

2011 Annual Report

South Dakota Department of Transportation





A contractor crew fills cracks in asphalt concrete pavement with hot asphalt crack sealant and rolls tissue across the seal on state Highway 34 in western South Dakota. Up ahead, workers rout cracks and then blow out loose material. This preliminary work helps ensure a long-lasting seal. Crack sealing is one of the most basic and critical types of road maintenance, preventing water from infiltrating the road foundation and thereby lengthening its service life. Crack-sealing projects play an important role in the South Dakota Department of Transportation's effort to preserve existing infrastructure and provide a smooth ride.

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A Message from the Secretary

My Fellow South Dakotans

After two years of extreme winter weather and spring flooding, the mild winter of 2011-2012 has been a welcome break for the South Dakota Department of Transportation. Instead of plowing snow and unplugging culverts, maintenance crews have been able to tackle a backlog of sign repairs, spot road repairs and other work. The savings in overtime, fuel and materials from this past winter will help the DOT begin to address the existing backlog of equipment, building and maintenance needs.

In the 2010 annual report, I said our greatest achievement was incorporating \$183 million in American Recovery and Reinvestment Act (ARRA) funding into our five-year State Transportation Improvement Program, or STIP—our prioritized list of road and bridge projects. In this 2011 report, I can say that, according to the U.S. House of Representatives Committee on Transportation and Infrastructure, the DOT did it with exemplary efficiency. South Dakota and five other states tied for the No. 1 ranking for quickly putting those funds to work in our recession-battered national economy.

Our managers were also gratified to hear that our strategy of focusing on the maintenance of existing pavements and bridges—what we've called “preservation mode”—was deemed “the most fiscally responsible transportation investment the state can make” by a nonpartisan taxpayers' advocacy group. The department will continue to focus on maintaining and preserving our existing pavements and bridges in an effort to keep their condition at the level South Dakotans have come to expect.

We are heartened by recent efforts in Congress to keep short-term federal transportation funding at the same level as recent years, but, with 2012 being an election year, this is some distance from being a sure thing in the long term.

As always, many challenges lie ahead in 2012. I and the rest of the department employees will continue working to provide you with a safe, efficient and effective transportation system—whatever those challenges turn out to be.

Sincerely,



Darin P. Bergquist
Secretary of Transportation



Secretary of Transportation Darin Bergquist (right) looks at maps with Pierre Area Engineer Dean VanDeWiele at the Emergency Operations Center during the Missouri River flooding in 2011.



Executive Summary

2011 Annual Report

South Dakota Department of Transportation



parts need to be monitored and/or repaired. “Functionally obsolete” means the bridge’s design is outdated. It may be too narrow by current standards or have a low clearance. All bridges on public roads are regularly inspected. When engineers determine a bridge can only support certain weights, weight limit signs are posted. Heavier vehicles must take another route. Limited resources for county, city and township bridges and high numbers of low-volume structures have contributed to the lower overall condition of local system bridges.

Highway Fatalities

Crash deaths dropped from 140 in 2010 to 110 in 2011, a decrease of 21%.

Reducing fatalities and serious injuries is a continual DOT goal. The DOT has begun focusing on certain segments of highways with features known to be hazardous, based on national crash statistics, such as narrow shoulders or high inslopes, and is now considering improvements to some of these locations *before* accidents happen. Locations throughout the state with high accident rates also are identified, and possible safety improvements are investigated. When a road or bridge project is in the planning stages, the location’s crash history is reviewed for improvements that can be made as part of the project.

Public Transit

Public transit services provided an all-time high of 1.98 million rides for rural residents and specialized transit services for elderly and handicapped persons living in both urban and rural areas in 2011. The DOT administers federal grants to about 50 transit providers, including tribal agencies, and ensures expenditures comply with federal regulations. A recent study found public transit provides substantial economic and social benefits in South Dakota.

Percentage of State Highway System Receiving Improvements

A little over a fifth, or 21 percent, of the State Highway System was substantially improved in 2011. These improvements include resurfacings with asphalt concrete, reconstruction, new construction, and safety improvements such as high-performance, nonpaint pavement markings and rumble strips.



Performance Measures

	2011	2010	2009	2008
Surface Condition Index	*	4.31	4.23	4.09
Bridge Average Sufficiency Index	90.8	89.3	89.6	89.1
Highway fatalities (state and local)	110	140	131	121
Public transit rides** (millions)	1.98	1.91	1.87	1.82
% of state-owned system improved	21.0	25.3	18.3	5.0

*Not available as of printing date of this report

**Excludes urban transit systems in Sioux Falls and Rapid City

	2011	2006	2004	1999
Customer Satisfaction	82%	81%	78%	60%

Pavements

The Pavement Surface Condition Index (SCI), a measure of the overall pavement condition of the State Highway System, is at an all-time high of 4.31 on a scale of 5. The increase is due to stimulus-funded Interstate reconstruction and overlays of two-lane rural highways over the past two years. Increased federal funding since 1999’s SCI of 3.34 helped the DOT bring the overall pavement condition to its current level.

Bridges

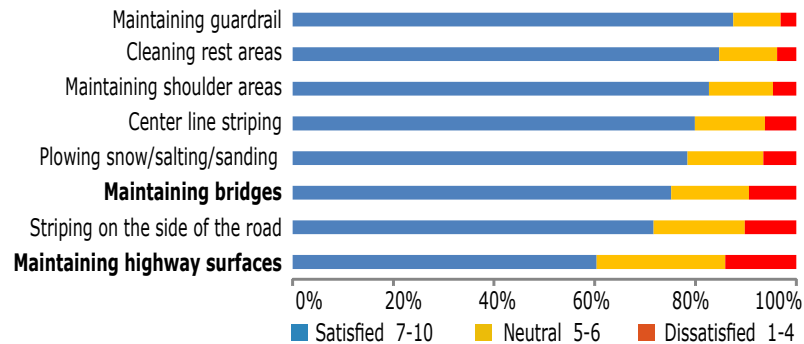
The Bridge Average Sufficiency Index for state-owned bridges increased from 89.3 to 90.8 on a scale of 100. This high number indicates the vast majority of State Highway System bridges are in good condition. Only 69 out of a total 1,803 state-owned bridges are listed as structurally deficient; 89 are functionally obsolete. Neither term means a bridge is unsafe. “Structurally deficient” means certain bridge

Customer Satisfaction

Public continues to be satisfied with overall DOT performance

The 2011 Customer Satisfaction Survey shows a large majority of South Dakotans, including contractors doing business with DOT, continue to be satisfied or very satisfied with the agency's overall performance. The DOT also leads neighboring state DOTs in public satisfaction with delivery of services.

Public Satisfaction Levels with DOT Maintenance Activities
By percentage of respondents rating the services between 1 and 10



High approval for specific DOT maintenance activities, but growing concern about pavement conditions

Two-thirds of South Dakotans responding were satisfied or very satisfied with nearly all maintenance activities provided by DOT. Only 60 percent of respondents were satisfied with maintenance of smooth highway surfaces, a decrease of 9 points from 2006, the year of the last survey. Given that State Highway System pavement conditions are at an all-time high, respondents may have been thinking of generally lower local road system conditions when answering this question.

Bridge safety is an emerging concern

The percentage of state residents satisfied or very satisfied with bridge maintenance in 2011 dropped 9 points to 73, down from 82 percent in 2006. Again, circumstances beyond the State Highway System may have affected perceptions. The Interstate 35W bridge in Minneapolis collapsed Aug. 1, 2007, due to a design flaw and additional weight on the bridge at the time. The catastrophe generated intense news coverage of nationwide bridge safety concerns. In South Dakota, the average bridge sufficiency index for state-owned bridges in 2011 was 90.8 on a scale of 100. For local system bridges, the index is 72.6.

The Challenges Ahead

Maintaining the existing highway system

All of DOT's major customer groups agree: Preserving the existing state system of roads and bridges should be the department's top priority. This includes farmers, ranchers, residents, truckers, shippers, legislators, emergency vehicle operators and senior citizens. Taxpayers for Common Sense and Smart Growth America commented in 2011: "Funding, to the extent possible, the annual maintenance needed to keep South Dakota's road and bridge system in a state of good repair...is the most fiscally responsible transportation investment the state can make."

Federal funding

Current federal gas tax revenues are not enough to support the federal highway program. Congress has dipped into the federal general fund to make up the difference, but is unlikely to approve additional funds from this source. Proposals for future highway funding currently range from maintaining the status quo to a reduction of about one third of the current level of federal funding.

State funding

The state must match federal funding on construction projects with 9 to 18 percent of funding from the State Highway Fund, not the state general fund. State Highway Fund revenue, which comes mostly from the state gas tax and the excise tax on motor vehicles, increased by \$19 million in FY 2011.

Should increases in road funding wait until the economy improves?

As discussed on p. 15, at existing funding levels, the overall pavement condition of the State Highway System likely will decrease. Allowing conditions to worsen and then trying to catch up later would be more expensive than keeping pavements in good condition every year. A dollar spent on pavement maintenance can save \$6-\$14 in future repairs.

The current percentage of state-owned highways in poor condition is 2%. If funding remains the same, this will grow to 16% in 10 years. A quarter of these roads will be in poor condition in 13 years. To the right is an example of an asphalt concrete road in poor condition. Poor roads can have extensive, wide cracks, pothole patches that are starting to crumble and moderate rutting.



Annual Messages from the Division Directors



Kellie Beck
Finance and Management
Director

The Division of Finance and Management is comprised of two offices, the Office of Finance and the Office of Air, Rail and Transit.

The Office of Finance is responsible for reporting and managing the financial activities of the Transportation Department. This includes developing accounting processes and internal controls, accounts pay-

able and receivable, billing and federal draw downs, budget preparation and monitoring, cash forecasting, project accounting, and financial reporting to management, in addition to other state and federal agencies.

2011 was a very busy year for Air, Rail and Transit. We had one of the largest rail projects that South Dakota has ever overseen consume a large portion of our time. We were part of a State Management Review of the Transit Program, which is required every three years. Prior to the Local Government Assistance staff being transitioned to the new Administration Office in the Planning and Engineering Division, the economic development grant program was brought back. This is a program that local governments thoroughly enjoyed, and we implemented a version of the 90/10 exchange program—all while doing our normal, day-to-day activities.



Greg Fuller
Operations Division
Director

Mother Nature played an important role in the Division of Operations' 2011 accomplishments. Flooding in the spring of 2011 challenged both South Dakota motorists and communities. Not only were some state highways impassable and threatened, but the infrastructures of many local governments were threatened as well. As

leaders in public service, the division's maintenance, construction and office personnel supported emergency operations by helping with traffic control, repairing flood-damaged highways, providing technical expertise to local entities, and transporting materials and equipment to fight floods.

The wet spring weather delayed the start of numerous highway construction projects. Operations employees worked closely with contractors to get these quality projects completed during the 2011 construction season. An unusually dry and mild fall helped a great deal. The mild winter weather of 2011-2012 required less winter highway maintenance, meaning less money was spent on winter maintenance activities than anticipated. Maintenance crews turned their attention to much-needed patching, erosion repairs, culvert repairs and sign maintenance. Construction staff members were able to complete survey work for the upcoming construction season.



Joel Jundt
Planning and Engineering
Division Director

While we emphasized asset preservation again this past year, we continue to look for opportunities to improve highway safety.

We programmed a number of safety projects in our five-year plan using different criteria than before. Instead of focusing solely on locations where serious accidents have

occurred, we adopted a method that also considers certain roadway geometrics (narrow shoulders, steep inslopes, etc.) that are associated with higher accident rates on a statewide perspective. Our goal is to try to eliminate—or at least reduce—their accident potential and create a safer highway system.

We also focused on managing other critical components such as smaller drainage structures, lighting and signal poles. We began inventorying all these structures to determine the existing condition of each individual feature. It will take a few years to inspect each and every structure, but a number of locations already have been found to require immediate attention, including funding to replace or repair these structures.

The end result will be not only to preserve our existing infrastructure but to identify the appropriate treatment and perform that treatment at the right time, thus maximizing the expenditure of our available resources.

Stimulus Achievements in South Dakota

South Dakota's Department of Transportation completed 51 projects with \$183 million in American Recovery and Reinvestment Act funds and—despite a near-double workload—was recognized by a congressional panel for quickly putting that funding to work.

The DOT has a reputation for efficient management of projects and funding. This reputation was reinforced when it tied with five other states for the No. 1 ranking for putting stimulus money to work by September 2010. Rankings were compiled by the U.S. House of Representatives Committee on Transportation and Infrastructure.

Stimulus projects were selected from the department's State Transportation Improvement Program, a rolling list of projects scheduled to be completed in the next five years. Stimulus funding allowed some of these projects to be completed earlier than planned or allowed projects that had been deferred due to lack of funding in previous years to finally get done.

“Extraordinary effort and additional hours were required on top of the regular workload to get these projects completed and the jobs and financial data collected and reported,” Transportation Secretary Darin Bergquist said.

A total of 446 highway construction jobs were created or saved between March 2009 and October 2011. This figure is based on contractor-reported employee hours divided by roughly 2,080 hours in a work year. Broken down by year, that was 177 full-time jobs in 2009, 249 full-time jobs in 2010 and 20 full-time jobs in 2011.

Stimulus summary

\$183 million extra for roads and bridges

446 highway construction jobs

\$12.8 million extra to improve airports

\$7.4 million extra to improve public transit

Stimulus-funded projects were added to DOT's regular road, bridge, airport and public transit projects



Major FY2011 projects

Aberdeen Region



Tacoma Park bridge over the James River, Brown County

This new 178-foot, two-span prestressed concrete girder bridge over the James River is owned by Brown County, but the DOT assisted with its design and construction. Why? The state DOT shares federal bridge funds with the counties. Under an agreement with the Federal Highway Administration, the state helps federally funded local government bridge projects comply with federal requirements. In practice, Local Transportation Programs personnel review plans and construction contracts. The Transportation Commission must approve these contracts, and local DOT offices—in this case, the Aberdeen Area Office—administer the contracts.



Segment 1, South Connector Project in Watertown

Watertown's South Connector will go south from the U.S. Highway 212/South Dakota Highway 20 intersection on the city's west side to U.S. Highway 81. The South Connector will divert eastbound truck traffic from U.S. 212 through Watertown and promote economic development and growth in the Hanten Industrial Park area in the southeastern part of the city. Segment 1, completed in November 2010, started at U.S. 81 and went two miles down 20th Avenue SE to 29th Street SE. The project included grading, structures and asphalt concrete surfacing. Work on 2.1 miles of Segment 2, which starts at the 212/20 intersection, is scheduled for 2012.



Reconstruction of I-29 southbound lanes, from S.D. 20 (South Shore) to Watertown

The South Dakota Department of Transportation didn't just place new portland cement concrete pavement on the 14.4-mile stretch of I-29 between South Shore and Watertown, it made the new concrete smarter. Permanent automated traffic volume counters were replaced with permanent vehicle classification system sensors. The new sensors will classify each vehicle as one of 13 distinct types, from semis to sedans to motorcycles, and record their speed and direction. Data will be used to understand commercial truck movement in the Watertown area and for statewide vehicle-miles-traveled statistics, transportation planning and pavement design.



South Dakota Highway 10 Grade Raise, Residents and travelers in northeastern South Dakota have only two state highways going east and west, South Dakota Highway 10 and U.S. Highway 12. When Highway 10 4.4 miles east of the U.S. Highway 281 intersection was submerged under two feet of water in March 2010, agribusinesses had to haul feed, cattle or grain on detours of up to 35 extra miles, one way. This emergency project, completed in the fall of 2010, raised the grade by five feet. Federal Emergency Relief funding helped pay for the work, which involved trucking in 81,000 cubic yards of clay, arranging riprap to withstand wind-whipped waves and a new asphalt concrete surface. As of mid-summer 2011, it was still high and dry.

Major FY2011 projects

Mitchell Region



The Marion Road and Interstate 90 interchange in Sioux Falls (Exit 395)

The DOT and the city of Sioux Falls worked together to complete this new interchange, which will promote residential, commercial and industrial growth in northwest Sioux Falls. The interchange is a folded diamond type with a westbound off ramp loop and eastbound on ramp loop. The westbound on ramp and eastbound off ramp have a diamond-style layout. If traffic increases, this interchange can convert to a partial cloverleaf, with additional ramps on the east side. The city widened Marion Road from South Dakota Highway 38/West 60th Street to just north of Wireless Road from two to four lanes. The interchange opened Nov. 20, 2010.



Interstate 29 southbound lanes from the Big Sioux River to the Madison exit

When the DOT reconstructs a highway segment, Office of Road Design engineers look at all aspects of the roadway for opportunities to improve safety. Although the main purpose of this project was to remove and replace a 13.4-mile stretch of portland cement concrete pavement on southbound I-29, the project also included replacement of two culverts with new concrete pipe culverts with a safer design. Culverts play an important role in moving water underneath and away from the road foundation. Because they protrude from the inslope, their design needs to be engineered to minimize the danger to a vehicle that has left the roadway.



Interstate 29 northbound lanes from Elk Point to Junction City

This project is another example of how the federal stimulus funds provided in 2009 have helped rebuild South Dakota's Interstate highways. This 9.6-mile segment of the northbound lanes of I-29 in Union County stretched from a half-mile north of Elk Point to the South Dakota Highway 50 exit. Existing portland cement concrete pavement was removed and replaced with portland cement concrete pavement. Some slabs received joint and spall repairs. Exit 26 also received some improvements.



Interstate 90 eastbound lanes from east of Plankinton to Mount Vernon

Like the last two projects, this one reconstructed an aged segment of Interstate. Federal stimulus funds helped pay for the work. In addition to 10.8 miles of new portland cement concrete pavement, the project included safety improvements: new guardrail to protect vehicles leaving driving lanes from going over steep embankments, and extension of culvert ends farther from the shoulder. From spring of 2009 to fall of 2011, 22 miles of I-90 near Mitchell have been reconstructed with PCC pavement from White Lake to Mount Vernon; 31 miles from Chamberlain to White Lake were resurfaced with asphalt concrete. Travelers will be able to enjoy smooth driving west of Mitchell in the years ahead.

Major FY2011 projects

Mitchell Region



Chamberlain truss bridge

Chamberlain's truss bridge re-opened in 2011, after being closed to traffic for most of the last two years. Truss repainting was the last major task in the rehabilitation project, which included new lighting, replacing bridge decks and approach spans, concrete substructure repair, and repairing or replacing selected structural steel members of the truss floor system. The bridge, which is on the National Register of Historic Places, was created in 1953 as the Missouri River dams raised water levels. Spans from the bridges at Wheeler and Chamberlain were moved using barges and special rigging, then joined at the current site. The rehabilitated bridge serves local traffic and as a possible detour should the I-90 bridge need repair.



Grading on S.D. Highway 34 from Egan to the Minnesota state line

A total of 7.6 miles were graded and paved with five-inch-thick asphalt concrete from one mile west of South Dakota Highway 13 to the Minnesota state line. This stimulus project improved overall safety by creating longer sight distances and wider shoulders, and provided more snow storage within the right of way. A triple-barrel box culvert was installed a mile and a half east of the 13/34 intersection. A second box culvert was installed a mile and a half west of the Minnesota border. Traffic counts warranted the addition of turn lanes, including these at the turnoff to the Flandreau Sioux Tribe casino (pictured).



Yankton Meridian Bridge

Yankton-area residents began strolling and rolling across this newly repaired and transformed pedestrian/bicycle path bridge on Nov. 23, 2011. The Meridian Bridge was the first highway bridge over the Missouri River in South Dakota. It opened in 1924 and connected Yankton with Cedar County, Neb. The privately financed toll bridge was designed to carry automotive traffic on the top level and trains below, but trains never used it. The upper level carried South Dakota-bound traffic, while traffic headed to Nebraska used the bottom. Both lanes are now open to cyclists and walkers. The new Discovery Bridge, built upstream, replaced it as the U.S. Highway 81 bridge in 2008.



Resurfacing and Repair of I-90 from west of Salem to east of Hartford

Motorists may be surprised to know that underneath this stretch of Interstate 90 lies the original reinforced portland cement concrete pavement placed in the mid-1960s. An asphalt concrete overlay was done in 1997. This project added a thin layer of Class S asphalt concrete, which increases surface friction, preserves the underlying asphalt concrete overlay and improves smoothness. The DOT designs its asphalt concrete pavement to be either overlaid, or milled and overlaid, several times in its service life.

Major FY2011 projects

Pierre Region



The Mobridge and Forest City bridges over the Missouri River

“Preservation mode” describes efforts to maintain the overall condition of existing State Highway System pavements, but it also describes efforts to maintain state-owned bridges. Two Missouri River bridges, the U.S. Highway 12 bridge at Mobridge and the U.S. 212 bridge at Forest City, needed new paint in specific areas, joint modification, epoxy chip seals to preserve steel reinforcement in the bridge decks, bearing retrofits, guardrail, and approach work. The work helps ensure these bridges safely and effectively connect major portions of eastern and western South Dakota for at least the remainder of their original intended service lives.



S.D. Highway 63 resurfacing, Cheyenne River north to U.S. 212’s west junction

A total of 22.4 miles of South Dakota Highway 63 were improved by this stimulus-funded West River project, starting at the Cheyenne River and ending at the west junction with U.S. Highway 212 (pictured). Existing asphalt concrete was milled, and the remaining surface was overlaid with recycled asphalt concrete. Some grading, flattening of slopes, guardrail and bridge repair were included. This project provided employment opportunities for Cheyenne River Sioux Tribe members.



S.D. Highway 1806 from the Oahe Dam emergency spillway north

This 27-mile South Dakota Highway 1806 segment north of Fort Pierre provides access to camping and fishing areas on Lake Oahe, and is the only north-south highway for rural residents in northeastern Stanley County. Resurfacing of the deteriorated existing asphalt concrete was completed in 2010, along with geotechnical work, ditch channel protection and guardrail improvements. This was just in time for local residents and tourists, who could use it to get to the Lake Oahe emergency spillway area during the 2011 Missouri River flood to see the floodwater peak at just four inches below the top of the spillway gates.



S.D. Highway 44 from Wood to the U.S. Highway 183 junction

Winner, Witten, Wood and White River are served by this 25-mile segment of South Dakota Highway 44. The rural highway, which also serves as a secondary connecting route south of the Interstate from Sioux Falls to Rapid City, had not been resurfaced since the 1980s, and local residents wanted it to be improved. The asphalt concrete resurfacing, paid for with stimulus funds, corrected rutting and pothole problems. Steep, dangerous approach slopes were flattened, and guardrail was replaced.

Major FY2011 projects

Rapid City Region



Reconstruction of U.S. Highway 18 from Oglala to Pine Ridge

The DOT won a \$10 million grant that will pay a third of the cost of this 15.6-mile reconstruction project on the Pine Ridge Indian Reservation. Grading operations (shown at left) began in July 2010. The project will be completed when a chip seal is placed on the asphalt concrete in 2012. Just under two million cubic yards of dirt were moved during grading, and about 85,000 tons of asphalt concrete placed by early November 2011. The U.S. Department of Transportation awarded the Transportation Investment Generating Economic Recovery (TIGER) grant because the redesigned road will save lives and boost employment in the



U.S. Highway 85 through Belle Fourche

For the stimulus-funded U.S. 85 project through Belle Fourche, Area Engineer Mike Carlson worked with the contractor to compress work into one construction season instead of two, minimizing the time cars and semis had to thread their way through work zones. Care also was taken to minimize the impact on businesses. Instead of unbroken paving with a paving machine, the plan called for isolated hand pours at high-volume intersections. This allowed customers to access businesses from both sides of U.S. 85 or turn off the highway to a business during the main paving operation. Now Belle Fourche has free-flowing traffic on a smooth road—and the economic growth that comes with high-quality transportation infrastructure.



U.S. Highway 18/Fall River Road from Maverick Junction east to Hot Springs

This 1.2-mile segment was expanded to four lanes to relieve congestion of traffic heading to and from Hot Springs. Two aging bridges were replaced with reinforced concrete box culverts and the driving surface was paved with portland cement concrete. Grading for the two additional lanes exposed multi-colored sedimentary layers on a nearby hill, providing an additional view into the Black Hills' unique geological history.



U.S. Highway 18/Heartland Expressway, Maverick Junction south to Smithwick Road

More streamlined travel between Rapid City and Denver has been a longtime goal of Black Hills tourism advocates. This project expanded an 8.1-mile segment of U.S. 18 from two to four lanes and added a new 628-foot prestressed girder bridge over the Cheyenne River. Work was completed near the end of 2010. The improvements also make this road safer for freight traffic and tourists enjoying the Black Hills. South Dakota's part of the Heartland Expressway is expected to be completed when the project from Oelrichs south to the Nebraska state line is completed in 2014.

Major FY2011 projects

Rapid City Region



Interstate Highway 90 Exit 30 at Sturgis

Like many Rapid City Region projects, reconstruction of the eastbound and westbound lanes of Interstate 90 near Exit 30 at Sturgis worked around the annual motorcycle rally. For this two-year project, that meant two rallies. Work began early in the springs of 2009 and 2010, paused to allow four-lane traffic from late July to mid-August, and resumed later in August of 2009 and 2010. The improved interchange with U.S. Highway 14A and S.D. Highway 34 will keep travelers moving for decades. The project included widening of the westbound structure crossing U.S. 14A and S.D. 34, which was one of the safety enhancements to the bridges within the limits of this project.



Reconstruction of Reservoir Road and Longview Road, Pennington County

Reservoir Road was reconstructed with asphalt concrete from 500 feet north of the S.D. Highway 44 intersection north 1.2 miles to Twilight Drive. Longview Road was reconstructed from 600 feet east of S.D. 44 east 2,300 feet. The rural section roadways were widened to three lanes, and the Reservoir-Longview intersection was redesigned for increased safety. Curb and gutter were added along both roads. Subsurface improvements included new storm sewers, sanitary sewers and water distribution mains. Because federal money helped fund the project, the DOT administered this county project.



South Dakota Highway 40 through Hermosa

Almost a mile of South Dakota Highway 40 from South Dakota Highway 79 to the new trailer park in Hermosa was reconstructed, with a new storm sewer system and a sidewalk for pedestrians. The grading improved sight distance, and, by doing so, safety. In the process, the road was widened and new lighting installed. American Recovery and Reinvestment Act (federal stimulus) funds paid for this project.



U.S. Highway 16 from Cathedral Drive in Rapid City to Spring Creek

This 5.6-mile stretch of U.S. Highway 16, which goes by or is used to access Reptile Gardens and other major tourist attractions in the Black Hills, was milled and resurfaced with asphalt concrete. Shoulder erosion was repaired, new pavement markings were added and storm sewer was replaced. Some of the work was completed at night to minimize inconvenience to motorists. The project also was paid for with stimulus funds.

Federal Funding Outlook

Federal funding level is critical to State Highway System repair and reconstruction

The importance of federal funding to the South Dakota State Highway System cannot be overstated, because it makes up about 75 percent of the state DOT's annual construction budget.

Federal funding comes from the surface transportation program being considered for reauthorization by the United States Congress. This legislation is sometimes referred to as "the highway bill," even though the bill also provides transit funding.

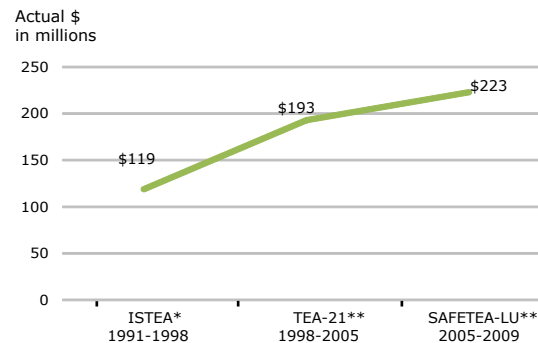
State gas tax and motor vehicle excise tax funds—pooled in the State Highway Fund—are used to match federal funds to pay for construction projects and to pay for maintenance activities such as plowing snow and mowing right of way, which can't be paid for with federal funds.

Who pays? Federal gas tax revenue isn't keeping up with federal highway spending

Unfortunately for South Dakota, the short-term and long-term federal funding outlook is the most uncertain in 20 years. Under the most recent highway act approved in 2005, annual highway program expenditures averaged about \$38.6 billion a year, but expenditures have been greater than revenues. This reduced the federal Highway Trust Fund balance.

Revenues and interest to the trust fund this year will be about \$37 billion—\$31.8 billion for highways and \$5.1 billion for transit. Congress has extended the highway legislation for two years as lawmakers labored to find

S.D. Average Annual Federal Formula Funds (not adjusted for inflation)



*Intermodal Surface Transportation Efficiency Act of 1991
**Transportation Equity Act for the 21st Century
***Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

additional funding. To maintain current funding levels, more revenue must be found for both the Senate and House bills.

Will we have continued program extensions or a bill?

In the short-term, a 90-day program extension was approved by Congress on March 29, 2012. The extension will last until June 30, 2012. It will be another 90 days until the end of the federal fiscal year.

The U.S. Senate version of the proposed new highway bill, Moving Ahead for Progress in the 21st Century (MAP-21), has been passed by the Senate. It keeps the current formula for distributing highway money to

states, eliminates earmarks, consolidates programs and provides flexibility to use funding for enhancements, recreational trails and safe routes to schools and for other activities. No additional taxes are proposed to pay for the bill. Instead, previous highway funding would be revoked, or federal money would be taken or reclaimed from other programs. The Senate is waiting on the House to achieve consensus on their version of the bill.

The House version, the American Energy and Infrastructure Jobs Financing Act of 2012, changes the funding distribution and reduces funding to South Dakota slightly. The House wants to eliminate earmarks, improve transportation outcomes and increase highway funding by linking it to revenue from increased U.S. energy production and reducing the federal contribution to federal employee pensions. House members were unable to reach a consensus on the bill and passed the 90-day extension to devote more time to rethinking and revising their bill. Increasing the portion of transit program funding coming from the Highway Trust Fund is being considered.

S.D. congressional delegation keeping watch

U.S. Sens. Tim Johnson and John Thune, along with U.S. Rep. Kristi Noem, are focused on finding adequate funding, streamlining the process and controlling unproductive regulations to keep South Dakota's economy moving.

Pavements

Maintaining "good" pavement condition on the state system is the challenge

Similar to last year, the DOT has been able to keep South Dakota's overall state highway pavement condition in the "good" category.

The overall condition of South Dakota State Highway System pavements was 4.31 on a scale of 0 to 5 in 2010, an all-time high. [A figure for 2011 was not available as this report went to print.] On this scale, 5 to 4.5 is excellent, 4.49-3.40 is good, 3.39 to 2.10 is fair and 2.09 to 0 is poor. The DOT's goal is to manage overall pavement surface conditions at 3.90, with 3.55 as a minimum.

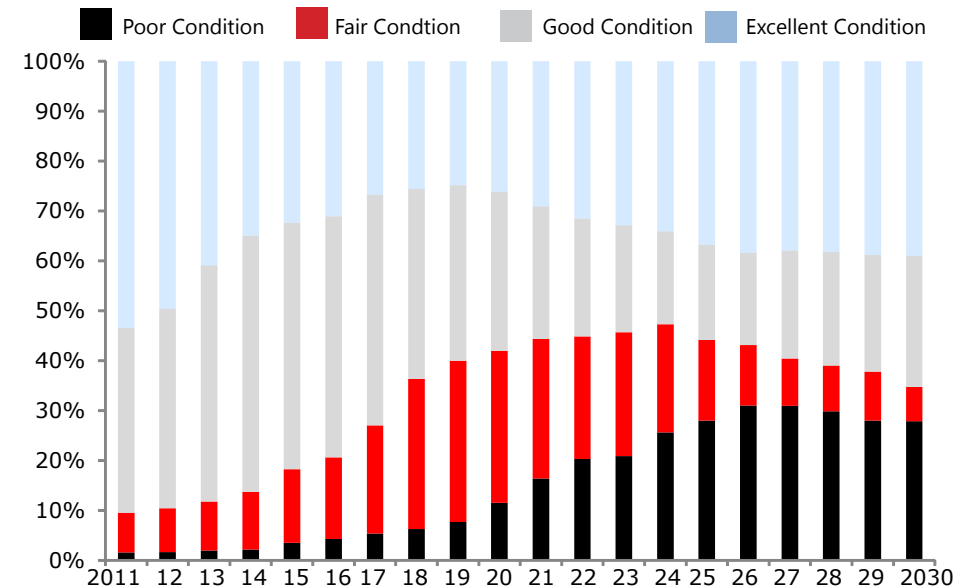
The relatively high level of surface conditions compared to a little over a decade ago is mainly due to additional federal dollars recently received. Using these funding sources, the DOT has continued to invest in state highway pavements to preserve them for years to come. In 2011, 21 percent of state highway centerline miles received some type of significant improvement, including reconstruction, resurfacing, a safety project or new construction.

Although the overall condition is at an all-time high, it will be very difficult to maintain this level in the future with the current annual amount of funding for pavements, roughly \$180 million. The graph on this page reflects projected conditions of the State Highway System out to the year 2030 based on that funding level. As you can see, the percentage of pavements in poor condition is expected to grow to around a quarter of total system miles.

Severe winters with heavy precipitation and multiple freeze-thaw cycles can cause more rapid deterioration of pavement conditions, while moderate weather results in slower deterioration.

The amount of federal funding the state receives greatly affects future pavement conditions. As the DOT patiently waits for a long-term highway bill, its managers hope federal funding remains at least at current levels.

If Existing Funding Levels Remain the Same, 26% of the State Highway System Is Projected to Be in Poor Condition in 13 Years



How asphalt concrete pavement looks when in excellent, good, fair and poor condition



Excellent
Smooth pavement with no rutting and no cracking



Good
Visible, light traffic wear, with limited, narrow crosswise and lengthwise cracking



Fair
Slight rutting, increasing aggregate loss, increasing width and extent of cracks



Poor
Deteriorated patching, extensive lengthwise and crosswise cracking, significant rutting

Bridge Safety

S.D. has a low percentage of structurally deficient, functionally obsolete state-owned bridges

The Department of Transportation has been focusing on keeping state-owned bridges in good structural and functional condition.

Those efforts resulted in a national top five ranking in 2011 for the lowest percentage of bridges rated structurally deficient or functionally obsolete. Sixty-nine bridges were rated structurally deficient and 89 rated functionally obsolete of a total of 1,803 state-owned bridges.

“As is the case with state highway pavements, the DOT emphasizes keeping existing bridges in good condition. This is the most cost-effective way to provide a safe and efficient transportation system,” said Kevin Goeden, Program Manager of the Bridge Design Office.

Minn. collapse raised concerns

National news stories have highlighted the overall poor condition of U.S. bridges since the 2007 collapse of an urban bridge in Minneapolis. By managing its transportation funds wisely, the DOT has been able to maintain the state-owned bridge inventory in an overall healthy and safe condition. However, the condition of bridges on South Dakota’s local roads remains a

concern. An increase in license plate fees approved by the 2011 Legislature is helping local governments address the 1,132 structurally deficient and 121 functionally obsolete bridges on local systems.

Federal law requires inspections of bridges on public roads

“Structurally deficient” and “functionally obsolete” do not necessarily mean unsafe. These are engineering terms from the National Bridge Inspection Standards (NBIS), established by Congress in 1968, which require all states to regularly inspect structures on public roads.

Structurally deficient indicates certain bridge elements need repair or replacement, such as deteriorated bridge surfaces. Functionally obsolete can mean a bridge is too narrow by current engineering standards for the traffic it is carrying or doesn’t meet current standards for vertical or horizontal clearance.

In South Dakota and other states, bridges unable to support weight above legal levels have warning signs limiting the weight of vehicles that can cross them. A bridge deemed unsafe would be closed to traffic.



The Pierre Region bridge crew measured erosion around bridge supports once a week during the Missouri River flood in the summer of 2011. The Aspen Ariel inspection truck allowed them to drop down to the water level and then use an electronic depth finder to take readings. The bridge was never in danger; it was designed to withstand the force of the moving water. Weekly checks were mainly a precaution.

Bridges

Large number of Interstate-era bridges will need to be replaced in coming decades



Exposed bridge members and elements are visually inspected regularly at “arm’s length.” Signs of a crack at a weld were found here during such an inspection. Paint was removed and liquid dye penetrant applied (orange area), highlighting the crack. The inspector marked and dated the crack. Problems like these are addressed when found in an inspection or in subsequent maintenance projects.

Many state-owned bridges were built in the Interstate construction era of the late 1950s to the 1970s.

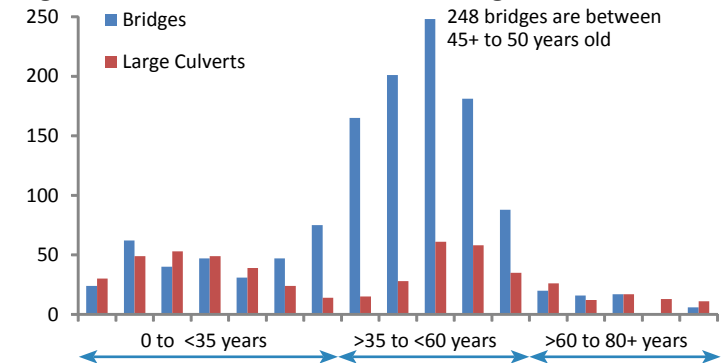
These structures, including large culverts, were designed to last 50-75 years (see chart at top right showing the age distribution of state-owned bridges). Although the Department of Transportation has kept its bridge inventory in overall good condition, maintenance cannot extend service life indefinitely.

Reconstruction costs more than maintenance and repair. One of the funding challenges for departments of transportation across the U.S. is funding both bridge repair and replacement.

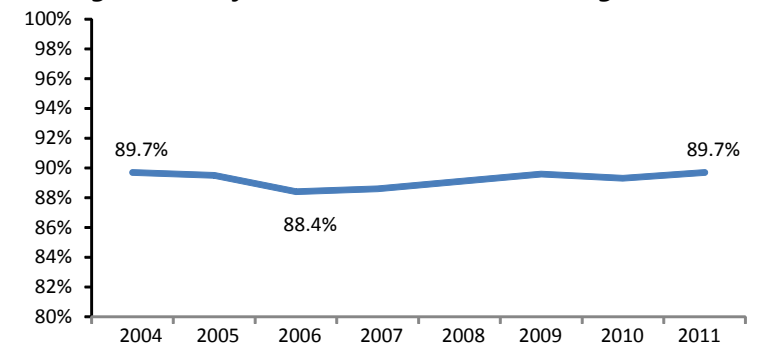
South Dakota has been reducing this bulge of future bridge reconstruction projects, so that costs of replacing them are spread over a long time frame. One new bridge and 13 new box culverts were let to contract in fiscal 2011. One hundred-eighteen existing bridges were let to contract for rehabilitation/repair, and six existing box culverts were let for extension.

State-owned bridges are inspected regularly, following the federal NBIS and additional state criteria. Projects addressing problems found during inspections are selected using a computerized bridge management system, input from DOT Region Bridge Specialists and past maintenance practices.

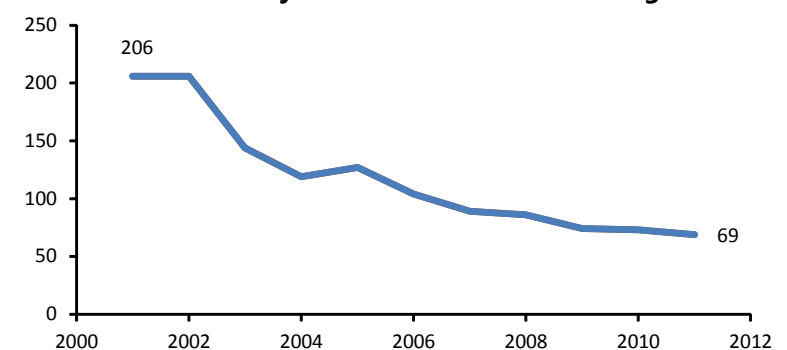
Age Distribution of State-Owned Bridges



Average Sufficiency Index for State-Owned Bridges



Number of Structurally Deficient State-Owned Bridges



Safety

S.D. highway fatalities dropped by 30, or 21%, to 110 in 2011

The primary causes of highway fatalities in South Dakota are known all too well: drinking and/or drugged drivers, speeding and lack of safety restraints.

Road designers and bridge engineers at the state Department of Transportation can't control the choices people make, but they can try to reduce the possibility of crashing, or reduce the risk of serious injury or death when crashes happen.

The DOT's current practice is to evaluate every construction project with safety as a first and last objective.

Some projects are initiated after accidents at a particular location have been analyzed, and a cost-effective engineering solution has been found with the potential to reduce accidents.

The dramatic drop in the total number of South Dakota highway fatalities in 2011, from 140 in 2010 to 110, therefore, has been positive reinforcement for these never-ending efforts.

Additional positive feedback came from state residents in the DOT's recent Customer Satisfaction Survey: 85 percent said state highways were as safe or safer than five years ago. Only 12 percent said highways were more dangerous; 3 percent didn't know.

2011 safety projects completed

The SDDOT used federal money specifically dedicated to safety improvements on both state-

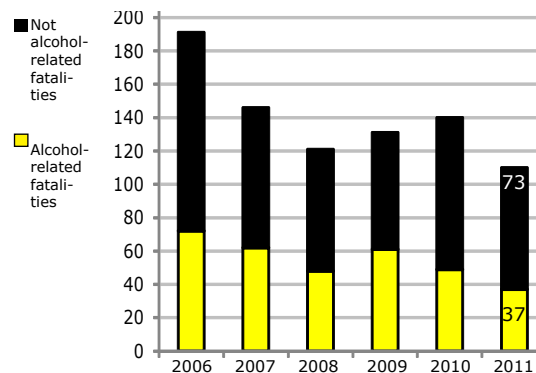
owned and local government-owned roads in 2011. Here are a few of those projects:

- \$950,000 for additional left-turn lanes at 10th Street and Cliff Avenue in Sioux Falls. Left-turn lanes can reduce rear-end and left-turn collisions.
- \$500,000 for culvert pipe extensions, repair of drop-offs and slope improvements on Perkins County routes 9 and 11. Less-steep slopes beyond road shoulders reduce the risk of rolling over.
- \$1.4 million for reconstruction of Radar Hill Road in Pennington County. Realigning this roadway eliminated tight reverse curves.

2012: first proactive safety projects

After studying its longtime method for identifying safety-focused projects, the DOT decided to also fund projects that were nationally proven to improve safety on roads with certain features.

S.D. Highway Deaths Continue to Decline



Source: Office of Highway Safety, South Dakota Department of Public Safety

These projects are meant to improve safety system-wide. Among those scheduled for 2012:

- \$1.8 million for guardrail replacement in Custer, Fall River, Harding, Lawrence, Meade, Pennington and Shannon counties.
- \$525,000 for durable pavement markings for state highways in the Mitchell Region.
- \$270,000 to install rumble strips on 166.2 miles of state highways in the Aberdeen Region.

More rumble strips

Adding more rumble strips along the edgelines of state highways has been a recent DOT focus. Between 2007 and 2011, the number of miles of rumble strips along state highway shoulders almost tripled, from 1,655 to 4,697 miles—53 percent of total roadway miles. Most of these rumble strips were added in the past three years, when \$183 million extra in federal stimulus funding allowed the DOT to tackle more of the projects on the State Transportation Improvement Program (STIP) list.

Installation of edgeline rumble strips have reduced run-off-the-road crashes by an average of 34% nationally, and the DOT hopes they are beginning to reduce such crashes and related fatalities in South Dakota.

At the end of the 2012 construction season, the DOT anticipates having rumble strips on 90 percent of the rural highways meeting the department's criteria for this safety feature.

Safety

DOT continues efforts to reduce crashes into plows

They're bright yellow, equipped with flashing lights and as tall as a semi.

Still, 38 people in South Dakota managed to hit Department of Transportation snow plows during the winter of 2010-2011—double the amount in the equally severe winter of 2009-2010. Some accidents put snow plows in the repair shop when they were needed on the highways.

Slow down when you see a plow

All 38 accidents were caused by other drivers. No DOT drivers were found at fault. Most of these drivers failed to realize the plow was going 20-30 mph—half as fast as they were—according to crash reports. When they got close, it was too late to slow down, so the drivers tried to pass and ended up side-swiping the plows.

Other drivers rear-ended the plows, and a few hit plows head on. Every year, the department renews its efforts to prevent plow hits. The DOT's media campaign tells the public, "Don't crowd the plow."

Every snow plow has flashing lights

All plow drivers have commercial driver licenses and receive annual safety training. Many drivers have thousands of hours of experience behind the wheel. The DOT has studied ways to reduce plow hits. Research pointed to the potential of flashing lights to heighten visibility. Flashing lights were added to all plows in 2001.

Department officials hope news reports about the record number of hits in 2010-2011 will make the driving public more cautious around plows in future winters.

Focus is even more important when snow and ice are on the road

Drivers can avoid crashing into a snow plow by focusing on driving, especially in the winter, when roads are or could become slippery. Talking to passengers, talking on a cell phone, texting, eating and fatigue can increase the time before drivers react to changing road conditions.

Is visibility reduced? The harder it is to see the road, the less information a driver has to make decisions and adjust speed or location. Winter driving when pavement is not dry or wind is blowing snow requires more attention. Ignoring poor visibility and driving while distracted increase your risk of a crash. Begin each trip with the intent to remain focused on driving.

As mentioned in the tips to the right, slow down when you see a snow plow. You have better control of your vehicle at slower speeds. If the plow is down and stirring up snow, it's going 20-30 mph. Drivers should decelerate to the same speed and stay a safe distance behind it. If you must pass a plow, make sure you can see far enough ahead to determine if the path is clear.



Keeping clear of snow plows

- If it's snowing, blowing, sleeting or raining during the winter—or precipitation is on the pavement—be on the lookout for snow plows.
- If you see a large vehicle ahead enveloped in a cloud of snow, assume it is a plow, take your foot off the gas and slow down to 20-30 mph, the average speed of a plow.
- Remember: the size of a plow truck makes it difficult for the plow driver to see directly behind it.
- Stay a safe distance behind a moving plow. Be patient. It may pull over shortly, allowing vehicles to pass safely.
- If you must pass a plow, make sure you can see far enough ahead to determine whether or not your path is clear. Watch for trucks equipped with a side plow extending eight feet to the right. On Interstates or expressways, a side plow can extend to the left as the plow clears the passing lane.

Public Transit

For South Dakotans, it's much more than transportation

A recently completed research study commissioned by the state DOT Public Transit confirmed what was long suspected: the benefits of public transit extend well beyond transporting riders.

The study also found that public transit benefits road users and the community at large by enhancing mobility, safety, air quality and economic development. Public transit is a major contributor to the state's economy and is critical to the well-being of its residents.

The study's findings come as public transit ridership continues growing in South Dakota. A total of 1.98 million rides were provided in federal fiscal year 2011.

Public transit contributed \$46.1 million to state economy in 2010

Key findings of the research centered on the economic impact of transit in South Dakota:

- When people use public transit, they save money that can be spent on housing, food, healthcare and other basic needs. In 2010, these out-of-pocket cost savings totaled \$10.3 million in South Dakota.
- Every 10 jobs in public transit create three additional jobs in supporting industries. Public transit operating and capital expenses, along with spending of out-of-pocket cost savings by transit riders, sustained 530 jobs in South Dakota.
- Transit contributed about \$46.1 million to South Dakota's economy in 2010. Every dollar spent on public transit in South Dakota generates \$1.90 in economic activity.

Benefits of public transit

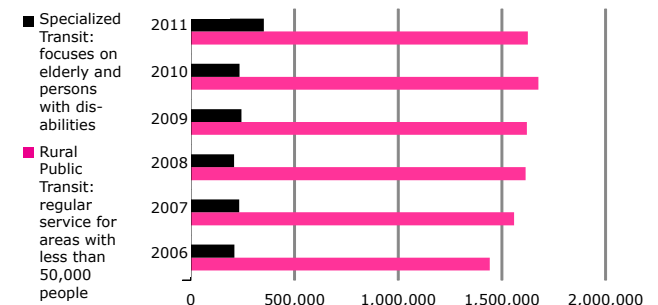
- **\$46 million contribution to state economy in 2010**
- **\$1 spent on transit generates \$1.90 in economic activity**
- **Social benefits include keeping seniors out of nursing homes and allowing low-income and handicapped individuals to hold jobs**

Helping seniors get to doctors, students to school and workers to jobs

Transit expands mobility for South Dakotans. Nearly half of the trips made on public transit in South Dakota are for work or medical purposes. Some riders rely entirely on public transit. An estimated \$7.1 million in low-cost mobility benefits, such as savings in homecare and welfare costs, were attributable to public transit in 2010. Research confirms:

- Without public transit, some people would either not be able to work or would lose their jobs.
- Without public transit, many people would have to forego medical trips, while others would require in-home care or would have to move to a nursing home facility.
- About 22 percent of transit trips in South Dakota are for educational purposes. Where school buses are not available, public transit provides safe, dependable rides for students preschool through college. With public transit for their children, parents can remain at

2011: Rides Total Grows for 6th Consecutive Year



Source: SDDOT Office of Public Transit, federal fiscal year (FFY) 2011 data

work and maintain their earnings and productivity.

Public transit helps seniors stay in their homes and stay active in their communities

The study also confirmed the strength of transit's ability to bring communities together:

- Transit provides vital transportation for senior citizens and persons with disabilities, ensuring that people can remain actively involved in their communities and have access to facilities and services.
- Seniors account for more than a quarter of riders in rural public transit systems operating in South Dakota. Especially in low-density rural areas, public transit serves as a lifeline, allowing people to continue living in their hometowns.
- Transit expands social and recreational opportunities in rural areas. Twenty-two of 24 public transit systems operating in South Dakota serve rural areas. Many participate in community-sponsored events and programs such as Senior Meals.

Aeronautics

A new 20-year aviation system plan describes trends, conditions and needs



Hunters old and young arrive at the Pierre airport for the opening day of South Dakota pheasant season in October 2011. Pheasant hunters who travel by air to South Dakota have an annual impact of nearly \$83 million on the state economy, according to a DOT aviation study.

South Dakota airports could see an increase in use based on changes in technology and industry trends.

For general aviation, these changes may include more business charters of the newer very light jets to visit clients, unmanned aerial vehicles used to monitor crop conditions and more recreational flyers taking off in gyroplanes and powered parachutes. For commercial services, this could mean improvements at airports to meet customer demands and safety innovations.

To understand and keep on top of these trends, the South Dakota Department of Transportation Office of Aeronautics developed the 20-year State Aviation System Plan this year. “The plan looks at the total aviation package in the state, tells us where we are at, and what improvements we should consider for the next 20 years. Proper planning is important because of the large economic impact aviation has in South Dakota,” Aeronautics Commission Chairman Larry Vetterman said.

The plan identifies the current condition and future needs of the 72 public-use airports in the areas of safety and security, infrastructure maintenance and development, and accessibility to users. The plan fosters cooperation between government and airport authorities because, although recommendations in the plan are developed at the state level, decisions are ultimately the responsibility of local government entities.

The aviation forecast is bright in South Dakota. Understanding airport roles, facility and service targets for the various airport categories, and recommendations for improvement at specific facilities will help meet the goals and objectives in the State Aviation System Plan.

Aviation’s \$792 million annual economic impact in South Dakota

\$792 million in direct and indirect business sales every year, resulting in:

More than 7,000 jobs

Over \$251 million in personal income

Source: *South Dakota State Aviation System Plan 2010-2030*, available at: <http://www.sddot.com/fpa/Aeronautics/docs/FinalReport.pdf>

Railroads

Rail line and service improvements bring multimillion-dollar benefits to central S.D.



From left: Construction workers finish a rail splice on the state-owned Mitchell to Chamberlain line. Lynn Kennison (middle) and Bruce Lindholm of DOT Local Transportation Programs discuss progress on the Mitchell to Chamberlain project with a CDI Inc. engineer. A Harrold Grain Co. employee watches as the first 110-car train to use the new loop track is filled with corn.

A \$16-million federal grant to rehabilitate the state-owned rail line between Mitchell and Chamberlain is expected to generate more than twice that amount in business investment along its tracks.

Liberty Grain began building a \$32 million elevator and fertilizer plant at the Interstate Highway 90 and state Highway 45 intersection in September 2011. Dakota Mill and Grain is planning an elevator northwest of Kimball. The 62-mile stretch of track had been inactive for about 15 years.

SDDOT Local Transportation Programs competed for \$16 million for project

The DOT Local Transportation Programs Office wrote the grant, awarded in October 2010. Competition for the second round of Transportation Investment Generating

Economic Recovery (TIGER) grants was fierce. Only about 75 of roughly 1,000 applications, or less than 1 percent, were approved.

The Mitchell to Rapid City Regional Railroad Authority, Dakota Southern Railway—which leases the track from the authority—and the state Railroad Board contributed \$12 million to the project. Replacement of ties, rails and ballast is expected to be completed in 2012.

State Core Line sale made shuttle service—and higher profits—possible

The project's big winners most likely will be central and south-central South Dakota grain farmers, who no longer will pay to truck grain as far as Mitchell or Highmore. BNSF Railway shuttle service from the new elevators to West Coast markets also could mean they'll get higher prices. Grain producers' increased profits could boost local economies in Plankinton, White Lake and Mount Vernon.

A new loop track in Harrold, financed with a loan from the state Railroad Board, allows Harrold Grain Co. to quickly fill 110-car trains. BNSF shuttle service, which DOT helped negotiate as a term of the Core Line sale, began in the fall of 2010 and already is helping grain farmers get more per bushel.

Research

The DOT studies Black Hills floods, so it can build bridges and highways to withstand them

To design structures that can safely withstand flooding of nearby rivers and streams, engineers need accurate, long-term historical data about water levels and velocities during previous floods.

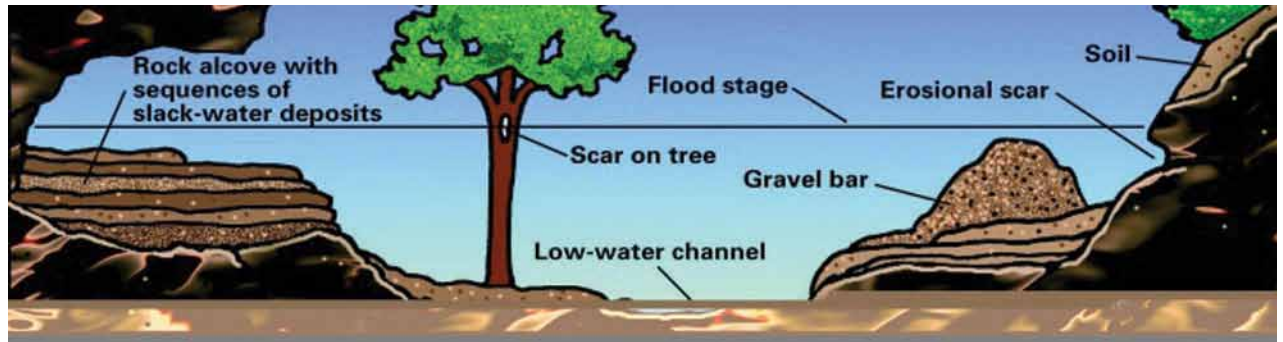
This data is especially vital for bridges and highways in the eastern Black Hills, where heavy storms over steep watersheds compound the possibility of sudden and severe floods. The extraordinary 1972 Rapid City flood, in which 238 people died, remains fresh in many South Dakotans' memories. But, only 125 years of hydrological records are available.

The South Dakota DOT and U.S. Geological Survey collaborated recently on a study of eastern Black Hills paleofloods—floods going back hundreds of years—to improve reliability of flood estimates in that region.

Comprehensive paleoflood investigations were conducted at 29 locations along Spring Creek, two reaches of Rapid Creek, two reaches of Boxelder Creek, and Elk Creek. These investigations provided a



The paleoflood study area in Pennington, Meade and Lawrence counties. Each location of a detailed paleoflood site investigation is identified with a red X. Red boxes show the reach of detailed paleoflood site investigations and hydraulic analyses.



Paleoflood investigations rely on evidence of prehistoric flooding. This cutaway diagram shows where flooding evidence can be found along a stream.

rich history of large floods extending back more than 2,000 years.

Deposits of sediment and organic materials in crevices high above the present-day flow of water provided evidence of past floods for the study. Organic materials were radiocarbon dated to create a chronology of floods over long periods of time. Peak flows necessary to deposit material at high elevations were determined by hydraulic analyses, using the geometry of stream channels and canyon walls.

High-resolution flood chronologies were developed at many locations, and sound flood-frequency analyses were derived for all six study reaches. The results provide much better, physically based information on low-probability floods than previously available. When combined with the existing 125 years of observed data, they greatly improve the reliability of estimates of flood magnitude and frequency in these basins.

Most significantly, the study found that the frequency and magnitude of very large floods in the eastern Black Hills are much higher than previously known. Rapid Creek, just upstream from Rapid City, has experienced

peak flows at least *twice* as large as the 1972 flood at least 14 times in the past 2,200 years. Put another way, that's once every 160 years, on average.

This vastly improved data will provide more accurate flood forecasts, enabling DOT engineers to design bridges, culverts and pavements that are more likely to continue functioning during floods—and avoid the huge expense of overbuilding. Study results have been presented to Black Hills area officials and may profoundly impact land use and emergency planning.

The Federal Emergency Management Agency, the West Dakota Water Development District and the City of Rapid City also were joint sponsors of the study.

A similar study of the southern Black Hills starts in 2012. Call the DOT Office of Research at (605) 773-3292 for more information.



Visible layers of sediment delineate separate floods.

East River and Missouri River Flooding

Emergency projects kept East River traffic flowing in 2010 and 2011

The DOT Area Offices worked hard in 2010 and 2011 to keep motorists and truckers moving through soggy East River.

Precipitation was abnormally heavy both years. The James, Vermillion and Big Sioux rivers overflowed and sloshed onto roads. South Dakota's infamous wind drove waves that eroded road foundations.

Ten state highways were damaged by floodwaters in 2011, prompting 30 emergency projects estimated at \$9.1 million. In 2010, multiple flooding events necessitated 17 emergency projects costing about \$5.8 million. The Federal Highway Administration Emergency Relief program for federal-aid highways reimbursed the state for \$4.8 million of 2010 costs. The 2011 reimbursement has yet to be determined.

U.S. 12 segment was closed for months in 2011

One of 2011's hot spots was two miles of U.S. Highway 12 near Roscoe. Closure of this segment in May 2011 made it harder for residents, truckers and motorists in upper northeastern South Dakota to move east and west. U.S. 12 is one of only two major east-west highways in that region.

The DOT's engineers designed a grade raise for U.S. 12, let an emergency contract and supervised construction. The interim surface re-opened in late summer. A permanent surface should be placed by June 2012.

For the flooding on U.S. 81, the DOT's Sioux Falls Area Office determined that lowering Twin Lakes was the best way to preserve the pavement and underlying base. The Brookings County Drainage Board approved the DOT's plan to pump water from Twin



Top: Chunks of South Dakota Highway 44 east of Parkston broke off in 2011 after James River floodwaters undermined the road's foundation. In the background, DOT employees from the Menno shop work on temporary repairs. Bottom: South Dakota Highway 10 was closed for most of the summer of 2010 as clay was hauled in to raise the grade.

Lakes into an outlet east of U.S. 81 that goes to Lake Sinai, which drains into the Big Sioux River.

For some flooded state highways, adequate drainage and time solved the problem. However, lack of drainage was *the* problem in the flat areas around Aberdeen. Placement and size of culverts became lively issues in some areas of the state.

The Missouri River near Pierre, Fort Pierre, Yankton and Dakota Dunes also flooded in 2011, but no state highways or structures were damaged. DOT officials joined other state, federal and local officials in the coordinated flood response.

Flooding in 2010 was a year-long ordeal

Many highways that flooded in 2011 had flooded in 2010: S.D. 48 near the Iowa border; S.D. 19 south of Centerville; and S.D. 44 east of Parkston. U.S. Highway 14 was an exception. A short segment in Miller only flooded in June 2011.

Flooding in 2010 also continued from the spring thaw through summer. A July rain washed out state highways 115 and 11 south of Sioux Falls. Emergency projects were let to fix those.

Most troublesome was the submersion of South Dakota Highway 10 under two feet of water, creating the same east-west travel problem as the U.S. 12 closure near Roscoe. The S.D. 10 segment was 4.4 miles east of U.S. 281 and two thirds of a mile long.

DOT engineers designed and supervised an emergency grade raise of five feet, pictured under construction above. Despite another wet spring in 2011, S.D. 10 stayed dry.

Winter Maintenance

South Dakota motorists appreciate DOT's road condition information services

Over the past few years, employees in the Operations Division have strived to provide accurate information about current road conditions and to increase the efficiency of DOT winter maintenance activities.

South Dakotans noticed the improvements, particularly in communication. In the 2011 Customer Satisfaction Survey, state residents gave the department high marks for the accuracy of road condition information provided by the SafeTravelUSA Web site and 511 phone line.

93% of South Dakotans surveyed in 2011 said road condition information on 511 was very accurate, accurate or OK. 95% said information on SafeTravelUSA.com was very accurate, accurate or OK

“Even though we work hard at plowing snow and treating the roads with de-icing chemicals to keep them as safe as possible, there are times when road conditions are such that they can impact travelers,” Division Director Greg Fuller said. “It is imperative that we keep travelers informed when road conditions deteriorate or become severe enough to impose travel restrictions.

“By keeping travelers informed about road conditions, travel restrictions and our hours of operation, travelers can make more informed decisions regarding their travel plans. The 511 phone system and the

SafeTravelUSA Web site, including the road cameras, are all instrumental in getting that information to travelers.”

Emphasis on communication has led to more realistic expectations of what the agency can accomplish during winter weather events and helps motorists make decisions that keep them out of the ditches.

At the same time, the DOT has continued implementing the computerized Maintenance Decision Support System, a scientific approach to determining when and where to apply de-icing chemicals.

“We’re treating the specific storm, not just a one-size-fits-all approach to winter maintenance,” Construction and Maintenance Engineer Jason Humphrey said.

“A number of years ago you would have seen our trucks out there putting down up to a thousand pounds of salt-sand abrasive combination per mile, no matter what the situation was.

“The Maintenance Decision Support System makes specific recommendations based on the actual conditions—the roadway temperatures, the air temperatures, the expected roadway and air temperatures—and it also takes into account what we’ve done in the hours previous to that, because we don’t want to continually be putting down material when it’s not needed. It’s a more efficient way to do de-icing, and it’s shown to save us money in the long run.”



A DOT blower helps extract a semi from a snowdrift.



Get e-mails and text messages about road closures and re-openings, no-travel advisories and flooding when you subscribe to South Dakota’s free ClearPath 511 service.

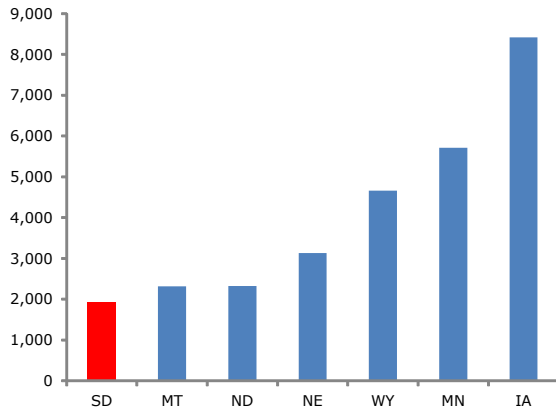
ClearPath 511 will send updates for the routes, dates and times you select—as soon as reports are released by state officials. Just like 511, ClearPath 511 is available 24 hours a day, 7 days a week.

The road condition information service is free, but standard text messaging rates from your carrier apply.

To create an account, go to www.SafeTravelUSA.com/sd/ and click on the ClearPath 511 icon at top right. 

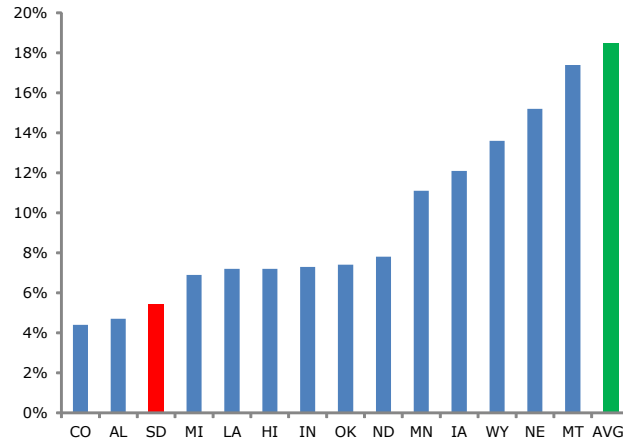
Efficiency Statistics

DOT has lower per-mile winter maintenance costs than all neighboring states



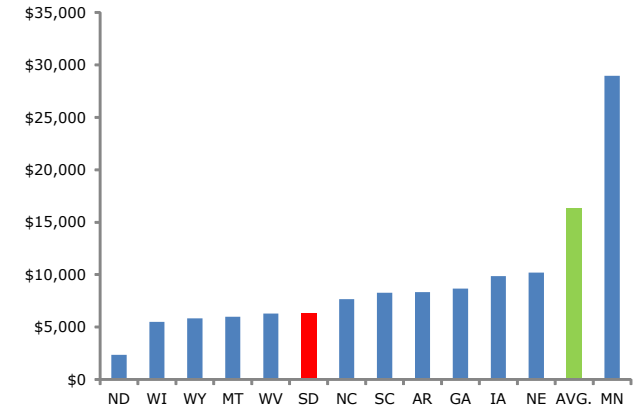
Sources: *Highway Statistics* 2009, Table SF-4C (April 2011), and *Highway Statistics* 2008, Table HM-81 (October 2009) Federal Highway Administration

DOT has the third-lowest engineering costs as a percentage of total project costs in the nation



Includes planning activities, design, bid-letting process and construction administration by engineering staff.
Source: *Highway Statistics* 2009, Table SF-4C (April 2011), Federal Highway Administration

DOT has the sixth-lowest routine maintenance costs per mile in the nation



Includes maintenance of the driving surface, shoulders, bridges, drainage and erosion control, ditch cleaning, mowing, fence repair and other costs. Excludes snow and ice control.
Source: *Highway Statistics* 2009, Table SF-4C (April 2011) and *Highway Statistics* 2008 Table HM-81 (October 2009), Federal Highway Administration



Bill Weischedel, Pierre Region Mechanic, works on a truck differential. Weischedel is one of a number of DOT employees currently serving overseas in the South Dakota National Guard.

An Organization-Wide Drive for Efficiency

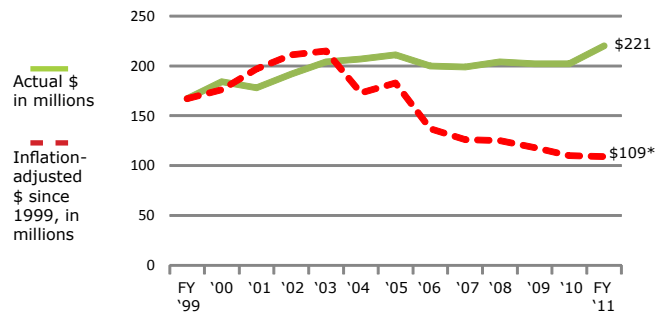
In every area of responsibility—accounting, auditing, planning, project design, bid letting, construction administration and maintenance—the South Dakota Department of Transportation strives to keep costs down while providing the smoothest and safest transportation system possible with available funding.

The percent difference between the total amount of bid awards for projects completed in 2010 and the corresponding total final costs was -1.13 percent, an extraordinarily low figure in the construction business. The negative sign means changes were made during the life of some projects, such as lower quantities of material than originally contracted, that reduced projects' costs.

That means DOT properly assessed the geotechnical aspects of the construction site, designed the right treatment and provided a high-quality set of plans for the contractor, who competed with other construction firms for the public project. Then, Operations engineers and engineering technicians monitored and inspected the work to ensure quality and the meeting of specifications.

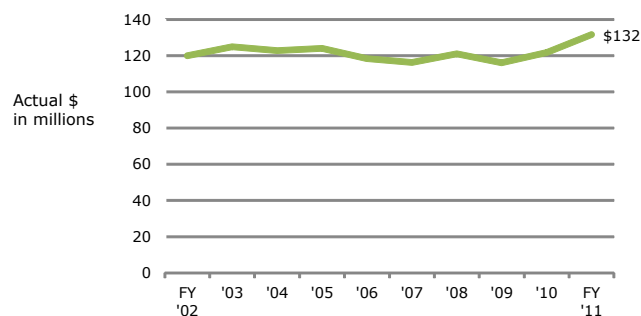
Finance Statistics and Economic Development Grants

State Highway Fund Revenue through FY 2011

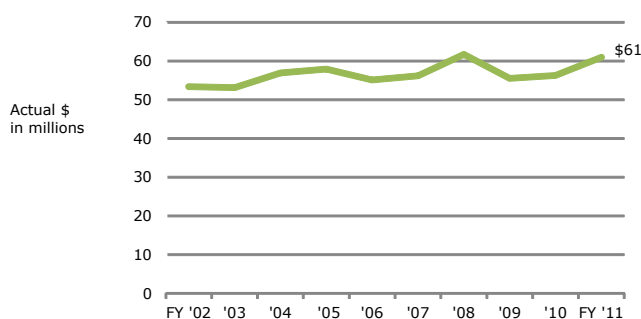


*2010 and 2011 figures are estimates.

Motor Fuel Tax Revenue through FY 2011



Motor Vehicle 3% Excise Tax Revenue through FY 2011



Source: SDDOT Finance and Management Division, 2011

Economic development grants for local roads resume

Local governments in South Dakota received about \$2 million in 2011 to improve roads to grain elevators, a new beef-packing plant, a molded-fiberglass factory and schools.

Brown County received \$250,000 for work on county Highway 19, which serves the Molded Fiber Glass Companies wind turbine blade factory. Another \$250,000 will help with County Road 14W leading to the new Northern Beef Packers plant.



The other recipients, amounts and project locations:

Colton—\$96,000 for 5th Street, leading to the grain elevator

Corsica—\$250,000 for Railway Avenue, leading to the grain elevator

Groton—\$250,000 for First Street and Fourth Avenue, to the school

Scotland—\$250,000 for Washington Street, leading to the POET ethanol plant

Veblen—\$178,545 for Main Street and Prairie Street

Worthing—\$250,000 for Second, Juniper, and Third Streets, leading to the school.



Community access, industrial park, and agri-business grant program funds are awarded to improve roads leading to schools, main business areas, hospitals, grain elevators and other economic areas in the communities. The grants come from the State Highway Fund and were approved by the Transportation Commission.

The previous year, economic development grants were awarded to:

Dell Rapids—\$200,000 for 15th Street leading to the new elementary school

Wall—\$200,000 for Main Street

Mobridge—\$149,400 for the end of Main Street

Emery—\$125,000 for 3rd Street (main business area)

Edgemont—\$200,000 for H Street leading to the clinic, airport and high school

Eagle Butte—\$200,000 for Main Street

Onida—\$200,000 for Cedar Avenue leading to the CHS Midwest Coop facility

Hughes County—\$120,000 for 321st Avenue in Harrold leading to the grain terminal

Gregory—\$200,000 for 5th, 6th and Logan Streets leading to the school.

Community officials interested in pursuing an economic development grant for a road project should contact the Planning and Engineering Division's Administration Office at 773-6253.

Long-Range Plan

The South Dakota Statewide Long Range Transportation Plan, was approved by the Transportation Commission in September 2010.

Unlike the five-year State Transportation Improvement Program (STIP), which lists specific projects meeting immediate repair and re-paving needs, the long-range plan looks at the big picture: population shifts, economic growth opportunities, the overall condition of public and private infrastructure, available funding and many other factors. The long-range plan outlines general actions for the DOT to take in the next 20 years to address these opportunities and trends.

Not surprisingly for those who follow issues facing the DOT, the most pressing need is for Congress to enact a highway bill providing the needed federal funding to South Dakota and other states over the next several years. The former highway bill expired after September 2009, and Congress has since doled out funding through continuing resolutions lasting a year or less. Federal funding comprises roughly 75% of the DOT's annual construction budget.

When the DOT is uncertain about future federal funding, it is more difficult to make the most cost-effective choices when deciding among options for improving pavement conditions.

Take, for example, a deteriorated highway segment: When future funding is unknown and current funding limited, the agency might decide to resurface pavement with a layer of asphalt concrete that will only last 10-12 years. If the DOT knew adequate federal funding was assured over the next several years, it might decide to remove the existing pavement and reconstruct the segment with portland cement concrete pavement, which might be more expensive initially, but could last longer and cost less over the long term. If future funding was unknown *and* the agency decided to go ahead with the initially more expensive option, it might end up having to forego other system improvements if expected funding declined, jeopardizing the overall condition of the highway system.



South Dakota's Long-Range Transportation Issues and Challenges

Economic growth

Need for improved rail and/or highway access to ethanol plants, wind energy facilities and agribusinesses. The need to preserve local rail service requires improvements to short-line track, and, for state-owned track, funding for upgrades and improvements. Local and state roads must be able to support the load weights of increasing yields of corn, wheat and soybeans to rail-served elevators.

Aging population

South Dakotans aged 65 or more will grow from 114,459 in 2010 to 185,064 in 2030—from almost 15 to 23 percent of the total population. This may increase the need for brighter pavement markings, more and brighter intersection lighting and increased rest area facilities. Elderly residents may need increased public transit services.

Population shift from rural to urban areas

More traffic in urban areas.

Air service

Passenger service is limited. Six airports provide commercial passenger service.

Local governments

May have to convert deteriorated pavements to gravel roads due to lack of funding.

Accolades



“I’d just like to thank the Department of Transportation of South Dakota for giving some attention to the Pine Ridge Reservation over the last few years. It’s been long overdue, and it’s very welcome. We look forward to much-improved safety on those roads that are being dealt with. Highway 18 in particular, I think, will be a very successful project when it’s completed in terms of safety, and also the efforts east of Pine Ridge, I think, will be a tremendous contributor.”

Jimmy Sam
Oglala Sioux Tribe Transportation Department



“You know, the last number of years on the Interstate we’ve heard comments about two lanes and one lane and all those type of things. However, I want to congratulate and thank the state of South Dakota for causing that, because we end up with some pretty good roads coming into Mitchell on the Interstate. In order to have something good, you have to go through some rough times, and we’re going to have it again out on the Interstate from Mount Vernon to the Jim River. But when the projects are done, they’re there for a long time, and we can have good roads around Mitchell. I thank you guys for that.”

Lou Sebert
Mayor of Mitchell



“I would like to thank you for giving consideration to the needs of Leola, Ipswich, Groton, Redfield, Roscoe, Eureka and so many more in our region on the STIP for the next several years. We are a very interdependent regional economy and all of that investment will pay off for all of us long term.”

Julie Johnson
Executive Director of Absolutely! Aberdeen

Residents and motorists on the newly reconstructed U.S. 18 from Oglala to Pine Ridge will benefit from sidewalks in urban areas, rumble strips, turn lanes, wider shoulders and gentler slopes. Grading began in 2010, paving was completed in 2011, and a chip seal in 2012 will complete the 15.6-mile project.

“I just want to express appreciation and gratitude for the 16.1-mile project on U.S. 83 in Campbell and Walworth counties. Of course, that also includes Mound City. We’ve got three different construction firms working in town right now, and they have all assured me that by the end of summer we’ll have new curb and gutter, sidewalks, lighting and resurfacing. Also, the general contractor said the remaining 16 miles will be ready by the time snow falls for resurfacing next year in 2012, and I see that is in the tentative plan for next year, so thank you.”

James Kanable
Mayor of Mound City

Quality Control

Testing and inspection lead to longer-lasting, smoother pavements



The slump test is the industry-wide standard method to measure the consistency and workability of portland cement concrete. Journey Transportation Technician Craig Orke, DOT Sioux Falls Area, takes a sample of newly placed concrete, fills the slump cone mold, rods the mold, strikes the surface flush with the tamping rod, lifts the mold vertically, measures the height difference and records the result. Slump tests are an important quality control measure.



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Photography and other illustration credits

Cover: Mark Bates (orange cap) of the Herreid Maintenance Unit operates paver, while (left to right) Bill Dunbar (Mobridge Maintenance Unit), Max Goetz (Selby Maintenance Unit) and Denton Kary (Herried unit) monitor and break up clods as hot mix asphalt begins being laid down on U.S. 212 through Gettysburg in late July 2011. At the far right is Highway Maintenance Supervisor Lynn Fravel (Pierre Area). Working on this crew but not in the picture are Alex Fjeldheim (Herreid unit) and Justin Moser (Selby unit). By Julie Bolding, Management Analyst, Office of the Secretary.

P. 2: by Bolding.

P. 3: by Public Information Officer Kristi Sandal.

P. 4: Line of DOT trucks by Patrick M. Callahan, Moving Photography, used with permission; all others by Bolding.

P. 5: from Project Development Office.

P. 6: by Sandal.

P. 7: by Bolding.

P. 8: top to bottom: Mark Peterson, Aberdeen Area Engineering Supervisor; unknown; Bryce Olson, Lead Project Engineer, Watertown Area; unknown.

P. 9: I-90, east of Plankinton to Mount Vernon, photo by Travis Schnabel, Journey Transportation Technician, Mitchell Area; all others by Bolding.

P. 10: top to bottom: by Sandal; Bolding; courtesy photo; Harvey Odens, Project Engineer, Sioux Falls Area.

P. 11: top to bottom: Hadly Eisenbeisz, Engineering Supervisor, Bridge Design; John Villbrandt, Mobridge Area Engineer; Bolding; Colleen Farley, Winner Area Senior Secretary.

P. 12: top three photos by Bolding, bottom photo by Custer Area Project Technician Jay Noem.

P. 13: top to bottom: first photo by Brenda Flottmeyer, Lead Project Engineer, Rapid City Area; second by Rich Marsh, CETEC Engineering Services, Rapid City; third by Custer

Area Office; fourth by Steve Palmer, Engineering Supervisor, Rapid City Area.

P. 15: from the Project Development Office.

P. 16: by Tom Gilsrud, Bridge Maintenance Engineer.

P. 17: by Jay Larson, Mitchell Region Bridge Specialist.

P. 19: from Winner Area.

PP. 20-21: by Bolding.

P. 22: left to right: Sandal; Kevin Tveidt, Transportation Specialist, Office of the Secretary; and Bolding.

P. 23: Diagram, map and photograph courtesy of U.S. Geological Survey.

P. 24: Top photo by Yankton Area Engineer Ron Peterson; bottom photo by Bolding.

P. 25: by Tim Huffman, Winner Area Highway Maintenance Supervisor.

P. 26: by Sandal.

P. 28: by Bolding.

P. 29: top photo by Bolding, second and third photos by Harry Johnston, Custer Area Project Engineer.

PP. 30-31: by Bolding.

Back cover: by Sandal.

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(605) 773-3265

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Gearing up for winter



DOT trucks roll through all four seasons, but when winter approaches, they need to be outfitted with de-icing equipment and plows. Here Pierre Area Operations employees attach those pieces: first, the unit that dispenses salt and de-icing solution; second, the plow; and, finally, the side plow. Functional equipment is essential to DOT operations when snow falls and ice forms. The

speed at which roads are cleared of snow, and de-icer is applied depends on it. A computerized equipment management system tracks the condition and age of equipment, so items can be replaced when it's more cost-effective to get new equipment than keep repairing old equipment. Local governments in the state get the first chance to buy used DOT equipment before it is sold as surplus.