

The Interstate Highway System in South Dakota:

Saving Lives, Time and Money

*A report on the condition, impact, use and future needs of
South Dakota's Interstate Highway System*

June 29, 2006

TRIP

1726 M Street, NW, Suite 401

Washington, DC 20036

Phone: (202) 466-6706

Fax: (202) 785-4722

www.tripnet.org

Founded in 1971, TRIP of Washington, DC is a nonprofit organization that researches, evaluates and distributes economic and technical data on highway transportation issues. TRIP is supported by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway engineering, construction and finance; labor unions; and organizations concerned with an efficient and safe highway transportation network.

Executive Summary

Fifty years ago the nation embarked on its greatest public works project, the construction of the Interstate Highway System. President Dwight D. Eisenhower provided strong support for the building of an Interstate Highway System that would improve traffic safety, reduce travel times and improve the nation's economic productivity.

Serving as the most critical transportation link in the state's economy, South Dakota's Interstate highways have significantly improved the lives of the state's residents and visitors. In South Dakota, and throughout the nation, the Interstate system allows for high levels of mobility by greatly reducing travel times and providing a significantly higher level of traffic safety than other routes.

But 50 years after President Eisenhower articulated a vision for the nation's 20th century transportation system, South Dakota and the nation again face a challenge in modernizing the system of aging, increasingly congested Interstate highways. If South Dakota residents are to continue to enjoy their current level of mobility on Interstate highways and bridges, the state will need to make a commitment to providing the public with a 21st Century highway system.

In this report, TRIP looks at the history and benefits of South Dakota's Interstate Highway System, its current use and condition and the future needs of the state's most critical transportation system. Sources of data for this study include the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), the U.S. Census Bureau and the South Dakota Department of Transportation (SDDOT). The major findings of the report are:

The Dwight D. Eisenhower National System of Interstate and Defense Highways, which has been called the most ambitious public works project built since the Roman Empire, is the most critical link in the nation's and South Dakota's transportation system.

- South Dakota's Interstate system, which includes two percent of all roadway lane miles in the state, carries 29 percent of all vehicle travel in the state.
- Since Interstate construction began in 1956, vehicle miles of travel in South Dakota have increased by 184 percent, the number of vehicles in the state has increased by 158 percent, and the state's population has increased by 15 percent.

The state's Interstate Highway System saves the average South Dakota resident \$1,776 per year in reduced accident-related costs, the value of time saved, reduced motor fuel consumption and reduced consumer expenses for apparel, food, housing and transportation costs. The total annual statewide savings is approximately \$1.37 billion.

- Improved traffic safety provided by the Interstate system saves the state \$114 million annually and saves the average state resident \$148 annually in reduced healthcare costs and costs associated with lost productivity due to traffic crashes.
- By reducing travel times, the Interstate system saves each South Dakota resident 33 hours of travel time annually – 25 million hours statewide.
- Faster and more efficient routes provided by the Interstate system save South Dakota residents approximately \$405 million annually in the value of saved time and fuel - \$526 per person (\$487 in time and \$39 in fuel).
- South Dakota's Interstate system annually reduces statewide motor fuel consumption by 12 million gallons.
- Consumer costs have been significantly lowered by the Interstate Highway System. The cost of transporting goods has been reduced because the time it takes to make trips has been decreased. And increased access between locations has enabled access to cheaper land.
- TRIP estimates that consumer costs in South Dakota for apparel, food, housing and transportation are reduced by \$850 million annually, or \$1,102 per state resident, as a result of the Interstate Highway System.
- TRIP's estimates of reduced consumer costs are based on consumer expenditure estimates by the U.S. Department of Labor and estimates of the Interstate's impact on consumer costs collected in a survey of transportation economists.

South Dakota's Interstate system carries significant amounts of traffic daily, but the system has stayed ahead of the crippling congestion facing most of the nation's urban areas.

- Between 1990 and 2004, vehicle travel on South Dakota's Interstate increased by 60 percent, from approximately 1.6 billion miles to 2.5 billion miles annually.
- During that same time, Interstate lane miles increased by only 2 percent, from 2,712 miles to 2,753 miles.
- The average annual amount of travel per Interstate lane-mile in South Dakota increased by 58 percent from 1990 to 2004.

South Dakota faces a significant challenge over the next 20 years in maintaining the physical condition of its aging Interstate system and expanding Interstate capacity to address growing traffic congestion.

- Increasing urban traffic congestion may erode some of the logistics advantages that South Dakota producers and distributors have over competitors as the cost and reliability of shipping goods is negatively affected.
- South Dakota Department of Transportation reports that within 20 years, 85 percent of the state's Interstate Highway System (580 miles out of 679 miles) will be in need of significant rehabilitation or reconstruction.
- By 2026, 25 of the state's 446 Interstate bridges will need significant repairs.
- In 20 years, South Dakota will need to increase the capacity of urban Interstate routes by about 10 percent to keep up with growth in travel and population.
- South Dakota Department of Transportation estimates it will need to build or upgrade 14 additional miles of urban Interstate roadway in Sioux Falls and Rapid City by 2026.
- The total cost of needed preservation and capacity expansion of South Dakota's Interstate highways over the next 20 years is \$1.385 billion: \$985 million for preservation and \$400 million for expansion. (This report contains a list of priority projects needed over the next 20 years.)

Travel on South Dakota's Interstate highways is approximately two and a half times safer than travel on all other roadways in the state. South Dakota's Interstates are designed with a variety of safety features that greatly reduce the likelihood of serious accidents.

- South Dakota's Interstate highways have saved approximately 900 lives in the state since 1956, based on an estimate of the number of traffic deaths that would have occurred if South Dakota did not have Interstate highways.
- The number of lives saved by the Interstate was calculated by estimating the additional fatalities that would have occurred had Interstate traffic been carried by other major roadways in the state, which often have higher traffic fatality rates and may lack the safety features common to Interstate routes.
- South Dakota's Interstate system has saved approximately 30 lives per year over the last 10 years, based on the above criteria.
- The features that make Interstates safer than other roads include: a separation from other roads and rail lines, a minimum of four-lanes, gentler curves and

often paved shoulders, median barriers and rumble strips to warn drivers when they are leaving the roadway.

- Travel on South Dakota's Interstate highways is significantly safer than travel on all other roadways. The fatality rate per 100 million vehicle miles of travel on South Dakota's Interstate system in 2004 was 1.07, while it was 2.71 on non-Interstate routes in South Dakota.
- There were 27 traffic fatalities on South Dakota's Interstate highways in 2004. Less than 14 percent of the 197 traffic fatalities that occurred in South Dakota in 2004 occurred on the Interstate system, even though it carried 29 percent of all travel in the state in 2004.

Overall, current pavement and bridge conditions on most of South Dakota's Interstate system are acceptable, but some deficiencies exist.

- One percent of South Dakota's Interstate pavements are in poor condition and an additional 11 percent are in mediocre condition. Another 36 percent of Interstate pavements are in fair condition and the remaining 52 percent are in good condition.
- Approximately six percent of the state's 446 Interstate bridges are rated structurally deficient and 16 percent are rated functionally obsolete.
- A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.
- The average age of South Dakota's Interstate bridges is 35 years. Older bridges typically need significant repairs, reconstruction or replacement at approximately 50 years.

Construction of the Interstate system in South Dakota started in 1956 and was completed in 1983, providing the state with two primary Interstate routes totaling 679 miles, linking the state's largest urban areas and connecting South Dakota to the rest of the nation.

- The Federal-Aid Highway Act of 1956, signed into law by President Dwight Eisenhower on June 29th, 1956, called for the construction of a 41,000 mile system of Interstate highways to be paid for by taxes on motorists, such as the federal motor fuel tax. The federal motor fuel tax was set at three cents-per-gallon and is now 18.4 cents-per-gallon.

- Revenue collected from the 18.4 cents-per-gallon federal motor fuel tax and the 24.4 cents-per-gallon federal diesel fuel tax are the primary sources of funding for the federal Highway Trust Fund, which distributes funds to state and local governments for highway and bridge repairs as well as other surface transportation improvements, including public transit, walking and bicycling facilities.
- The planning for many of the routes that make up South Dakota's Interstate Highway System was already underway or completed when the Federal Aid-Highway Act was signed into law in 1956. The first Interstate project undertaken in South Dakota was a section of I-29 in Sioux Falls – from Russell Street to SD-38 – constructed and opened to traffic in 1956.
- The most recent section of South Dakota's Interstate system to be completed was approximately 10 miles along I-29 from Sisseton to Peever in the northeast corner of the state. This segment was opened in 1983, making South Dakota the sixth state in the nation to complete its Interstate highway system.

The Interstate system is the backbone of the South Dakota economy and has played a critical role in improving business productivity in the state.

- The Interstate system carries nearly 45 percent of all large commercial truck travel in South Dakota. Travel by large commercial trucks accounted for nearly 19 percent of all vehicle travel on the state's Interstate system in 2004.
- Every year, \$26.4 billion in goods are shipped annually from sites in South Dakota and another \$20 billion in goods are shipped annually to sites in South Dakota, mostly by truck.
- Sixty percent of the goods shipped annually from sites in South Dakota are carried by trucks and another 13 percent are carried by courier services, which use trucks for part of the deliveries. Similarly, 70 percent of the goods shipped to sites in South Dakota are carried by trucks and another 12 percent are carried by courier services, which use trucks for part of their deliveries.
- The Interstate system has led to significant increases in economic productivity. Improvements in the highway system have allowed businesses to adopt more efficient logistics practices, which reduce costs for producers and consumers.
- The initial construction of much of the Interstate system provided a tremendous boost to business productivity as a result of more efficient goods shipment. Economists have estimated that from the initial phase of Interstate construction in 1956 to 1970, the annual rate of return for every dollar of

public investment in highway construction was 54 cents, which meant that investments recovered their costs in two years.

- The completion of the vast majority of the Interstate system by the 1980s and the deregulation of the U.S. trucking industry resulted in a significant improvement in the competitiveness of U.S. business. In fact, the cost of moving freight, as measured by U.S. business logistics costs, dropped from 16 percent of U.S. Gross Domestic Product (GDP) in 1980 to nine percent in 2002.
- South Dakota's Interstate highways have reduced travel times both within the state and to locations outside of South Dakota. The improved mobility provided by the Interstate system has given South Dakota's residents greater choices about where they live, work, shop and spend their leisure time.

Introduction

The Dwight D. Eisenhower National System of Interstate and Defense Highways has been called the most ambitious public works project built since the age of the Roman Empire. It is literally the backbone of America's economy.

Initially conceived in 1939, significant construction of the Interstate system did not start until 1956 when Congress approved the financing of today's Interstate system, largely through collection of the federal motor fuel tax and other taxes on highway users.

With two primary Interstates running through the state's major urban areas from Wyoming in the west to Minnesota in the east, and from North Dakota south to Nebraska and Iowa, South Dakota's Interstate Highway System is the most critical element of the state's transportation network. Fifty years after construction of the Interstate Highway System began, this network of highways has become the most important set of corridors linking South Dakota's citizens to people and businesses within the state and throughout the nation.

Today, the Interstate system continues to provide South Dakota with economic growth, improved traffic safety and convenient access while playing a role in the nation's defense.

In this report, TRIP looks at the history and impact of South Dakota's Interstate Highway System, its current use and condition, the system's benefits and the future needs of the state's most critical transportation system. Just as 50 years ago, when our leaders made critical decisions on the future of the nation's highway system, today's political leaders now face the challenge of insuring that the safety and reliability of the Interstate

system are maintained by investing adequately in needed repairs and improvements to meet the transportation challenges of the 21st Century.

Development of the U.S. Interstate System

In 1919, Lieutenant Dwight D. Eisenhower participated in the U.S. Army's first transcontinental motor convoy, from Washington, DC to San Francisco. During the 62 days it took to cross the country, the convoy experienced numerous difficulties, including roads that were muddy, narrow or otherwise inadequate and bridges that often could not support the vehicles in the convoy.

A generation later, General Eisenhower saw first hand how an efficient, effective highway transportation system benefited a nation, when he noted that the German Autobahn network, opened in 1935, provided a significant military advantage to Germany.

The United States also began exploring the feasibility of constructing a series of interregional highways in the late 1930s. In 1938 Congress directed the then Bureau of Public Roads (BPR) to prepare a study on the possibility of building a national system of toll highways. The resulting 1939 BPR report concluded that it would be impossible to finance a national system of highways strictly through charging tolls, but did recommend that the U.S. build a system of approximately 26,700 miles of transcontinental highways. The BPR report also called for many of the design elements found on modern Interstate highways, including limited access, which separates highway traffic from other traffic and from trains. The BPR report also suggested that the nation's highways should

connect with the center of large cities, should include beltways around large urban areas and should bypass small towns.

Further attempts to develop a national highway system were interrupted by World War II. But as the Allies gained the upper hand in the war, Congress started to turn its attention to post-war challenges, including consideration of a modern highway system to support the nation's growing economy and improve safety and mobility. The Federal-Aid Highway Act of 1944 authorized the BPR to designate a system of approximately 40,000 miles of Interstate highways, which proved very similar to the routes approved ultimately as the national Interstate system. But the 1944 highway bill did not specify any additional funds for construction of the highways, other than the small amount of funds currently made available by the federal government for highway construction.

The 1944 Highway Act had identified the need for a national system of interconnected highways, but had left out a key piece of the puzzle – how to fund a uniformly-designed national highway system, which would have significant differences in construction costs and traffic volume, depending on location. Even without significant federal funding available, cities and states began to move forward on their own, with some additional highway networks being built or planned in current Interstate corridors under various financing mechanisms. These early highway projects included toll highways such as the Pennsylvania Turnpike and the New York Thruway and early urban highways including the Los Angeles Freeway System and the Detroit Expressway System.

But for most motorists and businesses, the inadequate roadway system of the late 1940s and early 1950s contributed to growing human and economic losses, as cars and

trucks jostled for position on the nation's inadequate, narrow and winding roads and streets.

In 1954 President Eisenhower appointed a committee to draft a proposal to fund a national system of Interstate Highways. Eisenhower noted that the nation's obsolete highway system penalized Americans through increased traffic deaths, the waste of time caused by traffic delays, the increased cost of freight movement and the inability of the nation's highways to meet the mobility demands that would be caused by a regional catastrophe or national defense emergency.

The initial plan prepared for President Eisenhower called for funding a national Interstate Highway System through bond financing, but Congress dismissed the use of bond revenue as the primary source of Interstate financing. In 1956, Congress overwhelmingly approved the construction of a national Interstate Highway System when the financing was changed to a pay-as-you-go format that would collect a series of user fees -- most notably a 3 cent-per-gallon tax on motor fuel -- into a national Highway Trust Fund.

The Federal-Aid Highway Act of 1956 called for the construction of a 41,000-mile Interstate Highway System, which was to be completed by 1970 at a cost of approximately \$27 billion. The design of the system was very similar to the initial 1944 plan, which called for connecting large urban areas, including routing highways into central cities, largely at the request of mayors and other local politicians who feared that their communities would be left behind without modern highway access. The Interstate system was designated to incorporate approximately 2,000 miles of existing highways, including the Pennsylvania Turnpike and the New York Thruway. The highways were to

be built to high design standards that would reduce traffic deaths and increase the amount and speed of traffic that could be carried. These design standards included full access control to limit entrance and exit to on and off ramps, a minimum of four lanes, medians to separate oncoming lanes and moderate curves.

The Construction of the Interstate System in South Dakota

Following the signing of the Federal-Aid Highway Act of 1956 by President Eisenhower on June 29, 1956, South Dakota moved quickly to orient its highway program toward the enormous task of planning and constructing the state's eventual 679-mile Interstate system. The first Interstate project undertaken in South Dakota was a section of I-29 in Sioux Falls – from Russell Street to SD-38 – constructed and opened to traffic in 1956.¹

The most recent section of South Dakota's Interstate system to be completed was approximately 10 miles of I-29 from Sisseton to Peever in the northeast corner of the state. This segment was opened in 1983, making South Dakota the sixth state in the nation to complete its Interstate highway system.²

Trends in Interstate Travel and Capacity

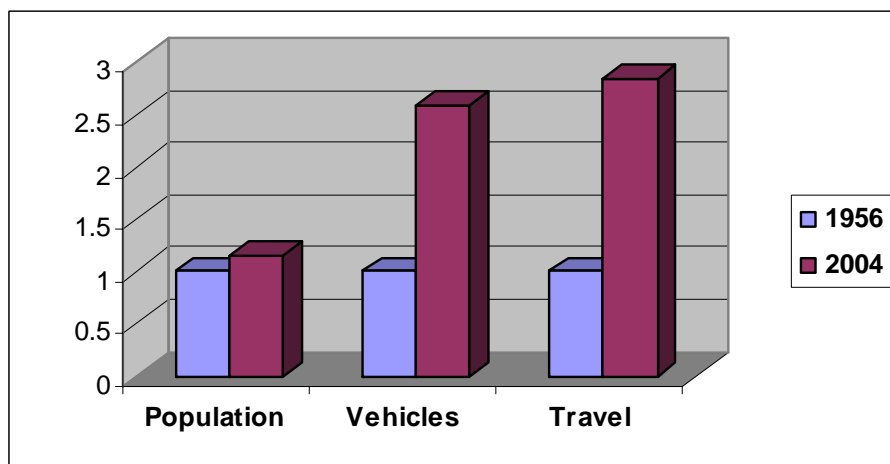
South Dakota is served by two primary Interstate routes. These include about 413 miles along I-90, a 3,000-mile east-west route from Boston to Seattle. Within the state,

I-90 connects Rapid City with Sioux Falls. I-90 is supported by a Business-90 route through Rapid City.

While I-90 connects South Dakota with its east-west neighbors, Minnesota and Wyoming, I-29 connects South Dakota with North Dakota, Iowa, and Nebraska. I-29 runs down from the Canadian border to Kansas City, Missouri, traveling 252.5 miles through South Dakota. I-29 is supported by I-229, an 11.3-mile route in the Sioux Falls area.

Since the beginning of the Interstate Era 50 years ago, South Dakota has seen enormous increases in population, the number of motor vehicles and the amount of vehicle travel. From 1956 to 2004 (the latest year for which data is available), the state's population has increased by 15 percent from approximately 669,000 to 771,000. During that same time, the number of motor vehicles increased by 158 percent from approximately 326,000 to 841,000 and vehicle travel in South Dakota has increased by 184 percent from approximately 3.1 billion miles driven annually to 8.8 billion miles.³

Chart 1. Increase since 1956 in Population, Vehicles and Travel in South Dakota (1 = 1956 level)



Source: TRIP analysis of U.S. Census and Federal Highway Administration data

Traffic Congestion on South Dakota's Interstates

The Interstate Highway System was initially designed largely to provide transportation between the nation's urban areas and to support national defense. But as Interstate highways were ultimately built around and through many cities, they became the nation's most critical transportation corridors both between and within urban areas. Today, the Interstate Highway System remains the most critical component of South Dakota's transportation system. While Interstate highways account for only two percent of all lane miles of roads in the state, they carry 29 percent of all travel in the state.⁴ Lane miles are the total number of lanes multiplied by the length. Thus, a 10-mile segment of four-lane highway equals 10 center-lane miles and 40 lane miles.

Between 1990 and 2004, vehicle travel on South Dakota's Interstate increased by 60 percent, from approximately 1.6 billion miles to 2.5 billion miles annually. During that same time, Interstate lane miles increased by only 2 percent, from 2,712 miles to 2,753 miles. The average annual amount of travel per Interstate lane-mile in South Dakota increased by 58 percent from 1990 to 2004.

This increase in traffic on South Dakota's Interstate highways has resulted in increasing levels of traffic congestion, particularly in Minnehaha and Pennington counties. However, none of South Dakota's urban Interstates are yet considered congested because of traffic levels that result in significant delays during peak travel hours.⁵

Freight Shipment by Large Trucks on South Dakota's Interstate Highways

Every year, \$26.4 billion in goods are shipped from sites in South Dakota and another \$20 billion in goods are shipped to sites in South Dakota, mostly by trucks.⁶ In fact, nearly 60 percent of the goods shipped annually from sites in South Dakota are carried by trucks and another 13 percent are carried by courier services, which use trucks for part of their deliveries.⁷ Similarly, 70 percent of the goods shipped to sites in South Dakota are carried by trucks and another 12 percent are carried by courier services, which use trucks for part of their deliveries.⁸

South Dakota's Interstate Highway System is the most critical set of highways for goods shipment. Nationally, Interstate highways account for 50 percent of travel by large trucks.⁹ In South Dakota, 45 percent of all large commercial truck travel occurs on the state's Interstate highways. In 2004, travel by large commercial trucks accounted for 19 percent of all miles traveled on South Dakota's Interstate system.¹⁰

Traffic Safety on South Dakota's Interstate Highways

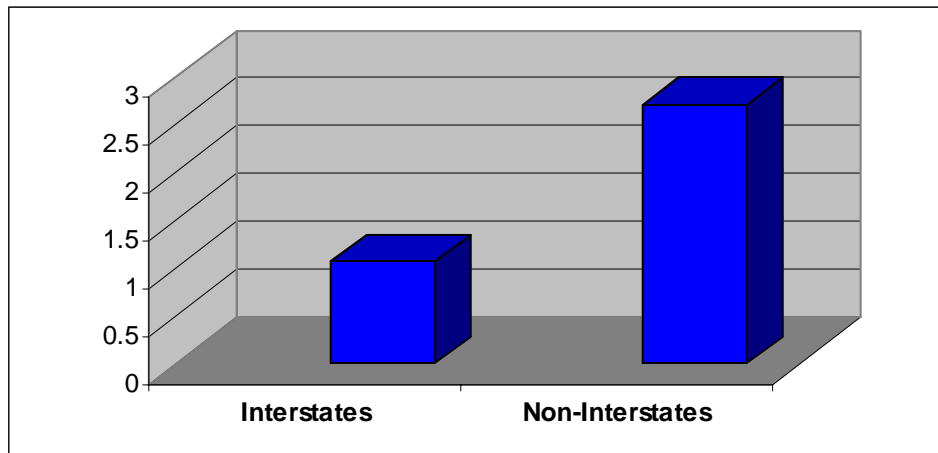
Perhaps the most significant benefit of the Interstate system is that it has greatly improved traffic safety in South Dakota, and throughout the U.S., by providing a network of highways with a variety of safety designs that greatly reduce the likelihood of serious accidents.

The safety features that are required on Interstates include a separation from other roads, streets and rail lines, access limited to on and off ramps, a minimum of four-lanes to prevent the need to enter oncoming lanes for passing, and gentler curves. Most

Interstate highways also have paved shoulders, and many have median barriers to avoid cross-over accidents and rumble strips to warn drivers if they are leaving the roadway.

The result of the high level of safety design standards on the Interstate is that travel on South Dakota's Interstate highways is much safer than travel on all other roads and highways in the state. The traffic fatality rate per 100 million vehicle miles of travel on South Dakota's Interstate highways was 1.07 in 2004, the latest year for which data is available. The fatality rate per 100 million vehicle miles of travel in 2004 on South Dakota's non-Interstate routes was 2.71 – approximately two-and-a-half times greater than the rate on the state's Interstates.

Chart 2. Fatality rate per 100 Million Vehicle Miles of Travel for South Dakota's Interstate and Non-Interstate roadways, 2004



Source: TRIP analysis of FHWA data

South Dakota's Interstate Highway System, which carried 29 percent of the state's travel in 2004, accounted for only a small percentage of the state's fatalities as a result of its superior traffic safety features. There were 27 traffic fatalities on South Dakota's Interstate highways in 2004 – less than 14 percent of the 197 traffic fatalities that occurred in South Dakota in 2004.¹¹

Pavement Conditions of South Dakota's Interstate System

The lifecycle of highway pavements is greatly affected by a transportation agency's ability to perform timely maintenance and upgrades to ensure that surfaces remain smooth for as long as possible. The pavement condition of a state's major roads are evaluated and classified as being in poor, mediocre, fair or good condition.¹² A desirable goal for state and local organizations that are responsible for road maintenance is to keep 75 percent of major roads in good condition.¹³

In 2004 (the latest year for which data is available), 1 percent of South Dakota's Interstate pavements were in poor condition and 11 percent were in mediocre condition. Roads rated in mediocre condition show signs of significant wear and may also have some visible pavement distress. Most pavements in mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.

Fifty-two percent of Interstate pavements in South Dakota were rated in good condition. Another 36 percent of Interstate pavements were rated in fair condition.¹⁴ Routes in urban areas showed worse pavement conditions than those in rural areas.¹⁵

Pavement deterioration is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road surfaces at intersections are even more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major

repairs because reconstructing roads costs approximately four times more than resurfacing them.¹⁶

Bridge Conditions of South Dakota’s Interstate Highways

South Dakota has 446 bridges on its Interstate system. While some are roadway overpasses, others are much more significant structures. One of the most challenging projects undertaken during the Interstate construction program in South Dakota was the design and construction of the I-90 crossing over the Missouri River near Chamberlain. In 1967, the Department of Transportation awarded a \$2.6 million project to place fill for a 1.8-mile earthen causeway on the west side of the river. The project was completed in March 1970. The Chamberlain bridge substructure was awarded in March 1969 and the superstructure was awarded in August 1971. Construction was completed in July 1974.¹⁷

Chart 3: Interstate bridge construction in South Dakota

Interstate Bridges: Year built or completely reconstructed	Number in South Dakota
1956-1959:	35
1960-1964:	110
1965-1969:	76
1970-1974:	130
1975-1979:	24
1980-1984:	16
1985-1989	5
1990 to present:	50

Source: South Dakota Department of Transportation

Age is taking its toll on South Dakota’s bridges. Approximately six percent of bridges in South Dakota’s Interstate system are rated as structurally deficient and 16 percent are rated as functionally obsolete.¹⁸

Bridges that are rated structurally deficient show significant signs of deterioration as a result of use and exposure. The FHWA defines a structurally deficient bridge as one that requires immediate rehabilitation to remain open, is restricted to carrying lighter-weight vehicles or is closed. Bridges that are rated as functionally obsolete do not meet current design standards, which may result in reduced traffic safety, compared to a bridge meeting current standards. Functionally obsolete bridges are defined by the FHWA as those that have deck geometry, load carrying capacity, clearance or approach roadway alignment that no longer meet the criteria for the system of which the bridge is a part.

While more than three-quarters of the state's Interstate bridges are generally in acceptable condition, a large number of these bridges will soon require significant repairs, and in some cases replacement, over the next 10 to 20 years.

The average lifespan of an older bridge is 50 years.¹⁹ Older bridges often need significant repairs or rehabilitation or may need to be replaced to continue to provide adequate service. The average age of South Dakota's Interstate bridges is 35 years old.²⁰

Benefits of South Dakota's Interstate System

The construction of South Dakota's Interstate Highway System has had a profound impact on the state's development, affecting the quality of life of the state's residents and visitors in numerous ways including improved safety, expanded lifestyle choices, improved business productivity and an enhanced economic standard of living.

By greatly increasing the number of areas that are within a reasonable driving distance, the Interstate system has greatly increased people's access to jobs, housing, recreation, healthcare, shopping and other amenities.

Similarly, the construction of the Interstate system has benefited the nation's economy by reducing the costs of and increasing the speed of goods movement. The ability to cheaply and quickly ship products to or from South Dakota and many U.S. and international sites has provided lower costs and greater selection to consumers and has opened up new markets to South Dakota businesses. The completion of the vast majority of the Interstate system by the 1980s and the deregulation of the U.S. trucking industry resulted in a significant improvement in the competitiveness of U.S. business. In fact, the cost of moving freight, as measured by U.S. business logistics costs, dropped from 16 percent of U.S. Gross Domestic Product (GDP) in 1980 to nine percent in 2002.²¹

The initial construction of much of the Interstate system provided a tremendous boost to business productivity as a result of more efficient goods shipment. Economists have estimated that through the initial phase of Interstate construction to 1970, the rate of return for every dollar of public investment in highway construction was 54 cents, which meant that investments recovered their costs in two years.

The continued tremendous increase in freight deliveries over recent years has been partly fueled by improved communications and the need for greater economic competitiveness. Improved communications provided by the Internet are integrating producers, wholesalers, retailers and consumers. Businesses have responded to improved communications and the necessity to cut costs with a variety of innovations, including just-in-time delivery, increases in small package delivery, demand-side inventory management and accepting customer orders through the Internet.

The result of these changes has been a significant improvement in logistics efficiency as firms move away from a push-style distribution system, which relies on

large-scale warehousing of materials, to a pull-style distribution system, which relies on smaller, more strategic movement of goods.²²

Interstate Benefits for Individuals in South Dakota

TRIP has calculated the annual financial benefit per person and statewide in South Dakota, based on the value of improved traffic safety, reduced travel time, reduced fuel use and reduced consumer costs.

Safety:

By carrying significant volumes of traffic on roadways with higher safety standards and lower traffic fatality rates, the Interstates save numerous lives annually. In fact, TRIP estimates that Interstate highways in South Dakota have saved an average of 30 lives per year over the last 10 years, and that since 1956, Interstate highways have saved more than 900 lives in South Dakota.²³ This estimate is based on a comparison of the annual fatality rate on South Dakota's Interstate highways compared to the fatality rate each year on other major roads in the state. Interstate safety benefits were estimated by calculating the additional fatalities that would have occurred in each year if the travel that occurred on South Dakota's Interstate highways had instead been carried by other major roads in the state, many of which lack many of the safety features found on Interstate highways and have a significantly higher traffic fatality rate.

TRIP estimates that the improved highway safety provided by South Dakota's Interstates saves the state nearly \$114 million annually in reduced economic costs as a result of the reduction in fatal or serious traffic accidents, saving \$148 per person annually.²⁴ TRIP's estimate is based on research by the National Highway Traffic Safety

Administration (NHTSA), which annually estimates the economic costs of fatal and serious traffic accidents in the U.S. The NHTSA estimates are strictly of the economic consequences of serious and fatal traffic crashes, such as lost productivity and increased healthcare costs.

Time and motor fuel:

Because it features limited access, no stoplights and often more direct routes between major urban areas, the Interstate system has saved travelers time by reducing travel times and making travel more efficient. By reducing travel times, the Interstate Highway System has also increased the choices people have of where to live, work, shop and travel for recreation.

TRIP has estimated the additional time that South Dakota residents would spend traveling if the state did not have its network of Interstate highways. These estimates assume that if there were no Interstate highways in South Dakota, this traffic would be carried by other major roads in the state, such as other urban freeways and urban and rural arterial roads and highways. Shifting the state's Interstate traffic onto other routes would increase traffic congestion on these other routes and also slow travel times by shifting travel from faster-moving Interstate highways onto slower-moving roads and highways. TRIP applied traffic speed calculations developed by the Texas Transportation Institute, which annually estimates traffic congestion levels throughout the U.S., to estimate the traffic speeds that would result on other major roads in the state if they had to carry the traffic in South Dakota currently being carried by the state's Interstate system.

TRIP found that without Interstate highways, South Dakota residents would spend an additional 25 million hours annually traveling in vehicles, or 33 hours per person annually.²⁵ TRIP also found that without Interstate highways, South Dakota motorists would use an additional 12 million gallons of motor fuel annually. The total value of the time and motor fuel that are saved annually in South Dakota by the Interstate Highway System is \$526 per person (\$487 in time and \$39 in fuel), or \$405 million statewide.²⁶

Reduced Consumer Costs:

The Interstate system has had a significant impact on consumer costs by reducing the time it takes to complete trips, thereby reducing the cost of transporting goods. It has also reduced costs by increasing access between locations, which has increased access to cheaper land and increased consumer choices for everything from housing and jobs to recreation and shopping.

To calculate the economic impact of the Interstate Highway System on individual consumers in South Dakota, TRIP has gathered data on average consumer expenditures in the state and has estimated the impact of the Interstate Highway System on these costs. Based on data from the U.S. Department of Labor and the Bureau of Economic Analysis, TRIP has calculated the average expenditure per capita in each state on apparel, food, housing and transportation.²⁷ TRIP then surveyed the nation's leading transportation economists for their estimates of the percentage reduction in consumer expenditures, as a result of the Interstate system, for apparel, food, housing and transportation. TRIP used the average estimated impact in each category to calculate the average amount saved by South Dakota consumers annually in each category.

Apparel and food costs are affected by reduced logistics costs. Transportation costs, which include the cost of a vehicle, vehicle repairs and maintenance, and the cost of fuel, are similarly affected by reduced logistics costs. The impact of the Interstate system on housing costs includes its impact on the cost of materials that are used in constructing homes as well as the impact that the Interstate system has had on lowering land prices by increasing consumer access to cheaper land, thus lowering housing costs.

TRIP estimates that the average South Dakota resident saves \$1,102 per year as a result of the Interstate Highway System. The following chart indicates the annual saving per South Dakota resident for apparel, food, housing and transportation costs as a result of the Interstate Highway System. The total annual statewide savings in South Dakota in reduced consumer costs as a result of the Interstate Highway System is estimated to be nearly \$850 million.

Chart 4. Annual, per person savings in South Dakota, as a result of the Interstate Highway System.

	ANNUAL SAVINGS IN SOUTH DAKOTA
Apparel	\$ 39
Food	\$ 141
Housing	\$ 569
Transportation	\$ 353
Total savings per person	\$ 1,102

Source: TRIP

The Interstate Highway System provides tremendous benefits every year to the people of South Dakota. The total annual benefit per person in South Dakota of the

Interstate system is \$1,776 as a result of additional safety, reduced time and fuel costs, and lower consumer expenses. The total statewide benefit in South Dakota of the Interstate Highway System is nearly \$1.37 billion. The following chart shows the combined annual benefit of the Interstate system per person and statewide in South Dakota.

Chart 5. Total Annual Interstate Benefit Per Person and statewide in South Dakota

	Per Person	Statewide (millions)
Safety	\$ 148	\$ 114
Time and Gas	\$ 526	\$ 405
Reduced Consumer Costs	\$ 1,102	\$ 850
Total	\$ 1,776	\$ 1,369

Source: TRIP

Meeting South Dakota’s Future Interstate Travel Needs

South Dakota faces a significant challenge in maintaining and rebuilding its aging Interstate Highway System and providing adequate levels of access to meet growing travel demand.

By the year 2026, 85 percent of the state’s Interstate Highway System will be in need of significant rehabilitation or reconstruction to provide a smooth pavement surface (580 of 679 miles).²⁸

In addition, the SDDOT estimates that by 2026, the state will need to increase the capacity on urban Interstate routes by about 10 percent.²⁹

SDDOT also estimates significant repairs or reconstruction will be required on 25 bridges on the Interstate system between 2006 and 2026.³⁰

In addition to reconstruction and maintenance of the existing system, the state has identified the need to build 14 additional Interstate lane miles, expanding urban capacity from four to six lanes along four sites in Sioux Falls and Rapid City.

Chart 6: New Interstate Highway Segments Needed in South Dakota, 2006-2026.

Route	County	From	To	Length (Mi.)	Current Lanes	Lanes After Proposed Widening	Funding Status
29	Lincoln	Tea, SD near Sioux Falls	Lincoln County Line	0.4	4	6	Programmed - 2009
29	Minnehaha	Lincoln County Line	Skunk Creek in Sioux Falls, SD	1.5	4	6 + Auxillary	Programmed - 2010
90	Pennington	Maple Ave in Rapid City	Elk Vale Road In Rapid City	4	4	6	Unfunded – 2015 to 2020
90	Meade, Pennington	Blackhawk, SD	Maple Ave. in Rapid City	8.2	4	6	Unfunded – 2020 to 2026

Source: South Dakota Department of Transportation

SDDOT has determined that over the next 20 years, the state needs to expend \$985 million to preserve the Interstates, and another \$400 million to expand Interstate capacity to meet the needs of a growing population. The total required for preservation and capacity enhancement during 2006 to 2026 will be \$1.385 billion. However, this does not include costs for major replacement or new interchanges. Under current conditions and funding assumptions, the state would be able to fund \$1.392 billion in preservation and expansion if Congressional funding and inflationary costs remain stable. However, as shown in the chart above, needed capacity improvements in Rapid City and Sioux Falls are not yet funded.

Conclusion

Fifty years after construction of the Interstate Highway System began, South Dakota, and all of the U.S., continues to reap tremendous benefits from the nation's most critical transportation network. South Dakota's Interstate system has saved approximately 900 lives since its inception in 1956. In addition to saving lives, the Interstate continues to save South Dakota residents time, fuel and money by reducing the costs of goods that improve their quality of life, including the cost of apparel, food, housing and transportation. The state's Interstate highways also play a critical role in supporting economic growth and increasing personal access to jobs, recreation, health care and housing, enhancing the lifestyle choices of the state's residents and visitors.

The safe, reliable and timely mobility provided by the state's Interstate highways has also improved the efficiency of South Dakota's businesses and is integral to the functioning of the state's economy.

Prior to the approval of the Interstate system, President Eisenhower noted that inadequate highways resulted in lost time due to traffic delays, reduced economic productivity and reduced traffic safety.

Today, similar challenges are faced in South Dakota, with growing traffic congestion, increasing car and truck travel and aging road surfaces and bridges that will soon need significant repairs and rehabilitation.

As South Dakota's citizens look back on the many benefits that the Interstate Highway System has provided the state, they must also look ahead to meeting the challenge of providing a 21st Century Interstate Highway System that will continue to enhance the quality of life of today's and future residents of South Dakota.

Endnotes

-
- ¹ South Dakota Department of Transportation (SDDOT) response to TRIP survey, 2006.
- ² Ibid.
- ³ U.S. Census Bureau data, Federal Highway Administration data. See charts MV-1 and VM-2. Additional historical data from Highway Statistics Summary to 1995.
- ⁴ TRIP analysis of Highway Statistics, 2004, Federal Highway Administration. Data is from charts VM-2 and HM-20.
- ⁵ Ibid. Additional information: SDDOT response to TRIP survey, 2006.
- ⁶ “2002 Commodity Flow Survey,” Bureau of Transportation Statistics, U.S. Department of Transportation: State Summaries, State Table 13.
- ⁷ Ibid.
- ⁸ Ibid. State Table 15.
- ⁹ TRIP analysis of 2004 Federal Highway Administration data. 2004 Highway Statistics. Chart VM-1.
- ¹⁰ SDDOT response to TRIP survey, 2006.
- ¹¹ “Highway Statistics 2004.” Federal Highway Administration: Charts FI-10, VM-2.
- ¹² FHWA and states use the standardized International Roughness Index to rate pavement smoothness.
- ¹³ “Highway Statistics 2004.” Federal Highway Administration: Charts FI-10, VM-2.
- ¹⁴ TRIP analysis of 2004 Federal Highway Administration data. See charts HM-63 and HM-64 in Highway Statistics 2004.
- ¹⁵ SDDOT response to TRIP survey, 2006.
- ¹⁶ R. Hicks, J. Moulthrop. “Selecting a Preventative Maintenance Treatment for Flexible Pavements.” Transportation Research Board, 1999: Figure 1.
- ¹⁷ SDDOT response to TRIP survey, 2006.
- ¹⁸ SDDOT response to TRIP survey, 2006. Additional data from Federal Highway Administration, 2005, National Bridge Inventory data.
- ¹⁹ 2005-06 Governor’s Executive Budget. Commonwealth of Pennsylvania.
- ²⁰ SDDOT response to TRIP survey, 2006.
- ²¹ TRIP analysis of Federal Highway Administration data. See 2004 Federal Highway Statistics, charts HM-60 and VM-2.
- ²² Ibid. P. 7.
- ²³ TRIP calculation is based on TRIP analysis of 1997 to 2004 data. Estimates of lives saved by the Interstate system from 1956 to 1996 are based on analysis by Wendell Cox and Jean Love in the 1996 publication “The Best Investment a Nation Ever Made.”
- ²⁴ TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data.
- ²⁵ TRIP analysis of 2004 Federal Highway data, using speed factors from the 2005 Urban Mobility Report, which is published by the Texas Transportation Institute.
- ²⁶ The value of time used for these estimates was \$14.85 per hour, based on the value used by the Texas Transportation Institute in their annual report on urban traffic congestion. The value used to calculate fuel consumption is \$2.50 per gallon.
- ²⁷ The U.S. Department of Labor estimates consumer costs per capita for U.S. regions. TRIP then calculated this data for each state by using state income per capita data to estimate cost differences between states.
- ²⁸ SDDOT response to TRIP survey, 2006.
- ²⁹ Ibid.
- ³⁰ Ibid.