**Arkansas' Highway Safety Improvement Program Report for State Fiscal Year 2013**

## Executive Summary

In accordance with 23 USC 148 and pursuant to 23 CFR 924, the Arkansas State Highway and Transportation Department (AHTD) has prepared a Highway Safety Improvement Program (HSIP) Annual Report for State Fiscal Year 2013 (July 1, 2012 through June 30, 2013). The format of this report is consistent with the reporting guidelines issued by the Federal Highway Administration on February 13, 2013.

## Program Structure

### *Program Administration*

**How are Highway Safety Improvement Program funds administered in a State?**

☑Central
☐District
☐Other: 1T

If District, how are the HSIP funds allocated?
☐Formula
☐Crash data
☐Other: 1T

**Describe how local roads are addressed as part of Highway Safety Improvement Program.**

To address safety concerns on local roads, the AHTD continues to provide technical assistance and training programs on safety issues to local governments through its efforts by Planning and Research Division staff and the Technology Transfer Program. The AHTD continues to coordinate with the Arkansas State Police through the Traffic Records Coordinating Committee to implement eCrash and the CARE (Critical Analysis Reporting Environment) program that will allow law enforcement agencies to have better access to crash data on all public roads.

Furthermore, the AHTD recently enhanced its roadway data base by providing a linear referencing system for 12,665 miles of Federal-aid local roads. This allowed the location of a crash that occurs on Federal-aid local roads to be identified by geographical location. Based on this data, crash queries can be conducted to determine if there are locations with a high frequency of crashes. This data can be provided to a local government agency or a Metropolitan Planning Organization (MPO) upon request.

AHTD has provided a GIS and Aerial photograph driven tool, VISUAL-T, to the Arkansas State Police and various county and local law enforcement agencies to assist the agencies with providing an accurate crash location on the crash report. This tool has greatly enhanced both speed and accuracy in providing a crash location to the Crash Database.

**Identify which internal partners are involved with Highway Safety Improvement Program planning.**
Check all that apply.
☑Design
☑Planning
☑Maintenance
☑Operations
☑Governor's Highway Safety Office
☐Other: 1T

**Briefly describe coordination with internal partners.**
Coordination with internal partners, along with the HSO, occurs on different levels. Design, planning, maintenance, operations and the HSO are all on the SHSP committee. Coordination has also taken place when addressing work zone safety, roadway departure safety, and in the identification of infrastructure and non-infrastructure projects.

**Identify which external partners are involved with Highway Safety Improvement Program planning.**
Check all that apply.
☑Metropolitan Planning Organizations
☑Governor's Highway Safety Office
☐Local Government Association
☐Other: Click here to enter text.

**Identify any program administration practices used to implement the HSIP that have changed since the last reporting period.**
☐Multi-disciplinary HSIP steering committee
☐Other: 1T

**Describe any other aspects of Highway Safety Improvement Program Administration on which you would like to elaborate.**
Since the last SFY, the AHTD Traffic Safety Section (TSS), which manages the HSIP, has hired an engineer. The TSS has also increased use of GIS. The TSS organized an HSM training workshop with FHWA in February 2013, and organized a workshop as part of NCHRP 8-76 in March 2013. The TSS worked with FHWA on the Roadway Departure Implementation Plan, and has begun work with FHWA on the Work Zone Safety Implementation Plan. The TSS also updated the SHSP (approved by FHWA in March 2013) with a focus on TZD.

***Program Methodology***

**Select the programs that are administered under the HSIP.**

☑Median Barrier ☐Intersection ☐Safe Corridor

| | | |
|---|---|---|
| ☑Horizontal Curve | ☐Bicycle Safety | ☑Rural State Highway |
| ☑Skid Hazard | ☑Crash Data | ☐Red Light Running |
| ☑Roadway Departure | ☑Low-Cost Spot Improvements | ☑Sign Replacement and Improvement |
| ☐Local Safety | ☐Pedestrian Safety | ☐Right Angle Crash |
| ☐Left-turn Crash | ☐Shoulder Improvement | ☐Segments |
| ☐Other: | | |
| 1T | | |

For each program checked above, enter the following information:

Program: Below information applies to all programs checked above.

Date of Program Methodology: 7/7/2011

What data types were used in the program methodology? Check all that apply

| ***Crashes*** | ***Exposure*** | ***Roadway*** |
|---|---|---|
| ☑All crashes | ☑Traffic | ☑Median width |
| ☐Fatal crashes only | ☐Volume | ☐Horizontal curvature |
| ☑Fatal and serious injury crashes only | ☐Population | ☑Functional classification |
| ☐Other: 1T | ☑Lane miles | ☐Roadside features |
| | ☐Other: 1T | ☑Other: Pavement, curve, lane and shoulder width, rural/urban, etc. |

What project identification methodology was used for this program? Check all that apply.

☑Crash frequency
☐Expected crash frequency with EB adjustment
☐Equivalent property damage only (EPDO crash frequency)
☐Relative severity index
☑Crash rate
☐Critical rate
☐Level of service of safety (LOSS)
☐Excess expected crash frequency using SPFs
☐Excess expected crash frequency with EB adjustment
☐Excess expected crash frequency using method of moments
☐Probability of specific crash types

☐Excess proportions of specific crash types

☐Other: 1T

**Are local roads (non-state owned and operated) included or addressed in this program?**

No

**If yes, are local road projects identified using the same methodology as state roads?**

**If no, describe the methodology used to identify local road projects as part of this program.**

AHTD is working on a linear referencing system (LRS) for all public roads. It is also working toward expanding its safety training options to locals through the local technical assistance program (LTAP).

**How are highway safety improvement projects advanced for implementation?**

☐Competitive application process

☐Selection committee

☑Other: The project selection process is consistent with the recent HSIP guidance and the AHTD/FHWA HSIP process adopted in 2011. See attachment.

**Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).**

☐Relative Weight in Scoring

☑Rank of Priority Consideration

| | |
|---|---|
| Ranking based on B/C | 1T |
| Available funding | 1T |
| Incremental B/C | 1T |
| Ranking based on net benefit | 1T |
| Cost effectiveness | 1T |
| Other | The process is consistent with the AHTD/FHWA HSIP process adopted in 2011. See attachment. |

**What proportion of highway safety improvement program funds address systemic improvements?**

49%

**Highway safety improvement program funds are used to address which of the following systemic improvements? Please check all that apply.**

| | |
|---|---|
| ☑Cable median barriers | ☐Upgrade guard rails |
| ☐Rumble strips | ☐Clear zone improvements |
| ☐Traffic control device rehabilitation | ☐Safety edge |
| ☐Pavement/shoulder widening | ☐Install/improve lighting |

☐Install/Improve Signing
☐Install/improve pavement marking/delineation
☐Add/upgrade/modify/remove traffic signal
☐Other:
1T

**What process is used to identify potential countermeasures?**

☑Engineering Study
☐Road Safety Assessment
☐Other: 1T

**Identify any program methodology practices used to implement the HSIP that have changed since the last reporting period.**

☑Highway Safety Manual
☐Road Safety Audits
☑Systemic Approach
☐Other: 1T

**Describe any other aspects of the Highway Safety Improvement Program methodology on which you would like to elaborate.**

Systemic approaches to addressing roadway departure safety is underway. AHTD is already implementing cable median barrier projects through a systemic process. With guidance from the Roadway Departure Safety Implementation Plan, a systemic approach to install signs, markings, and rumble strips is also under way.

## Progress in Implementing Projects

***Funds Programmed***

**Reporting period for Highway Safety Improvement Program funding.**

State Fiscal Year (July 1, 2012 through June 30, 2013)

**Enter the programmed and obligated funding for each applicable funding category.**

| **HSIP Project Funding** | | |
|---|---|---|
| **Reporting Period 07/01/2012 to 06/30/2013** | | |
| **Funding Category** | **Programmed** | **Obligated** |
| **HSIP (Section 148)** | **23,864,000** | **25,146,777** |
| **HRRRP (SAFETEA-LU)** | **0** | **0** |
| **HRRR Special Rule** | **0** | **0** |
| **Penalty Transfer - Section 154** | **15,660,000** | **28,625,004** |
| **Penalty Transfer – Section 164** | **0** | **0** |

| | | |
|---|---|---|
| **Incentive Grants - Section 163** | **0** | **0** |
| **Incentive Grants (Section 406)** | **0** | **0** |
| **Other Federal-aid Funds (i.e. STP, NHPP)** | **98,108,000*** | **27,541,830*** |
| **State and Local Funds** | **28,176,000** | **9,679,544** |
| **Total** | **165,808,000** | **90,993,155** |

*Includes signals, intersection/interchange improvements, passing lanes, Safe Routes to School, and safety related studies

**How much funding is programmed to local (non-state owned and maintained) safety projects?**
None directly
**How much funding is obligated to local safety projects?**
None directly

**How much funding is programmed to non-infrastructure safety projects?**
$785,000
**How much funding is obligated to non-infrastructure safety projects?**
$785,000

**How much funding was transferred in to the HSIP from other core program areas during the reporting period?**
$10,285,611
**How much funding was transferred out of the HSIP to other core program areas during the reporting period?**
None

**Discuss impediments to obligating Highway Safety Improvement Program funds and plans to overcome this in the future.**
Develop a policy to systematically deploy the use of HSIP funds for the installation, improvement, and replacement of signs and raised pavement markers.

**Describe any other aspects of the general Highway Safety Improvement Program implementation progress on which you would like to elaborate.**
Significant progress has been made towards the installation of cable median barriers to reduce or eliminate KA crashes on Interstates and other high speed routes.

## *General Listing of Projects*

List each highway safety improvement project obligated during the reporting period.

| Project | Improvement Category | Output *(miles)* | HSIP Cost | Total Cost | Funding Cat. | Func. Class. | AADT | Speed | Roadway Ownership^ | Relationship to SHSP | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | *Emphasis Area | **Strategy |
| 110516 | Roadside | 10.27 | 49,592 | 55,047 | 148 | Interstate | 2433 | 70 | State Hwy. | 3 | B |
| 110564 | Roadside | 9.82 | 267,975 | 297,452 | 148 | Interstate | 28000 | 70 | State Hwy. | 3 | B |
| 110576 | Roadway | 4.61 | 1,359,199 | 1,508,711 | 148 | Interstate | 28000 | 70 | State Hwy. | 2 | C |
| 020544 | Roadside | 15.47 | 3,377,725 | 3,749,275 | 148 | Interstate | 25500 | 65 | State Hwy. | 3 | B |
| 040472 | Roadway | 2.2 | 332,106 | 368,638 | 148 | Minor Art. | 4900 | 55 | State Hwy. | 2 | D |
| 040645 | Roadside | 5.1 | 974,476 | 1,081,668 | 148 | Interstate/Other Fwy. | 18667 | 55 | State Hwy. | 3 | B |
| 061218 | Alignment | 0.07 | 64,242 | 71,309 | 148 | Urban Prin. Art. Other | 28000 | 35 | State Hwy. | 2 | E |
| 061328 | Roadside | 7.31 | 100,142 | 111,158 | 148 | Interstate | 74000 | 65 | State Hwy. | 3 | B |
| 061408 | Roadway | 1.0 | 123,385 | 136,957 | 148 | Interstate | 42000 | 65 | State Hwy. | 2 | C |
| 080273 | Roadway | 0.41 | 27,639 | 30,679 | 148 | Urban Prin. Art. Other | 18000 | 35 | State Hwy. | 2 | D |
| 080310 | Alignment | 0.91 | 557,047 | 618,322 | 148 | Urban Prin. Art. Other | 1100 | 55 | State Hwy. | 2 | E |
| 080465 | Roadway | 9.35 | 1,362,213 | 151,196 | 148 | Interstate | 32250 | 70 | State Hwy. | 3 | B |
| 090369 | Roadside | 4.96 | 1,364,714 | 1,514,833 | 148 | Interstate | 39000 | 70 | State Hwy. | 3 | B |
| 100768 | Roadside | 16.81 | 2,438,590 | 2,706,835 | 148 | Interstate | 13775 | 65 | State Hwy. | 3 | B |
| 012149 | Roadside | 17.27 | 246,179 | 273,259 | 148 | Interstate | 27667 | 70 | State Hwy. | 3 | B |
| 012166 | Roadway | 3.0 | 904,555 | 1,004,056 | 148 | Interstate | 25000 | 70 | State Hwy. | 3 | C |
| 012168 | Roadside | 27.7 | 4,436,244 | 4,924,231 | 148 | Interstate | 24800 | 70 | State Hwy. | 2 | B |
| 012169 | Roadside | 13.02 | 1,543,303 | 1,713,066 | 148 | Interstate /Urban Prin. Art. Other | 17250 | 65 | State Hwy. | 3 | B |
| 012170 | Roadside | 14.94 | 94,074 | 104,422 | 148 | Interstate | 25000 | 70 | State Hwy. | 3 | B |
| 012185 | Non-Infrast. | 0 | 8,506 | 9,442 | 148 | NA | NA | NA | NA | NA | NA |
| 012200 | Roadway | 11.84 | 2,930,090 | 3,252,400 | 148 | Interstate | 25000 | 70 | State Hwy. | 2 | C |
| BB0403 | Roadway | 14.1 | 429,402 | 476,636 | 148 | Interstate | 26633 | 70 | State Hwy. | 2 | C |
| BB0407 | Roadway | 7.46 | 800,391 | 888,434 | 148 | Interstate | 48167 | 65 | State Hwy. | 2 | C |
| BB0614 | Roadway | 7.49 | 1,573,414 | 1,746,490 | 148 | Interstate | 22667 | 70 | State Hwy. | 2 | C |
| BB0804 | Roadway | 7.4 | 693,837 | 770,159 | 148 | Interstate | 27000 | 70 | State Hwy. | 2 | C |
| BB0806 | Roadway | 18.6 | 999,106 | 1,109,008 | 148 | Interstate | 29900 | 70 | State Hwy. | 2 | C |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BB1003 | Roadway | 7.82 | 588,261 | 652,970 | 148 | Interstate | 18500 | 70 | State Hwy. | 2 | C |
| 030425 | Roadside | 14.13 | 2,394,195 | 2,657,556 | 154 | Urban Prin. Art. Other | 9400 | 55 | State Hwy. | 3 | B |
| 050044 | Roadway | 0.73 | 45,698 | 50,725 | 154 | Urban Prin. Art. Other | 16000 | 35 | State Hwy. | 2 | D |
| 061309 | Roadway | 2.4 | 10,000 | 11,100 | 154 | Minor Art. | 8150 | 55 | State Hwy. | 2 | D |
| 061407 | Roadway | 2.56 | 865,183 | 960,353 | 154 | Interstate | 77000 | 65 | State Hwy. | 2 | C |
| 080466 | Roadside | 9.29 | 1,390,026 | 1,542,929 | 154 | Prin. Art Other | 6050 | 65 | State Hwy. | 3 | B |
| 012167 | Roadside | 64.6 | 6,166,368 | 6,844,668 | 154 | Interstate | 19400 | 70 | State Hwy. | 3 | B |
| 012170 | Roadside | 14.94 | 2,631,548 | 2,921,018 | 154 | Interstate | 25000 | 70 | State Hwy. | 3 | B |
| 012177 | Roadside | 36.96 | 7,031,189 | 7,804,620 | 154 | Interstate | 31943 | 70 | State Hwy. | 3 | B |
| 012179 | Roadside | 39.19 | 6,231,092 | 6,916,512 | 154 | Urban Prin. Art Other | 26667 | 70 | State Hwy. | 3 | B |
| 012190 | Non-Infrast. | 0 | 785,000 | 871,350 | 154 | NA | NA | NA | NA | 1 | A |
| 012200 | Roadway | 11.84 | 663,948 | 736,982 | 154 | Interstate | 25000 | 70 | State Hwy. | 2 | C |
| BB0105 | Roadway | 7.88 | 410,757 | 455,940 | 154 | Interstate | 30800 | 70 | State Hwy. | 2 | C |

*1=Curbing aggressive driving; 2=Keeping vehicles in roadway; 3=Reducing head on and across median crashes

**A=Enhancement Speed enforcement; B=Installation of cable median barriers; C=Increase surface friction; D=Widening/Passing lanes; E=Realignment

## Progress in Achieving Safety Performance Targets

### *Overview of General Safety Trends*

**Present data showing the general highway safety trends in the state for the past five years.**

| Performance Measures* | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|
| Number of fatalities | 650 | 600 | 592 | 571 | 551 |
| Number of serious injuries | 3072 | 3471 | 3693 | 3331 | 3239 |
| Fatality rate (per100MVMT) | 2.01 | 1.86 | 1.79 | 1.70 | 1.67 |
| Serious injury rate (per 100MVMT) | 9.48 | 10.70 | 11.14 | 9.90 | 9.83 |

*States should use a 5-year rolling average to present the performance measures

**To the maximum extent possible, present this data by functional classification and ownership.**

| Function Classification | 2011 | | | |
|---|---|---|---|---|
| | Number of fatalities | Number of serious injuries | Fatality rate (per 100MVMT) | Serious injury rate (per 100MVMT) |
| Interstate | 74 | 479 | 0.87 | 5.64 |
| Other Freeways | 13 | 77 | 0.91 | 5.37 |

| | | | | |
|---|---|---|---|---|
| Other Principal Arterials | 129 | 831 | 1.73 | 11.12 |
| Minor Arterials | 87 | 578 | 1.46 | 9.71 |
| Major Collector | 99 | 641 | 1.87 | 12.12 |
| Minor Collector | 5 | 12 | 0.66 | 1.58 |
| Local | 144 | 621 | 4.05 | 17.46 |

| Roadway Ownership | 2011 | | | |
|---|---|---|---|---|
| | Number of fatalities | Number of serious injuries | Fatality rate (per 100MVMT) | Serious injury rate (per 100MVMT) |
| State Highway System | 417 | 2652 | 1.67 | 10.63 |
| City Streets and County Roads | 134 | 587 | 1.67 | 7.33 |

**Describe any other aspects of the general highway safety trends on which you would like to elaborate.**
The definition for reporting incapacitating injuries (which we use for reporting serious injuries) was updated in 2007 by Arkansas State Police. The trend for incapacitating injuries has followed fatalities except for the jump in 2008 and 2009. We think this can be partly explained by the updated definition used by law enforcement officers from 2007.

***Application of Special Rules***

Present the rate of traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65.

Show table from template with 7 years

| Older Driver/Pedestrian Performance Measures | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|
| Fatality rate (per capita) | 0.56 | 0.42 | 0.48 | 0.47 | 0.42 | 0.42 | 0.45 |
| Serious injury rate (per capita) | 16.04 | 12.73 | 15.69 | 18.03 | 18.12 | 17.17 | 16.40 |
| Fatality and serious injury rate (per capita) | 16.59 | 13.15 | 16.17 | 18.50 | 18.55 | 17.59 | 16.84 |

Show your calculations.

Rolling Average for 2009 and 2011 for Comparison

2011= SUM((2459/146)+(2533/144)+(2652/143)+(2627/142)+(2264/140))/5=17.5

2009= SUM((2652/143)+(2627/142)+(2264/140)+(1815/138)+(2240/135))/5=16.6

Does the older driver special rule apply to your state?

Yes

If yes, describe the approach to include respective strategies to address the increase in those rates in the State SHSP.

Current strategies listed in the SHSP to address older drivers will be considered. These strategies include:

- Improved roadway visibility features;
- Implementation of the FHWA Highway Design Handbook for Older Drivers;
- Education of older drivers on the safety risks resulting from reduced driving task performance;
- Education of older drivers on alternative transportation modes;
- Increase frequency of vision assessments for older drivers; and
- Promote the use of restricted drivers licenses for older drivers.

SHSP steering committee will review these strategies in the near future and determine if any changes are needed. This may also include an establishment of an older driver action plan and SHSP subcommittee.

**Secondary Analysis**

| Older Pedestrians | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|
| Fatalities | 9 | 5 | 6 | 8 | 3 | 5 | 1 |
| Serious injuries | 10 | 8 | 6 | 6 | 4 | 7 | 7 |
| Fatalities and serious injuries | 19 | 13 | 12 | 14 | 7 | 12 | 8 |

The increase is not due to pedestrians.

## Assessment of the Effectiveness of the Improvements (Program Evaluation)

**What indicators of success can you use to demonstrate effectiveness and success in the Highway Safety Improvement Program? Select all that apply.**

☑B/C ratio

☐Policy change

☑Other: AHTD moving toward a systemic and risk-based approach to address safety.

**What significant programmatic changes have occurred since the last reporting period? Select all that apply.**

☑Shift focus to fatalities and serious injuries
☐Organizational changes
☑More systemic programs included in HSIP
☐Other: 1T

**Briefly describe significant program changes that have occurred since the last reporting period.**

More systemic projects have been programmed. Specifically, system-wide implementation of cable median barriers to address fatal and serious injuries. Other areas as mentioned previously to address roadway departure safety is underway.

***SHSP Emphasis Areas***

**For each SHSP emphasis area that relates to the HSIP, present trends in emphasis area performance measures. Show 5 tables for each year**

| HSIP-related SHSP Emphasis Areas | Number of fatalities | Number of serious injuries | Fatality rate (per HMVMT) | Serious injury rate (per HMVMT) |
|---|---|---|---|---|
| 2011 | | | | |
| Roadway Departure | 358 | 1998 | 1.08 | 6.06 |
| Intersections | 108 | 961 | 0.33 | 2.92 |
| Work Zones | 16 | 117 | 0.05 | 0.36 |

| HSIP-related SHSP Emphasis Areas | Number of fatalities | Number of serious injuries | Fatality rate (per HMVMT) | Serious injury rate (per HMVMT) |
|---|---|---|---|---|
| 2010 | | | | |
| Roadway Departure | 358 | 2056 | 1.06 | 6.11 |
| Intersections | 132 | 945 | 0.39 | 2.81 |
| Work Zones | 16 | 89 | 0.05 | 0.26 |

| HSIP-related SHSP Emphasis Areas | Number of fatalities | Number of serious injuries | Fatality rate (per HMVMT) | Serious injury rate (per HMVMT) |
|---|---|---|---|---|
| 2009 | | | | |
| Roadway Departure | 398 | 2311 | 1.20 | 6.97 |
| Intersections | 125 | 1095 | 0.38 | 3.30 |
| Work Zones | 23 | 93 | 0.07 | 0.28 |

| HSIP-related SHSP Emphasis Areas | Number of fatalities | Number of serious injuries | Fatality rate (per HMVMT) | Serious injury rate (per HMVMT) |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 2008 | | | | |
| Roadway Departure | 402 | 2096 | 1.24 | 6.44 |
| Intersections | 110 | 1042 | 0.34 | 3.20 |
| Work Zones | 12 | 113 | 0.04 | 0.35 |

| HSIP-related SHSP Emphasis Areas | Number of fatalities | Number of serious injuries | Fatality rate (per HMVMT) | Serious injury rate (per HMVMT) |
|---|---|---|---|---|
| 2007 | | | | |
| Roadway Departure | 422 | 1945 | 1.30 | 6.00 |
| Intersections | 131 | 954 | 0.40 | 2.95 |
| Work Zones | 22 | 98 | 0.07 | 0.30 |

***Groups of similar project types***

**Present the overall effectiveness of HSIP subprograms**.

Before and After Crash Analysis

Job 012053, Shoulder Rumble Strips (Selected Sections) (Statewide)

| | 24 Months Before Rumble Strips (2007-2008) | 24 Months After Rumble Strips (2010-2011) | Percent Change |
|---|---|---|---|
| Average Annual Daily Traffic (ADT) | 5,501 | 5,664 | 3.0% |
| Total Number of Crashes | 3,275 | 2,677 | (18.3%) |
| Annual Crash Rate[1] | 0.80 | 0.64 | (20.0%) |
| Number of Fatal Crashes | 108 | 70 | (35.2%) |
| Number of Fatalities | 123 | 84 | (31.7%) |
| *Statewide Number of Fatalities* | *1,250* | *1,122* | *(10.2%)* |
| Number of Serious Injury Crashes | 386 | 309 | (20.0%) |
| Number of Minor Injury Crashes | 557 | 392 | (29.6%) |
| Number of Possible Injury Crashes | 692 | 425 | (38.6%) |
| Number of PDO[2] Crashes | 1532 | 1481 | (3.3%) |
| Human Capital Crash Cost[3,5], all severities | $303.8 million | $210.5 million | (30.7%) |
| Comprehensive Crash Cost[4,5], all severities | $795.0 million | $624.4 million | (21.5%) |
| Average Annual Human Capital Crash Cost Savings | $46.7 million | | |
| Average Annual Comprehensive Crash Cost Savings | $85.3 million | | |
| Construction cost of Job 012053 | $0.9 million | | |

[1] Crash Rate = number of crashes per year per million vehicle miles traveled

[2] PDO = Property Damage Only

[3] Human capital crash costs include monetary losses associated with medical care, emergency services, property damage, and lost productivity.

[4] Comprehensive crash costs include human capital crash costs in addition to non-monetary costs related to the reduction in the quality of life in order to capture a more accurate level of the burden of injury. Comprehensive costs are generally used in analyses conducted by non-transportation state and federal agencies.

[5] Crash costs were calculated using the costs provided in Table 4A-1 in the 2010 Highway Safety Manual and adjusted to July 2013 dollars based on the latest Consumer Price Index.

## Before and After Crash Analysis

Highway 7 Centerline Rumble Strips[1]

| | 36 Months Before Rumble Strips (2001-2004) | 36 Months After Rumble Strips (2005-2007) | Additional 48 Months After (2008-2011) |
|---|---|---|---|
| Average Annual Daily Traffic (ADT) | 1,970 | 1,940 | 1,773 |
| Average Annual Number of Crashes | 104.0 | 61.7 | 81.0 |
| Average Annual Number of Fatal Crashes | 3.7 | 1.3 | 1.5 |
| Average Annual Number of Fatalities | 3.7 | 1.3 | 1.5 |
| Average Annual Number of Serious Injury Crashes | 12.7 | 8.7 | 13.8 |
| Average Annual Number of Minor Injury Crashes | 26.3 | 14.3 | 14.8 |
| Average Annual Number of Possible Injury Crashes | 14.3 | 16.7 | 9.5 |
| Average Annual Number of PDO[2] Crashes | 47.0 | 20.7 | 41.5 |

[1] Section 15 (LM 9.68-19.13); Section 16 (LM 0.00-19.34); Section 17 (LM 0.00-13.52); Section 18 (LM 0.00-14.21 and 14.80-25.33); Section 19 (LM 0.00-7.26)
[2] PDO = Property Damage Only

## Before and After Crash Analysis

Job 012016, I-40 Cable Median Barrier (Biscoe-Brinkley)

| | 36 Months Before Cable Median Barrier | 36 Months After Cable Median Barrier |
|---|---|---|
| Average Annual Daily Traffic (ADT) | 31,900 | 30,900 |
| Total Number of Crashes | 95 | 108 |
| Number of Fatal Crashes | 10 | 0 |
| Number of Fatalities | 11 | 0 |
| Number of Serious Injury Crashes | 5 | 6 |
| Number of Minor Injury Crashes | 12 | 6 |
| Number of Possible Injury Crashes | 27 | 16 |
| Number of PDO[1] Crashes | 41 | 80 |
| Human Capital Crash Cost[2,4], all severities | $18.82 million | $2.44 million |
| Comprehensive Crash Cost[3,4], all severities | $56.45 million | $3.98 million |
| Average Annual Human Capital Crash Cost Savings | $5.46 million | |
| Average Annual Comprehensive Crash Cost Savings | $17.49 million | |
| Construction cost of Job 012016 | $2.05 million | |

Job 012016: I-40, Sections 42 and 43, Log Mile 204.50-213.00 (8.50 miles in length)

## Before and After Crash Analysis

Job 110495, I-55 Cable Median Barrier (So. of Highway 64-James Mill Road)

| | 36 Months Before Cable Median Barrier | 36 Months After Cable Median Barrier |
|---|---|---|
| Average Annual Daily Traffic (ADT) | 34,800 | 31,800 |
| Total Number of Crashes | 77 | 102 |
| Number of Fatal Crashes | 2 | 0 |
| Number of Fatalities | 2 | 0 |

| | | |
|---|---|---|
| Number of Serious Injury Crashes | 7 | 2 |
| Number of Minor Injury Crashes | 4 | 4 |
| Number of Possible Injury Crashes | 34 | 24 |
| Number of PDO[1] Crashes | 30 | 72 |
| Human Capital Crash Cost[2,4], all severities | $5.95 million | $1.98 million |
| Comprehensive Crash Cost[3,4], all severities | $15.00 million | $3.05 million |
| Average Annual Human Capital Crash Cost Savings | $1.32 million | |
| Average Annual Comprehensive Crash Cost Savings | $3.98 million | |
| Construction cost of Job 012016 | $0.85 million | |

Job 110495: I-55, Section 11, Log Mile 8.50-12.62 (4.12 miles in length)

[1]PDO = Property Damage Only

[2]Human capital crash costs include monetary losses associated with medical care, emergency services, property damage, and lost productivity.

[3]Comprehensive crash costs include human capital crash costs in addition to non-monetary costs related to the reduction in the quality of life in order to capture a more accurate level of the burden of injury. Comprehensive costs are generally used in analyses conducted by non-transportation state and federal agencies.

[4]Crash costs were calculated using the costs provided in Table 4A-1 in the 2010 Highway Safety Manual, which are based on a 2005 FHWA report in 2001 dollars, and adjusting to July 2012 dollars based on the latest Consumer Price Index.

***Systemic Treatments***

Present the overall effectiveness of systemic treatments.

| HSIP Sub-program Types | Number of fatalities* | Number of serious injuries* | Fatality rate (per HMVMT)* | Serious injury rate (per HMVMT)* |
|---|---|---|---|---|
| **Cable Median Barriers/Median Crossover Crashes on Interstates and Freeways | 14 | 42 | 1.41 | 4.23 |
| | | | | |
| | | | | |
| | | | | |

*For the target crash type Head On and Sideswipe Opposite Direction Crashes.

** First year for data, 2011 only.

Describe any other aspects of the overall Highway Safety Improvement Program effectiveness on which you would like to elaborate.

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Provide project evaluation data for completed projects (optional).

Previous implementation of cable median barrier and rumble strip projects have shown a clear reduction in fatal and serious injury crashes.