1998 South Dakota

Statewide Seatbelt Survey

Final Report

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by

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Motor vehicle crashes continue to needlessly dominate mortality records in the State of South Dakota as one of the leading causes of death. According to the National Highway Safety Administration (NHTSA), deaths and serious disabilities caused by motor vehicle crashes could be reduced by approximately 50% with the use of safety belts and child restraint devices. Seatbelts are estimated to save 9,500 lives in America each year. Research has found that lap/shoulder belts, when used properly, reduce the risk of fatal injury to front seat passenger car occupants by 45 percent and the risk of moderate-to-critical injury by 50 percent. Yet, fewer than 40 percent of both adults and children who died in traffic crashes were properly restrained.

These facts and figures from the "*Presidential Initiative for Increasing Seat Belt Use Nationwide:* Recommendations from The Secretary of Transportation," emphasize the importance of safety restraint usage at the local level. In response to this initiative, the South Dakota Office of Highway Safety commissioned Associates of the Human Factors Laboratory (HFL) at the University of South Dakota to conduct a probability-based survey of seatbelt use in the state. The purpose of the study was to document the level of seatbelt use in a sample of drivers and front seat passengers traveling in noncommercial vehicles on South Dakota roads in November of 1998.

Methods

The study was designed and conducted according to federal guidelines established by NHTSA. The methods and procedures described below are in compliance with the "Uniform Criteria for State Observational Surveys of Seat Belt Use", published in the Federal Register on September 1, 1998 (63 F.R. 463389).

Survey Design: Stage 1

The first step of the study was to select geographic areas for sampling of traffic. South Dakota is a state with less than 800,000 citizens residing in 66 counties. The population is not evenly distributed throughout the state, as 50% of the citizens live in eight counties with urban centers. Many of the remaining 58 counties have low populations residing in largely rural areas. Because it is difficult to sample traffic in all areas of a state with a low population, a "multi-stage cluster approach" was utilized. In this plan recommended by NHTSA guidelines, sampling can be restricted to the counties that account for 85% of the state's population. Therefore, the sampling pool was comprised of the 33 largest counties in South Dakota that account for 85% of South Dakota's population. Table 1 shows the eligible counties in ascending order according to population size.

Table 1: Largest South Dakota Counties Accounting for 85% of the State Population.

	County	Population	% of	Cumulative %
1-33				14.44%
34	*Dewey*	5,668	0.77%	15.21%
35	*McCook*	5,686	0.77%	15.98%
36	*Kingsbury*	5,830	0.79%	16.77%
37	*Day*	6,421	0.87%	17.64%
38	*Moody*	6,538	0.89%	18.53%
39	*Tripp*	6,883	0.93%	19.46%
40	*Custer*	6,966	0.94%	20.40%
41	*Fall River*	7,123	0.97%	21.37%
42	*Bon*	7,677	1.04%	22.41%
43	*Spink*	7,700	1.04%	23.45%
44	*Grant*	8,048	1.09%	24.54%
45	*Hutchinson*	8,102	1.10%	25.64%
46	*Turner*	8,633	1.17%	26.81%
47	*Butte*	8,926	1.21%	28.02%
48	*Todd*	9,296	1.26%	29.28%
49	*Charles Mix*	9,493	1.29%	30.57%
50	*Roberts*	9,973	1.35%	31.92%
51	*Lake*	10,647	1.44%	33.36%
52	*Union*	11,959	1.62%	34.98%
53	*Shannon*	12,010	1.63%	36.61%
54	*Clay*	15,370	2.08%	38.69%
55	*Hughes*	15,404	2.09%	40.78%
56	*Beadle*	17,976	2.44%	43.22%
57	*Davison*	18,807	2.55%	45.77%
58	*Lincoln*	20,152	2.73%	48.50%
59	*Yankton*	21,013	2.85%	51.35%
60	*Meade*	21,999	2.98%	54.33%
61	*Lawrence*	22,131	3.00%	57.33%
62	*Codington*	25,452	3.45%	60.78%
63	*Brookings*	26,186	3.55%	64.33%
64	*Brown*	35,701	4.84%	69.17%
65	*Pennington*	87,190	11.81%	80.98%
66	*Minnehaha*	140,518	19.04%	100.00%
	Total	737.9733	100.00%	

Following NHTSA guidelines, a sample of 13 counties could be drawn for a state with at least 85% of the population residing in 30 – 39 counties. The 13 counties were drawn by a random selection procedure which weighted them in proportion to population (i.e., counties were selected with the probability proportional to population.) Table 2 lists the counties that were selected and their corresponding populations.

Table 2: Selected Counties and Their Populations

County	Population
1. Minnehaha	140,518
2. Pennington	87,190
3. Brown	35,701
4. Lawrence	22,131
5. Davison	18,807
6. Beadle	17,976
7. Hughes	15,404
8. Union	11,959
9. Charles Mix	9,493
10. Grant	8,048
11. Fall River	7,123
12. Tripp	6,883
13. Kingsbury	5,830

Although Hutchinson County was initially drawn for the sample, it was learned that the county would be undergoing a local seatbelt survey in the fall of 1998. Therefore, Tripp County was substituted.

Survey Design: Stage 2

The second stage of the study was to select the sample of road segments to be surveyed within the thirteen counties. According to NHTSA guidelines, road segments must be drawn from roads that have an adequate level of traffic based upon Vehicle Miles Traveled (VMT) estimates. Initially, it was estimated that there were an average number of 50 road segments available for sampling in the South Dakota counties. According to the NHTSA guidelines, 19 road segments can be sampled from a base of 50 road segments per county.

However, assessment of 1998 VMT estimates for South Dakota roadways revealed that only an average number of 27 road segments were available for sampling in the 13 counties. (Relative to other states, South Dakota has a limited number of roadways for which VMT estimates are recorded.) Therefore, permission was received from the regional survey design advisor to sample 17 or fewer road segments per county.

In order to select the road segments, maps of roadways and VMT estimates per roadway segments for the 13 counties were obtained from the South Dakota Department of Transportation, Division of Planning and Engineering. Roadways were divided into four classifications:

urban interstate
urban highway -- principal and minor highways within designated urban areas (5,000 + population)
rural interstate
rural highways -- principal and minor highways outside of urban areas.

Following recommendations from the regional survey design advisor, road segments for urban interstate and urban highways were measured in one mile units, whereas road segments for rural interstate and rural highways were measured in ten mile units. VMT estimates were calculated for each road segment chosen. Road segments with unacceptably low VMT estimates were excluded. Once all of the roadways in a county were divided into eligible segments, a random numbers program was used to select 17 segments for sampling.

The random selection procedure was restricted by the roadway classification of a segment so that the number of segments chosen would be proportionate to the total VMT traveled on a roadway type for that county. For example, in Minnehaha County, the proportions of total vehicle miles traveled by roadway type were:

23% for urban interstate
43% for urban highways
25% for rural interstate
10% for rural highways.

Therefore, the drawing of selected road segments was restricted to:

4 urban interstate sites (23% of 17 sites)
7 urban highway sites (43% of 17 sites)
4 rural interstate sites (25% of 17 sites)
2 rural highway sites (10% of 17 sites).

The procedure described above was applied individually to the 13 counties for final selection of the 17 road segments. Five counties (Brown, Davison, Grant, Kingsbury, and Tripp) had only 13 to16 road segments chosen because of a limited number of roadways.

The last step in the road segment selection process was to designate a seatbelt observation site within each of the selected road segments. Whenever possible, the observation site was placed at an intersection in which vehicles slowed or stopped for a traffic signal or sign. This allowed for accurate and safe viewing of seatbelt use by the Observers.

Sampling Time Periods

Six 90-minute blocks of daylight time were scheduled for seatbelt observations. One observation time period was 40 minutes. Including travel time, six sites could be observed in a single day. A county could therefore be surveyed in a four-day period. To minimize travel time and distance required to conduct the survey, sample sites were grouped into geographic clusters. A day of the week to begin data collection was assigned to a cluster. Within a cluster, each road segment was randomly assigned to the available time slots. The time blocks were:

1) 7:30AM - 9:00AM
2) 9:00AM - 10:30AM
3) 10:30AM - 12 noon
4) 12 noon - 1:30PM
5) 1:30PM - 3:00 PM
6) 3:00PM - 4:30PM

Sample Size

Based on previous observational surveys in South Dakota, it was estimated that approximately 10,000 vehicle observations would be collected from the 208 sites. This sample size allows one to be 95% confident that the numbers reported would be within 1% of the actual values -- an acceptable margin of error according to NHTSA guidelines.

Data Collection

A data collection form was designed for recording seatbelt use (yes or no) by front seat drivers and right-side passengers of each vehicle observed in the survey. The form allowed collection of other information of interest to the South Dakota Office of Highway Safety, including child restraint use by front seat passengers who appeared to be under age five, estimated age of drivers and passengers, vehicle type, and in- or out-of-state license plate of the vehicle. Demographic data were also collected for each vehicular observation, including county, site number, time of day, date, observer initials, and roadway type. A copy of the data collection form for the 1998 survey is on the last page of the Observer Manual in Appendix A.

Data were collected for all passenger cars, pickups, vans, and sport utility vehicles observed. Commercial trucks and motor homes were excluded.

Observers, Observation Procedures, and Observer Training

Two Observers were assigned to a county. Observers were members of a retired citizen group who have a background in driver education. Members of this group have been found to be accurate and motivated Observers of seatbelt use in previous surveys. Observers received (1) a list of observation sites and a description and maps of the site locations for their respective counties, (2) a four-day schedule for completing a 40-minute observation period of each site in their county, and (3) an instruction manual explaining how to conduct

roadside observations. In addition, the Office of Highway Safety issued Observers safety vests and clipboards. Observers received training through a series of telephone conference calls with the HFL investigators. They were instructed to read the manual and engage in a practice period using local traffic. After the practice period, Observers received a final call from the investigators to review procedures.

Observers were instructed to follow their observation schedules as closely as possible. In the event that Observers could not complete a scheduled site due to weather or complications, they were instructed to call the HFL investigators for reassignment of that site. Observers were asked to stand or park in a safe viewing place when they reached an observation site. They were to station themselves so that they could view traffic traveling in a pre-designated direction on the pre-designated roadway. Observers were instructed to monitor every vehicle if the traffic flow was regular or light, and every other vehicle if the traffic flow was heavy. Observers monitored traffic for 40 minutes of the 90 minute observation period, and used the remaining minutes for travel time and location of a safe observation point.

The data collection procedures are explained in detail in the "Observer Manual – 1998 South Dakota Seatbelt Survey" in Appendix A.

Results and Discussion

A total of 11,620 observations were made from the 13 selected counties. Of these, 11,599 observations include data on seatbelt restraint use. Note a small percentage of observations can not be included in individual analyses due to missing data. Table 3 presents a summary of data regarding overall seatbelt restraint use in each county as well

Table 3: Restraint Use by County

County	Restraint Used		Child Restraint	
	Yes	No	Yes	Total
Minnehaha	773 (53.8%)	660 (46%)	3 (.2%)	1436 (12.4%)
Pennington	523 (37.5%)	870 (62.4%)	1 (.1%)	1394 (12%)
Brown	450 (36.7%)	775 (63.3%)	0	1225 (10.6%)
Lawrence	335 (39%)	521 (60.7%)	3 (.3%)	859 (7.4%)
Davison	578 (55.3%)	468 (44.7%)	0	1046 (9%)
Beadle	400 (40.7%)	583 (59.3%)	0	983 (8.5%)
Hughes	373 (41.4%)	529 (58.6%)	0	902 (7.8%)
Union	460 (49.3%)	469 (50.3%)	4 (.4%)	933 (8%)
Charles Mix	67 (16.5%)	340 (83.5%)	0	407 (3.5%)
Grant	203 (40.9%)	293 (59.1%)	0	496 (4.3%)
Fall River	139 (46.5%)	154 (51.5%)	6 (2%)	299 (2.6%)
Tripp	287 (52.4%)	259 (47.3%)	2 (.45%)	548 (4.7%)
Kingsbury	460 (43%)	611 (57%)	0	1071 (9.2%)
Total	5048	6532	19	11599
% of Total	(43.5%)	(56.3%)	(.2%)	(100%)

as the total number of observations per county. Note that of the 11,599 motorists for which seatbelt use was recorded, 5048 or 43.5% were wearing shoulder safety restraints while 6532 or 56.3% were not wearing safety restraints. Note that restraint use was

recorded as the observed presence of a shoulder harness. Using the presence of a shoulder strap to indicate seatbelt restraint usage has been demonstrated in previous research to result in the highest accuracy rate as compared to other existing methods.

Seatbelt Restraint Usage by County

As illustrated in Table 3, seatbelt use was highest in Davison County where 55.3% or 578 of the 1046 motorists observed were wearing safety restraints. Minnehaha County had the next highest rate of seatbelt use with 53.8% or 773 of the 1436 motorists observed wearing a safety restraint. Seatbelt use was lowest in Charles Mix county where only 16.5% or 67 of the 407 motorists observed were wearing a safety restraint. The next lowest rate of restraint use observed was in Brown county where only 36.7% or 450 out of 1225 of the motorists observed were wearing restraints. Pennington County had usage rates nearly as low as Brown's with only 37.5% or 523 out of the 1394 motorists observed wearing a restraint. The percentages of safety restraint usage for the remaining counties in the sample fell in between Davison and Charles Mix with seatbelt restraints being worn by 39% or 335 out of 859 in Lawrence County, 40.7% or 400 out of 983 in Beadle County, 41.4% or 373 out of 902 in Hughes County, 49.3% or 460 out of 933 in Union County, 40.9% or 203 out of 496 in Grant County, 52.4% or 287 out of 548 in Tripp County, 43% or 460 out of 1071 in Kingsbury County and 46.5% or 139 out of 299 in Fall River County.

Age of Motorist

Observers estimated the age of drivers and front seat passengers to the best of their ability. In a limited number of cases the observer was unable to determine age. These few instances are excluded from the following age by restraint use analyses.

Child restraint usage was defined as a passenger in the front seat restrained by a child carrier. If children under the age of 5 years were observed riding in the front seat of a vehicle unrestrained, this was recorded as no restraint used. If a child under five years of age was observed riding in the front passenger seat wearing a shoulder restraint but not seated in a child carrier, then restraint use was recorded as a yes. Note however, that according to South Dakota law, all children under the age of 5 years should be restrained in an approved child safety seat unless they weigh more than 40 pounds. Table 4 illustrates the total number of observations and restraint use by each age group including the use of child restraints.

Of the 30 observations of children under the age of 5 years, 10 or 33.3% were wearing a shoulder restraint, 11 or 36.7% were not wearing any type safety restraint and 9 or 30% were restrained in a child carrier. For children between the ages of 5 to 13 years, 45 out of 114 or 39.5% were wearing a safety restraint, 60 of 114 or 52.6% were not wearing any safety restraint, and 9 of the 114 or 7.9% were restrained in a child carrier. A total of 358 motorists were estimated to be in the 14 to17 years age group. Of these 358, 147 or 41.1% were wearing a safety restraint and 211 or 58.9% were not wearing a restraint. A total of 10,933 motorists were estimated to be in the age group of 18 years and older, which comprised the overwhelming majority of observations. Of

these 10,933, - 4791or 43.8% were wearing a restraint and 6142 or 56.2% were not wearing a restraint.

Table 4: Restraint Use by Age

Age	Restraint Used		Child Restraint	
	Yes	No	Yes	Total
0-4 years	10 (33.3%)	11 (36.7%)	9 (29%)	30 (.3%)
5-13 years	45 (39.5%)	60 (52.6%)	9 (7.9%)	114 (1.0%)
14-17 years	147 (41.1%)	211 (58.9%)	0	358 (3.1%)
18 & over	4791 (43.8%)	6142 (56.2%)	0	10,933 (95.6%)
Total	4993 (43.7%)	6424 (56.2%)	18 (.2%)	11,435 (100%)

Drivers versus Passengers

According to guidelines discussed previously, data were recorded only for motorists in the driver and front right passenger seat. No data were recorded for passengers in the back seat. As illustrated in Table 5, most observations were for drivers with no passengers in the vehicle. Passengers were only present in 21.8% of the vehicles

Table 5: Restraint Use for Drivers versus Passengers.

	Restraint Used			
	Yes	No	Child Restraint	Total
Drivers	3933 (43.4%)	5135 (56.6%)	0	9068 (78.2%)
Passengers	1111 (44%)	1397 (55.3%)	19 (.8%)	2527 (21.8%)
Total	5044 (43.5%)	6532 (56.3%)	19 (.2%)	11595 (100%)

observed. Table 5 also provides data regarding the use of restraints among drivers versus passengers.

Note that restraint use was similar for both drivers and passengers. Of the 9068 drivers observed, 3933 or 43.4% were observed wearing safety restraints while 5135 or 56.6% were not wearing restraints. Among the 2527 passengers observed, 1111 or 44%

were wearing shoulder restraints, 1397 or 56.3% were not wearing a safety restraint and 19 or .8% were restrained in a child safety seat.

Vehicle Type

Only non-commercial vehicles were included in the observations. Vehicles were categorized into three classifications. The first classification was for cars. The second classification was designated vans/pickups and also included mini-vans and station wagons. The third classification was for the increasingly popular Sport Utility Vehicle (SUV). Table 6 presents a summary of data regarding restraint use in each vehicle category. Note that the ratio of restraints worn per motorist is much higher in cars and Sport Utility Vehicles (2905 out of 5750 or 50.5% and 644 out of 1364 or 47.2%, respectively) than was observed for vans/pickups (1482 out of 4458 or 38.5%).

Table 6: Restraint Use by Vehicle Type

	Restraint Used			
	Yes	**No**	**Child Restraint**	**Total**
Cars	2905 (50.5%)	2834 (49.3%)	11 (.2%)	5750 (49.7%)
Vans/Pickups	1482 (33.2%)	2972 (66.7%)	4 (.1%)	4458 (38.5%)
Sport Utility Vehicles	644 (47.2%)	716 (66.7%)	4 (.3%)	1364 (11.8%)
Total	5031 (43.5%)	6522 (56.4%)	19 (.2%)	11572 (100%)

Type of Roadway

Four types of road segments were eligible for inclusion in the survey, including urban and rural highways and urban and rural interstates. In order to be classified "urban" the road must pass through a city with a population of at least 5000 people.

Table 7: Restraint Use by Road Type

Road Type	Restraint Used			
	Yes	**No**	**Child Restraint**	**Total**
Urban Highway	1621 (42.3%)	2207 (57.6%)	2 (.1%)	3830 (33%)
Rural Highway	2438 (41.2%)	3472 (58.6%)	14 (.2%)	5924 (51.1%)
Urban Interstate	639 (52.5%)	575 (47.3%)	2 (.2%)	1216 (10.5%)
Rural Interstate	349 (55.6%)	278 (44.3%)	1 (.2%)	628 (5.4%)
Total	5047 (43.5%)	6532 (56.3%)	19 (.2%)	11598 (100%)

Table 7 illustrates the frequency of restraint use observed on each type of road classification. Note that restraint use was highest on rural interstates. Of the 628 observations of motorist on rural interstates, 349 or 55.6% were wearing a restraint. Urban Interstates had the second highest usage rate with 639 of 1216 or 52.5% of the motorists observed wearing restraints while 575 or 47.3% were not wearing a restraint. A total of 3830 motorists were observed traveling along Urban Highways. Of these 3830, 1621 or 42.3% were wearing a restraint and 2207 or 57.6% were not wearing a restraint. The Rural Highway classification comprised the majority of observations (5924 out of 11598 or 51.1%), but had the lowest rate of restraint use among the four classifications. Of the 5924 motorists observed traveling along Rural Highways, only 2438 or 41.1% were wearing a restraint while 3472 or 58.6% were observed not wearing a restraint.

In-State versus Out-of-State Vehicles

Observers recorded whether or not the vehicles included in the observation had in or out-of-state license plates. The overwhelming majority of observations were of vehicles with in-state license plates (92.6% or 10,370 of 11213). As illustrated in Table 8, vehicles with out-of-state license plates tended to have higher rates of seatbelt restraint usage. Of the 834 out-of-state vehicles observed, 429 or 51.4% of the motorists observed were wearing a restraint as compared to 4442 out of 10,379 or only 42.8% of motorists traveling in vehicles with in-state license plates.

Table 8: Restraint Usage Observed for In-and Out-of State License Plates

	Restraint Used			
License Plates	**Yes**	**No**	**Child Restraint**	**Total**
In-State	4442 (42.8%)	5921 (57%)	16 (.2%)	10379 (92.6%)
Out-of-State	429 (51.4%)	402 (48.2%)	3 (.4%)	834 (7.4%)
Total	4871 (43.4%)	6323 (56.4%)	19 (.2%)	11,213 (100%)

Conclusion

This large-scale probability-based survey of seatbelt restraint use found overall restraint use in the state of South Dakota to be just over 43%. Restraint use varied among the counties selected for inclusion in the survey with the highest rate observed at 55.3% and the lowest rate observed at 16.5%. Further, restraint usage tended to be lower in the vehicle classification pickup/van at only 33.2% as compared to the other two types of vehicle classifications with motorists in cars showing a restraint usage rate of 50.5% and motorists in Sport Utility Vehicles demonstrating a usage rate of 47.2%. In general, restraint usage was higher on interstates than on highways.

Additionally, despite legislation mandating that all vehicle occupants under the age of 5 years be restrained in a child safety seat, only 9 out of 30 or 29% of the under 5 years of age motorists in this survey were observed to be restrained in a child safety seat. It should be pointed out that the overall rate of under 5 years of age motorist was quite low in this survey (30 out of 11,435). This low occurrence rate may be due in large part to the wide spread safety practice of placing young children in child safety seats located in the back seat of the vehicle. Only front seat passengers were included in this survey.

The rates of seatbelt use observed in the current investigation illustrate areas with potential for vast improvement. The use of a seatbelt restraint has been shown to decrease mortality and serious disability by approximately 50%. Increasing seatbelt restraint usage has the promise of dramatically improving the safety and longevity of South Dakota residents.

Appendix A

Observer Manual – 1998 South Dakota Seatbelt Survey

Observer Manual

1998 South Dakota Seatbelt Survey

INSTRUCTIONS FOR USING THE SEATBELT OBSERVER FORM

South Dakota Statewide Seatbelt Survey

Fall, 1998

The Seatbelt Survey Observer Form has been designed so that information can be easily collected about seatbelt use. The form allows for collection of seatbelt use data for all drivers and right front passengers in non-commercial vehicles. The form is constructed so that each driver and a passenger (when one is present) receives one full line of data -- 22 columns across the page. The first 8 columns are used to record information about the vehicle and the occupant. The first information recorded is the vehicle sequence number and whether the vehicle is a car, a van/truck/station wagon/minivan or Sport Utility Vehicle (SUV). The occupant information includes whether the person is a driver or passenger and--most importantly--whether the occupant has on a seatbelt. Age of the occupant is estimated in order to determine restraint use for children and teenagers. Finally, the license plate is recorded as being either in state or out of state.

The remaining 13 columns are used for recording "demographic" information about the observation such as county, site number, time of day, and road type. The vehicle-occupant information must be recorded immediately as the Observer watches people in passing vehicles. The demographic information, however, only has to be written once on the first line of the first coding form used. When the coding sheets are keypunched, the demographic information will be automatically duplicated for all persons recorded during that 40 minute observation session.

INSTRUCTIONS

Observers will be provided an Observer Site Schedule which will show the time and place to observe traffic over a 4 day period with an additional week listed in case there is need to select an alternate observation date. They will receive an Observation Site List which contains the numbers and descriptions of the observation sites. Maps of the observation sites will also be provided. Sites include road segments between mile markers which are located along urban and rural highways and interstates. Each site will be monitored for a 40 minute session during one of 6 time slots spread over the 4 day period. The observations are conducted according to the following steps.

1) Preparation for the Observation Session:

Observers should wear an orange safety vest issued by the SD Office of Highway Safety to increase their visibility to passing traffic. Observers should carry their observation sheets on a clip board and use a number 2 pencil for recording information. Do not use ink or flair pens. It is very important that Observers write numbers clearly so that they can be entered correctly into the computer. Cross "7"s so that they can be distinguished from "1"s.

2) **Arrival on Site and selection of an Observation Area:**

Observers should reach their observation site a few minutes before they plan to begin the observation session. Note that scheduled time periods are 1½ hour periods and the observation session is only for 40 minutes. This will allow Observers some leeway in start and stop times. Schedule observations within the time period making sure to allow plenty of time to finish and get to a consecutive site on time.

Before the observation session begins, the Observer should record the demographic information in columns 9 - 22 on the first row of the observation sheet. Most of the codes for the demographic information are on the top of the observation form. Information about "Road Type" is on the Site List. This information only has to be coded once for each 40 minute observation session.

Observers will then choose a position at the site which provides the best view of occupants in vehicles. For urban road sites, choose sites which allow observation of vehicles which have stopped for a red light or stop sign, or slowed for a yield sign. The best position is usually on the curb next to a right-hand turn lane on urban sites. For rural segments, intersections or junctions provide a safe yet effective observation position.

As Observers prepare to observe, they should stand at the safest possible position either on the curb or well to the side of the road which allows them a good view inside the front seat of cars/vans/trucks and sport utility vehicles which will be stopping or slowing at the site. Observers must be careful not to step into the roadway and endanger themselves as they attempt to look inside passing vehicles. It is better to be safe and guess about some information than it is to put oneself at risk for a thorough look. Do not observe in stormy weather with lightning.

3) **Selection and Coding of the First Vehicle:**

When the Observer is ready to record data, he/she will observe the first non-commercial car, mini-van, van, pickup-truck, or sport utility vehicle (SUV) to stop at the site. **IMPORTANT: Commercial vehicles of any type (cars, station wagons, mini-vans, vans, pickup trucks, and large trucks) will not be included in the survey.** Commercial vehicles are those with commercial license plates and/or commercial signing or lettering of any kind on the vehicle. South Dakota commercial plates have a white rather than a tan background.

Information about the vehicle will then be coded. The first vehicle is assigned the sequence number "001" and marked as either a car, a truck/van/mini van/stationwagon or as a SUV. Then the drivers' seatbelt use is coded. If there is a right front vehicle passenger, the next line of the form is used to code passenger information. This line also begins with a sequence number of "001" since it is the same vehicle. Note that information is collected only for right front passengers. Persons seated in the middle front or in the back seat are **not** coded.

Observers may not always be able to record accurately all information about the vehicle. The best strategy is record the most important information first: seatbelt use and vehicle type (car versus van/pick-up versus SUV). Then, move to other categories such as state of license plate and age.

4) **Selection of Vehicles Throughout the Observation Session:**

Cars and Vans/Trucks and Sport Utility Vehicles:

If traffic flow is heavy (an average of more than 1 vehicle per minute), observe every other vehicle that stops or slows down. For example, after the first car or van/truck has been coded as Vehicle ID "001", the Observer should let one car or van/truck stop and leave and then code data on the next vehicle that stops as Vehicle ID Number "002". Repeat the pattern for the next session.

If the traffic flow is lighter such that less than one vehicle stops every minute, Observers should record data on every car/van/truck/SUV that stops or slows down.

5) **Completing the Observation Session:**

At the end of the 40 minute observation session, Observers should go to the box in the lower right corner of the first survey form used for the session and check whether every car or every other car was observed. Then, Observers should count the total number vehicles observed for the session. Record this total in the lower half of the box on the first page of the forms used for this session. **Note that the sum of all vehicles should match the highest Vehicle ID Number for the session - be careful not to count vehicles with passengers twice.** Scan handwriting and correct unreadable numbers. The survey forms should be clipped together in sequence, and stored in a safe, dry place until they are returned to the survey supervisor.

6) **Starting the Next Observation Session:**

At the Observer's next 40 minute observation session, he/she should begin with a new survey form and the Vehicle ID numbers should begin again with "001".

DESCRIPTIONS OF CATEGORIES AND CODES

Observers should use the codes exactly as described. The most common mistake is to forget to fill in "0"'s for double or triple digit codes. For example, for the date November 9th, record 1 1 0 9 9 8, not 1 1 9 9 8 . See Appendix A for an explanation of some sample coding.

Vehicle ID Number

During each observation session, the Observer will assign a sequential "Vehicle ID number" to

each vehicle which is sampled (selected for observation). The sequential ID's should start with "001" each session. ID numbers for an observation session in heavy traffic will probably run from 001 through 070. The same Vehicle ID Number is assigned to the driver of a vehicle and the passenger if there is one. In other words, if a vehicle has only a driver, only one line of the coding form will be used for the vehicle. If the vehicle has a driver and a passenger, two lines of the coding form will be used for the vehicle and both will have the same Vehicle ID Number.

Veh Type

Non-commercial passenger cars are coded as "1". All other non-commercial vehicles (mini-vans, station wagons, vans, pickup trucks, etc.) **except** sport utility vehicles are coded as "2". Sport Utility Vehicles of all types are coded as "3". Sport utility vehicles are being coded separately for future research purposes. **Remember, commercial vehicles of any type are not to be included in the survey.**

Drive/Pass

Drivers are coded as "1"; Passengers are recorded as "2".

Belt Use

As soon as a vehicle stops or slows down, Observers should immediately determine whether the driver and right front passenger are wearing a safety restraint. A "1" means safety equipment was present. A "2" means it was not present. A "3" is used for the special case when a child passenger is in a child restraint.

> For cars all vehicles (cars, mini-vans, vans, station wagons, pickups and sport utility vehicles), proceed as follows:
>
> Restraint use is determined by the **shoulder strap of the seatbelt or by the use of a child restraint**. Using a shoulder strap as an indicator is a procedure that the National Highway Traffic Safety Administration has standardized on for seatbelt surveys across the country. Although it may not be 100% accurate because of some cars which have lap belts and no shoulder strap, using shoulder straps as indicators has been determined to be more accurate in the long run than trying to see inside of cars to check for lap belts.
>
> For the driver code "1" if a shoulder strap is in use. Code "2" if the shoulder strap is not in use.
>
> If there is a right front passenger, start a new line of code with the same vehicle sequence number used for the driver on the previous line. For the right front passenger code "1" if a shoulder strap is in use. Code "3" if a child restraint (car safety seat, infant carrier, special harness to supplement the standard lap/shoulder belt,

etc.) is in use. Code "2" if NEITHER the shoulder strap nor a child restraint is in use.

Age

Observers should pay special attention to judging the age of child occupants.

If the occupant is an "infant" to 4 years old, code "1".

If the occupant appears to be 5 to 13 years old, code "2".

If the occupant appears to be 14 to 17 years old, code "3".

If the occupant appears to be 18 years old or older, code "4".

If it is absolutely impossible to determine the age of a vehicle occupant, code "5" for unknown. You should **not** use this category when you are uncertain about the exact age of an occupant, e.g. you're not sure if an occupant is 13 or 14. If you are uncertain, make your best guess. The unknown category is reserved for only those cases when you can not determine age at all, e.g. large hat obscuring face of vehicle occupant.

Lic State

This column is used to indicate whether or not the license plate on the observed vehicle is from South Dakota of another state. Code "1" for a South Dakota plate (regardless of county of origin). Code "2" for any out of state plate. Code "3" if you absolutely could not determine whether or not the plate was in-state or out of state.

THE REMAINING CODES ARE RECORDED ONLY ONCE ON THE FIRST LINE OF THE FIRST FORM USED AT A SITE.

County

Code the appropriate number for the thirteen counties listed on the Observer Form.

Site

Observers will be given an "Observation Site List" which will list all observation sites in the county and a two-digit Site Number for each site. Observers should code the appropriate Site Number for each 40 minute observation session.

Time

The Time category refers to the time of day that the observation session is scheduled.

1 = 7:30 to 9:00 A.M.
2 = 9:00 to 10:30 A.M.
3 = 10:30 to 12 noon
4 = 12 noon to 1:30 P.M.
5 = 1:30 to 3:00 P.M.
6 = 3:00 to 4:30 P.M.

Month/Day/Year

Record the full date of the observation day --including "0"s --in these six spaces. November 9, 1998 would be recorded as "1 1 0 9 9 8".

Observer

Each Observer will enter their first and last initial initials on the coding sheet for identification purposes.

Road Type

The Observation Site List provided to all observers will have a "Road Type" code for each site. Four road types will be sampled. Road segments within and on the border of cities with populations over 5000 have been designated as "Urban". All other segments, including highways that go through small towns, are designated "Rural". Urban Highways are coded as "1". Rural Highways are coded as "2". Urban Interstates are coded as "3" and Rural Interstates are coded as "4".

********** IMPORTANT **********

If you have any questions about this manual or any of the survey procedures, call Carryl Baldwin at (712) 274-8733 ext. 1425 during day-time hours or (605) 624-3497 in the evenings. Questions may also be directed to Cindy Struckman-Johnson in the Human Factors Lab at the University of South Dakota at (605) 677-5295. If neither Cindy nor Carryl is available, please leave a message with a number and a good time to call you and we will return your call.

APPENDIX A

SEATBELT SURVEY FORM EXAMPLES

The last page of this appendix contains an example of a partially completed survey form. It contains coding for 4 vehicles at a hypothetical observation site in Brown County. What follows is an explanation of why the codes shown on the sample form have been used. These examples have been selected to demonstrate many of the things you will commonly encounter while observing as well as some things you need to be careful about.

Vehicle 001

There is only a single line with the vehicle ID 001, so this vehicle did not have a passenger. Note that vehicle 1 is coded "001" not "1". The vehicle type is coded as 1 so this vehicle must have been a non-commercial car. The third thing that is coded is 1 for Drive/Pass. This line of entries describes a driver. The next column indicates the driver's belt use. Since this is coded as 1, a shoulder belt was in use. Age is coded 4 meaning that the driver is 18 years old or older. The 1 in the Lic State column means the vehicle plate was from South Dakota.

The remaining columns of information apply to all the vehicles coded on this sheet, so only one line of data needs to be entered for the entire sheet. County is coded 03 since this example takes place in Brown County. The next 2 columns are the code for the particular site within Brown County. Each observer will be provided with a list of codes for all sites at which he/she will be observing. Time is coded as 2 meaning that the observation is taking place between 9:00 and 10:30 A.M. The next six columns code the month, day and year of the observation in that order. Note that for November 2nd, the 2nd day of the month is coded "02" not just "2". The next two columns are for the first and last initials of the observer. In this example, Donna Smith was observing so D and S go in these two columns. The next column indicates the type of road on which the observation is taking place. Since this observation is a highway which runs through a city, the correct road type is urban highway and code 1 is entered. Although the road type will be fairly obvious for each site, it will be identified on the list providing site codes so the will be no possibility for confusion.

Vehicle 002

The information entered for vehicle 002 indicates that the observer recorded information on a car with a right-front passenger. There are two lines of information entered for vehicle 002, so there must be both a driver and a right front passenger. The first line for vehicle 002 indicates that the vehicle is a van, minvan, station wagon, or pickup truck (Veh Type is 2). The first line of information is for the driver since Driv/Pass is coded as 1. Belt Use is coded as 2, so the driver was not wearing a shoulder belt. Age is coded as 4 so the driver must be 18 years old or older. Finally, the vehicle license plate is from South Dakota (code is 1).

The third line of information on the form is the second line for vehicle 002. Note that both the

Vehicle ID Number (002) and Veh Type code of 1 were entered a second time for the vehicle. This line contains passenger information as indicated by the 2 in the Drive/Pass column. The next column indicates that the passenger was wearing a shoulder strap (code = 1). The age of the passenger is coded as 2 which means the passenger is between 5 and 13 years of age. Finally, the code for South Dakota license plate (1) is entered as on the line above.

Vehicle 003

Like vehicle 002, vehicle 003 has 2 lines of information indicating both a driver and a passenger. The Veh Type column for vehicle 003 is coded as 3 indicating that the vehicle is a sport utility vehicle. The driver line (code 1 in Drive/Pass) has an entry for Belt Use indicating that the driver was not wearing a seatbelt (code = 2). Note that the same code value is used to indicate a vehicle occupant **is not** wearing a shoulder harness or using a child restraint for all vehicle types. The remaining codes for the driver of vehicle 003 indicate that the driver is 18 years old or older and that the sport utility vehicle has out of state plates (code of Lic State = 2).

The line of information for the passenger on vehicle 003 duplicates the Vehicle ID Number and Veh Type codes. The Drive/Pass column is coded 2 to indicate a passenger. The Belt Use column is coded 1 which indicates that the passenger was wearing a seat belt. The next column of the passenger information records age. Code 5 is entered in this example. Code 5 stands for "Unknown". In this example, the age is unknown because the passenger was wearing a large hat which blocked his or her entire face from view. This is one of the few situations in which code 5 is appropriate. Code 5 should not be used in cases when you are not sure whether a person is 4 or 5, 13 or 14, or 17 or 18. If you are not sure about age category, make your best guess. Use code 5 only in those cases when you can't tell age at all. The final column of passenger data duplicates the out of state license code from the previous line for this sport utility vehicle.

Vehicle 004

Vehicle 004 is a car and has two lines of code and a 1 in the Veh Type column indicating a car with a driver and right-front passenger. The driver line indicates a shoulder belt was used (code 2) and that driver was at least 18 years old. The car has South Dakota plates.

The passenger line for Vehicle 004 indicates that the passenger was in a child restraint (code = 3). It is extremely important to the survey that child restraint use be coded correctly. If a right front passenger is **USING** a child restraint, 3 is the correct code for the Belt use column. Do **NOT** code 1 (shoulder belt used) even if a shoulder belt is being used to hold the child restraint in place. Finally, do NOT use code 3 if an empty child restraint is present in the right front seat. The age is coded as 1 indicating that the passenger was under 4 years of age. The final column for the Vehicle 004 passenger line repeats the South Dakota license plate code (1).

Observation Session Summary Box

The observation session summary box in the lower right hand corner of the sample form would be completed if this were the first page of information collected at a site. Since this example starts with Vehicle ID Number 001, this is a first sheet. Although the information is somewhat unrealistic for an entire observation session (traffic volume would likely be much higher), it is correct for the vehicles shown on this sheet.

The upper half of the box indicates whether every vehicle was observed (normal traffic conditions) or every other vehicle was observed (heavy traffic conditions). The "Every Car Observed" line is check since traffic was obviously light enough for this strategy.

The lower half of the box indicates the total number of vehicles observed during the 40 minute observation session. In this case, there were 2 cars, 1 van and 1 sport utility vehicle. Note that these numbers represent ALL vehicles observed during the entire 40 minute observation session which normally will be recorded on several sheets. At the end of an observation session, you will have to count vehicles on ALL forms used during that session, but you should only enter the totals on the first sheet.

The lower box is used for recording a written description of the actual location used for observation. For this example the observer was located at the interchange of Hwy. 281 and Hwy. 12 standing on the north side by a stop sign observing all traffic turning onto Hwy. 281.

The survey summary box and the location description box will be blank on all observation sheets except the first one used at each site.

South Dakota Seatbelt Survey Form

Vehicle Type
Car = 1
Pickup/Van = 2
Sport Utility = 3

Driver / Passenger
Driver = 1
Passenger = 2

Seatbelt Use
Used = 1
Not Used = 2
Child Restrain Used = 3

Age
Infant to 4 = 1
5 to 13 = 2
14 to 17 = 3
18 or over = 4
Unknown = 5

License State
South Dakota = 1
Other State = 2
Unknown = 3

County
Minnehaha = 01
Pennington = 02
Brown = 03
Lawrence = 04
Davison = 05
Beadle = 06
Hughes = 07
Union = 08
Charles Mix = 09
Grant = 10
Fall River = 11
Tripp = 12
Kingsberry = 13

Site Number
Check County Site

Time
7:30 – 9:00 am = 1
9:00 – 10:30 am = 2
10:30 – noon = 3
noon – 1:30 pm = 4
1:30 – 3:00 pm = 5
3:00 – 4:30 pm = 6

Road Type
Urban Highway = 1
Rural Highway = 2
Urban Interstate = 3
Rural Interstate = 4

Vehicle ID Number			Veh Type	Drive or Pass	Seat Belt Use	Age	Lic State	County		Site Number		Time	Month		Day		Year		Observer		Road Type
0	0	1	1	1	1	4	1	0	3	0	1	2	1	1	0	2	9	8	D	S.	1
0	0	2	2	1	2	4	1														
0	0	2	2	2	1	2	1														
0	0	3	3	1	2	4	2														
0	0	3	3	2	2	5	2														
0	0	4	1	1	1	4	1														
0	0	4	1	2	3	1	1														

Check One

Every vehicle observed ✓

Every other vehicle observed _____

Total vehicles observed in 40 minutes 4

Describe your observing location at this site:

Intersection of 281 & 12 - Stood on the North corner by a stop sign & watched traffic turning onto 281.