SEAT BELT USE IN SOUTH DAKOTA

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Disclaimer
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EXECUTIVE SUMMARY

South Dakota's seat belt use study provides statistically reliable data from which generalizations, comparative analyses, and recommendations can be developed based on a field survey of driver and right front-seat passenger seat belt use. This National Occupant Protection Use Survey (NOPUS) is based on national standards for survey design and field observation protocol. It provides the South Dakota Department of Public Safety (SDDPS) with a systematic evaluation of seat belt use rates within the state. The National Highway Traffic Safety Administration (NHTSA) funds NOPUS through the SDDPS's Office of Highway Safety.

In April 2011, NHTSA issued new Uniform Criteria for the state observational survey of seat belt use in an effort to improve the survey's representativeness. One of the main changes NHTSA implemented was to focus county selection using crash-related fatalities data, as reported by the Fatality Analysis Reporting System (FARS), instead of the population-based exclusion criterion used in the past. The revised criteria, implemented for the 2012 survey and outlined in the Federal Register, Vol. 76 No. 63, resulted in substantial changes to the county selection, sites, road type classifications and weighting procedures.

The Federal rule directs states to update sampling frame data every five years to ensure accurate fatality distribution as well as a representative inventory of road segments. Accordingly, in 2017 a review of fatalities over the five-year period from 2010 to 2014 was performed resulting in changes in county involvement and a complete reselection of sites.

To choose the survey counties, all 66 counties in South Dakota were listed in descending order based on the average number of motor vehicle crash-related fatalities from 2010 to 2014. The top 38 counties accounted for at least 85% of the state's total crash-related fatalities. These 38 counties were then stratified by region based on statistical differences in seat belt use observed in prior surveys between the counties in the western and eastern parts of the state. Therefore, the 38 counties in the sampling frame were stratified according to geographical region with 18 counties in the west and 20 counties in the east. Eight counties were selected from each region using probability proportional to size (PPS) sampling with vehicle miles traveled (VMT) as the measure of size (MOS).

Road segments within each county were then stratified by the MAF/TIGER Feature Class Code (MTFCC) road type and sorted by segment length. A systematic random sample of 20 road segments was selected within each county using PPS sampling with road segment length as the MOS. This represents the second stage of sample selection. This process resulted in the selection of 320 road segments (16 counties with 20 sites per county). Additional sites were also selected for use as alternate sites.

During the week of June 11 - 17, 2018, trained observers visited each site in their assigned counties to survey seat belt use for drivers and right front seat passengers in vehicles with a gross vehicle weight up to 10,000 lbs.

For the 2018 statewide survey, observers recorded seat belt use for 21,813 drivers and 7,503 right front-seat passengers, for a total of 29,316 vehicle occupants. The unweighted estimates of seat belt use were 80.7% for drivers, 88.7% for passengers, and 82.7% overall. Adjusting the raw state rate for the survey design and weights resulted in an overall weighted state rate of 78.9% which is the generalizable seat belt use rate for the state. This compares to a weighted rate of 74.8% in 2017. Rates by strata such as gender, vehicle type, region, roadway, and population density are unweighted due to the sample design.

Male occupants were less likely to wear seatbelts than females with overall rates of 79.1% and 87.4%, respectively. When considering occupant position, more drivers were male, 67.2%. Restraint use for male drivers was 78.8% compared to female drivers at 84.4%. Passengers, on the other hand, were more likely to be female, 70.9%. The observed seat belt use for passengers of both genders was 91.5%.

Overall seat belt use rates by vehicle type ranged from 77.5% to 87.8%. The trend of higher rates of female seat belt use held for each vehicle type as well – female use ranged from 83.8% to 89.5% over the four vehicle types, while male use ranged from 74.7% to 85.7%. Rates by region indicate occupants in the east were more likely to buckle up (91.1%) than those in the west (74.6%).

Seat belt use was highest on primary roads, 89.1%, followed by local roads, 80.9%, and secondary roads, 75.4%. Rates by road type also showed higher restraint use for each road class in the east region than the west region. When separating survey counties into Metropolitan Statistical Areas (MSA) and non-MSAs, higher use on primary roads was found in MSA counties compared to non-MSAs, 89.1% and 88.0%, respectively. This was true on secondary roads, as well, where higher use was demonstrated in MSA counties (78.5%) compared to non-MSAs (73.6%). Local roads were only selected in MSA counties according to survey methodology, and restraint use was 78.9%. There was substantial variation, not only between the different county designations, but also within regions and road classifications.

South Dakota's weighted seat belt rate of 78.9% falls below the most recent seat belt results published by NHTSA of 89.7% nationally. The gap is less disparate when compared to states with similar seat belt laws (secondary) where NHTSA reports restraint use of 85.7% (2017). In general, the findings in the 2018 South Dakota statewide survey are consistent with the findings of previous surveys.

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INTRODUCTION

The Upper Great Plains Transportation Institute (UGPTI), a department at North Dakota State University (NDSU) was contracted by the South Dakota Department of Public Safety (SDDPS) to conduct a field survey of seat belt use in 2018. The study replicates the sampling methodology previously revised and approved by the NHTSA and the SDDPS for the 2012 survey. That methodology was a redesign of an earlier method to yield a more statistically robust estimate of seat belt use on all roadways in South Dakota. In 2017, survey researchers implemented a NHTSA-mandated review of state crash-related fatalities that resulted in modifications to county inclusion and selection, and a complete reselection of observation sites. This reselection is certified for five years. Requirements for conducting statewide seat belt surveys are published in the Federal Register, Vol. 76 No. 63, April 1, 2011, Rules and Regulations, pp. 18042 – 18059.

OBJECTIVE

The objective of this study was to estimate the statewide rate of seat belt use of drivers and right front-seat passengers in the state of South Dakota.

Additional analyses estimated seat belt use rates in the following categories:

- Occupant position (driver, passenger)
- Gender (male, female)
- Type of vehicle (car, van, sport utility vehicle, truck)
- Region of state (east, west)
- Roadway type (primary, secondary, local)
- Population density/economic activity (MSA, non-MSA)

A description of the tasks involved in conducting the statewide seat belt survey is provided in this report. It includes general information about the methods and protocols. Table 1 summarizes the 2018 survey. Survey sample design methods were employed to ensure that the results were representative of the behavior statewide. One exception to this was that local roads were only sampled in MSA counties per NHTSA protocol.

Table 1: Summary of the Seat Belt Use Survey

Methodology	Multistage Stratified Cluster Design with Probability Proportional to Size Sampling
Source of Samples	NHTSA supplied FARS, VMT, and road segment data
Geographic Coverage	State of South Dakota
Identified Regions	East West
Selected Counties	East Region: Aurora, Bon Homme, Day, Hamlin, Lincoln, Minnehaha, Moody, Spink West Region: Harding, Jones, Lawrence, Lyman, Meade, Oglala Lakota, Pennington, Ziebach
Number of Sites	320
Survey Period	June 11-17, 2018
Observation Duration Per Site	60 minutes
Sample Size	29,316 vehicle occupants (includes all vehicles where either the driver or passenger or both had a known protection status)

METHODOLOGY

Uniform Criteria published in 2011 guided the development of methodology used for seat belt surveys in South Dakota from 2012 through 2016. This methodology changed the focus for county sampling from population-based criterion to traffic-crash-related fatality criterion. The federal criteria mandated a reselection of observation sites at 5-year intervals. This reselection requirement was carried out in 2017 without further modifications to the survey design. A comprehensive explanation of survey methodology is found in Appendix A.

Standard Error and Confidence Intervals

The standard error of the state seat belt use rate measures the amount of random sampling error in the survey results. The smaller the standard error, the more accurate the seat belt use rate when compared to the true, but unknown, seat belt use rate for South Dakota. Assuming the design of the survey accurately measures the variable of interest, the larger the survey sample the more accurate the results.

The standard error for the state seat belt use was calculated to be 0.01% using SAS statistical software. From this, a 95% confidence interval for the state seat belt use can be determined. The 95% confidence interval means that statistically there is only a 5% chance that the actual statewide seat belt percentage falls outside the range of 76.0% to 81.8%.

Table 2: Confidence Interval

95% Confidence Interval and Estimated Standard Error for the 2018 State Seat Belt Use				
Occupants	**State Rate**	**Standard Error**	**95% CI Lower Limit**	**95% CI Upper Limit**
29,316	78.9%	0.01%	76.0%	81.8%

Nonresponse Rate

A factor that could potentially bias the results and invalidate the survey is exceedingly high nonresponse rates. A nonresponse occurs when the observer tries but cannot determine an occupant's seat belt use. In the 2018 survey, seat belt use could not be determined for 396 vehicle occupants resulting in a nonresponse rate of 1.3%. As stipulated in NHTSA's guidelines, the nonresponse rate did not exceed the allowable maximum of 10% so no re-sampling was necessary.

Protocols

Observers

Observers contracted to conduct the 2018 statewide seat belt survey were required to complete online training. The training module covered survey methods and observer responsibilities, as well as knowledge points requiring correct responses in order to move forward in the module. Completion of training was verified by the survey administrator.

All observers were required to have a current driver's license with proof of adequate vehicle insurance. They were required to use seat belts and wear safety vests while conducting field observations.

Observational Protocols

The observational protocols used in the 2018 study adhere to the Uniform Criteria as outlined in the Federal Register.

Observations were conducted Monday through Sunday. The day of the week and time of day were randomly chosen for one site within each county. The remaining sites within each county were arranged based on the first site to minimize travel time and costs. This predetermined order of daily observation sites was provided to each observer before the survey. A complete list of county observation sites is available in the survey certification documentation submitted to NHTSA. The traffic direction of vehicles to be observed was randomly chosen in advance and was limited to one direction.

An 11-hour block of daylight, from 7 a.m. to 6 p.m., was identified as the observational period. Observations at each site occurred in the predetermined time slot, requiring a 60-minute observation period, which began at the start of the pre-determined time slot - or the first 5-minute interval after arrival at the site if the observer was delayed - and ended 60 minutes later.

Traffic Conditions and Data Collection Problems

Observers were trained to cope with traffic problems in the following manner:

- When traffic was heavy and there were too many vehicles to observe, recording was done as long as possible and then stopped until the observer could catch up with observations. Some vehicles were, therefore, outside the sample. When this occurred, counting resumed after no more than a one-minute pause. Once an observer's eyes were locked on a vehicle, a record of that vehicle was required on the observation form.
- At sites with more than one lane of traffic in the predetermined direction, observations were made from the lane closest to the observer.

Site Accessibility Problems

Field observers could terminate observations at a preselected site if any of the following circumstances arose: (1) weather conditions that would hinder the accuracy of the observations; (2) heavy traffic flow that might endanger the safety of the observer; or (3) road conditions that rendered observations unfeasible, such as road construction, detoured traffic, or a crash site. In these circumstances, observers were directed to contact the project coordinator immediately for assignment of an alternate site if a suitable vantage point could not be established.

Observed Vehicles

All vehicles with a gross vehicle weight up to 10,000 lbs. were observed and classified on the observation form as cars, vans, sport utility vehicles, and trucks. Large trucks (semi or large box), large emergency vehicles (ambulance/fire), and RVs/motor homes were not included in the survey.

Observations

Type of vehicle, gender, and seat belt use for both drivers and right front seat passengers were recorded. Observations occurred from within the observer's vehicle whenever possible. The observer was parked as close as possible to the road for accurate observation without compromising safety. If observations could not be conducted from within the vehicle, the observer was allowed to stand off the roadway. Observers were required to wear an ANSI-approved Type-2 safety vest at all times to enhance the visibility of the observer.

Problems Encountered by Observers

If traffic, observer safety, or construction issues were problematic, alternate sites were available through the project coordinator. Observer placement was managed according to site protocols. Intermittent problems relating to road construction and inclement weather did not seriously impede schedules, and hour-long observations were fulfilled as described in the protocol with on-time arrival at subsequent sites not impacted. In accordance with the Federal Register, if scheduled observations were not carried out for any of the above reasons, a return visit would have been arranged the following week adhering to the original prescribed schedule for data collection. Detailed site information is found in Appendix D.

Quality Assurance

Observers

The SDDPS contracted directly with a nonprofit organization for observers to complete the field work, as they have with previous surveys. Online training was offered at the observers' convenience. All contracted observers were required to complete the online training. Completion was verified prior to survey week.

During observation week, quality control personnel carried out unannounced site visits (one per county) to verify observers were located within valid road segments, conforming to the prearranged day of week/time of day schedules, and properly recording seat belt data. It is required that quality control personnel visit any new observers during their initial observation day to assure protocol compliance and verify safe observation practices.

Data Entry

Steps were taken to ensure quality control with respect to data entry. Each site packet was checked to ensure the number of observation sheets submitted was the same as that noted by the observers. Database records were verified to match the number of observations. An accuracy check was done on a systematic sample of records and was measured at greater than 99.9% for every field. Errors discovered during quality assurance checks were corrected prior to completion of all analyses.

SEAT BELT SURVEY RESULTS

Statewide Results

Sample Size by Year

Table 3: Survey Sample By Occupant Position

Occupants Observed	2014	% of Sample	2015	% of Sample	2016	% of Sample	2017	% of Sample	2018	% of Sample
Drivers	19,634	76.6%	20,923	73.0%	22,034	73.8%	20,401	75.6%	21,813	74.4%
Passengers	5,998	23.4%	7,740	27.0%	7,812	26.2%	6,583	24.4%	7,503	25.6%
Total	25,632	100.0%	28,663	100.0%	29,846	100.0%	26,984	100.0%	29,316	100.0%

Table 3 shows the size of annual seat belt surveys from 2014 to 2018 by occupant position. Total occupants in 2018 numbered 29,316, consisting of 21,813 drivers representing 74.4% of the sample, and 7,503 passengers for a 25.6% share. These figures include only vehicle occupants where protection status could be determined.

Total sample size can vary from year-to-year depending on site locations and traffic flow. The occupant shares in 2018 are comparative to previous surveys. Complete details on the number of observations and restraint use by site are found in Appendix C. It is not uncommon to have several individual sites capture only a limited number of vehicles. However, these sites are still important to the aggregate measurement of statewide and county seat belt use, and, therefore, are captured each year.

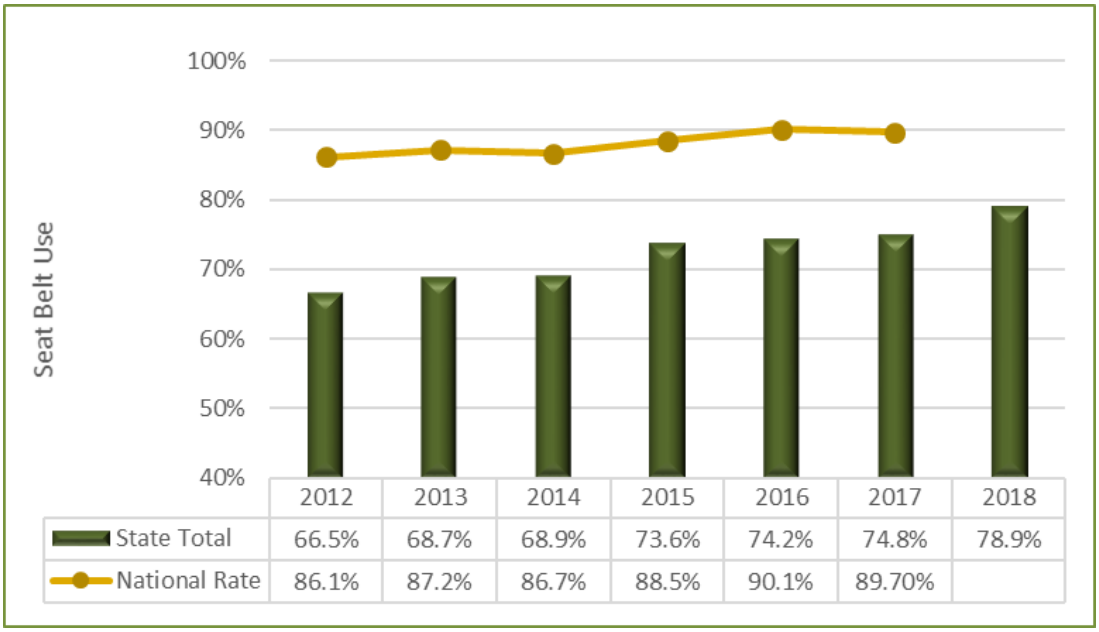
The driver-to-passenger ratio can influence overall use rates. This year the ratio was 2.9 drivers for every occupant, meaning drivers represent 74.4% of the sample. Table 4 shows only minor variations in the most recent 5-year period with the driver share of the sample deviating less than 4 percentage points.

Table 4: Ratio of Drivers to Passengers, 2014-2018

Ratio	2014	2015	2016	2017	2018
Drivers:Passengers	3.3:1	2.7:1	2.8:1	3.1:1	2.9:1
Drivers as % of Sample	76.6%	73.0%	73.8%	75.6%	74.4%

Overall unweighted results of the 2018 statewide survey indicated 82.7% of vehicle occupants were observed wearing seat belts on South Dakota roads. Because the survey employs a two-stage stratified random sampling scheme, a more appropriate estimate of seat belt use is found by weighting the unadjusted rate using the formulas and design weights from the methodology section. Using those formulas, the overall weighted rate of seat belt use in South Dakota was 78.9% for 2018. Figure 1 shows annual seat belt use since implementation of the amended methodology in 2012, as well as national use

reported by NHTSA. Although South Dakota rates fall below the national level of 89.7% (2017), rates have 19% from a low of 66.5% in 2012 to a high of 78.9% in 2018. The state's current use remains below the overall national rate, as well as NHTSA's published rate of 85.7% for states without primary seat belt laws.[1]



	2012	2013	2014	2015	2016	2017	2018
State Total	66.5%	68.7%	68.9%	73.6%	74.2%	74.8%	78.9%
National Rate	86.1%	87.2%	86.7%	88.5%	90.1%	89.70%	

Figure 1: Statewide Seat Belt Use, Weighted

*2017 rate marks NHTSA-mandated resampling of counties and sites

County Results

Restraint use outlined in Figure 2 ranged from a high of 98.8% in Aurora County to a low of 50.5% in Ziebach County in 2018. Higher seat belt use is often observed in counties that follow interstate corridors. Counties demonstrating the highest rates this year - Aurora, Moody, and Lincoln - have a share of this road type which may influence higher use. Less seat belt use was recorded in Oglala Lakota, Bon Homme, and Harding Counties with rates below 70%, as well as, Ziebach with 50.5% restraint use.

Rates vary from year-to-year at the county level. The changes can represent sampling differences and are not likely to be statistically significant, especially for counties where there are fewer total observations. However, even the rates for counties with more observations may exhibit noticeable change from one year to the next.

[1] National Highway Traffic Safety Administration. Traffic Safety Facts Research Note. November 2016. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812351

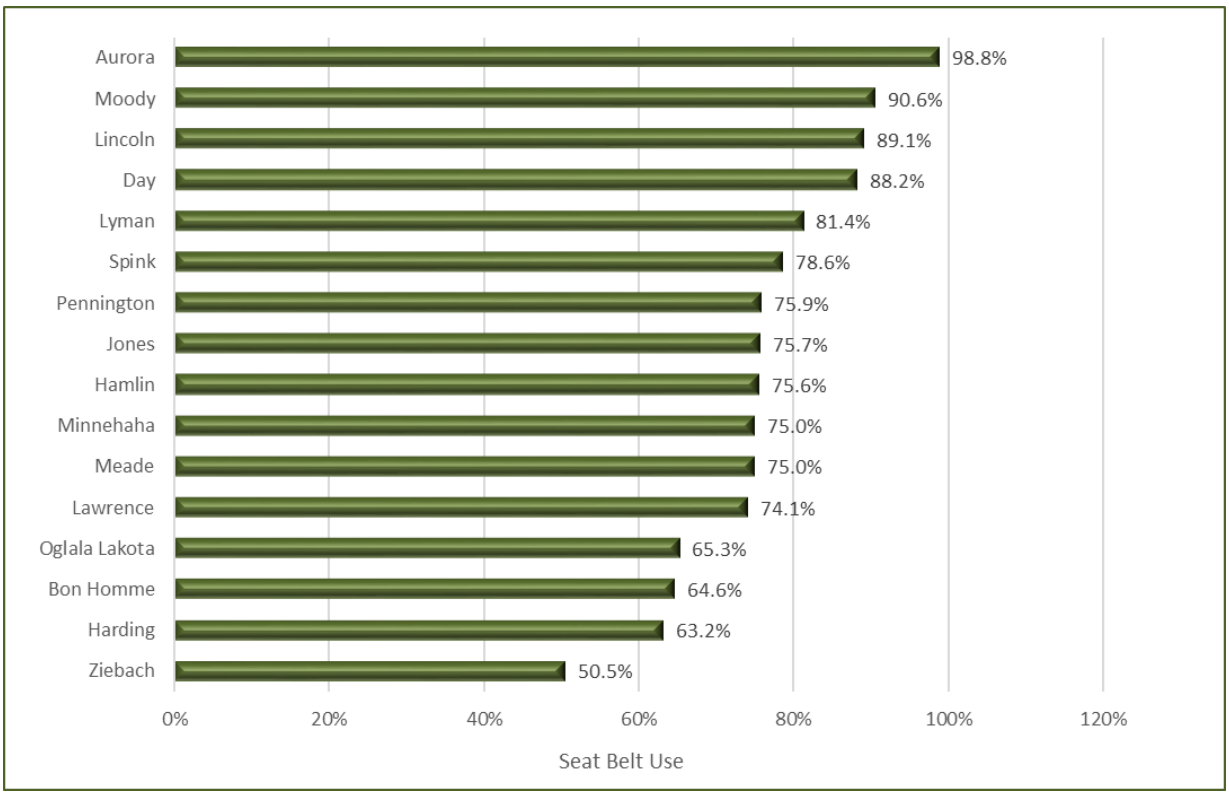


Figure 2: Seat Belt Use by County, 2018, Weighted

To smooth the annual variability, 3-year averages are graphed in Figure 3 to provide a representation of county rates and trend comparison. However, several counties are newer additions to the survey because of the reselection process in 2017 and reflect only two years of data. The graph shows variations in the level of seat belt use. Counties having six years of available data show increased belt

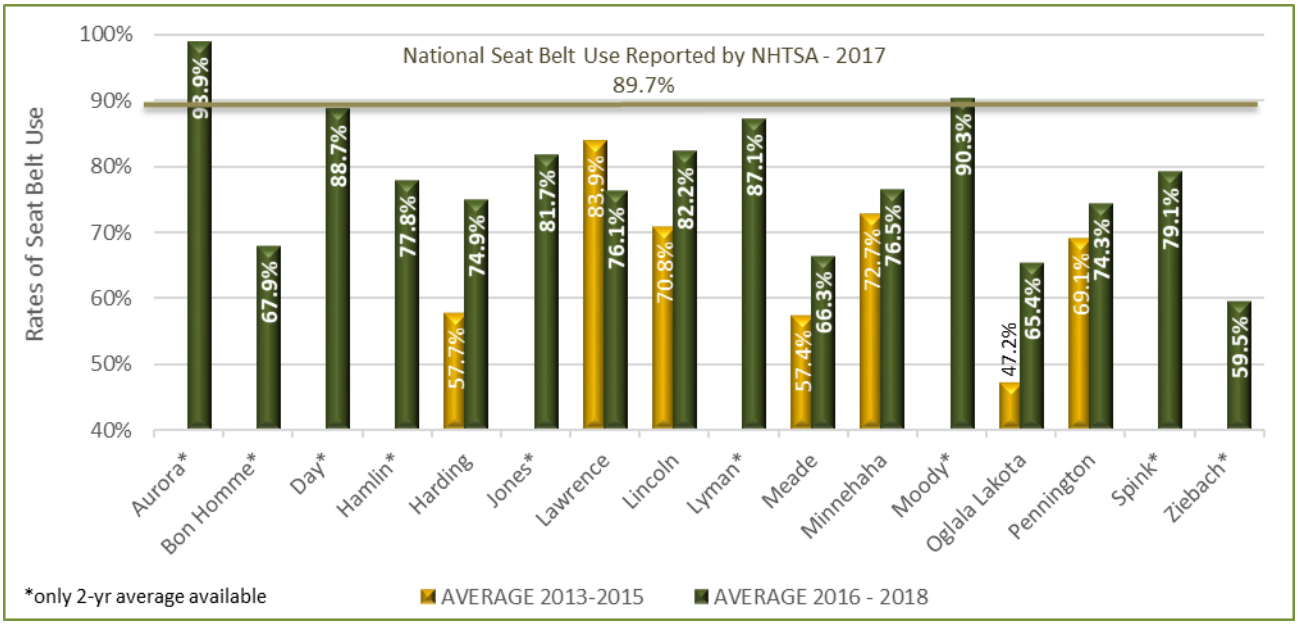


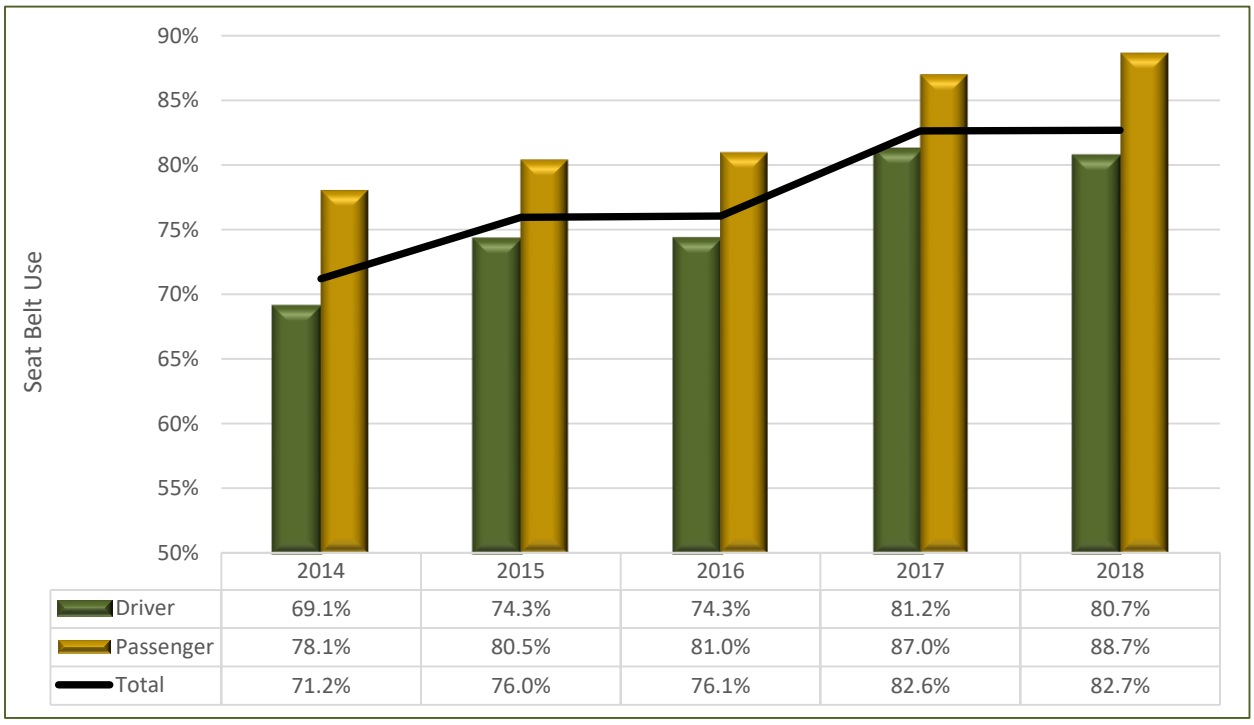
Figure 3: Seat Belt Use by County, 3-Year Averages, Weighted

use in the 2016-2018 average in all counties except Lawrence county which shows a reduction in use from 83.9% to 76.1%. Counties showing significant improvement in seat belt use over the earlier time period are Harding from 57.7% to 74.9%, and Oglala Lakota from 47.2% to 65.4%.

The preceding statewide data is weighted based on the sampling methodology. However, the following sections of this report describe frequencies that are unadjusted due to survey design.

Results for Vehicle Occupants by Position

Annual surveys reinforce that passengers buckle up at higher rates overall than drivers in South Dakota and this continued in 2018. When looking at the state as a whole, the unweighted estimates of seat belt use in 2018 were 80.2% for drivers, 88.7% for passengers, with an overall estimate of the seat belt use rate of 82.7% for drivers and passengers combined (Figure 4). These rates compare to 81.2%, 87.0%, and 82.6%, respectively in 2017. A leveling of rates from the previous years' surveys took place in 2016 and 2018. Even so, seat belt rates reveal a significant upward trend for both occupant positions over the previous five years. Driver rates have risen from a low of 69.1% in 2014 to the current rate of 80.7%, and passenger rates rose correspondingly from 78.1% to 88.7%.



	2014	2015	2016	2017	2018
Driver	69.1%	74.3%	74.3%	81.2%	80.7%
Passenger	78.1%	80.5%	81.0%	87.0%	88.7%
Total	71.2%	76.0%	76.1%	82.6%	82.7%

Figure 4: Percent Belted by Position, Annually, Unweighted

Figure 5 illustrates seat belt use by occupant position in 2018. Passenger rates were higher than driver rates in all counties. The rate differences range from slight to substantial - less than one percentage 1% in Aurora to 33% in Ziebach. The outer limits in restraint use by occupant position is seen in these

counties as well. Driver use ranged from a low in Ziebach County of 44.8% to a high in Aurora County of 98.7%, while passenger use ranged from a low of 59.6% in Ziebach County to a high of 99.4% in Aurora County.

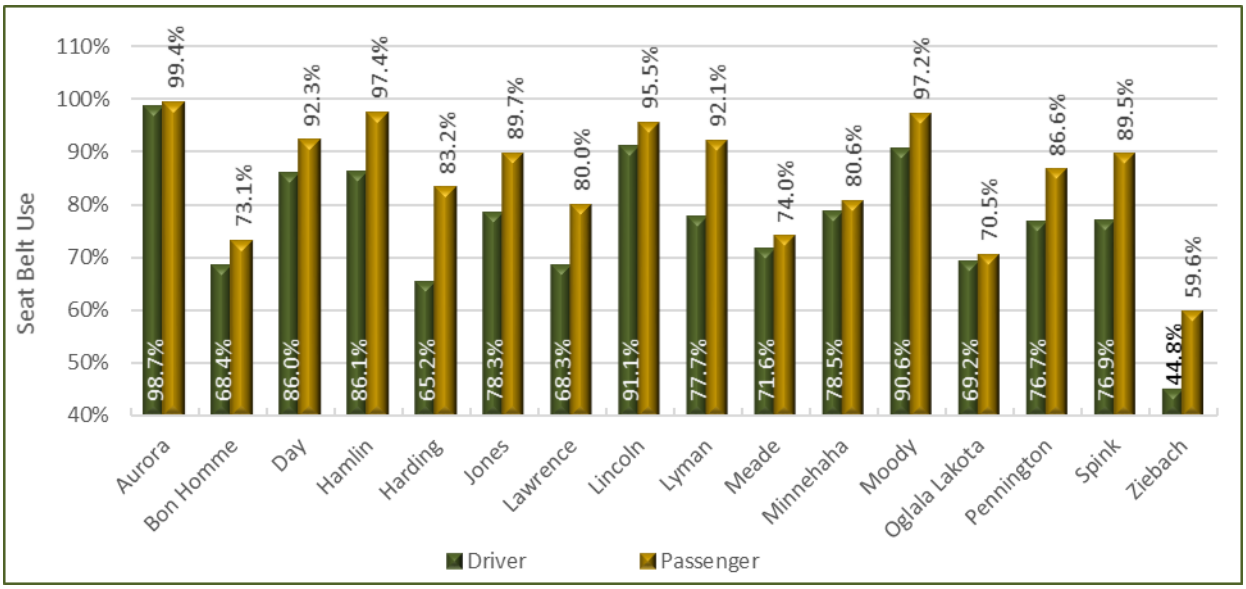


Figure 5: Percent Belted by Occupant Position and County, 2018, Unweighted

Efforts to address seat belt use in South Dakota are ongoing. The overall weighted rate this year is 78.9%. The rate continues to be lower than the national average reported by NHTSA of 89.7%. Experiences from other states suggest that some impetus to cause a major shift will be necessary to achieve significant increases in seat belt use. One possibility would be enactment of a primary seat belt law which NHTSA suggests would change seat belt use rates by 10% to 15%. NHTSA's 2017 survey of seat belt use in primary law states was 90.9% while the rate in states with secondary laws was 85.7%. Other possible interventions include heightened education and/or enforcement across the state.

Some factors that may be useful in administering programs to increase seat belt use in South Dakota are found in the remainder of this report. Differences in seat belt use among regions of the state, gender, vehicle type, and roadway type are explored for additional insight.

Results by South Dakota Regions

The survey sampling methodology groups the state into an east/west regional division. The west region contains three "certainty" counties and five additional counties selected from the remaining counties in the west.[2] The east region is comprised of one "certainty" county and seven additional counties from the east.

[2] See the discussion of the sampling methodology for details on certainty counties and the selection processes.

Table 5: Sample Size By Region

Region	2014	% of Sample	2015	% of Sample	2016	% of Sample	2017	% of Sample	2018	% of Sample
East	11,374	42.0%	12,525	43.7%	14,654	49.1%	14,687	54.4%	14,422	49.2%
West	15,676	58.0%	16,138	56.3%	15,192	50.9%	12,297	45.6%	14,894	50.8%
Total	27,050	100.0%	28,663	100.0%	29,846	100.0%	26,984	100.0%	29,316	100.0%

In 2018, more occupant data was collected from western South Dakota than from the eastern half of the state. Observations in the west numbered 14,894 occupants compared to 14,422 from the east, or 50.8% and 49.2% of the sample, respectively (Table 5). The regional distribution in 2018 remains proportional to previous surveys. Minor differences seen from year-to-year may be associated with changes in travel levels or patterns.

Seat belt use is routinely higher in the east than the west as shown annually in Figure 6. Both regions have shown increased restraint use over time, although rates in the east indicate more annual fluctuations compared with the straighter path shown in the west. This higher use is also documented in the form of 3-year averages in Figure 7. The rate in the east was 78.3% in 2013-2015 increasing to 87.0% in 2016-2018. Seat belt use in the west averaged 68.8% increasing to 73.6% during the respective time frames.

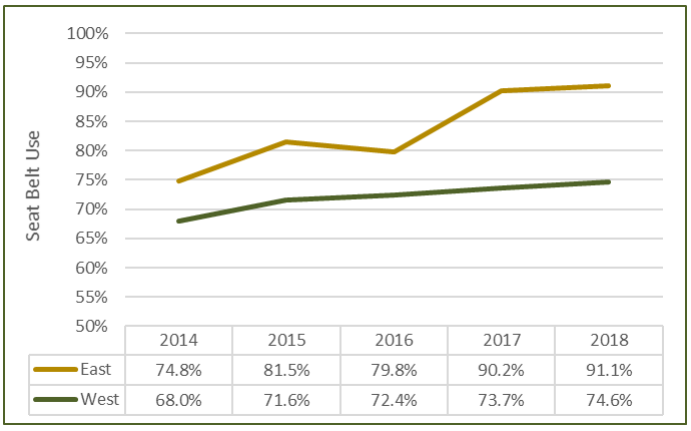


Figure 6: Percent Belted by Region, Annually, Unweighted

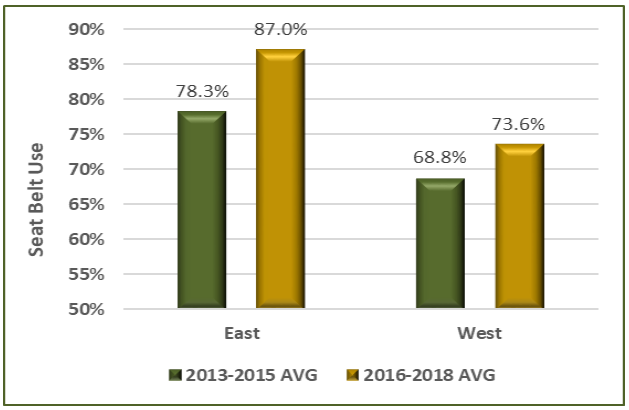
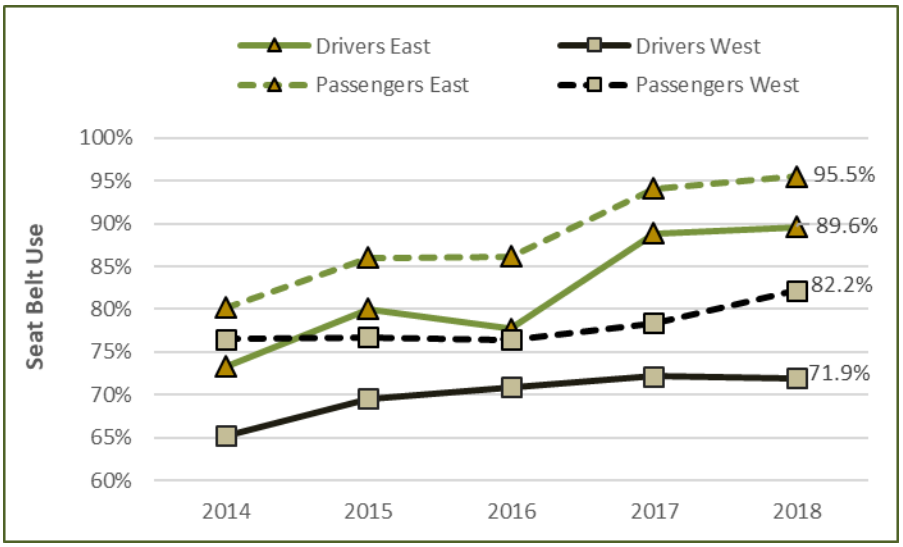


Figure 7: Seat Belt Use by Region, 3-Year Averages, Unweighted

Figure 8 shows patterns of restraint use annually by position and region. Rates for the driver position in both regions were mostly flat from 2017 to 2018. Little change was also reported in passenger rates in the east. However, an increase in passenger use in the western region was more noticeable in 2018 after a plateau in rates from 2014 through 2016. Restraint use in these occupants started to increase in 2017, and the rate this year reached a highpoint exceeding 80% for the first time on record.

Overall, however, growth was moderate in driver and passenger rates from the west region. In 2014, restraint use by occupant position in the west region was 65.2% for drivers and 76.5%, for passengers rising to 71.9% and 82.2%, respectively in the 2018 survey. In contrast, driver and passenger use from the east region has risen from 73.3% and 80.2%, respectively, to 89.6% and 95.5% in 2018.



2016-2018 Average

	Driver	Passenger
East	85.4%	91.9%
West	71.7%	79.0%

Figure 8: Percent Belted by Region and Occupant Position, Unweighted

Results by Vehicle Type

Beginning with the 2012 statewide seat belt survey, South Dakota incorporated the expanded Uniform Criteria vehicle eligibility to define a fleet that included all passenger vehicles with a gross vehicle weight up to 10,000 pounds. This change necessitated the inclusion of various small trucks. Trucks with commercial use indicated by logos on doors or truck body are within the survey scope.[3]

Table 6 shows the annual fleet distribution for 2014 through 2018. Throughout this period, trucks have consistently held about 30% of the overall share. Vans regularly make up 10% of the vehicles. During the

[3] Truck definition is trucks with a gross vehicle weight of less than 10,000 lbs. including pickups, wrecker tow vehicles, flatbed 3 or 4 ton trucks, and utility service trucks; excludes semi or large box trucks, and large emergency vehicles.

same time frame, car and SUV shares have reversed whereby cars now hold 25% of the vehicle share and SUVs one-third.

Table 6: Sample by Vehicle Type

Vehicles Observed	2014	% of Sample	2015	% of Sample	2016	% of Sample	2017	% of Sample	2018	% of Sample
Car	8,584	33.5%	9,512	33.2%	9,377	31.4%	7607	28.2%	7,216	24.6%
SUV	6,478	25.3%	7,493	26.1%	7,888	26.4%	8212	30.4%	9,931	33.9%
Truck	7,904	30.8%	8,625	30.1%	9,370	31.4%	8374	31.0%	9,349	31.9%
Van	2,666	10.4%	3,033	10.6%	3,211	10.8%	2791	10.3%	2,820	9.6%
Total	25,632	100.0%	28,663	100.0%	29,846	100.0%	26,984	100.0%	29,316	100.0%

Annual results for overall seat belt use by vehicle type are shown in Figure 9. Occupant restraint use was observed to be relatively high in SUVs and vans, 87.8% and 87.1%, respectively. This was followed by cars at 80.7% and trucks at 77.5%. Minor rate reversals were observed from 2017 to 2018 in occupants of all vehicle types with the exception of trucks. A consistent upward trend in belt use by truck occupants is seen during the five-year time frame, from a low of 63.2% in 2014 to a high of 77.5% in 2018. Although this demographic demonstrates heightened use, these occupants continue to buckle up at lower rates than those in other vehicle types.

Truck rates were not uniformly low in each county in 2018, however, some counties not only had low truck rates, but a large proportion of trucks as a share of the total county sample. Truck observations in Ziebach County totaled 38% of the county sample with a use rate of 45.5%. In Meade the truck share was 36% of the sample with restraint use of 58.9%. Lawrence, Harding, and Bon Homme counties all had truck shares of 35% - 45% and seat belt use between 64.0% to 68.9%. This lower use, coupled with the greater proportion of trucks in the sample, can reduce both county rates and the overall state rate.

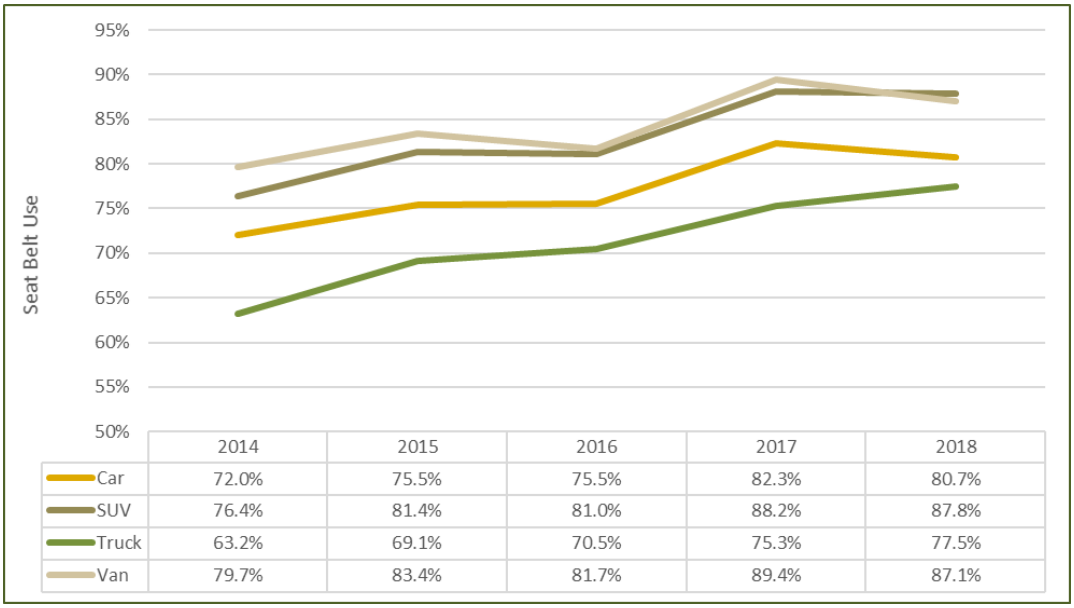


Figure 9: Percent Belted by Vehicle Type, Annually, Unweighted

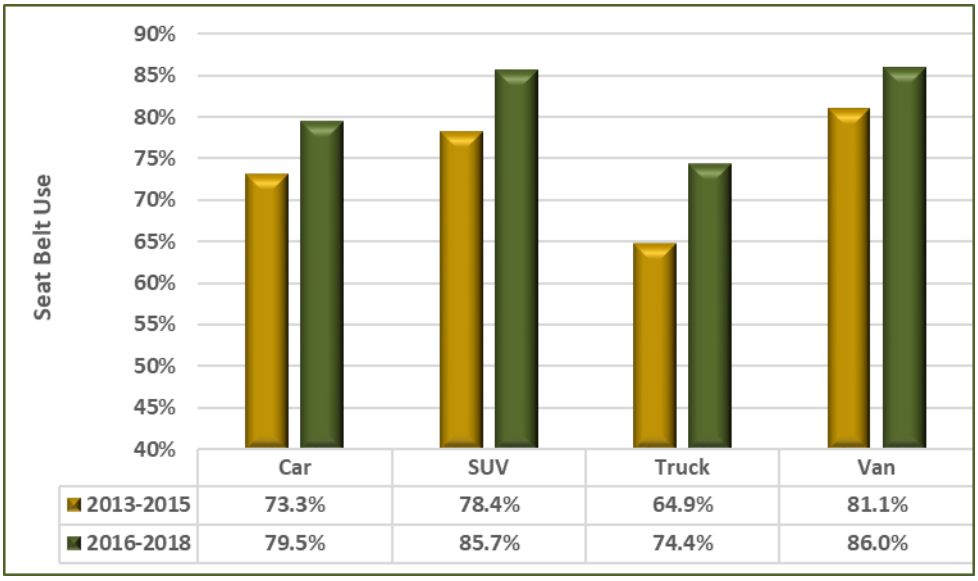


Figure 10: Seat Belt Use by Vehicle Type, 3-Year Averages, Unweighted

A comparison of averages shown in Figure 10 indicates increased seat belt use in the 2016-2018 period over the 2013-2015 period. The current 3-year averages exceed the earlier averages in each vehicle type by 6% to 15%. Individual county rates by vehicle type for 2018 are outlined in Table 7.

Table 7: Percent Belted by County and Vehicle Type, 2018, Unweighted

2018							
Car		**SUV**		**Truck**		**Van**	
Aurora	99.1%	Aurora	99.7%	Aurora	97.4%	Aurora	99.8%
Bon Homme	73.4%	Bon Homme	70.6%	Bon Homme	67.2%	Bon Homme	68.1%
Day	87.4%	Day	95.3%	Day	79.1%	Day	93.2%
Hamlin	93.8%	Hamlin	91.1%	Hamlin	79.0%	Hamlin	94.6%
Harding	69.7%	Harding	71.6%	Harding	65.5%	Harding	94.1%
Jones	78.9%	Jones	86.4%	Jones	76.6%	Jones	83.5%
Lawrence	66.1%	Lawrence	81.1%	Lawrence	64.0%	Lawrence	76.2%
Lincoln	90.2%	Lincoln	94.8%	Lincoln	89.2%	Lincoln	92.7%
Lyman	78.9%	Lyman	85.0%	Lyman	76.9%	Lyman	84.1%
Meade	76.0%	Meade	81.4%	Meade	58.9%	Meade	78.9%
Minnehaha	79.9%	Minnehaha	74.1%	Minnehaha	76.5%	Minnehaha	87.5%
Moody	91.6%	Moody	94.8%	Moody	89.4%	Moody	93.3%
Oglala Lakota	63.1%	Oglala Lakota	75.6%	Oglala Lakota	70.1%	Oglala Lakota	75.7%
Pennington	76.9%	Pennington	83.0%	Pennington	75.8%	Pennington	84.0%
Spink	86.4%	Spink	83.3%	Spink	75.3%	Spink	77.7%
Ziebach	35.7%	Ziebach	62.5%	Ziebach	45.5%	Ziebach	61.5%

The 2018 results by vehicle type are consistent with long-term trends for seat belt use in South Dakota and other states that do not have primary seat belt laws, are largely rural in nature, and have a high proportion of trucks.

Results by Occupant Gender and Position

Table 8: Sample by Gender

Gender Observed	2014	% of Sample	2015	% of Sample	2016	% of Sample	2017	% of Sample	2018	% of Sample
Female	10,855	42.3%	12,679	44.2%	13,198	44.2%	11,761	43.6%	12,350	42.1%
Male	14,752	57.6%	15,917	55.5%	16,598	55.6%	15,147	56.1%	16,728	57.1%
Unknown	25	0.1%	67	0.2%	50	0.2%	76	0.3%	238	0.8%
Total	25,632	100.0%	28,663	100.0%	29,846	100.0%	26,984	100.0%	29,316	100.0%

Minimal year-to-year variation in gender composition of the sample is observed from 2014 through 2018 as summarized in Table 8. Males occupants were 57.1% of the overall sample in 2018 while females were 42.1%. In a small percentage of observations, occupant gender was unable to be determined (less than 1%), but occupant protection was still recorded. These cases are included in all of the analyses except where gender is one of the variables of interest. Removing these observations for these parts of the analyses has no effect on the overall numbers, but is mentioned here for comprehensive reporting.

Gender use and disparity continued an annual pattern whereby females had higher rates of seat belt use than males, and the gap between gender use persisted (Figure 11). The 2018 survey results showed female restraint use of 87.4%, compared to 79.1% for males. Again, rates have shown improvement over time. Female use has registered above 80% since 2015. Male use is approaching this mark with rates that have increased from 66.0% in 2014 to the current level.

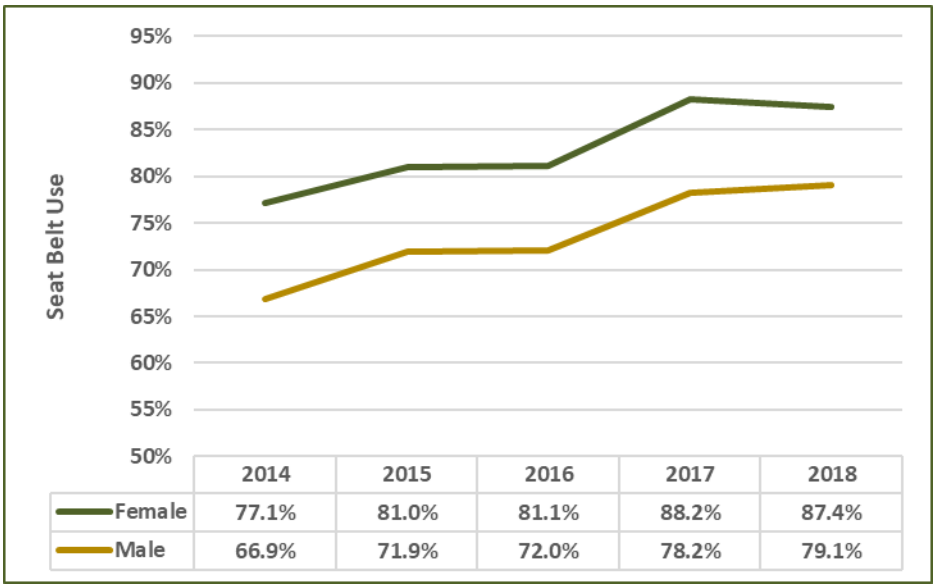


Figure 11: Percent Belted by Gender, Annually, Unweighted

A review of individual counties found a 43 percentage point range for female occupant use (Table 9). The lowest rate for females was found in Ziebach County at 56.5% and the highest in Aurora at 99.5. Diversity in male rates at the county level indicates a 54 percentage point difference between the lowest rate observed in Ziebach County (44.3%) and the highest rate found in Aurora County (98.4%). Readers are reminded of the variability of rates seen from year-to-year associated with factors such as site locations, traffic patterns, sample size, road type, road construction projects, and weather impacts.

Table 9: Percent Belted by Gender & County, 2018

2018			
FEMALE OCCUPANTS		**MALE OCCUPANTS**	
Aurora	99.5%	Aurora	98.4%
Bon Homme	74.9%	Bon Homme	65.1%
Day	96.3%	Day	81.1%
Hamlin	95.4%	Hamlin	83.2%
Harding	77.2%	Harding	65.7%
Jones	88.9%	Jones	76.2%
Lawrence	78.1%	Lawrence	66.6%
Lincoln	95.7%	Lincoln	88.9%
Lyman	85.8%	Lyman	77.2%
Meade	81.1%	Meade	64.0%
Minnehaha	80.0%	Minnehaha	78.2%
Moody	95.2%	Moody	90.0%
Oglala Lakota	71.6%	Oglala Lakota	67.8%
Pennington	81.8%	Pennington	78.0%
Spink	78.0%	Spink	79.4%
Ziebach	56.5%	Ziebach	44.3%

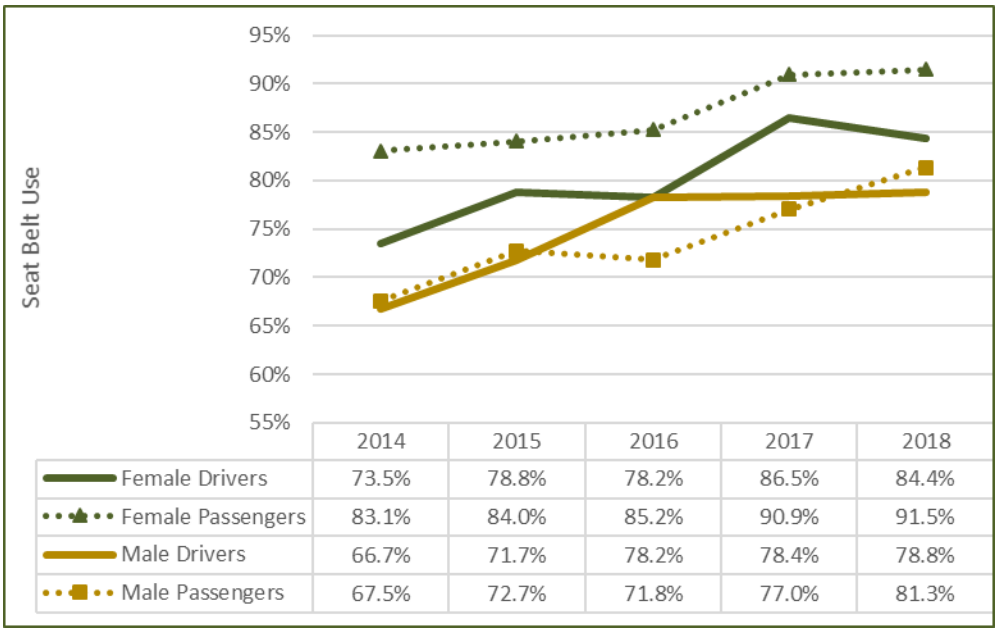
The sample by gender and occupant position also remains quite stable from year-to-year with the 2018 sample indicating a gender distribution proportionate to past surveys. As defined in Table 10, drivers were twice as likely to be male than female (14,582 compared to 7,126). In contrast, passengers were two and a half times more likely to be female than male (5,224 compared to 2,146).

Table 10: Sample by Gender and Position

Occupants Observed	2014	% of Sample	2015	% of Sample	2016	% of Sample	2017	% of Sample	2018	% of Sample
Drivers:										
Male	12,826	50.0%	13,440	46.9%	14,133	47.4%	13,294	49.3%	14,582	49.7%
Female	6,793	26.5%	7,451	26.0%	7,868	26.4%	7,045	26.1%	7,126	24.3%
Passengers:										
Male	1,926	7.5%	2,477	8.6%	2,465	8.3%	1,853	6.9%	2,146	7.3%
Female	4,062	15.8%	5,228	18.2%	5,330	17.9%	4,716	17.5%	5,224	17.8%
Unknown:	25	0.1%	67	0.2%	50	0.2%	76	0.3%	238	0.8%
Total	25,632	100.0%	28,663	100.0%	29,846	100.0%	26,984	100.0%	29,316	100.0%

Male drivers were buckled at a rate of 78.8% in 2018 (Figure 12). This measure of restraint use replicated rates from the previous two-years. Rates for male passengers continued to increase reaching

a high of 81.3%. A separation between male driver and passenger rates occurred in 2016 but the gap closed again in 2017, and surpassed the rate for male drivers in 2018. The survey results corroborate higher rates of use by females regardless of occupant position with one exception in 2016 where drivers of both genders were belted at a rate of 78.2%. Female driver and passenger seat belt use in 2018 was 84.4% and 91.5%, respectively.



	2014	2015	2016	2017	2018
Female Drivers	73.5%	78.8%	78.2%	86.5%	84.4%
Female Passengers	83.1%	84.0%	85.2%	90.9%	91.5%
Male Drivers	66.7%	71.7%	78.2%	78.4%	78.8%
Male Passengers	67.5%	72.7%	71.8%	77.0%	81.3%

Figure 12: Percent Belted by Gender and Position, Annually, Unweighted

Three-year averages identifying rates of seat belt use by both gender and occupant positions show male drivers with an average rate of 68.5% in 2013-2015 compared to 78.5% in 2016-2018 (Figure 13). Rates of use for female drivers were 75.8% to 83.0%, and female passengers were 82.7% and 89.9% in the respective time frames.

	Female Drivers	Male Drivers	Female Passengers	Male Passengers
2013-2015	75.8%	68.5%	82.7%	69.2%
2016-2018	83.0%	78.5%	89.2%	76.7%

Figure 13: Seat Belt Use by Gender & Position, 3-Year Averages, Unweighted

Additional county detail found in Table 11 shows wide-ranging rates in individual counties in all occupant positions.

Table 11: Percent Belted by Gender and Position by County, 2018, Unweighted

2018							
FEMALE DRIVERS		**FEMALE PASSENGERS**		**MALE DRIVERS**		**MALE PASSENGERS**	
Aurora	99.5%	Aurora	99.5%	Aurora	98.4%	Aurora	98.5%
Bon Homme	72.4%	Bon Homme	81.7%	Bon Homme	65.4%	Bon Homme	64.1%
Day	95.2%	Day	97.8%	Day	80.8%	Day	82.1%
Hamlin	93.7%	Hamlin	100.0%	Hamlin	82.3%	Hamlin	92.3%
Harding	67.0%	Harding	87.0%	Harding	64.6%	Harding	73.9%
Jones	86.5%	Jones	91.6%	Jones	74.9%	Jones	84.6%
Lawrence	74.2%	Lawrence	84.7%	Lawrence	65.4%	Lawrence	72.7%
Lincoln	95.2%	Lincoln	96.8%	Lincoln	88.8%	Lincoln	91.2%
Lyman	80.9%	Lyman	93.0%	Lyman	75.4%	Lyman	89.9%
Meade	82.7%	Meade	76.7%	Meade	64.0%	Meade	63.9%
Minnehaha	77.8%	Minnehaha	100.0%	Minnehaha	78.5%	Minnehaha	75.0%
Moody	93.3%	Moody	97.6%	Moody	89.4%	Moody	95.7%
Oglala Lakota	72.0%	Oglala Lakota	71.0%	Oglala Lakota	67.4%	Oglala Lakota	69.4%
Pennington	74.9%	Pennington	88.9%	Pennington	77.7%	Pennington	79.9%
Spink	74.7%	Spink	90.3%	Spink	78.3%	Spink	88.4%
Ziebach	42.9%	Ziebach	72.2%	Ziebach	45.6%	Ziebach	39.0%

Results by Gender and Vehicle Type

Examining survey sample size without respect to the driver/passenger demographic shows the ratio of male to female occupants was approximately 1.4 to 1 in 2018 (16,728 males and 12,350 females). A breakdown of gender representation identified by vehicle type is shown in Table 12. Males had slightly higher representation in cars and vans, while females held a larger share in SUVs. A large gender imbalance is noticed in the truck category, where males represented 77% of the occupant share in this vehicle type.

Table 12: Sample by Vehicle Type and Gender

Occupants Observed	2014	% of Sample	2015	% of Sample	2016	% of Sample	2017	% of Sample	2018	% of Sample
Male										
Car	4,202	16.4%	4,501	15.7%	4,619	15.5%	3,649	13.5%	3,629	12.4%
SUV	3,056	11.9%	3,433	12.0%	3,595	12.0%	3,719	13.8%	4,488	15.3%
Truck	6,199	24.2%	6,561	22.9%	6,935	23.2%	6,403	23.7%	7,164	24.4%
Van	1,295	5.1%	1,422	5.0%	1,449	4.9%	1,376	5.1%	1,447	4.9%
Female										
Car	4,371	17.1%	4,984	17.4%	4,741	15.9%	3,940	14.6%	3,507	12.0%
SUV	3,418	13.3%	4,042	14.1%	4,278	14.3%	4,467	16.6%	5,372	18.3%
Truck	1,696	6.6%	2,053	7.2%	2,421	8.1%	1,948	7.2%	2,128	7.3%
Van	1,370	5.3%	1,600	5.6%	1,758	5.9%	1,406	5.2%	1,343	4.6%
Unknown:	25	0.1%	67	0.2%	50	0.2%	76	0.3%	238	0.8%
Total	25,632	100.0%	28,663	100.0%	29,846	100.0%	26,984	100.0%	29,316	100.0%

Differences in seat belt use by gender varied across the vehicle types (Figure 14). In the 2018 survey, male occupants were belted from a low of 74.7% in trucks to a high of 85.7% in SUVs. Females were belted at rates above 80% in all vehicle types ranging from a low of 83.8% in cars, to a high of 89.5% in SUVs.

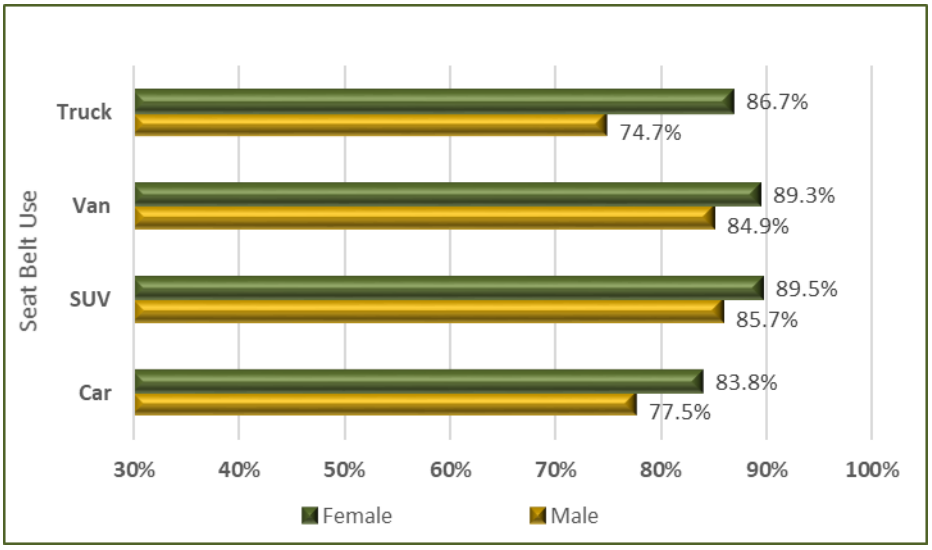


Figure 14: Percent Belted by Gender and Vehicle Type, 2018, Unweighted

Although the size of the disparity between gender belt use shifts from year-to-year, male use is shown to be lower than female use in every vehicle type in every year by as much as 14.9 percentage points to as little as 3.8 percentage points (Table 13). Annual rates of belt use for both genders are highest in SUVs and vans throughout the years represented in the table. Both genders are observed to have the lowest use in trucks, and this is also where the gender difference is most noticeable. However, substantial increases have been made by both genders in this vehicle type from 2014 to 2018 with male use rising from 60.0% to 74.7% and female use from 74.9% to 86.7%.

Table 13: Annual Percent Belted by Gender and Vehicle Type, Unweighted

Male	2014	2015	2016	2017	2018
Car	69.3%	73.1%	72.7%	78.9%	77.5%
SUV	73.1%	77.9%	77.1%	85.2%	85.7%
Van	77.1%	80.5%	80.7%	86.8%	84.9%
Truck	60.0%	66.1%	67.1%	71.9%	74.7%
Female	**2014**	**2015**	**2016**	**2017**	**2018**
Car	74.5%	77.6%	78.1%	85.4%	83.8%
SUV	79.4%	84.3%	84.3%	90.6%	89.5%
Van	82.1%	85.9%	82.4%	91.8%	89.3%
Truck	74.9%	78.8%	80.1%	86.1%	86.7%

The 3-year averages in Figure 15 demonstrate improvement in rates of seat belt use by both genders across all vehicle types when comparing the 2013-2015 period to 2016-2018.

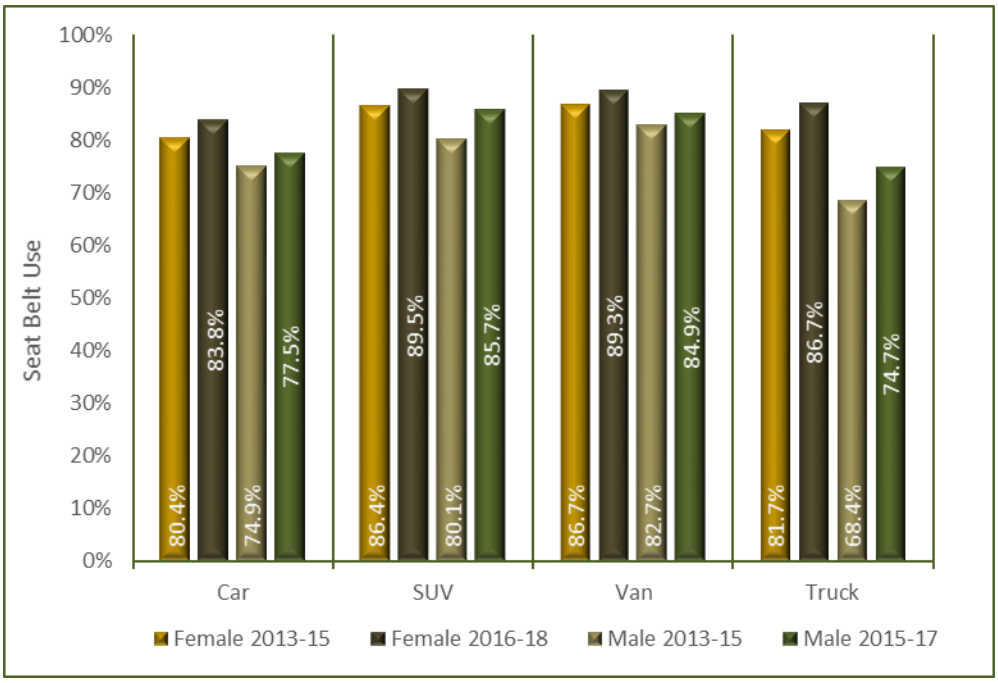


Figure 15: Seat Belt Use by Gender and Vehicle Type, 3-Year Averages, Unweighted

Results by Road Type

Roadways are classified into three road types and broadly described as follows:

- Primary road – divided, limited-access, e.g. interstates
- Secondary road – main arteries usually in the U.S./state/county highway system
- Local neighborhood road/rural road/city street – paved, non-arterial streets

A more comprehensive definition of road type is provided in Appendix E.

Sample distribution by road type and region is diverse as shown in Table 14. However, the overall difference in the sample size between regions was slight in 2018. The west region made up 50.8% (14,894) of the entire sample, and the east contributed 49.2% (14,422). Primary, secondary and local roadways accounted for 47.5%, 38.0%, and 14.5% of total vehicle occupants, respectively.

While it is typical to see annual variations in the regional sample size by road class, the NHTSA-mandated reselection of sites for the 2017 survey heightened the disparities. A noticeable difference was seen on primary roads which historically produced 22% - 25% of the overall South Dakota sample. This increased to 40.8% in 2017, and 47.5% in 2018. A further difference was a sizable decline on

secondary roads that had previously provided 57% - 63% of the overall sample. This share was reduced to 41.3% and 38.0% in 2017 and 2018, respectively.

Table 14: Sample by Road Type

Occupants Observed	2014	% of Sample	2015	% of Sample	2016	% of Sample	2017	% of Sample	2018	% of Sample
East										
Primary	4,030	15.7%	3,860	13.5%	4,764	16.0%	7,161	26.5%	7245	24.7%
Secondary	5,615	21.9%	6,500	22.7%	8,058	27.0%	5,747	21.3%	5482	18.7%
Local	2,441	9.5%	2,165	7.6%	1,832	6.1%	1,779	6.6%	1695	5.8%
Total East	12,086	47.2%	12,525	43.7%	14,654	49.1%	14,687	54.4%	14,422	49.2%
West										
Primary	2,388	9.3%	3,221	11.2%	2,452	8.2%	3,856	14.3%	6694	22.8%
Secondary	8,996	35.1%	10,768	37.6%	10,614	35.6%	5,384	20.0%	5647	19.3%
Local	2,162	8.4%	2,149	7.5%	2,126	7.1%	3,057	11.3%	2553	8.7%
Total West	13,546	52.8%	16,138	56.3%	15,192	50.9%	12,297	45.6%	14,894	50.8%
Total	25,632	100.0%	28,663	100.0%	29,846	100.0%	26,984	100.0%	29,316	100.0%

Sample variations were associated with revisions in the number of sites drawn for each road type, as well as traffic volumes at new site locations. Contextual information is provided in Figure 16 identifying the proportion of sites by road type established with the amended methodology in 2012 followed by the reselection in 2017. Although the weighted results do include adjustments for changes to road site characteristics, the unweighted results may be influenced by the site mix and underlying characteristics such as higher use rates on interstate corridors.

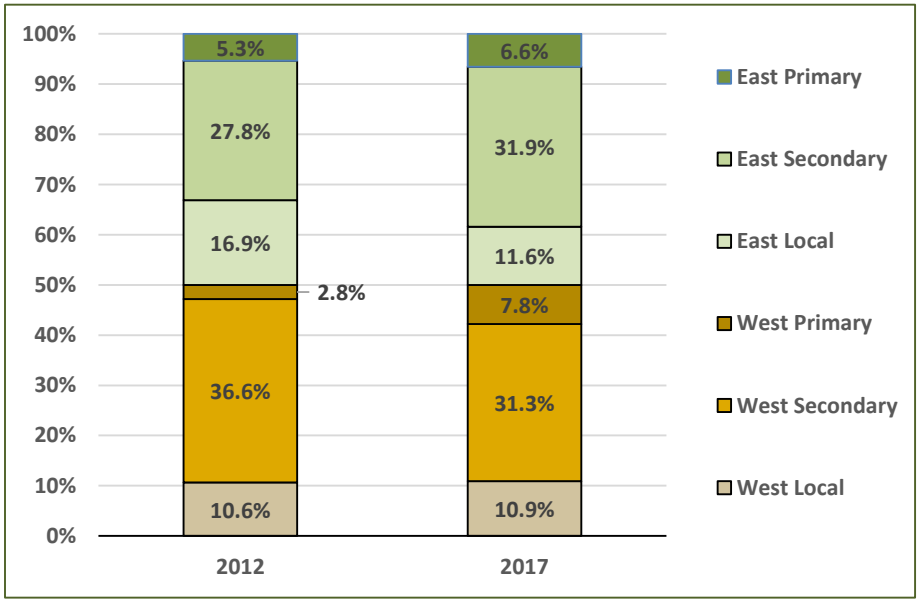


Figure 16: Survey Sites by Road Type, 2012 and 2017

Vehicle occupants on primary roadways were belted at a higher rate than occupants on local and secondary roads, 89.1%, 80.9%, and 75.4%, respectively (Figure 17). The level of seat belt use on secondary roads outpaced use on local roads from 2014 through 2017. However, in 2018 the occupant protection measured on local roads surpassed secondary roads which was unexpected. It will be interesting to see if this positive trend for local road use is carried into future surveys.

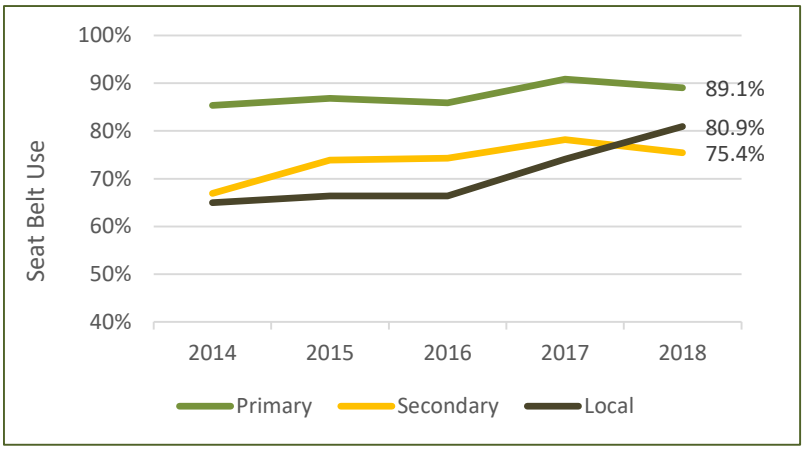


Figure 17: Percent Belted by Road Type, Annually, Unweighted

Annual rates stratified by region and road type are shown in Table 15. Restraint use on primary roads in the east region ranged from 83.1% to 97.1%. Rates on primary roads in the west region ranged from 80.4% to 91.4%. Use on secondary roads fluctuated between 69.1% and 85.1% in the east, and 65.6% and 70.8% in the west. Occupants traveling local roads in both regions have shown significant advances in seat belt use when considering 2014 to 2018 rates. These occupants were belted at rates ranging from 72.3% to 90.6%, and 56.7% and 74.5% in the east and west regions, respectively. Rates for secondary and local roads were higher in the east than the west for all years, whereas higher rates on primary roads fluctuated between the regions.

Table 15: Annual Percent Belted by Region & Road Type, Unweighted

EAST	2014	2015	2016	2017	2018
Primary	84.2%	86.9%	83.1%	96.2%	97.1%
Secondary	69.1%	80.7%	78.9%	85.1%	83.4%
Local	72.3%	74.2%	75.1%	82.2%	90.6%
WEST	**2014**	**2015**	**2016**	**2017**	**2018**
Primary	87.4%	86.7%	91.4%	81.0%	80.4%
Secondary	65.6%	69.7%	70.8%	70.8%	67.7%
Local	56.7%	58.4%	58.6%	69.4%	74.5%
TOTAL	**2014**	**2015**	**2016**	**2017**	**2018**
Primary	85.4%	86.9%	85.9%	90.9%	89.1%
Secondary	66.9%	73.9%	74.3%	78.2%	75.4%
Local	65.0%	66.4%	66.4%	74.1%	80.9%

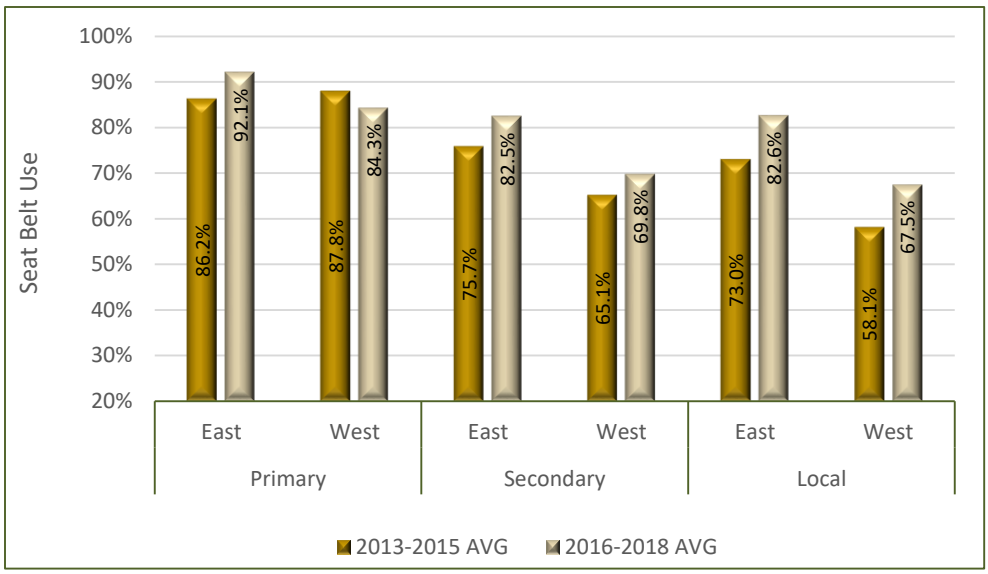


Figure 18: Seat Belt Use by Roadway Type, 3-Year Averages, Unweighted

Increases in rates are evident in each road classification and region in the comparison of 2013-2015 and 2016-2018 figures (Figure 18). The one exception was primary roads in the west where the rate fell from 87.8% to 84.3%. Although the extent of the increases varied, the largest improvement over time was found in belt use on local roads in both east and west regions. More divergence is identified regionally within the road types. For example, average restraint use on secondary roads in the east during 2016-2018 was 82.5%, whereas the rate in the west was 69.8%. Occupants on local roads in the east during this time frame demonstrated use of 82.6% compared with 67.5% in the west region**.**

Additional insight is found in delineating restraint use by road type and metropolitan statistical areas (MSA). MSA counties are defined as a core area consisting of a larger population nucleus and adjacent communities with high economic and social involvement (U.S. Census Bureau). The designated MSA counties in the South Dakota observational seat belt survey are Lincoln, Meade, Minnehaha, and Pennington.

The data shown in Figure 19 is unweighted and does not account for the allocation of sites by road type in the two categories. Analysis shows similar rates of use on primary roads in MSA and non-MSA

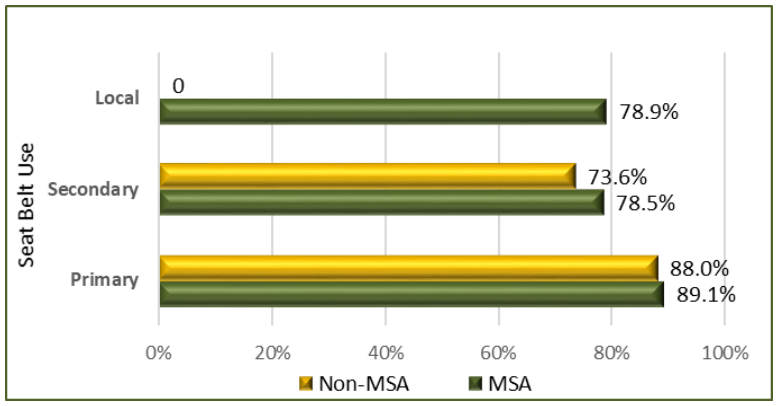


Figure 19: Percent Belted by Road Type & Metropolitan Statistical Areas, 2018, Unweighted

counties of 89.1% and 88.0%, respectively. Occupants traveling secondary roads were observed to be restrained at a rate of 78.5% in MSA counties, and 73.6% in non-MSA counties. Occupants on local roads in MSA counties were restrained at a rate of 78.9%. Since local road sites were outside the sampling frame in non-MSA counties, a comparison of that road type is not available.

Table 16 shows a regional breakdown of sample size and restraint use by county designation and road type. A preponderance of observations for the primary road type was collected in non-MSA counties. The rate for this group was much higher in the east (96.4%) than in the west (79.6%). The reverse was seen in MSA counties where occupants were restrained at a rate of 81.0% in the east compared with 97.1% in the west.

Secondary road occupants were also sampled more heavily in non-MSA counties than MSA counties. Occupants in non-MSA counties on this road type demonstrated rates of 81.8% in the east and 65.4% in the west. Rates in MSA counties were 95.6% and 61.4%, respectively.

As mentioned previously, observations were collected on local roads in MSA counties only per NHTSA protocol guidance. The rate on local roads in the east was 83.6% and 74.3% in the west.

Table 16: Seat Belt Use by Region and MSA Designations

		East		West	
		Sample	Belted	Sample	Belted
Primary	**MSA**	200	81.0%	384	97.1%
	non-MSA	7045	96.4%	6310	79.6%
Secondary	**MSA**	69	95.6%	193	61.4%
	non-MSA	5413	81.8%	5454	65.4%
Local	**MSA**	1695	83.6%	2553	74.3%
	non-MSA	n.a.	n.a.	n.a.	n.a.

SUMMARY

Observers collected data on seat belt use for 21,813 drivers and 7,503 right front-seat passengers for a total of 29,316 vehicle occupants. The observations were conducted at 320 sites across 16 counties. Based on the sampling methodology weighting procedures, the final estimate for the statewide seat belt use was 78.9%. Experiences from other states indicate that improvement in seat belt use will likely only occur through some type of significant change such as implementation of a primary seat belt law, increased funding for additional enforcement, or possibly higher fines (NHTSA).

A summary of major findings from the 2018 survey regarding seat belt use in South Dakota are:

- **County.** Weighted rates of seat belt use by county showed Aurora with the highest use at 98.8%. Ziebach County had the lowest use at 50.5%. Harding, Bon Homme, and Oglala Lakota Counties were also observed to be restrained at rates less than 70% in 2018. Trend comparison for seven counties where historical data was available showed varied rates expressed in 3-year averages comparing 2013-2015 to 2016-2018. Trends were not available in the majority of counties due to the NHTSA-mandated reselection process that took place in 2017 limiting the findings to two years of data.

- **Vehicle Occupant.** Driver seat belt use was 80.7% while passenger use was 88.7% statewide. At the county level, Aurora reflected the highest rate of driver and passenger use, 98.7% and 99.4%, respectively. This was followed by Lincoln and Moody Counties with a rates for both occupant positions above 90%. Bon Homme, Harding, Lawrence, and Oglala Lakota demonstrated driver use less than 70%. Passenger use was lowest in Ziebach County at 44.8%.

- **Region.** Overall rates of seat belt use were higher in the east region, 91.1%, compared to 74.6% in the west region. This regional disparity is noted throughout the 2014 to 2018 time frame. Rates in the east ranged from a low of 74.8% in 2014 to a high of 91.1% in 2018. Rates in the west were considerably lower, ranging from a low of 68.0% in 2014 to a high of 74.6% in 2018. Regional disparity was also evident in occupant position. Drivers and passengers in the east registered use of 89.6% and 95.5%, respectively, compared to their counterparts in the west with use of 71.9% for drivers and 82.2% for passengers.

- **Vehicle Type.** The results of the 2018 statewide survey indicated occupants of cars, SUVs and vans demonstrated relatively high restraint use, 80.7%, 87.8%, and 87.1%, respectively. Truck occupants, on the other hand, were belted at a lower rate, 77.5%. The sample size of this demographic (31.9%) combined with the lower use continues to negatively influence the overall South Dakota rate. Male occupants in trucks were belted at 74.7% in 2018 compared to 86.7% for females.

- **Gender.** In 2018, female occupants continued to show higher rates of seat belt use overall than male occupants, 87.4% and 79.1%, respectively. When considering rates at the county level, approximately 60% of the survey counties registered female use at or above 80%, whereas male rates were less than that level in roughly 70% of the counties. The rates by gender within the counties varied from less than 1 to as much as 27 percentage points. Higher rates hold for females whether they are drivers or passengers, not only in South Dakota, but across the nation.

- **Gender and Vehicle Type.** Females had higher rates of seat belt use than males for every vehicle type. The highest rate for males was found in SUVs, 85.7%, and the lowest in trucks, 74.7%. By comparison, female rates were more consistent across vehicle types, ranging from a high of 89.5% in SUVs to a low of 83.8% in cars.

- **Road Type.** Primary roads produced the largest share of occupants in the sample at 47.5%, followed by secondary roads with a 38.0% share. Local roads had the smallest share (14.5%) mainly due to their selection in only MSA counties per NHTSA protocol. Seat belt use in 2018 was highest on primary roads (89.1%), followed by local roads (80.9%), and secondary roads (75.4%). A comparison of results defined by MSA versus non-MSA county designation showed variations in sample size and rates of use. Less than 20% of the sample was from designated MSA counties with rates of 89.1%, 78.5%, and 78.9% on primary, secondary, and local roads, respectively. The majority of the sample was from non-MSA counties with rates of 88.0% on primary roads and 73.6% on secondary roads. Regional differences in shares and use rates by road type were also noticed.

APPENDICES

Appendix A: Survey Methodology

Methodology Overview

On April 1, 2011, NHTSA published revised Uniform Criteria for the state observational seat belt surveys to guide occupant protection programs. The new rule changed many aspects of the survey design. One of these changes was to include counties in the sampling frame based on fatality-based inclusion criterion as opposed to the population-based criterion of the past. This methodology was used for surveys from 2012 to 2016. The Federal rule directs states to update sampling frame data every five years to ensure accurate fatality distribution as well as a representative inventory of road segments. Accordingly, in 2017 a review of fatalities over the five-year period from 2010 to 2014 was performed resulting in changes in county involvement and a complete reselection of sites.

It was determined that 44 counties accounted for at least 85% of South Dakota's total crash-related fatalities from 2010 to 2014. A subsample of 16 counties was selected for the survey of seat belt use in South Dakota. Counties represent the primary sampling unit. Half of the counties were selected from the western part of the state and the other eight were selected from the eastern half. Within each of those 16 counties a sample of 20 sites were selected providing a total of 320 site locations across the state. In the event that any original sites could not be observed due to unforeseen circumstances, a reserve sample of sites was also selected. The sites within the counties are the secondary sampling unit. The sites were stratified by road types, identified within three MAF/TIGER Feature Class Code (MTFCC) classifications: primary roads, secondary roads, and local roads.

The formulas contained in this report use the following definitions.

g – denotes the county strata (east or west)
c – denotes the county
h – denotes the road segment strata (primary, secondary, or local)
i – denotes the road segment
j – denotes the time segment
k – denotes the vehicles direction of travel
l – denotes the lane of observation
m – denotes the vehicle
n – denotes the front-seat occupant (driver or passenger)

Within each stratum, east and west, counties were selected with probability proportional to size (PPS) with the measure of size (MOS) being vehicle miles traveled (VMT). If we let $g = 1{,}2$ be the first stage strata, v_{gc} be the VMT for county c in stratum g, and $v_g = \sum_{all\ c\ in\ g} v_{gc}$ be the total VMT for all counties in first stage stratum g, then the primary sampling unit (PSU) inclusion probability is: $\pi_{gc} = n_g v_{gc}/v_g$, here $n_g$is the PSU sample size for first stage stratum g that was allocated. First, each strata was analyzed to identify if any certainty counties existed. A county was selected with certainty if its MOS was equal to or exceeded v_g/n_g. Each certainty county identified was set aside and the stratum MOS was reduced by that county's VMT and n_g was reduced by one. This process was repeated until no

county's MOS was equal to or greater than v_g/n_g based on the reduced values for v_g and n_g. The probabilities of selection for the remaining counties in the stratum were calculated based on the new values for v_g and n_g. Three certainty counties were identified in the west region: Pennington, Meade, and Lawrence. Minnehaha was the only county selected with certainty from the east region. The remaining counties for each region were selected using the SAS procedure PROC SURVEYSELECT based on the re-calculated probabilities of selection.

Next, road segments within each county were stratified by their MTFCC class; primary, secondary and local. The list of eligible road segments within each county was then sorted by segment length within each MTFCC group to obtain an ordered list. Road segments were selected with PPS using length as the MOS. The same procedure that was used to identify certainty counties was used to identify any certainty sites. Only one certainty road segment was identified. A sampling interval (I) was calculated as the total length across all remaining road segments within the county divided by the number of road segments to select within each county (i.e. 20 less the number of certainty sites). A random starting point (RS) was selected between 0 and I, which determined the first road segment selected. Subsequent road segments selected were determined by adding multiples of I to RS until the desired number of road segments was selected and/or the end of the sorted list was reached.

Once the sites were chosen, a random order of the sites to observe within each county was constructed. One of the sites in each county was randomly chosen as the starting site. This site was then randomly assigned to one of the 77 one-hour time slots within the week as mandated by the Uniform Criteria. The time slots cover Monday through Sunday from 7 a.m. to 6 p.m. Once the initial site was selected and assigned to a time slot, the remaining sites were clustered and arranged within the county to achieve administrative and economic efficiencies. After each site was identified, the direction of travel was chosen randomly as either N/W or S/E. The lane of traffic was chosen as the closest lane to where the observer could find a suitable and safe place to make observations.

Under the stratified multistage sample design, the inclusion probability for each observed vehicle is the product of selection probabilities at all stages:

> π_{gc} for county,$\pi_{hi|gc}$ for road segment, $\pi_{j|gchi}$ for time segment, $\pi_{k|gchij}$ for direction, $\pi_{l|gchij}$ for lane, and $\pi_{m|gchijl}$for vehicle.

So the overall vehicle inclusion probability is:

$$\pi_{gchijklm} = \pi_{gc} \cdot \pi_{hi|gc} \cdot \pi_{j|gchi} \cdot \pi_{k|gchij} \cdot \pi_{l|gchij} \cdot \pi_{m|gchijl}$$

The sampling weight (design weight) for vehicle *m* is:

$$w_{gchijklm} = \frac{1}{\pi_{gchijklm}}$$

Noting that all front-seat occupants were observed and letting the driver/passenger seat belt use status be:

$$y_{gchijklmn} = \begin{cases} 1, & if\ belt\ used \\ 0, & otherwise \end{cases}.$$

Then the seat belt use rate estimator is a ratio estimator calculated as follows:

$$\rho = \frac{\sum_{all\ gchijklmn} w_{gchijklm} y_{gchijklmn}}{\sum_{all\ gchijklmn} w_{gchijklm}}.$$

This estimator captures traffic volume and vehicle miles traveled through design weights (which will include nonresponse adjustment factors) at various stages and it does not require knowledge of VMT/DVMT.

Appendix B: Survey Instrument

Seat Belt Survey Form **Page # _____ of_____**

Date _____ **Start Time:** _____ **AM/PM** **End Time** _____**AM/PM**

County_____ **Observer Name:**_____

Site Location Description (including city/town where applicable): _____

Site ID Number: _____ **(if applicable)**

Traffic Type Being Observed: ❑ Town/City ❑ Highway/County Road (outside of city/town) ❑ Interstate

Obs	Vehicle Type					Driver						Passenger					
						Gender			Protection			Gender			Protection		
1	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
2	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
3	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
4	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
5	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
6	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
7	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
8	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
9	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
10	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
11	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
12	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
13	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
14	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
15	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
16	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
17	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
18	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
19	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
20	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
21	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
22	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
23	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
24	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
25	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
26	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
27	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
28	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
29	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK
30	Car	Trck	SUV	Van	Mcycl	M	F	DK	Y	N	DK	M	F	DK	Y	N	DK

Appendix C: Seat Belt Use Rates with Site and County Weights

Aurora County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.05035	0.19189	445	445	100.0%
2	0.10222	0.19189	249	253	98.4%
3	0.14767	0.19189	583	583	100.0%
4	0.20058	0.19189	728	728	100.0%
5	0.27463	0.19189	578	582	99.3%
6	0.30301	0.19189	371	373	99.5%
7	0.30591	0.19189	433	433	100.0%
8	0.44173	0.19189	589	591	99.7%
9	0.01473	0.19189	55	59	93.2%
10	0.06036	0.19189	31	34	91.2%
11	0.09658	0.19189	8	11	72.7%
12	0.12607	0.19189	55	55	100.0%
13	0.14341	0.19189	57	64	89.1%
14	0.15693	0.19189	10	14	71.4%
15	0.16507	0.19189	13	15	86.7%
16	0.16856	0.19189	5	9	55.6%
17	0.17007	0.19189	15	19	78.9%
18	0.17101	0.19189	33	34	97.1%
19	0.17200	0.19189	19	24	79.2%
20	0.19845	0.19189	51	51	100.0%

Bon Homme County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.00677	0.12394	6	12	50.0%
2	0.01354	0.12394	22	31	71.0%
3	0.02130	0.12394	41	68	60.3%
4	0.02624	0.12394	1	1	100.0%
5	0.03260	0.12394	17	36	47.2%
6	0.03993	0.12394	27	36	75.0%
7	0.04383	0.12394	45	77	58.4%
8	0.04734	0.12394	32	38	84.2%
9	0.05213	0.12394	28	39	71.8%
10	0.05662	0.12394	18	28	64.3%
11	0.06199	0.12394	25	31	80.6%
12	0.06954	0.12394	30	36	83.3%
13	0.07733	0.12394	27	34	79.4%
14	0.08431	0.12394	19	32	59.4%
15	0.08981	0.12394	19	25	76.0%
16	0.09959	0.12394	26	29	89.7%
17	0.11460	0.12394	38	59	64.4%
18	0.12924	0.12394	19	25	76.0%
19	0.14300	0.12394	25	37	67.6%
20	0.17121	0.12394	17	20	85.0%

Day County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.00763	0.16674	131	143	91.6%
2	0.01587	0.16674	44	60	73.3%
3	0.02587	0.16674	173	192	90.1%
4	0.03766	0.16674	117	134	87.3%
5	0.04626	0.16674	21	25	84.0%
6	0.05194	0.16674	167	196	85.2%
7	0.06034	0.16674	139	143	97.2%
8	0.07156	0.16674	205	254	80.7%
9	0.08272	0.16674	169	190	88.9%
10	0.09304	0.16674	16	20	80.0%
11	0.09970	0.16674	46	56	82.1%
12	0.10886	0.16674	16	18	88.9%
13	0.12871	0.16674	15	17	88.2%
14	0.13554	0.16674	48	54	88.9%
15	0.14992	0.16674	208	228	91.2%
16	0.16337	0.16674	15	16	93.8%
17	0.17701	0.16674	120	130	92.3%
18	0.20885	0.16674	253	288	87.8%
19	0.21114	0.16674	123	145	84.8%
20	0.22351	0.16674	173	196	88.3%

Hamlin County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.15358	0.13285	191	203	94.1%
2	0.23698	0.13285	174	182	95.6%
3	0.01384	0.13285	26	52	50.0%
4	0.02658	0.13285	28	29	96.6%
5	0.04188	0.13285	26	36	72.2%
6	0.05948	0.13285	16	17	94.1%
7	0.07491	0.13285	25	31	80.6%
8	0.08760	0.13285	44	56	78.6%
9	0.10508	0.13285	18	19	94.7%
10	0.11610	0.13285	10	11	90.9%
11	0.12552	0.13285	16	18	88.9%
12	0.13577	0.13285	21	24	87.5%
13	0.15665	0.13285	46	52	88.5%
14	0.17134	0.13285	22	24	91.7%
15	0.18804	0.13285	59	67	88.1%
16	0.19998	0.13285	16	18	88.9%
17	0.21429	0.13285	23	27	85.2%
18	0.21527	0.13285	21	23	91.3%
19	0.21612	0.13285	28	33	84.8%
20	0.37343	0.13285	39	44	88.6%

Harding County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.02008	0.21203	19	35	54.3%
2	0.04026	0.21203	35	53	66.0%
3	0.05132	0.21203	3	7	42.9%
4	0.05907	0.21203	5	9	55.6%
5	0.06630	0.21203	8	11	72.7%
6	0.07584	0.21203	41	64	64.1%
7	0.08620	0.21203	19	45	42.2%
8	0.09559	0.21203	4	11	36.4%
9	0.10437	0.21203	9	16	56.3%
10	0.10704	0.21203	19	23	82.6%
11	0.11705	0.21203	58	71	81.7%
12	0.12407	0.21203	16	18	88.9%
13	0.14668	0.21203	17	23	73.9%
14	0.16130	0.21203	2	4	50.0%
15	0.18339	0.21203	6	11	54.5%
16	0.21183	0.21203	4	4	100.0%
17	0.24223	0.21203	4	11	36.4%
18	0.27401	0.21203	58	76	76.3%
19	0.34095	0.21203	37	51	72.5%
20	0.49021	0.21203	64	69	92.8%

Jones County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.04197	0.37274	155	180	86.1%
2	0.05313	0.37274	126	159	79.2%
3	0.06438	0.37274	153	177	86.4%
4	0.07633	0.37274	153	184	83.2%
5	0.09061	0.37274	154	191	80.6%
6	0.10413	0.37274	129	157	82.2%
7	0.12280	0.37274	235	286	82.2%
8	0.14236	0.37274	186	220	84.5%
9	0.20049	0.37274	198	236	83.9%
10	0.33076	0.37274	261	299	87.3%
11	0.36963	0.37274	212	258	82.2%
12	0.00525	0.37274	48	86	55.8%
13	0.03489	0.37274	4	10	40.0%
14	0.05222	0.37274	0	3	0.0%
15	0.07942	0.37274	41	54	75.9%
16	0.10054	0.37274	34	59	57.6%
17	0.13721	0.37274	2	5	40.0%
18	0.16655	0.37274	2	4	50.0%
19	0.20673	0.37274	2	2	100.0%
20	0.36671	0.37274	19	29	65.5%

Lawrence County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.03584	1.00000	287	422	68.0%
2	0.04487	1.00000	299	398	75.1%
3	0.07269	1.00000	148	195	75.9%
4	0.09063	1.00000	284	397	71.5%
5	0.12581	1.00000	317	420	75.5%
6	0.19099	1.00000	288	407	70.8%
7	0.00300	1.00000	227	292	77.7%
8	0.01134	1.00000	112	143	78.3%
9	0.01950	1.00000	179	262	68.3%
10	0.02725	1.00000	37	48	77.1%
11	0.03695	1.00000	97	149	65.1%
12	0.04993	1.00000	46	60	76.7%
13	0.06129	1.00000	140	214	65.4%
14	0.07615	1.00000	34	48	70.8%
15	0.09037	1.00000	99	151	65.6%
16	0.10017	1.00000	77	142	54.2%
17	0.11583	1.00000	22	31	71.0%
18	0.16564	1.00000	110	155	71.0%
19	0.26954	1.00000	77	117	65.8%
20	0.36665	1.00000	75	102	73.5%

Lincoln County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.00075	0.95517	62	68	91.2%
2	0.00113	0.95517	21	23	91.3%
3	0.00064	0.95517	286	325	88.0%
4	0.00275	0.95517	437	461	94.8%
5	0.00321	0.95517	52	54	96.3%
6	0.00422	0.95517	175	178	98.3%
7	0.00063	0.95517	20	34	58.8%
8	0.00233	0.95517	2	2	100.0%
9	0.00085	0.95517	3	3	100.0%
10	0.00321	0.95517	211	223	94.6%
11	0.00113	0.95517	15	15	100.0%
12	0.00421	0.95517	15	19	78.9%
13	0.00763	0.95517	25	28	89.3%
14	0.01149	0.95517	11	14	78.6%
15	0.00620	0.95517	1	1	100.0%
16	0.00657	0.95517	82	88	93.2%
17	0.00318	0.95517	5	7	71.4%
18	0.00396	0.95517	39	42	92.9%
19	0.01162	0.95517	3	7	42.9%
20	0.00196	0.95517	33	38	86.8%

Lyman County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.01033	0.73276	216	264	81.8%
2	0.02300	0.73276	170	213	79.8%
3	0.04714	0.73276	240	284	84.5%
4	0.06524	0.73276	306	355	86.2%
5	0.07863	0.73276	109	138	79.0%
6	0.11631	0.73276	272	337	80.7%
7	0.13672	0.73276	113	133	85.0%
8	0.00314	0.73276	11	15	73.3%
9	0.01797	0.73276	99	121	81.8%
10	0.02754	0.73276	3	10	30.0%
11	0.03447	0.73276	12	19	63.2%
12	0.04179	0.73276	33	40	82.5%
13	0.05414	0.73276	5	9	55.6%
14	0.06812	0.73276	22	27	81.5%
15	0.07054	0.73276	11	17	64.7%
16	0.09146	0.73276	4	5	80.0%
17	0.11040	0.73276	6	14	42.9%
18	0.13650	0.73276	8	15	53.3%
19	0.18173	0.73276	6	10	60.0%
20	0.25105	0.73276	32	40	80.0%

Meade County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.00173	1.00000	9	18	50.0%
2	0.00988	1.00000	9	31	29.0%
3	0.00032	1.00000	58	78	74.4%
4	0.00032	1.00000	40	65	61.5%
5	0.00348	1.00000	5	18	27.8%
6	0.00032	1.00000	243	311	78.1%
7	0.00175	1.00000	137	154	89.0%
8	0.00143	1.00000	4	8	50.0%
9	0.00121	1.00000	91	125	72.8%
10	0.04477	1.00000	13	19	68.4%
11	0.00681	1.00000	20	28	71.4%
12	0.00435	1.00000	31	44	70.5%
13	0.00670	1.00000	15	24	62.5%
14	0.00978	1.00000	4	12	33.3%
15	0.00249	1.00000	19	29	65.5%
16	0.01388	1.00000	24	28	85.7%
17	0.01440	1.00000	3	5	60.0%
18	0.00484	1.00000	7	20	35.0%
19	0.00084	1.00000	12	16	75.0%
20	0.01092	1.00000	12	17	70.6%

Minnehaha County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.00306	1.00000	162	200	81.0%
2	0.00191	1.00000	1	1	100.0%
3	0.00024	1.00000	20	28	71.4%
4	0.00047	1.00000	9	12	75.0%
5	0.00047	1.00000	6	9	66.7%
6	0.00067	1.00000	4	6	66.7%
7	0.00086	1.00000	2	2	100.0%
8	0.00053	1.00000	9	15	60.0%
9	0.00131	1.00000	3	3	100.0%
10	0.00086	1.00000	2	6	33.3%
11	0.00198	1.00000	7	9	77.8%
12	0.00245	1.00000	1	1	100.0%
13	0.00105	1.00000	16	18	88.9%
14	0.00366	1.00000		0	
15	0.00131	1.00000	13	13	100.0%
16	0.00305	1.00000	4	4	100.0%
17	0.00565	1.00000	2	3	66.7%
18	0.00365	1.00000	0	1	0.0%
19	0.00047	1.00000	1	2	50.0%
20	0.00053	1.00000	1	1	100.0%

Moody County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.05083	0.32382	239	246	97.2%
2	0.08886	0.32382	307	321	95.6%
3	0.10728	0.32382	248	262	94.7%
4	0.15578	0.32382	190	206	92.2%
5	0.20432	0.32382	237	248	95.6%
6	0.23366	0.32382	286	311	92.0%
7	0.34741	0.32382	214	226	94.7%
8	0.36261	0.32382	200	213	93.9%
9	0.55812	0.32382	275	290	94.8%
10	0.55932	0.32382	334	349	95.7%
11	0.02071	0.32382	53	66	80.3%
12	0.05203	0.32382	51	70	72.9%
13	0.07210	0.32382	23	27	85.2%
14	0.09211	0.32382	34	39	87.2%
15	0.10583	0.32382	45	50	90.0%
16	0.13445	0.32382	40	47	85.1%
17	0.15909	0.32382	58	79	73.4%
18	0.19919	0.32382	86	110	78.2%
19	0.20421	0.32382	35	40	87.5%
20	0.20578	0.32382	30	36	83.3%

Oglala Lakota County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.01929	0.42510	36	76	47.4%
2	0.03308	0.42510	100	134	74.6%
3	0.04394	0.42510	75	173	43.4%
4	0.05114	0.42510	140	188	74.5%
5	0.06254	0.42510	125	167	74.9%
6	0.07509	0.42510	30	39	76.9%
7	0.08333	0.42510	175	221	79.2%
8	0.10421	0.42510	72	113	63.7%
9	0.12402	0.42510	52	95	54.7%
10	0.13727	0.42510	63	84	75.0%
11	0.15818	0.42510	94	126	74.6%
12	0.18245	0.42510	24	27	88.9%
13	0.20438	0.42510	38	52	73.1%
14	0.26934	0.42510	27	43	62.8%
15	0.29136	0.42510	24	31	77.4%
16	0.30310	0.42510	66	75	88.0%
17	0.33269	0.42510	42	61	68.9%
18	0.36616	0.42510	21	35	60.0%
19	0.43750	0.42510	30	36	83.3%
20	0.46074	0.42510	30	40	75.0%

Pennington County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.00417	1.00000	373	384	97.1%
2	0.00206	1.00000	121	140	86.4%
3	0.01345	1.00000	3	4	75.0%
4	0.00071	1.00000	19	22	86.4%
5	0.00052	1.00000	16	20	80.0%
6	0.00035	1.00000	21	26	80.8%
7	0.00095	1.00000	169	260	65.0%
8	0.00124	1.00000	165	218	75.7%
9	0.00095	1.00000	148	187	79.1%
10	0.00158	1.00000	240	336	71.4%
11	0.00294	1.00000	7	9	77.8%
12	0.00346	1.00000	52	57	91.2%
13	0.00477	1.00000	3	3	100.0%
14	0.00411	1.00000	5	5	100.0%
15	0.00035	1.00000	246	330	74.5%
16	0.00123	1.00000	26	26	100.0%
17	0.00147	1.00000	6	6	100.0%
18	0.00343	1.00000	2	2	100.0%
19	0.00444	1.00000	2	3	66.7%
20	0.00206	1.00000	36	42	85.7%

Spink County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.01126	0.17868	24	29	82.8%
2	0.02329	0.17868	23	29	79.3%
3	0.03309	0.17868	41	59	69.5%
4	0.04366	0.17868	22	32	68.8%
5	0.05127	0.17868	44	62	71.0%
6	0.05746	0.17868	1	1	100.0%
7	0.06522	0.17868	16	24	66.7%
8	0.07646	0.17868	27	31	87.1%
9	0.08227	0.17868	15	17	88.2%
10	0.09032	0.17868	77	90	85.6%
11	0.10165	0.17868	17	25	68.0%
12	0.11261	0.17868	8	11	72.7%
13	0.11342	0.17868	5	6	83.3%
14	0.11365	0.17868	8	10	80.0%
15	0.11381	0.17868	90	114	78.9%
16	0.11398	0.17868	39	46	84.8%
17	0.11414	0.17868	10	13	76.9%
18	0.11429	0.17868	23	26	88.5%
19	0.11733	0.17868	26	33	78.8%
20	0.18051	0.17868	20	22	90.9%

Ziebach County

June, 2018

Site Rates with Weights					
Site	Site Weight	County Weight	Total Belted	Total Occupants	Seat Belt Rate
1	0.05346	0.12200	24	53	45.3%
2	0.07036	0.12200	27	49	55.1%
3	0.08918	0.12200	30	53	56.6%
4	0.09439	0.12200	27	63	42.9%
5	0.10966	0.12200	5	8	62.5%
6	0.12806	0.12200	50	75	66.7%
7	0.15963	0.12200	7	9	77.8%
8	0.18352	0.12200		0	
9	0.20028	0.12200	2	6	33.3%
10	0.21030	0.12200	22	71	31.0%
11	0.21676	0.12200	0	2	0.0%
12	0.22885	0.12200	1	1	100.0%
13	0.25846	0.12200	1	2	50.0%
14	0.30727	0.12200	7	8	87.5%
15	0.35155	0.12200	6	12	50.0%
16	0.41238	0.12200	7	24	29.2%
17	0.47518	0.12200	10	24	41.7%
18	0.58634	0.12200	6	23	26.1%
19	0.74696	0.12200	11	13	84.6%
20	1.00000	0.12200	12	22	54.5%

Appendix D: Site Locations

Aurora County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	I- 90	-98.711036	43.717075	W	0.295807
2	I- 90	-98.775451	43.737054	W	0.600553
3	I- 90	-98.334537	43.695906	W	0.867614
4	I- 90	-98.643136	43.708542	W	1.178463
5	I- 90	-98.465742	43.697836	W	1.613522
6	I- 90	-98.690655	43.714571	W	1.780276
7	I- 90	-98.576599	43.708418	W	1.797319
8	I- 90	-98.391453	43.694927	E	2.595301
9	388th Ave	-98.444219	43.695611	S	0.086549
10	388th Ave	-98.451611	43.934345	S	0.354612
11	US Hwy 16	-98.619279	43.721344	E	0.567449
12	388th Ave	-98.439677	43.536256	N	0.740700
13	388th Ave	-98.445438	43.736771	N	0.842584
14	US Hwy 16	-98.453942	43.711876	W	0.922033
15	253rd St	-98.536351	43.715416	W	0.969811
16	US Hwy 16	-98.395364	43.710896	W	0.990334
17	US Hwy 16	-98.415223	43.711225	E	0.999214
18	388th Ave	-98.442762	43.650772	S	1.004750
19	Hwy 281	-98.445488	43.781790	N	1.010563
20	US Hwy 281	-98.432065	43.520089	N	1.165928

Bon Homme County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	W 2nd Ave	-98.069505	43.006343	W	0.039539
2	State Hwy 50 Alt	-98.088327	43.009924	E	0.079136
3	303rd St	-97.891180	42.993049	E	0.124469
4	State Hwy 50 Alt	-98.080639	43.006732	W	0.153352
5	State Hwy 52	-97.850603	42.908374	E	0.190537
6	Hwy 46 Sd	-98.066293	43.082653	E	0.233354
7	303rd St	-97.906876	42.995821	W	0.256148
8	State Hwy 37	-97.970135	43.130159	N	0.276641
9	304th St	-97.841775	42.980561	E	0.304679
10	State Hwy 25	-97.715894	43.128493	N	0.330905
11	State Hwy 46	-97.691682	43.082467	W	0.362295
12	State Hwy 37	-97.970464	43.143101	N	0.406405
13	State Hwy 50	-97.779093	42.975864	W	0.451929
14	State Hwy 52	-97.865922	42.908354	W	0.492761
15	State Hwy 46	-98.004248	43.082337	E	0.524872
16	Hwy 50 Sd	-98.078017	43.010058	W	0.582009
17	State Hwy 50	-97.883050	42.989750	E	0.669763
18	Hwy 25 Sd	-97.714304	42.989848	S	0.755341
19	State Hwy 52	-97.666447	42.908575	E	0.835726
20	State Hwy 46	-98.078486	43.082682	W	1.000613

Day County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	US Hwy 12	-97.292311	45.340932	W	0.036480
2	Bryant Ave	-97.490984	45.500277	E	0.075864
3	US Hwy 12	-97.905667	45.413980	W	0.123693
4	US Hwy 12	-97.849318	45.385845	S	0.180041
5	State Hwy 25	-97.430484	45.545537	S	0.221140
6	US Hwy 12	-97.312833	45.340980	E	0.248293
7	US Hwy 12	-97.619349	45.340922	W	0.288462
8	US Hwy 12	-97.410993	45.341006	E	0.342129
9	US Hwy 12	-97.595829	45.340735	E	0.395454
10	State Hwy 27	-97.836952	45.526447	S	0.444825
11	State Hwy 25	-97.535347	45.169618	S	0.476645
12	State Hwy 27	-97.837609	45.467836	S	0.520453
13	State Hwy 27	-97.837909	45.437921	S	0.615331
14	US Hwy 12	-97.233443	45.335474	E	0.647995
15	US Hwy 12	-97.885825	45.413865	E	0.716732
16	State Hwy 27	-97.836817	45.538539	S	0.781051
17	US Hwy 12	-97.357186	45.341012	W	0.846239
18	US Hwy 12	-97.663450	45.340964	W	0.998437
19	US Hwy 12	-97.929787	45.414977	E	1.009388
20	US Hwy 12	-97.334694	45.341012	E	1.068562

Hamlin County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	I- 29	-96.893813	44.752783	N	0.711760
2	I- 29	-96.949954	44.793024	N	1.098312
3	State Ave	-96.904386	44.572753	E	0.064163
4	192nd St	-97.048644	44.602546	E	0.123204
5	Hwy 28	-97.308379	44.587005	W	0.194079
6	E Hwy 22	-96.983321	44.731779	E	0.275641
7	Hwy 28	-97.367072	44.586982	W	0.347190
8	Sd 22	-97.103578	44.731216	E	0.406006
9	E Hwy 22	-97.011204	44.731762	W	0.486994
10	Hwy 22	-97.183733	44.757595	W	0.538064
11	463rd Ave	-96.945561	44.739040	W	0.581707
12	Hwy 28	-97.036261	44.599979	E	0.629229
13	S Dakota Highway 28	-97.198105	44.585937	E	0.726019
14	Hwy 28	-97.318393	44.587000	W	0.794093
15	454th Ave	-97.127786	44.650690	S	0.871483
16	E Hwy 22	-96.995536	44.731756	W	0.926795
17	188th St	-97.178724	44.658936	E	0.993124
18	Hwy 22	-97.279095	44.760488	W	0.997691
19	Hwy 28	-97.279835	44.587045	E	1.001614
20	181st St	-97.150806	44.760338	W	1.730673

Harding County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	State Hwy 79	-103.094577	45.530776	S	0.164416
2	US Hwy 85	-103.394383	45.789655	S	0.329652
3	State Hwy 20	-103.893300	45.561241	E	0.420237
4	State Hwy 79	-102.997048	45.643853	S	0.483704
5	State Hwy 20	-103.558110	45.581571	W	0.542908
6	US Hwy 85	-103.397998	45.783256	N	0.621028
7	US Hwy 85	-103.379962	45.815087	S	0.705853
8	State Hwy 79	-103.004848	45.583439	N	0.782695
9	State Hwy 79	-103.095272	45.464629	S	0.854613
10	State Hwy 79	-102.984020	45.789996	S	0.876451
11	US Hwy 85	-103.556651	45.388768	S	0.958474
12	State Hwy 79	-102.963335	45.885312	N	1.015966
13	State Hwy 79	-102.984213	45.825834	N	1.201053
14	State Hwy 20	-103.201699	45.531076	E	1.320746
15	State Hwy 79	-103.122390	45.420449	S	1.501650
16	State Hwy 20	-103.785440	45.582484	E	1.734573
17	State Hwy 20	-102.984344	45.536678	W	1.983486
18	US Hwy 85	-103.483599	45.667616	S	2.243670
19	US Hwy 85	-103.545781	45.539275	S	2.791817
20	US Hwy 85	-103.545674	45.487638	S	4.013973

Jones County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	I- 90	-100.372511	43.910997	E	0.251204
2	I- 90	-100.885732	43.887944	E	0.317985
3	I- 90	-100.731845	43.884400	W	0.385335
4	I- 90	-100.471395	43.908586	W	0.456865
5	I- 90	-100.481403	43.908587	E	0.542319
6	I- 90	-100.381893	43.910370	W	0.623233
7	I- 90	-100.645178	43.905894	E	0.735012
8	I- 90	-100.687780	43.883560	W	0.852081
9	I- 90	-100.565269	43.908559	W	1.199989
10	I- 90	-100.506666	43.908867	E	1.979688
11	I- 90	-100.444770	43.908853	W	2.212306
12	I- 90 Business Lp	-100.713556	43.886646	E	0.031408
13	State Hwy 16	-100.787837	43.879435	W	0.208849
14	State Hwy 16	-100.870066	43.879998	E	0.312541
15	US Hwy 83	-100.681902	43.760673	N	0.475371
16	US Hwy 83	-100.682402	43.735288	S	0.601738
17	State Hwy 16	-100.435894	43.917221	W	0.821211
18	State Hwy 16	-100.881070	43.885664	E	0.996826
19	State Hwy 16	-101.033575	43.893857	W	1.237321
20	US Hwy 83	-100.692545	43.807593	S	2.194835

Lawrence County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	I- 90	-103.743609	44.477209	E	0.296513
2	I- 90	-103.675380	44.478865	E	0.371163
3	I- 90	-103.989834	44.546420	E	0.601389
4	I- 90	-103.855961	44.501142	W	0.749744
5	I- 90	-103.661297	44.477395	W	1.040799
6	I- 90	-103.579955	44.434987	W	1.579981
7	US Hwy 14 Alt	-103.585867	44.394714	E	0.024810
8	US Hwy 385	-103.737003	44.349558	N	0.093836
9	US Hwy 85	-103.728913	44.465874	S	0.161352
10	US Hwy 85	-103.974800	44.216406	N	0.225462
11	US Hwy 14 Alt	-103.650324	44.391451	W	0.305658
12	US Hwy 385	-103.638094	44.197074	N	0.413030
13	US Hwy 14 Alt	-103.783957	44.339096	N	0.507002
14	Spearfish Canyon Hwy	-103.849378	44.469382	N	0.629992
15	S Dakota Hwy 34	-103.769577	44.584716	S	0.747612
16	S Dakota Hwy 34	-103.694402	44.522117	S	0.828685
17	US Hwy 85	-104.009659	44.200627	W	0.958227
18	US Hwy 14 Alt	-103.634563	44.388800	E	1.370309
19	Spearfish Canyon Hwy	-103.881504	44.414234	S	2.229856
20	Spearfish Canyon Hwy	-103.864612	44.449958	N	3.033210

Lincoln County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	478th Ave	-96.648647	43.334568	N	0.057989
2	S Chuck Dr	-96.761778	43.493721	N	0.087256
3	W 57th St	-96.726890	43.500350	E	0.049149
4	473rd Ave	-96.747347	43.491157	N	0.213002
5	481st Ave	-96.589081	43.331704	N	0.248319
6	297th St	-96.861863	43.083694	W	0.326410
7	W 1st St	-96.841035	43.446480	W	0.049143
8	476th Ave	-96.687347	43.128556	N	0.179965
9	Cottonwood Dr	-96.714784	43.425112	N	0.065616
10	271st St	-96.743985	43.460688	W	0.248420
11	Redstone Ave	-96.762363	43.480455	N	0.087248
12	472nd Ave	-96.767067	43.284447	N	0.326184
13	Spur Ave	-96.480038	43.090894	S	0.590145
14	278th St	-96.834992	43.359463	E	0.889302
15	476th Ave	-96.687368	43.104269	S	0.479907
16	276th St	-96.653548	43.388007	E	0.508127
17	288th St	-96.636466	43.214016	W	0.246062
18	481st Ave	-96.589122	43.337747	N	0.306513
19	469th Ave	-96.826244	43.323866	S	0.899580
20	466th Ave	-96.885912	43.294895	N	0.152026

Lyman County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	I- 90	-100.307926	43.912525	E	0.151331
2	I- 90	-100.289744	43.912258	E	0.337013
3	I- 90	-100.197185	43.912508	W	0.690732
4	I- 90	-99.364223	43.806560	W	0.955945
5	I- 90	-99.421615	43.811779	W	1.152128
6	I- 90	-99.542803	43.847193	W	1.704269
7	I- 90	-99.985783	43.897162	E	2.003365
8	Hwy 16	-100.084620	43.905258	W	0.046021
9	I- 90 Bus	-99.381091	43.802667	E	0.263351
10	State Hwy 49	-99.581606	43.670867	N	0.403507
11	Hwy 16	-99.920628	43.898201	E	0.505072
12	State Hwy 47	-99.446212	44.039862	S	0.612317
13	State Hwy 47	-99.606019	43.899488	S	0.793347
14	State Hwy 47	-99.605961	43.926988	N	0.998141
15	US Hwy 183	-100.045208	43.839647	N	1.033591
16	Hwy 16	-99.752763	43.883952	E	1.340262
17	Hwy 16	-99.989632	43.898041	E	1.617713
18	US Hwy 183	-100.041115	43.774969	N	2.000214
19	State Hwy 1806	-99.952271	44.163104	N	2.662931
20	State Hwy 47	-99.560911	43.777460	N	3.678782

Meade County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	State Hwy 34	-102.947723	44.504833	W	0.156862
2	State Hwy 34	-102.457068	44.586098	E	0.893845
3	Sturgis Rd	-103.359905	44.204391	S	0.029141
4	Stage Stop Rd	-103.339911	44.198474	E	0.029113
5	New Underwood Rd	-102.843425	44.391294	N	0.315142
6	Sturgis Rd	-103.328103	44.173474	N	0.029085
7	Sturgis Rd	-103.317547	44.166330	S	0.158732
8	Silver St	-103.530318	44.420800	E	0.129507
9	Sturgis Rd	-103.342957	44.189076	N	0.109085
10	New Underwood Rd	-102.801852	44.427356	S	4.050788
11	New Underwood Rd	-102.813841	44.472006	N	0.616616
12	Elk Creek Rd	-103.362850	44.226261	W	0.393408
13	Elk Creek Rd	-103.244492	44.227722	W	0.606507
14	New Underwood Rd	-102.829042	44.305511	N	0.884841
15	Peaceful Pines Rd	-103.285787	44.154770	W	0.224910
16	New Underwood Rd	-102.843401	44.363377	N	1.255786
17	Alkali Rd	-103.344108	44.423990	E	1.302863
18	New Underwood Rd	-102.823962	44.512233	N	0.438112
19	Fulton St	-103.506331	44.406042	N	0.076444
20	New Underwood Rd	-102.829489	44.204964	N	0.987751

Minnehaha County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	I- 90	-96.595886	43.609146	W	0.387272
2	265th St	-97.047030	43.543327	W	0.241868
3	E 49th St	-96.699685	43.507545	E	0.029999
4	E Crestview Dr	-96.709279	43.506737	E	0.059132
5	S Dundee Dr	-96.813555	43.536385	S	0.059111
6	David Roe Dr	-96.939411	43.625961	W	0.085362
7	S Camellia Ave	-96.664828	43.509174	N	0.109013
8	Clark Ave	-96.713684	43.825779	N	0.067455
9	W Nancy St	-96.797614	43.538013	W	0.166238
10	S Chestnut Blvd	-96.552071	43.588091	N	0.108827
11	N Foss Ave	-96.660701	43.549372	N	0.250194
12	484th Ave	-96.531631	43.653883	N	0.310694
13	E Redwood Blvd	-96.570946	43.601886	W	0.132459
14	256th St	-96.846515	43.674152	E	0.463835
15	S Goldenrod Ln	-96.669498	43.512969	N	0.166221
16	250th St	-96.515785	43.761364	W	0.386356
17	250th St	-96.579224	43.761314	E	0.716209
18	478th Ave	-96.651169	43.707530	S	0.462746
19	S Alpine Ave	-96.667453	43.525767	S	0.059104
20	S Gill Ave	-96.835725	43.536642	S	0.067448

Moody County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	I- 29	-96.759888	44.154267	S	0.248652
2	I- 29	-96.758317	43.882473	S	0.434707
3	I- 29	-96.758922	44.040646	S	0.524820
4	I- 29	-96.759146	44.060296	N	0.762099
5	I- 29	-96.759216	44.116211	S	0.999548
6	I- 29	-96.757945	43.871009	S	1.143086
7	I- 29	-96.758558	43.995578	N	1.699543
8	I- 29	-96.759716	44.136291	S	1.773871
9	I- 29	-96.758307	43.955088	S	2.730349
10	I- 29	-96.758661	43.955135	N	2.736208
11	SW 3rd St	-96.847908	43.978988	E	0.101311
12	W Pipestone Ave	-96.610294	44.048483	W	0.254549
13	481st Ave	-96.587610	44.025463	N	0.352698
14	230th St	-96.753057	44.051409	W	0.450598
15	233rd St	-96.541122	44.007588	E	0.517702
16	230th St	-96.735527	44.051413	W	0.657724
17	SW 3rd St	-96.880972	43.978780	E	0.778271
18	235th St	-96.778444	43.978777	W	0.974431
19	235th St	-96.718785	43.978747	W	0.999014
20	481st Ave	-96.588629	44.174640	S	1.006655

Oglala Lakota County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	US Hwy 18	-102.708446	43.174903	S	0.058104
2	US Hwy 18	-102.566949	43.062263	S	0.099659
3	White Clay Rd	-102.554526	43.013235	N	0.132384
4	US Hwy 18	-102.566638	43.058031	S	0.154064
5	US Hwy 18	-102.579648	43.075295	N	0.188430
6	US Hwy 18	-102.122547	43.126456	N	0.226221
7	US Hwy 18	-102.604263	43.095527	N	0.251056
8	US Hwy 18	-102.704660	43.170969	S	0.313964
9	US Hwy 18	-102.685729	43.150538	N	0.373646
10	US Hwy 18	-102.960470	43.188292	W	0.413565
11	US Hwy 18	-102.587340	43.083402	S	0.476543
12	US Hwy 18	-102.157461	43.101763	N	0.549677
13	US Hwy 18	-102.970655	43.188399	W	0.615742
14	US Hwy 18	-102.250679	43.046554	W	0.811445
15	US Hwy 18	-102.167610	43.094593	N	0.877784
16	US Hwy 18	-102.846698	43.188303	W	0.913149
17	US Hwy 18	-102.367296	43.046542	W	1.002304
18	US Hwy 18	-102.866650	43.188343	W	1.103142
19	State Hwy 391	-102.212118	43.008754	S	1.318075
20	US Hwy 18	-102.276556	43.047133	W	1.388081

Pennington County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	I- 90	-102.815629	44.103427	E	0.691297
2	State Hwy 44	-103.371705	44.060337	E	0.340958
3	E Hwy 44	-102.497362	43.747191	S	2.231841
4	City View Dr	-103.237313	44.049778	W	0.117876
5	Major Lake Dr	-103.567964	43.936325	N	0.085682
6	West Blvd N	-103.232761	44.098748	N	0.058277
7	Catron Blvd	-103.258208	44.024543	E	0.157108
8	E Saint Patrick St	-103.178733	44.067494	W	0.205004
9	E Minnesota St	-103.213249	44.044835	W	0.157106
10	Sheridan Lake Rd	-103.261510	44.065842	N	0.261684
11	Lower Spring Creek Rd	-103.049177	43.896200	W	0.488500
12	Deerfield Rd	-103.640543	43.972879	S	0.574091
13	Creighton Rd	-102.218040	44.110301	E	0.790902
14	Samco Rd	-103.266081	44.101449	S	0.681675
15	N Haines Ave	-103.221707	44.112149	N	0.058273
16	Flormann St	-103.243388	44.063472	W	0.204848
17	Quinn Rd	-102.127648	43.997919	S	0.244201
18	Deerfield Rd	-103.833381	44.016653	S	0.568243
19	Deerfield Rd	-103.812014	44.005964	N	0.736512
20	Sheridan Lake Rd	-103.390910	43.993135	E	0.342010

Spink County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	406th Ave	-98.104551	45.160413	N	0.098914
2	172nd St	-97.984907	44.892306	W	0.204589
3	385th Ave	-98.523546	44.862685	N	0.290642
4	172nd St	-98.237023	44.894344	E	0.383492
5	172nd St	-98.700771	44.896918	E	0.450251
6	154th St	-98.488042	45.157968	E	0.504624
7	154th St	-98.303560	45.156071	E	0.572837
8	172nd St	-98.152725	44.893604	W	0.671567
9	US Hwy 212	-98.557570	44.889108	E	0.722513
10	386th Ave	-98.514633	45.236526	N	0.793278
11	154th St	-98.236553	45.155807	W	0.892749
12	157th St	-98.053282	45.110179	W	0.989022
13	400th Ave	-98.220766	44.842365	N	0.996164
14	State Hwy 20	-98.605630	45.158971	E	0.998133
15	386th Ave	-98.513812	45.223490	S	0.999569
16	386th Ave	-98.514225	45.223498	S	1.001067
17	154th St	-98.155976	45.154855	E	1.002490
18	386th Ave	-98.513013	44.933563	N	1.003791
19	177th St	-98.533761	44.821482	E	1.030456
20	406th Ave	-98.104170	45.194685	S	1.585336

Ziebach County

Site	Location	Longitude	Latitude	Direction	Segment Length
1	US Hwy 212	-101.570648	45.052421	E	0.247990
2	US Hwy 212	-101.789576	45.055088	E	0.326353
3	US Hwy 212	-101.751382	45.052901	E	0.413660
4	US Hwy 212	-101.593055	45.055827	W	0.437826
5	State Hwy 34	-101.929854	44.534979	S	0.508649
6	US Hwy 212	-101.798908	45.054281	W	0.594028
7	State Hwy 20	-101.642382	45.385853	E	0.740459
8	State Hwy 20	-101.927706	45.420225	W	0.851245
9	State Hwy 20	-101.594656	45.385819	E	0.928981
10	US Hwy 212	-101.518147	45.050735	E	0.975489
11	State Hwy 20	-101.870968	45.400142	E	1.005468
12	State Hwy 20	-101.747597	45.393092	E	1.061540
13	State Hwy 20	-101.572793	45.385797	W	1.198868
14	State Hwy 63	-101.266987	44.785018	N	1.425290
15	State Hwy 63	-101.278760	44.817609	N	1.630667
16	State Hwy 63	-101.278560	44.842993	N	1.912845
17	State Hwy 65	-101.568088	45.126720	S	2.204117
18	State Hwy 65	-101.542574	45.177355	S	2.719772
19	State Hwy 63	-101.252951	44.752051	S	3.464786
20	State Hwy 34	-101.935878	44.571867	S	4.660425

Appendix E: Roadway Classifications

Roadway Type Classifications

Code	Name	Definition
S1100	Primary Road	Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways.
S1200	Secondary Road	Secondary roads are main arteries, usually in the U.S. Highway, State Highway or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They often have both a local name and a route number.
S1400	Local Neighborhood Road, Rural Road, City Street	Generally paved non-arterial streets, roads, or byways that usually have a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads.