

Connecting South Dakota and the nation for 100 years

1917-2017



TRAFFIC DIRECTION

South Dakota
Department of Transportation
2016-2017 Report



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.

Special features



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2016-2017 Report
With historical articles celebrating the SDDOT's 100th year in 2017

Contents

Secretary's Annual Message	3
Executive Summary	4
Division Directors' Messages	5

Pavements	10
Bridges	12
Rail	14
Public transit	15
Aeronautics	16
Safety	17

Major 2016-2017 projects

Aberdeen Region	19, 25
Mitchell Region	20, 26
Pierre Region	22, 28
Rapid City Region	23, 29

Local Government Assistance

Bridge Improvement Grant projects	31
2016-2017 local-state road projects	32
2016-2017 local-state bridge projects	33
Economic development road grants	34

Selected statistics	35
Accolades	36
Time lines	37, 38
Photo credits	39

The winter that "just wouldn't quit" **p. 18**

SDDOT's history of innovation **p. 8**

A State Highway System worth celebrating **p. 6**

A message from the Secretary



My fellow South Dakotans,

For employees at the South Dakota Department of Transportation, the decades we've spent designing, managing and maintaining your highways have gone fast.

In 2017, we paused, briefly, to celebrate the transportation system hundreds of thousands of South Dakotans use every day. In a single century residents have gone from days-long trips on rutted gumbo roads to a hard-surface system that enables people and freight to cross the state in less than eight hours. Self-driving cars and trucks are on the horizon.

The almost 8,000 miles on the state system result from careful calculations by SDDOT employees who listened to your concerns as roads and bridges were planned, who strove to get the most for the public dollar when projects went out for competitive bids and who worked with contractors to ensure quality specifications were met during construction.

Employees clear snow and prevent icing in snowplows programmed to lay down only the amount of de-icing chemicals necessary to increase safety. Their work zone plans get you through the cones safely. Our SafeTravelUSA website provides you with the road condition updates and weather forecasts needed to make informed decisions before heading out in winter weather.

Other employees create the state highway map, negotiate right-of-way agreements with property owners, work with local governments on projects within their boundaries, do research leading to more durable concrete, scrutinize vouchers and purchase orders, and answer your questions by phone, email or letter. They drill in South Dakota's notorious clay-type soils to obtain data needed to ensure underlying materials adequately support concrete slabs and bridge piers are supported on bedrock. They analyze pavement and bridge condition data to prioritize maintenance projects that wring the most life out of pavements and bridges at the lowest cost.

The SDDOT's responsibility to manage and lease 406 miles of active state-owned rail lines has had a higher profile in recent years, as new elevators and loop tracks help lower transportation costs for grain and soybean farmers. We continue to play a role in general and commercial aviation by administering federal grants that maintain runways and fund other airport improvements. We help local public transit agencies comply with the regulations applying to federal funds they use to provide rides to rural residents, veterans, the elderly and people with disabilities.

South Dakotans get their money's worth from the state and federal dollars expended on the State Highway System, state-owned rail lines, public transit and airports. I am honored to be the secretary of a transportation agency where employees personally commit to making South Dakota's transportation system the best and safest it can be with available funding. Our second century begins with that same commitment.

Sincerely,

A handwritten signature in black ink that reads "D. Bergquist".

Darin P. Bergquist
Secretary of Transportation



Transportation Secretary Darin Bergquist (far right) congratulates winners of the 2016 SDDOT statewide ROADeo, held to sharpen snowplow drivers' skills in preparation for winter. Left to right: first place, Nathan Loecker, Unit 292, Yankton-Menno-Tyndall; second, Chris Voelker, Unit 272, Madison-Flandreau; and third, Jay Boldt, Unit 372, McIntosh-Eagle Butte-Isabel.

Executive Summary

2016-2017 Report
South Dakota Department of Transportation



Performance Measures

	2017	2016	2015	2014
Interstate pavements in good to excellent condition, % of	86.1	81.0	91.3	95.4
Non-Interstate pavements in good to excellent condition, % of	86.0	83.1	82.2	88.4
State-owned bridges in fair or better condition, % of	96.9	96.3	96.1	96.2
% of state-owned system improved	19.6	28.1	33.7	21.1
Fatal crashes	111	103	116	125
Public transit rides* (millions)	1.74	1.71	1.68	1.74

*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 2017, 86.1% of Interstate and 86.0% of non-Interstate 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. 2018.

Bridges

As of 2017, 96.9% of the 1,796 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 fair or better condition through 2018.

Percentage of State Highway System improved

A total of 1,525 miles or 19.6% of the State Highway System was substantially improved in 2017. Improvements can be pavement or bridge construction, asphalt concrete overlays, chip seals, bridge repairs, lighting, traffic signals and signs.

Fatal crashes

There were 111 fatal crashes in 2017, compared with 103 in 2016, an increase of 8%. The current SDDOT Strategic Plan goal is to decrease fatal crashes to 92 in 2019. South Dakota's fatality rate per 100 million vehicle miles traveled—the metric used to compare it with other states—has been trending downward over the long term. In 2016 it was 1.226, the lowest in at least

50 years, but still higher than the U.S. rate of 1.18 in 2016, the latest national figure available.

Aeronautics

In 2017, the SDDOT Aeronautics Office administered \$28.6 million in federal and \$1.6 million in state funding for statewide airport improvements, including reconstruction of Redfield's runway 17/35 for \$3.9 million and reconstruction of Webster's runway 12/30, apron and taxiway for \$2.2 million.

Rail service

New, higher-capacity elevators along improved rail lines are helping South Dakota farmers get better prices for their crops and save on transportation costs. The elevators can more quickly load longer unit trains of 100 cars or more.

The new Dakota Plains Ag Center Napa Facility near Utica began shipping corn and soybeans in late 2017. The Yankton County facility, located on state-owned and BNSF Railway rail lines, can store up to 6.5 million bushels of grain. Two other rail improvement projects began in 2017: rehabilitation of 10 miles of Rapid City, Pierre & Eastern Railroad (RCP&E)-owned rail east of Huron, which will allow trains to travel 40 mph, and construction of a new siding at Philip that will allow the RCP&E to move 100 more trains a year on the privately owned line between Tracy, Minn., and Colony, Wyo. The combined \$12.4-million cost of the two projects is being paid by a federal grant, state funding and the RCP&E. Over at Onida, sidings on the RCP&E-owned line for the new Ringneck Energy ethanol plant will be completed in 2018, and construction of the ethanol production facility is expected to be completed in 2019.

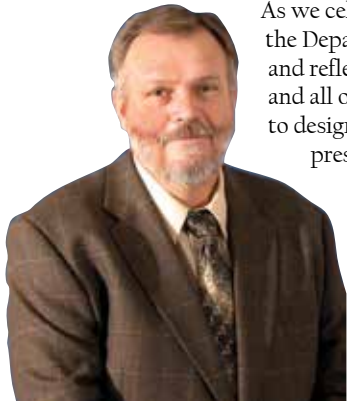
One milestone bridged 2016 and 2017: the new \$32-million Wheaton Dumont Co-op Elevator's new grain terminal in Britton loaded its first unit train in 2016, after a 23-mile segment of the state-owned rail line between Aberdeen and the North Dakota border was upgraded to heavier rail for heavier and longer trains. The south leg of the wye also was built at Jarrett Junction, north of Britton, to enable trains to go north or south on the line without switching locomotives from one end of the train to the other. A \$7.3-million partnership between the state and the Dakota, Missouri Valley & Western Railroad, which operates in South Dakota, North Dakota and Montana, paid for the work. In 2017, the Britton location became the only place in the state where two Class I railroads, BNSF and Canadian Pacific Railway, compete for business from growers in the surrounding area. Also in 2016, rehabilitation of the state-owned line from Chamberlain all the way to Presho was completed Oct. 27. The improvements spurred construction of a new Wheat Growers grain elevator in Kennebec. The facility can load 80,000 bushels of grain per hour into rail cars, or a 110-unit train in 10 hours. That rehabilitation also prompted Dakota Mill & Grain to expand east of Presho.

Public transit

A total of 234,451 rides were provided through specialized services to elderly people and persons with disabilities, and 1,503,367 rural public transit rides were provided for a total of 1,737,818 rides given in 2017, more than 2016 and 2015.

Customer satisfaction

Overall customer satisfaction with SDDOT slipped since the 2011 survey but remains high when compared to other state DOTs, the 2015-2016 survey found.



Greg Fuller
Operations
Division Director

As we celebrate the 100th year of the Department of Transportation and reflect on our achievements and all of the employee efforts to design, build, maintain and preserve South Dakota's

transportation system, I can't help but think about the future of transportation.

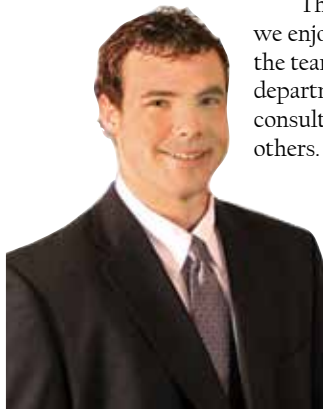
Technology has set the stage for enormous change in how we transport people and freight.

These changes in technology are evolving

at an exponential rate. Technologies such as autonomous and connected vehicles and intelligent transportation systems will all likely play a key role in the future of transportation.

When I started working for the department some 37 years ago, a mentor of mine always used to say "nothing is as constant as change." That statement was true then, but is even more so today. We are entering an exciting time to be in the transportation industry. We have the opportunity to be in on the ground floor of what the future of transportation will look like. How we seize the opportunity and how we embrace and shape change will determine our success.

We have been up to the challenge for the last 100 years, and I am confident we will be up to the challenges yet to come. What a great time to be part of the Department of Transportation team!



Mike Behm
Planning and Engineering
Division Director

The transportation system we enjoy today is a legacy of the teamwork with contractors, department employees, the consultant industry and countless others.

Our Transportation Hall of Honor features 86 individuals who have been inducted for their contributions to South Dakota's air, highway and rail transportation systems. Their leadership and foresight have helped to create one of the most cost-effective

transportation systems in the United States and serve as inspiration to countless others.

Teamwork and a passion for public service are critical to our success, as our state is vast and relatively sparsely populated. By serving our transportation customers with 7,798 highway miles, 1,796 bridge-length structures, more than 28,000 culverts, 70 public airports, 406 miles of active state-owned rail line and more than 1.7 million transit rides per year, our employees wear many hats. Some move within our organization and in doing so gain a wide variety of experiences and serve in different ways. Others find their passion early and stay with an office for their entire careers.

I'd like to note here one of many individuals whose SDDOT career epitomizes a deep commitment to providing the public with a safe and efficient State Highway System. Kevin Goeden, Program Manager for the Bridge Design Office, retired recently after nearly 35 years of helping build and maintain bridges and box culverts across our state. Kevin's time here exemplified public service, teamwork and a true passion for bridges. We're fortunate to have an organization that was not only built on teamwork, but one that carries those same values into the future.



Kellie Beck
Finance and Management
Division Director

In 2016 and 2017 the Finance and Management Division worked to ensure the SDDOT and state government have adequate internal controls.

This included helping the state government-wide Uniform Grant Guidance Committee develop a uniform federal grant subrecipient monitoring plan and uniform grant template. The

committee's work was presented to the State Board of Internal Controls in 2017 for adoption. Most state agencies have agreed to use these forms. The division will be represented on a new subcommittee looking at legal risks that come with federal grants.

Also in 2016, division staff trained SDDOT managers on internal control principles and how internal control pertains to the entire agency. 2016 was the first year the state produced a Comprehensive Annual Financial Report (CAFR) by December. Gov. Daugaard wanted to produce a state CAFR by December to earn a better financial rating and help legislators with the next budget. Our state's strong financial management gave South Dakota the highest rating possible from Standard & Poor's, Moody's and Finch. The higher rating will yield substantial savings in future interest payments. Division employees worked hard in 2017, 2016 and previous years to provide data earlier.



1917-2017: A State Highway System worth celebrating

Highways and bridges designed and managed by the SDDOT have provided efficient, cost-effective and ever-safer transportation for 100 years

Few South Dakotans remember the days when state roads were almost entirely dirt roads—dusty in the summer, slow going when soggy and impassable after heavy snow.

Most of South Dakota's 865,000 people have never known a time when they couldn't get in their cars or pickups and drive on a hard-surface road from Sioux Falls, across the Missouri River on a permanent bridge, to Rapid City in less than a day. Half of today's residents were born after Interstate Highway 90 was completed in 1976 and Interstate Highway 29 was completed in 1983.

The highways and bridges we now consider permanent parts of our landscape are the work of generations of dauntless and determined state leaders, lawmakers and South Dakota Department of Transportation employees. These pioneers have been supported in turn with taxes paid by corresponding generations of state residents who understood the economic necessity of roads and bridges, and how they would improve the quality of life in South Dakota.

As the South Dakota Department of Transportation turned 100 in 2017, we wanted to tell the story of how the current State Highway System of 7,798 center-line miles is kept in good condition with a computerized pavement management system that is one of the best, if not the best, in the nation. About 97 percent of 1,796 state-owned bridges also are in fair or better condition, because SDDOT bridge engineers pioneered use of service life-extending maintenance treatments and helped develop widely used bridge management software. Our state economy runs on roads, rails, runways and public transit buses managed directly or indirectly, in whole or in part, by the SDDOT.

When Dakota Territory was created in 1861, railroads were beginning to span the continent, first focusing on passenger transport and later displacing waterways as cost-efficient long-distance transportation of freight. A railroad committee was created in 1882 to oversee railroad issues. Although the first territorial legislators authorized construction of six roads outward from what is now southeastern South Dakota, they provided no money to do so.

State's road story begins in territorial days

The need for roads that were more than compacted earth grew in the late 1800s and early 1900s, emerging as the national "Good Roads" movement and driven primarily by farmers wanting better roads from their fields and pastures to markets. A national effort to create free postal service for rural Americans also propelled the issue, according to South Dakota transportation historian Steven Bucklin, a University of South Dakota



By 1936 standards, a good South Dakota road, graded with a gravel surface

professor, as did the increasing number of automobiles using the dirt roads.

Roads became a more defined state responsibility when the State Highway Commission was created in 1913. Just the year before, the Legislature began requiring automobile owners to buy numbered metal license plates. By 1919, more than 100,000 cars and trucks were registered in South Dakota.

Highway commissioners wanted to provide standard designs for bridges and culverts to local governments but had no money to print or mail the documents. Auto license revenues went mostly to the counties, with the South Dakota secretary of state receiving only 12.5 percent, from which the cost of registration supplies was subtracted before the remainder went into the state general fund.

Federal government funding begins

In 1916 President Woodrow Wilson signed the Federal Aid Road Act, which provided \$75 million to the states over five years on a 50/50 matching basis. The money was raised by a new national income tax.

To receive federal road funding, states had to comply with federal regulations. In South Dakota, the constitution needed to be amended to allow the state to pay for "internal improvement projects." Peter Norbeck, a good-roads supporter, promoted the change and, after becoming governor in 1917, signed a law creating the State Highway Department, giving it a mandate and budget to start a state road system.

The 1919 state law guiding early road and bridge construction directed the new agency to connect county seats and cities with populations of 750 or more. Under the 1916 federal act, South Dakota was allowed to build 8,000 miles of road with federal aid.

Federal involvement intensified after World War II, with a newly elected president who had first-hand experience of America's disorganized and inefficient road system, and had seen something different in Germany's autobahn. Dwight Eisenhower created a coalition in Congress to build an integrated interstate system of highways to expedite the movement of people and goods across state borders.



Former state highway employees Kline Nelson, far left, and Carroll Stageberg, third from left, work on plans in this undated photograph. Most of South Dakota Interstate highways 29 and 90 were designed and constructed in the 1960s and 1970s.

Construction: just the start of transportation investment

As many public leaders in those early days learned, and leaders today come to understand, building a road or bridge is just the beginning of a cycle of maintenance and reconstruction that continues as long as people drive on them. Pavement cracks need to be sealed or repaired to extend the life of the slab and the foundation underneath. If not done, the large cost of reconstruction will occur sooner. Bridges require maintenance, too. National bridge inspection standards require regular inspection of all bridges on public roads. South Dakota bridges on the state and local road systems are inspected on regular schedules of one-to-four years. Much of the SDDOT's work involves analyzing infrastructure condition data and scheduling life-extending treatments and repairs to wring as much life as possible from the pavement or bridge before reconstruction is necessary.

Federal funds for roads and bridge construction came with a stipulation still in effect today: States must pay for maintenance such as crack sealing, patching, snow removal and de-icing. To fund those activities, and raise matching funds for construction projects, a motor fuel tax of one cent was passed by the South Dakota Legislature in 1922. Motor vehicle sales were first taxed the next year. The state gas tax has inched up to 28 cents a gallon today, and the motor vehicle excise tax on new and used vehicles is four percent. Revenues go into the State Highway Fund.

South Dakota's road and bridge funding policy develops

"In general South Dakota leaders adopted a philosophy that those who used the highways and roads should pay for them. In turn, the people who used the roads expected that their taxes would be used for roads," Bucklin writes in *Going Places: History of the South Dakota Department of Transportation, 1956-Present*. When lawmakers strayed from pay-as-you-go, using more than half of motor fuel taxes for a veterans' fund, rural credit interest fund and to pay various state officials' travel costs, South Dakotans objected. A 1940 referendum prohibited diversion of

gas tax money from transportation projects. The constitutional amendment means the millions of dollars in the State Highway Fund can't be raided to avoid increasing other taxes. In other states, this dubious practice leads to deteriorating highway conditions.

The federal share of construction costs grew over the decades to 80 percent for non-Interstate routes and 92 percent for Interstate highways. The state match now is 20 percent and 8 percent, respectively. An informal agreement among South Dakota lawmakers, government officials and highway interest groups designated motor vehicle registration revenue, often referred to as license plate fees, as local road system funding, and motor fuel and motor vehicle excise tax revenues as State Highway System funding. The agreement, which became state

law in 1985, avoids tussles over slices of the three revenue pies. The state constitution also makes it difficult to issue bonds for road work. These limitations help keep our state highways and bridges in good condition and avoid the additional cost of bond interest. Pay-as-you-go, as opposed to shifting today's costs to tomorrow's users, remains the South Dakota way.

Because grading, paving, bridge construction, winter maintenance, and other transportation system assets and services are costly—the annual SDDOT budget is about a half-billion dollars in federal and state funds—the U.S. Department of Transportation and state DOTs continuously seek to reduce costs. In fact, the federal government requires states to use two percent of their annual federal allocations for research and planning.

A history of innovation

Over decades, the SDDOT earned a reputation for innovation. Most notable is invention of the road profiler, a system using sound waves (later, lasers) to measure road roughness and cracking, mounted on a vehicle moving at highway speeds. Other states copied the technology. Data from the profiler, which is more accurate than previous ways of measuring pavement roughness, is fed into a computerized pavement management system, also developed through SDDOT research, which helps SDDOT personnel optimize the overall State Highway System condition. More information about the SDDOT's history of innovation is on the next page.

Decades of implemented innovations, many developed through SDDOT research, have saved lives, stretched taxpayer dollars, and improved transportation for generations of South Dakotans

Federal road funds pay for research done at the national level and in South Dakota

Traveler information

Travel information by phone: South Dakota launched its 511 Traveler Information Service in 2002. It was the 10th state to offer a statewide 511 phone number for road condition information. The 511 service evolved from #SAFE, the first statewide phone-based road information system in the nation, developed by the SDDOT and North Dakota DOT.

Travel information through the Internet: South Dakotans can use smartphones and computers to check safetravelusa.com/sd/ for information about weather, road visibility, construction work zones and incidents affecting travel on state highways. One hundred and eleven cameras give seeing-is-believing images of current road conditions.

Automated delivery of customized travel information: ClearPath 511 is a free service delivering road condition, closure, re-opening and construction zone information via email or phone text messages by highway number, day of the week and time of day.

Free smartphone apps for travel information:

All information at safetravelusa.com/sd/ is now available on Android and Apple smartphones. Download a free app by searching for SDDOT 511 in the Google Play or iPhone app stores.

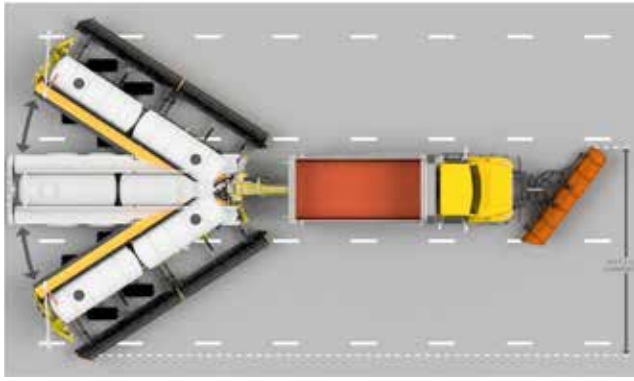


This safetravelusa.com/sd/ screenshot shows yellow "threat warnings" meant to alert motorists to poor driving conditions forecast for those highways in the next 24 hours.

Snow and ice removal

Maintenance decision software helps put snowplows and de-icing chemicals where they're needed, when they're needed: Working with 18 other states, the SDDOT has led research to develop and improve a maintenance decision support system (MDSS) for winter road maintenance. The system uses current weather and pavement condition data and weather forecasts, combined with the physics and chemistry governing the behavior of snow, ice and de-icing chemicals on pavements, to predict future road weather conditions. The MDSS provides guidance to our highway maintenance personnel on when to send out snowplows and what amount of de-icing material, if any, they should spread. When combined with the knowledge of our personnel, this system helps maintain as safe a driving surface as reasonably possible while avoiding waste of de-icing materials and labor. Eighty-five roadside environmental sensor stations feed current weather and pavement data to the MDSS.

Snowplow safety: State snowplows were repeatedly being rear-ended by motorists unable to see where the large yellow vehicles were in the clouds of snow often surrounding them. The SDDOT Research Office analyzed the crashes and determined how a variable angle blade could reduce blowing snow and increase visibility of the truck. That study and subsequent research also led to more effective lighting on snowplows.



When this technology evolved to allow the blade to swing from one side of the truck to the other, the SDDOT bought one and tested it in Sioux Falls during the winter of 2016-2017. Tow plows began being used in Rapid City, Hot Springs and Yankton in the winter of 2017-2018.

Pavements

Asphalt and portland cement concrete pavement design: Along with other state DOTs, the SDDOT is gradually moving from a standard method of designing pavements based on road-test data collected in the 1950s to a mechanistic-empirical method. Mechanistic-empirical pavement design takes into account the particular mechanical properties of soils underneath a road, the gravel and other granular materials used to support pavement, and pavement materials themselves to design a roadway that more exactly meets the needed performance level. This method could help save materials by avoiding greater pavement thickness than necessary and create longer-lasting pavements.

Warm-mix asphalt: Chemical and physical additives as well as asphalt foaming technology can reduce the temperature needed to produce asphalt concrete for highways, reducing the carbon footprint by 40 percent and emissions by 50 percent. This new method allows newly mixed asphalt concrete to be hauled longer distances and paving to be done at colder temperatures. The SDDOT researched how this new process could work in South Dakota.

Forensic analysis of concrete defects: When a defect in concrete pavement on highways or bridges occurs, a forensic investigation can determine the cause or causes. Ground penetrating radar (pictured on opposite page), infrared thermography, scanning electron microscopy and petrographic analysis can provide answers. When causes are identified, changes can be made in design, materials and construction procedures to prevent problems in future construction.

Bridges

Integral abutments for new steel girder bridges: The Bridge Design Office developed and adopted an alternative to an older jointed design with bearings. The change saved money during construction and reduced maintenance.

Self-consolidating concrete: Structural concrete is difficult to place in forms where heavy reinforcing steel restricts concrete flow and consolidation. Special concrete modified with chemical admixtures flows easily without segregating, ensuring concrete encases the steel and fills the form. Self-consolidating concrete saves time and labor.

Local road bridge alternatives: A series of research projects found ways to extend the service life of prestressed concrete girder bridges, the type used on many local roads. Other economical bridge designs also were identified.



The SDDOT has been researching how to improve a common bridge design used on rural roads.

Management systems

Roadway evaluation: Research shows that maintenance treatments applied at exact points in asphalt and portland cement concrete pavement service lives can delay costly reconstruction for years. A van equipped with systems that measure and record pavement conditions throughout the State Highway System is a critical part of this strategy. The road profiler uses lasers to measure pavement distresses such as cracks and rutting. Fed into the SDDOT pavement management system (PMS), this data is used to objectively prescribe maintenance treatments and prioritize projects. Using objective data to rank projects and treatments gives the public the best possible State Highway System with the funding available. One of the SDDOT's biggest points of pride is

that the technology used to accurately measure pavement roughness was invented at the SDDOT, and its PMS was developed and enhanced by consultants working with its personnel. SDDOT employees continue to incrementally improve both. A recent third-party evaluation concluded the SDDOT pavement management system is among the best, if not the best, in the nation.

Asset management: In addition to the PMS described above, management systems help the SDDOT inventory and analyze the condition and maintenance of bridges, heavy equipment, culverts, light poles and traffic signals. These systems make recommendations for maintenance work or alert the SDDOT that it would be more cost-effective to replace the equipment than keep repairing it. During major winter storms, the equipment management system ensures the SDDOT can deploy most of its equipment, rather than risk that older equipment will break down when it's needed most.

Other SDDOT research

- Automated commercial truck permitting
- Teen driver education
- Reducing crashes with wildlife
- Impacts of bridges, culverts on Topeka shiner populations
- SDDOT Transportation Systems Management & Operations Program Plan



In 1976, the SDDOT used granulated rubber from used tires in an experimental seal coat on South Dakota Highway 11 in Minnehaha and Lincoln counties.

Pavement management system is key to efficiency, good highways

In the 1970s, South Dakota Department of Transportation employees checked pavement conditions the old-fashioned way. They looked at them.

Driving slower than the rest of highway traffic, employees looked through windshields for cracks, faults, spalls and rutting. They periodically stopped to record observations and rate conditions from 0 (undriveably rough) to five (smooth new construction).

These ratings were combined with data from a roughometer driven over the same road to create a single Pavement Serviceability Rating number. Numbers for all highway pavement segments on the state system were compiled into what is now called the *Highway Needs and Project Analysis Report*.

Once a year, Central Office and field engineers met in Pierre to debate and decide what should be done to improve certain highway segments and when. Over several days they'd leaf through the needs book and draw on decades of personal experience building and maintaining those same highways to create a rolling four-year schedule of road and bridge construction projects now called the *Statewide Transportation Improvement Program*, or STIP.

Prioritizing construction projects by pavement conditions now goes by the trendy term "data driven," and between the 1980s and 2000s the SDDOT refined this approach into one of the best, if not *the* best, pavement management systems (PMS) in the country, according to a U.S. pavement expert.

"It's the essence of our business," says a longtime SDDOT employee.

Why is a good pavement management system important? Because South Dakota spends about \$275 million each year to keep the State Highway System's 7,798 center-line miles of pavement in good condition. When reconstruction of a single mile of two-lane highway can cost \$1.5 million or more, that amount is clearly not enough in the long term to keep all our highways in good condition—even with recent increases in the state gas tax, vehicle excise tax and license plate fees.

In the short term, the SDDOT must carefully allocate those dollars to projects that will maintain the overall system in the best possible condition. South Dakotans and South Dakota businesses depend on these pavements—which would cost nearly \$15 billion to replace—to go to work, ship products, serve tourists and run their businesses.

To be effective, a pavement management system needs accurate data. A giant step toward improving the accuracy of pavement condition data was invention of the South Dakota Road Profiler in the early 1980s by a young physics graduate in the SDDOT materials office.

Using off-the-shelf electronic components, he and SDDOT personnel equipped a Plymouth sedan with an accelerometer and ultrasonic transducers connected to a 256-KB minicomputer with dual eight-inch floppy disks. The instrumentation and computer could measure and record road roughness data and rut depths at highway speeds.

"A transducer similar to those found on some autofocus cameras transmits a 50-kHz sound toward the pavement surface. The pavement reflects the sound upward, where it is detected by the same transducer," he wrote in a 1987 paper. "The distance between the transducer and the pavement surface is computed from the elapsed time between sound generation and echo detection."

The profiler was more accurate than the roughometer because any effect road roughness had on the vehicle itself was subtracted from the measurement. It hasn't entirely replaced visual inspection, though. Employees still do windshield surveys to collect some data.

Lasers later replaced sound waves and measured additional pavement characteristics, and equipment to digitally record moving images of the pavement surface and surrounding

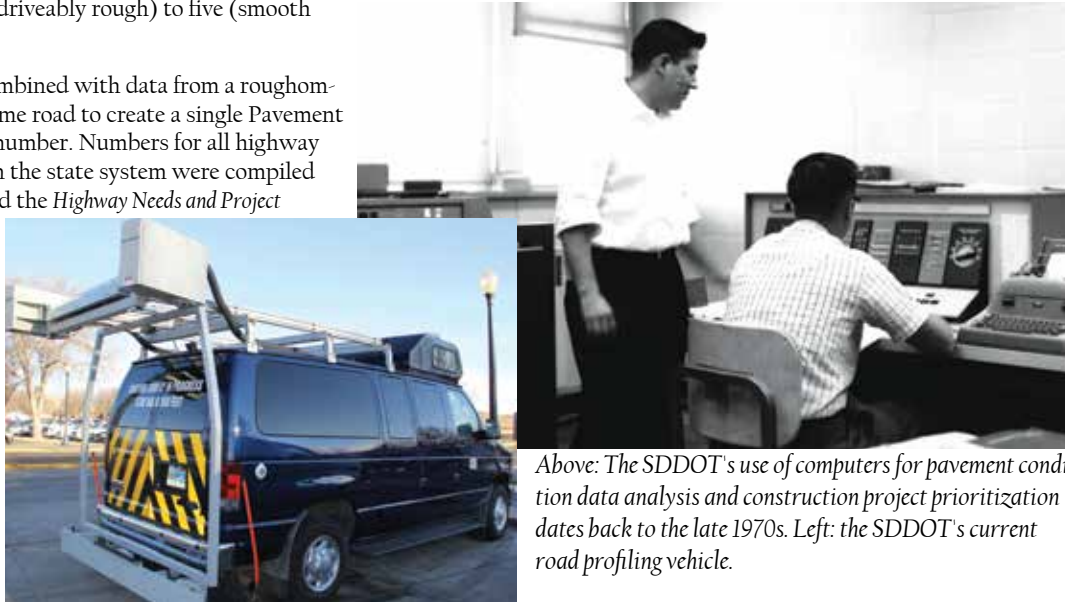
roadway was added to the profiling vehicle, allowing employees at their desks to see the actual roadways being analyzed. Other states copied the profiler, the technology was commercialized

The Rural Planning Inventory System, the SDDOT's first mainframe-based pavement management system, was developed in 1977. It analyzed pavement condition data and prioritized pavement improvement needs for a single year. In 1993, after using it for more than a decade, SDDOT personnel wanted the system to evaluate more options for maintaining good road conditions under varying budget scenarios and a longer time frame.

Working with a consultant, new software was written to store pavement performance data and analyze life-cycle costs for every highway segment in the state. The enhanced pavement management system used performance curves created from SDDOT engineers' expert knowledge of how five (later, six) types of asphalt concrete and five types of portland cement concrete pavements deteriorate over their service lives. Performance curves relating severity of distresses such as rutting, roughness and cracking to pavement age help the program calculate the best times for, and types of, maintenance treatments.

SDDOT personnel struggled with prioritizing projects unrelated to pavement conditions as the enhanced PMS evolved, eventually establishing decision-making processes for scheduling projects that increased safety, added lanes on busy segments and installed Americans with Disabilities Act-compliant curb ramps and traffic signals.

continued on p. 39



Above: The SDDOT's use of computers for pavement condition data analysis and construction project prioritization dates back to the late 1970s. Left: the SDDOT's current road profiling vehicle.

Grading & paving



Grading operation in 1935, county and road unknown



Placing of bituminous surfacing, Hand County, 1938



This 1939 photograph shows a Koehring longitudinal float used for portland cement concrete paving in Union County.



1947 photograph of "manner of laying subgrade paper with special cart"



Interstate Highway 90 grading west of Rapid City, circa 1959



Newly graded cloverleaf interchange of Interstate highways 90 and 29 in Sioux Falls, circa 1961. Object at left is an airplane wing strut.



Cement placer on Interstate Highway 29, 1962



Federal stimulus funding in 2009 helped reconstruct segments of I-29 and I-90, including this northbound I-29 segment between the Beresford and Volin exits.

Crossings, connections & culverts

A brief history of the state bridge office



Former South Dakota state chief bridge engineers Kenneth Scurr, first from left; John E. Kirkham, third from left; J. Harper Hamilton, fourth from left; and other unidentified state highway personnel, circa 1921-24.

For as long as anyone remembers, the South Dakota Department of Transportation has had—human nature notwithstanding—a cooperative culture in which employees work to make roads and bridges the best they can be for the driving public: in design, construction or maintenance.

Perhaps this stems from so many employees spending most of their careers here, developing an easy rapport as they work on many aspects of the State Highway System.

The SDDOT's bridge engineers have their own version of this fellowship and professionalism. It springs from a history of striving to design, build and maintain structures with available funding, and, when asked to create uniquely context-sensitive crossings, doing so in a way that boosted tourism and earned international acclaim. Office leaders have come up through the ranks and served long tenures. Over almost a century, there have been just nine chief bridge engineers.

"The comradeship, professionalism and technical capability/expertise displayed in the Office of Bridge Design over the years have been nothing short of exemplary. A string of long-term bridge professionals serving as mentors continues to this day in those currently leading the office and department into excellence tomorrow," said Kevin Goeden, the eighth chief bridge engineer, who retired in 2016.

Bridge-building in South Dakota began as a local responsibility, local people being the ones who benefited from them most. When Gov. Peter Norbeck and the Legislature began planning a state road system in 1917, bridges became a state responsibility, and a well-regarded Iowa State University engineering professor with a bent for self-promotion saw his opportunity. Norbeck took John E. Kirkham on a tour of South Dakota, and the

engineer persuaded the governor state bridges could be built more economically. Kirkham was hired in 1919 and assembled a staff including several of his former students.

Kenneth Scurr, a Kirkham student who joined him in Pierre and eventually became the third chief bridge engineer, described Kirkham as having "a brilliant engineering mind bordering on genius." Under his leadership in the 1920s, Missouri River bridges were built at Mobridge, Chamberlain, Wheeler, Pierre and Forest City.

For counties, Kirkham's office developed standardized bridge plans suited to the state's climate, terrain and rural traffic needs, according to Steven Bucklin, a University of South Dakota professor who wrote a state transportation history.



The Keystone Wye bridges

To Scurr fell the later responsibility of replacing those bridges with structures over the Missouri River reservoirs created by the federal Pick-Sloan Flood Control Act of 1944. Interstate Highway 90 travelers crossing the Missouri can see the recycled spans of the old Chamberlain and Wheeler bridges on the local-traffic bridge between Oacoma and Chamberlain, just north of the I-90 bridge.

Two Black Hills bridge projects gave South Dakota's bridge staff a chance to create engineering marvels. The first were three curving "pigtail" bridges, built to conform to U.S. Highway 16A's cork-screw turns, with the help of the Custer State Park Board and U.S. Forest Service. First constructed of

Black Hills timber, the wood deteriorated and was replaced with steel. The route is a must-see for Black Hills visitors, including bikers attending the August Sturgis Motorcycle Rally. The two Keystone Wye bridges, built in 1967-1968 of laminated timber, are the office's crowning achievement. Use of three hinged, timber glulam arches for the high bridge was rare for highway structures of the time. The Keystone Wye bridges form a three-level interchange for U.S. highways 16 and 16A.

"There were comments and questions from all over the world. A similar bridge was built in Japan, as I recall," said Clyde Jundt, who designed it. He later became the sixth chief bridge engineer. "The number of questions and comments were considerable. Questions started soon after the bridges were built: what would be done to preserve the timber from deterioration, rot, vandalism, etc."

Most bridge engineering work is more mundane: determining the size and type of pipe culvert needed to drain water from roadways, repairing girders smacked by trucks with overheight loads, replacing old bridges with structures designed to today's standards and analyzing bridge condition data.

One of the office's current challenges is replacement of the many highway bridges built when Interstate Highway 90 and Interstate Highway 29 were constructed in the 1960s and 1970s. Construction of these second-generation bridges is being spaced further apart, so they won't all come up for replacement again at the same time. In this way, the cost of the third generation of Interstate bridges will be less of a strain on future state highway construction budgets.

SDDOT chief bridge engineers 1919 to present

- | | |
|-----------------------|------------------|
| 1. John E. Kirkham | 6. Clyde Jundt |
| 2. J. Harper Hamilton | 7. John Cole |
| 3. Kenneth Scurr | 8. Kevin Goeden |
| 4. Philo Schultz | 9. Steve Johnson |
| 5. K.C. Wilson | |

Connecting Platte and Winner,
East River and West River

Building South Dakota's longest bridge



A little more than a mile long, the bridge connecting the cities of Platte and Winner is easily South Dakota's longest. Without it, traffic would have to detour about 85 miles to use the next-closest bridges. A concrete plant located on the shore provided the portland cement concrete needed to create the hollow prestressed, precast concrete pipe piles supporting the bridge, and once installed, to backfill them. Far left: the casting

beds, with the prestressed reinforcing steel exposed on the right, used to create the concrete pipe piles, which were four feet in diameter. Longtime SDDOT engineer Vern Bump is the man walking along the casting beds. The other photos show the piles in stages of being placed. Photos are circa 1963, except for the 1966 finished bridge photo in the background. The SDDOT has begun planning this bridge's replacement, tentatively scheduled for construction in the mid-2020s.

Rail service

Essential to the state economy for over 100 years



South Dakota officials are hoping economic development prompted by recent investments in state-owned rail lines will go beyond giant new grain elevators to other rail-reliant businesses.

“While we’ve got some of these big elevators [that] have gone in as a result of what we’ve done with rail, there is tremendous opportunity between the Kimball elevator and the Kennebec elevator for other rail-related businesses to come in,” Transportation Secretary Darin Bergquist said in 2017.

“We’re probably at least weekly talking to somebody who’s got a business who says ‘I need reliable rail service in order to locate my business.’ We’re saying, ‘We’ve got lots of places in South Dakota to put you.’ We’d sure like to see us be able to expand on that and take further advantage of that rail investment we’ve made,” he told a legislative committee.

Rail service was the fastest way to move people and freight as eastern populations pushed into Dakota Territory in the late 1800s, but a transcontinental main line was never built through South Dakota. Western South Dakota was largely Indian reservation at the time, and east-west main lines were constructed through Nebraska and North Dakota. The federal government didn’t allow Indian land to be crossed until the turn of the century.

Rail was the first transportation mode to have a dedicated government body in South Dakota, the Board of Railroad Commissioners, which eventually became the current South Dakota Railroad Board.

The rail lines built in South Dakota were largely secondary main lines and branch lines, which had to support themselves with intrastate traffic. In 1905, the Milwaukee Road was allowed to cross the Missouri River at Chamberlain, and the Chicago and North Western crossed it at Pierre in 1907. The state has never had a major north-south interstate rail line.

According to the state’s first rail transportation plan, published in 1978, railroads in the early 1900s served mostly eastern South Dakota communities, carrying passengers, partial carloads of goods and mail, and grain, which could vary in volume by crop year. When railroads began to discourage or eliminate partial carloads, merchants turned to trucks. The automobile eventually outcompeted passenger rail, and the original lighter rail proved inadequate for heavier train cars and loads. Rail conditions worsened.

By the 1970s, poor rail service had become a big problem for South Dakota farmers, who needed cost-efficient transportation of growing yields of soybeans, wheat and corn to other states and nations, and to receive fertilizer. The line feeding lignite coal from North Dakota to the Big Stone City power plant was on the verge of abandonment. South Dakota’s economy faced a grave threat, and the private sector didn’t appear able to resolve the issues. The SDDOT Division of Railroads was organized in 1975 to maintain adequate rail service in the state.



2017 South Dakota Rail Map

The Milwaukee Road, with about 1,500 miles of track in the state, went bankrupt in 1977, ending service to a large part of South Dakota. In Jan. 1979, the mess became Gov. Bill Janklow’s problem, and its resolution one of his and the Legislature’s greatest achievements. To resume rail service for grain shippers, the state in 1980 bought the tracks deemed vital for agricultural commodities and that connected to national and international markets, dubbed the “Core Line.” Also purchased were branch lines serving communities with an interest in their development. The enabling legislation allowed regional railroad author-

ities to lease state-owned tracks to railroad operators. A temporary one-cent sales tax increase raised \$25 million—\$18 million for the trackage and right of way, \$7 million for improvements. A railroad board and authority were created, and, as the healthiest railroad in the state able to operate the Core Line, BNSF Railway was selected by the state to run it.

The Division of Railroads created plans to identify and prioritize line problems, which helped the state qualify for Railroad Revitalization and Regulatory Reform Act of 1976 funding. The 1978 Local Rail Service Assistance Act also provided funding. Responsibility for managing the lines moved to the SDDOT Planning Division and now is held by the Rail Office.

The Core Line, which served the East River areas generating the most rail traffic, had priority during the first years of state ownership. The 368-mile Core Line went south from Mitchell through Yankton to Sioux City, north to Aberdeen and east to Canton, then Canton to Sioux Falls.

The Chicago and North Western Railway also proposed abandoning South Dakota trackage in the 1980s. This time, a South Dakota U.S. senator helped maintain service. The Dakota, Minnesota and Eastern Railroad (DM&E) emerged from the ashes to haul grain, bentonite and kaolin clay. Later it sought approvals to build track to Wyoming’s Powder River Basin to haul coal. A subsequent owner, Canadian Pacific, gave up the effort in 2012 and sold the DM&E line west of Tracy, Minn., to Wyoming & Genesee. It was renamed the Rapid City, Pierre and Eastern Railroad (RCP&E).

Unmet needs of a small number of West River grain farmers became an issue. A state law was passed allowing tandem trucks on the State Highway System. Highways are now designed to accommodate their movements.

When the BNSF in 2005 exercised its right to purchase the Core Line under previously agreed terms, reluctant

continued on p. 39

No license, no car, no problem

With public transit, South Dakotans get where they need to go

South Dakota's public transit services are a success story that Jim Severson and Willis McLaughlin are proud of.

"Some elderly individuals, when they stop driving, they're able to still access essential services, get to the senior center, go to the meals project, go shopping, banking—those types of things— medical appointments," says Severson, who administers Older Americans Act funds at the Department of Human Services.

"Probably those two groups, I would say, elderly and the disabled, if some of them didn't have transportation [to meal sites or for meal delivery to their homes], where would they be at?"

The services McLaughlin, Severson and many others helped develop provide about 1.7 million rides a year to rural South Dakotans, including the elderly and people with disabilities. That's an average of 4,700 rides a day.

The SDDOT administers Federal Transit Act funding, the major source of financial support for rides provided by about 44 local organizations. Section 5311 funding pays for services for rural residents in general, and Section 5310 funding covers services to the elderly and people with disabilities. Section 5339 funding helps pay for buses and facilities. Fares and other federal, state and local funds (public and private), cover the remaining costs.



A vehicle used to transport the elderly on the Cheyenne River Indian Reservation at the White Horse meal site, 1979

Sioux Falls, Rapid City, North Sioux City and the tribes deal directly with the Federal Transit Administration for their operating funding, but the cities get capital funding through the SDDOT.



School children transferring Brookings Area Transit Authority buses

Federal legislation passed in the 1960s funded public transit, and South Dakota state government agencies began supporting transit services because so few communities offered them.

Lack of coordination among state services led to creation of the state Transportation Planning and Coordination Task Force in 1976, and the SDDOT was designated the lead agency for public transit. At that time, people over 60 were eligible for public transit service under the Older Americans Act Title III-B funding administered by the state Department of Health, Education and Welfare. Over at the state Department of Labor, Work Incentive Program participants were served by public transit in areas where it had not been readily accessible or available.

The Department of Transportation could apply for Urban Mass Transportation Act

grants or loans to purchase vehicles, facilities to house them and land for local transit agencies. The task force wrestled with separate federal laws and regulations for each program, restrictions on funds that limited who could be served, differing state agency policies and legal liability issues.

With the group's 1977 report, "Interagency Coordination Report on Public Transportation in South Dakota," a decades-long effort began to coordinate state agency public transit efforts and encourage local organizations, including schools and senior centers, to work together to create a single transit service serving everyone in a community or area. The late former Gov. Bill Janklow intensified these efforts in his later terms.

Public transit agencies now serve people throughout most of the state. Some agencies serve a single city or a city and county, others multiple towns in multiple counties.

Public transit services also help meet state policy goals to keep the elderly and people with disabilities living independently in their communities, instead of clustered in nursing and group homes in urban areas, and help low-income people get to jobs.

In 1985, the SDDOT's public transit program joined together with North Dakota's public transit agency to form the Dakota Transit Association. Under this organizational umbrella state and local transit officials work to improve public transit in both states and share training opportunities. In turn, the Dakota Transit Association is part of the Community Transportation Association of America (CTAA), which helps state and local transit understand how the federal government is administering public transit programs and represents local and state agencies' concerns. The CTAA also offers competitions that have provided opportunities for South Dakota's

transit agencies to benchmark performance against other public transit agencies. River Cities Public Transit in central South Dakota won the CTAA Rural Transit System of the Year award in 2006. Ron Baumgart of River Cities and Barb Cline of Prairie Hills won Community Transportation Manager of the Year awards in 2013 and 2007, respectively. Prairie Hills Transit in western South Dakota also won a regional Federal Transit Administration award in 2012 for its new intermodal building.



Riders on East Dakota Transit, which serves the city of Madison and Lake County

"Maybe it's changed, but the transit providers in this state do not pat themselves on the back," McLaughlin adds. "What they do, they don't want to brag. They just think that's their job to do."

McLaughlin, now retired and living in Pierre, is encouraged when he sees young people using River Cities Public Transit in Pierre and Fort Pierre, and Severson imagines a future where youth are lifelong regular transit users.

The two men look at the current level of services with some satisfaction, especially services now available to the elderly and disabled. "What would they do without it? Now that they have it, I don't know," says Severson. "Couldn't live where they're at," responds McLaughlin.

Airports connect S.D. with rest of U.S.; support ag, emergency services

For many South Dakotans, travel by air is an occasional event, a hop from Rapid City, Sioux Falls, Aberdeen, Pierre or Watertown to a hub, then transferring to a larger plane headed for the real destination.

The broader story of South Dakota aviation today, though, is more about maintaining air service at a level that supports agriculture, tourism, economic development and responses to emergencies. Conveniently connecting business people with their customers and corporate offices, and state government officials with their state and federal colleagues in the nation's capital and other cities, is important. And now there's something new to manage: drones and other unmanned aircraft.

The SDDOT's Air, Rail and Transit Office and the state Aeronautics Commission work to make sure air service is safe, runways are maintained, and planes and pilots are licensed. Federal Aviation Administration funding for their work, which includes administering grants for runway maintenance and other airport improvements, comes from charges on each passenger ticket originating at a South Dakota airport, as well as aviation fuel taxes.

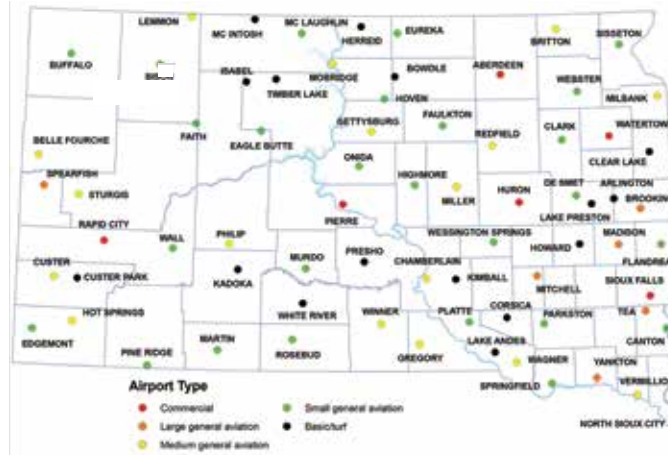
Travel by air in South Dakota started as a novelty. Barnstormers came to town in the 1910s, and, goggles on, performed stunts and gave rides in biplanes, University of South Dakota history professor Steven Bucklin recounts in a history of state transportation. Package delivery and passenger service businesses were started, and cities and counties began to provide landing fields.

South Dakota servicemen who learned to fly during World War I were among the state's first pilots. To prepare for World War II, the army took over the Sioux Falls, Pierre and Watertown airports, and after Pearl Harbor, the Rapid City Army Air Base was established to train B-17 Flying Fortress crews. The base has since been renamed Ellsworth Air Force Base. The South Dakota Air National Guard headquarters is at the Sioux Falls airport.

The South Dakota Civil Air Patrol also has its origins in preparation for World War II. It continues to encourage young people to learn to fly and assists local and state agencies with fire suppression and aerial searches.



Inspection of the newly constructed east end of the east-west runway at the Sioux Falls airport in 1978



South Dakota Airports



North Central Airlines plane at the Huron airport, undated photo. North Central Airlines became Republic Airlines in a 1979 merger.

The state Aeronautics Commission was created by a uniform aeronautics law passed by the 1935 South Dakota Legislature. The state had 27 airports, 85 licensed pilots and 86 licensed planes at that time. The commission was an independent agency until 1973, when it became part of the Department of Transportation.

Commercial service in the 20th century, the kind average South Dakotans use to visit relatives or take vacations, has been as turbulent as the history of the airline industry, with many different airlines serving cities for a time. Today, only Sioux Falls and Rapid City offer unsubsidized commercial service.

South Dakota's smaller cities, including its capital, have struggled to keep passenger service since 1978, when deregulation allowed airlines to drop less-lucrative or unprofitable routes. The same legislation deregulating the U.S. airline industry created the Essential Air Service, which subsidizes airlines serving sparsely populated areas. Today Pierre and Watertown have this subsidized service through Aerodynamics Incorporated, which has a codeshare and hosting agreement with Great Lakes Jet Express, and Aberdeen has subsidized service from SkyWest Airlines, which does business as Delta Connection.

South Dakota state government started an in-state service among South Dakota cities in October 1990, only to ground it in February of the next year because of inadequate ridership.

Although most passengers in South Dakota ride on highways, and freight in South Dakota moves in trucks or on rails, aviation's economic impact is substantial. A total of \$792 million in direct and indirect business sales in South Dakota are aviation related, supporting 7,000 jobs and providing \$251 million in personal income, according to the *South Dakota State Aviation System Plan, 2010-2030*.

Safety

Transportation professionals in South Dakota and the rest of the United States have learned a great deal about highway safety since 1917, the year the South Dakota Highway Department was created.

Delineators

Delineators prevent crashes. These reflectors on sticks help drivers stay in their lanes at night and when pavement markings are covered by snow and ice. Snowplow drivers are big fans. Delineators were required along Interstate highways when they were new more than a half-century ago (see picture below). Because they proved effective in improving safety, delineator use in South Dakota grew from placement along curves of other state highways in the late 1970s to standard equipment on all state highways today. Delineators also are used on bridge approaches.



Inslopes

The typical fatal crash in South Dakota is a one-car rollover. The angle of the slope down from the shoulder—called the inslope—can help prevent a rollover or decrease its severity by reducing the force that flips the vehicle as a panicked driver of a drifted vehicle tries to reverse course and return to the driving lane. Many older American highways have steeper slopes than would be designed today. The SDDOT's current standard for slopes without barriers is a ratio of 4:1 for state and 6:1 for Interstate highways. Regrading two-lane rural state highways with steep inslopes is expensive, but the state is flattening inslopes on these routes in conjunction with other improvements as funding permits.



Above: This 1936 paving scene in Hand County shows how steep inslopes on early highways could be. At right: The gentle inslope on this South Dakota highway may have contributed to this driver's survival.



Guardrail

Guardrail is designed to prevent vehicles from plunging down steep slopes and from hitting bridges and other obstacles. It can absorb a moving vehicle's energy and bring it to rest or deflect it back onto the roadway in a manner minimizing the risk of crashing into other vehicles. Today's cable guardrail (pictured below) is safer than stout posts used when Interstate highways were constructed in the 1960s (pictured at left).



Above: Posts along Interstate Highway 90 in Pennington County, 1964. Right: Cable guardrail on I-90 in 2017.



Roadway lighting

In our 2006 customer satisfaction survey, South Dakota drivers told us they wanted better lighting at rural Interstate highway interchanges. We added additional lighting at the start and end of Interstate 29 exit lanes to Elk Point (18), Canton (62) and Dell Rapids (98), and Interstate 90 exit lanes to Whitewood (23) and Ellsworth Air Force Base (67, pictured). Though some might argue exits at Brookings (133 on I-29), Spearfish (10 and 17 on I-90) and Watertown (177 on I-29) are urban, those got additional lighting on exit lanes as well. Interstate 29 Exit 68 to Lennox and Exit 71 to Tea and Harrisburg are scheduled to get additional lighting within the next decade. Installing lights at the start and end of two exit lanes at one interchange costs about \$125,000.



Responding to winter weather, floods and other disasters

Pietz led '96-'97 road-clearing operations when snowstorms "just wouldn't quit"



Didn't matter if the road was state or local during the bad winter of 1996-1997: the SDDOT worked to keep them open as snow fell and the wind moved it around. This is a Brown County road.

During the worst blizzard in the worst winter in recent history, the SDDOT Operations Director was stranded in Rapid City. Not a problem for Clyde Pietz. He coordinated the agency's snow-removal activities by phone from the Rapid City Region Office's conference room.



Clyde Pietz

"I could do the same thing there as I could from my office here,"

he said during a recent interview in the Becker-Hansen Building.

Pietz made it back to Pierre by state plane after the Jan. 9-12, 1997, storm, but his working life and the lives of his subordinates were 12-hour days, seven days a week, week after

week. He'd come in around 6:30 a.m., discuss conditions with his Area and Region Engineers, then cross to the Capitol to go over the situation with Gov. Bill Janklow and 20-30 other state officials. The group repeated the process at mid-afternoon.

"You know, it was the worst one by far that I had anything to do with," Pietz, now retired, says of the winter of 1996-1997. "It went on for so much longer. We had storms that were that bad during quite a few years, but the duration was usually just several days or a week or so. That one just wouldn't quit. It just—day after day after day. That's what made it so bad."

SDDOT employees have worked through uncounted blizzards and bad winters during the last century, including icy power-line snappers, monster-snowdrift makers and ones with whipping subzero winds. In addition to

snow removal and de-icing, they and SDDOT's equipment protect bridges and roads as rivers rise or help clean up after floods, including the 1972 Rapid City flood, when 238 people died.

Bad-winter stories are an integral part of South Dakota history. From the perspective of SDDOT employees responsible for keeping paved roads open, the winter of '96-'97 is legendary.

The rescue of a 51-year-old Webster woman made national news. She and others chanced driving despite warnings from officials. She used her cell telephone to tell the pilot of a plane flying over the area when it sounded near or far. Ten minutes before the phone battery would have run out, her location was pinpointed, and rescuers came on snowmobiles. She had been snowbound for 40 hours.

"We were quite involved in that," Pietz says. The SDDOT had pulled its plows off area highways due to zero visibility. "The county sheriff told me he needed to go out and make an effort. We went and we didn't get very far out of Webster and had to turn around, but we tried."

In Pierre, Central Office staff manned telephone hotlines every night for weeks, recording reports of blocked roads, jotting down requests for help and providing information. State Radio linked agencies responding to emergencies.

Cattle and buffaloes used the wind-packed snowdrifts to escape pastures, sometimes ending up on nearby highways. When new snow wasn't falling, winds relocated any dry snow, forming new drifts on recently cleared roads.

The SDDOT lost maintenance staff in state employee layoffs earlier that year, but he thinks it had a fairly good fleet for winter maintenance, except for the powerful equipment needed to deal with those hardened drifts.

"That was so much worse than a normal situation. We didn't have adequate heavy snow-removal capability, mainly rotaries that blow the snow, big trucks with a lot of power

and a blower on it. When you get to a point where you can't push it anymore, that was your only recourse. We probably only had maybe a dozen or so of them, two or three to each Region. You couldn't move them around enough where we had too many places. So we brought in a lot of those from neighboring states, Iowa and Nebraska mostly. We probably had 20 of those or more even that we brought in to help with that effort. After that storm, we got more of them (heavy equipment and rotaries), plus we got more of the bigger snowplows. It's the kind of piece of equipment that's very expensive, and maybe you don't even use it every winter—you don't need it—until you get one like that."

The South Dakota National Guard also greatly assisted the department during the Jan. 9-12 storm.

Spring flooding followed the difficult winter. The SDDOT worked with federal agencies to document damage and fund repairs on the state and local systems.

Pietz was in many ways a typical SDDOT employee. The Hosmer native graduated from the South Dakota School of Mines and Technology in 1962 with a civil engineering degree and, except for a short stint as a Naval Civil Engineer Corps officer, worked here his entire career. He first surveyed and inspected construction projects in Redfield, then helped complete construction of Interstate highways 90 and 29 at posts in Pierre, Huron and Aberdeen. He headed Operations from the mid-1980s until he retired later in 1997. His extraordinary service during the winter of '96-'97 earned him a place in 2004 in the South Dakota Transportation Hall of Honor.

Even when SDDOT co-workers disagree, they come together after a decision is made, Pietz explains as he's asked about the SDDOT's 100 years of service. "This is a great department. There are many good, loyal employees who work for the department. This is a great place to work," he says. "It's always been that way."

Aberdeen Region

2016 major state projects



North of Huron: Highway 37 gets new PCC surface



Resurfacing deteriorated portland cement concrete (PCC) pavement with bond-breaker fabric is becoming almost routine in the Aberdeen Region. The method involves laying a nonwoven polypropylene fabric about a quarter-inch thick on the existing concrete, then placing the new layer of PCC on top. In this case, the resurfacing was on 3.8 miles of state Highway 37 north of the Huron city limits. The fabric is strong enough to prevent the new pavement from adhering to the existing concrete and can drain water between the two layers. Another option for deteriorated PCC is to crush and recompact the old concrete into a supporting layer for new PCC.

2014 average daily traffic (ADT)	2,146 vehicles	+23%
2034 projected ADT	2,650 vehicles	

U.S. highways 212, 281 resurfaced through Redfield

Segments of two U.S. highways intersecting in Redfield were milled and resurfaced with asphalt concrete in 2016. The U.S. Highway 212 portion extended west 7.5 miles from 2nd Street West in Redfield to west of the James River. One approximately half-mile U.S. Highway 281 segment went from 16th Avenue north to the west U.S. 212 junction, and the second half-mile from the east U.S. 212 junction to the northern city limits. The project included Americans with Disabilities Act-compliant curb ramps and a new traffic signal where the two highways coincide at Seventh Avenue and Main Street.



	U.S. 212	U.S. 281
2014 average daily traffic (ADT)	1,909 vehicles	4,622 vehicles
2034 projected ADT	2,256 vehicles	5,464 vehicles
18% increase projected in 20 years for both segments		



Aberdeen: New turn lanes at U.S. 12 intersection

U.S. Highway 12 is one of the few east-west highways spanning the northern half of South Dakota and, as Sixth Avenue Southeast in Aberdeen, an important commercial area. A new left-turn lane at Lamont Street South allows vehicles to wait to the side as northbound traffic uses the other lane to go into the Aberdeen Mall parking lot or eastbound traffic turns east on Sixth. It also relieves traffic buildup on Seventh Avenue Southeast. A new Sixth Avenue right-turn lane helps traffic flow, as does increased space for turning. In addition to relieving congestion, turning lanes reduce rear-end crashes. Safety was further enhanced with new sidewalk on the south side of the intersection, sidewalk repair and new ADA-compliant curb ramps. A new traffic signal offers push buttons for pedestrians walking to and from the mall.

2015 average daily traffic (ADT)	13,502 vehicles	+29%
2035 projected ADT	17,418 vehicles	

Hamlin, Clark counties: 10 miles of state Highway 28

Almost 10 miles of state Highway 28, from the south state Highway 25 junction to east of Bryant, were cold milled and resurfaced with asphalt concrete. ADA-compliant curb ramps were added on sidewalks along Highway 28 as it goes through Bryant. This 2016 project also included pipe work in the rural areas.

2014 average daily traffic (ADT)	2,146 vehicles	+24%
2034 projected ADT	2,650 vehicles	



Flashing red beacon for pedestrian crossing added to U.S. Highway 81

Children and other pedestrians walking to and from a school and a daycare in northern Watertown now are able to cross U.S. Highway 81 at a new, midblock crosswalk between East Highland Boulevard and 12th Avenue Northeast. To stop traffic, they push an audible button activating a flashing red beacon. The red beacon requires highway traffic to stop at the crosswalk. The decision to install the red flashing beacon on Highway 81 came after school and daycare officials expressed concern about childrens' safety in the area. The beacon is the only one of its kind in South Dakota. A new stoplight also was added at the 10th Avenue Northeast intersection. The 1.4-mile urban reconstruction project included grading, portland cement concrete paving, roadway lighting, storm sewer, curb and gutter, and sidewalk. In December 2016, the SDDOT and its contractor were notified this project had won the South Dakota Chapter of the American Concrete Pavement Association's award in the urban arterials and collectors category.

2014 average daily traffic (ADT)	7,638 vehicles	+45%
2039 projected ADT	11,076 vehicles	

Mitchell Region



Sioux Falls traffic through new Interstate Highway 29-Interstate Highway 229 interchange expected to more than double by 2036

With major Interstate Highway 29 and Interstate Highway 90 projects recently completed on the west and north sides of Sioux Falls, the time came to reconstruct the 55-year-old I-29 and Interstate Highway 229 interchange on the south side. Farm fields south of Sioux Falls have been changing to residential and commercial properties as growth spreads into Lincoln County. Completed in 2017, traffic approaching or exiting the interchange now has three lanes to maneuver and crosses new northbound and southbound I-29 bridges. The I-29 part of the reconstructed interchange is expected to carry 70,500 vehicles a day by 2036, 112 percent more than 2013. The I-229 and I-29 on and off ramps carry 6,000-9,000 vehicles a day now, but are projected to serve 9,000-15,000 in 2036, an increase of roughly 50 percent.

2013 average daily traffic (ADT) 33,300 vehicles
 2036 projected ADT 70,500 vehicles **+112%**

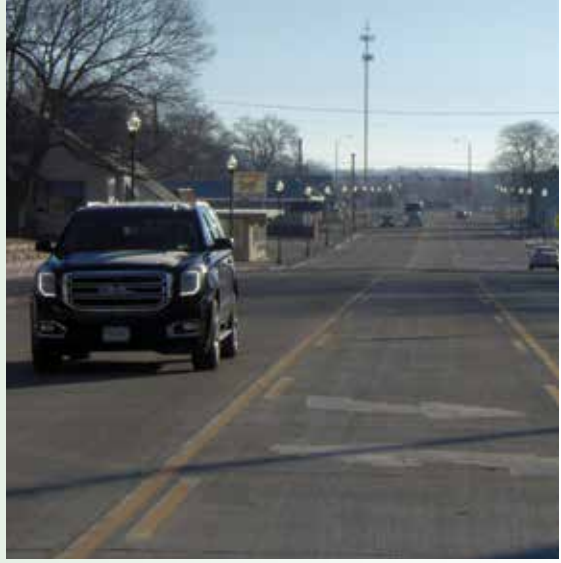
Yankton: Highway 50 from U.S. 81 to Marne Creek

South Dakota Highway 50 pavements have had some hard use in recent years, especially while the Discovery Bridge was being built as the new U.S. Highway 81 bridge over the Missouri River to Nebraska. In phase 1 of this project, 31-year-old portland cement concrete (PCC) was removed, the roadway regraded and new storm sewer, curb and gutter, lighting, sidewalks, signs and traffic signals were installed. The new surface between Broadway Avenue and Burleigh Street, two lanes each way with a center turn lane, also is PCC. In phase 2 in 2017, another almost mile-long section between Marne Creek and Archery Lane was reconstructed. The Marne Creek bridge got a deck overlay, as well as new approach guardrail, approach slabs, berm repair and riprap.

2013 average daily traffic (ADT) 9,321 vehicles
 2033 projected ADT 11,717 vehicles **+26%**

I approach this intersection from different directions several times a week, and each time I'm impressed with the improvements. It's safer, easier to navigate and a huge improvement. Kudos to all those involved in the planning and construction. It's a job well done.

— David Kelly, Sioux Falls



U.S. Highway 81 resurfaced, Freeman to S.D. 46

This 20-mile project spanning Hutchinson and Yankton counties made numerous improvements to extend the service lives of portland cement concrete (PCC) pavement segments, including PCC repair, culvert repair, new edge drains on two elevated curves, growth joint installations and a project-length asphalt concrete overlay.

2014 average daily traffic (ADT) 1,986 vehicles
 2034 projected ADT 2,426 vehicles **+22%**



S.D. 17 reconstructed through Lennox

South Dakota Highway 17 through Lennox was reconstructed in 2016 with asphalt concrete pavement. The 1.2-mile segment, built in 1949 and last resurfaced in 1987, went from the state Highway 44 junction to the northern city limits. Grading, new curb and gutter, and new roadway lighting were part of the project. The improvements will help this northern Lincoln County community handle growing traffic.

2015 average daily traffic (ADT) 3,363 vehicles
 2036 projected ADT 6,504 vehicles **+93%**



Mitchell Region

Reconstructed South Dakota Highway 34 serves eastside Madison businesses, growing industrial park

With so many Madison residents and businesses affected by the reconstruction of South Dakota Highway 34 (North 2nd Street) in 2016, the SDDOT and its contractor made sure the public had a weekly opportunity to learn and express concerns about its progress. Work was designed to allow head-to-head traffic in two lanes along the work zone. The westbound lanes and the Washington Avenue intersection were reconstructed in phase 1, followed by the two eastbound lanes in phase 2. The center turn lane was rebuilt during phase 3. The project included grading, portland cement concrete paving, storm sewer, curb and gutter, street lights, sidewalks and traffic signals. Some access points to roadside parking lots were closed to decrease the potential for crashes. The city took advantage of the opportunity to install new sanitary sewer and water main along the route during phase 1 and paid extra to have energy-saving LED light fixtures. The improved state highway will accommodate increasing traffic as businesses have developed along the highway and in Lakeview Industrial Park.

2013 average daily traffic (ADT) 6,592 vehicles
 2033 projected ADT 7,805 vehicles **+18%**



S.D. 44 resurfaced to west of Platte-Winner bridge

The Platte-Winner bridge on state Highway 44 connects West River and East River residents in south-central South Dakota and is one of seven state-owned Missouri River crossings. This project milled 16 miles of the existing asphalt concrete's top layer and recycled this material to resurface the segment with asphalt concrete, from the state Highway 47 junction east of Dixon to the bridge. Without this route, residents and trucks would have to loop north to Chamberlain or south to Pickstown for a Missouri River crossing, a one-way trip of about 85 miles, using more fuel and time. With the bridge, the distance between Winner and Platte is 53 miles. Although current average daily traffic reflects the region's rural character, the percentage of trucks using this segment is high, 21%, underscoring the route's economic importance.

2014 average daily traffic (ADT) 543 vehicles
 2034 projected ADT 618 vehicles **+14%**



Dell Rapids: 3-year state Highway 115 project begins

Dell Rapids residents will have a new three-lane, portland cement concrete highway through town and two new bridges over the Big Sioux River's north and south branches when this South Dakota Highway 115 project is done. Work began south of Dell Rapids at the Colton corner (248th Street) in 2016, ending at Quarry Road. Sioux quartzite underlying the area is scenic when exposed along the river, but that bedrock, paired with 2016's upstream rainfall, delayed construction of the southern Big Sioux River bridge, prompting a switch in the work sequence. Reconstruction of the Interstate Highway 29 interchange (Exit 98) will be done in 2017, followed by reconstruction or overlay of the central Highway 115 segment from Quarry Road to 472nd Avenue on the west side of Dell Rapids in 2018. The northern Big Sioux River bridge and a small bridge over Rocky Run Creek also will be reconstructed in 2018. The project includes regrading, storm sewer, and curb and gutter.

2014 average daily traffic (ADT) 3,629 vehicles
 2039 projected ADT 5,987 vehicles **+65%**

Sioux Falls: new Veterans Parkway segment opens

Another piece of a future outer beltway envisioned for Sioux Falls' east side was completed in 2016. This 1.1-mile segment was the first to be an entirely new road, branching off South Dakota Highway 11 at North Powderhouse Road and running northeasterly to Maple Street. The four-lane expressway project has long been referred to as South Dakota Highway 100, but the city of Sioux Falls, which eventually will take over the route, changed the official name of the segment north from 57th Street to Veterans Parkway in 2015. Work on the segment from Maple north to Rice Street started in 2016 and was completed in 2017. Construction of a new I-90 Exit 402 interchange is scheduled for 2018.

The 2035 average daily traffic (ADT) on the Madison-to-Maple segment of Veterans Parkway is projected at 38,000 vehicles.



Pierre Region

I-90 eastbound lanes between Belvidere and Kadoka reconstructed with improved drainage

I-90 westbound lanes from west of Draper to west of Murdo get PCC overlay

Two stretches of Interstate Highway 90 between the Missouri River and the Black Hills were resurfaced in 2016: eight miles in Jones County and 11 in Jackson County. Swelling and shrinkage of Pierre Shale underlying the eastbound lanes of the Jackson County segment led to uneven pavement and a rough ride, necessitating removal of the existing concrete and material beneath. In Jones County, the westbound lanes' pavement was cracked but not as uneven, making a portland cement concrete overlay with bond-breaker fabric a cost-effective way to provide a smoother ride. An additional benefit to using the unwoven polypropylene fabric, which provides a sturdy surface for a new PCC layer, is shorter construction time. Travelers spent less time driving in two-way traffic on the opposite Interstate lanes, an important safety consideration, especially during the Sturgis Motorcycle Rally. New edge drains on both segments will improve drainage from the roadway. Grading on the two projects created gentler slopes, and culverts were cleaned, extended and repaired.

I-90 westbound, Jones County Draper to Murdo		I-90 eastbound, Jackson County Belvidere to Kadoka	
2014 ADT	2,864 vehicles	2,787 vehicles	
2034 ADT	3,353 vehicles	3,208 vehicles	
17% increase in 20 years		15% increase in 20 years	



U.S. Highway 212: another example of asphalt recycling

What is the most recycled material by weight in the United States? Not paper or plastic. According to the U.S. Environmental Protection Agency, it's old asphalt concrete pavement. The South Dakota Department of Transportation and other state DOTs add the asphalt material and aggregate to "new" asphalt concrete mixtures or grind it into granular material for base courses and highway shoulders. This project recycled 9.4 miles of U.S. Highway 212 asphalt concrete pavement between Gettysburg and Lebanon. Both aggregates and oil were recycled when the pieces of the old pavement were blended into the new asphalt concrete mix. Special machines working along the old pavement broke up the remaining asphalt concrete, blended it with existing base course material and recompact the mix as new base course. Full-depth reclamation costs less than reconstruction with all-new materials and, by incorporating recycled asphalt concrete, the new base course is stronger and resists moisture better than before. Any leftover asphalt concrete is stockpiled for future use.

2014 average daily traffic (ADT)	964 vehicles
2034 projected ADT	982 vehicles
Trucks make up 19% of the traffic on this segment.	

Hoven funds local improvements as S.D. 20 is reconstructed

As state Highway 20 was reconstructed through town, Hoven was upgrading its water and sewer lines with an eye to the future. The city of 406 hopes retiring farmers and ranchers living outside of town will decide to move to Hoven when they retire. Hoven wants to keep its young people, too, and rebuilt the high school that burned in 2014 as a new addition to its elementary school. Northwest of town, the main runway at the airport was reconstructed in 2016 as well. The state highway project included grading, asphalt concrete surfacing, curb and gutter, roadway lighting, sidewalks with curb ramps, and new storm sewers. The improved infrastructure will serve residents and visitors of Hoven's main attraction, St. Anthony of Padua Catholic Church, the "Cathedral of the Prairie," located along the highway, which attracts tourists from all over the world to its regular celebrations of Mass and special musical events.

2013 average daily traffic (ADT)	1,048 vehicles
2038 projected ADT	1,071 vehicles

Trucks make up 12% of traffic on this segment.



U.S. Highway 12 resurfaced between Selby and Bowdle

About 22 miles of the asphalt concrete surfaces of U.S. Highway 12 and U.S. Highway 83 from Selby to Bowdle were cold milled and resurfaced with asphalt concrete in 2016. Milling machines have drums studded with carbide cutters that grind off asphalt concrete at varying depths. In this case, the top layer of asphalt concrete was ground off, and the rest of the pavement was left in place, to be resurfaced later with asphalt concrete containing a percentage of the milled material. Culverts underneath pavements were flushed out, and some culvert joints sealed. Some of the reclaimed asphalt concrete was used to widen median shoulders and the rest stockpiled for future use. Rumble strips also were ground into the new pavement.

U.S. Highway 12 east-west segment

2014 average daily traffic (ADT)	1,364 vehicles
2034 projected ADT	1,398 vehicles

Trucks make up 30-31% of the traffic in the project area.



Bond breaker fabric



Rapid City: Mount Rushmore Road project progresses

Reconstruction of Mount Rushmore Road (U.S. Highway 16) between Kansas City and St. James streets, the project's second phase, was largely completed in 2016. Businesses remained open on this traditional route south to Mount Rushmore, with two-way traffic on the northbound lanes as southbound lanes were rebuilt and then the reverse as northbound lanes were rebuilt. Keeping the public informed and minimizing its impact on people and businesses are important parts of this major urban project's long history. The SDDOT and its contractors used tweets, a website, open houses and news releases, in addition to availability of their personnel, to make sure people knew what was happening and how it affected businesses, residents and traffic. Employees and customers of businesses along the Kansas City-St. James segment could park at the Rushmore Plaza Civic Center and take a free shuttle to those businesses. The new Mount Rushmore Road has portland cement concrete (PCC) pavement, sidewalks, traffic signals, curb and gutter, lighting and landscaping. Phase 3, St. James to Flormann streets, started in late 2016 and is expected to be completed in 2018.

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



A safer, more efficient interchange at Interstate Highway 190 and Silver Street in Rapid City

The 58-year-old Interstate Highway 190-Silver Street interchange in Rapid City was overdue for redesign and reconstruction. This mile-long segment connects Interstate Highway 90 to the north with Omaha Street in downtown Rapid City, which links to Mount Rushmore Road, the traditional route to South Dakota's tourist mecca, the Mount Rushmore National Memorial. After studying options with interchange users, residents, other government officials and an engineering consultant, the SDDOT decided to build a single-point intersection connecting to an extended Silver Street. The design accommodated existing traffic patterns but involved removing an entire hill. The extensive excavation, which began in late 2015, had a silver lining, so to speak. The 100,000 cubic yards of earth were repurposed as fill for the bridge embankments. A new bridge with a higher vertical clearance replaced the old. Traffic leaving or heading toward I-190 now is controlled by one traffic signal under the bridge—the "single point" in single-point intersection. Ramps entering or exiting I-190 are longer, increasing safety. Pedestrians and cyclists have an entirely new bike path along the western side of I-190 and along North Street, and sidewalk along 11th Street connecting to the city bike path. New storm sewer, sanitary sewer and water mains were installed.

Interstate Highway 190 interchange

2014 average daily traffic (ADT)	17,681 vehicles
2035 projected ADT	22,261 vehicles

Interchange traffic is expected to **increase 26%** in 21 years.



U.S. 85 reconstructed in Deadwood, Pluma to Cemetery

Realignment and reconstruction of U.S. Highway 85 in Deadwood presented engineering challenges, including ADA accessibility, utility conflicts and managing tourist traffic during peak construction season. This segment of U.S. 85 was widened to include a center turn lane between Pluma Junction and Walnut Street. New sidewalk borders the realigned roadway, and on-street parking was added from Walnut to Cemetery streets. The Cemetery Street intersection got an upgraded traffic signal. New decorative lighting lines Harrison to Walnut streets, and the city of Deadwood requested and paid the extra cost for 46 more from Walnut Street to Deadwood Gulch. Asphalt concrete was chosen for the surface because it hardens faster than PCC, allowing the road to be quickly reopened to traffic.

2013 average daily traffic (ADT)	5,410 vehicles	+35%
2033 projected ADT	7,320 vehicles	

I-90 Service Road reconstructed further west of I-90

The I-90 Service Road (Sturgis Road) running parallel to the eastbound Interstate Highway 90 lanes between Piedmont and Tilford was moved further west in 2015 and 2016. The move creates space for expansion of I-90 from two lanes each way to three lanes each way from Rapid City to Sturgis when the need arises. Realignment increased safety by reducing the risk of vehicles on I-90 leaving their lanes and crashing into vehicles on the service road. Other safety features: six-foot paved shoulders, new signs and delineation, and a reduced speed of 45 mph. New structures were built over Elk and Little Elk creeks. Space now exists for development along both sides of the road. Crossovers were constructed near Exit 44 and at Elk Creek on I-90 for use during reconstruction of I-90's existing two lanes, as well as a slightly realigned segment of the Clover Place Service Road near Tilford. Between exits 44 and 46, the service road along I-90's westbound lanes was realigned in 2015 to go east, then south to Elk Creek Road. This gravel road will be maintained by Meade County and the city of Piedmont.

2009 average daily traffic (ADT)	700 vehicles	+49%
2029 projected ADT	1,045 vehicles	



Rapid City Region



An illustration of how traffic flows over the new Interstate Highway 90 Exit 14 interchange at Spearfish

Interstate Highway 90 Exit 14 interchange redesigned for better traffic flow

Reconstruction of Spearfish exit was completed in 2017

This massive project will improve traffic flow in the northern Black Hills for residents, truckers and tourists, especially those visiting during the Sturgis Motorcycle Rally. The redesign merges the former U.S. Highway 14A-Colorado Boulevard intersection and Exit 14 interchange into a single-point intersection flowing over a new Interstate Highway 90 underpass. This simplification reduces the potential for crashes and will accommodate growing traffic in the Black Hills. In 2016, repaving of the eastbound and westbound I-90 lanes was completed, and the U.S. Highway 14A-Colorado Boulevard segments were reconstructed. The east half of the new underpass also was built. The old underpass was demolished in the spring of 2017. The west half of the new underpass was constructed and 27th Street reconstructed in 2017.

2009 average daily traffic (ADT)	11,750 vehicles
2035 projected ADT	34,500 vehicles

Traffic is expected to almost triple on this I-90 segment in 26 years. Trucks make up 13% of traffic.

Reconstruction of U.S 85 through Lead completed

Plans to reconstruct U.S. Highway 85 (Main Street) through Lead energized efforts to improve Lead's downtown and diversify its economy. The half-mile reconstruction project went from Blatt to Julius streets and included another mile of concrete pavement repair within city limits. The highway between Julius and Galena streets was rebuilt in 2014 with portland cement concrete pavement (PCC) and storm sewer, curb and gutter, and widened sidewalks. In 2015 the same was done from Galena to Blatt streets. The city paid the added cost of decorative roadway lighting along the reconstructed segments and for new sanitary sewer and water lines, separating century-old combined storm and sanitary sewer lines. A new Homestake Sanford Lab Visitor Center opened in 2016 on the lower end of U.S. 85, and new businesses include a microbrewery, pharmacy and hardware store. Crews also removed buried rails from the old electric trolley system, remnants of another era in transportation.

2010 average daily traffic (ADT)	4,790 vehicles	+7%
2030 projected ADT	5,115 vehicles	



New Highway 73 bridge, box culvert in Perkins County

Although U.S. Highway 85 to the west shoulders much of the North Dakota oil and gas field traffic coming from the south, South Dakota Highway 73 carries a significant amount, too. This project constructed a Highway 73 bridge and reinforced concrete box culvert to handle heavy loads for decades to come. The new prestressed girder bridge over the Moreau River at right is 395 feet long. A picture of the old Moreau River bridge is directly below. The four-barrel box culvert spans Flint Rock Creek.

2013 average daily traffic (ADT)	396 vehicles	+26%
2033 projected ADT	500 vehicles	

Trucks make up 31% of the vehicles using this route.



I-90 resurfaced from Wyoming line to Exit 10

The PCC surface of this Interstate Highway 90 segment was built 40 years ago and needed to be replaced. An asphalt concrete overlay was an option, but engineers knew cracks in PCC could migrate through the new layer. To avoid this, and the cost of complete reconstruction, they decided to "crack and seat" the old PCC. A breaker machine broke PCC into evenly sized pieces separated by hairline cracks, then a heavy roller compacted them into a level surface that uniformly and flexibly supports the overlay. This work will extend the service life of these 10 miles of I-90 and provide a smooth ride. The project included culvert repair, guardrail, shoulder shaping and permanent pavement markings.

2013 average daily traffic (ADT)	5,394 vehicles	+63%
2033 projected ADT	8,786 vehicles	

Trucks make up 16% of traffic on this route.



“ Every project we have has got a safety component in it. I like to think DOT is improving safety one construction project at a time. We really like working with the citizens and communities up here in northeastern South Dakota to make that happen. ”

— Jeff Senst, Aberdeen Region Engineer

Aberdeen Region: Center-line rumble stripes

Center-line rumble stripes were added on U.S. Highway 12 and other two-lane highways in Beadle, Brown, Codington, Edmunds, Grant and Hamlin counties by a 2017 safety project. Center-line rumble stripes alert drivers straying into opposing lanes, reducing head-on and side-swipe crashes.



U.S. 212 resurfacing in Deuel County

This 7.4-mile portland cement concrete resurfacing project in Deuel County contributed to the smooth ride motorists are experiencing on this east-west U.S. Highway 212 stretch starting in Faulk County. New shoulders are asphalt concrete.

Trucks make up 23% of average daily traffic on this rural segment.

S.D. 45 resurfaced in Hand, Buffalo counties

Thirteen miles of South Dakota Highway 45 were resurfaced with asphalt concrete in the fall of 2017. The resurfaced segment stretched from 208th Street in Hand County, went by the Sunshine Bible Academy and ended one mile into Buffalo County. Culverts underneath the road also were repaired, and new permanent signing installed.

Trucks make up 23% of average daily traffic on this rural segment.



S.D. 37 through Groton resurfaced

Groton area residents' patience in 2017 was rewarded with a reconstructed mile-long segment of state Highway 37 through town and a reconstructed Highway 37-U.S. Highway 12 intersection on the city's west side, where trucks will more easily turn. Work included asphalt concrete resurfacing on 37, traffic signals, curb and gutter, storm sewer and Americans with Disabilities Act-compliant sidewalks, plus roadway lighting and signs on both highways.

Traffic on both highways is expected to **grow 30%** over 20 years. Trucks are 18% of traffic on the U.S. 12 segment.



U.S. Highway 14-Sixth Street reconstruction improves traffic flow in Brookings

Reconstruction of Sixth Street in Brookings from 20th to 34th avenues relieved congestion on the mile-long segment, making it easier and safer to get on and off Interstate Highway 29 and to access businesses clustered near Exit 132. The 22nd Avenue intersection was widened to as many as seven lanes, with additional right-turn and left-turn lanes. The two original bridges carrying eastbound and westbound traffic over I-29 were replaced with a single bridge carrying traffic in both directions. Pedestrians will be safer on the new sidewalk added to both sides of 6th Street and on both sides of the new bridge. The project, paved with portland cement concrete, also serves industrial development east of I-29, where Daktronics has long manufactured electronic signs and a Bel Brands USA cheese plant was built in 2012. Storm drainage was improved, and the city of Brookings replaced water main, sanitary sewer and electrical ducting during the reconstruction.

2015 average daily traffic (ADT)	11,058 vehicles	+28%
2035 projected ADT	14,133 vehicles	

Mitchell Region

Mitchell's Burr Street-S.D. Highway 37 reconstructed from I-90 to Havens

New sidewalk, path safer for pedestrians, cyclists

Burr Street, the main road taking residents and tourists north into Mitchell from Interstate Highway 90, was reconstructed to Havens Avenue in 2017. You name it, it was replaced with new and better: portland concrete pavement, curb and gutter, storm sewer, roadway lighting and traffic signals. The redesign adds a five-foot-wide sidewalk on the east side of Burr and an eight-foot pedestrian path on the west that accommodates cyclists. Both comply with the Americans with Disabilities Act. The wide, grassy ditch of the divided highway was replaced with a narrow raised median, creating a condensed roadway that improves traffic flow from intersecting roads. In 2018, similar work will be done from I-90 south to Spruce Street, where new development has sprouted near Cabela's, Menard's and the Mitchell Technical Institute. Service roads at the Norway Avenue intersection were redesigned and reconstructed to reduce congestion at nearby fast-food restaurants. The project will be completed in 2019.

2015 average daily traffic (ADT)	5,157 vehicles	+4.8%
2040 projected ADT	7,607 vehicles	

Trucks make up 17% of traffic on this segment.



Veterans Parkway in Sioux Falls

The new Veterans Parkway in Sioux Falls, formerly known as South Dakota Highway 100, came closer to Interstate Highway 90 in 2017. The new Maple-to-Rice segment is portland cement concrete and includes a box culvert, curb and gutter, roadway lighting, a traffic signal and storm sewer. This 1.7-mile segment, like the Maple-to-Madison segment completed in 2016, is an entirely new road that will eventually lead to a reconstructed Exit 402 interchange. That project gets underway in 2018.

Veterans Parkway is expected to carry 38,000 vehicles per day by 2035, 7% of which will be trucks.

I-29, Minnehaha and Moody counties

Interstate Highway 29 from north of the Colman-Madison exit (Exit 109 to S.D. Highway 34) to south of the Crooks exit (Exit 86) was resurfaced with asphalt concrete during the summer of 2017. Work on both the northbound and southbound lanes of the 24.8-mile I-29 maintenance project included installation of new guardrail and edge drains, pavement repair and pipe extensions.

2015 average daily traffic (ADT)	17,149 vehicles	+4.0%
2035 projected ADT	24,060 vehicles	



Mitchell Region: center-line rumble stripes

Center-line rumble stripes were added across South Dakota in 2017 to improve highway safety statewide. A Mitchell Region project added them to U.S. highways 18 and 81 and segments of state highways 11, 19, 34, 38, 42 and 46 in Lake, Lincoln, McCook, Minnehaha and Yankton counties. Center-line rumble stripes reduce head-on and sideswipe crashes on two-lane rural highways by alerting drivers who stray into opposing lanes. Transverse rumble strips were added to State Highway 11 northbound and southbound lanes near the 271st Street intersection in Lincoln County to increase safety there.





Yankton: State Highway 50

Work on South Dakota Highway 50 in Yankton continued in 2017, with a portland cement concrete overlay of eastbound and westbound lanes from Archery Lane to the start of divided lanes east of the city. From there, only the westbound lane of the divided highway was overlaid with portland cement concrete to west of Gayville. This urban construction project included guardrail and edge drains.

<u>S.D. 50 two-lane segment</u>			
2015 average daily traffic (ADT)	8,371 vehicles		
2035 projected ADT	11,268 vehicles	+35%	

<u>S.D. 50 westbound lane segment</u>			
2015 ADT	2,423 vehicles		
2035 projected ADT	3,291 vehicles	+36%	

I-90 bridges near Brandon

Like other bridges on the state's Interstate highways, the two Interstate Highway 90 structures over Split Rock Creek east of the Brandon exit reached the end of their design lives and needed to be replaced. Work on two new prestressed girder bridges began in 2017 and is scheduled for completion in July 2018.

2015 average daily traffic (ADT)	13,630 vehicles	+67%
2040 projected ADT	22,830 vehicles	



State Highway 50 east of Vermillion

State Highway 50's eastbound lanes from Vermillion to just west of Interstate Highway 29 and both lanes from the west side of the I-29 interchange east to the state Highway 11 junction were overlaid with asphalt concrete in 2017. The work was completed after a reinforced concrete box culvert replaced a bridge on the segment east of I-29. Three new box culverts, and pipe culverts at two locations, also were added to this segment that spring and summer. Both lanes of a Highway 50 Loop segment (easternmost Cherry Street) also were milled and overlaid.

<u>Western S.D. 50 segment, eastbound traffic only</u>			
2014 average daily traffic (ADT)	3,301 vehicles		
2034 projected ADT	4,282 vehicles	+30%	

<u>Eastern S.D. 50 segment, both directions</u>			
2014 ADT	1,195 vehicles		
2034 projected ADT	1,610 vehicles	+35%	

Reconstructed I-29 Exit 98 interchange has safety-enhancing updates

State Highway 115 through Dell Rapids being rebuilt with center turn lane

Reconstruction of the Interstate Highway 29-South Dakota Highway 115 interchange west of Dell Rapids began in 2017, the second year of a three-year project that includes widening state Highway 115 through the growing northern Minnehaha County city. The Highway 115 and interchange work were separate projects that were combined to minimize inconvenience to motorists. While the diamond shape of the rural-access interchange remained, many design changes were made to increase safety. The new bridge has a higher clearance than the original, which was built in 1963. Highway 115's grade was raised to improve sight distances for exiting I-29 traffic and traffic turning on 115. The ramps were redesigned with longer acceleration and deceleration lanes, and their grades were raised to Highway 115's new levels. The project is scheduled to be completed in June 2019.

Highway 115

2015 average daily traffic (ADT)	3,604 vehicles	+65%
2040 projected ADT	5,946 vehicles	



Pierre Region

2017 major state projects



U.S. 18 and U.S. 83 reconstructed through Mission with added sidewalk

Pedestrians and cyclists in Mission will be safer with new sidewalk on both sides of reconstructed U.S. Highway 18 and U.S. Highway 83 segments through town. Most of the U.S. 18 segment is being widened to two lanes each way with a new two-way center turn lane. The U.S. 83 segment is being changed to one lane each way with a two-way center turn lane, and, on the southern end, two right-turn lanes, along with an increased capacity driveway to the Todd County Middle School. A new traffic signal will be installed at the U.S. 18-U.S. 83 intersection, and the existing signal at U.S. 18 and Main Street will be replaced. New portland cement concrete paving, storm sewer, curb and gutter, Americans with Disabilities-Act upgrades and roadway lighting will be included. Existing weigh-in-motion equipment about six miles east of Mission on U.S. 18 also is being upgraded.

U.S. 18 segment

2015 average daily traffic (ADT)	9,315 vehicles
2040 projected ADT	15,602 vehicles

U.S. 83 segment

2015 ADT	2,971 vehicles
2040 projected ADT	4,976 vehicles

67% increase projected in 25 years for both segments

U.S. Highway 83 between Pierre, I-90

U.S. Highway 83's surface between Pierre and Interstate Highway 90 was micromilled in 2017 and given a smooth asphalt concrete overlay. The segment stretched from eight miles north of I-90 to Fort Pierre's Bad River bridge. Segments in Pierre of U.S. Highway 14B from Fourth Street to the four-lane and U.S. Highway 14 from just east of Pierre to seven miles east of town also got new asphalt concrete surfaces. Center-line rumble stripes were ground into the U.S. 14 portion to enhance safety. Rumble stripes were added on U.S. 83 shoulders in both directions.

2015 average daily traffic (ADT)	1,961 vehicles	+61%
2035 projected ADT	3,166 vehicles	



I-90 eastbound lanes, Murdo to Draper

An 8.4-mile eastbound Interstate Highway 90 segment from three miles west of Murdo to three miles west of Draper was resurfaced in 2017 with a portland cement concrete overlay. The asphalt concrete shoulders were milled and resurfaced, along with the Exit 191 ramps. Pavement beneath the bridges at exits 191 and 192 was removed, and the areas regraded to a lower level to increase the clearance to 16 feet. New edge drains will improve roadway drainage.

I-90 eastbound lanes only

2015 average daily traffic (ADT)	2,849 vehicles	+17%
2035 projected ADT	3,336 vehicles	

Trucks make up 28% of average daily traffic.

State Highway 63, I-90 to Midland

A 13.5-mile state Highway 63 segment from Interstate Highway 90 to Midland was milled and resurfaced with asphalt concrete in 2017. Cattle passes that were no longer being used were converted to culverts. Other culverts were repaired and/or cleaned out.

2015 average daily traffic (ADT)	283 vehicles	+13%
2035 projected ADT	320 vehicles	

Trucks make up 21.5% of average daily traffic.



Rapid City: I-190/Silver Street interchange

The new, single-point interchange at Interstate Highway 190 and North Street is improving traffic flow and traffic safety for Rapid City pedestrians and cyclists. City residents, the SDDOT and its contractors celebrated the three-year project's completion with an Aug. 15, 2017, ribbon-cutting. The new bridge's higher clearance reduces the chance of truck hits. Underneath the bridge, a single traffic signal controls movement. Ramps entering and leaving I-190 are longer, and people walking or biking have a new path along the western side of I-190 and along North Street, while sidewalk along 11th Street connects to the city bike path.

Interstate Highway 190 interchange

2014 average daily traffic (ADT)	17,681 vehicles	
2035 projected ADT	22,261 vehicles	+26%



Butte and Harding counties: state Highway 79

Extensive cracking and rutting on this 34.5-mile segment of South Dakota Highway 79 prompted the SDDOT's decision to mill the asphalt concrete surface and place an asphalt concrete overlay. Some of the asphalt millings were recycled into the new asphalt concrete surface. This is a low-volume highway, but it carries lots of truck traffic to and from the North Dakota oil and gas fields.

State Highway 79

2015 average daily traffic (ADT)	446 vehicles	
2035 projected ADT	512 vehicles	+15%

Trucks make up 27% of traffic.



Rapid City Region: Crack leveling, sealing, chip seals

Leveling uneven slabs of pavement was one of the goals of maintenance projects on state highways 20, 34, 73, 79 and 168 and U.S. highways 12 and 85 in the Belle Fourche Area in 2017. Asphalt concrete pavement contracts during South Dakota winters, leaving transverse cracks across driving lanes. These cracks can lead to uneven asphalt concrete surfaces that make for a rough ride, and to water infiltration that erodes the materials supporting the pavement. Asphalt mastic, a mixture of asphalt cement and small limestone aggregate, was poured and spread across cracks. When set, asphalt mastic provides a durable surface for heavy traffic. Leveling cracks is quicker and much less expensive than replacing the concrete. Chip seals were applied to the highway segments after cracks were sealed or leveled.



Wider shoulders increase safety on southwestern S.D. highways

Wide highway shoulders can save lives and prevent serious injuries. A shoulder is a level recovery area for a vehicle straying from the driving lane. People bicycling, jogging or walking along a rural road are safer on wide shoulders than narrow shoulders or in driving lanes. Shoulders also are places for law enforcement and maintenance workers to perform their duties without closing a lane. U.S. Highway 18's one-foot-wide shoulder was regraded to eight feet in 2017, from Pine Ridge east to the U.S. Highway 391 junction. U.S. Highway 391 was milled and resurfaced from the same junction south to the Nebraska state line. Three box culverts were built on the U.S. 18 segment, which also was milled and resurfaced. State Highway System safety improvements are part of the SDDOT's efforts to significantly reduce fatal and serious-injury crashes by 2019.

U.S. Highway 18 segment

2012 average daily traffic (ADT)	2,459 vehicles
2032 projected ADT	3,017 vehicles

U.S. Highway 391 segment

2012 ADT	855 vehicles
2032 projected ADT	1,049 vehicles

23% increase projected in 20 years for both segments



Shoulder width now



Shoulder width before

Rapid City Region



Calined banxite aggregate is spread over pavement previously coated with an epoxy 'glue'. This high-friction surface benefits winter drivers and motorcyclists navigating the Black Hills' many winding roads.

16 western South Dakota highway curves get high-friction surfaces in 2017

Earlier Deadwood, Sioux Falls projects cut crashes

When South Dakotans meet road ice, there's a good chance they'll say goodbye traction, hello ditch—or worse. Snow removal and de-icing chemicals go a long way in keeping winter drivers on the road, but on high-speed curves, the laws of physics are working even harder against them. A high-friction surface treatment—a thin layer of extremely hard small aggregate glued to existing pavement—increases friction between the road and tires, which helps drivers keep control of their vehicles and stay in their lanes. In 2017, these treatments were applied to 16 locations with winter-crash histories: eight segments of U.S. Highway 14A, four on U.S. Highway 85, one on U.S. Highway 16, the U.S. Highway 18-state Highway 79 junction, the eastbound Interstate Highway 90 curve northwest of Tilford and I-90 Exit 63's westbound on ramp. Crashes dropped dramatically after high-friction surface treatments were applied in Boulder Canyon near Deadwood and Sioux Falls in 2014. The SDDOT hopes for the same from these Rapid City Region segments.

I-go between Tilford, Piedmont regraded for growth

The SDDOT is thinking far ahead as it reconstructs the two eastbound and two westbound lanes of Interstate Highway 90 between exits 40 (Tilford) and 44 (Piedmont). The roadway is being graded for three lanes each way, although only two lanes each way will be paved with portland cement concrete. Construction of the third lanes depends on traffic growth in coming years. Four continuous concrete bridges are being built within the segment, which will include an additional two prestressed girder bridges in the redesigned Exit 44 interchange. (pictured). The project includes seven box culvert extensions, signs, lighting and pavement markings. In 2017, the westbound lanes were rebuilt; the eastbound lanes will be done in 2018. Completion is scheduled for June 2019.

Interstate Highway 90, Exit 40 to Exit 44

2015 average daily traffic (ADT)	18,052 vehicles	+27%
2035 projected ADT	22,872 vehicles	



Rapid City: Mount Rushmore Road work nears end

Reconstruction of Rapid City's Mount Rushmore Road (U.S. Highway 16) continued from St. James to Flormann streets in 2017. Work on the southbound lanes began in March, with two-way traffic moved to the northbound lanes. Two-way traffic switched to the new southbound lanes in June while the northbound lanes were reconstructed. New sanitary sewer, water main, storm sewer, retaining walls, medians, landscaping, curb and gutter, sidewalks and driveways are included in the city-state project, which is scheduled to wrap up in 2018.

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

Redesigned Spearfish exit serves more traffic

Spearfish residents have a rebuilt Exit 14 from Interstate Highway 90 that improves traffic flow as the number of vehicles using it triples in coming decades. The interchange bridge links Spearfish to Walmart and other retailers in a growing commercial area north of the Interstate, as well as serving Sturgis Motorcycle Rally and other Black Hills tourist traffic. The redesign eliminated the U.S. Highway 14A-Colorado Boulevard intersection, creating a single point for traffic control. Reconstruction of the bridge's west half and 27th Street was completed in 2017.

2009 average daily traffic (ADT)	11,750 vehicles	+211%
2035 projected ADT	34,500 vehicles	





Former state Sen. Mike Vehle (front and center) celebrates re-opening the Foster Street bridge in Davison County with, from left to right: Commissioner John Claggett; Highway Superintendent Rusty Weinberg; Commission Chair Brenda Bode; Commissioner Dennis Kiner; Andrea Horton, Davison County Highway Department administrative assistant; Commissioner Randy Reider, Commission Vice Chair Kim Weitala; and Mark Jennings and Jeff Bathke, both with the Davison County Office of Emergency Management.

Local bridges are being evaluated, repaired and replaced by the state BIG program

The first Bridge Improvement Grant (BIG)-funded project was completed in Davison County in October 2017.

Preservation work on the Foster Street bridge over Firesteel Creek included new transverse stiffeners, new steel diaphragms, a concrete bridge deck overlay, new guardrail and repainting. The bridge serves commuters from housing developments northeast of Mitchell and is on an emergency route to Avera Queen of Peace Hospital.

These improvements cost \$507,200 in BIG funding and \$158,000 from Davison County. The work is expected to extend its service life 12-15 years. Replacing the 166-foot steel girder bridge, built in 1952, would have cost \$1.2 million.

Current state Transportation Commission member and former state Sen. Mike Vehle, who led the successful 2015 effort to increase state and local bridge and road funding, attended the ribbon-cutting, along with Lt. Gov. Matt Michels and Transportation Secretary Darin Bergquist.

Three other BIG projects were completed in 2017.

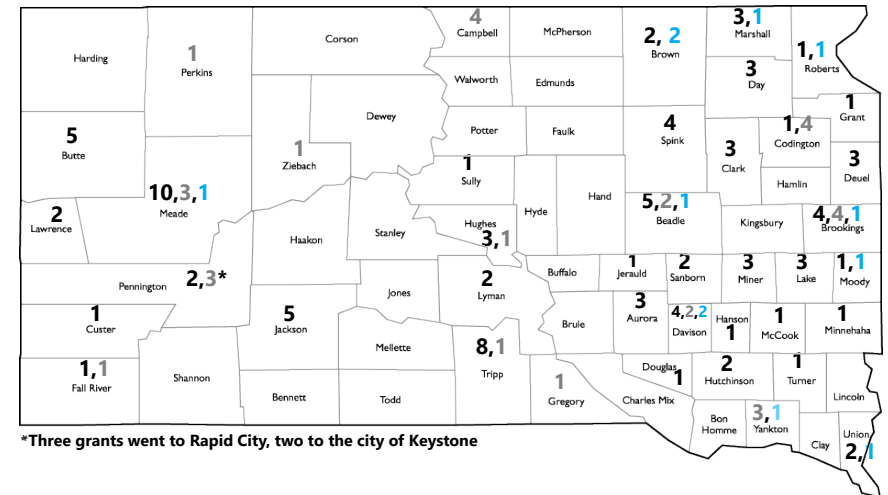
Box culverts were installed over the Langford Ditch on 120th Street, northwest of Langford in Marshall County and west of Peever in Roberts County. A bridge deck overlay was completed southeast of Bruce in Brookings County.

West of Ward in Moody County, the Fink Bridge over the Big Sioux River is scheduled to be replaced with a 234-foot prestressed girder bridge in 2018. The Third Avenue Southeast bridge over Moccasin Creek in Aberdeen and the Pine Street bridge over Marne Creek in Yankton also are expected to be replaced in 2018.

BIG grants at work

Grant types awarded, 2016-2018 (Aug. 24, 2017), to cities and counties

- Preliminary engineering, 96
- Preservation, 31
- Repair/replacement, 12



Left: Signs like this one will be posted at completed BIG projects. Right: Construction workers spread fresh concrete over exposed reinforcing steel on the deck of a Brookings County-owned bridge southeast of Bruce. This overlay project was one of four BIG projects completed in 2017.

Sturgis Main Street reconstructed with additional utilities, upgraded water lines

New downtown landscaping ties in with Harley-Davidson Plaza

Taking a design cue from the new Harley-Davidson Plaza, downtown Sturgis began undergoing a makeover in 2016. Completed in June 2017, five blocks between 4th and Middle streets now have colored crosswalks, decorative lighting and Americans with Disabilities Act-compliant curb ramps at intersections, plus concrete flower planters with black metal railings that repeat the half-wheel design of the plaza railings. Some of the segment was reconstructed with asphalt concrete pavement, and the rest was milled and given a new asphalt concrete surface. New water main and service lines, installed from 4th Street to Junction Avenue, were paid for separately by the city. The blocks between 4th and Junction also got new storm sewer, sidewalks, and curb and gutter. The area didn't have storm sewer lines before. When snow melted, water had nowhere to go and refroze. Sturgis used accumulated and future federal road funding, along with city funds, to pay for the project, with the state providing matching funds and project administration.

2013 average daily traffic (ADT) 2,840 vehicles +24%
2033 projected ADT 3,510 vehicles



Perkins County: Bixby Road gets asphalt overlay

Twenty-seven miles of Bixby Road in Perkins County were cold milled and overlaid with asphalt concrete in 2016. The overlay started at South Dakota Highway 20 five miles west of Bison and went south to the southern county line. Ten miles between Ridgeview Road and the Moreau River bridge were excluded. This north-south road is the only paved road in the southern half of the county other than state highways 20 (east-west) and 73 (north-south). Local and state roads helped the county's 437 ranches and farms produce \$82 million of livestock and \$43 million in crops in 2012, according to the latest federal Census in Agriculture.

2013 average daily traffic (ADT) 130 vehicles +27%
2033 projected ADT 165 vehicles

Trucks are 7% of total traffic.



8 miles of 242nd Street west of Canova resurfaced

Miner County used its accumulated federal-aid road funding to resurface the eight miles of 242nd Street connecting Canova to South Dakota Highway 25. The 486 farms and ranches in Miner County used 242nd Street and other state, county and township roads to produce and sell \$75 million in crops and \$49 million of livestock in 2012, according to the latest federal Census in Agriculture.

2014 average daily traffic (ADT) 150 vehicles +17%
2034 projected ADT 175 vehicles

Trucks are 7% of total traffic.



Tripp County: 315th Avenue, 296th Street get chip seal

This 28.5-mile project will extend the life of asphalt concrete pavement on 315th Avenue (South County Road) from Winner south, then west on 296th Street. Cracks were filled with sealer, then a layer of asphalt was sprayed on the pavement, followed by a layer of small aggregates, and a lighter spraying of asphalt called a fog seal. These treatments will prevent water from eroding the material supporting the pavement, slow asphalt concrete deterioration and restore safety-enhancing friction. Tripp County's 629 farms and ranches used this road and other state and local roads to produce and sell \$87 million in crops and \$142 million in livestock in 2012, according to the latest federal Census in Agriculture.

2014 average daily traffic (ADT) 257 vehicles +11%
2034 projected ADT 284 vehicles

Trucks are 13% of total traffic.

These local-state road and bridge projects are among the last in which the South Dakota Department of Transportation will review the plans and oversee bidding. Counties, and Sturgis and other Class I municipalities, have long received a portion of the state's annual federal highway funding. Because the amounts distributed were often small, the SDDOT set up accounts where they could accumulate enough over a number of years to pay for a project. In 2016, SDDOT began substituting State Highway Fund money for

those federal funds and sending the amount directly to the local government each year. By using state funds instead of federal, local governments won't have to meet the more-stringent regulations on federal funds, and in return, the SDDOT can use the federal funds on the State Highway System. In addition, local governments can get loans from the State Infrastructure Bank that can be repaid with their State Highway Fund money.



New Stamford Road bridge over White River in Mellette County links to Jones County, I-90

A new 321-foot bridge was constructed over the White River on Stamford Road, which residents in Mellette County use to access Interstate Highway 90 at Exit 172. The road segment with the bridge had been closed since the fall of 2016 for the construction. It re-opened after construction was completed in the fall of 2017. The three-span precast girder bridge replaced a 245-foot three-span pony truss bridge with timber plank deck built in 1930.

2011 Average daily traffic (ADT)	85	+35%
2031 ADT	115	

Trucks are 11% of total traffic.



Historic bridge carries traffic on Mitchell bike path

A classic South Dakota historian's joke is that state structures aren't historic until they've been moved a time or two. If true, the bridge on Mitchell's newest bike path segment has earned the designation. The city of Mitchell had wanted a historic bridge for its bike path, and the SDDOT found this steel, Pratt-style, pony-truss bridge in Charles Mix County, where it had spanned an unnamed creek near Geddes. While no longer safe for today's heavy trucks, it is strong enough to carry pedestrian traffic. The 49-foot-long, seven-ton bridge superstructure was transported and installed where the bike path crosses a tributary to Firesteel Creek near Lake Mitchell. Preservation of these bridge superstructures highlights transportation history in South Dakota, and bikers, walkers and photographers enjoy their rusty, rustic features. Bike paths in Pierre and Yankton also make use of historic bridges.



Box culvert serves Hughes County

Grey Goose Road serves the growing bedroom community of Grey Goose north of Pierre, and area farmers and hunters. A new, two-barrel reinforced concrete box culvert was built over a Spring Creek tributary in 2016. The box culvert replaced three large corrugated metal arch pipes.

2007 Average daily traffic (ADT)	150	+13%
2027 ADT	170	

Trucks are 10% of total traffic.

Faulk County: new bridge over Preachers Run Creek

A 50-foot prestressed concrete double-tee bridge was built in 2016 where Preachers Run Creek empties into South Scatterwood Lake. The bridge on 152nd Street, just west of the 371st Avenue intersection, is one mile north and 1.1 miles west of Chelsea, in the far northeastern corner of Faulk County. Work began in April 2016 and was completed in July 2016. The new bridge replaced a 45-foot, four-span continuous concrete bridge with timber wingwalls that was posted below legal loads. The new bridge carries all legal-weight vehicles. The stream's name dates back to pioneer days, when a minister in a group hunting prairie chickens disappeared, never to be heard from again.

Traffic is expected to remain the same at an average 36 vehicles a day. Trucks are 4% of total traffic.



Economic Development Road Grants

Lincoln County gets \$400,000 road grant to improve access to new 7,700-cow dairy farm

Milk may not be among the first agricultural products people think of when considering the loads carried by South Dakota's farm-to-market roads. Maybe that should change.

State and local economic development officials are working to boost dairy production in South Dakota, and new dairy operations mean more tankers will use state and local roads to transport milk around their locations. The new Dakota Plains Dairy that began construction in 2017 in Lincoln County is the latest beneficiary of an agribusiness grant from the South Dakota Department of Transportation to improve nearby local roads.

"Quite simply, dairy cows add tremendous value opportunities for area producers from their consumption of locally grown feedstuffs to the highly valuable nutrients which are generated and returned back to croplands. Dairy farms create a significant multiplier effect when they buy local feed, generate numerous direct and indirect jobs for rural residents, sell milk to regional processors, and provide nutrients back to local farms," said Mike Jaspers, South Dakota's secretary of agriculture. "The state's economic development grants for roads help Lincoln and other counties build durable roads for new agribusinesses and expansions."

The new dairy, Dakota Plains Dairy's second in Lincoln County, is expected to milk 6,000 cows and have 1,700 dry cows. The new facility also will include a feed mill serving both South Dakota and Iowa operations. The existing Dakota Plains Dairy's annual economic impact is estimated at \$111 million, about \$9 million of that for feed and supplies. It has 4,250 cows and about 35 employees. All milk goes to the Agropur plant in Hull, Iowa.



Lincoln County's first Dakota Plains Dairy facility. The South Dakota Transportation Commission approved an agribusiness grant to improve the road to a second facility in Lincoln County that will milk 6,000 cows.

Lincoln County applied for the \$400,000 grant to improve 468th Avenue and 290th Street, northwest of Beresford and close to Interstate Highway 29. The original South Dakota dairy is at 29023 467th Ave., Centerville.

Community access grants awarded in 2016

City of Bridgewater—\$71,500 for Juniper Street, which serves a business area

Campbell County—\$101,000 for Summit Street and A Avenue, which serve the elevator and a business area

City of Elk Point—\$290,000 for Rose Street, which serves a business area

City of Eureka—\$88,000 for 9th and 10th streets, which serve the school

City of Gettysburg—\$183,000 for Broadway and Potter streets, which serve the elevator

City of Kimball—\$126,000 for Kiote Road, which serves a business area

City of Mount Vernon—\$82,000 for Railroad Avenue, which serves the elevator and associated businesses

City of Murdo—\$400,000 for 3rd Street and Cleveland Avenue, which serve the school

City of Parkston—\$309,000 for Depot Street, which serves the elevator and associated businesses

Town of Peever—\$45,400 for Main and Third streets and Lincoln and Newton avenues, which serve the downtown business area

Town of Pollock—\$85,200 for Summit Street and A Avenue, which serve the elevator and a business area

Town of Ramona—\$143,400 for Railway Avenue, which serves the elevator

City of Salem—\$400,000 for Main Street and Norton and Essex avenues, which serve the downtown business area

City of Tyndall—\$142,000 for Maple Street, which serves the elevator

Town of Wolsey—\$203,000 for Ash Street, which serves the school

Community access grants awarded in 2017

Armour—\$400,000 to reconstruct Third, Fourth and Dobson streets, which serve the schools

Centerville—\$240,000 for base course, excavation and asphalt surfacing on Main Street, which serves businesses

Chamberlain—\$400,000 to reconstruct Paul Gust Road, which serves an agribusiness area

Elkton—\$400,000 to reconstruct 6th and Buffalo streets, which serve schools

Lake Preston—\$321,000 to reconstruct Park Avenue, which serves the grain elevator

Lead—\$400,000 to reconstruct Houston and Pavilion streets, which serve schools and the Sanford Underground Research Facility

Perkins County (Lemmon)—\$400,000 to reconstruct Theatre Road, which serves businesses

Philip—\$373,000 to reconstruct Oak Street and Howard Avenue, which serve businesses

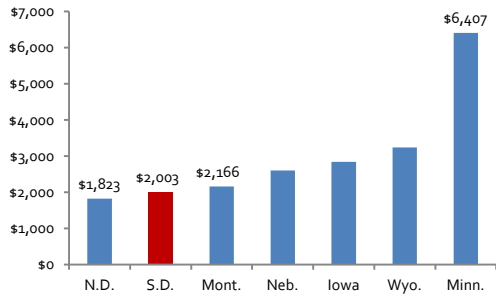
Presho—\$400,000 to reconstruct Main Avenue, which serves the grain elevator and central business district

Walworth County (Selby)—\$164,000 to reconstruct Scranton Street, which serves an agribusiness area

Wilmot—\$180,000 to reconstruct First Street, which serves businesses

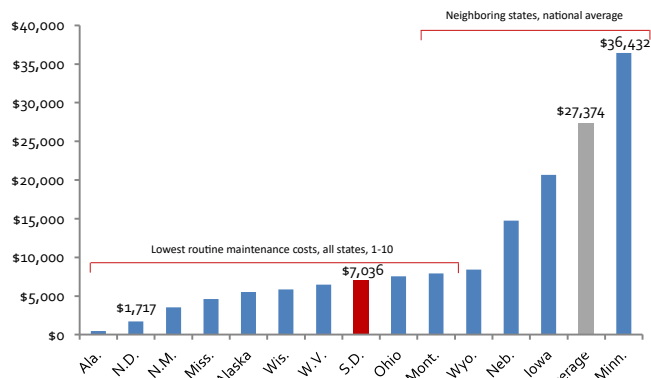
Efficiency Statistics

2nd-lowest winter maintenance costs per mile compared with neighboring states



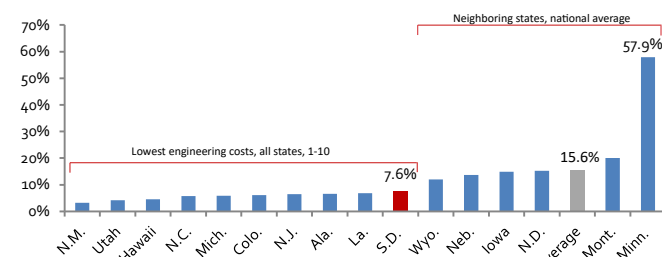
Source: Highway Statistics 2015, Table SF-4C (Feb. 2017) and Highway Statistics 2016, Table HM-8a (Sept. 2017). Amounts shown represent 2015 expenditures.

8th-lowest routine maintenance costs per mile of all 50 states



Source: Highway Statistics 2015, Table SF-4C (Feb. 2017) and Highway Statistics 2016, Table HM-8a, (Sept. 2017). Amounts shown represent 2015 expenditures.

10th-lowest engineering costs as a percentage of project costs in all 50 states



Source: Highway Statistics 2015, Table SF-4C (Feb. 2017). Amounts shown represent 2015 expenditures.

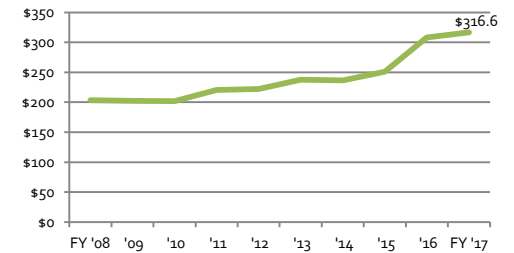


Resistivity testing by department employees in 1963 on a landslide near Interstate Highway 90 in Meade County

FY 2017 Revenue

State Highway Fund revenues, 2008-2017

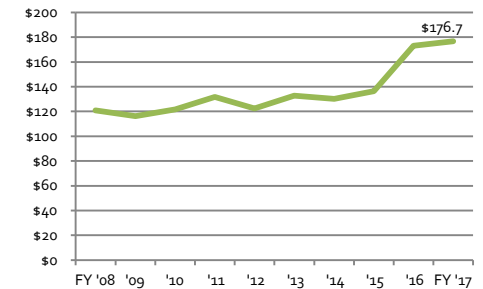
In millions of dollars (not adjusted for inflation)



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, 2008-2017

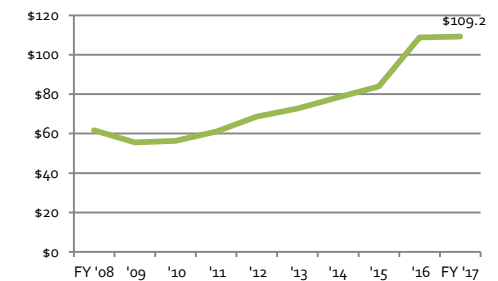
In millions of dollars (not adjusted for inflation)



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

Motor vehicle 4%* excise tax revenue, 2008-2017

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

Comment made at the Statewide Transportation Improvement Program meeting in Mitchell, July 13, 2016

Pleased to see that project on Highway 50 for 2019 coming down that four-lane where the slide is. We would like to partner with the State on some additional lighting on that project if at all possible, particularly on that hill and where the curve is, take a look at it and see if we can do something there. Then we are exploring the possibility, if it'll work with your structural engineers and geotechnical engineers, of doing a walk path along that highway as well. Look forward to applying for a grant on that. Hopefully we can partner on that as well.

Greg Powell
Chamberlain City Engineer

Comment made at the Statewide Transportation Improvement Program meeting in Pierre, July 14, 2016

My big problem is you made our town look bad. I mean, the highways are so nice, that the town looks bad. The urban re-do through Highmore looks great. Highway 14's been worked on last year. Highway 47 both ways—I mean it's really nice over there, and I want to thank you guys. We really appreciate that. The next part: as a highway superintendent I want to tell you that the DOT and the local government part that works with us [SDDOT's Local Government Assistance Office], I don't know that you guys ever hear this, but they really, really help us out, us highway superintendents. South Dakota LTAP (Local Transportation Assistance Program) has helped us a great deal. DOT does us a lot of good. Thank you very much.

Mike Cowan
Hyde County Highway Superintendent
Member, Highmore City Council

Comment made at the Statewide Transportation Improvement Program meeting in Pierre, July 14, 2016

I want to thank our Department of Transportation. Prior to last year when we increased the taxes of six cents and the excise tax, you folks have done a pretty good job with what little resources you've been handed. I wasn't in favor of the tax to begin with, but after we really looked and saw the condition of our highways and bridges in South Dakota, I reluctantly supported it. I'm not one to really raise taxes, but this is something we needed to do, and I know with what resources you had prior to that you've done a very good job keeping our roads. If you look down the road past 2020—and that's something we were told last year—we don't know where the federal dollars are going to come from then. We do know the money that we put in on the state end of it's going to help, but we're still going to be behind. I look at this as maybe just a Band-aid approach of what the Legislature did last year. There are a lot of roads that do need work in the upcoming 10-to-15 years. I know back in 2008, 2009, 2010, the federal government spent a lot of money on shovel-ready projects, so we had a lot of roads worked on then. Some of these roads after 10, 15, 20 years are going need to be re-done. I've very proud of our Department of Transportation, what they've done.

Rep. Tim Rounds
Pierre

Comment made at the Statewide Transportation Improvement Program meeting in Rapid City, July 19, 2016

This is actually the 11th year that we have attended the STIP meeting, and it's always a fun meeting to attend. We appreciate being able to attend because we are in such support of the Mount Rushmore Road and the project and the work that the DOT and the city and the contractors are doing. That's why we're here again is to show our appreciation for the continued dedication and the involvement of the DOT. Steve Palmer and Jason Baker continue to attend our monthly meetings. They're there to answer questions and to present information. Before that, Todd Seaman. Some of the gentlemen who have already retired—Dan Staton was one of them—used to come every month. And we've been doing that since the year 2005. Also the relationship with the city of Rapid City, the mayor and the city council is so appreciated by the businesses and also the residents of Mount Rushmore Road and in that particular area as we continue the construction that will continue for another couple of years and has been going on for a few years. Also the businesses appreciate the effort of the DOT and Reede Construction to provide that shuttle service for the employees and the customers, especially when parking is such a challenge. We think there might need to be maybe a few tweaks, a little more awareness that may be necessary as we continue to utilize that this year and then again for project 3. If there's anything that the Mount Rushmore Road Group can do to assist maybe in a location and also awareness, we'd love to do that, because we think that's a great service that the DOT provides. The Mount Rushmore Road Group of course is looking forward to the completion of project 2, project 3 and even beyond that. So Todd, we may be before you, and Mike, we may be before you, you never know, in 2020, 2021 and continued. Again, we want to just express our appreciation for the help that you have given us and the dedication. Thank you.

Debra Jensen
President, Mount Rushmore Road Group
Rapid City

Comment made at the House Transportation Committee meeting on Jan. 19, 2017

I appreciate the investment that we're making in rail improvement in South Dakota. That is a huge relief off of our highway system. More investment in rail, I think is a great idea, and a future investment in South Dakota.

Rep. Roger Chase
House Transportation Committee member
Huron

Email received Dec. 19, 2016

My family and myself would like to thank all the plow truck drivers across the whole state on I-90 on the night of 12/16 through 12/17. We were traveling across your state from Wyoming to get to Michigan. The plows were keeping up with the storm and clearing the way for all of the drivers on the road. You all did a fantastic job and made my in-laws very happy that we could make it in time to celebrate their 50th wedding anniversary. Once again you made one family very happy, and we are extremely grateful for your hard work and dedication.

Karen Mainwaring Lasslett
Gillette, Wyo.

Letter to the Argus Leader editor, printed Aug. 26, 2016

I have had to drive through the I-29/I-229 reconstruction area many times since it started last year, and most recently, this summer. I really have to compliment the contractors involved in this project for keeping traffic flowing and for getting so much done in such a short period of time. I know the lack of rain has helped keep things going, but I really appreciate the planning it takes to keep all the phases on task and on time. It's one of those things we probably take for granted and don't appreciate as we drive through the site, but again, thank you to: prime contractor T&R Contracting, Sioux Falls; traffic control, Dakota Traffic Services, Tea; grading, Runge Enterprises, Sioux Falls; erosion and sediment control, Guardrail Enterprises, Chancellor; bridge/structures, SFC Civil Constructors, Sioux Falls; asphalt paving, Blacktop Paving Co., Sioux Falls; surveying, DGR Engineering, Sioux Falls; and signing/lighting, Action Electric, Sioux Falls.

Larry D. Plucker Jr.
Sioux Falls

Letter received at the Central Office in Pierre in January 2017

I just would like to drop you a note thanking you for the conditions of your roads. We just took a trip to Rapid City from eastern Wisconsin. Your roads are the best I've ever driven on. We're used to potholes and cracks. Thanks again for your excellent roads.

Dan Malone
Sullivan, Wis.

Email to SDDOT, Jan. 12, 2017

We just wanted to say thanks to the plow drivers up here on I-29 near exit 157. (As I sit here watching them diligently trying to clear the glare ice off the bridge and roadways.) It's our first winter here on the farm and just appreciate how dedicated they are. We regularly commute to Brookings, so a clean road surface is such a blessing.

Jenna Lundgren
Blue Dasher Farm, Deuel County

Message on SDDOT's Facebook page, Jan. 13, 2017

I want to tell you and all of your men and women who put their life on the line for the entire state, THANK YOU!! As an EMT, first responder and a fire wife, I know you guys and gals put in thankless, tireless hours. Without what you guys do, nothing else could commence. Thank you and be safe out there!!

Jenifer Laurvick
Beresford

2016 Time Line

- Feb. 25 First preliminary engineering grants for local bridge projects awarded from the new Local Bridge Improvement Grant (BIG) fund by the Transportation Commission.
- April 28 First five bridge replacement and 14 bridge preservation grants awarded from the BIG fund by the Transportation Commission.
- May 12 South Dakota Interstate Rest Area Revitalization Plan proposes reducing the number of rest areas on I-29 and I-90 from 21 to 17, and the number of rest areas serving as tourist welcome centers from 13 to five, one each where traffic enters on South Dakota's northern, southern, eastern and western borders, and one centrally located in Chamberlain.
- June 29 Phase II of the state's Jackson Boulevard urban construction project in Rapid City wins in the regional Best Use of Innovation category of America's Transportation Awards, a national contest sponsored by the American Association of State Highway and Transportation Officials. Using policies, scheduling software and special practices, two years of work were condensed to one, reducing inconvenience for motorists and businesses.
- June 29 A web application developed by SDDOT's Geographic Information Systems (GIS) employees earned the Special Achievement in GIS Award at the annual Esri user conference in San Diego. Employees developed an interactive version of the heavily used needs book, a lengthy annual document with current condition and historical information on segments of State Highway System pavements.
- July 8 Gov. Dennis Daugaard attends ceremony celebrating completion of a \$5.65-million project to construct 17,520 feet of main-line sidings in Aurora and Huron on the Rapid City, Pierre & Eastern-owned rail line. Sidings allow more trains to use the tracks.
- July 25 Retired SDDOT bridge and planning engineer Dean Hyde of Pierre is inducted into the South Dakota Transportation Hall of Fame.
- Aug. 15 Commercial air service resumes at the Pierre Regional Airport, with 12 weekly flights to Denver by Aerodynamics Inc.
- Aug. 23 State and local roads and bridges received \$73 million and \$26 million respectively in new money in 2016, the first full year of fee and tax increases resulting from passage of Senate Bill 1 in 2015, the state Department of Revenue tells legislators.
- Sept. 26 Ron Peterson, longtime Yankton Area Engineer, is inducted into the South Dakota Transportation Hall of Fame.
- Oct. 18 First shipment of soybeans loaded on the loop track of the new Wheat Growers elevator-fertilizer facility in Kennebec, served by a recently rehabilitated state-owned rail line.
- Oct. 27 Rehabilitation of state-owned rail line between Kennebec and Presho completed.
- Nov. A tow plow debuts in the Sioux Falls area. The pilot effort was successful in terms of efficiency and safety, leading to a decision to use tow plows in Rapid City, Hot Springs and Yankton in 2017.
- Dec. 25 Christmas Day winter storm closes I-90 between Vivian and the Wyoming border. The storm stranded motorists and caused power outages.
- Dec. 31 2016 closed with 116 highway fatalities in South Dakota, the lowest number since 2011 and the second-lowest number since 1960.

Email to SDDOT, Jan. 27, 2017

I would like to commend the Gregory County state highway employees. They have done an excellent job during the last couple days. We received anywhere from 18" to 20" of snow from Tues., Jan. 24 through Wed., Jan. 25. I drive from Bonesteel to Lake Andes every day, and they did a fantastic job keeping the river hills sanded and bladed. I am very thankful for their dedication to their jobs! You have some great employees in Gregory County!

Karen Janousek
Bonesteel

An appreciative truck driver visits the SDDOT Rapid City Area office early in 2017

Don Kessler, a Servall truck driver, has a route taking him as far west as Gillette. He stopped in last week to say he appreciates how well our roads are maintained in the winter. He always breathes a sigh of relief when he crosses the state line back into South Dakota, because he knows our plow operators have been out, and the roads will be in good shape. He extends his thanks to you and the plow drivers on these routes. Greg [Boness, Highway Maintenance Supervisor in Sturgis] and Bob [Smith, Highway Maintenance Supervisor in Rapid City], please extend his appreciation to your crews. And also I want to thank them for doing such an outstanding job.

Mike Carlson
Rapid City Area Engineer



This prestressed concrete double-tee bridge on 7th Street East in Redfield, built over Turtle Creek in 2017, replaced a one-lane, guardrail-less, 25-foot steel stringer bridge with a timber deck, built in 1930. The project was paid for with federal bridge funds, plus 20 percent local matching funds.

Message on SDDOT's Facebook page, Aug. 14, 2016

I just wanted to give a huge thanks to Rob Roth and your Platte crew. Two weeks ago a guitar of mine was missing. Turns out it flew out of the back of my truck. Rather than keeping it or setting it in a corner, they searched the one clue on my guitar, the band's name, and two weeks later tracked me down. Guys like this are an asset to your department. I even tried to give them the reward I offered, and they wouldn't take it. I owe them a big one!

Dave Fogel
Guitarist, The Onslaught
Gregory

Comment made at the Statewide Transportation Improvement Program meeting in Aberdeen, July 11, 2017

I'd like to give the South Dakota Department of Transportation a big thank-you [for recent projects that reconstructed U.S. Highway 212 on Redfield's west side and resurfaced it on the east side, plus installation of Americans with Disabilities Act-compliant curb ramps on adjacent sidewalks]. We do have a significant population of older people in town. It's very nice for them. We do have a lot of people in town with motorized wheelchairs. Lighting in and around the city of Redfield, and you guys are doing construction to the bridges this year. The infrastructure of the city of Redfield is very good right now. We're very, very thankful for all the work that you guys did in and around Redfield in the last 10 years.

Mayor Jayme Akin
Redfield

2017 Time Line

- Jan. 24 I-90 closes from Kadoka to Chamberlain due to strong winds and snow, re-opening the next day.
- Feb. 17 Former Sen. Mike Vehle of Mitchell was appointed to the South Dakota Transportation Commission.
- March Railroad Board discusses future rail service needs after learning its trust fund is projected to grow from \$10.3 million in 2018 to \$26.8 million in 2022.
- June 13 Gov. Dennis Daugaard spoke at the South Dakota Department of Transportation celebration of its 100th year at the Becker-Hansen building in Pierre. The program was broadcast live through Facebook to simultaneous celebrations at the SDDOT's Aberdeen, Sioux Falls and Rapid City offices.
- June 20-21 Open houses are held in Sioux Falls and Rapid City to solicit public input to the draft 2017 South Dakota Freight Plan, SDDOT's strategy for improving freight movement, lowering freight costs and facilitating economic growth.
- July 18 Wheaton Dumont-grain terminal in Britton begins accepting grain. The new elevator is the only location where two Class 1 railroads, Canadian Pacific Railway and BNSF Railway, compete for business in South Dakota.
- Sept. 7 Dakota Plains Ag Napa Facility holds grand opening. The grain terminal is part of an industrial rail park that has revived the state-owned Napa-to-Platte rail line.
- Sept. 22 The SDDOT received \$25.7 million in additional Federal Highway Administration funding, the highest amount ever from the federal agency's annual redistribution of funding others states had not spent by the end of the federal fiscal year.
- Sept. 30 Mark Knight, former president of Foothills Contracting, Aberdeen, and the first South Dakotan to serve as president of the Associated General Contractors (AGC) of America, was inducted into the South Dakota Transportation Hall of Fame.
- Oct. 6 Clyde Jundt, former SDDOT chief bridge engineer, was inducted into the South Dakota Transportation Hall of Fame for his pioneering bridge rehabilitation efforts and design of the Keystone Wye bridges.
- Oct. 10-12 Performance Excellence Network examiners for the Malcolm Baldrige Framework for Performance Excellence visited SDDOT to review its organizational leadership, strategy and other processes. Results will be used to improve performance.
- Oct. 17 The Foster Street bridge over Firesteel Creek northeast of Mitchell is celebrated as the first state Bridge Improvement Grant project to be completed. Davison County got a preservation grant for work that may extend its service life by about 15 years.
- Oct. 26 Three additional tow plows are added to the SDDOT winter maintenance fleet, one each in Rapid City, Hot Springs and Yankton. First used around Sioux Falls in the winter of 2016-2017, a tow plow can clear two highway lanes in one pass, increasing safety and worker productivity.
Larry A. Nelson, Canton, appointed to the Transportation Commission.
- Nov. 21 A \$55.1-million contract is awarded for reconstruction of Interstate Highway 90 Exit 402, the largest contract as far as dollar amount in SDDOT history.

Photo and illustration credits and descriptions

Front cover: South Dakota State Archives photographs, left to right: a snowplow in Meade County, possibly the late 1930s; center, Highway Engineer A.M. "Bill" Young at a June 1, 1966, hearing in Yankton; Milwaukee Road train in Huron, circa 1960. Background is a page from the plans for PCN 01QS, the reconstruction of the Interstate Highway 29-Interstate Highway 229 interchange, let in 2015 and completed in 2017.

p. 3: Kristi Sandal, Public Information Officer

p. 5: Sandal

p. 6: top, Julie Bolding, Management Analyst, and bottom, State Archives

p. 7: State Archives

p. 8-9: SDDOT Research Office staff; tow plow graphic by Kory Kraus, Viking-Cives Midwest Inc.; State Archives

p. 10: Sandal, State Archives

p. 11: black and white photographs, State Archives; color photograph, Bolding

p. 12-13: black and white photographs, State Archives

p. 14: Brookings County, probably late 1930s, State Archives; map by GIS Coordinator Kimberly Zerr

p. 15: left to right: Public Transit Office staff, Brookings Area Transit Authority and East Dakota Transit

p. 16: State Archives

p. 17: clockwise from top left: Bolding; State Archives; South Dakota Highway Patrol; Bolding; Scott Fuerst, Project Development Office; State Archives

p. 18: '96-'97 winter photograph courtesy of *Aberdeen American News*

2016 major projects

Aberdeen Region, p. 19: left, Bryce Olson, Watertown Area Project Engineer; right, from top: Trevor Johnson, Huron Area Project Engineer; Tyler Brunsvig, Watertown Area Project Engineer; Google satellite image; and Dave Drake, Watertown Area Project Engineer

Mitchell Region, p. 20: left, Ryan Gulbrandson, Project Manager for T&R Contracting; right, from top: Greg Putnam, Yankton Area Project Engineer; Joe Sestak, Yankton Area Project Engineer; and Google Street View, Aug. 2016

Mitchell Region, p. 21: left, Kirk Henderson, Sioux Falls Area Project Engineer; right, from top: Rick Brandner, Mitchell Area Project Engineer; Steven Neumeister, Sioux Falls Area Project Engineer; and Brad Tiede, Sioux Falls Area Project Engineer

Pierre Region, p. 22: left, Winner Area staff; right, from top: Pierre Area staff; Chris Vetter, Mobridge Area Project Technician; and Steven Jacobs, Mobridge Area Project Engineer

Rapid City Region, p. 23: left, Todd Seaman, Rapid City Region Engineer; right, from top: Rapid City Area staff; Harry Johnston, Rapid City Area Project Engineer; Bolding

Rapid City Region, page 24: left, graphic by Felsburg Holt & Ullevig; right, from top: Mike Cameron, HDR Engineering; Tanner Sorlie, Belle Fourche Area Journey Technician; Bolding

2017 major projects

Aberdeen Region, page 25: aerial photo at upper right by Johnson Design and Video, Brookings; left, from top: Brian Rogness, Watertown Area Project Engineer; Bryce Olson, Watertown Area Project Engineer;

Bolding; and Bruce Schroeder, Aberdeen Area Project Engineer

Mitchell Region page 26: large photo at left by Rick Brandner, Mitchell Area Project Engineer; right, from top: Brad Tiede, Sioux Falls Area Project Engineer; Harvey Odens, Sioux Falls Area Project Engineer; and Brian Vandam, Sioux Falls Area Project Engineer

Second Mitchell Region, page 27: large photo at right is a 2017 Google satellite image; left, from top: Joe Sestak, Yankton Area Project Engineer; Kirk Henderson, Sioux Falls Area Project Engineer; and Kevin Heiman, Yankton Area Project Engineer

Pierre Region, page 28: all photos by Bolding except I-90 eastbound lanes, Murdo to Draper, project by Bill Gardner, Winner Area Project Technician

Rapid City Region, page 29: lower right: Google satellite image of U.S. 18 shoulder before reconstruction and after-reconstruction photo by Matt Rippentrop, Custer Area Project Engineer; from top left: Jason Wittenberg, Rapid City Area Chamber of Commerce; Tanner Sorlie, Belle Fourche Area Project Technician; Belle Fourche Area staff

Rapid City Region, page 30: large photo at left, Harry Johnston, Rapid City Area Project Engineer; right from top: Google satellite image; Jason Baker, Rapid City Area Project Engineer; and Joel Flesner, Belle Fourche Area Project Engineer

BIG grant and 2016-2017 local-state projects

BIG grant projects, p. 31: Foster Street bridge re-opening and BIG sign pictures by Sandal; Brookings County bridge picture by Colin Zwaschka, Banner Associates

Local-state road projects, p. 32: left, Bolding; right, from top: Jim Dorfschmidt, Belle Fourche Area Project Technician; Milo Hansen, Mitchell Area Journey Transportation Technician; and Eric Prunty, Brosz Engineering

Local-state bridge projects, p. 33: old Stamford Road bridge photo by Patrick Doyle; new Stamford Bridge photo by Pierre Area staff; right, from top: Stephanie Stacey, Mitchell Area Senior Secretary; Bolding; and Google satellite image

Economic development grants, p. 34: photo courtesy of Dakota Plains Dairy

p. 35: State Archives

p. 38: Aberdeen Region bridge inspection staff

Back cover: State Archives transportation photos: top to bottom, left to right: South Dakota Highway 48 west of the Iowa border after Big Sioux River flooding in 1966; construction of the Keystone Wye bridges, circa 1967-1968; motorists pose by a crashed vehicle, undated; cattle move through a Haakon County underpass east of Philip, 1965; constructing the Interstate Highway 90 bridge over Lake Francis Case, circa 1974; installing an expansion joint in portland cement concrete, 1935; unidentified women, possibly State Highway Commission stenographers, circa 1921-1924; Sioux Falls traffic near 10th Street and Interstate Highway 229, 1976; state highway employees Allen Fladeboe (left) and Burton Miller, unknown date; materials testing, circa 1960; the original East 10th Street ramps on Interstate Highway 229 in Sioux Falls, 1966; and Black Hills tourism, 1965

Pavement management system

Continued from p. 10

As the agency has used the enhanced PMS, it has accumulated over 20 years of pavement performance data. This historical data is being used to refine the performance curves the PMS uses in its analyses, sharpening its ability to recommend optimal treatment strategies at different funding levels. The historical data also increase the agency's understanding of the effectiveness of chip seals, crack sealing, asphalt overlays and other maintenance treatments in extending pavement life.

The SDDOT's data-driven effort to optimize the overall condition of the State Highway System provides state residents and visitors with the best possible roads.

Railroads

Continued from p. 14

state officials negotiated haulage and trackage rights that increased the economic potential of the other private and state-owned rail lines. Freight originating on a state-owned line, such as the one between Mitchell and Rapid City, can now be picked up by a BNSF locomotive and delivered to a third-party Class I railroad, such as Union Pacific, for transport and delivery to a Union Pacific destination. The change gives South Dakota shippers better access to markets served by non-BNSF railroads.

Another rail funding source appeared in the 2009 federal economic stimulus bill: Transportation Investment Generating Economic Recovery (TIGER) grants. Competing against other states' projects, the Railroad Office won two grants: \$16 million to help rehabilitate state-owned tracks between Mitchell and Chamberlain, and \$12.7 million to continue on to Presho. Those projects spurred construction of elevators at Kimball and Kennebec that save transportation costs for farmers.

The South Dakota rail reset began more than 35 years ago, and it's not over. Gov. Dennis Daugaard led efforts to combine state, private and federal funds to complete rehabilitation, siding and rail replacement projects listed in the 2014 South Dakota Rail Plan. An elevator project using the Napa-Platte line near Yankton has begun operating. The Railroad Board will have \$26.8 million in loan repayments and other money by 2022 to fund low-interest loans and possibly grants for additional rail improvements.

Moving growing crop yields by rail benefits more than farmers. It lessens wear and tear from heavy trucks on State Highway System pavements and bridges, reducing the public cost of maintenance and reconstruction.



See Erection Details for SLIP BASE ALTERNATE

BREAKAWAY SUPPORT

do not extend more than 4" max.

Mounting height as recommended in LIGHTS ROADSIDE DESIGN GUIDE

Stiffeners

7.115 lbs./ft. Layer Section

Side Trim Mounting to the vertical edges of extruded panels fastened at a minimum

#H <= 2'-0" #V <= 8'-0"

be as recommended in ANNUAL CONTR

Number Vertical Horizontal

of lower

Post

ON

AFF

top of L