

Better lives through better transportation

South Dakota
Department of Transportation

2018 Annual Report





2018 Annual Report

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Mission

To efficiently provide a safe and effective public transportation system.

Vision

Achieve excellence in providing transportation facilities that meet the needs of the public.

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Better lives through better transportation

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Secretary's message

As highways, bridges and rail service in South Dakota improve, so do our economy and quality of life. At the South Dakota Department of Transportation, we call this “better lives through better transportation.”

You may already have noticed that most state highways provide smooth rides. Eighty-eight percent of our state highways, including the Interstates, are rated good to excellent. Ninety-seven percent of state-owned bridges are in fair or better condition.

State residents living or doing business in Brookings, Spearfish, Sioux Falls or Rapid City are driving through new interchanges designed to keep the growing number of cars and trucks moving. Residents and tourists are enjoying a redesigned, reconstructed Mount Rushmore Road (U.S. Highway 16).

In counties and cities, planning has begun for construction or repair of dozens of local bridges that carry daily traffic, heavy farm equipment and emergency vehicles.

New grain elevators continue to rise near state-owned and private rail lines as a result of rail-line improvements or with the help of a State Highway Fund loan for a road to the facility. These elevators move grain and soybeans faster and cheaper, and compete for farmers' business with increased prices, financially benefiting our agricultural producers.

Rumble strips and stripes along state highways throughout South Dakota have saved lives and reduced crashes. We've also decreased crashes with wider shoulders on rural two-lane highways, high-friction surface treatments and regraded inslopes. Use of center-line rumble stripes shows promise in reducing head-on crashes.

Along with ongoing efforts in public transit and aviation, these projects help South Dakotans get where they want to go with greater safety and help businesses move supplies and products.

Sometimes it's hard to see the connection between a well-managed transportation system and a high quality of living and good business climate, but the link can be measured and experienced. At SDDOT, we're happy to have achieved so much since 2015, when South Dakotans decided to continue investing in better lives through better transportation.

Sincerely,



Darin P. Bergquist



Executive Summary

2018 Report

Performance Measures

	2018	2017	2016	2015
Interstate pavements in good-to-excellent condition, % of	88.3	86.1	81.0	91.3
Non-Interstate pavements in good-to-excellent condition, % of	87.5	86.0	83.1	82.2
State-owned bridges in fair or better condition, % of	97.3	96.9	96.3	96.1
% of state-owned system improved	28	19.6	28.1	33.7
Fatal crashes	109	111	103	116
Public transit rides* (millions)	1.63	1.74	1.71	1.68

**Excludes the Deadwood Trolley, and urban transit systems in Sioux Falls and Rapid City*

	2015	2011	2006	2004	1999
Customer satisfaction	75%	82%	81%	78%	60%

Pavements

As of 2018, 88.3% of Interstate and 87.5% of non-Interstate highway pavements were in good-to-excellent condition, meeting the current SDDOT strategic plan goal of keeping 80% of Interstate and 75% of non-Interstate pavements in good-to-excellent condition through Dec. 2019.

Bridges

In 2018 97.3% of the 1,795 state-owned bridges on the National Bridge Inventory were in fair or better condition, meeting the SDDOT strategic plan goal of 95% or more in that condition through Dec. 2019.

Percentage of State Highway System Improved

A total of 2,211 miles or 28% of the State Highway System was substantially improved in 2018. Improvements can be pavement or bridge construction or reconstruction, pavement overlays, chip

seals, shoulder work, lighting, pavement markings, culvert work traffic signals or signs.

Fatal crashes

There were 110 fatal crashes in 2018. The current SDDOT strategic plan is to decrease these to 92 by 2019. The people who died numbered 130. South Dakota's 2018 fatality rate per 100 million vehicle miles traveled was 1.34. The 2017 national rate was 1.16.

Rail service

Two state rail plan improvement projects were completed in 2018 that increased rail capacity for ag shippers. A 7,000-foot siding near Philip was built that allows more traffic on the Rapid City, Pierre & Eastern (RCPE) line from Rapid City to Pierre. Heavier, continuous-welded rail replaced lighter jointed rail on 10 miles of RCPE-owned rail line near Huron.

Public transit

Rural public transit services provided 1,431,321 rides; 199,338 rides for senior citizens and persons with disabilities were provided by specialized services. Total: 1,630,659.

Aviation

\$22.3 million was awarded for airport improvements throughout South Dakota. Work began on a new 10-year state aviation plan.

Division Director m

Although highways and bridges continue to be our biggest assets, we work diligently with our partners in the aeronautics, railroad and public transit modes of transportation. The Aeronautics Commission approved \$1.2 million in state funding to leverage



Joel Jundt
Deputy Secretary

\$20 million of federal funds to expand and enhance South Dakota airports. For details, see the Aeronautics section on p. 24. The upgrade of the state-owned rail line from Mitchell to Rapid City (MRC) continues to provide an economic return. Dakota Mill & Grain completed a new grain terminal in Presho this past year, the third agricultural facility built along the MRC in recent years. The new terminal reduces truck traffic on our highways and freight costs for farmers and shippers. We have worked with public transit providers to secure federal grants to construct new and/or remodel existing transit facilities, enhancing their ability to serve the public. Volunteer consolidation of nonprofit public transit agencies aims to reduce administrative costs, so dollars saved can be invested in other areas of these services. We also have worked very hard in 2018 to improve our roads and bridges while maintaining a state of good repair. All this work in South Dakota, across all transportation modes, culminates in better lives through better transportation!

“Exemplary and transparent public service” is one of the SDDOT’s core values.

While employees provide exemplary and transparent service as they design bridges and roadways, administer projects in the field, perform maintenance and operate the



Greg Fuller
Operations Division Director

State Highway System, I’ve developed immense pride in how, day after day, year after year, they go above and beyond their job duties. Probably the most notable recent example occurred Aug. 15, 2018, when five SDDOT maintenance workers saved a young man who was trying to end his life by jumping off a bridge into traffic. They were truly heroic, and there are so many other instances of SDDOT employees assisting a stranded motorist, helping travelers change a tire, rescuing people in the wee morning hours during a blizzard, raising funds for charities and volunteering in their communities. SDDOT employees not only make “Better Lives through Better Transportation” by excelling at providing our services, but also truly care about those we serve and go above and beyond those services to enrich the lives of others.

Managing a transportation system built over a century requires a solid inventory and good long-term planning. Over the last year the SDDOT developed a Transportation Asset Management Plan (TAMP) with help from over 30 persons with deep knowledge and experience



Mike Behm
Planning and Engineering
Division Director

in our asset management enterprise. The SDDOT first developed formal pavement management processes, including objective condition assessment and economic analysis, in the 1970s and led development and application of pavement condition assessment equipment. For 25 years, the SDDOT has used long-range network optimization to develop strategies and capital improvement programs for pavement rehabilitation, repair and reconstruction. As bridge management software became available, the SDDOT applied similar rigor to management of structures. As much as any state DOT in the U.S., the SDDOT has embraced, developed, refined and used asset management to fulfill its mission and responsibilities to taxpayers and highway users. The TAMP explains pavements and structure management processes and describes the present condition and outlook for these important assets. The plan not only represents our response to federal requirements, but also articulates our dedication to sound asset management principles and commitment of resources.

As the department continues its journey with the Baldrige criteria, we continue to emphasize enhancing efficiencies by focusing on process reviews. As laid out in the Strategic Plan, one of the strategic objectives is to improve the efficiency, quality and timeliness of our services. As a result of this, the SDDOT has engaged staff to



Kellie Beck
Finance and Management
Division Director

embark on process reviews, big or small, that will improve the timeliness and efficiency of our services. A kaizen event was held to review the pipe culvert repair/replacement process. Kaizen is a facilitated approach to creating continuous improvements based on the idea that small, ongoing, positive changes can lead to major improvements. The pipe culvert process was documented by key staff, and the facilitated discussion led to a new and improved workflow and decision tree. As a result of this review, enhanced processes will be developed, resulting in efficiencies for the SDDOT. There have been other successful process reviews the SDDOT and individual offices have embarked upon, such as streamlining construction change order approval and environmental clearances and the timely processing of partsroom vouchers. These process reviews help move the agency forward in achieving its mission and objectives as outlined in the Strategic Plan.



Clockwise from left: (1) Piers for the new bridge over the Ellis & Eastern Railroad line rose in 2018. The bridge will connect the reconstructed Interstate Highway 90 Exit 402 interchange in Sioux Falls with Veterans Parkway, the beltway east of I-229. (2) A commercial truck passes one of the newly installed flashing beacon signs at U.S. Highway 281 and state Highway 20, a safety project aimed at preventing crashes where the two-lane Highway 20 intersects with the divided four lanes of Highway 281. Grain trucks are frequent intersection users. (3) Concrete is poured for the Interstate Highway 29 overpass at Sixth Street in Brookings. The award-winning Exit 132 project made it easier to safely navigate this busy commercial area.

Better lives through better transportation

Large projects, safety efforts and local bridge program are improving transportation in South Dakota

South Dakotans have seen some big changes in transportation in the last several years.

Reconstructed Interstate highway interchanges in Brookings, Rapid City, Sioux Falls and Spearfish are efficiently channeling growing passenger and freight traffic.

Automobile and truck drivers on our Interstate and other state highways are experiencing very smooth pavements. Eighty-eight percent of our Interstate highway and other state highway pavements are in good-to-excellent condition. Ninety-seven percent of State Highway System bridges are in fair or better condition.

New grain elevators sprouted after improvements to state-owned and private rail lines. Farmers' cost per bushel to move corn, wheat and soybeans by rail has decreased, and more elevators compete for their business with better prices, putting more money in producers' pockets.

And some South Dakotans are alive or uninjured because rumble strips lining state highways alerted them to potential danger in time for corrective action.

All these improvements make it easier, faster, less costly and safer for state residents to get where they're going and for businesses and agricultural producers to move products and receive supplies. Simply put, South Dakotans are living better because transportation in our state is better.

Revenue increases key to funding big projects, more local bridge work

The additional funding provided by the gas tax and excise tax increases approved by the 2015 Legislature allowed more highway projects to move ahead in the South Dakota Department of Transportation's prioritized lists of projects. This increased funding also made it easier to balance the needs of economic centers

with rural areas, while keeping the system's 7,794 miles of pavement and 1,795 bridges in overall good condition. SDDOT and other state DOTs struggled through much of the 2000s and 2010s with funding levels decimated by construction cost inflation, which forced an emphasis on preservation of existing pavements and bridges.

155 county and city bridge projects receive BIG grants

The 2015 legislation that increased revenues for the State Highway System also increased much-needed highway and bridge funding for local governments and created the Local Bridge Improvement Grant (BIG) program to repair and replace deficient bridges on local roads. A total of 155 projects in 41 counties and 11 cities received grants between 2016 and 2018.

Large bridge reconstruction projects ahead

The large reconstruction projects mentioned earlier and additional capacity projects now underway are being built during a brief period of financial feasibility. Two Missouri River bridges and many Interstate Highway 29 and Interstate Highway 90 bridges are nearing the end of their service lives and will need to be reconstructed in coming years. Balancing those big-ticket items with the ongoing expense of keeping the entire State Highway System in good condition is one of the difficult tasks ahead.

IT will shape future transportation

A concept called Transportation Systems Management and Operations (TSMO) offers the potential of improving transportation in South Dakota further by focusing on safety, real-time flow of traffic and avoidance of problems that might delay motorists, such as congestion during special events and slow-downs from flooding and crashes. Information technologies, including those involving connected and autonomous vehicles, will be integral to those efforts.

Federal funding could drop, remain the same or increase in 2020

As always, federal funding is vital to maintaining the state's transportation system. Federal funding provides three-quarters of South Dakota's highway construction budget and needs to increase in order to maintain highways and bridges in good condition. The current federal highway bill, called the FAST Act, expires in Sept. 2020. Already South Dakota's congressional delegation is working with other rural states to increase funding for their extensive systems.

Better lives through better transportation

Statewide installation of edge-line rumble strips, other safety projects are saving lives and preventing serious injuries

Addition of 1,700 miles of shoulder rumble strips and edge-line rumble stripes on South Dakota state highways has reduced road departure crashes by 20%.

This reduction has prevented approximately 100 injuries on our roadways or about 20 fatal and serious-injury crashes in South Dakota since the rumble strips and stripes were installed.

“Those are real people that are getting home safe, to their family or to their destination,” said Mike Behm, Planning and Engineering Director at the South Dakota Department of Transportation.

Safety is a mission and a core value for SDDOT employees. The safety projects they’ve recently completed with the Federal Highway Administration are part of a 15-year decrease in fatalities, fatal crashes (in which more than one person may have died) and injury crashes in the state.

“Our Department of Public Safety and emergency medical services also have a critical role in providing a safe system. We’re seeing a significant reduction in our fatal crashes across the state, yet nationally there’s an uptick. In 2014 to 2015, fatal crashes increased 8.3% nationally. Then in 2015 to 2016, it was up another 5.8%. So nationally we’re seeing an increase in fatal



Rumble strips line both sides of the northbound and southbound lanes of U.S. Highway 83, a newly resurfaced divided highway in Stanley and Lyman counties.

crashes, yet South Dakota continues to buck the trend. I think a lot of the work our team has done by improving roadway facilities and helping with driver behavior has resulted in fewer fatalities,” Behm said.

In South Dakota, fatal crashes dropped 7.2% in 2015, 11.2 % in 2016 but increased 7.8% in 2017. That’s a three-year rolling average of 3.2% fewer fatal crashes a year. Rolling averages are used to smooth out fluctuations that obscure a general trend.

The SDDOT set quantifiable goals in detailed strategic highway safety plans created in 2008 and 2014. Those goals were included in the SDDOT’s overall strategic plans. Rumble strip and stripe projects were programmed to reduce the most common fatal crash in the

“Those are real people that are getting home safe, to their family or to their destination.”

— Mike Behm, SDDOT Planning and Engineering Director

state, a single vehicle leaving its lane, going past the shoulder and rolling. The vast majority of the State Highway System’s 7,794 miles are now lined with “rumbles.”

The 2018-2019 SDDOT strategic plan aims to reduce fatal crashes by 26%, or 125 to 92, and serious-injury crashes by 13%, or 596 to 522, by December 2019.

“We’re seeing a diminishing amount of fatalities and accidents here, which the only reason I can think of is because of the efforts at the DOT here and the Division office towards reducing those accidents and fatalities,” said Kirk Fredrichs, South Dakota Division administrator for the Federal Highway Administration, told the Transportation Commission. “Kudos to the DOT for everything that you do here.”

More safety-increasing projects

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- Region major projects, pages 17- 22

Better lives through better transportation

SDDOT's innovative use of high-friction surfaces is preventing winter crashes, wins award

High-friction surface treatments on bridge decks and high-speed highway curves have reduced crashes during wet weather across the nation.

Why not install them on high-speed highway curves in South Dakota to prevent crashes during winter weather? SDDOT safety engineers asked.

In 2014 the department put its idea to the test, applying a "glue" to two curves on Interstate Highway 229 in Sioux Falls and two more on U.S. Highway 14A in Boulder Canyon near Deadwood. Specially engineered small, angular bauxite chips were spread on the glue.

Crashes were reduced by 80% on the four I-229 and U.S. 14A curves, extraordinary for

a safety project. The department predicts the 16 additional locations in the Black Hills area that received high-friction surface treatments in 2017 will save \$88 million in societal costs over 10 years. Black Hills winter weather, curving roads and high numbers of motorcyclists combine to create many crash-prone locations.

In June 2018 the 2017 projects won a "Best Use of Technology & Innovation" award at the Western Association of State and Highway Officials annual conference held in Rapid City. Now attendees from 17 other states are taking the idea home to prevent more crashes.

"Through our installation and great results, we're seeing other states jumping on board and looking at using this treatment to reduce

crashes that occur during winter-weather events. This is an area where the state of South Dakota is leading," said Mike Behm, SDDOT's Planning and Engineering Director.

The 2017 locations include segments of U.S. 14A, U.S. Highway 85 and U.S. Highway 16, plus the U.S. Highway 18-state Highway 79 junction, the eastbound Interstate Highway 90 curve northwest of Tilford and the I-90 Exit 63 westbound on ramp.

Unfortunately, high-friction surface treatments are too expensive to use on every state highway curve. Locations with crash histories have the best benefit-cost ratios. Because the aggregate will be lost or removed over time by heavy traffic and snowplow blades, the SDDOT is monitoring aggregate loss on the treated segments.



Calcined bauxite aggregate used for high-friction surface treatments



A high-friction surface treatment being added to a Black Hills highway curve in 2017

Better lives through better transportation

Widened shoulders are making rural two-lane highways safer across the state



2018 shoulder-widening project in Perkins County

Rural South Dakota residents concerned about safety often ask SDDOT to widen the shoulders of two-lane state highways serving their communities.

Widening shoulders hasn't been an easy request to fill, because the necessary regrading of the slope beyond the pavement edge is expensive, and SDDOT has had limited funding to spread across a 7,794-mile system.

Gas and motor vehicle excise tax increases that were approved by the 2015 Legislature have helped maintain funding for shoulder-widening projects.

One economical way to design these projects is to widen the roadway while leaving the existing lanes in place. This cuts the cost significantly when contrasted with reconstruction.

Twelve widening projects have been completed or gotten underway since 2000.

Like high-friction surface treatments, the benefits have been dramatic: On 36 miles of state highways 73 and 20 in Perkins County, run-off-the-road crashes have dropped 80% since shoulders were extended to four feet in 2012 and paved in 2013.

"We are pleased with the reduced crash rates on our shoulder-widening projects. These projects are key to our strategic goal to reduce fatal and severe-injury crashes," says Todd Seaman, Rapid City Region Engineer.

Wider shoulders provide more area for drivers who've left driving lanes to correct their courses, and for maintenance and law enforcement personnel to perform their duties. People who walk, jog or bicycle on wide shoulders feel safer, too.

Seventeen more widening projects are scheduled over the next seven years.

U.S. 12 center-line rumble stripes between Ipswich, Aberdeen preventing crashes

Nine people died in six head-on crashes and one side-swipe crash on U.S. Highway 12 between Ipswich and Aberdeen from 2013 to 2016.

Residents wanted the SDDOT to do something about it, but preventing this type of crash, which can be caused by distracted driving, wasn't an easy problem to solve.

After investigating the crashes and roadway, SDDOT decided to grind center-line rumble stripes into the asphalt concrete. They're called

stripes—with an added "e"—because the series of grooves are painted like pavement markings. Like shoulder rumble strips, they alert drivers that the vehicle is straying out of its lane—in this case into oncoming traffic.

"I have heard positive comments as well as some that don't like them," Aberdeen Region Engineer Jeff Senst says. "The negative comments are related to motorcyclists passing, snow and ice being thrown up by traffic following an event, and

noise. The positive is we have not had any head-on crash fatalities since installation [in 2017]."

In addition to the problems noted by Senst, and because of cost, center-line rumble stripes are not appropriate for the entire State Highway System.

New passing lanes, new lighting and intersection improvements on this segment are scheduled for 2022.

Interstate rest area revitalization progresses

2018 was a big year for rest area projects. Reconstruction of the west-bound rest area, welcome center and port of entry on Interstate Highway 90 at Valley Springs began. So did reconstruction of the northbound Interstate Highway 29 rest area and welcome center at Homestead, near Vermillion Exit 26. Construction of a welcome center addition to the I-29 rest area near Wilmot also got underway.

The work is part of a comprehensive effort by the SDDOT and state Department of Tourism to reconstruct or update aging facilities where I-29 and I-90 motorists enter the state.

“I’m confident the new and improved facilities will meet the needs of travelers, including those with disabilities, who need a break from driving,” said Governor Kristi Noem. “These new welcome centers will help visitors learn about all that South Dakota has to offer, including national and state parks, arts and culture, unique dining locations, exciting events and hunting opportunities. These new centers will inspire visitors to try new things, extend their vacations or make return visits to our great state in future years.”

More than 700,000 out-of-state

motorists, state residents and truck drivers used state Interstate rest areas in 2015, according to a survey of 13 of the 21 rest areas done before work on the rest area plan started.

Rest areas will get various improvements, including Americans with Disabilities Act (ADA) upgrades such as push-button doors, security camera system upgrades, family restrooms, new tiling, new sinks or new lighting over the next several years.

To date, the Wasta rest areas have been remodeled with the addition of family bathrooms meeting ADA requirements. Rest areas at Belvidere, Presho and Salem will be remodeled in 2020 and 2021.

Chamberlain's rest area is the state's signature welcome center and needed little updating. Old sidewalk was removed in 2017 and replaced, along with new sidewalk to the Dignity statue.

The SDDOT is monitoring use of rest area truck parking spaces by commercial freight haulers. Freight traffic is growing, which is increasing truck parking use. During evening hours, truck parking demand currently exceeds capacity at some South Dakota rest areas. The SDDOT is planning projects to address future truck parking demand.



Above: the future Valley Springs rest area, welcome center and port of entry building, to open in 2020. Below: the Homestead rest area and welcome center, scheduled to open in the late spring of 2019.



Better lives through better transportation

Rapidly evolving technologies will continue to change travel in South Dakota—and the agency that manages state highways

Ensuring the safe and smooth flow of traffic in real time is an increasingly important part of what the South Dakota Department of Transportation (SDDOT) does.

"We're good at reporting road conditions. That's a real success for us. We're good at putting on construction project information [on SafeTravelUSA.com, 511 and ClearPath 511]. I think in those two areas we excel," says Dave Huft, SDDOT's longtime head of research and point man for transportation system management and operations.

Evolving and existing information technologies (IT) can further improve safety and traffic flow—again, in real time—but the possibilities are so numerous, contingent on developments in IT, varied, complex and in some cases costly that Huft struggles to sum them up.

He is sure, though, that more and improved services in transportation systems management and operations (TSMO, commonly pronounced "tizmo") are coming, and that providing those services will create widespread changes in the way SDDOT operates.

SDDOT to inform travelers of crashes that partially or fully close roads

One of his first examples is incident management. Although the Highway Patrol, part of



Dynamic message signs like this one near Oa-coma are part of SDDOT efforts to inform the traveling public of real-time road conditions.

the Department of Public Safety, is responsible for managing crashes, SDDOT is working with the Highway Patrol to have crash and incident information automatically added to SafeTravelUSA.com and 511 services. With this information, drivers can avoid segments partially or completely closed to traffic due to crashes or other causes.

Highway Patrol troopers and SDDOT staff also collaborated recently on training to clear crash scenes more quickly and promote the safety of emergency responders.

Fiber-optic cable can help improve reliability

To provide new and better services, SDDOT will need a bigger data pipeline, Huft says. You may notice construction workers burying fiber-optic cable for SDDOT operations during pavement resurfacing or reconstruction work in the future.

Current services such as the road cameras use less-reliable wireless cellular services with limited bandwidth that incur monthly fees from carriers. Fiber could allow the state to monitor traffic with high-definition video and perform many other data tasks without ongoing fees. The city of Sioux Falls already uses fiber to link to its traffic signals and installs fiber along its streets.

New responsibilities will mean new challenges

While these technologies are designed to be easy for drivers to use, deploying them on the State Highway System will be challenging. Part of the challenge is these technologies are evolving. No one knows how "driverless" vehicles really will be and how they'll connect to infrastructure and other vehicles.

For example, two platforms are being developed to enable vehicles to communicate with infrastructure such as traffic signals. Because they're incompatible, officials hesitate to

implement the technology until one platform becomes the standard. No agency wants to install expensive systems that might need to be replaced in a short time frame.

Maintenance workers have been the first group to prioritize real-time traffic management

Updating road condition information is now one of the first duties of maintenance workers preparing to plow snow or de-ice pavements. Under SDDOT's performance standard, a first report goes out by 7 a.m., a midday report between 11 a.m. and 1 p.m., and a final report between 4 and 7 p.m. Weekends and holidays, the standard is a report before 9 a.m. and another between 4 and 7 p.m. If conditions change, more updates may be made.

"Our customers are the traveling public, and a lot of them rely on the 511 system, so it needs to be accurate to the best of our abilities," says Loren Haynes, Lead Highway Maintenance Worker in Martin. "It is always in the back of my mind, with changing weather, if I need to update, whether it be the weekend or after hours sometime."

He gets frustrated when drivers don't check the system or ignore what it says and end up stranded or stuck in a snowdrift, requiring emergency assistance that endangers SDDOT personnel who should be doing other work. "It takes a lot of extra time and responsibility for someone to get up early and update the system," Haynes says.

IT functionality to become part of project planning

Other personnel will eventually join maintenance workers in prioritizing the real-time flow and safety of state traffic. For planning and programming personnel, this may start with incorporation of fiber-optic cable and other IT components into pavement and bridge projects.

Should State Highway System traffic signals communicate with vehicles?

Most of the possible IT-enabled improvements will require extensive discussions among SDDOT personnel and other transportation stakeholders. Again, traffic signals are a good example. In the future with connected infrastructure, traffic signals will communicate with vehicles and slow vehicles down if they are unable to clear an intersection before the signal changes. This capability could prevent fatal crashes and serious injuries, but it would cost about \$10,000 per signalized intersection. Should SDDOT use this technology? If so, at which intersections?

Advancing transportation safety and mobility

South Dakota operates a temporary traffic operations center (TOC) during the Sturgis Motorcycle Rally each August. SDDOT employees monitor live video of traffic at various Black Hills chokepoints and manually change



Trucking firms that comply with weight restrictions and safety laws can frequently bypass weigh stations. The gantry on U.S. 14/83 near Blunt identifies trucks by license plate number. This technology saves the trucking industry about \$2.50 per minute in avoided stops.

traffic signal timings to keep traffic moving.

Sioux Falls has a small, year-round TOC where city traffic engineering staff monitor congestion and crashes at busy intersections via video feeds from cameras mounted on traffic signals. "They used it during the flooding event last week [immediately after the March 2019 blizzard], so they were using intersection cameras to look at flooding, Huft says.

These TOCs provide opportunities to monitor traffic and conditions in real time, enhancing safety and mobility.

continued on p. 28

Local Bridge Improvement Grant (BIG) fund projects



This new Moody County bridge is on 223rd Street over the Big Sioux River, about 11 miles west of Ward.



A recent polymer chip seal of this Meade County bridge deck and repainted railings will lengthen its service life. The bridge is on Alkali Road over the Belle Fourche River, three miles west of Hereford.



The spindle railings on the new Pine Street bridge over Marne Creek in Yankton echo the design of the century-old structure it replaced. The city of Yankton paid more than the required 20% in matching funds for the enhanced aesthetics of the new structure.

43 local bridge grants awarded in 2018

Twenty-six preliminary engineering grants, nine preservation grants and eight repair/replacement grants totaling \$8.5 million were awarded to counties and cities from the Local Bridge Improvement Grant (BIG) fund in 2018.

More money will be awarded in 2019 because the former local bridge program will have completed its backlog of projects. The \$8 million in State Highway Fund money used for the old program now becomes part of the BIG program.

Although the yearly amount available for grants will be \$15 million, totals will vary year to year because some awardees decide not to go forward with bridge projects, and the money is re-awarded to other local governments.

The Transportation Commission awarded \$26 million in BIG grants from 2016 through 2018. New preservation and repair/replacement grants are awarded each April; preliminary engineering grants are awarded in August.

For more info and an interactive map with information about all current and completed projects go to: <http://www.sddot.com/business/local/big/Default.aspx>.



This new Grant County double-barrel box culvert is on 482nd Avenue over a creek. It is a half-mile south of Revillo.

Pavements

Designing and maintaining pavements built on unstable clay-type soils

South Dakota is No. 1 for swelling clay-type soils.

This distinction is not celebrated by the South Dakota Department of Transportation's employees, who must design and maintain roads over unstable "gumbo" soils that swell or shrink in response to abundant water or drought. Volume changes in foundation material can lead to cracking in the pavement above.

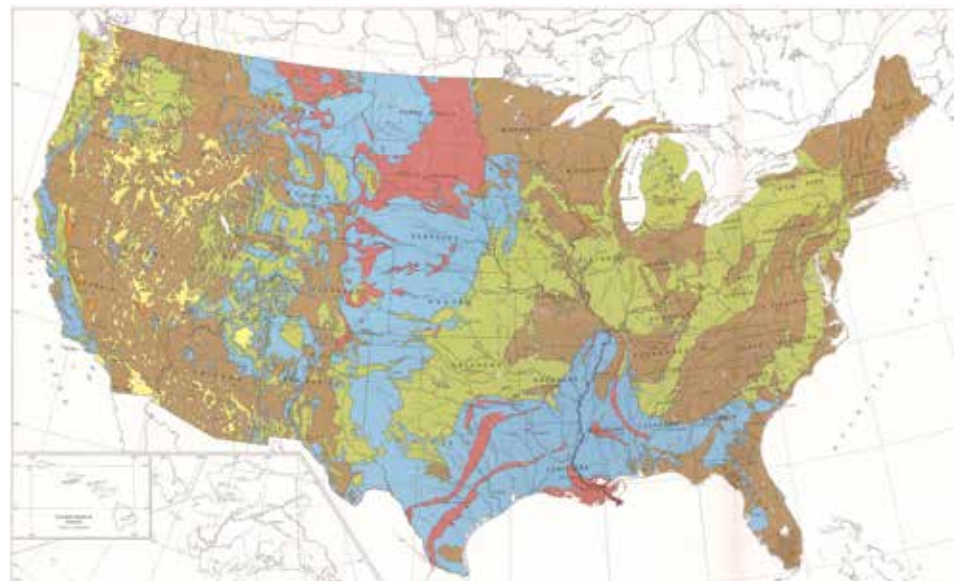
The terms clay-type, gumbo or shale soils are used interchangeably, but Pierre Shale is the formal name of a geological formation of clay-rich material stretching from Canada to New Mexico. It was created by particles that fell to the bottom of the Western Interior Seaway during the Upper Cretaceous Period, when dinosaurs roamed North America.

"Nearly all of western South Dakota is composed of highly expansive Pierre shale," says Geotechnical Engineer Kevin Griese.

"Field investigations and testing of the subgrade soils are important steps in the design process for grading projects. Determining soil classifications, liquid limit and plastic indices help refine construction specifications. Undercutting expansive soils—reworking and replacing at controlled moisture and density—is key to improving performance and longevity of the subgrade."

"Our number-one priority with maintenance is to try and keep the top surface sealed up nice so that water cannot penetrate below," says Winner Area Engineer Doug Sherman.

Despite those efforts, pavements inevitably crack due to repeated use by heavy vehicles, temperature changes over decades and moisture eventually infiltrating the road foundation.



Above: The red portions of this map show areas of the United States where 50 percent or more of the soils are known to have high swelling potential. South Dakota and North Dakota have high percentages of these soils. Below: State Highway 34 near the Missouri River in Hughes County before a 2015 resurfacing. The area's clay-type soils cause cracking. Roads built on them require continuous crack sealing.





Above: A steel girder on the Hartford exit overpass damaged by an Aug. 2016 hit. Right: Damage to the same bridge in 2014. The total for heat-straightening steel girders and replacing other bridge parts for both hits was more than \$1 million.

Bridge hits a growing problem in S.D., other states

Whack-a-bridge isn't a game. It's a growing problem for the SDDOT that costs state taxpayers big money.

Bridge hits by trucks hauling over-height loads have grown from two in 1991 to 13 in 2016.

Two hits of the Interstate Highway 90 overpass near Hartford show how expensive repairs can be. A 2014 hit cost \$681,000. A 2016 hit did \$397,000 more in damage. Hits don't just make the bridge look beaten up. They can affect the structure's ability to carry vehicles.

Sometimes those responsible for bridge hits are

identified and billed for repairs, as was the case with both Hartford bridge hits. Others slip away, sticking taxpayers with the bills and reducing the funding available to build new bridges and repair existing ones.

Taxpayers also pay for the problem with their time. Traffic on damaged bridges can be reduced to one lane or halted altogether until bridges are inspected and repaired, resulting in delays and long detours.

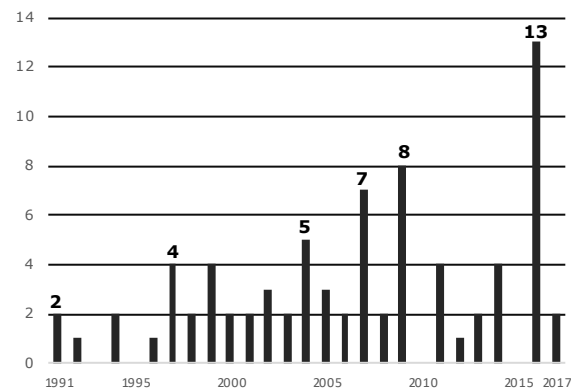
State law requires a commercial hauler with a vehicle or load height exceeding 14 feet to obtain an oversize permit specifying allowed height

and a safe route, but some haulers don't bother, don't know loads are too high, improperly measure or monitor load heights, or don't adequately restrain equipment such as backhoes that can come loose en route and strike a bridge.

Other states also are seeing more bridge hits as freight traffic increases, some semi drivers use GPS devices meant for cars and pickup trucks, and less-experienced drivers are hired as the freight industry deals with a labor shortage.

SDDOT officials have been discussing the issue with other state transportation officials, but a comprehensive, safe, and cost-effective solution or technology has yet to be developed.

Bridge hits* on state highways, 1991-2017



*Year can be when hit was found during an inspection or when the strike occurred.
Source: Office of Bridge Design

Aberdeen Region



New collision warning system at U.S. 281-S.D. 20 intersection

Farmers use U.S. Highway 281 and state Highway 20 to transport grain to the region's many elevators. Because U.S. 281 is a rural divided four-lane highway, it has a higher potential for severe, high-speed angle crashes as vehicles turn from one route onto the other. To reduce that potential, the SDDOT installed an intersection collision warning system, activated in July 2018. As traffic approaches the intersection, pavement sensors trigger flashing lights warning them of vehicles approaching from the opposing route. A similar system was installed in 2017 at the intersection of state highways 46 and 37 in Bon Homme County.

U.S. Highway 281-S.D. 20 intersection

2016 average daily traffic (ADT)	1,415	+18%
2036 ADT	1,673	

Trucks make up 23% of traffic.



SE Watertown gets 1st roundabout on state system
 Roundabouts can be controversial when proposed, but after construction they save lives, prevent serious injuries, reduce congestion and cut automotive emissions. The first State Highway System roundabout was built at U.S. Highway 81 and Watertown's South Connector (20th Avenue Southeast). It opened for traffic on Aug. 7.

U.S. 81 north of 20th Ave. SE

2015 average daily traffic (ADT)	5,609	+45%
2040 ADT	8,133	

S.D. Highway 37 resurfaced from Groton north

Twenty-three miles of state Highway 37, from U.S. Highway 12 near Groton north to state Highway 10, were milled and resurfaced with asphalt concrete. Riprap on the inslope was covered at two locations to improve safety. New bridge and approach guardrail also was installed.

S.D. Highway 37 from Groton to south of Hecla

2016 average daily traffic (ADT)	947	+30%
2036 ADT	1,235	



U.S. 14 between Lake Preston and Arlington resurfaced
 This project milled off 0.75 inches of the asphalt concrete surface and placed a fresh layer of smooth asphalt concrete. Below the asphalt concrete is the original portland cement concrete pavement, constructed in 1976. The eight-foot shoulders on each side also were milled and resurfaced with asphalt concrete.

U.S. 14 between Lake Preston and Arlington

2016 average daily traffic (ADT)	2,038	+16%
2036 ADT	2,369	

I-29 southbound lanes in Roberts County resurfaced

Fifteen miles of deteriorated portland cement concrete (PCC) pavement on the southbound lanes of Interstate Highway 29 in Roberts County were overlaid with more PCC. Five bridge decks received life-extending polymer chip seals and updated guardrail. The project, stretching from exits 224 to 242, was substantially complete in Nov. 2018. The Exit 232 detour ramps will be completed in 2019.

I-29 southbound lanes between exits 224 and 242

2015 average daily traffic (ADT)	2,548	+30%
2035 ADT	3,318	





2018 major state projects

Mitchell Region

Structures for Exit 402, Veterans Parkway traffic take shape

A reconstructed Interstate Highway 90 interchange that will make it easier for freight and passenger traffic to access and exit eastern Sioux Falls using the new Veterans Parkway began construction in the fall of 2018. The Exit 402 interchange's original two-lane overpass is being replaced with a single-point four-lane bridge. A flurry of other structures work preceded the start due to the need to realign a curving Timberline Avenue segment, including reconstruction of bridges over the Big Sioux River and the BNSF Railway and Ellis and Eastern rail lines. The U.S. Department of Transportation, with the support of South Dakota's congressional delegation and governor, provided \$21 million in Infrastructure for Rebuilding America funding toward the \$55 million cost of the interchange, the SDDOT's costliest project to date, scheduled for completion in 2020.

2015 average daily traffic (ADT)	2,729	
2035 ADT	4,029	+48%

State Highway 37 gets PCC overlay

Five miles of the southbound lanes and three of the northbound lanes of divided South Dakota Highway 37 from the Mitchell airport to the Sanborn County border were overlaid with portland cement concrete in 2018. Low-slump dense concrete overlays were placed on the decks of the two bridges over Dry Run Creek, a James River tributary, plus new approach slabs. The work will maintain good driving conditions into Mitchell and extend the service lives of both structures.

2015 average daily traffic (ADT)	3,327	
2035 ADT	4,881	+47%



Arrowhead Parkway widened in Sioux Falls

The SDDOT and city of Sioux Falls are working together to reconstruct and widen Arrowhead Parkway, also known as state Highway 42, as traffic grows in the surrounding areas. Paving between Sycamore and Highline avenues was completed in 2018, but rainy weather pushed work on the curbs and shared-use path south from Highline into 2019. Paving is scheduled to continue on to just west of Six Mile Road in 2021.

2014 average daily traffic (ADT)	17,900	
2040 ADT	41,700	+133%

I-29 resurfaced between Beresford and Canton

Interstate Highway 29 driving lanes and shoulders from north of Beresford Exit 47 to south of Canton Exit 62 were milled and resurfaced with asphalt concrete for a smoother, more durable surface. Ramps and crossroads at exits 50, 53, 56 and 59 were chip-sealed. New guardrail will increase safety. Erosion and drainage problems were fixed at 29 locations throughout the project.

	I-29 South		I-29 North	
2015 average daily traffic (ADT)	7,776		7,775	
2035 ADT	13,772	+77%	14,305	+84%



U.S. 18 segment being reconstructed

Regrading of U.S. Highway 18 in Turner and Hutchinson counties began in 2018, the first step in reconstructing it between U.S. Highway 81 and state Highway 19. The road is closed until interim surfacing is completed in 2019. Asphalt concrete paving is scheduled for 2020. Work includes construction of a 173-foot continuous-concrete bridge over Turkey Ridge Creek and nine box culverts.

2016 average daily traffic (ADT)	839	
2041 ADT	914	+9%



State Highway 44 in Douglas County resurfaced

Deteriorated driving surfaces and shoulders on state Highway 44 necessitated this 15-mile asphalt concrete pavement resurfacing project between state Highway 50 and U.S. Highway 281 in Douglas County. The existing asphalt concrete surface was cold-milled, and some of the millings were recycled into the smooth new asphalt surface. Resurfacing lengthens the service life of the underlying asphalt concrete on this segment.

2016 average daily traffic (ADT)	1,374	
2036 ADT	1,853	+35%



Stitches in time on Highway 34 near Madison

Rather than remove and replace some of the cracked state Highway 34 concrete panels between U.S. Highway 81 and Interstate Highway 29, the SDDOT decided to sew them together. The threads were epoxy-coated steel tie bars inserted into alternating holes drilled at 35 degrees across the cracks in the 10-mile segment of portland cement concrete segment east of Madison. Epoxy resin adhesive was then injected to anchor the tie bar in place. The tie bars help aggregates within concrete remain interlocked as heavy vehicles exert weight on slabs. A two-mile U.S. 81 segment west of Madison also was part of the concrete-repair project.

S.D. 34 2016 average daily traffic (ADT)	3,596	
U.S. 81 2016 ADT	3,926	+9%



Dump truck crash causes \$120K of damage to Dakota Dunes exit bridge

Junction City maintenance personnel witnessed a dump truck with its dump box up crash into the Interstate Highway 29 Exit 1 bridge near Dakota Dunes in August 2016. An immediate inspection found an 11-inch crack in a weld between load-supporting members (highlighted in red spray paint in the picture above) and other damage. Some State Highway System bridge repair or reconstruction projects wait years or even decades for funding. Bridge hit repairs move faster, because a damaged bridge could be a safety issue. Engineering plans were drawn for the repairs and contractors competed for the job, completed in the spring of 2018. Here the driver's insurance company paid \$120,000 to fix the bridge. In other cases, drivers disappear, and costs are subtracted from funds that could have been used for projects in the queue. See p. 16 for more about the state's growing problem with bridge hits.

I-29 northbound, 2016 average daily traffic (ADT)	13,259
I-29 southbound, 2016 ADT	12,136
Dakota Dunes Boulevard, 2016 ADT	8,995

Pierre



Concrete patching, epoxy injections for concrete substructures lengthen service lives of Missouri River bridges at Mobridge, Forest City

The SDDOT wants to extend the service lives of its Missouri River bridges for as long as safely possible. That's the idea behind concrete repair work on the columns and load-supporting elements of the steel continuous truss bridges at Forest City (1958) and Mobridge (1959). Cracks were cleaned and injected with epoxy, then sealed. Other concrete areas were patched, and galvanic anodes were installed to decrease corrosion of reinforcing steel. Though daily traffic is lighter than Chamberlain's Interstate Highway 90 bridge over the Missouri, these bridges are vital connections for east-west traffic.

	Mobridge		Forest City
2015 average daily traffic (ADT)	2,269		630
2035 ADT	3,084	+36%	764
Current truck ADT	13.5%		16.3%

Westbound I-90 resurfaced, Belvidere to Kadoka
Swelling and shrinking Pierre Shale soils underly this segment of Interstate Highway 90 in Jackson County, causing a rough ride. The SDDOT removed and recycled the uneven pavement and replaced gumbo soils with a mixture of soil and recycled concrete, creating a more stable base of granular material. Eleven miles of the westbound lanes from Belvidere to Kadoka were repaved with portland cement concrete. Asphalt shoulders, edge drains, drainage repairs and inslope flattening were included.

2016 average daily traffic (ADT)	3,141	+15%
2036 ADT	3,615	

Trucks make up 26% of traffic.



U.S. Highway 14 resurfaced Fort Pierre to Hayes

Like the I-90 segment above, U.S. Highway 14 from Fort Pierre to Hayes is built on unstable shale soils, making it difficult for pavement to remain smooth for long periods. The asphalt concrete surface was milled, with some millings recycled into the new asphalt concrete surface. The Willow Creek bridge's deck got a life-extending polymer chip seal.

2016 average daily traffic (ADT)	1,539	+51%
2036 ADT	2,330	

Trucks make up 16% of traffic.

U.S. 83 gets wider shoulders, Mission to Neb. line

Twelve miles of shoulders along U.S. Highway 83 are being widened from the Nebraska state line north to just south of Mission. In planning this project, the SDDOT worked to avoid disturbing a recently buried water line, and, with the Rosebud Sioux Tribe, to install a pedestrian path and highway crossing between Sicangu Village and a casino. A marked crosswalk with lighting was installed at the Plaza entrance, preceded in both directions by a pedestrian crossing sign with flashing amber beacons activated by push buttons at the crosswalk. Flattening of ditch slopes will make this segment safer for drivers who stray from driving lanes.

2016 average daily traffic (ADT)	2,220	+54%
2036 ADT	3,429	



High-friction surfaces added to Haines bridges

Bridge decks can become icier than nearby pavements, because bridges are more exposed to winter temperature changes. Application of high-friction surface treatments to the Haines Avenue bridges over Interstate Highway 90 (Exit 58) will help Rapid City motorists "get a grip" when conditions are slushy or slick. The treatment was applied during 2018 rehabilitation work designed to lengthen the service lives of the Haines Avenue and Maple Street bridges. Median barriers (pictured) were upgraded on the median sides of the Maple Street bridges, which will be widened in a future project.

	Haines	Maple
2016 average daily traffic (ADT)	35,185	33,010
2036 ADT	45,424	42,616

Traffic on these bridges is expected to increase 29% by 2036.



Rapid City Region

4-year Rushmore Road project completed

Black Hills motorists and Mount Rushmore visitors now drive on a vastly improved route through Rapid City. The 2018 work on the Mount Rushmore Road (U.S. Highway 16) project included decorative concrete in medians and landscaping. The road is paved with new or repaired portland cement concrete and has new curb and gutter, sidewalks, larger-capacity storm sewer, traffic signals and lighting. SDDOT personnel joined Rapid City residents and officials on June 6, 2018, to celebrate successful completion of the four-year state-city project.

2014 average daily traffic (ADT)	24,535 vehicles	+93%
2039 ADT	47,230 vehicles	



W. Chicago Street in Rapid City reconstructed

Rapid City and the SDDOT coordinated major infrastructure improvements to a 1.1-mile stretch of West Chicago Street (state Highway 231). The state's part included grading, paving of four 12-foot lanes, construction of new turn lanes, bridge improvements, storm sewer installation, sidewalk construction, an upgraded traffic signal at Sturgis Road and roadway lighting. The city installed new water main and sanitary sewer.

2016 average daily traffic (ADT)	7,287	+74%
2036 ADT	12,694	



Soil nailing stabilizes Deadwood landslide

Slope stability has been an ongoing problem along U.S. Highway 14A just east of the U.S. Highway 85 junction north of Deadwood. Material supporting the eastbound shoulder kept sliding down the hill. Pavement cracked after loss of support. Retaining walls have tried to hold the hill in; this project used soil nailing to further stabilize the inslope. Holes were drilled across the slope, then epoxy-coated steel bars were inserted and anchored with grout. Plates on top of the bars function like nail heads, pressing against a flexible reinforcing mesh.

2016 average daily traffic (ADT)	5,357	+35%
2036 ADT	7,248	



Rapid City Region



Center-line rumble stripes added on U.S. 18

Addition of center-line rumble stripes on U.S. Highway 18, and state highways 391 and 407 was part of a statewide effort to reduce head-on, side-swipe and run-off-the-road crashes that cross the opposite lane of a two-lane highway. On U.S. Highway 18, the segments were between Hot Springs and Edgemont and Oglala and Pine Ridge, then from Pine Ridge east to Highway 391 south to the Gordon junction in Nebraska. Highway 407 from Pine Ridge to White Clay, Neb., also got center-line rumble stripes. Special effort was made to avoid or minimize noise from rumble stripes near houses. Effectiveness of this safety project will be measured in coming years by comparing crash rates.



Six-foot shoulders added to U.S. 12, S.D. 73
 Asphalt concrete shoulders along 10.5 miles of U.S. Highway 12 from the North Dakota border to the state Highway 73 junction and southward along 10.5 miles of Highway 73 were widened to six feet in 2018. This regrading project included box culvert installations, pipe culvert extensions and full-width pipe culvert installations. New Americans with Disabilities Act-compliant curb ramps and lighting were installed along U.S. 12 in Lemmon.

U.S. 12, 2015 average daily traffic (ADT)	867
S.D. 73, 2015 ADT	768

New warning system on Strawberry Hill

A dynamic curve warning and guidance system was installed in 2018 on Strawberry Hill as part of a project to mill and resurface 6.5 miles of U.S. Highway 385, from north of Nemo Road to U.S. Highway 85. Traffic going over 40 mph triggers solar-powered LED lights on chevrons warning drivers of the curve ahead. This is the first use of sequential flashing chevrons in the state. The SDDOT hopes this will increase safety at a location with a history of severe crashes. The project included pipe work, guardrail and erosion repair..

2016 average daily traffic (ADT)	2,077	+35%
2036 ADT	2,810	



S.D. 34 segment resurfaced, gets "mumbles"

Almost 17 miles of state Highway 34 east of Sturgis, from state Highway 79 to the Belle Fourche River, were milled and resurfaced in 2018. Sinusoidal center-line rumble stripes were installed as part of the work. Known as "mumble" stripes, sinusoidal rumble stripes create less exterior noise than regular rumble stripes while still alerting drivers crossing the center line. Sinusoidal rumble stripes are created by grinding a wave pattern into the asphalt concrete.

2016 average daily traffic (ADT)	765	+34%
2036 ADT	1,024	

Trucks make up 18% of traffic on this segment.

Railroads

Road funding boosts economic development at a new industrial park in Yankton County near two rail lines

A first-of-its-kind \$6-million state loan in 2015 to help Yankton County pave a township road from state Highway 50 to a new rail-served industrial park is creating jobs and millions more dollars in business investment.

"Since that has opened, Dakota Plains Ag Center has invested over \$40 million in an ag facility there. Dakota Protein, which is a DDG [dried distillers grain] processor, just broke ground. They're going to invest \$15 million into their facility at the rail park," Transportation Secretary Darin Bergquist said.

"They are also applying for permits to build an ethanol plant, totaling their investment to over \$200 million. All those businesses are complementary to each other. It is a very good show of when the department, the commission, local government entities and private development, partnering together can really stimulate economic development in this state," he said.

The Dakota Plains Ag Center, with a 6.5-million-bushel storage capacity, and Dakota Protein have created 10 new jobs each, and each has a \$750,000 annual payroll, he said. The elevator's property tax is \$445,000. Dakota Protein's is \$100,000.

The proposed ethanol plant is expected to hire 50

people, have an annual payroll of about \$3.5 million and pay \$1.5 million a year in property taxes. The rail

park is next to the junction of a BNSF Railway line and the state-owned Napa-Platte rail line.

The loan was different than past large loans approved by the Transportation Commission, because it was made from the State Highway Fund, the pool of gas tax and motor vehicle excise tax revenues used to repair and reconstruct the Interstate and other state-owned highways.

Previous loans were from the State Infrastructure Bank or SIB. The SIB was initially seeded with federal funding and any loans must be for federal-aid-eligible roads. Most locally owned rural roads in South Dakota don't qualify, including the township road in Yankton County.

Yankton County is repaying the loan over 10 years through a tax-increment-financing plan.

Bergquist thinks the state-funded loans will be used only in "rare instances," The SDDOT and



A BNSF shuttle train loads wheat in Nov. 2018 in Presho.

Transportation Commission worked in early 2019 on administrative rules defining those instances.

Supporting the development of rail-based businesses helps the state capitalize on its purchase of and improvements to 530 miles of rail lines. The state entered the rail-line business in 1980, after the Milwaukee Road's bankruptcy threatened to leave South Dakota farmers without low-cost rail transportation for their crops.

Rail-sited grain, bean and legume businesses also add value to agricultural products, a long-time goal of economic development leaders and farmers.

Aeronautics

SDDOT begins work on new 10-year aviation plan

South Dakota pilots, airport officials and passengers can participate as the SDDOT prepares a new 10-year state aviation system plan.

The study will develop aviation forecasts that include possible drone activity, review existing airport roles and create a system-wide improvement plan. The plan advisory committee includes members of the South Dakota Pilots Association, S.D. Airport Management Association, S.D. Aeronautics Commission and S.D. Aviation Association, plus representatives of the Federal Aviation Administration, state agencies, Sanford Airmed and Avera Careflight.

A public kickoff meeting was held in Feb. 2019. Findings and proposals will be discussed at a future public meeting. The new plan is expected to be completed by June 2020. To learn more, go to www.2020sdasp.com or call (605) 773-4162.



Onida airport

South Dakota airports received \$22.3 million for improvements, equipment and engineering services in 2018

Airport	Federal \$*	State \$**	Local \$	FY 2018 airport improvement projects
Aberdeen	\$1,215,000	\$67,500	\$67,500	Passenger boarding bridge, master plan, airport layout plan
Bison	\$189,000	\$10,500	\$10,500	Rehabilitate, pave access road and construct new parking area
Brookings	\$90,000	\$5,000	\$5,000	Design apron reconstruction and geotechnical exploration
Buffalo-Harding Co.	\$221,731	\$12,318	\$12,318	Specifications and acquire snow-removal equipment
Clark County	\$99,000	\$5,500	\$5,500	Design, geotechnical for 12/30 runway and connector, taxiway reconstruction
Custer County	\$324,000	\$18,000	\$18,000	Master plan study, airport layout plan, runway 8/26 justification
De Smet	\$607,500	\$33,750	\$33,750	Hangar taxilane expansion and concrete hardstand
Eagle Butte	\$834,000	\$46,333	\$46,333	General aviation apron reconstruction
Eureka	\$64,800	\$3,600	\$3,600	Install tilt-down beacon pole
Faith	\$339,300	\$18,850	\$18,850	Rehabilitate and pave access road and parking area
Flandreau	\$99,000	\$5,500	\$5,500	Environmental assessment for runway geometry, land acquisition
Gettysburg	\$440,309	\$24,462	\$24,462	Install new fuel system, pavement maintenance
Gregory	\$343,800	\$19,100	\$19,100	Engineering, geotechnical, construction of hangar taxilane expansion
Hoven	\$526,500	\$29,250	\$29,250	Engineering, geotechnical, reconstruction of general aviation apron
Huron	\$67,500	\$3,750	\$3,750	Repair commercial apron, wildlife study, hazard mitigation plan
Lemmon	\$3,172,500	\$176,250	\$176,250	Runway 12/30 reconstruction
Madison	\$2,938,978	\$163,277	\$163,277	Construct parallel taxiway, runway connector, taxilane, apron connector
Mobridge	\$355,460	\$19,748	\$19,748	Design, construct 12/30 runway and connector, turnaround expansion
Onida	\$675,000	\$37,500	\$37,500	Design, construct 6-unit T-hangar and taxilane
Philip	\$117,000	\$6,500	\$6,500	Design of revenue-producing hangar, general aviation apron reconstruction design
Pierre	\$1,200,001	\$66,667	\$66,667	General aviation hangar taxilane, ag area taxiway construction
Platte	\$130,500	\$7,250	\$7,250	Card reader for fuel, design hangar/general aviation terminal
Rapid City	\$805,000	\$44,722	\$44,722	Design, construct new baggage claim, escalators, elevator and stairs; environmental assessment for sanitary sewer
Sioux Falls	\$3,007,295	\$167,072	\$167,072	Replace perimeter fence, remove obstruction, expand west general aviation apron, design terminal apron expansion/de-icing pad
Sisseton	\$171,000	\$9,500	\$9,500	Airport layout plan update
Spearfish-BH	\$28,000	\$1,556	\$1,556	Environmental assessment for runway 5/23 construction and land
Springfield	\$219,992	\$12,222	\$12,222	Replace runway lights
Sturgis	\$343,666	\$19,093	\$19,093	Environmental design, construct revenue-producing fuel system
Wagner	\$31,500	\$1,750	\$1,750	Design for revenue-producing T-hangars
Watertown	\$99,000	\$5,500	\$5,500	Design terminal apron reconstruction
Wessington Springs	\$103,500	\$5,750	\$5,750	Design runway 12/30 reconstruction, engineering report
Yankton	\$171,449	\$9,525	\$9,525	Historic mitigation for and design of apron expansion
SDDOT	\$157,500	\$17,500	\$0	Statewide pavement condition index survey
SDDOT	\$540,000	\$60,000	\$0	10-year statewide aviation system plan
SDDOT	\$315,000	\$17,500	\$17,500	Statewide pavement maintenance

2018 Projects **\$20,043,781** **\$1,152,295** **\$1,074,795** **Total: \$22,270,871**

*Federal Airport Improvement Program (AIP) funds come from federal taxes on airline tickets and aviation fuel.

**State matching funds come from the state tax on aviation fuel and aircraft sales tax and registrations.

Transit Asset Management and Safety Plan developed for local transit agencies

Behind the million-plus rides that tens of thousands of South Dakotans take each year on rural and specialized transit service buses is a three-person SDDOT team dedicated to making sure those services operate efficiently with safe vehicles.

By serving as federal transit policy experts and administrators of federal transit funding, the biggest funding source for South Dakota's rural and specialized public transit services, the SDDOT helps local transit and social service agencies do what they do best: meet mobility needs in their communities.

In 2018, one of the office's major efforts was to develop a transit asset management and safety plan. The goal of this plan is to keep transit vehicles and facilities in good condition. Like other SDDOT programs involving federal funding, there are performance measures that staff must track and report to a national database.

The Transit Asset Management and Safety Plan plays an important role in the nationwide transit program. The Asset Management Plan helps each state form goals, and helps provide nationwide consistency to track and report federally acquired assets. The Safety Plan helps states with the safety reporting requirements, gives states new safety forms and helps drive nationwide consistency.

Twenty-one transit agencies and 18 specialized agencies reported on their facilities, equipment and vehicles, and the conditions of those assets.

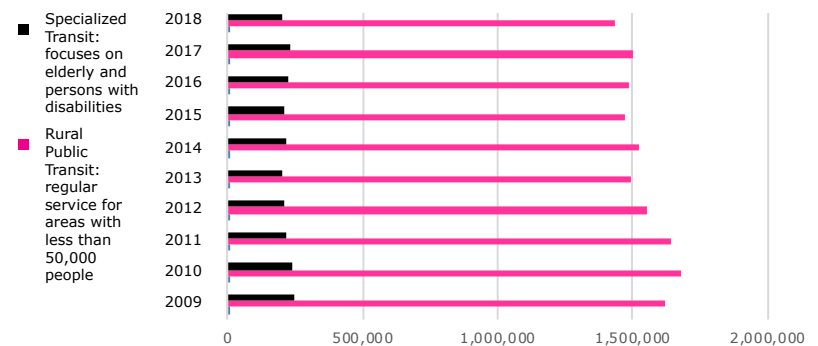
The transit office also works with communities that need or want to consolidate transit services. Consolidating transit providers is beneficial because it eliminates duplication of efforts and maximizes the sharing of resources. This ultimately leads to stretching the federal dollars. Hartford Transit, ICAP, Arrow Transit, the Bennett County Senior Center, and Prairie Hills Transit have decided to merge with neighboring transit agencies. Five other providers also plan to merge.

The Mobridge Senior Center has begun looking at the possibility of working with an existing transit service to provide rides in Mobridge.



Transportation Specialist Doug Gorham inspects a new local transit agency vehicle purchased with Federal Transit Administration funds managed by the SDDOT.

1.6 million specialized and rural public transit rides provided in 2018



Source: Office of Public Transit, federal fiscal year (FFY) 2018 data

2018 road grants benefit tribe, counties and small communities

Six South Dakota cities, two counties and the Oglala Sioux Tribe received \$4.7 million in grants to improve roads in their communities in 2018.

A \$600,000 agribusiness grant went to Lyman County to improve 306th Avenue to the new Dakota Mill & Grain elevator in Presho, which loaded its first train in 2018.

Beadle County received a \$400,000 agribusiness grant to improve 383rd Avenue and 203rd Street near the newly expanded Lazy J Dairy west of Wolsley. The dairy received a permit to house up to 1,900 Holstein cows in 2017.

Avon's \$600,000 community access grant will improve access to the businesses and grain elevator on Main Street.

The other recipients of community access grants were:

- Bridgewater: \$258,000 grant to improve 6th Street and Poplar Avenue, which serve the school.
- Clear Lake: \$340,000 for 2nd Street, 2nd Avenue S and 3rd Street, which serves the elevator
- Dell Rapids: \$600,000 for 7th Street, which serves a business area.
- Humboldt: \$600,000 for Main Street, which serves the school.
- Irene: \$340,000 for State Street and Dickerson Avenue, serving the school.
- Oglala Sioux Tribe: \$600,000 for Crazy Horse School Drive in Wanblee, which serves the school.
- Whitewood: \$400,000 for Laurel Street, serving the school and business area.

A total of \$4 million is available annually for economic development road grants in three categories: community access, agribusinesses and industrial parks. Only communities with less than 5,000 people are eligible for community access grants. The other grants are open to all cities, counties and townships.



Top: Beadle County received a grant to improve roads serving the expanded Lazy J Dairy. Bottom: Humboldt received a grant to improve Main Street, which serves Humboldt Elementary School.



Efficiency efforts keep pressure on winter maintenance costs

Tow plows, information technologies and process improvements are helping SDDOT contain winter maintenance costs.

We're doing it better, we feel. Winter maintenance is a big-dollar item for us and a large budget center, so there are plenty of opportunities to continue improving

Jason Humphrey
Construction and Maintenance
Engineer

Despite an inflation rate of more than 22% for associated costs such as diesel fuel since 2011, the SDDOT has kept the cost of winter maintenance to just \$1.7 million more than seven years ago, or 9%. Without efficiency efforts, the cost could have been \$4 million or more.

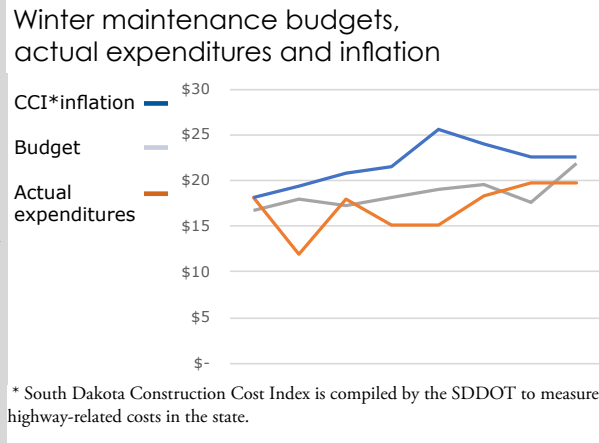
The winter maintenance budget for state highways has been about \$18 million for

seven years, but the amount spent varies with the number and severity of snow and ice storms.

With a tow plow a snowplow driver can clear twice as much highway as a single plow without one, saving on labor and diesel fuel.

SDDOT's maintenance decision support system, or MDSS, helps maintenance workers decide when to send snowplows out and how much de-icing material to apply. System computers installed in maintenance shops and snowplows use weather forecasts and data from environmental sensor stations placed around the state to generate recommendations.

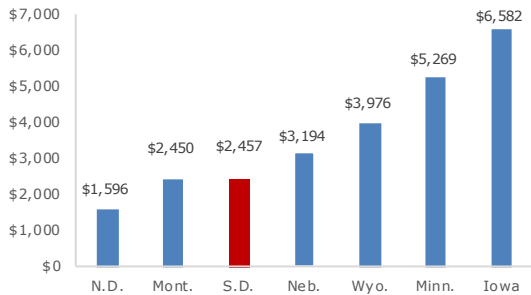
"We're doing it better, we feel," said Jason Humphrey, Construction and Maintenance Engineer. "Winter maintenance is a big-dollar item for us and a large budget center, so there are plenty of opportunities to continue improving."



A geotechnical company hired by the SDDOT collects underwater data at the pier locations of the new Pierre-Fort Pierre bridge over the Missouri River in August 2018.

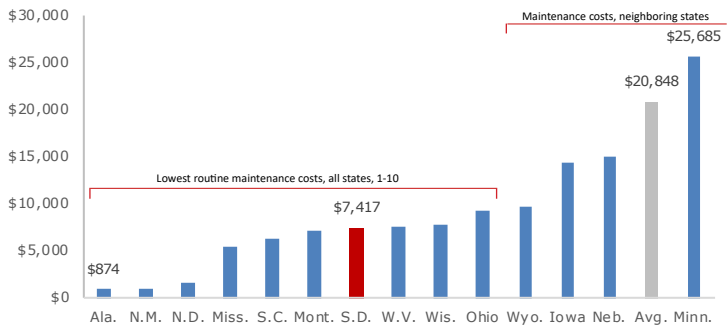
SDDOT efficiency statistics

3rd-lowest winter maintenance costs per mile compared with neighboring states



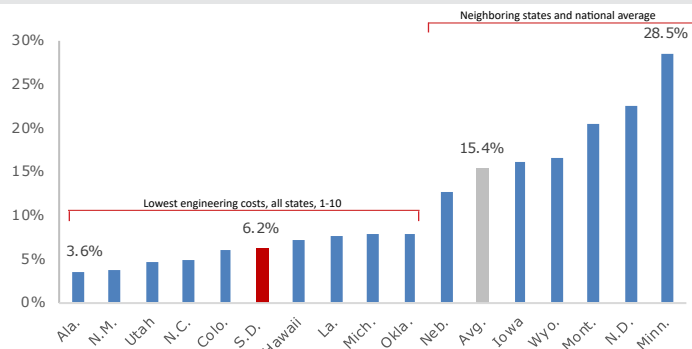
Source: *Highway Statistics* 2016, Table SF-4C (June 2018) and *Highway Statistics* 2017, Table HM-80 (Aug. 23, 2018). Amounts shown represent 2016 expenditures.

7th-lowest routine maintenance costs per mile of all 50 states



Source: *Highway Statistics* 2016, Table SF-4C (June 2018) and *Highway Statistics* 2017, Table HM-80, (Aug. 23, 2018). Amounts shown represent 2016 expenditures.

6th-lowest engineering costs as a percentage of project costs in all 50 states



Source: *Highway Statistics* 2016, Table SF-4C (Feb. 2017). Amounts shown represent 2016 expenditures.

continued from p. 13

Benefits will be realized as more IT is incorporated

The benefits of using information technologies are already being realized by numerous agencies and travelers in South Dakota. The transportation-related systems being developed and implemented in vehicles and roadside infrastructure have great potential for increasing safety and reducing congestion. The SDDOT is actively monitoring technological advances in connected and autonomous vehicles and assessing their benefits, costs, safety issues and reliability.

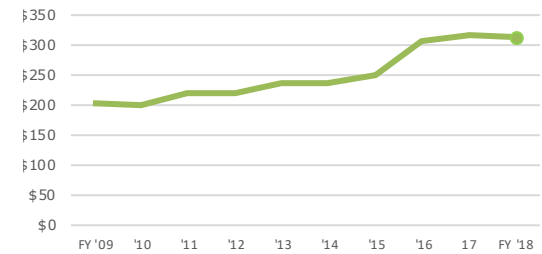
“We’re trying to find ways to streamline these technologies and the processes needed to implement them so we capitalize on these investments,” Huft says.

One thing about this uncharted and complex future is certain: SDDOT employees will have many opportunities to shape it in the years to come. The ultimate goal will continue to be better lives through better transportation.

Highway revenue trends

State Highway Fund revenues, 2009-2018

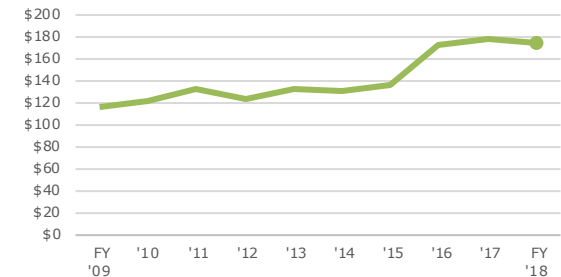
In millions of dollars (not adjusted for inflation)



State Highway Fund revenues include motor fuel tax revenue, motor vehicle 4% excise tax revenue, port of entry fees, prorated commercial license fees, oversized vehicle permit fees and miscellaneous revenues. Bridge Improvement Grant (BIG) program funding that goes to local governments is not included in these figures.

Motor fuel tax* revenue, 2009-2018

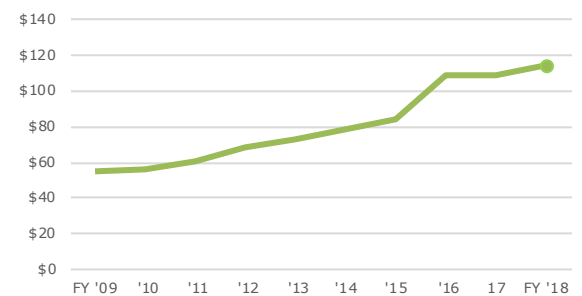
In millions of dollars (not adjusted for inflation)



*The motor fuel tax increased by 6 cents from 22 to 28 cents in April 2015.

Motor vehicle 4%* excise tax revenue, 2009-2018

In millions of dollars (not adjusted for inflation)



*The motor vehicle excise tax increased from 3 to 4% in April 2015.

Source: Division of Finance and Management

2018 Accolades

Comment on the SDDOT project to reduce crashes by changing the four-lane segment of state Highway 50 through Tyndall and Tabor to a two-lane highway with a center turning lane, made at the Statewide Transportation Program meeting in Sioux Falls on July 11, 2018.

I like to find data. My husband and I went to Florida recently and we went through five states: Missouri, Arkansas, Mississippi, Florida and Tennessee. We don't take the Interstates; we like to take the roads. I have to say this: All the roads down there, no matter the size of the community—some smaller than our rural communities here, some of course very urban—all had four-lane highways. They were state highways. Everything had four-lane. So I have to think, OK, we're moving to two-lanes and turning lanes. I then decided you don't know what you don't know. I have a family member that works for Colorado DOT that happens to be from the Tyndall-Tabor area, so [is] familiar. I posed a question to her, I said, "What are the trends out there?" recognizing Colorado's much different. But I do want to give you a compliment, because she said that South Dakota among DOT states is a leader in innovation in what they're doing for their roads, so that was a positive that maybe there was something there. ... I just wanted to follow up on a couple of other things in your slide presentation when you talk about safety. One of the innovations that you did was on [the intersection of state highways] 46 and 37. You did not show that about the light and about approaching traffic at that intersection. To me that's innovative. I've been asking for a long time to get something there. I got data from your department this week which indicates there's been a reduction in accidents. To me, that is a strategy that works. I'm still waiting for [U.S. Highway] 81 and 46 north of Yankton for that same strategy to come out.

Rep. Jean Hunhoff
Yankton

Comment on SDDOT reconstruction of Sixth Street/U.S. Highway 14 in Brookings during the Jan. 17, 2019, House Transportation Committee meeting

"Being a business owner in Brookings, and I'm very familiar with that community, there was real fear about the disruption that project was going to cause in Brookings, but from my experience interacting with DOT and from just the experiences of others, I think it was managed exceptionally well. Traffic was managed really well. There were very few complaints, a lot of great communication out to the business community on either side of the highway. There were website links, a weekly update that came out to all the businesses. I think you just really did an excellent job. If that's the marker that you're heading for, it was very, very well done, and the department is to be commended for that project. No wonder that it won an award.

Rep. John Mills, House Transportation Committee chairman
Volga

2018 Timeline

Events in South Dakota transportation

- Jan. 22 I-29 from Tea to the Iowa border closes due to heavy snow, strong winds and numerous disabled vehicles.
- March 30 Remodeled Wasta rest areas open.
- April 13 I-90 closes overnight from Sioux Falls to Murdo. I-29 closes from Sioux Falls to the North Dakota border. Rain, freezing rain, heavy snow and strong winds make for a memorable April winter storm in central and eastern South Dakota.
- June 6 South Dakota receives a \$21-million Infrastructure Rebuilding America (INFRA) grant to be used for the Veterans Parkway project in eastern Sioux Falls.
- June 13 A 2017 SDDOT project that installed crash-preventing high-friction surfaces on western South Dakota highway curves wins in the best use of technology and innovation category of the regional America's Transportation Awards. The SDDOT project to reconstruct Sixth Street/U.S. Highway 14 in Brookings wins in the operations excellence category. Special care was taken to provide for automotive, pedestrian and bicyclist traffic through the construction.
- June 22 Flooding from rains earlier in the week closes State Highway 46 near the Iowa border and Highway 19 just 3.5 miles south of Highway 46. The state Highway 11 bridge over Splitrock Creek south of Brandon also closes due to flooding.
- June 23 State highways 48 and 50 at the Iowa border close due to flooding on the roadway.
- July 16 The South Dakota DOT receives the 2017 South Dakota Performance Excellence Award. The award is based on the Baldrige Performance Excellence Framework and came after a rigorous evaluation of its management system.
- July 19 Longtime SDDOT engineer Laurie Schultz, who started in the bridge office in 1979 and became a program manager, is named to the South Dakota Transportation Hall of Honor. Schultz was the first of now many woman engineers at the SD DOT. Charles "Chuck" Lien, who founded the Pete Lien and Sons construction company of Rapid City, also received the honor.
- Aug. 7 First roundabout on State Highway System opens in Watertown.
- Sept. 12 South Dakota farmers ask the Surface Transportation Board to help make rail cars available when tariffs end and crops need to be shipped.
- Nov. 10 A train loaded with winter wheat was the first to leave the new Dakota Mill & Grain facility in Presho.
- Dec. 6 U.S. DOT awards a \$20-million BUILD grant to help reconstruct U.S. 83 from Murdo to White River, which will enhance access to I-90 and I-80. A \$7-million grant goes to the city of Tea's County Highway 106 project.

Accolades

Comments made at the Statewide Transportation Improvement Program meeting in Aberdeen on July 10, 2018

Being from a county where we're starved and always trying to strap stuff together, I have an appreciation for your approach on the bridge[s]. I'm not a big fan of spending money for aesthetics at all unless there's some safety or psychological safety component of it. So to see you actually just painting the [rusting] parts of the bridge that you can see and [not] the parts that aren't affected [by rust]... and also adding the turning lanes. It's definitely targetting the resource right where it needs to be when you're adding a turning lane versus grading many, many miles."

Dirk Rogers
Brown County Highway Superintendent

*Email to Pierre Region Engineer John Forman
March 19, 2018*

Friday, March 16, 2018, I was driving home from Lemmon when I got caught in the snowstorm that went through central SD. If it weren't for the DOT staff, I truly believe I would not have had the courage or common sense to make it home. There are many of your staff I would like to bring to your attention who were my "guardian angels" that day.

While in Lemmon, I was getting only ND news and only knew there was a "system" going through central SD. I didn't know to what extent until I was in the muck of it. I thought I would take the quick route home to get ahead of it and ended up stranded at Howes Corner at the Jct. of Hwy 73 and Hwy 34. There was a semi-trailer and about 3 other vehicles in a quandary on which direction to proceed as we were all going east to Pierre. The Cheyenne valley was to our east, so we knew we needed to have plowed highways to drive on. For some insight, I initially called my landlord, Perry Griffith, who works for the DOT in Pierre. He immediately connected me with Barb Spelbring [Senior Secretary in the Pierre Area office]. I explained I worked for the state, was driving a state car and trying to get back to Pierre. Since I was out of her route area, Barb directed me to a woman in Philip, who then directed me to Jared [Fosheim, Highway Maintenance Supervisor in Philip], who

eventually directed me to Joel Larson [Highway Maintenance Supervisor] in Bel Fourche. Joel was so attentive, making sure I was calm, and reassured me. The woman in Philip called me back and redirected me to a safe route going back thorough the treacherous roads I had just driven on back to Faith, to Hwy 212, east to Hwy 83, and south to Hwy 14 to Pierre. She knew I was hesitant since the snow was at least 6" by now. Also, at least 2 additional vehicles had gathered at Howes Corner. I shared the directions the DOT had given me, and we all followed each other back to Faith. I turned on Hwy 212 east, took the route back to Pierre and arrived just as it started to snow. I had left Lemmon at 9:30 CT and finally arrived in Pierre at 4:30. It was a LONG day.

My intention of this letter is not only to recognize all those who helped me in my time of need but to especially give accolades to Joel. He called me at least twice asking me how I was doing, making sure I was on the right route, reassuring me, and even giving me a name and number to contact in Eagle Butte should I run into any more challenges. The DOT is representative of not only how you ensure the safety of all travelers, but they didn't leave "one of their own from the state" unattended. I felt I was taken under their wings and would like to show my appreciation by contacting you and sharing my story. If you would, please share this message of thanks with those mentioned and those who oversee their duties. On Friday, March 16, 2018, they all went above and beyond their expectations, and I, for one, will be forever grateful.

Beth Ann Haskins
Program Specialist
Division of Developmental Disabilities
South Dakota Department of Human Services

Email to Jeff Sens, Aberdeen Region Engineer, Feb. 25, 2018

Clark, Codington and Day highway workers did a great job clearing the roads from Webster to Watertown this weekend.

John Suhr
Owner, Reporter & Farmer
Webster

Post to SDDOT's Facebook page, March 8, 2018

Since we didn't get a chance to post during #blizzard2018, we would now like to take the time to thank the South Dakota Highway Patrol and the South Dakota Department of Transportation for their excellent work keeping our South Dakota highways clear and safe.

**Carlson Body Shop
Beresford**



 **SD Highway Patrol** @SDHighwayPatrol · Mar 8
Thank you #BeresfordSD @SouthDakotaDOT for coming out and helping us help the motorist with their trailer. #partnership #Helping #helpingothers

Photo credits

Cover photo: traffic west of the Marion Road interchange (Exit 395) in Sioux Falls, Oct. 4, 2018, Management Analyst Julie Bolding
Inside front cover: A Ringgenberg Electric employee activates newly installed collision warning system flashing beacon signs at the state Highway 20-U.S. Highway 281 intersection in Spink County, a 2018 SDDOT safety project, on July 18, 2018. Bolding
p. 3: Transportation Secretary Darin Bergquist speaks at an event celebrating completion of the Mount Rushmore Road Project in Rapid City, June 6, 2018. Public Information Officer Kristi Sandal
p. 4-5: Sandal
p. 6: left and top right by Bolding, bottom right by Johnson Design and Video, Brookings
p. 8: Bolding
p. 9: left, Sandal; right, Harry Johnston, Rapid City Area Project Engineer

p. 10: Belle Fourche Area staff
pp. 12-13: Bolding
p. 11: Top, TSP Inc.; bottom, JLG Architects
p. 14: Left from top: Mitchell Region staff, Brosz Engineering, Mitchell Region staff; right Aberdeen Region staff
p. 15: U.S. Geological Survey map at https://ngmdb.usgs.gov/Prodesc/proddesc_10014.htm, photo by Bolding
p. 16: Mitchell Region bridge staff
p. 17: left, Bolding; right from top: Mike Will, Watertown Area Project Engineer; Google View, 2019; Stephen Keeler, Journey Technician, Huron Area
p. 18: left, Bolding; right from top: Google View, 2018; Bolding; Google View, 2018
p. 19: right, Mitchell Region bridge staff; left from top: Yankton Area staff; Bolding; Steven Neumeister, Sioux Falls Area Project Engineer
p. 20: left, Pierre Region Bridge Engineer Ron Bren; right from top: Bolding; Winner Area staff; Tom Strubel, Winner

Area Project Engineer
p. 21: left, John Gerlach, Rapid City Region Project Engineer Supervisor; right from top: Sandal; Brenda Flottmeyer, Rapid City Area Project Engineer; Neil Olmstead, Assistant Geotechnical Engineer
p. 22: Left, Google View, 2018; right from top: Belle Fourche Area staff; Harry Johnston, Rapid City Area Project Engineer; Darrel Henrichsen, Rapid City Area Project Technician
p. 23: Perry Griffith, Transportation Specialist, Office of Railroads
p. 25: Ron Block, Harlow's Bus and Truck Sales
p. 26: top, Russell Jungemann, Lazy J Dairy; bottom, Nicole Baars, Humboldt city finance officer-administrator
p. 27: Sandal
p. 31: South Dakota Highway Patrol
p. 32: Travis Dressen, Sioux Falls Area Engineer

South Dakota Senate Transportation Committee meeting, Jan. 10, 2018

I know especially in Union County the commissioners there are really happy with the BIG [Local Bridge Improvement Grant] program. They have applied for a number of these, and some of them have been accepted... I just want to say it's a start. It's not going to meet every need, but commissioners in my area are really happy. We just want to keep working with the highway department. Let's just kind of keep it moving. I appreciate the good work you've done.

**Sen. Jim Bolin, Canton
District 16, Lincoln and Union counties**

Email sent to DOT General Info, Dec. 6, 2018

I just wanted you to know how much I enjoy and think they are effective the messages put on the Amber Alert signs this winter. Today when driving to east Rapid City from our home, the sign says, "Who you going to call?" Immediately "Ghost Busters" came into my mind. Second line said, "Nobody! You are driving!" Excellent reminder that catches your eye. P.S. I do not use my cell when I am driving, but I think these signs are wonderful. Keep up the good work.

**Maryann Clarin
Piedmont**



Quick thinking and teamwork by Curt Theisen, Jordan Doane, Chris Peters, Adam Feistner and Gary Steinhoff (above, left to right) saved a suicidal teenager who fell from a Marion Street bridge onto Interstate Highway 90 driving lanes on Aug. 15, 2018. Some of the SDDOT employees stopped traffic while others broke the teenager's fall. When he ran into the opposite lanes, they followed and restrained him until he could be taken to a Sioux Falls hospital. The five men had been working nearby when they heard about a possible suicide effort, and, when they realized they were close, headed to the bridge. "If they hadn't been there, he surely would have been successful in his attempt to end his

life," Minnehaha County Sheriff Mike Milstead and Captain Mike Walsh said to Transportation Secretary Darin Bergquist. "It is no exaggeration to say that Gary, Chris, Adam, Jordan and Curt saved a young man who was in mental crisis, and kept an unwitting driver from hitting him, which would have been devastating to anyone. They should be commended for their efforts, and they have our thanks." Gov. Dennis Daugaard hosted an honorary lunch for the men a week later. SDDOT maintenance employees play an enormous role in your safety every day by removing snow and ice, providing road condition information, promptly repairing and replacing signs, and many other road maintenance tasks.