards for load carrying capacity increased, hundreds of bridges suddenly became "deficient" because they no longer met the new standards.

TABLE 9

BRIDGE DEFICIENCIES AND REPAIR/REPLACEMENTS
F.Y. 1978-1982

Roadway Systems	1978	1979	1980	1981	1982
Trunk Highways					
Deficient Bridges	508	482	491	480	469
Repaired/Replaced	46	43	19	24	
New Deficiencies	20	52	8	13	
County State-Aid Highways					
Deficient Bridges	925	850	803	770	778
Repaired/Replaced	123	87	59	64	
New Deficiencies	48	40	26	72	
Municipal State-Aid Streets					
Deficient Bridges	69	72	74	78	74
Repaired/Replaced	12	6	7	6	
New Deficiencies	15	8	11	2	
County Roads					
Deficient Bridges	433	406	374	363	413
Repaired/Replaced	50	50	24	20	
New Deficiencies	23	18	13	70	
Township Roads					
Deficient Bridges	1,738	1,615	1,524	1,478	1,471
Repaired/Replaced	189	161	96	98	
New Deficiencies	66	70	50	91	
City Streets					
Deficient Bridges	188	190	194	202	202
Repaired/Replaced	17	11	12	9	
New Deficiencies	19	15	20	9	
Miscellaneous*					
Deficient Bridges	78	74	76	80	76
Repaired/Replaced	7	3	7	7	
New Deficiencies	3	5	11	3	
Total All Systems					
Deficient Bridges	3,939	3,689	3,536	3,451	3,483
Estimated Replacement Cost	$692,861,000	$744,456,000	$787,388,000	$768,791,000	$809,616,000
Repaired/Replaced	444	361	224	228	
New Deficiencies	194	208	139	260	

*Miscellaneous includes unorganized Township road bridges and bridges on Forest Highways and Reservation Roads.

SOURCE: MN Department of Transportation, October 1982

Table 9 shows that every year between FY 1978-82, local systems (county roads, township roads and city streets) had nearly twice as many deficient bridges as state assisted roads (trunk highways, county state-aid highways and municipal state-aid streets). In 1982, for example, 62 percent of the 3,483 deficient bridges were on locally owned roads as against 38 percent on state-assisted roads.

Table 9 also depicts the effects of inflation on bridge replacement and repair costs. For example, while there were 456 fewer deficient bridges in Minnesota in 1982 than 1978, the cost of bridge repair and replacement had increased by $116.8 million, from $692.8 million to $809.6 million.

The majority of Minnesota's deficient bridges are on systems that carry the least amount of traffic.

Recent data from the Minnesota Department of Transportation (July 1982) shows that of the state total of 19,287 bridges, 4,325 or 22 percent were deficient in some way. The majority of deficient bridges (68 percent) are on systems that carry the least percentage of vehicle miles traveled. The two systems that carry the largest percentage of vehicle miles traveled are the trunk highways and county state-aid roads. Together they account for 79 percent of all vehicle miles traveled. Approximately 11 percent of trunk highway bridges are deficient in some capacity. A slightly higher percentage (17 percent) of county state-aid bridges are deficient in some capacity. Taken together, the total number of deficient bridges on these two systems comprise 32 percent of all the deficient bridges in the state. (See Table 10)

While only 32 percent of the bridges on the combined state trunk highway system and county state-aid highways are deficient, they are responsible for the greatest proportion (71 percent) of estimated repair costs. (See Table 11)

Between 1981 and 1982, 376 bridges were improved at a total cost of $45,564,320. By July of 1982, however, an additional 341 bridges were classified as deficient by MnDOT. The estimated cost of improving these bridges is $84,821,991. While only 25 percent of the 341 deficient bridges are located on the trunk highway or county state-aid systems, they account for 71 percent of the total cost of improvements.

TABLE 11

TOTAL ESTIMATED COST
ALL BRIDGES 10' AND OVER

System	Estimated Cost Of Repair	% Of Total Cost
TH	$358,056,000	43
CSAH	233,630,760	28
MSAS	44,525,000	5
County Roads	40,287,948	5
Township Roads	107,846,600	13
Unorganized Township Roads	2,284,080	1
City Streets	41,145,040	5
Miscellaneous	4,431,960	1
TOTAL	$831,807,388	100

SOURCE: MN Department of Transportation, July 1982

The most frequent causes of bridge deficiencies in Minnesota are inadequate load carrying capacity and width, not structural condition.

In evaluating the condition of Minnesota's bridges it is important to understand the reasons why bridges are determined to be deficient. Essentially there are three major reasons:

- The bridge cannot carry enough weight (load).
- The bridge is not wide enough (width).
- The bridge's structural condition has deteriorated (condition).

TABLE 10

TOTAL ESTIMATED BRIDGE NEEDS
ALL BRIDGES 10' AND OVER

System	% Of Miles	% Of Travel	Bridges On System	Number Deficient	%	% Of Total Deficient Bridges
TH	9	58	4,431	486	11	11
CSAH	23	21	5,324	928	17	21
MSAS	1	8	353	76	22	2
County Roads	12	2	2,196	503	23	12
Township Roads	42	2	6,078	1,989	33	46
Unorganized Township Roads	--	--	82	41	50	1
City Streets	11	8	230	66	35	5
Miscellaneous	2	1	157	72	46	2
TOTAL	100	100	19,287	4,325	22	100

SOURCE: MN Department of Transportation, July 1982

According to MnDOT's most recent figures, Minnesota has approximately 4,325 deficient bridges. A summary of these deficiencies is presented in Table 12. (The total number of deficiencies is more than 4,325 because some of the bridges had more than one deficiency.) From the table it is apparent that the majority of the stated deficiencies have to do with load carrying capacity (43 percent) or width (37 percent). Only 16 percent of the deficiencies have to do with structural condition.

These data raise several important questions:

- If the majority of deficiencies do not relate directly to structural condition or public safety, how many of these bridges should be upgraded at public expense, in order to meet changing vehicle weight standards? At what point do such standards become unaffordable?

- The two major causes of deficiencies (load and width) affect some classes of vehicles, particularly heavy trucks, more than others. To what extent should the costs of upgrading these facilities for heavy trucks be borne by the public sector?

TABLE 12

SUMMARY OF DEFICIENCIES ON ALL DEFICIENT BRIDGES 10' AND OVER

System	Load	Width	Condition	Clearance	Water
TH	115	349	83	81	2
CSAH	453	597	166	53	4
MSAS	28	32	24	33	0
County Roads	375	183	127	10	6
Twp. Roads	1,432	893	456	24	9
Unorg. Twp. Roads	31	16	11	0	0
City Streets	113	74	59	74	0
Miscellaneous	27	53	9	0	0
TOTAL	2,574	2,197	935	275	21

SOURCE: MN Department of Transportation, July 1982

Assessing the condition of the state's county and municipal state aid roads is more difficult, but it is clear that significant improvements have been made.

MnDOT has neither sufficiency nor condition ratings for the County State-Aid Highway (CSAH) system or the Municipal State-Aid Street (MSAS) system. Thus, it is somewhat harder to assess the condition of these systems. County engineers, though, are asked to report the number of deficiencies found in each mile of the CSAH and MSAS systems. If those deficiencies are aggregated and identified by type, they would render some indication of the status of the two systems.

In reviewing data on the CSAH and the MSAS systems, three major kinds of deficiencies are reported. The first of these is cross-section or the width of the road. The second deficiency is design speed. If, for example, a motorist is forced to slow down because of the curvature of the road, the design speed of that road is said to be "deficient". The final deficiency is called structure which relates to the road's load-carrying capacity. These three deficiencies may appear individually, or in combinations.

According to data provided by the Minnesota Department of Transportation, the most frequent deficiencies found on the CSAH and the MSAS systems are related to the width of the roads and how much weight they could carry.

The first thing that is obvious about this data is what it does *not* tell us. It does not tell us what condition these roads are in. It merely tells us that based on existing highway standards, certain numbers of miles in each case failed to meet those standards and were labeled "deficient".

Minnesota has upgraded the load-carrying capacity and improved the surfaces of its state aided county and municipal roads in the last 20 years. This can be readily seen in the changes that have occurred in the surfaces of these roads. Many former gravel roads are now paved.

Tables 13 and 14 depict 1965 and 1981 highway surface types for all county state-aid highways and municipal state-aid streets in Minnesota. Table 13 demonstrates the progress that has been made in converting gravel roads to hard surfaces on the CSAH system during this period. Such progress is even more significant considering that total county-state aid highway mileage increased by 560 miles between 1965 and 1981.

Table 14 reflects mileage by surface type for the municipal state-aid street system. The MSAS includes all cities in Minnesota with populations of 5,000 or more. Illustrated in this table is the significant increase in total MSAS mileage between 1965 and 1981 (from 1,156 miles to 1,832 miles) resulting from increases in the number of cities statewide which experienced population growth and became eligible for MSAS funding. Progress has been made in hard surfacing many gravel MSAS segments. However, these changes are not as readily apparent

TABLE 13

COUNTY STATE-AID HIGHWAYS

Year	Gravel	Hard Surface	Total
1965	15,770 (53%)	13,210 (41%)	29,430 (100%)
1981	9,040 (30%)	20,950 (70%)	29,990 (100%)

SOURCE: MN Department of Transportation, 1982

TABLE 14

MUNICIPAL STATE-AID STREETS

Year	Gravel	Hard Surface	Total
1965	121	1,035	1,156
	(10%)	(90%)	(100%)
1981	169	1,663	1,832
	(9%)	(91%)	(100%)

SOURCE: MN Department of Transportation, 1982

due to significant increases (672 miles) in the total MSAS mileage.

Minnesota's roads have remained in relatively good condition because state and local governments have spent large sums of public money on them.

Table 15 shows Minnesota's 1980 spending per capita in major areas of spending and the percentage of national average for each function.

TABLE 15

MINNESOTA 1980 PER CAPITA EXPENDITURES FOR MAJOR STATE-LOCAL FUNCTIONS

	Minnesota	% of U.S. Average
Education	653	111
Health/Welfare	411	120
Highway	219	149
Police/Fire/ Corrections	93	82
TOTAL	1,894	117

SOURCE: MN Taxpayers Association: *How Does Minnesota Compare?* 1982

Table 16 compares Minnesota's epxenditures per capita for various highway purposes with the U.S. average.

Several major trends could erode Minnesota's financial capacity to keep its roads and bridges in good condition.

The system is getting older thus increasing the need for more costly forms of repair.

Listed below are data indicating the last time that interstate and trunk highway bridges were remodeled and the last time that interstate and trunk highway roads were last resurfaced or graded.

- **Bridges.** All of Minnesota's 161 interstate highway bridges were built after 1950. Seventy-eight (6.7 percent) were built during the 1950s, 698 (60 percent) during the 1960s, and the other 385 (32.3 percent) were built after 1970.

- On the trunk highway system, 1.3 percent of trunk highway bridges were rebuilt before 1920. Twenty-nine percent were remodeled before1940. Twenty-eight percent were remodeled prior to 1960 and 877 bridges or 37 percent were remodeled before 1980. Since 1980, 97 bridges have been remodeled, accounting for 4.1 percent.

- Table 17 portrays MnDOT data indicating the last time trunk and interstate highways were resurfaced.

As the system gets older it will need more extensive maintenance. Simple resurfacing will no longer do. Old roads with structural deficiencies will have to be torn up and reconstructed. Typically, such maintenance practices are more costly. According to Merritt Linzie, Director of the Office of Highway Programs, MnDOT, the average cost of resurfacing a road is $100,000 per mile as opposed to the cost of reconstruction ($500,000 per mile) or major construction ($1,000,000 per mile). In the last two years, the state spent substantially more on resurfacing than reconstruction ($83.5 million to $38.9 million). In part, this may account for why the surface of the state's trunk highway system is in such good condition. MnDOT has already

TABLE 16

1980 MINNESOTA/NATIONAL HIGHWAY EXPENDITURES

Category	Minnesota	National
Total expenditures on all roads (state & local) per capita	$ 247.33	$ 165.11
Total expenditures on state administrered roads per capita	85.68	72.86
State expenditures for maintenance per 1,000 vehicle miles	2.75	2.63
State expenditures for maintenance per mile of road	5,818.00	5,148.00
State expenditures for maintenance per capita	17.29	19.68
State expenditures for maintenance per registered vehicle	21.63	27.59

SOURCE: MN Department of Transportation, derived from Highway Statistics 1980 FHWA, March 1983

indicated that it intends to reverse these priorities in the future in order to spend more on reconstruction.

TABLE 17

DATE OF LAST RESURFACING, MINNESOTA TRUNK HIGHWAYS

Year	Interstate	TH
Pre-1940	–	4%
1940-60	3%	21%
1960-70	64%	32%
1970-80	33%	44%
TOTAL	100%	100%

- The last time the interstate highways and trunk highways were graded was:

Year	Interstate	TH
Pre-1940	--	37%
1940-60	4%	*43%
1960-70	68%	15%
1970-80	28%	5%
TOTAL	100%	100%

*28% in the 1950s
SOURCE: MnDOT, 1982

Minnesota has more roads to maintain than other states, thus incurring more costs.

In comparison to the United States as a whole, Minnesota is 12th in terms of area and 21st in total population. Historically, Minnesota needed roads spaced fairly close together in order to accommodate its fairly dispersed population in the pre-automobile days. With the advent of the car it was decided that the state should have a state trunk highway system. The resulting system was erected on top of the old county, municipal and township road systems. By the 1950s, with the great surge in America's post-war economy, the need arose for a national system of highways, an interstate system. Soon this system too, was added on top of the others even though some changes in jurisdiction occurred. Rarely was road jurisdiction changed, even when traditional functions had been usurped by new roads. In this fashion, the entire system continued to grow.

In comparison with other states, data shows that Minnesota has:

- The fifth largest total road mileage in the United States at 129,572 miles (1980). The only states with larger road systems are: Texas, 267,122; California, 178,706; Kansas, 135,348, and Illinois, 134,949.
- The 11th largest state primary system in the U.S. at 12,124 miles. The U.S. average is 9,503 miles.
- The 17th largest state-administered system in the United States.
- More than twice the national average of county and township roads.

	U.S.	50 State Avg.	MN
County Roads	1,720,006	34,400	41,722
Township Roads	493,080	9,862	55,303
TOTAL	2,213,086	44,262	97,025

SOURCE: Highway Statistics, 1980, p. 111 FHA

- 50 percent more municipal streets than the national average, according to committee testimony by John Williams, staff, House Transportation Committee.

Moreover, the state finds itself in a difficult financial situation with only a limited capacity to bond for highway improvements.

As of August 1, 1982, the state had authorized, but not yet issued, $521.415 million in general obligation bonds for a variety of purposes. Approximately $111.4 million of that, or 21 percent, was transportation related. In August the state authorized the issuance of another $63 million worth of general obligation bonds, of which $22.7 million was designated for bridges on state trunk highways, county and municipal state-aid systems and township roads. With that issue the amount of state general obligation bonds (GO) outstanding rose to $1,001.624 billion, of which 18.4 percent or $185 million, was transportation related.

Persistent budget problems have helped cause the state's credit rating to slip from an AAA status to an AA rating with the nation's major investment houses. For that reason, despite the passage of Constitutional Amendment #2 last fall (which removed the five percent interest limitation and the $150 million debt limitation) the state may be more cautious about bonding for highway improvements than it has in the past.

Inflation has weakened the state's purchasing power. As a result tax dollars purchase fewer improvements than in the past.

Table 18 indicates how inflation has weakened the state's purchasing power in recent years. Although the level of annual expenditures for highway construction has increased in inflated dollars, this level has decreased when expressed in constant dollars. Thus, every year Minnesotans have been spending more and getting less. Expressed in constant dollars, Minnesota's

highway purchasing power was cut by more than half from 1967 to 1981.

TABLE 18

EFFECT OF INFLATION ON "CONSTANT DOLLARS". MnDOT HIGHWAY CONSTRUCTION PROGRAM

Year	Constant $ Million	Inflated $ Million
1967	130.6	130.6
1968	166.1	160.4
1969	133.2	142.9
1970	118.4	143.1
1971	98.8	125.5
1972	107.2	139.8
1973	100.2	136.7
1974	87.6	151.1
1975	75.9	134.2
1976	84.4	142.4
1977	81.9	149.4
1978	71.2	157.6
1979	95.3	256.0
1980	68.3	193.3
1981	64.7	188.9

SOURCE: MnDOT, 1982

Because of inflation, Minnesota has been forced to increase motor fuel and motor vehicle registration fees.

As automobiles continue to become more fuel efficient, fuel consumption has declined. In 1970, the average Minnesota automobile was getting 12.4 miles per gallon (MPG). By 1980 that figure had risen to 13.2 mpg. By 1985, it is expected to be 14.8 mpg. As a consequence, fuel consumption, though rising through most of the 1970s, began to decline in 1979, decreasing from a peak of 2,505 million gallons that year to 2,175 million gallons in 1981—a net decrease of 13.6 percent. By 1985, according to MnDOT projections, state fuel consumption should decline to 2,030 million gallons—a 6.7 percent decrease from 1982. (See Table 19)

As a result of these trends, revenues from Minnesota's motor fuel taxes are projected to decline from $259.4 million in FY 1983 to $247.4 million in FY 1985. (See Table 20) This decline will come even in the face of recent fuel tax increases but will be more than offset by substantial projected increases in motor vehicle registration fees. As the table indicates, revenues from motor vehicle registration fees are projected to increase from $144 million FY 1982 to $199 million in FY 1985.

Despite recent tax increases, Minnesota appears to be slowly slipping behind on a regular cycle of maintenance for its trunk highway system.

How many miles of state trunk highways should be resurfaced,

TABLE 19

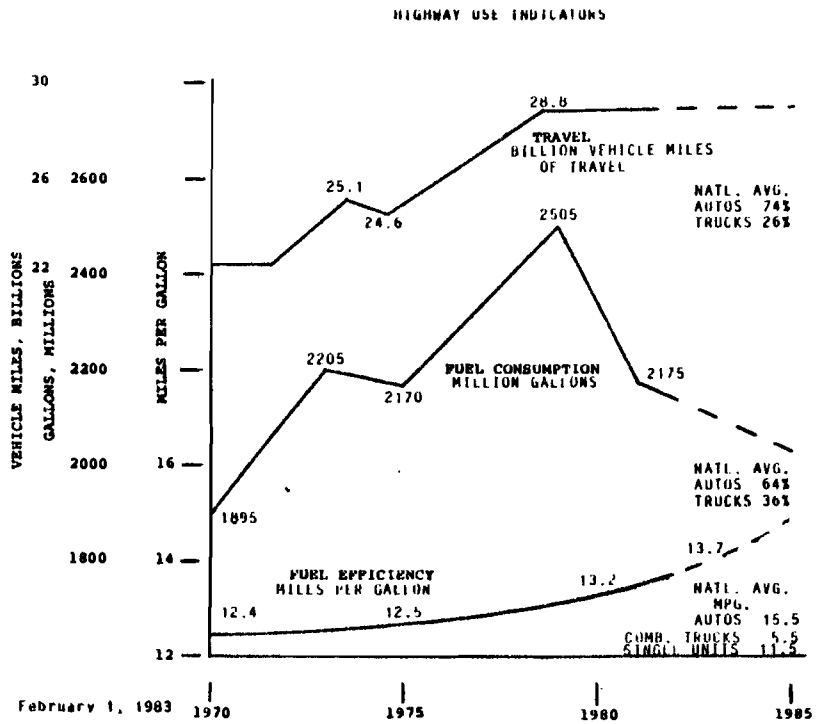


TABLE 20

ROADWAY USER TAXES FY 1980-1985
(Millions of Dollars)

Fiscal Year	Motor Fuel Taxes	Motor Vehicle Registration Fees
1980	$202.9	$123.0
1981	227.2	130.7
1982	259.4	144.0
1983	254.8*	162.6*
1984	250.6*	179.0*
1985	247.4*	199.0*

*Estimated Revenues
SOURCE: MnDOT, 1982

reconditioned or reconstructed every year?

Obviously this is a key question. To answer it we need to know what an optimum schedule of maintenance would be for a 12,100-mile system. In a February, 1981 report to then Governor Quie, his Highway for Economic Vitality Committee suggested the following schedule:

State Trunk Highway System (12,100 miles)

Repair, resurface and reconstruct 675 miles per year	$81 million/year
Repair or replace 90 bridges per year	$34 million/year

With that as the optimum, how well will Minnesota do in coming years? According to the proposed 1983-85 MnDOT budget the state will fund at a level far short of what is needed to keep the entire system on a regular repair cycle.

Transportation Commissioner Richard Braun has calculated that at the current rate of construction and new construction (as authorized by the State Legislature in the 1981 biennium) the state would only be able to reconstruct an existing road once every 372 years.

Gene Ofstead, MnDOT Director of Government Relations, recently calculated that Minnesota would need $560 million per year to complete the interstate system, preserve bridges and trunk highways and stay ahead on routine maintenance. In contrast, however, Ofstead expects the state will receive between $265 million and $290 million per year during the 1984-85 biennium. According to Ofstead, those estimates include the state's share of revenues from the new federal five-cent gasoline tax increase, projected to be about $40 million.

Ofstead was quoted in a recent *St. Paul Pioneer Press* article as saying that he had initially thought that the new federal gas tax increase would be a possible solution to Minnesota's long term highway problems. But since most of the federal money is dedicated for use only on the state's interstate system, "Minnesota will collect only $20 million more than it had before for the rest of the highways."

TABLE 21

ASSESSING MINNESOTA'S FINANCIAL CAPACITY TO RECONSTRUCT EACH MILE OF ITS CURRENT TRUNK HIGHWAY SYSTEM

Roads	Optimum	Actual 1981	Actual 1982	Estimated 1983	Estimated 1984	Estimated 1985
Resurface Recondition Reconstruct	675*	522	550	603	422	475
Cost	$81†	$41	$67	$75	$54	$59.5
Bridges						
Repair/ replace	90+	50	60	80	70	70
Cost	$34†	$15.6	$30.7	$43.8	$40.4	$40.4

*Miles per year †million +per year
SOURCE: Citizens League derivation of *Highways for Economic Vitality Report* (1980) and MnDOT Proposed Annual Budget (1983-85). 1982

NOTE: This table was constructed prior to the passage of the federal five cent gas tax increase and the action of the 1983 Minnesota Legislature which raised Minnesota gas taxes an additional four cents.

As the state begins to reassess the size and condition of its trunk highway system, it is only natural that it focus on strategies which have the potential to prevent highway deterioration, such as alternatives to salt.

The decision to use salt on the road system and management practices connected with salt utilization have often contributed to deterioration.

Deicing compounds such as road salt and calcium chloride are applied to roads and bridges for essentially three reasons. First, salt is applied to melt ice on the pavement (deicing). Second, salt is applied to prevent the formation of ice (anti-icing). Finally, salt is applied to prevent the build-up of "pack" snow, which is formed by traffic and adheres the snow to the pavement as tightly as ice, but in a thicker and more irregular fashion.

1. Studies have shown that the use of deicing salt and other chemicals have significantly contributed to the deterioration of roads and bridges.

   There are a number of costs associated with the use of road salt. Some of these are public costs–accruing to public facilities such as roads and bridges. It is clear that such costs go far beyond the mere purchase price of salt. They extend to the damage done to bridge structures and concrete pavements. The costs can occur in several ways: replacement costs after the damage is done; added costs to reduce or prevent damage; and research and development costs for methods to reduce or prevent damage.

   A special report prepared for the Minnesota House Committee on Transportation in 1978 by the Legislative Office of Science and Technology "The Use of Deicing Salts in Minnesota: A Review of Snow and Ice Removal Management Practices, Salt Use Effects and Alternatives" concluded:

   > "Salt, while heavily impacting the decks of bridges, is also affecting the supporting elements. Estimates of structural deterioration costs due to deicing chlorides alone range from $70 million to $500 million annually. If these estimates are legitimate in determining the magnitude of the costs associated with the use of deicing salts, then the validity of the "bare road" policies should be questioned. Estimates of this magnitude would indicate that the use of deicing salts may NOT be cost effective." (Emphasis added)

2. Minnesota intergovernmental practices in managing salt utilization were lax in the past, thereby allowing more deterioration than might otherwise have occurred.

   A 1978 House Committee on Transportation/Science and Technology Project survey evaluated snow and ice removal practices on the state, county and municipal levels. The survey was sent to all 16 state maintenance areas, the 87 counties and 101 municipalities of populations of 5,000 or more.

   Based on an overall return rate of 70 percent, it was found that "management practices for snow and ice removal were lax in most instances." The report cited eight changes in management practices which if "uniformally implemented" could reduce the use of salt considerably.

3. Since then, there has been some reduction in the use of salt.

   MnDOT used 120,000 tons of salt during the 1981-82 winter season. This represents a 42 percent reduction in salt usage compared to the 204,000 tons of salt used in the winter of 1968-69, the year of highest salt usage. (The year of lowest salt usage was 1960-61 when 15,000 tons were used.)

   We do not know whether cities and counties have modified their snow and ice removal practices in accordance with the report's proposed recommendations.

The use of salt occasions many additional costs to citizens–as taxpayers and as private citizens.

In addition to the public costs, there are private costs. Studies have shown that as much as 50 percent of automobile rust may be traced to deicing salt. Individuals pay these additional costs through the purchase of rust-proofing services, repair work on deteroriating garage floors, and the higher parking prices in municipal or private ramps caused by salt induced repair costs.

In 1981, the total annual costs of rust in the United States was estimated at $7.5 billion. If Minnesota's share of those costs is about two percent, then the annual cost of rust to Minnesota would be about $150 million per year. Assuming that Minnesota is in a more rust-prone area would tend to increase these costs.

A number of new salt substitutes have been developed which might eventually replace salt as a roadway deicer. These salt substitutes include Prilled Urea, Calcium Chloride and Thaw.

1. **Prilled Urea**

   - **It is illegal to use salt on airport runways.** The airports do not use salt in any areas with which the planes are in contact. It is too corrosive a substance for the metal to withstand. Moreover, salt has the potential to destroy a plane's hydraulic system. For these reasons, the Federal Aviation Administration (FAA) has banned salt from runways, taxiing ramps and landing areas.

- **An urea-based substitute is used instead.** This substance is called Prilled Urea. Its chemical name is number 409 Nitrogen.

- **This urea-based substitute has many properties and powers.** The Metropolitan Airports Commission (MAC) purchases Prilled Urea in 50 lb. bags for snow removal. It has the same effect on ice as salt if used under certain conditions (i.e., the temperature must be above -20 degrees Fahrenheit.) Because it needs "at least some warmth to work, if conditions are below -20 degrees Fahrenheit, flamethrowers are used to warm up the surface areas and then prilled urea is sprinkled with sand. The result is a sandpaper like surface. Prilled urea has no negative effects on grass and vegetation.

- **Prilled Urea is more expensive than salt.** The Metropolitan Airports Commission has used Prilled Urea for about 10 years. It is FAA approved. In 1981 the main airport purchased 29 tons of the substance at a total cost of $6,185 or $235 per ton. This price showed a significant increase from the previous year when its cost was $190 per ton. (In 1979-80, the airport purchased 20 tons at a total cost of $3,800.) Because of the increase in cost, the airport switched from a single purchase order to a system of soliciting bids from local chemical companies.

  By comparison, the main airport purchased 694 tons of salt in 1981 for use on the major access roads to the airport including the frontage roads and the entrance roads to the terminal. (A total of 10 to 15 miles.) It paid $15,500 for the salt or $22.33 per ton.

2. **Calcium Chloride**

   MnDOT used to mix calcium chloride with sand to cut down on chemical utilization while still providing adequate traction. But the Department found that wind and vehicle movement blew the calcium pellets off the roadway. Now MnDOT is trying a solution of liquid calcium chloride sprayed over truckloads of sand and salt. With the new method, more of the mixture sticks to the surface. Besides being better than salt environmentally, the wetting process helps control spreading and improves the deicing process.

3. **Thaw**

   - A new product called Thaw, which has been developed in the United Kingdom melts snow and ice, yet does no damage to the environment or to vehicles and steel bridges. Thaw can be used as a direct substitute for salt.

     Thaw is somewhat more expensive than rock salt, but a little goes a long way. A typical usage rate is 50 grams per square meter. One keg of Thaw will cover 400 square meters. The granules may be spread by existing gritting machinery. But Thaw's most impressive quality is that it goes on working once it's in place. Thaw will go on deicing for five days, thereby reducing labor.

     Already five airports and several local governments in the United Kingdom are using Thaw to keep runways, roads and pedestrian areas clear of snow and ice.

The federal government and many state governments are exploring whether heavy trucks pay enough taxes to offset the damage they inflict on highways.

The answer to this question depends on how costs are allocated to heavy trucks. But there are several other pertinent questions to consider as well:

- How much road deterioration is caused by weather as opposed to heavy trucks?

- How much road deterioration is caused by trucks as opposed to other vehicles?

- How much of the cost of new highway and bridge capacity is related to adapting these structures for use by heavy trucks?

We will deal with each issue in turn.

Experts disagree on the amount of highway deterioration caused by weather as opposed to traffic--particularly heavy trucks.

There are two principal forms of stress which affect the useful life of roads. First, there is thermal stress, the expansion and contraction of the roadway under different types of climate and weather. The amount of water which gets into the cracks in the roads in the winter and freezes contributes to the deterioration process, as does the spring thaw.

The second type of stress is called fatigue stress. Fatigue stress is made up of several factors including the number of vehicles which pass over a given stretch of roadway, the weight of those vehicles and the number of times they pass over that stretch. This process has been likened to the number of times it takes to bend a given piece of metal. The more times the metal is bent the shorter the amount of time needed to break it completely. Pavement fatigue is measured by the number and weight of axle-loads that it takes to make pavements unserviceable.

Government highway officials and trucking interests differ on exactly how much road deterioration is substantially caused by the interrelationship of traffic with weather. But they disagree as to which of these elements causes the most damage, and in

what proportion. To the American Trucking Association, weather, age, and salt account for more than 50 percent of all roadway damage. To the Federal Highway Administration, however, these factors account for less than 10 percent of all road damage costs.

Of the highway deterioration caused by vehicles, experts disagree on the amount of damage caused by trucks as opposed to other vehicles.

Most people tend to agree that of the damage to roadways occasioned by vehicles, trucks cause more damage than cars. But the real debate concerns quantifying that relationship (i.e., how much more damaging are trucks as opposed to cars on pavements?). In particular, much of the debate over this relationship has centered on the results of a study performed by the American Association of State Highway Officials (AASHTO).

The AASHTO road test in Ottawa, Illinois, is the primary source of data on the relative effects of different axle-loads on pavements. During this $30 million road test performed in the late 1950s, trucks with fixed-axle weights were driven around selections of road constructed in loops about one mile long. There were about five loops containing about 460 pavement sections with traffic of typical, single- or tandem-axle of given magnitude on a given loop. Over one million loads were applied over a two-year plus period on each section.

The results of the AASHTO road test showed that:

- The damage a truck causes increases rapidly as axle weight increases.
- Pavement fatigue damage is reduced by using axle arrangements such as tandem-axle or tridem-axle which spread the load more evenly.
- Road damage tends to increase faster than truck loads increase. (For example, one nine-ton axle causes about 10 times more damage than a five-ton axle.)

Table 21b shows these relationships. When axle weight increases from 18,000 lbs. to 20,000 lbs., stress from that axle increases by roughly 50 percent. An 80,000 lb. truck weighs 20 times as much as an automobile, but its combined axle causes 9,600 times as much stress on the pavement and roadbed. As the table indicates, road damage attributable to trucks increases dramatically if the truck's load exceeds the legal limits. Jim Wright of the Minnesota Department of Transportation observed that MnDOT weight-in-motion studies show that about 17 percent of all axles are overloaded and 15 percent of trucks exceed legal gross vehicle weight. Wright commented that it appears to be the heaviest trucks, the five-axle units, which are the biggest contributors to road damage.

The trucking industry on the other hand rejects the conclusions of the AASHTO road test. Their objections to it and particularly to the eqivalent single-axle standard of measurement can best be summarized in the following quote by Bennett C. Whitlock, president of the American Trucking Association:

> "The use of equivalent single axle loads as a measure of pavement damage or 'consumption' is both technically indefensible and substantially biased against heavier vehicles. The AASHTO road test was designed to show the effect of vehicle weight on highways *independent of weather, chemicals, proper maintenance or any other factor other than weight.* They ran over a million axle loadings of up to 30,000 lbs. of single-axle and 48,000 lbs. tandem-axle in a two-year period with little or no maintenance being performed on any roadway. Despite that enormous pounding, the highway sections built to *modern design standards* were essentially undamaged. Since the modern pavements were not hurt, they couldn't be used in a formula measuring damage. So the damage formula was derived from the results of what happened to the pavements that were deliberately underdesigned for the axle loadings which were run over them. Since the AASHTO road test formula does not properly measure the combined effects of weather, age, chemicals and traffic, its use as a measure of pavement damage cannot be accepted."

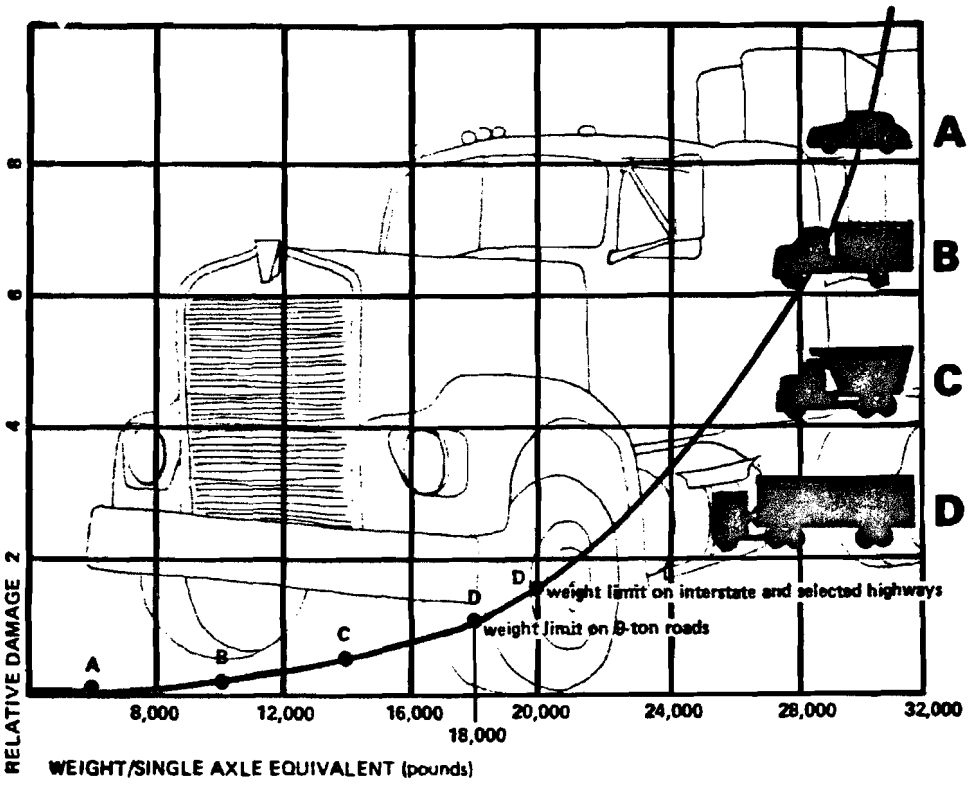
A number of cost-allocation studies have been done which attempt to allocate highway costs among various vehicle classifications. With few exceptions these studies have consistently concluded that the heaviest trucks significantly underpay.

A federal highway cost allocation study (May 1982) attempted to allocate highway costs among the various highway vehicle classes responsible for the costs and make recommendations on how to make current federal user charges more equitable. Briefly, the report concluded that:

- Some 53 percent of federal capital costs were found to be atributable to characteristics of vehicle classes such as length, width, horsepower and weight. The remaining 47 percent were judged to be residual or common costs. *Attributable* costs were assigned to specific classes of vehicles on the basis of the extra design requirements for new facilities and additional deterioration imposed on existing highways by specific types of vehicles. *Residual* costs were assigned to classes on the basis of vehicle miles traveled.
- By 1985, the study found, automobiles will be responsible for 40 percent of the total federal highway program cost; pickups and vans, 17 percent; other single unit trucks, eight percent; combination trucks, 33 percent; and other vehicles, two percent.
- Based on 1982 tax rates the federal study showed that by 1985 automobiles would pay 100 percent of their cost

Table 21b

Damage level escalation due to added vehicle weight per axle



SOURCE: Minnesota Department of Highways, Axle Loads Effects on Highway, p. 2

responsibility, pickup trucks and vans, 110 percent, other single unit trucks 200 percent, combination (single and double trailer) trucks of less than 70,000 lbs. registered gross weight, 125 percent, and combination trucks over 70,000 lbs., 65 percent.

- User charge rates should be graduated more heavily according to truck weight because the greater a truck's weight the higher its cost responsibility. While the cost allocation study does not recommend a single new user charge structure or a target revenue level, it does present several options showing more equitable user proposals.

This study formed the empirical basis for the recent federal law which substantially raised truck taxes and prompted the nationwide independent operators trucking strike. The Surface Transportation Act of 1982 repealed a number of excise taxes on passenger cars and small trucks and substantially increased excise taxes on large trucks. The increased taxes on heavy trucks were coupled with establishment of federal uniform standards for trucks operating on interstate and some primary system highways. (This provision was a compromise of sorts which allowed the trucking industry access to such roads in every state. Illinois, Arkansas and other states had prohibited 80,000 lb. vehicles from operating on their roads.) Under the provisions of the new federal law, states would lose federal highway funds if they do not allow 80,000 lb. trucks access to their interstate roads. Further, states will not be permitted to prohibit double-bottom truck combinations, limit truck widths to less than 102 inches, or enforce length limits on any interstate or designated primary highway.

A recent (October 1982) cost allocation study by the State of Wisconsin found that motorcycles, small automobiles, heavy tractor-trailers, and light trailers are significant underpayers; heavy single-unit trucks, light tractor trailers, heavy trailers, farm trucks and motor homes are significant overpayers. For large automobiles, light trucks and commercial buses there was a relatively close balance between cost responsibility and revenue payment. In terms of dollars per vehicle, the principal overpayers were single-unit trucks.

Table 22 compares the vehicle cost responsibilities determined in Wisconsin's study to vehicle cost responsibility studies in other states.

Truck traffic has increased significantly in Minnesota in the last 20 years.

TABLE 22

State	Date of Study	Cost Responsibility (¢/mile) Standard Automobile	72,000 lb. Tractor-Trailer	Tractor-Auto Ratio
Washington	1976	0.92	4.07	4.4
Missouri	1978	0.70	2.87	4.1
Oregon	1981	0.53	5.87	11.1
Maryland	1981	0.81	5.11	6.3
Wisconsin	1983	0.91	3.92	4.3

SOURCE: State of Wisconsin DOT, Highway Cost Allocation Study, December, 1982

Table 23 shows that truck traffic patterns on Minnesota's rural state trunk highways over the last two decades have increased faster than traffic volume as a whole. Furthermore, of the total increases in truck volume, it is the heaviest trucks, the five-axle trailers and semi-trailers, that have increased at the fastest rate (809.7 percent).

The table also indicates that in 1960 cars were 88 percent of all average daily traffic (ADT) with trucks representing the final 12 percent. By 1980, however, trucks had increased to 16 percent of all ADT with cars dropping to 84 percent. While the state experienced a 105 percent increase in automobile traffic between 1960 and 1980 it saw a 278 percent increase in truck traffic.

Interstate routes in Minnesota generally carry a slightly higher proportion of total truck traffic than conventional state trunk highway routes (16.0 percent compared to 15. 2 percent). However five-axle truck traffic volumes have increased on all types of highways. Table 24 reflects five-axle average daily traffic volumes to total daily traffic volumes in 1980 at seven interstate and nine trunk highway locations in Minnesota. The table indicates that five-axle truck volumes of over a thousand a day are not uncommon, and at three of the selected locations, five-axle trucks accounted for over a quarter of the total traffic volumes.

Truck damage to the roads has increased in recent years because grain that formerly was carried by rail is now being shipped by truck.

Since the mid-1960s, many changes have occurred in Minnesota's agriculture and the transportation system which serves it. Some farming areas have changed from livestock or dairy producing areas to cash grain areas. Grain yields have increased and Minnesota's farmers have participated in the huge increase in U.S. grain exports during the early 1970s. Fertilizer use has increased. All of these changes have increased Minnesota agriculture's need for long distance commodity transportation.

Train technology has also changed. The covered hopper car capable of carrying over 3,500 bushels of grain replaced the old boxcars of 2,200 bushel capacity. The covered hopper has significant cost and handling advantages over the boxcars

TABLE 23

AVERAGE DAILY TRAFFIC BY VEHICLE TYPE AT 29 RURAL TRUNK HIGHWAY LOCATIONS

Vehicle Type	Average Daily Volume 1960	1980	Percent Change
4-Tire (Autos, etc.)	2,717	5,579	+105.3
2-Axle Dual Tire	126	162	+ 28.6
3-Axle Single Unit	36	92	+155.5
3-Axle Trailer, Semi-Trailer	35	12	- 65.7
4-Axle Trailer, Semi-Trailer	74	29	- 60.8
5-Axle Trailer, Semi-Trailer	78	709	+809.7
Buses, Miscellaneous	25	39	+ 56.0
All Vehicles	3,091	6,622	+114.2

SOURCE: MnDOT, 1982

TABLE 24

5-AXLE TST* AVERAGE DAILY TRAFFIC VOLUME

T.H.	County	Year	Volume	% of Total Daily Volume
T.H. 12	Washington	1979	4053	14.4
I-35	Steele	1978	1963	17.4
I-35	Freeborn	1979	1810	21.0
I-90	Winona	1979	1625	29.0
I-35	Dakota	1979	1322	5.7
I-94	Stearns	1978	1188	12.3
I-35	Chisago	1979	828	6.7
T.H. 10	Clay	1979	822	9.1
I-90	Freeborn	1978	766	18.8
T.H. 52	Olmstead	1979	660	5.5
T.H. 10	Becker	1979	587	10.1
T.H. 210	Aitkin	1979	576	30.3
T.H. 10	Benton	1979	547	6.4
T.H. 2	Clearwater	1978	520	19.7
T.H. 44	Fillmore	1979	493	27.4
T.H. 61	Wabasha	1979	406	13.5

*TST = Tractor and Semi-Trailer Combination Truck
SOURCE: MnDOT, 1982

which replaced it. Multiple-car rates for grain that were lower than the single-car rates are another widely adopted innovation. The use of 75 and 100 car unit trains has spread from the very dense grain surplus regions of Illinois throughout the midwest and Minnesota.

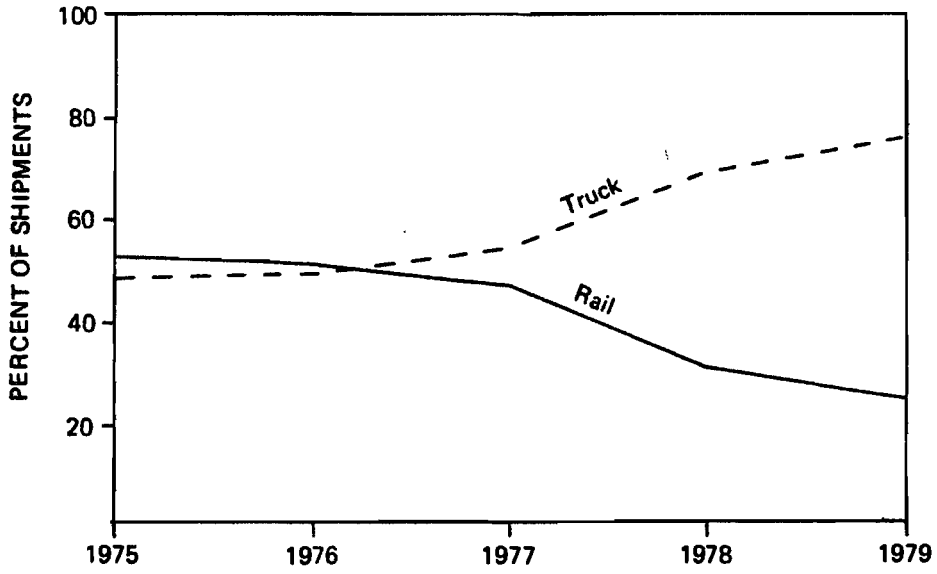
But these developments were not favorable for many of Minnesota's branch lines and, in fact, contributed to their decline. Most of the branch lines were built before 1900 with light rails. Bridges, rails, and roadbeds were inadequate to handle fully loaded hopper cars and modern locomotives. The railroads and shippers on branch lines were unable to take full advantage of the potential cost savings of hopper cars and multiple-car shipments. These developments, in fact, hastened the day when a branch line would become technically obsolete and require decisions on whether to spend capital to upgrade or to abandon.

At the same time, technological developments caused trucks to become more efficient. And cumulative state improvements on local and state roads, many of which were systematically upgraded from five-to-seven-to-nine-ton standards, helped insure that the roads could carry heavier loads. Finally the development of the interstate system allowed trucks to provide better service over increasing distances.

As a result, trucks have increasingly been gaining shipments relative to railroads in terms of short haul grain shipments of less than 250 miles. Formerly these hauls were the province of railroad branch lines but as more branch lines have been eliminated, trucks have picked up the slack. Railroads may now be more involved in long haul commodity movement. (See Tables 25 and 26)

TABLE 25

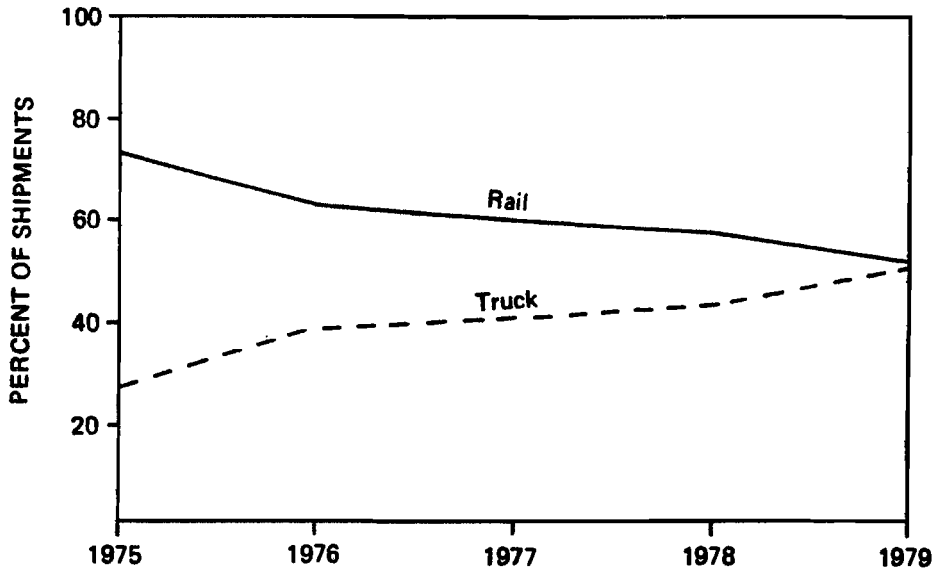
Movement of Grain to Minneapolis-St. Paul Terminal, 1975-79
Percent of Shipments by Major Mode



SOURCE: Highways for Economic Vitality, Report and recommendations of the Governor's task force on Highways for Economic Vitality, February 1981.

TABLE 26

Movement of Grain to Duluth-Superior Terminal, 1975-79
Percent of Shipments by Major Mode



SOURCE: Highways for Economic Vitality, Report and recommendations of the Governor's task force on Highways for Economic Vitality, February 1981.

CONCLUSIONS

Minnesota should begin now to reduce the size of its roads and bridge system, starting–as a first priority–with the state's trunk highway system.

This conclusion was painful for our committee. But given the abundance of the data we have seen and the testimony we have heard, it is an inevitable one. In fact, slowly, invisibly this process is already occurring through the DOT's informal policy of "benign neglect" on some of our state's roads. We feel that policies so important to the state should be more explicit.

As difficult as this new direction will be, it is important to note that other states are also moving, prudently, to reduce the size of their road and bridge systems. These states include: Colorado, Florida, New York, Arizona, Pennsylvania, Illinois, South Dakota and Iowa.

Private railroads are already moving in the direction of "pruning" routes and miles on their rail systems. Currently Minnesota has 5,805 miles of operating rail lines. But this is a far cry from the size of our rail network in the 1920s. At that time the state had approximately 9,500 miles of rail. Over 1,350 miles of rail line have been abandoned since 1976 and another 2,000 miles are slated for abandonment in the next ten years.

In the midst of these changes a silent phenomenon is occurring. The rail system is slowly revitalizing itself. Nearly 241 miles of rail line have been rehabilitated at public expense. Much of this rehabilitation is directed towards rebuilding railroad beds and ties to carry the greater weight of hopper cars. Major decisions are being made about which lines are most important to key agricultural and commercial businesses.

While the analogy from Minnesota's rail system to its road system is an imperfect one, it can render an important lesson. Minnesota's trunk highway system could emerge from consolidation much stronger than it is today if the state is wise enough to target its road priorities.

Difficult as it will be to reduce the state trunk highway system, Minnesota has recognized the need to consolidate capacity it could no longer afford in other, equally difficult areas such as hospitals and schools.

Several key factors influenced our thinking in arriving at this conclusion:

- Numerous historical studies which suggested that the state reduce the size of its trunk highway system.
- Financial data which show the state's incapacity to finance a regularly scheduled cycle of maintenance on a 12,200 mile trunk highway system.
- The fact that the state in the past few years has been trying, without success, to forestall the day or the possibility of reducing the number of miles on its trunk highway system. The state has, for example, reduced the number of DOT employees by 30 percent over the last 10 years. Within the last four years MnDOT has cancelled several hundred million dollars in highway projects. Last year, the Department began to reduce the level of maintenance that it would provide on some state trunk highways. Today, the issue of reducing the number of miles on the system itself should no longer be avoided.
- The highway jurisdiction question has not been seriously examined for about 25 years. In the meantime, much has changed, including the entire interstate system and serious equity questions have arisen between state and local levels of government and local governments themselves.

Minnesota can no longer afford so extensive a system at such a high level of maintenance. If the financial capacity question pertains today, it will be even more significant in the future. Present trends are clear. They indicate that to attempt to continue to thinly spread existing or increased revenues over so large a system would serve only to undermine the integrity of the system as a whole. Larger investments today purchase smaller improvements. It was inevitable that that equation would catch up with us sooner or later.

Our committee reviewed evidence suggesting that Minnesota has reached the point where the state may not be able to afford the system now in place. Based on MnDOT's own data, an ideal replacement cycle for a 12,200-mile trunk highway system would be to resurface, recondition, or reconstruct 675 miles per year. In 1981 and 1982 the state was able to maintain only 522 miles and 550 miles respectively in these categories. Based on tentative projections from the 1982-83 MnDOT budget (made prior to the federal five cent gas tax increase) it appears that by 1985 the state's capacity to resurface, recondition, or reconstruct its trunk highways will diminish even further–to 475 miles per

year.

The same situation confronts the state's bridges. To maintain all of the existing state trunk highway bridges on a regularly scheduled cycle of maintenance would require the repair or replacement of 90 bridges per year. In 1981 and 1982 the state was able to repair or replace only 50 and 60, respectively. By 1985, according to proposed MnDOT budget estimates, the state would be able to repair or replace 70 bridges per year–an improvement, but still substantially short of what is required to maintain the present system.

When the data began to substantiate our suspicions we asked to meet with MnDOT Commissioner Richard Braun. He confirmed that the state could not afford to maintain the size of the present system, with existing revenues in anything other than a basic snowplowing manner of maintenance. To resurface, recondition or reconstruct the entire TH system is well beyond the state's financial capacity, he indicated.

Highway standards are a critical part of this debate. The issue is not merely how many trunk highway miles the state can afford to maintain, but at what level or standards of maintenance.

So great are these costs that the Minnesota DOT has already begun to implement different levels of standards on different types of roads. Nationally, the American Road and Transportation Builders Association has argued that maintaining current standards in transportation will cost a staggering $623 billion by 1990. As a result of the new federal gas tax increase the U.S. Congress threw out the old standards for reconstruction, reconditioning and resurfacing and instead charged the Transportation Research Board with performing a one-year study examining the trade-offs on safety with lowered standards.

What cannot be ignored in any discussion of the state's continued ability to finance its present standards is whether taxpayers would continue to be willing to absorb these costs, to pay what it would take to retain this system. There is no way for us to speculate on that question. But we wonder whether they, too, would not agree that before we take on such a commitment we should look carefully at the system for unnecessary improvements, duplication, and ways to cut costs. And, particularly at this junction in Minnesota's history, we wonder whether taxpayers would not want their elected representative to weigh the trade-offs between improving some roads as opposed to preserving an essential network of highways.

Although the trunk highway system is in good condition today, Minnesota faces a major decision as to how to best use its highway dollars in the future. That decision may be likened to a tradeoff between increased consumption and conservation.

Minnesota, today, has a mature state trunk highway system. Highway experts agree that the focus now ought to be on preserving what exists as opposed to building anything new, on "conservation" as opposed to "consumption" of road dollars through never-ending improvements.

But old priorities are hard to change. Pressures continue to physically expand the system's capacity. Many communities around the state were promised new or improved roads in the years when state resources were more plentiful. Today, those dollars have dried up, but local expectations remain.

A second source of pressure for "consumption" comes from within the Department of Transportation as it seeks to upgrade the trunk highway system to higher standards. Often the standards are designed to make the roadway more forgiving of drivers. (The implicit, but rarely examined tradeoff is between additional construction and, where safety warrants, lower speed limits.) In other cases, standards are changed to accommodate the needs of a particular class of vehicles, such as trucks. In still others, standards specify improvements be made in other than the pavement surfaces themselves. . .in shoulders or embankments or ditches or sight distances. The Department of Transportation is reluctant to recognize such projects as improvements, partially because it has grown accustomed to providing that level of service. But clearly such improvements drain needed dollars away from another priority–simply maintaining and preserving existing facilities.

Politically, constituencies exist for road improvements such as four lane highways or bypasses. Many communities are still waiting for the Department of Transportation to improve "their" highways. There is always a constituency for something new or improved simply because it is more visible. It gives politicians a means of demonstrating what they have done for their communities. Likewise, ready constituencies remain poised to salute increased standards which call for higher bridges, wider surfaces, and deeper pavements, that are able to withstand heavier loads. Truckers want that. So does business. Increasingly, as more farmers operate heavy farm vehicles, they do too. Those are powerful interests, particularly in this state.

But there are then few left to argue that what is needed is simply to preserve existing facilities instead of expanding them or that the state should begin to focus its highway investments instead of spreading them so thin. Few are left to point out that the state is falling steadily behind on a regular schedule of maintenance for the existing state trunk highway system.

Minnesota stands today at a crossroads in terms of its future highway spending priorities. On the one hand are those who would have us make more improvements and higher standards. On the other are those urging the state to take a more rational long-term perspective, to prioritize investments where they make sense, to conserve through replacement and possible consolidation.

Both approaches will entail significant spending if not new taxes. But the difference lies in how the money will be spent and toward what ultimate objective.

It is clear that in the present climate the first course is the more attractive. It is popularly believed that the condition of the state's trunk highway roads and bridges is deteriorating rapidly. Many Minnesotans are out of work and need jobs. Matching these needs together appears to be a readily available marriage of convenience. More federal dollars will flow into the state as a result of the new five cent gas tax increase. Governor Rudy Perpich has, with every good intention, proposed a nickel increase in Minnesota. The time for the Legislature to pass such an increase seems ripe since falling gasoline prices will diminish the political fallout from such a move.

If all of these initiatives succeed, Minnesota will have substantially more highway revenues. But in the present environment we are concerned that the state will not spend them wisely. If these revenues are used only to increase the capacity of the system by building more four-lane highways, interchanges and bypasses they will not have been wisely used. Minnesota's highway system is complete. The challenge now is to preserve it.

The last few state highway commissioners recognized this challenge and were successful in helping Minnesota hold the line on unneeded highway spending. Tight economic times and public sector resource constraints aided them in their efforts. It has taken some courage to tell local communities that road improvements, once promised, cannot and should not be fulfilled.

In today's climate the danger exists that the state will try to honor those promises.

There is a better alternative. We believe that Minnesota's highway dollars would go further if they were spent simply to preserve the present system in its entirety. Substantial evidence exists to suggest that it can not. If that is so, why should system capacity improvements be considered? The state will be better served by a policy of future conservation at the expense of present consumption.

Most of Minnesota's state trunk highways are in good condition today. We doubt that at the beginning of our study any of us would have conceived arriving at this conclusion. But as the months wore on and the data accumulated, the majority of the evidence led us to conclude that most of the state's trunk highways are in good condition today.

Several key indicators influenced our thinking:

- There has been little change in the condition of the trunk highway system in the last five years. In fact, in some cases, the system is in better condition today than in 1978.
- The most heavily traveled state roads are in the best shape.
- Minnesota has fewer deficient bridges today than it had in 1978.
- The majority of deficient bridges are on roads that carry the least amount of traffic.
- The vast majority of Minnesota's deficient bridges are not physically deteriorated.

But there is another side to the condition issue. The opposite view holds that despite the evidence of condition and sufficiency ratings, the subbase of our trunk highways is crumbling. Proponents of this view hold that neither rating system is indicative of "what's really out there." The discrepancy, they say, is due to the state's maintenance priorities in recent years, which have placed more highway dollars into resurfacing than reconstruction and major repairs. Such practices have led to band-aid solutions, they say, or at best cosmetic surgery. As Commissioner Braun put it, "Do you keep shingling the roof when the beams are rotting?"

Our committee examined that view. It is true that in the last two fiscal years the state has spent substantially more on resurfacing than reconstruction ($83.5 million to $38.9 million.) But this has not been true over time. For example, between 1974 and 1982 the state spent $215.4 million resurfacing versus $259 million on reconstruction and major construction.

Aside from some testimony from highway professionals, there is no evidence to support the claim that trunk highways' subbase is crumbling. If the department really believes this to be true, it should take core samples and analyze the results. Without hard evidence, this theory inspires little confidence.

In order to reduce the number of trunk highway miles, Minnesota should begin to prioritize its investment in a core system of highways of maximum economic significance to the state.

In the early 1970s the Minnesota Department of Transportation proposed a "backbone plan" to help it prioritize new construction and improvements to the state's road system. The development of this plan was necessary because "demands and requests for highway improvements throughout the state far exeeded its capacity to finance them."

Now the state must, in effect, designate a backbone system not for what it intends to *improve* but for what it intends to *retain.* As the state begins to move in this direction many of the factors which influenced the development of the backbone plan should be reconsidered as sound guiding principles. The Legislature should ask itself, as MnDOT did then:

- Which trunk highway routes connect the state's major trade centers?

- Which trunk highway routes serve the state's major cities or population centers?

- Which trunk highway routes serve the greatest proportion of average daily traffic? Of commercial or agricultural traffic?

- Which trunk highway routes serve essentially local functions?

As the state goes about deciding which roads should compose a rational state trunk highway system, it should also factor in, at the outset, the function which these roads should serve. Roads serving longer trips and facilitating mobility by the greatest number of vehicles should continue to be state trunk highways. Functional classification and average daily travel are useful in making these determinations.

State owned roads that serve essentially local functions should be returned to local levels of government along with the means of paying for them.

Despite the need to reduce the state's trunk highway system, Minnesota should not miss its chance to grasp a significant opportunity from its present predicament. Unlike many other systems (such as schools, for example), reducing the number of trunk highway miles need not mean closure or elimination. We are not suggesting that these roads be abandoned, but rather affirmatively turned back to local jurisdictions for which they may be a higher priority than if they were left in state hands. If abandonments are to take place, local levels of government are better situated then the state to make such determinations after re-evaluating their priorities and financial capacities.

Many miles of state trunk highways serve essentially local functions while on the state system. Their presence on the state system is due primarily to financial reimbursement incentives, and, often, legislative insistence. Now it is time to return these local roads to a more rational jurisdiction.

Nor is this a strange or foreign approach for the state to pursue. The state has often, in many other fields, returned to local levels of government major policymaking authority and policy discretion. This is especially true, for example, of the Community Social Services Block Grant program.

Likewise, it is clear that lower levels of government can assume these responsibilities if given the time and the funds to do so. Historically, in fact, Minnesota counties assumed maintenance responsibilities for state roads. This practice has been the ongoing experience of Wisconsin. And the state of Minnesota has for years had a program of contract maintenance with many of its municipalities to maintain trunk highways. In FY 1981, for example, the state contracted with 25 different municipalities to provide maintenance on more than 589 equivalent lane miles of state trunk highways.

Minnesota's cities, counties and townships already do the vast amount of the routine maintenance on the state's entire highway system. After all, of the total of 130,700 miles of roads in Minnesota only 12,200 or 9.2 percent are maintained by the state. All the rest (90.8 percent) are maintained by local levels of government who already have the equipment and the personnel to do the job effectively.

If this strategy is to make any sense, however, and be affordable, the standards to which counties and municipalities are held accountable must be lowered. To return many miles to these levels of government requires more tolerance of lowered standards on roads with lower travel demands placed on them.

We believe that the return of many miles of state trunk highways to local governments can and will have positive long-term effects. It will enable every level of government to re-examine the kind of road system it needs and serve as a catalyst toward directing public revenues to meet these priorities. Some roads may ultimately be abandoned or maintained in minimum tolerable condition. But the system which remains will be stronger, more capable and more cost effective than the present system.

Minnesota should use its new capacity to bond sparingly—for high priority projects with major structural defects. Minnesota should not view bonding as a panacea for all of its highway problems, as a way to fulfill past promises or to simply create jobs.

It would be understandable if the culmination of two major recent events were to tempt the state back into a mindset of build as usual. Both the additional revenues from the new federal gasoline tax and the passage of Constitutional Amendment Number Two last fall increase the potential for that possibility. And, in fact, a bill has been introduced in the 1983 Legislature calling for $400 million of new bonding for a number of specific road improvements.

Whatever is built must be maintained. In our view such a program would only postpone the day when the state would be forced to confront the issue of its ultimate financial capacity to maintain the present trunk highway system. Instead, the state should use bonding sparingly—for major projects of high priority with serious structural or safety defects. The criteria to be used for such determinations should be performance related rather than based on existing standards. Otherwise, highway programs should be funded on a "pay as you go" basis.

Finally, any state tax increases resulting in higher highway user fees should be strictly tied to reduction of state trunk highway miles and ongoing reconstruction aimed at preserving a core system. The state should not borrow in order to fulfill long awaited improvements to trunk highways. Now, more than ever, the state must hold the line on new "consumption" of highway dollars for four-lane highways, bypasses and projects aimed at bringing facilities up to unrealistically high standards.

Minnesota should move to a system of truck taxation based more on vehicle weight than fuel consumption and license fees.

The current vehicle registration system in Minnesota was developed in a piecemeal manner over 80 years; during this time 1) construction overshadowed maintenance activities, 2) inflation was insignificant, 3) vehicle fuel consumption per mile traveled was higher and more constant for automobiles than it is today and 4) the railroads carried a far greater proportion of freight vis-a-vis trucks than they do today. Much has changed in that time. These changes have substantial bearing on the motor vehicle cost responsibilities or use fees borne by trucks and cars.

It could be argued, as some have, that from the 1920s through the 1960s, the road system was being developed for general transportation. The system was going to be built whether or not trucks used it. Since the system was for everyone's use, commercial vehicles paid the "incremental costs" of its use. The public paid right-of-way, basic construction, and other basic costs, while an additional charge was levied on trucks corresponding to the increased pavement thickness and width they required.

The continued validity of this taxing system has been diminished by a number of key factors:

Roads and bridges are no longer designed for general traffic. They are designed for heavy vehicles.

Several trends make this an inevitable conclusion. First, truck weights are increasing as automobile weights are declining. Second, the average daily traffic volumes of the heaviest trucks (five-axle tractor and semi-trailers) have increased more than 800 percent in Minnesota over the last twenty years as compared with an increase in automobile traffic of slightly over 100 percent. Five-axle truck volumes of over 1,000 a day are not uncommon. (For comparison purposes a MnDOT study entitled "Axle Loads Effects on Highways" found that one five-axle semi-trailer causes 2,500 times more damage than a car.) Third, truck traffic is expected to continue to increase faster than automobile traffic. MnDOT engineers say that many design costs can be directly attributed to heavy trucks such as pavement depth and bridge clearance. MnDOT has estimated that to upgrade the state truck highway system to ten-ton roads would cost about $3.1 billion. The DOT has already begun to upgrade some of the trunk highway system to this standard.

Constant pounding from heavy vehicles has been found to significantly decrease pavement life. . .hastening maintenance and repair costs.

If the results of the American Association of State Highway Officials road test were applied to the design life of the state's system it would show that "the ratio of damage effects of ten-ton loads is a 30 percent decrease in road life." Although MnDOT estimates are more conservative they indicated in 1977 that "if axle weights were allowed to increase from 18,000 pounds to 20,000 pounds average pavement life would be reduced about seven percent and annual maintenance costs would increase by $2.25 million." Since then, MnDOT has informally adopted ten-ton roads as its official design standard for many state highways.

Our findings show that the larger number of "deficiencies" in Minnesota's roads and bridges relate to load carrying capacity and to width. Both of these attributes are related to truck usage.

According to the most recent figures from the Department of Transportation Minnesota has 4,325 "deficient" bridges. Yet only 16 percent of these deficiencies relate to structural condition. The largest numbers of deficiencies (43 percent) relate to load carrying capacity or width (37 percent). If the Department intends to urge the state to correct these "deficiencies" the question must be asked: "For whom?"

To the extent that these trends are valid they indicate some interesting intermodal policy choices by the state.

Since about 1975, trucks have surpassed the railroads in Minnesota in the percentage of grain shipments carried to Duluth and the Twin Cities. Policy decisions to upgrade portions of the road system to ten-ton capacity have intermodal ramifications. Viewed solely from an economic perspective, such policies result in direct subsidization of trucks as opposed to rail. (During the same period the state did not likewise invest in massive upgrading of railroad beds or heavy steel rails in order to allow hopper cars to carry heavier loads.) Nor is that, in itself, necessarily bad. We simply wonder at the rationale, especially when a more proportionate allocation of resources between upgrading rail and roads could serve to take some loads (particularly grain) off public roads thereby increasing the design life of these structures and scarce maintenance dollars.

For these reasons and because fuel consumption increases with size and weight but not proportionately with cost responsibility we would urge the state to retain the present user pay principle with one significant modification. Because of the extra costs they occasion and for reasons of greater equity between different classes of vehicles, heavy trucks should be taxed more on their vehicle weight and miles traveled than fuel consumption.

Such a system would be very similar to that used in Oregon. Oregon's funding mechanism is distinctive in that it is based on the philosophy of cost responsibility fees. This is believed to be more directly related to road wear than the traditional motor vehicle ownership and fuel tax.

Oregon's cost responsibility philosophy is guided by three principles: 1) those who benefit from the roads should pay, 2) road

users should pay a large part of the cost of maintaining public roads and should pay in proportion to the damage they inflict, 3) road user tax dollars should be used primarily for construction and maintenance.

Within this concept of highway financing, Oregon has developed a three-tier structure of road user taxes consisting of regulation, fuel and weight distance tax. The first tier, registration tax, is considered an entry permit to use the system. Revenues from this tax are used to cover fixed and overhead costs. Traditionally, registration taxes are very low; ten dollars per year for automobiles, pickups and other light vehicles up to $150 for large combination trucks.

The second tier of the structure is the fuel tax. Its advantages lie in its simplicity of administration and collection and in the difficulty of evading it. Fuel tax is an accurate measure of cost responsibility for light-weight vehicles. However, the fuel tax is inadequate in capturing the additional cost occasioned by heavy vehicles. This creates the need for the third structure in the tier which is the weight-mile tax.

Oregon passed the weight-mile tax in 1947. It is a graduated tax on vehicles weighing over 8,000 pounds gross weight. It is adjusted for the additional cost responsibility for heavier vehicles by 2,000 pound increments. It differs from the ton-mile tax in that it is a schedule of rates with a separate rate for each 2,000 pound increment above 8,000 pounds.

The use of salt on Minnesota's roads and bridges occasions substantial public and private costs and accelerates structural deterioration. Minnesota should continue testing other chemical deicers, and, if effective, move to phase out use of salt.

Given the substantial damage which study after study has shown salt to occasion on roads and bridges, it can no longer be considered a foregone conclusion that salt *must* be used. No scientific evidence exists that salt contributes to increased safety on roads even though drivers may feel more secure when driving on bare pavement. And there are alternatives--more expensive, perhaps; but we suspect that a comprehensive cost-benefit analysis of the total public-private costs of salt use would show that salt is not cost-effective.

The most common defense for the use of salt is that there are no other deicers that are as cost-effective. What people generally mean by that is that the *purchase price* of other deciers is significantly higher than salt. While that is true, the issue is whether salt would still prove to be more economical if other factors (notably the damage it cases) were to be included in the cost comparison.

In order to test that hypothesis, we put together a very simple cost comparison analyzing the true economic costs of using salt as opposed to another deicer, prilled urea.

Basic facts about salt

According to a spokesman for a major salt distributor, the total amount of salt used annually on Minnesota streets and highways by all units of government is not likely to exceed 200,000 tons a year. Thus, at $20 per ton, the state's total salt expenditure is not in excess of $4 million. According to the Department of Transportation, there are about 3.5 million vehicles in the state. So, the net salt expenditure to the vehicle owner is $1.14 each year.

Basic facts about urea

According to the maintenance director at the Minneapolis/ St. Paul International Airport, prilled urea is used on the runways because of the corrosive effects of salt on airplanes. Salt is used on roads surrounding the airport. According to the airport's maintenance director, prilled urea is used less intensively than salt. He estimates that they use 20-30 percent less prilled urea per application than salt. If we were to hypothetically use prilled urea on a statewide basis as a road deicer, 150,000 tons would be needed. (200,000 x .25 = 50,000. 200,000 - 50,000 = 150,000) Prilled urea cost $235 per ton in 1981. So the state's net expenditure for prilled urea would be $35,250,000. Dividing that figure by the state's 3.5 million vehicles renders an average cost per vehicle of $10.07 each year.

Accounting for the damage done by salt

As noted in our findings, a special report prepared for the Minnesota House Transportation Committee in 1978 by the Legislative Office of Science and Technology, stated that "estimates of structural deterioration costs due to deicing chlorides range from $70 million to $500 million annually." Assessing those costs to all of the vehicles in the state gives a cost range per vehicle of $20 to $142.85.

In our simple cost comparison, these costs would have to be added to the purchase price of salt since they represent the "true economic costs" of using that product.

With only these two measures used to estimate the "true" costs of salt usage, the cost comparison comes out this way:

	SALT	PRILLED UREA
Purchase price per vehicle	$1.14	$10.07
Public repair costs attributable to salt per vehicle	$20 - $142.85	
TOTAL	$21.14 - $143.99	$10.07

This is not a complex cost comparison. But it makes the point. The significant difference in cost of other deicers alone should not rule out their use. Other costs, particularly the cost of rust must also be considered.

The estimates above only include the public costs of rust. The equation could be even more decisive in favor of salt alternatives if private costs were added. Rustproofing of private automobiles is a sizable industry in Minnesota, a state that is located in a more rustprone area of the country.

These costs would have to be added to the purchase price of salt as a measure of its true economic costs. (Again, it could be observed that such measures would still be conservative since they do not include the devaluation of the cost of an average vehicle as a result of rusting.)

If continued testing of other alternatives shows them to be promising, cost alone should not stand in the way of their being tried.

RECOMMENDATIONS

The Legislature in its 1983 session should begin the process of substantially reducing the state trunk highway system.

Minnesota is living beyond its means in the financing of its road system. This is not merely true of the trunk highway system. It is true of the road system at all levels. Reducing the size of the state trunk highway system is necessary in itself, but it will also send a message to local levels of government to begin to reassess their priorities as well. Should the state choose to begin the process of reducing its trunk highway system by turning back miles to counties and cities it would have the needed effect of encouraging these levels of government to ask themselves important questions. Which roads serve vital economic and transportation functions? Are some roads duplicative? Which roads are the most heavily used? How should existing revenues be divided among competing priorities?

Doubtless, such legislative action would spur intensive planning by all levels of government. It is just such planning that is needed now.

We urge the Minnesota Legislature to pass a bill in its 1983 session to begin the process of substantially reducing the state trunk highway system. Such legislation should contain specific provisions that would designate the criteria by which certain miles would be retained as part of a reduced trunk highway system.

What follows represents our suggestions to the Legislature in the establishment of such criteria.

Those trunk highways that are principal arterials, serve major economic centers, serve cities over 1,000 population and have average daily traffic volumes of 2,000 per day should be retained as part of the core highway network.

The state should, in contemplating system realignments, use existing functional classification methods as the basis of jurisdictional changes. Accordingly, principal arterials should be the primary responsibility of the state with minor arterials, collectors and local roads being assigned to local levels of government. (The following table illustrates state trunk highway miles on the basis of the existing federal functional classification system.)

Federal Functional Classification	Number of MN TH Miles
Principal arterials	4,859
Minor arterials	5,662
Collectors	1,565
Local roads	26

As we suggested, the state should reserve exclusive responsibility for the principal arterial system. This includes the entire interstate system as well as other principal arterials. The principal arterial system may be divided as follows:

Rural interstate	696
Urban interstate	172
Rural primary	3,415
Urban primary	458
Other freeways	118
TOTAL	4,859

To this basic system, we recommend that the Legislature add the following as the major criteria by which existing state trunk highway miles should be judged in determining the future composition of this system.

Major economic centers

In what is still regarded as a classic work, John R. Borchert and Russell Adams in their report *Trade Centers and Trade Areas of the Upper Midwest* categorized all municipalities into one of eight trade center classes on the basis of the types and the dollar volume of business in each municipality. Ranked in descending order, these classes were as follows: a) metropolitan, b) primary wholesale-retail, c) secondary wholesale-retail, d) complete shopping, e) partial shopping, f) full convenience, g) minimum convenience, and h) hamlet.

In the early 1970s as the Minnesota Department of Transportation formulated its Backbone Plan it relied on the Borchert/Adams study for prioritizing highway improvements. Those involved in the Backbone strategy assumed that "cities are the main generators of traffic and the amount of traffic any city will generate is proportional to the amount of its economic activity." Therefore, the Department of Transportation envisioned a network of highways:

"that interconnected our metropolitan center, the Twin Cities, and connected it to metropolitan centers in nearby states. To this network was added highways connecting all primary wholesale-retail centers to each other and all nearby metropolitan centers. This process was continued for the secondary wholesale-retail and complete shopping centers."

As the authors of the Backbone Plan noted at the time, "the highway network established at this stage provided service to almost all areas of the state." In particular, that highway network was *designed to facilitate outstate economic development,* an even more critical consideration today than it was at the time. (See following map of this highway network. The routes indicated in black comprised a core system of approximately 5,150 miles.)

Major population centers

All cities with populations greater than 1,000 should be served by a trunk highway.

Major routes with significant traffic volumes

With few exceptions, no trunk highway carrying a lower average daily volume than 2,000 should remain on the state system.

We recognize that other criteria could be applied in determining the net mileage of an essential or "core" highway system. These might include such factors as main recreational routes or those of significant importance to Minnesota agri-business. And we believe that the Minnesota Legislature should consider these factors as well. But functional classification, major population centers, economic factors and traffic volume should remain paramount.

According to MnDOT Commissioner Richard Braun, Minnesota could financially afford a 5,500-7,000 mile trunk highway. We agree, therefore, that regardless of the criteria which the Legislature ultimately chooses to use, the ultimate size of the core system should be no larger than 7,000 miles.

The Minnesota Department of Transportation has been kind enough to take these criteria and compute the mileage that would result if our proposal were implemented. Based on existing trunk highway mileage of 12,121 miles, the criteria would result in the following: (See chart at bottom of page)

The Governor and the State Legislature should, before the end of the 1983 session, establish an independent commission to formulate an implementation strategy to facilitate statewide return to cities and counties of non-essential trunk highway routes.

Composition

The commission should be made up of legislators, representatives of local governments (cities, counties and townships) and citizen generalists selected by the Governor with reasonable representation from rural and urban areas. The Minnesota Department of Transportation should provide staffing and technical assistance to the group.

Charge

The commission should be charged with recommending any

CITIZENS LEAGUE PROPOSAL FOR A REDUCED STATE TRUNK HIGHWAY SYSTEM

	Mileage	Accumulative Total
All rural principal arterials and all urban trunk highways	5,150	5,150
Wholesale-Retail centers (9)	--	5,150
Complete shopping centers (35)	--	5,150
Partial shopping centers (55) (17 not served by principal arterials)	950	6,100
Population centers of 1,000 (144) (25 not served by principal arterials)	510	6,610
Agribusiness (32) (publicly owned grain elevators)	15	6,625
Mileage of 2,000 Average Daily Traffic	250	6,875
Total Mileage Under CL Proposals	6,875	6,875

NOTE:
1). Does not include seasonal peak average daily traffic routes
2). Does not address county and city routes which carry traffic volumes over 2,000 average daily traffic
3). All mileages are approximate

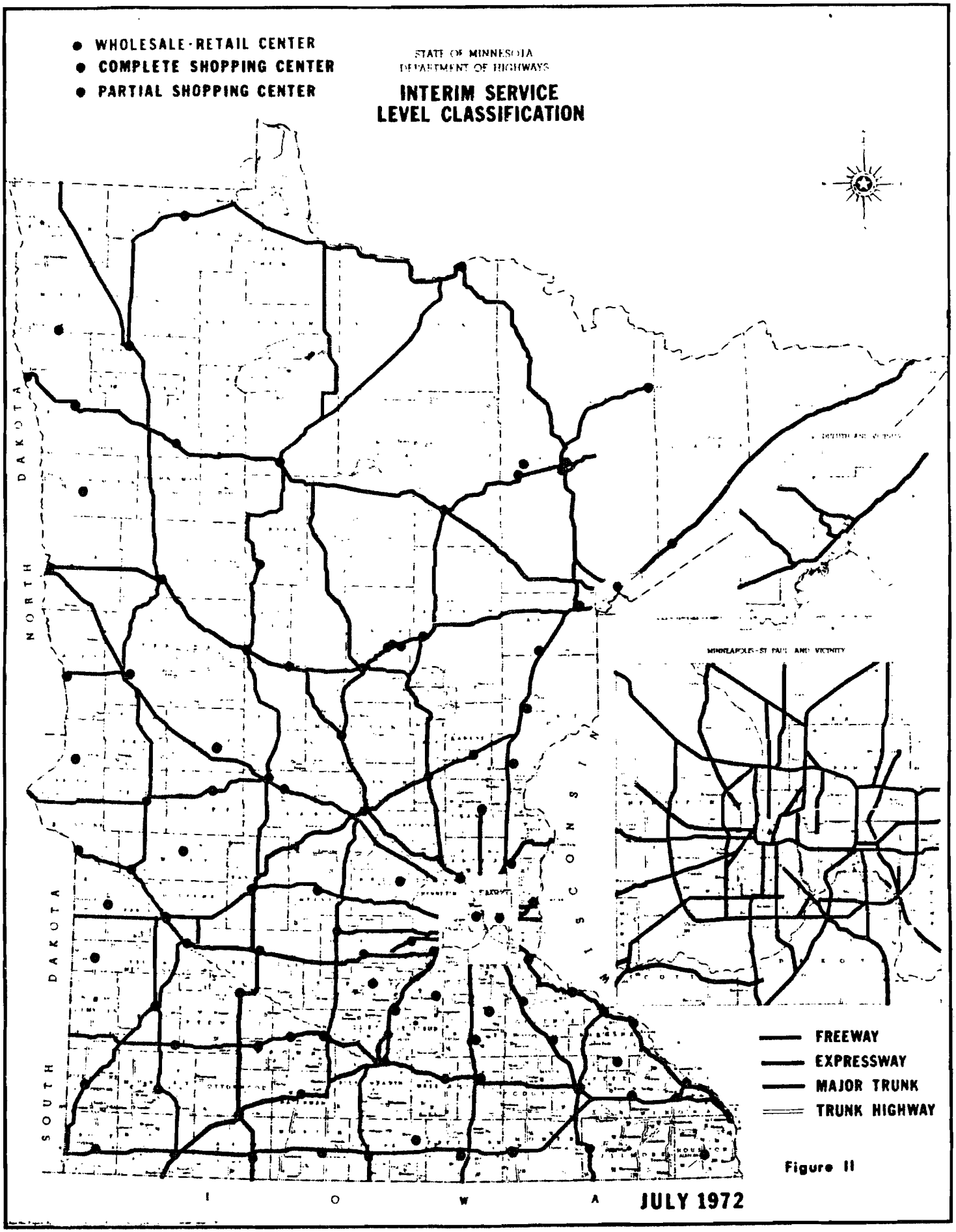

● WHOLESALE-RETAIL CENTER
● COMPLETE SHOPPING CENTER
● PARTIAL SHOPPING CENTER
STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS
INTERIM SERVICE
LEVEL CLASSIFICATION
NORTH DAKOTA
SOUTH DAKOTA
WISCONSIN
IOWA
MINNEAPOLIS-ST PAUL AND VICINITY
FREEWAY
EXPRESSWAY
MAJOR TRUNK
TRUNK HIGHWAY
JULY 1972

Figure 11

changes in the Legislature's criteria for designating core state trunk highways. Additionally, the commission should submit to the Legislature a detailed plan indicating which miles currently on the state trunk highway system should be retained and by implication, which should be returned to local units of government. Finally, the commission should have the responsibility to formulate an implementation strategy to realign road responsibilities to the most appropriate unit of government.

In developing an implementation plan, the commission should develop answers to the following questions:

- How are local governments to be compensated for accepting former trunk highway routes?
- How soon should the process of jurisdictional change be accomplished?
- What standards should be used in returning former state trunk highways to local governments?

Our committee has thought a great deal about the answers to these perplexing questions. We therefore submit the following recommendations to the Legislature in the hope that they will make a constructive contribution to the ongoing debate over these issues.

Several sources of revenue should be used to return state trunk highways serving local purposes back to local governments.

A portion of MnDOT's share of the Highway User Distribution Fund should be used to improve trunk highways designated for return to counties.

Once the independent commission decides which trunk highway routes are to remain as part of the new "core" system and which are to be turned back, it should submit its plans to the Legislature. The Legislature should direct the Minnesota Department of Transportation to use, for a period of five years, a portion, say 10 percent, of its 62 percent allocation from the Highway User Tax Distribution Fund to improve or upgrade the condition of those roads designated for turnback to counties.

Since our data indicates that princpal arterials are in the best shape with minor arterials and collectors somewhat more deteriorated, we propose that a percentage of the state's share of the Highway User Tax Distribution Fund be used by the state to improve these roads to standards established by the Commission before they are turned back to local units of government. The state can afford to move in this direction now because its principal arterials are in such good shape and more federal funding for the ongoing maintenance of the interstate system will soon be forthcoming. We are concerned that if Minnesota does not move in this direction now the Department of Transportation will be pressured into delivering on many unwise and unnecessary past promises to local communities.

Example: Recent MnDOT calculations indicate that the Department expects to receive somewhere between $265 million and $290 million per year for the 1984-85 biennium. This could include about as much as $40 million in new federal funds, of which only about $20 million could be used for non-interstate trunk highway purposes. Thus, between $49 million and $54 million would be available in the first two years of our proposal for reconstruction and resurfacing of those trunk highway routes designated for turnback.

It should be understood in advance that the upgrading of these roads will be to something less than existing standards for state trunk highways. The commission should recommend suitable standards.

For the same five year period, the Legislature should direct that the five percent turnback account be used to upgrade county roads being returned to cities and townships.

The Legislature should instruct MnDOT to use the entire sum to facilitate county turnbacks to cities and townships. These monies will then be directed to counties to help them improve roads which are to be turned back to cities and townships in the same manner as the state improving trunk highway routes which are to become the responsibility of the counties.

This will require legislation, since the five percent turnback account is presently allocated by statute, with the majority going to the state and lesser amount going to counties and cities. Our proposal would have 100 percent of the fund going to the counties for a five year period.

Example: In FY 1982, the five percent turnback account had a total of $15 million. Under our proposal, all $15 million would be turned over to MnDOT, which would allocate the money to counties according to needs. If, for example, a county received a disproportionate share of trunk highways from the state, this money could help it improve those roads serving other than county purposes before turning them back to cities or townships.

Finally, the Legislature should direct the independent commission to recommend how the present constitutional highway allocation formula should be changed.

The present constitutional allocation formula (62 percent going to the state, 29 percent to the counties and nine percent to the cities) may need to be modified in accordance with these changes. The state's share would then decrease while other levels of government would experience larger shares based on a significantly smaller trunk highway system. But this is an issue which the independent commission should grapple with in the course of its duties. Were it, at some time, to feel that the present formula should be modified, then it should recommend to the Legislature what the appropriate new allocation should be. The Legislature would then need to decide whether the new arrange-

ment was justified and, if so, put the question to the Minnesota voters in the form of a constitutional amendment.

A proposed timetable for jurisdictional change

We recommend that the state phase in by the end of this decade the turnback of mileage determined not to be essential to the trunk highway system. A proposed timetable follows:

YEAR	ACTIONS TO BE TAKEN
1983	Legislature passes a bill to downsize the trunk highway system and adopts criteria that routes must meet in order to be part of the new "core" system. Legislature and Governor jointly appoint an independent commission and charge it with examining these criteria and recommending any changes. Commission is assigned the task of defining the precise composition of the new trunk highway system and which miles currently on the trunk highway system should be turned back to local governments.
1984	Legislature passes a law calling for a constitutional amendment to remove routes numbered one through seventy as being constitutionally designated trunk highway routes. Commission reports to the Legislature any changes it deems necessary in criteria and which miles should remain on the trunk highway system. Legislature passes a statute allowing MnDOT to allocate the entire five percent turnback fund to counties as a means of facilitating turnbacks of non-essential county roads to cities and townships.
1985	Legislature instructs the Department of Transportation to begin using some portion, perhaps 10 percent of its 62 percent share of Highway User Tax Distribution Fund Revenues to upgrade those trunk highway routes in significant need of improvement. Upon completion of such improvements, where they are needed, it shall be understood that the jurisdiction of these roads will change from state ownership to the appropriate level of local government.
1985-1990	Process continues.
1990	Process completed.

The Minnesota Legislature should, in its 1984 session, agree to place an amendment on the 1984 general election ballot removing the specific enumeration of routes one through seventy as constitutionally designated trunk highway routes.

Such an amendment would encourage jurisdictional change and return of those state trunk highway routes serving essentially local functions to appropriate local levels of government.

The Minnesota Legislature should pass legislation in 1984 mandating a weight-mile tax be paid by heavy vehicles.

Recently federal studies and a number of studies from states, including Wisconsin, strongly suggest that the heaviest trunks are not paying fees proportionate to the wear they contribute. Here in Minnesota there has been more than an 800 percent increase in the number of five-axle trucks using the state roads at a time when automobile weights are going down.

We believe that the gas tax and motor vehicle licensing system does not adequately assess truckers user-fee responsibility for the damage these vehicles occasion.

For that reason, we urge the Legislature to adopt a weight-mile tax. The federal government has indicated its interest in pursuing this direction. The state of Kentucky has already adopted a similar tax, as have several other states.

Our suggestion would be to keep the implementation of the tax as simple as possible. One way to do that would simply involve taxing only the weight of the actual load rather than a truck's maximum or potential load. Were that to be the guiding principle then administration should be little more than careful auditing of the existing bill of lading receipts which truckers are obligated to carry. Should that prove unworkable, the state could give rebates to truckers based on those on which they were not loaded to capacity.

In the presently precarious economic environment, great care must be taken in order to make such an arrangement as equitable as possible. For that reason our support of this concept is contingent upon fair statewide implementation of a weight-mile tax that is administered along the lines we have set forth below. In order to establish a weight-mile tax that is fair we offer the following recommendations:

- All trucks weighing less than 20,000 pounds should be exempt from the weight-mile tax. They would continue to be taxed under existing arrangements.
- All trucks weighing 20,000 pounds or more would pay a weight-mile tax. However, they would be required to pay minimal registration fees and no fuel taxes.
- Farm vehicles which qualify would pay a weight-mile tax based on their light weight. They would then be charged the full rate only on that portion of their travel which involves commercial hauling.

- Many trucks and trucking firms particularly those hauling grain, carry freight one way and return empty. So as not to unfairly tax such truckers based on their "dead hauls" the system would offer them rebates for empty trips.

- Such rebates would be based, as much as possible, on the operator's activity in the preceeding year.

- Payment periods would be spread evenly throughout the year on a quarterly basis so as not to make any single payment overly burdensome.

In order to determine what rates should be assessed to those trucks falling under the jurisdiction of the new weight-mile law, the Legislature should charge the legislative auditor with performing a cost-allocation study. The study should be completed in time for legislative action in the 1984 Legislature. It should recommend a schedule of rates for various classes of trucking vehicles. Tax levels should be based on the weight of the loads actually carried and should be adjusted so that the heaviest vehicles face the greatest cost responsibility. Tax levels should be increased every 2,000 pounds. Total tax revenues should not be less than that presently paid by larger trucks.

Finally, the Legislature should find ways to reward truck operators who spread their loads or use rigs which cause less damage to the roads. Tridem axles for example, have been found to reduce excessive road damage.

If the system of truck weight monitoring and assessments we envision is to work it is critical that the Civil Penalty Truck Weight Law be retained with the full support of the Legislature. This statute, commonly referred to as the Relevant Evidence Law, has served the state well in significantly decreasing the number of overweight grain trucks. This law can be improved only through more vigorous enforcement. We call upon the state Attorney General and his staff to assure that such enforcement is forthcoming.

The 1983 Legislature should direct MnDOT to perform a cost-benefit study of salt as opposed to other deicers. The study should account for all costs, not merely purchase price, and render an opinion on the feasibility of substituting another deicer for salt. The DOT should make its report to the 1984 Legislature. If feasible, the Legislature should ban the use of salt by June 30, 1985.

The Minnesota Legislature has had a long history of involvement with this issue. In 1971 the Legislature passed legislation which regulated the use of salt on streets and highways. In January 1977 Representatives Mann, Fudro and Lemke called for a study by the House Transportation Committee of the feasibility of replacing or significantly reducing the negative effects of salt on vehicles and the environment.

That study prepared for the Minnesota House Committee on Transportation in 1978 by the Legislative Office of Science and Technology (The Use of Deicing Salts in Minnesota: A Review of Snow and Ice Removal Management Practices, Salt Use Effects and Alternatives) concluded:

> "Salt, while heavily impacting the decks of bridges, is also affecting the supporting elements. Estimates of structural deterioration costs due to deicing chlorides alone range from $70 million to $500 million annually. If these estimates are legitimate in determining the magnitude of the costs associated with the use of deicing salts, then the validity of the "bare road" policies should be questioned. Estimates of this magnitude would indicate that the use of deicing salts may NOT be cost effective." (p. 39)

Minnesota can no longer afford the damage done to its roads and bridges by salt. Our recommendation is intended to leverage serious consideration of what salt contributes to the deterioration of Minnesota's investment in its roads and bridges. A thorough cost comparison of salt as opposed to other deicers is needed. Mere consideration of purchase price alone will not suffice. All of salt's damaging effects to roads and bridges, to cars, the environment, parking ramps and the like must be considered. One bet is that the residents of Minnesota would willingly bear some additional costs to forego the extra costs they now experience as a result of the use of salt. Perhaps, the Legislature would be willing to increase the state's motor vehicle taxes to reflect the cost of using some other proven deicer as an alternative to salt.

WORK OF THE COMMITTEE

The Citizens League's Board of Directors gave the following charge to the Roads and Bridges Committee:

> In each of the last two legislative sessions major tax increases to finance Minnesota's road and bridge system (city, county and state) were passed. Yet there seems to be some evidence that even with more financial support, the condition of Minnesota's roads and bridges, in total, is not improving and may be declining. In this assignment we will analyze factors which contribute to deterioration, alternatives to existing practices, review the status of road and bridge finance, and review who makes decisions on use of road and bridge money.
>
> **Analysis of factors contributing to deterioration:**
>
> - Normal wear expectancy
> - Specific impact of climate
> - Construction methods and materials
> - Use of corrosive chemicals
> - Impact of heavily weighted vehicles
>
> **Alternatives to present practice with potential to reduce the rate of deterioration**
>
> **Review of status of finance:**
>
> - What is the cost of any alternative identified above compared with the cost of present practice?
> - What level of spending is required to maintain existing roads and bridges so as to minimize the need for rehabilitation and replacement?
> - Is there a logical source(s) of dedicated funds sufficient to this level of spending? Would it be better to subject this expense to competition or appropriation from the general fund?
> - What changes, if any, make sense in constitutional and statutory formulas for financing?
>
> **Review of decision-making:**
>
> - Who decides what policies should be followed in road and bridge maintenance and construction?
> - What role do elected officials play? Professional engineers?
> - Who decides how funds are apportioned? By geographic area within the state? Among cities, counties and the state? Between maintenance and construction? By specific categories of maintenance and construction?

COMMITTEE MEMBERSHIP

Ninety people responded to an invitation published in the CL NEWS to become committee members. Of these, 17 members actively participated in the committee's work and helped to shape its eventual recommendations. These are:

Peter Vanderpoel, chairman

Duane Bell	**Robert Johnson**
Emil Brandt	**Norma Lorshbough**
W. Scott Carlson	**Susan McCloskey**
James Denn	**Harry Reed**
David Ekern	**Mary Sullivan**
Janet Estep	**Robert Teetshorn**
Dean Fenner	**Joane Vail**
Edward Hunter	**Erling Weiberg**

The committee was assisted in its work by David Hunt, Donna Keller and Joann Latulippe of the League staff.

COMMITTEE PROCESS

The committee met 28 times from January 5, 1982 to March 1, 1983. Each meeting lasted approximately two hours. In the course of its deliberations, the committee received testimony from 25 resource persons, some from other parts of the country. During its work, the committee participated in four teleconference calls with out-of-state speakers.

Three phases were involved in the committee's work.

In the first phase, the committee heard from various resource speakers and produced a set of findings of fact.

In the second phase, the committee produced a list of critical issues which were to be resolved through further discussion. These issues were:

- What condition are Minnesota's trunk highway roads and bridges in today?
- Should Minnesota reduce the size of its trunk highway

system?

- If so, how should the state accomplish that reduction?
- What should Minnesota's road and bridge expenditure priorities be?
- Do all classes of vehicles pay their fair share of the road and bridge expenditures which they occasion?
- Would it be more cost-effective to society as a whole to use a salt substitute on Minnesota's roads and bridges?

In the third phase of the committee's work it took positions on these questions after much discussion of issue papers prepared by staff. Each position paper provided important background information and listed several possible alternative positions. The committee then debated each alternative and came to a position. After taking positions on all six major issues, staff was instructed to draft a report for the committee's review.

Committee members David Ekern and Robert Johnson registered their dissent from the final committee report. They did not submit minority reports.

Committee member Erling Weiberg abstained from taking a position on the report.

Committee member James Denn agreed with the thrust of the committee's major recommendation, namely, that the size of the trunk highway system be reduced. He disagreed, however, with the committee's recommendation on the need for a weight-mile tax in Minnesota. Denn filed a minority report on that issue arguing that:

> "The background material upon which the committee predicted its recommendation, particularly the U.S. DOT Cost Allocation Report, is in part flawed and subject to misinterpretation.
>
> "The committee did *not* receive any compelling evidence that the existing Minnesota highway user tax system was in any way defective or in need of change.
>
> "The State of Minnesota has not conducted a current cost allocation study, nor any other type of evaluation concluding that a weight-distance tax scheme should be adopted for trucks.
>
> "The Report calls for a major restructuring of truck taxation in Minnesota *without* first conducting a feasibility study to determine start-up costs or to assess the cost-benefit relationship of a shift to weight-mile taxation. In fact, the timetable set forth in the committee report would essentially preclude such a study.
>
> "Weight-mile tax programs invariably result in inequitable taxation of certain classes of trucks and types of trucking operations–no matter how thoughtfully the program is structured. In this regard it must be acknowledged that the committee has made a very serious attempt to identify specific procedures aimed at addressing these problems of equity. However, the committee's intent and efforts do not resolve the well founded concern that in practice, the safeguards it has suggested will not be implemented as intended."

In his concluding remarks, Denn observed:

> "If the program could be implemented with full compliance precisely along the lines suggested in the report, most if not all of these problems could be avoided. It would without doubt be the fairest such system in the nation. However, such a program would also be more dependent upon the cooperation and voluntary compliance of the various truck operators than in any of the ten states now using a weight-mile plan. Because of this, the program would at the same time be virtually unenforceable. To that extent there has been no resolution of the problems of inequitable taxes. Until these concerns can be satisfactorily put to rest, the appropriateness and relative merit of weight-mile tax programs remains extremely questionable."

Full copies of Denn's minority report are on file at the League's office and are available upon request.

Names of resource persons who met with the committee are listed below. Their participation and insights are gratefully acknowledged.

Charles Aten, director, Bureau of Operations, Wisconsin Department of Highways & Transportation Facilities
John Bowers, assistant division administrator, Federal Highway Administration
Emil Brandt, transportation coordinator, Transportation Advisory Board
Richard Braun, commissioner of transportation, Minnesota Department of Transportation
Charles Burrill, former Minnesota Department of Transportation Employee
Curt Christie, director of maintenance, Minnesota Department of Transportation
Richard Diercks, staff, Senate Finance Committee
Peter Fausch, former assistant commissioner, Minnesota Department of Transportation
Jerry Fruin, professor, Department of Agricultural & Applied Economics, University of Minnesota
David Graven, attorney, Holmes & Graven
Lloyd Henion, manager, Financial Planning & Economics, Oregon Department of Transportation
Kris Johnson, director of public affairs, Medtronic, Inc.

Milan Krukar, project manager, Cost Allocation Study, Oregon Department of Transportation

Merritt Linzie, director of highway programs, Minnesota Department of Transportation

Lyle Mehrkens, state representative

Roger Mingo, chief systems analyst, Federal Highway Administration

Patrick Murphy, director, public works, Carver County

Morris Nicholson, director, Continuing Education for Engineers & Scientists, University of Minnesota

Harvey Peterson, Wisconsin Division of Highways & Transportation Facilities

John Reith, director, Department of Interstate Cooperation, American Trucking Association

David Schaaf, former state senator

Brian Vollum, project manager, Transportation Advisory Board

Connie Waterous, research consultant, House Independent Republican Research

John Williams, staff, Minnesota House Research

Jim Wright, Minnesota Department of Transportation

A special thanks go to the many employees of the Minnesota Department of Transportation who gave so often of their time and energies to staff in the data gathering stages of the committee's work. In particular, thanks go to Merritt Linzie, MnDOT director of Highway Programs and Jonette Kriedeowicz a MnDOT planner, for the continuing research assistance which they provided.

RECENT CITIZENS LEAGUE REPORTS

(We would appreciate a $3 contribution for reports. Summaries, when available, are free.)

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Statement on Downtown People Mover in St. Paul, Prepared by Transportation Task Force	3/21/79
Testimony by the Citizens League before the Minneapolis Cable Communications Commission	3/8/79

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WHAT THE CITIZENS LEAGUE IS

Formed in 1952, the Citizens League is an independent, nonpartisan, nonprofit, educational corporation dedicated to understanding and helping to solve complex public problems of our metropolitan area.

Volunteer research committees of the Citizens League develop recommendations for solutions after months of intensive work.

Over the years, the League's research reports have been among the most helpful and reliable sources of information for governmental and civic leaders, and others concerned with the problems of our area.

The League is supported by membership dues of individual members and membership contributions from businesses, foundations and other organizations throughout the metropolitan area.

You are invited to join the League, or, if already a member, invite a friend to join. An application blank is provided for your convenience on the reverse side.

WHAT THE CITIZENS LEAGUE DOES

RESEARCH PROGRAM

- Four major studies are in progress regularly.
- Each committee works 2½ hours every other week, normally for 6-10 months.
- Annually over 250 resource persons made presentations to an average of 25 members per session.
- A fulltime professional staff of eight provides direct committee assistance.
- An average in excess of 100 persons follow committee hearings with summary minutes prepared by staff.
- Full reports (normally 40-75 pages) are distributed to 1,000-3,000 persons, in addition to 3,000 summaries provided through the CL NEWS.

CL NEWS

- Four pages; published every two weeks; mailed to all members.
- Reports activities of the Citizens League, meetings, publications, studies in progress, pending appointments.
- Analysis data and general background information on public affairs issues in the Twin Cities metropolitan area.

PUBLIC AFFAIRS ACTION PROGRAM

- Members of League study committees have been called on frequently to pursue the work further with governmental or nongovernmental agencies.
- The League routinely follows up on its reports to transfer, out to the larger group of persons involved in public life, an understanding of current community problems and League solutions.

PUBLIC AFFAIRS DIRECTORY

- A 40-page directory containing listings of Twin Cities area agencies, organizations and public officials.

COMMUNITY LEADERSHIP BREAKFASTS
LANDMARK LUNCHEONS
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- Public officials and community leaders discuss timely subjects in the areas of their competence and expertise for the benefit of the general public.
- Held from September through May.
- Minneapolis breakfasts are held each Tuesday from 7:30 - 8:30 a.m. at the Lutheran Brotherhood.
- St. Paul luncheons are held every other Thursday from noon to 1 p.m. at the Landmark Center.
- South Suburban breakfasts are held the last Thursday of each month from 7:30 - 8:30 a.m. at the Lincoln Del, 494 and France Avenue South, Bloomington.
- An average of 35 persons attend the 64 breakfasts and luncheons each year.
- Each year several Q & A luncheons are held throughout the metropolitan area featuring national or local authorities, who respond to questions from a panel on key public policy issues.
- The programs attract good news coverage in the daily press, television and radio.

SEMINARS

- At least six single-evening meetings a year.
- Opportunity for individuals to participate in background presentations and discussions on major public policy issues.
- An average of 75 person attend each session.

INFORMATION ASSISTANCE

- The League responds to many requests for information and provides speakers to community groups on topics studied.
- A clearinghouse for local public affairs information.

Citizens League non-partisan public affairs research and education in the St. Paul-Minneapolis metropolitan area. **84 S. 6th St., Minneapolis, Mn. 55402 (612) 338-0791**

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