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MEMORANDUM

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DATE: August 29, 2013

SUBJECT: Highway Safety Improvement Program (HSIP) Report – FFY12

Attached is the Highway Safety Improvement Program (HSIP) report for the Federal Fiscal Year 2012 as per Section 148, Title 23 of MAP-21 under 23 U.S.C. § 148(h), and 23 CFR 924.

If you have any questions, please give me a call at (605) 773-4421.

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION
HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP)
ANNUAL REPORT
FEDERAL FISCAL YEAR 2012
OCTOBER 1, 2011 TO SEPTEMBER 30, 2012

PROGRAM STRUCTURE

Program Administration

The South Dakota Highway Safety Improvement Program (HSIP) is administered through the Office of Project Development in the South Dakota Department of Transportation (SDDOT) Central Office. The SDDOT uses Road Safety Audits (RSA), Roadway Safety Improvement (RSI) inspections, and a Safety Module software program to identify locations that would benefit from a safety improvement project. RSI inspections are developed by utilizing the South Dakota Department of Public Safety's (SDDPS) crash reporting database, SDDOT's roadway and traffic data, and ArcMap software to determine high crash locations. Both the RSA process and RSI inspections are available for use on all public roadways in South Dakota. HSIP projects are selected for implementation by determining which project will result in the greatest safety improvement for the investment. The overall coordination and collaboration efforts for HSIP projects involve Regional SDDOT personnel, City representatives, County representatives, Township representatives, Consulting Firms, Law Enforcement representatives, among other agencies. The SDDOT HSIP process will be explained in further detail in the Program Methodology section of this report.

Program Methodology

SDDOT's HSIP projects are identified by either Road Safety Audits (RSA), Roadway Safety Improvement (RSI) inspections, or the Safety Module software program. The RSI process was established to identify safety improvement eligible locations that have a crash history of five or more crashes (fatality, injury, and property damage crashes, animal hits are excluded) in the most current three year period. RSI locations can be identified on all public roadways in SD and can be at intersections or on segments of roadway. RSI locations are identified by utilizing the SDDPS's crash reporting database, SDDOT's Roadway and Traffic Data, and ArcMap software. RSI locations are also identified by the four SDDOT Regions, 14 Class one Cities (population = 5,000 or greater), law enforcement agencies, or County Highway Superintendents where there is a perceived safety issue. Once the preliminary locations are identified, they are evaluated further by calculating a crash rate for the location and reviewing crash summaries and collision diagrams. Crash summaries are analyzed to determine the types of crashes occurring and other crash related information such as; driver behavior, driver contributing circumstances, weather conditions, roadway surface condition, roadway alignment, and driver impairment. Collision diagrams are created to determine if patterned type crashes are occurring at the selected location.

Once the locations with the most serious issues or patterned type crashes are identified, a team mainly consisting of the SDDOT Traffic and Safety Engineer, SDDOT Region Traffic Engineer, FHWA Traffic and Safety Engineer, Traffic Design Engineer, a road design representative, law enforcement representatives, and a local government representative will conduct an on-site inspection and make a recommendation for safety improvements at the identified location. The safety improvement recommendations can range from upgrading pavement markings, signing,

and traffic signals to reconstruction. If the recommended safety improvement is eligible for the use of safety funds, it may be programmed into the State Transportation Improvement Program (STIP) as a project. In the FFY 2012 STIP, there were no projects programmed that were identified through the RSI process.

The Safety Module software program uses the Highway Safety Manual (HSM) rural two lane crash predictive method to identify locations that have an actual crash frequency higher than the predicted crash frequency. The module then calculates a B/C ratio based on the recommended safety improvement cost.

South Dakota's Strategic Highway Safety Plan (SHSP) identified roadway departure crashes as the leading cause of fatalities in South Dakota. Roadway departure crashes are identified by three types of crashes; fixed object hits off roadway, overturned on roadway, and overturned off roadway crashes. The proactive processes and projects implemented by the SDDOT to help decrease the number of lane departure crashes are RSAs, Countywide traffic control signing projects, durable pavement marking projects, and regionwide rumble strip/stripe projects. SDDPS's crash reporting database and SDDOT's roadway data layers in ArcMap are used to create maps identifying roadway segments currently without rumble strips in place, the functional classification of the roadway, the width of existing shoulders, the Average Daily Traffic (ADT), the total number of crashes, and the locations and number of the roadway departure crashes. Crash rates and the percentage of roadway departure crashes compared to the total number of crashes for a segment are also displayed on the maps. In FFY 2012, region wide rumble strip/stripe projects were developed in each of the four Regions to have rumble strips/stripes installed on segments starting with those that have a higher occurrence of roadway departure crashes with respect to ADT, shoulders, and total crashes. A benefit/cost ratio may also be calculated to determine the prioritization of the segments once they are identified.

The following systemic improvements align with the State's SHSP and are programmed as part of the HSIP in the FFY2012 STIP; edgeline rumble strips/stripes for between 160 to 250 centerline miles in each of the four DOT Regions, durable pavement marking projects in each of the four DOT Regions, and upgrading traffic control signing and delineation on five County highway systems including township roads, and several towns. SDDOT has been implementing durable pavement marking projects, local government signing and delineation projects, and installing rumbles strips on resurfacing projects prior to the requirement to have a SHSP.

South Dakota is currently in the process of updating the SD SHSP, which is expected to be completed in the fall of 2013.

SDDOT will continue to implement the above projects in the FFY 2013 STIP and will look into establishing systemic curve delineation improvements, safety edge improvements, shoulder width improvements, intersection improvements and roadway barrier improvements. South Dakota also continues to actively investigate proactive safety improvement projects, shifting its focus from a primarily reactive process to a proactive process. Procedures are being established and implemented, which will provide SDDOT with greater flexibility to use safety funds.

PROGRESS IN IMPLEMENTING HSIP PROJECTS

HSIP Project Funding

The following is a summary of the HSIP and Section 164 funds programmed and obligated for FFY 2012.

HSIP Project Funding		
Reporting Period 10/01/2011 to 09/30/2012		
Funding Category	**Programmed**	**Obligated**
HSIP (Section 148)	$ 6,464,000.00	$ 3,854,177.94
HRRRP (SAFETEA-LU)		
HRRR Special Rule		
Penality Funds - Section 154		
Penality Funds - Section 164	$ 4,140,000.00	$ 5,085,471.27
Incentive Grants - Section 163		
Incentive Grants (Section 406)		
Other Federal-aid Fund (i.e. STP, NHPP)		
State and Local Funds	$ 718,000.00	$ 385,417.80
TOTAL	$ 11,322,000.00	$ 9,325,067.01
Transferred Out of HSIP Funds	$ 5,898,234.50	

In FFY 2012, SD was apportioned $6,714,748.50 in HSIP funds and $4,479,540.00 in Section 164 funds. Due to the low number of crashes in SD and the random occurrence of those crashes, it has been difficult to identify locations that justify spending the money for a safety improvement. As mentioned previously, SDDOT is in the process of shifting its focus of its HSIP from a reactive process to a proactive process, which should increase the amount of safety funds expended.

RSI and RSA inspections conducted both on state and local roads accounted for $0.160 of $7.182 Million programmed HSIP funds. No specific local government projects were programmed with HSIP funds in FFY 2012. Section 164 funds obligated on local government projects totaled $2.715M of $4.140M or 66%. These Section 164 projects included both county signing projects and local government traffic engineering services. In FFY 2012, $5,898,234.50 was transferred out of HSIP funds into STP Flex.

Listing of Projects let in FFY 2012

Letting Dates of projects below are between October 1, 2011 and September 31, 2012. The Project list was determined by letting dates as projects programmed in the STIP are to be let in the fiscal year the project is programmed.

Improvement Category	Improvement Sub- Category	Output (Miles)	HSIP Cost	Total Cost	Funding Category	Functional Class	AADT	Speed (MPH)	Roadway Ownership	SHSP Emphasis Area	SHSP Strategy
Roadway Signs and Traffic Control	Roadway Signs (including posts) - new or updated	N/A	$ 992,674.00	$ 992,674.00	Penalty Funds - Section 164	Local Roads - Rural	N/A	N/A	County and Township Roads	Run Off Road Crashes and Head On Collisions	Continue reviewing pavement marking and signage placement policy and quality of materials
Shoulder Treatments	Widen shoulder - paved or other	35.840	$ 1,300,000.00	$12,164,247.87	HSIP (Section 148)	Minor Arterial - Rural	220	65	State	Run Off Road Crashes and Head On Collisions	Continue reviewing shoulders and their maintenance to moderate edge drop-off.
Roadside	Guardrail	45.100	$ 1,607,014.70	$ 1,819,243.50	HSIP (Section 148)	Minor Arterial - Rural	N/A	N/A	State	Run Off Road Crashes and Head On Collisions	Continue reviewing guardrail placement procedures and materials
Intersection Traffic Control	Intersection traffic control - other	7.876	$ 662,000.00	$ 4,440,277.29	HSIP (Section 148)	Principal Arterial - Urban	5110	75	State	Run Off Road Crashes and Head On Collisions	Continue using RSI and RSA procedures to evaluate and implement countermeasures
Roadway Signs and Traffic Control	Roadway Signs and Traffic Control - other	0.600	$ 306,052.22	$ 359,935.04	HSIP (Section 148)	Principal Arterial - Urban	3390	75	State	Run Off Road Crashes and Head On Collisions	Continue using RSI and RSA procedures to evaluate and implement countermeasures
Roadway Delineation	Longitudinal pavement markings - remarking	20.400	$ 120,921.83	$ 134,857.59	HSIP (Section 148)	Principal Arterial - Rural	N/A	N/A	State	Run Off Road Crashes and Head On Collisions	Continue reviewing pavement marking and signage placement policy and quality of materials
Roadway Delineation	Longitudinal pavement markings - remarking	8.100	$ 183,696.53	$ 185,368.93	HSIP (Section 148)	Principal Arterial - Rural	N/A	N/A	State	Run Off Road Crashes and Head On Collisions	Continue reviewing pavement marking and signage placement policy and quality of materials
Roadway	Rumble Strips - edge or shoulder	162.740	$ 245,132.56	$ 276,869.51	HSIP (Section 148)	Minor Arterial - Rural	N/A	N/A	State	Run Off Road Crashes and Head On Collisions	Continue reviewing current shoulder rumble strip policy and develop recommendation on policy modification with consideration for all modes of transportation
Roadway	Rumble Strips - edge or shoulder	252.520	$ 309,196.65	$ 344,713.80	HSIP (Section 148)	Minor Arterial - Rural	N/A	N/A	State	Run Off Road Crashes and Head On Collisions	Continue reviewing current shoulder rumble strip policy and develop recommendation on policy modification with consideration for all modes of transportation
Roadway	Rumble Strips - edge or shoulder	206.580	$ 313,548.28	$ 348,986.98	HSIP (Section 148)	Major Collector - Rural	N/A	N/A	State	Run Off Road Crashes and Head On Collisions	Continue reviewing current shoulder rumble strip policy and develop recommendation on policy modification with consideration for all modes of transportation
Roadway	Rumble Strips - edge or shoulder	162.900	$ 224,876.24	$ 257,862.50	HSIP (Section 148)	Minor Arterial - Rural	N/A	N/A	State	Run Off Road Crashes and Head On Collisions	Continue reviewing current shoulder rumble strip policy and develop recommendation on policy modification with consideration for all modes of transportation
Roadway Delineation	Longitudinal pavement markings - remarking	47.490	$ 408,204.62	$ 408,204.62	HSIP (Section 148)	Principal Arterial - Rural	N/A	N/A	State	Run Off Road Crashes and Head On Collisions	Continue reviewing pavement marking and signage placement policy and quality of materials
Speed Management	Radar Speed Signs	3.300	$ 20,390.54	$ 23,656.15	HSIP (Section 148)	Principal Arterial - Rural	1046	45	State	Run Off Road Crashes and Head On Collisions	Consider implementing Intelligent Transportation System features
Roadway Delineation	Longitudinal pavement markings - remarking	27.16	$ 788,304.36	$ 788,304.36	Penalty Funds - Section 164	Principal Arterial - Urban	N/A	N/A	State	Run Off Road Crashes and Head On Collisions	Continue reviewing pavement marking and signage placement policy and quality of materials
Roadway Signs and Traffic Control	Roadway Signs (including posts) - new or updated	N/A	$ 1,398,781.37	$ 1,398,781.37	Penalty Funds - Section 164	Local Roads - Rural	N/A	N/A	County and Township Roads	Run Off Road Crashes and Head On Collisions	Continue reviewing pavement marking and signage placement policy and quality of materials
Roadside	Roadside grading and other	11.913	$ 3,080,000.00	$ 6,508,394.43	HSIP (Section 148)	Minor Arterial - Rural	560	65	State	Run Off Road Crashes and Head On Collisions	Continue slope and ditch flattening and traversable culvert end treatments

ASSESSMENT OF THE EFFECTIVENESS OF THE IMPROVEMENTS (Program Evaluation)

Overview of General Highway Safety Trends

An overview of the highway safety trends for the past five years can be seen in the table below which was received from the SD Department of Public Safety, Office of Accident Records. Table 2-2 below is the result of a combined effort of state, local, and public agencies.

TABLE 2-2
SOUTH DAKOTA YEARLY COMPARISON
OF MOTOR VEHICLE TRAFFIC FATALITIES, INJURIES,
CRASHES, MILES TRAVELED, & REGISTERED MOTOR VEHICLES

Year	Deaths	Death Rate[1]	Injuries	Total Crashes	Total Crash Rate[4]	Fatal Crashes	Injury Crashes	PDO[2] Crashes	Miles[3] Traveled (million)	Registered Motor Vehicles[5] (thousand)
2008	121	1.43	5,708	15,907	187.80	109	4,107	11,691	8,470	924
2009	131	1.50	5,704	16,994	194.44	112	4,101	12,781	8,740	952
2010	140	1.58	5,801	17,626	198.92	124	4,155	13,347	8,861	992
2011	111	1.23	5,374	17,362	193.06	101	3,973	13,288	8,993	976
2012	**133**	**1.47**	**5,432**	**16.261**	**179.15**	**118**	**3,887**	**12,256**	**9,077**	**992**

FOOTNOTES

1. Number of deaths per 100 million vehicle miles traveled.

2. July 1, 1978 the PDO threshold was increased to $400 accumulated property damage.
   July 1, 1986 the PDO threshold definition changed to $500 damage to any one person's property or $1000 accumulated property damage per crash.
   July 1, 2000 the PDO threshold definition changed to $1000 damage to any one person's property or $2000 accumulated property damage per crash.

3. Miles traveled from years 1980 through 1991 have been revised to agree with the Highway Performance Monitoring System's (HPMS) miles traveled. The revised travel was provided by Transportation Inventory Management of the South Dakota Department of Transportation.

4. Number of crashes per 100 million vehicle miles traveled.

5. Based on statutory changes primarily impacting SDCL 32-5-2.7 in 2008, a vehicle plate can be effective on more than one vehicle per year due to vehicle placement. Thus, the registration count may be lower than past year's data based on previous plate registration staying with the vehicle.

Source: SD Department of Public Safety – Office of Accident Records
SD Department of Transportation – Inventory Management
SD Department of Revenue -- Titles and Registration

Description of Overall HSIP Effectiveness

South Dakota has made strides in reducing fatal and injury crashes since the adoption of SAFETEA-LU. Since 2008, fatal crashes have slightly increased from 109 to 118 in 2012 and injury crashes have decreased from 4,071 in 2008 to 3,887 in 2012. The increase in fatal crashes may be due to an increase in registered vehicles and miles traveled since 2008. South Dakota's crash rate has also decreased since 2008, positively reflecting on efforts to reduce roadway crashes overall. The reduction in injury crashes is the result of the collaborative effort between many State, local, and public agencies. SDDOT has continued the reactive RSI

process, increased the miles of durable pavement marking on the State system, installed traffic control signs with higher retroreflectivity in recent years, and have worked with local governments to upgrade their traffic control signing since 1993. Due to the nature of these types of improvements, it has been difficult to fully measure the positive results of the implemented improvements; however, the Department believes the effort put forth to these improvements has contributed to the overall decrease of crashes in South Dakota.

SDDOT has also begun to explore the benefits of proactive processes to transportation safety improvements since the adoption of MAP-21. Statewide rumble strip/stripe guidance has been developed and was the foundation for programming the regionwide rumble strip/stripe projects. The new rumble strip/stripe guidance provides for rumble strip/stripe installation based on roadway width and shoulder width. This allows rumble strips/stripes to be installed on more resurfacing projects and on roadways that have a long service life remaining according to the SDDOT Pavement Management system. Since this will be the third year of installing systemic rumble strips/stripes, it will be a few years until we can fully evaluate the effectiveness of this systemic treatment.

SDDOT will continue to maintain a reactive safety improvement process while starting a more proactive approach for identifying safety improvements. SDDOT is establishing processes to identify locations for systemic curve delineation improvements, safety edge improvements, shoulder width improvements, intersection improvements and roadway barrier improvements.

HIGH RISK RURAL ROADS PROGRAM (HRRRP)

SDDOT is a predominantly rural state with approximately 73,000 miles of rural Major Collector, Minor Collector, or Local Roads. Because of the rural environment, the locations with fatal and incapacitating crashes are sporadic. SDDOT has developed an analysis to identify rural road segments that have experienced two or more crashes in a three year period. In order to develop a crash rate, the annual average daily traffic (AADT) was used for segments which had reportable data. For the remaining segments the county wide VMT data was tied to the functional classification of roadway per county. Projects have been identified and SDDOT is currently working with roadway segment owners to discuss safety projects that are applicable for implementation through the RSA inspection process. Two RSA inspections have been completed at this time and SDDOT is in the process of selecting the most appropriate safety project.