



# *South Dakota Legislative Research Council*

## *Issue Memorandum 97-25*

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### **HIGHWAY NEEDS**

A highway need to most people is that pothole in the highway or street in front of their home or business which the government having jurisdiction never seems to have enough resources to repair in a timely manner. To others a highway need is a larger and wider highway to facilitate commerce and thus allow a community to attract economic development. No matter which, highway needs are a significant factor considered by the Legislature when it discusses increases in the motor fuel tax or in motor vehicle license fees. This memorandum will supply background information about our state highway system and its usage, how highway needs are determined, and the most recent information about highway needs and the additional revenue needed to meet those needs.

#### **The Highway System**

The Legislature of the Dakota Territory in 1877 designated all section lines as public highways with a width of sixty-six feet. That was one of the first official governmental actions to begin the long process towards development of a state highway system as we know it today. In the early days of statehood, road building and road maintenance was largely the responsibility of local units of government and funded by local property taxes. Although a state highway commission was created in 1913 to establish a uniform roadway system in the

state and in 1917 the South Dakota Highway Department was created, it was not until the late 1930s that the state really relieved the counties of the responsibility to acquire highway right-of-way and to maintain the roads as part of a state highway system. In 1949 the Legislature designated those highways that should be a state responsibility and established a state trunk highway system consisting of 6,224 miles.

Currently 83,375 miles of highways, roads, and streets exist in the state. The vast majority of these miles are maintained by local governments. County governments have the responsibility for almost 36,000 miles, and townships have the responsibility for about 34,000 miles of roads. Miles of municipal streets in the state total just over 3,500. The state trunk highway system consists of 7,862 miles of highway. The state highway system includes the interstate highways (i.e., I-29, I-90), all highways identified as U.S. highways (i.e., US 14, US 18, US 81, US 385, etc.), and all highways identified as state highways (i.e., State Highway 34, State Highway 42, etc.). The remaining 2,000 miles of highway existing in the state are mainly the responsibility of the federal government (Bureau of Indian Affairs highways, U.S. Forest Service roads, etc.).

The total number of highways existing in the state has not changed much in the last

twenty years, growing by only one percent over that period. The largest growth has occurred in the number of city streets with over 500 miles of streets being added.

There have been, however, shifts in the number of miles of highway on a particular highway system worth noting. By 1982 the state trunk highway system had grown to 9,045 miles. Although part of the increase was due to the creation of the interstate highway system by Congress in 1956, the majority of the growth was the result of the Legislature and the commission (the highway commission became the transportation commission in 1973) each year adding miles of highway to the state trunk highway system. Those miles of highway added by the Legislature were identified in state statute and those added by the commission were done by commission resolution. Furthermore, even if the Legislature added a section of highway to the state trunk highway system, under the law that existed at that time the commission could choose not to maintain that section of highway. Consequently, by 1982 the state statutes did not accurately reflect the state trunk highway system and there were over 1,300 miles on the state trunk highway system that were not maintained by the state but by local governments.

In 1982 an interim legislative committee looked at the state trunk highway system and recommended that those highways not maintained by the state be removed from the state trunk highway system. Legislation was passed in 1983 and 1984 which amended the state statutes to accurately reflect the state trunk highway system and to make it clear that the commission would be responsible for all highways on the state trunk highway system. Now, any change to the state trunk highway system is the result of legislative action. Since 1982 there have been changes

to the state trunk highway system and these changes are usually the result of agreements between the state and local units of government to swap responsibilities for certain sections of highways.

## **Highway Use**

For the year 1996 there were an estimated 7.6 billion vehicle miles traveled over the streets and highways of the state. Although the state's portion is only 9.4% of the total highway miles in the state, it carries 66% of the traffic. County and township highway miles, on the other hand, represent 84% of the total miles in the state; these miles of roads carry only about 20% of the state's traffic each year. Municipal streets, which represent about 4% of the total miles, carry about 14% of the traffic in the state. While the number of highway miles has not increased significantly over the past twenty years, the number of vehicle miles traveled over this highway system has increased by about 24% over the same period.

This growth in highway use is projected by the Department of Transportation (DOT) to increase even more on the state trunk highway system in the next twenty years. In 1996 there were 1,322 lane miles of state trunk highway with an average daily traffic count of over 3,000 vehicles. By 2016, the department projects that 2,094 lane miles of state highway will have an average daily traffic count of over 3,000 vehicles. This is an increase of 58% in this higher traffic category. As can be expected most of the traffic increases on the state trunk highway system are projected to occur around the urban areas of the state. Also the projection is for increased traffic on most sections of the state's interstate system. While data is not available on a statewide basis for future traffic projection on county, municipal, and township highway systems, it is logical to

assume the traffic in and around these urban areas will increase but not as fast as in the urban areas.

### **Highway Surfaces**

The surfaces of highways in the state range from primitive dirt roads and gravel roads to bituminous and concrete streets and highways. The bituminous and concrete streets and highways carry the vast majority of the traffic in the state. Ninety-nine percent of township roads and county secondary roads (roads similar to township roads in counties with unorganized townships) have a gravel or dirt surface, whereas 99% of the highways on the state trunk highway system have a bituminous surface (80.6%) or a concrete surface (18.4%). Sixty-five percent of all highways maintained by county and township governments have a gravel surface. Thirty percent of highways on county systems and 77% of the municipal streets have a bituminous or concrete surface.

Unfortunately, no highway surface lasts forever. The effects of the weather and vehicle traffic on a highway surface eventually begin to take their toll and the surface becomes in need of improvement. The surfaces of bituminous or asphalt highways with routine maintenance are expected to last 15 to 18 years depending on the thickness of the asphalt. The expected life of a highway with a concrete surface with one or two major rehabilitations can be up to 50 years. However, if a highway is abused its life expectancy will be less. The Department of Transportation is finding that overloaded trucks are causing pavement failure on certain asphalt highways in 8 to 12 years instead of the 18 years as would normally be expected.

### **Highway Construction and Maintenance Costs**

A discussion of highway needs would not be complete without mentioning the costs of highway construction and maintenance. The high inflation of the late 1970s and early 1980s caused highway construction and maintenance costs to skyrocket. The last ten years have seen these increases level off and in some cases decrease. If inflation returns in the future, it will have a direct bearing on the cost of highway construction and maintenance and the ability of the state and local governments to address highway needs. Table 1 shows the average costs for highway construction and maintenance on the state trunk highway system and what has happened to those costs since 1987.

### **Determination of Highway Needs**

The Department of Transportation and local transportation officials collect road-related data to monitor the performance of highways and to determine what highway improvement needs exist. For the state trunk highway system, the DOT collects data regarding the roughness, rutting, grade characteristics, and pavement condition of these highway miles. This information is annually evaluated to determine the overall health of the pavement and to help determine when a segment of highway is in need of improvement. The department uses an enhanced pavement management system to predict pavement performance and needs. This system uses various life cycles for asphalt and concrete surfaces to estimate the year a segment of highway will need improvement. The department uses guidelines concerning minimum roadway widths and geometrics established by the American Association of

Table 1

<b>AVERAGE COSTS PER MILE FOR HIGHWAY CONSTRUCTION</b>			
	<b>1987</b>	<b>1993</b>	<b>1997</b>
Grade, Drain and Surface (PCC* Pavement) -- 4 Lane Expressway (Does not include ROW, Utilities, or Bridges)	\$1,235,000	\$1,604,000	\$1,650,000
Surface Reconstruction (PCC Pavement) -- 4 Lane Interstate	\$1,066,000	\$1,384,000	\$1,390,000
Grade, Drain, and Interim Surfacing -- 2 Lane Primary (Does not include ROW**, Utilities, or Bridges)	\$243,000	\$315,000	\$345,000
Surfacing (PCC Pavement) -- 2 Lane Primary	\$318,000	\$485,000	\$430,000
Surfacing (Asphalt Concrete) -- 2 Lane Primary	\$263,000	\$260,000	\$270,000
6" Gravel Base and Blotter -- 28 Foot Top	\$65,000	\$90,000	\$94,000
2" Asphalt Concrete Resurface -- 24 Foot Top	\$61,000	\$70,000	\$80,000
Chip Seal or Blotter -- 24 Foot Top	\$9,000	\$16,000	\$12,000
3" Gravel Surfacing -- 28 Foot Top	\$21,900	\$35,000	\$35,000
<b>AVERAGE MAINTENANCE COSTS PER MILE</b>			
Two Lane Highway	\$3,500 - 4,000	\$4,500 - 5,500	\$4,500 - 5,500
* Portland Concrete Cement    **Right-of-way			

State Highway and Transportation Officials (AASHTO) to help determine the type of improvement. Generally, if the highway does not meet these geometric guidelines, the highway is a candidate for reconstruction or widening. If the guidelines are met, resurfacing or rehabilitation procedures are determined based on the pavement type. Traffic levels and highway functions are also considered in determining the type of improvement. Once the type of improvement has been determined, a cost estimate for the improvement project can be developed. This estimate is the amount of the highway need.

Highway needs are further defined as being either backlog needs or accruing needs. *Backlog needs* are the total cost of those highway improvement projects that are presently needed but will not be accomplished this year due to a lack of funding. *Accruing needs* are the total cost of those highway improvement projects that become necessary for the first time each year. Accruing needs that are not addressed in the year needed because of a lack of funding become backlog needs.

## Highway Needs -- Recent Past History

In 1984 the DOT conducted an intensive needs study of all bridges, highways, and streets in the state. Initially, that study used AASHTO guidelines to determine the needs on all highways. The result of using those guidelines showed a backlog of \$1.2 billion on just county highways. The department determined that using these guidelines would result in an infrastructure the state could not afford to build or maintain. Consequently, the department applied more realistic guidelines in its opinion and reported to the Legislature in 1985 that backlog needs of \$624 million existed on the state highway system, backlog needs of \$220 million existed on county highway systems, and backlog needs of \$209 million existed on municipal highway systems. Representatives of county government argued at the time that the study understated the needs on county highways. The DOT study indicated that additional annual revenues of approximately \$3.8 million for counties, \$3.5 million for cities, and \$800,000 for townships were needed to meet accruing highway needs and address the backlog of highway needs over a twenty-year period. The 1985 Legislature subsequently passed legislation which resulted in counties receiving about \$2.3 million more a year than previously, cities about \$2 million more a year, and townships about \$600,000 more a year. That money was placed into a Local Government Highway and Bridge Fund and distributed to counties, cities, and townships based on their portion of total highway needs that had been previously identified by the DOT study.

This decade there have been two additional studies to take a look at highway needs on state and county highways. In 1991, the DOT and the South Dakota Highway Superintendents Association worked with a private consultant to conduct a local roads

needs study covering the roads maintained by counties. In 1994, the DOT was requested by the Legislature to develop a plan to deal with the backlog of needs on the state trunk highway system.

The 1991 study results, unlike the 1984 study, were accepted by the department and the counties as being realistic. The 1991 study developed minimum highway construction and maintenance guidelines that defined the appropriate service level for county roads and bridges rather than using the AASHTO guidelines as had been used in 1984. The results of the 1991 study indicated that a total backlog of needs on all county highways of \$980 million existed. Of this backlog amount, \$780 million were improvement needs on roads and \$200 million were improvement needs on bridges. The 1991 study also identified an annual accruing need to cover resurfacing and maintenance projects of \$85 million dollars. The study found that the counties were able to spend \$60 million dollars a year for such improvement projects. Consequently, the study indicated that \$25 million was being added each year to the backlog of needs. This study was reported to the Local Government Study Commission and, subsequently, to the 1992 Legislature. Despite several attempts in the Legislature since 1992, no legislation has been passed to provide funding to address this backlog of needs on the county highway system.

The 1994 study of the backlog of needs on the state trunk highway system was requested by the Joint Appropriations Committee at a time when the state was also discussing the potential of increasing highway revenues to provide for the completion of the proposed Heartland Expressway, the Pierre to I-90 Expressway, and the Eastern Dakota Expressway. Many legislators questioned the ability of the state

to fund these expressways when there was such a large backlog of needs on the current state trunk highway system and, as a result, the request was made for the department to develop a plan to address this backlog of needs. The results of that study indicated that a \$526 million backlog of needs existed on state highways and the study projected that the needs backlog would grow to \$1.07 billion by 2015 without an increase in funding. The study looked at the amount of additional funding it would take to reduce the backlog. Table 2 shows the study's

findings.

The study indicated that just to maintain the backlog at the \$526 million level over 20 years would require an additional \$21.9 million annually. No legislation to increase revenues to reduce the backlog of needs on the state highway system has passed since this study was reported to the 1995 Legislature.

Table 2

Backlog Reduced To:	Annual Funding Needed to Attain Backlog Goal		
	10 Years	15 Years	20 Years
\$400 M (Appx. 25% Reduction)	\$34.5 M./Yr.	\$29.3 M./Yr.	\$26.0 M./Yr.
\$260 M (Appx. 50% Reduction)	\$46.7 M./Yr.	\$36.8 M./Yr.	\$31.2 M./Yr.
\$100 M (Appx. 80% Reduction)	\$60.7 M./Yr.	\$45.4 M./Yr.	\$37.1 M./Yr.

**Additional Highway Needs Information**

Since the studies in 1984 and 1991 there has been one additional study on a statewide basis regarding local highway needs. The DOT in 1994 completed a needs assessment which estimated the construction and repair needs of municipal streets in the state. That study concluded that there would be funding needs of approximately \$113 million over the next 20 years to maintain and rehabilitate municipal streets in the state.

The DOT also compiles information regarding the needs on the 4,270 county and city bridges existing in the state. That information indicates \$281 million in backlog needs and an annual accruing need of \$7.6 million on these bridges. This

information compares to 1,788 bridges on the state highway system. The current backlog of bridge needs on the state highway system is \$56.7 million and the accruing bridge needs are between \$15 to \$20 million each year.

The DOT performs an annual needs analysis for highways on the state trunk highway system; therefore, current needs information regarding state highways is readily available. The backlog of needs on the state highway system has not changed significantly since 1991. Growth in existing highway revenues and efficiencies achieved by downsizing and reducing administrative costs of the department has allowed the department to keep pace with recent accruing highway needs. This probably will not continue in the

future. Many miles of the state's interstate highway system are reaching the end of their expected life cycle. Currently, 77% of the interstate is 20 years old or older and 46% is 30 years old or older. Because of age and use, the department estimates that 42% of the state's interstate highway system is currently in fair to poor condition. As the state diverts highway revenues to address these needs on the interstate highway system, less revenue will be available to address accruing and backlog needs on the remainder of the state trunk highway system.

### **Conclusion**

Recent studies indicate a large backlog of highway needs on county highways, municipal streets, and on the state trunk highway system. These studies also indicate that annual accruing highway needs exceed the funding available to cover those needs at

both the state and county levels. Consequently, the backlog of highway needs becomes larger each year. The counties have since 1991 expressed to the Legislature their need of additional highway revenues to address their highway needs. The Department of Transportation has not recently asked the Legislature to increase highway revenues to cover its backlog of highway improvement needs. However, as the highway improvement needs on the interstate highway system grow and if highway revenues do not continue to increase as they have been, it can be expected that the state will also need additional revenue to address increasing highway needs in the not too distant future.

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**This issue memorandum was written by David L. Ortbahn, Principal Research Analyst for the Legislative Research Council. It is designed to supply background information on the subject and is not a policy statement made by the Legislative Research Council.**

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