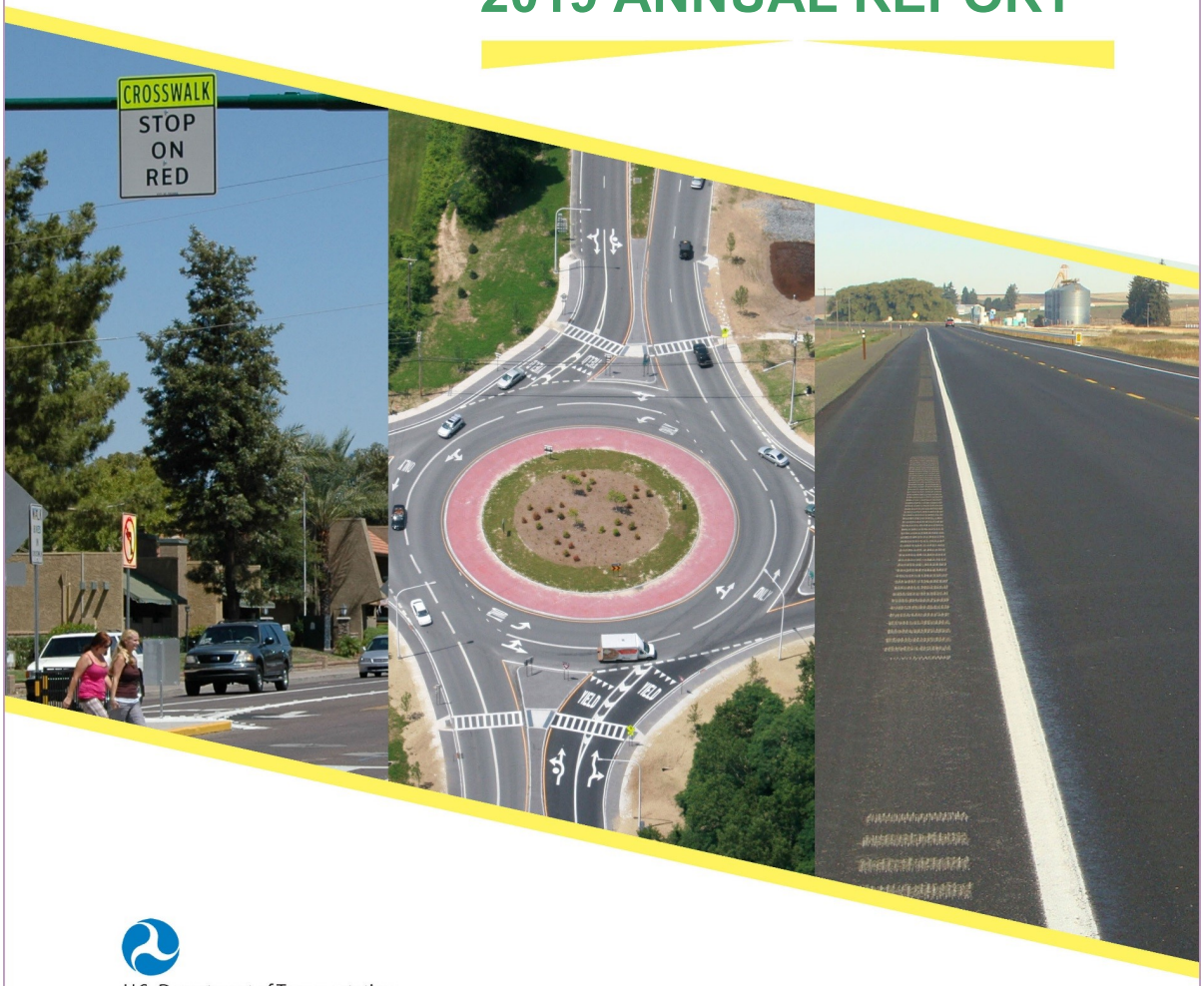
COLORADO

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2019 ANNUAL REPORT



U.S. Department of Transportation
Federal Highway Administration

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Protection of Data from Discovery Admission into Evidence

23 U.S.C. 148(h)(4) states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section[HSIP], shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.”

23 U.S.C. 409 states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.”

Executive Summary

The number of fatalities in Colorado has decreased in 2018 as compared to the previous year even with increasing vehicle mile traveled (VMT). As a result, fatality rates have also decreased. The crash data has shown that there are four specific areas where the fatalities increased from 2017: Urban, Older Driver (age 65 or older), Bicyclist, and Alcohol Impaired. Motorcycle fatalities in 2018 were the same as the previous year. The number of serious injuries and serious injury rate did increase in 2018 as compared to the previous year. Non-motorized fatalities and serious injuries in 2018 were about as the same as the previous year.

Colorado's HSIP program is administered by the Traffic & Safety Engineering (TSE) Branch at CDOT headquarters (HQ) and coordinates with the CDOT Office of Transportation Safety (which is the SHSO) to ensure that safety programs align with each other's objectives. The TSE branch actively engages with regional staff to coordinate efforts to research and analyze the need for safety improvements on segments and intersections statewide. The group provides subject matter expertise in safety and crash analyses to all roadway projects delivered by the Regions. The TSE staff also communicates and works directly with external entities and governing bodies such as FHWA, state and local law enforcement officials, other state agencies, MPOs, municipalities, counties, and other interested parties.

The Colorado Strategic Highway Safety Plan (SHSP) is a great tool to unify safety efforts in the state, as it is a comprehensive plan for transportation safety. Local agencies are invited and encouraged to participate in the SHSP update and subsequent implementation. They often participate in the emphasis area teams, for safety program or project design and implementation. Colorado will be completing its next SHSP update in 2020, as the current one was approved in 2015.

Colorado programmed a total of $33,777,419 of Federal HSIP funding (not including state or local match) towards safety improvement projects in state fiscal year (FY) 2019. Only seven percent of HSIP funding was programmed towards local (non-state highway) safety projects in FY 2019. Based on the survey responses and interviews from a 2018 HSIP assessment, some of the reasons for the low participation include lack of local agency knowledge of the opportunity, lack of readily available data, non-existent technical support, cumbersome federal aid program laws and regulations, lack of time and matching funds. CDOT recognizes these local agency challenges and has strategies planned to address them.

CDOT has started a new Safety Circuit Rider (SCR) program in 2019. The purpose of the SCR is to provide safety related education, training, outreach and support to local agency safety stakeholders under the direction of the Colorado Local Technical Assistance Program (CLTAP) and CDOT.

The High Risk Rural Roads (HRRR) special rule is once again in effect for this reporting period. Colorado must obligate $2,826,084 of HRRR in Federal FY 2019. Colorado is planning to integrate more systemic projects as part of the HSIP in upcoming years. This systemic approach should help Colorado deliver more HRRR projects, more specifically along local roads.

In addition to HSIP, CDOT utilizes other sources of safety funding. The Funding Advancement for Surface Transportation and Economic Recovery Act of 2009 (FASTER) established the Road Safety Fund to support the construction, reconstruction, or maintenance of projects that the state Transportation Commission, a county, or municipality determine are needed to enhance the safety of a state highway, county road, or city street. The fund dollars are allocated based on a statutory formula: 60% to CDOT, 22% to counties, and 18% to municipalities. For CDOT, FASTER provides approximately $80 million per year in safety funds.

Introduction

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. As per 23 U.S.C. 148(h) and 23 CFR 924.15, States are required to report annually on the progress being made to advance HSIP implementation and evaluation efforts. The format of this report is consistent with the HSIP Reporting Guidance dated December 29, 2016 and consists of five sections: program structure, progress in implementing highway safety improvement projects, progress in achieving safety outcomes and performance targets, effectiveness of the improvements and compliance assessment.

Program Structure

Program Administration

Describe the general structure of the HSIP in the State.

Colorado's HSIP program is administered by the Traffic & Safety Engineering (TSE) Branch at CDOT headquarters (HQ).

Regional CDOT traffic and safety engineering staff work internally and in consort with local agencies to identify projects with safety improvement needs. Initial review and analysis occur at this regional level. Upon acceptance by the region as a viable and potentially necessary safety project, the region makes a request to HQ for final review and analysis and associated HSIP funding eligibility criteria. The HQ TSE staff conducts an independent analysis of the project, including a detailed Benefit/Cost analysis, calculation of predicted crashes mitigated, a review of crash patterns, and a review of the crash modification factor used. Upon completion of final review and quantitative and qualitative analysis by HQ TSE staff of projects submitted by CDOT Regional traffic and safety engineering, the projects are either approved or denied and budgeted accordingly against the projected regional allocation for the fiscal year in which the funding is needed. In an effort to increase safety overall across the state, thorough dialogue between HQ and the requesting region occurs on a project-by-project basis when additional information, background, or data are needed in the event that a project appears to fall short of eligibility. Additionally, because projects that are awarded HSIP funding are required to address individual areas of focus as defined within the Strategic Highway Safety Plan (SHSP), as part of the review and analysis process, our group confirms that such projects do in fact fall within the SHSP areas of focus.

Upon approval of such HSIP funding the CDOT regions are responsible for final project delivery on-system. In the event that a local agency is receiving HSIP funding for off-system safety improvements, the CDOT regional staff coordinate with such local agencies regarding HSIP funding to enable these local agencies to deliver these projects.

Where is HSIP staff located within the State DOT?

Engineering

HSIP is managed in the Traffic and Safety Engineering Branch, under the Office of the Chief Engineer.

How are HSIP funds allocated in a State?

- Formula via Districts/Regions

Based off historical crash distribution, within each region.

Describe how local and tribal roads are addressed as part of HSIP.

Under this program all public roadways are eligible for participation, including roads on tribal lands (there are two tribes in Colorado, Ute Mountain and Southern Ute). Submittals for projects not located on the State Highway system are solicited from local authorities through the various Metropolitan Planning Organizations (MPO's) and the Special Highway Committee of the Colorado Counties, Inc. and the Colorado Municipal League. These candidate proposals for safety improvement projects are submitted for locations identified using the locals' own high hazard locations identification system. As with the Region applications, all submittals will be required to meet the minimum criteria. Copies of project applications received in the Safety and Traffic Engineering Office from locals are submitted to the Region offices for comments, evaluation and approval. The Region offices are specifically requested to verify project cost estimates, and when necessary, are also requested to make project cost adjustments with the submitting local authorities' concurrence. It is our hope that increased outreach and education by CDOT, in consort with local agency efforts, that more applications for HSIP funding will be received in future solicitations.

Approximately one half of the HSIP funding is allocated toward off-system locations (including tribal lands) because approximately half of all statewide crashes occur off system. The allocation is based on statewide crash distribution. In recent years, there have not been enough off-system safety improvement projects to use the full allocated amount. In such cases, the state will apply those unused funds for state highway safety improvement projects. CDOT will look to offer more support in helping local agencies submit enough projects to account for their full allocation in the future with the help of a new Safety Circuit Rider (SCR) program.

The purpose of the SCR is to provide safety related education, training, outreach and support to local agency safety stakeholders under the direction of the Colorado Local Technical Assistance Program (CLTAP) and CDOT. The need for a SCR program is clearly manifested by the fact that most local agencies in the Colorado, particularly the ones in smaller communities, lack resources and technical expertise to properly and routinely identify, diagnose, treat safety deficiencies and/or implement adequate countermeasures- all the resources and tools typically afforded by CDOT and some of the larger cities and counties in the State. The SCR program will greatly enhance technical capabilities at the local level and will help bridge existing safety related expertise gab resulting in overall reduction of crashes on local roads, which typically experience about 40% of the statewide annual fatalities. CDOT is also working to promote and develop more county Local Road Safety Plans (LRSP) with the assistance from the SCR to better serve our local agency partners in improving roadways safety for the traveling public.

Identify which internal partners (e.g., State departments of transportation (DOTs) Bureaus, Divisions) are involved with HSIP planning.

- Design
- Districts/Regions
- Governors Highway Safety Office
- Maintenance
- Operations
- Planning
- Traffic Engineering/Safety
- Other-Office of Financial Management & Budget
- Other-Division of Transportation Development (DTD)

Describe coordination with internal partners.

The CDOT HQ Traffic and Safety Engineering (TSE) branch actively engages with regional staff to coordinate

efforts to research and analyze the need for safety improvements on segment and intersections statewide. The group provides subject matter expertise in safety and crash analyses to all roadway projects delivered by the Regions.

The TSE staff periodically produces a statewide composite listing of potential locations for crash reduction is compiled for all highway segments and intersections performing at a sub-standard level of service of safety (LOSS) as well as identifying crash patterns that are over-represented at those locations. This listing is provided to each of the five CDOT Regions where their respective traffic units, roadway design staff and transportation planners can coordinate and select appropriate safety improvement projects with the goal of reducing roadway fatalities and serious injuries. The Regions use the listing along with other information such as their own operational reviews, input from citizens, staff and city/county personnel as well as other ongoing or scheduled construction activities in order to determine the most feasible and beneficial candidate safety projects. The Region may also choose to nominate other safety project locations besides those mentioned on the listing. Applications for new highway safety improvement projects are sent from the Regions to the TSE branch for evaluation to determine safety program (both HSIP and FASTER Safety) eligibility and level of funding.

The TSE branch coordinates efforts with the Office of Transportation Safety (OTS) to ensure that safety programs align with each other's objectives. The OTS handles most behavioral safety projects and contributes greatly to the Strategic Highway Safety Plan (SHSP) implementation and update process. The TSE branch also coordinates with the Division of Transportation Development (DTD) and the Maintenance Division for information exchange and for better organization to achieve shared safety goals. The DTD provides roadway data for all CDOT projects, including roadway characteristics and traffic counts. The Maintenance department attempts to coordinate replacement and maintenance work with safety standards and improvements to roadway safety. The TSE branch works with the Office of Financial Management & Budget (OFMB) to determine the amount of HSIP funding available for the current fiscal year as well as how much is anticipated to be available in future fiscal years for HSIP project planning and scheduling. The TSE branch also works with OFMB to obtain status updates on HSIP obligation and expenditure amounts for ongoing projects.

Identify which external partners are involved with HSIP planning.

- FHWA
- Governors Highway Safety Office
- Law Enforcement Agency
- Local Government Agency
- Local Technical Assistance Program
- Regional Planning Organizations (e.g. MPOs, RPOs, COGs)

Describe coordination with external partners.

In an effort to maintain consistency in data, analysis, and understanding of safety needs statewide, and subsequent implementation of such safety improvement projects, the CDOT HQ Traffic and Safety Engineering staff communicates and works directly with external entities and governing bodies such as FHWA, state and local law enforcement officials, other state agencies,
MPOs, municipalities, counties, and other interested parties. Additionally, at the regional level, the Regions coordinate more directly with local government officials, the citizenry, other such
stakeholders having traffic and safety concerns that are specific to their Region, and media relations. These individual areas of focus enable the Regions to be more directly in touch with local needs for which HSIP funding may be eligible. This then translates to CDOT's overall ability to integrate HSIP funded solutions utilized within any specific Region into the statewide efforts to
reduce crash severity, crashes overall, and progress toward the goal of zero deaths.

The Colorado Strategic Highway Safety Plan (SHSP) is a great tool to unify safety efforts in the state, as it is a

comprehensive plan for transportation safety. Local agencies are invited and encouraged to participate in the SHSP update and subsequent implementation. They often participate in the emphasis area teams, for safety program or project design and implementation.

The CDOT HQ Traffic and Safety Engineering branch is involved with the Statewide Traffic Records Advisory Committee (STRAC). The STRAC consists of many state and local agencies involved in traffic safety, including law enforcement. The STRAC attempts to unify efforts across the state to provide accurate, complete and timely traffic records data, which is instrumental to program and project selection and coordination.

Describe other aspects of HSIP Administration on which the State would like to elaborate.

CDOT was notified that our 5 year average fatality rate has increased on rural roadways for the last reporting period, and thus would need to obligate approximately $2.8 million for High Risk Rural Roads (HRRR) in Federal FY 2019 to address this concern.

In addition to HSIP, CDOT utilizes other sources of safety funding. The Funding Advancement for Surface Transportation and Economic Recovery Act of 2009 (FASTER) established the Road Safety Fund to support the construction, reconstruction, or maintenance of projects that the state Transportation Commission, a county, or municipality determine are needed to enhance the safety of a state highway, county road, or city street. The fund dollars are allocated based on a statutory formula: 60% to CDOT, 22% to counties, and 18% to municipalities. For CDOT, FASTER provides approximately $80 million per year in safety funds.

Program Methodology

Does the State have an HSIP manual or similar that clearly describes HSIP planning, implementation and evaluation processes?

Yes
FileName:
HSIP_2016.pdf

Colorado is currently working on revising our current HSIP manual to address recent input regarding recommended improvements by FHWA. In addition to addressing several improvement recommendations, CDOT will be specifically adding a systemic approach methodology as well as including an evaluation process to this manual.

Select the programs that are administered under the HSIP.

- HRRR
- HSIP (no subprograms)
- Other-General

Many of the projects selected for HSIP funding fit one of these program types. However, there is no over-riding program, or a different unit of CDOT or agency manages the program.

Program: HRRR

Date of Program Methodology:4/4/2017

What is the justification for this program?

- FHWA focused approach to safety

What is the funding approach for this program?

Funding set-aside

What data types were used in the program methodology?

Crashes	Exposure	Roadway
All crashes	Traffic Volume	Functional classification

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- Excess expected crash frequency using SPFs
- Excess expected crash frequency with the EB adjustment
- Excess proportions of specific crash types
- Expected crash frequency with EB adjustment
- Level of service of safety (LOSS)
- Probability of specific crash types

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Competitive application process

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).

Rank of Priority Consideration

Ranking based on B/C:2
Available funding:1

2019 Colorado Highway Safety Improvement Program
Program: HSIP (no subprograms)

Date of Program Methodology:9/1/2016

What is the justification for this program?

What is the funding approach for this program?

Other-Regional Distribution By Crash Totals

What data types were used in the program methodology?

Crashes	Exposure	Roadway
All crashes	Traffic Volume	Functional classification

What project identification methodology was used for this program?

- Crash frequency
- Excess expected crash frequency using SPFs
- Excess expected crash frequency with the EB adjustment
- Excess proportions of specific crash types
- Expected crash frequency with EB adjustment
- Level of service of safety (LOSS)
- Probability of specific crash types

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Competitive application process

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Rank of Priority Consideration

Ranking based on net benefit:2
Cost Effectiveness:1

Projects must meet a minimum B/C and LOSS rating.

Program: Other-General

Date of Program Methodology:1/1/2000

What is the justification for this program?

- FHWA focused approach to safety

What is the funding approach for this program?

Other-Regional Distribution By Crash Totals

What data types were used in the program methodology?

Crashes	Exposure	Roadway
All crashes	Traffic Volume	Functional classification

What project identification methodology was used for this program?

- Crash frequency
- Excess expected crash frequency using SPFs
- Excess expected crash frequency with the EB adjustment
- Excess proportions of specific crash types
- Expected crash frequency with EB adjustment
- Level of service of safety (LOSS)
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Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

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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).

Rank of Priority Consideration

Ranking based on B/C:2
Available funding:1

Projects must meet a minimum B/C and LOSS rating.

What percentage of HSIP funds address systemic improvements?

10

HSIP funds are used to address which of the following systemic improvements?

- Add/Upgrade/Modify/Remove Traffic Signal
- Cable Median Barriers
- Horizontal curve signs
- Install/Improve Lighting
- Install/Improve Pavement Marking and/or Delineation
- Install/Improve Signing
- Pavement/Shoulder Widening
- Rumble Strips
- Safety Edge
- Upgrade Guard Rails
- Wrong way driving treatments

Colorado is planning to integrate more systemic projects as part of the HSIP in upcoming years.

What process is used to identify potential countermeasures?

- Crash data analysis
- Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)
- Engineering Study
- Road Safety Assessment
- SHSP/Local road safety plan
- Stakeholder input
- Other-Requests by local agencies for investigations
- Other-Independent Research & Peer State Communication

SHSP is being renewed now, adhering to the FHWA checklist.

Does the State HSIP consider connected vehicles and ITS technologies?

Yes

Describe how the State HSIP considers connected vehicles and ITS technologies.

HSIP funding can be provided to connected vehicle and ITS technology projects which incorporate components that are known to mitigate crashes or crash types. Many of these advanced technology applications can now be found on the CMF clearinghouse or through other viable research papers.

Does the State use the Highway Safety Manual to support HSIP efforts?

Yes

Please describe how the State uses the HSM to support HSIP efforts.

Quantitative analysis methodology as described within the 1st Edition (2010) of the Highway Safety Manual (HSM) is incorporated into the software, manual techniques, and systemic analysis processes that are employed by the CDOT Traffic & Safety Engineering staff who are charged with responsibly determining HSIP funding eligibility for safety related projects statewide. Subject matter from the HSM that is incorporated into CDOT's HSIP efforts includes but is not limited to the following: Fundamentals, Data Requirements, CMF/CRF Selection, Safety Performance Functions(s) (SPF's) Development, Diagnostics, Countermeasure Selection, Economic Appraisal (Benefit/Cost analysis), Predictive Methodology, Network Screening, etc..

Describe other aspects of the HSIP methodology on which the State would like to elaborate.

In addition to the HSM methodology that Colorado has incorporated into the HSIP efforts, CDOT and its consultants have developed, and continue to develop and refine Safety Performance Functions (SPF's) baseline normative crash expectancy details that are specific to Colorado roadways, highways, freeways, interchanges, and intersections. CDOT believes this method allows the agency to be better prepared to address the specific safety concerns on Colorado roadways with respect to Colorado ADT, specific driving conditions, and driving habits.

Project Implementation

Funds Programmed

Reporting period for HSIP funding.

State Fiscal Year

State Fiscal Year 2019 (July 1, 2018 - June 30, 2019)

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

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	$20,287,248	$14,678,654	72.35%
HRRR Special Rule (23 U.S.C. 148(g)(1))	$2,129,041	$1,614,522	75.83%
Penalty Funds (23 U.S.C. 154)	$0	$0	0%
Penalty Funds (23 U.S.C. 164)	$11,361,130	$11,361,130	100%
RHCP (for HSIP purposes) (23 U.S.C. 130(e)(2))	$0	$0	0%
Other Federal-aid Funds (i.e. STBG, NHPP)	$0	$0	0%
State and Local Funds	$0	$0	0%
Totals	$33,777,419	$27,654,306	81.87%

Obligation totals may include amounts programmed from previous fiscal years.

How much funding is programmed to local (non-state owned and operated) or tribal safety projects?

$2,259,314

How much funding is obligated to local or tribal safety projects?

$2,787,197

Obligation totals may include amounts programmed from previous fiscal years which is why obligated amounts exceed programmed amounts.

How much funding is programmed to non-infrastructure safety projects?

$1,289,011

How much funding is obligated to non-infrastructure safety projects?

$791,750

Obligation totals may include amounts programmed from previous fiscal years.

How much funding was transferred in to the HSIP from other core program areas during the reporting period under 23 U.S.C. 126?

$0

How much funding was transferred out of the HSIP to other core program areas during the reporting period under 23 U.S.C. 126?

$0

Discuss impediments to obligating HSIP funds and plans to overcome this challenge in the future.

CDOT's Office of Financial Management and Budget (OFMB) does not typically obligate HSIP funding until the project has invoices submitted while under construction. The purpose of this is limit the possibility of having inactive projects. However, this does impact Colorado HSIP obligation rates as this tends to result in delayed obligation of funds for HSIP projects. There are longer than expected start up times for safety improvement projects, especially those run by local agencies. Special attention will now be given to construction scheduling and priority for fund programming will be given to projects that can deliver on a timely basis.

Only 7% of HSIP funding was programmed towards local (non-state highway) safety projects in FY 2019. Based on the survey responses and interviews from a 2018 HSIP assessment, some of the reasons for this include lack of local agency knowledge of the opportunity, lack of readily available data, non-existent technical support, cumbersome federal aid program laws and regulations, lack of time and matching funds.

Describe any other aspects of the State's progress in implementing HSIP projects on which the State would like to elaborate.

CDOT's Office of Financial Management & Budget (OFMB) is working with the HSIP program managers to find ways to manage Section 164 penalty funds so that those funds can be obligated immediately. It is anticipated that Section 164 penalty funding will continue into future fiscal years in Colorado.

General Listing of Projects

List the projects obligated using HSIP funds for the reporting period.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
I-70 GW Canyon Variable Speed Signing	Advanced technology and ITS	Dynamic message signs	17	Miles	$5998787	$8009618	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial-Interstate	17,000		State Highway Agency	Spot	Roadway Departure	
SH96A ABRIENDO - ORMAN Signals Improv	Roadway signs and traffic control	Roadway signs and traffic control - other	1	Intersections	$916212	$2641796	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	19,267		State Highway Agency	Spot	Intersections	
SH 21 Research Interchange	Interchange design	Convert at-grade intersection to interchange	1	Intersections	$500000	$3000000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other Freeways & Expressways	43,800		State Highway Agency	Spot	Intersections	
US 24 AT 31ST STREET INTERSECTION	Intersection traffic control	Modify traffic signal - modernization/replacement	2	Intersections	$1839999	$2502398.96	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other Freeways & Expressways	31,500		State Highway Agency	Spot	Intersections	
SH-67 Sedalia Resurfacing	Roadway	Roadway widening - add lane(s) along segment	1	Intersections	$435109	$1576872	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Principal Arterial-Other Freeways & Expressways	36,855		State Highway Agency	Spot	Intersections	
I-70 Avon to Vail	Roadway	Roadway widening - add lane(s) along segment	0.5	Miles	$474287	$13171555	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	41,000		State Highway Agency	Spot	Roadway Departure	
FY19 PIKES PEAK AREA SIGNAL REPLACEMENT	Roadway signs and traffic control	Roadway signs and traffic control - other	3	Intersections	$400000	$3010150	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other Freeways & Expressways	40,000		State Highway Agency	Spot	Intersections	
HWY 94 & PEYTON HWY	Intersection geometry	Auxiliary lanes - add acceleration lane	0.2	Miles	$173846	$175000	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	2,800		State Highway Agency	Spot	Intersections	
I-70 SILVERPLUMEGuardrail and Barrier	Intersection geometry	Auxiliary lanes - add left-turn lane	0.2	Miles	$710000	$3839329	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	36,000		State Highway Agency	Systemic	Roadway Departure	
I-25 NB Off-Ramp Intersection with SH52A	Intersection geometry	Auxiliary lanes - add acceleration lane	1	Intersections	$481484	$484984	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	111,000		State Highway Agency	Spot	Intersections	
SH1 & CR54 Intersection Improvements	Intersection traffic control	Intersection traffic control - other	1	Intersections	$42300	$47000	HSIP (23 U.S.C. 148)	Rural	Major Collector	7,300		State Highway Agency	Spot	Intersections	
WCR 2 / I-76 Frontage - Signalization	Intersection traffic control	Intersection traffic control - other	1	Intersections	$416880	$463200	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	19,760		State Highway Agency	Spot	Intersections	

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
R2 WRONG WAY PREVENTION	Intersection traffic control	Intersection signing - add enhanced regulatory sign (double-up and/or oversize)	2	Intersections	$1624376	$2569663	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	76,000		State Highway Agency	Spot	Intersections	
Mesa County Guardrail/Intersect Improve	Roadside	Barrier- metal	0.58	Miles	$224834	$249816	HRRR Special Rule (23 U.S.C. 148(g)(1))	Multiple/Varies	Multiple/Varies	0		County Highway Agency	Systemic	Lane Departure	
SH40 & SH83 INTERSECTION SAFETY IMP	Intersection geometry	Auxiliary lanes - modify left-turn lane offset	1	Intersections	$1754081	$1772136	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	48,000		State Highway Agency	Spot	Intersections	
EL PASO COUNTY ROAD SAFETY AUDIT	Non-infrastructure	Road safety audits	1	Numbers	$270000	$300000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		County Highway Agency	Systemic	Data	
Various Intersection Imps in the COA	Intersection traffic control	Modify traffic signal timing - left-turn phasing (permissive to protected/permissive)	1	Intersections	$192060	$213400	HSIP (23 U.S.C. 148)	Urban	Local Road or Street	0		City or Municipal Highway Agency	Spot	Intersections	
ARAPAHOE COUNTY LOCAL ROAD SAFETY PLAN (	Non-infrastructure	Transportation safety planning	1	Plan	$117000	$130000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		County Highway Agency	Systemic	Data	
136TH AVE:TEJON ST TO LEGACY HS -	Intersection geometry	Auxiliary lanes - add right-turn lane	0.4	Miles	$139397	$154885	HSIP (23 U.S.C. 148)	Urban	Local Road or Street	15,000		City or Municipal Highway Agency	Spot	Intersections	
US 40 Fraser Pedestrian Trail	Pedestrians and bicyclists	Medians and pedestrian refuge areas	6	Raised Medians	$607439	$1112432	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	11,000		State Highway Agency	Spot	Intersections	
US40 & Crescent Drive Sidewalk Imp-Craig	Pedestrians and bicyclists	Modify existing crosswalk	1.45	Miles	$837000	$930000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	4,100		State Highway Agency	Spot	Pedestrians	
CCD FY18 HSIP PKG 1 -	Intersection traffic control	Intersection traffic control - other	2	Intersections	$103500	$115000	HSIP (23 U.S.C. 148)	Urban	Local Road or Street	15,000		City or Municipal Highway Agency	Spot	Intersections	
CCD FY18 HSIP PKG 2 -	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	5	Intersections	$493998	$494000	HSIP (23 U.S.C. 148)	Urban	Local Road or Street	30,000		City or Municipal Highway Agency	Spot	Intersections	
CCD FY18 HSIP PKG 3 -	Intersection traffic control	Modify traffic signal - modify signal mounting (spanwire to mast arm)	2	Intersections	$540000	$600000	HSIP (23 U.S.C. 148)	Urban	Local Road or Street	2,500		City or Municipal Highway Agency	Spot	Intersections	

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
I-70 Exit 26 DDI Modifications	Interchange design	Interchange design - other	1	Intersections	$1177999	$1194289	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	18,000		State Highway Agency	Spot	Intersections	
CAPISTRANO AVE. TURN LANES	Intersection geometry	Auxiliary lanes - add right-turn lane	1	Intersections	$342000	$380000	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Collector	2,500		County Highway Agency	Spot	Intersections	
PLATTEVILLE BLVD. TURN LANES	Intersection geometry	Auxiliary lanes - add right-turn lane (free-flow)	1	Intersections	$303480	$337200	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Collector	3,200		Town or Township Highway Agency	Spot	Intersections	
SPAULDING ROUNDABOUT	Intersection traffic control	Modify control - two-way stop to roundabout	1	Intersections	$83826	$93139	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Collector	3,650		Town or Township Highway Agency	Spot	Intersections	
RAMP METERING	Interchange design	Ramp metering	19	Ramps	$3213901	$3959962	HSIP (23 U.S.C. 148)	Multiple/Varies	Principal Arterial-Interstate	0		State Highway Agency	Systemic	Intersections	
SH2 & SH95 CCD SIGNALS & MEDIANS FY20	Access management	Raised island - install new	8	Intersections	$430500	$789000	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	50,000		State Highway Agency	Spot	Intersections	
SOUTH FEDERAL BLVD SAFETY IMPROVEMENTS	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	5	Intersections	$2966599	$2974000	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	39,000		State Highway Agency	Spot	Intersections	
SIGNAL CONST PACKAGE A FOR 21793	Intersection traffic control	Modify traffic signal - modify signal mounting (spanwire to mast arm)	3	Intersections	$2062503	$3362503	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	37,000		State Highway Agency	Spot	Intersections	
AURORA SIGNAL IMPROVEMENT FY 18	Intersection traffic control	Modify traffic signal - modify signal mounting (spanwire to mast arm)	2	Intersections	$2000000	$3245513	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Interstate	41,000		State Highway Agency	Spot	Intersections	
SH225 AND 17TH PLACE IMPROVEMENTS	Intersection traffic control	Intersection traffic control - other	1	Intersections	$139538	$157385	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	0		State Highway Agency	Spot	Intersections	
US 287 & SH 52 Intersection Impv.	Intersection geometry	Auxiliary lanes - add left-turn lane	3	Lanes	$778254	$815000	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial-Other	28,000		State Highway Agency	Spot	Intersections	
Grand Junction Horizon Drive Crosswalks	Pedestrians and bicyclists	Medians and pedestrian refuge areas	1	Intersections	$225000	$250000	HSIP (23 U.S.C. 148)	Urban	Local Road or Street	0		City or Municipal Highway Agency	Spot	Pedestrians	

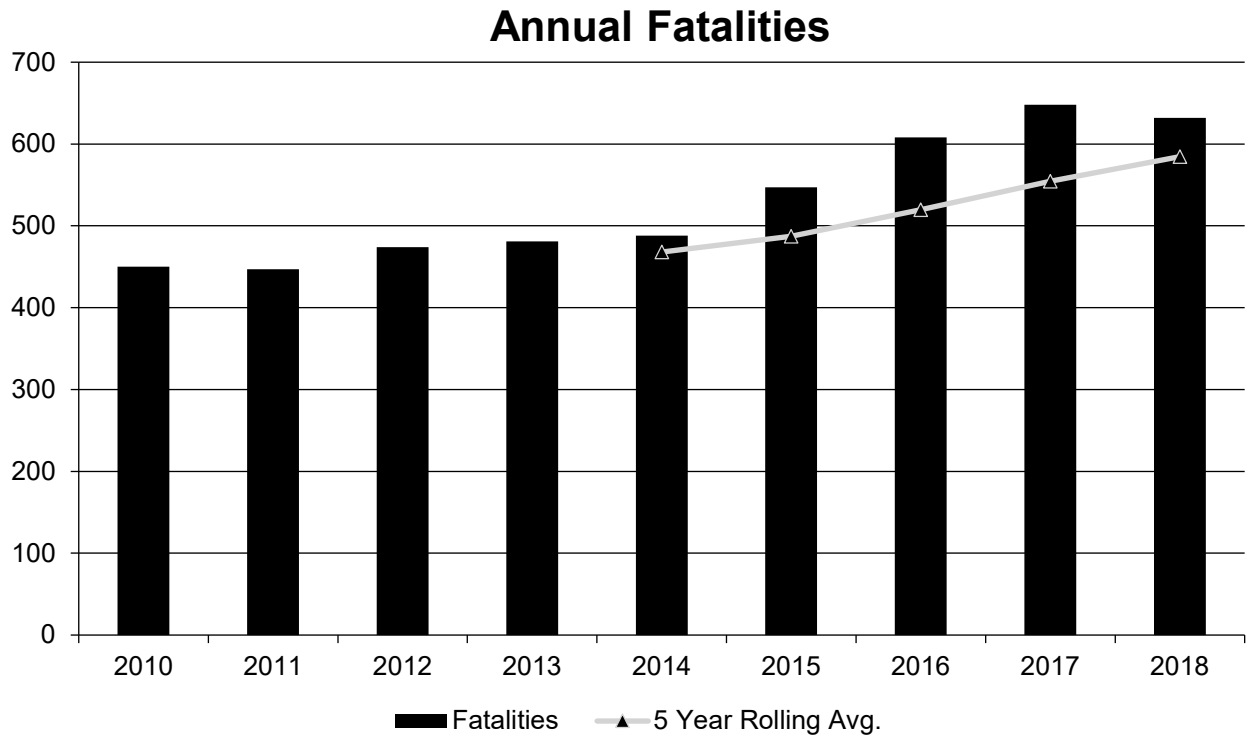
PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
Intersection Prioritization Study PH II	Non-infrastructure	Transportation safety planning	1	Plan / project list	$220721	$220722	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Multiple/Varies	0		Local and County agencies	Study for project prioritization	Data	
I-25 SEG3A RE-PKG 120TH TO E470	Roadway	Roadway widening - add lane(s) along segment	2.03	Miles	$5180996	$28868063	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	132,000		State Highway Agency	Spot	Crash Mitigation	
E ARAPAHOE RD @ YORK ST SAFETY IMP - Cen	Intersection geometry	Splitter island - remove from one or more approaches	1	Intersections	$99000	$110000	HSIP (23 U.S.C. 148)	Urban	Local Road or Street	33,000		Other Local Agency	Spot	Intersections	
I-25 RAMP METER INSTALLATION	Interchange design	Ramp metering		Ramps	$4861464	$4861465	HSIP (23 U.S.C. 148)	Multiple/Varies	Principal Arterial-Interstate	0		State Highway Agency	Systemic	Intersections	
CDOT SAFETY SUMMIT SUPPORT	Non-infrastructure	Transportation safety planning	1	Plan / Study	$16410	$16410	Penalty Funds (23 U.S.C. 164)	Multiple/Varies	Multiple/Varies	0		State Highway Agency	Study for project prioritization	Data	
SH75:BOWLES & MINERAL INTERSECTION IMP	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	1	Intersections	$158215	$175795	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	11,000		State Highway Agency	Spot	Pedestrians	
AURORA SIGNALS 2019	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	2	Intersections	$35000	$75000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	45,000		State Highway Agency	Spot	Intersections	
FEDERAL HSIP SIGNAL IMPROVEMENTS	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	6	Intersections	$274137.15	$294000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	36,000		State Highway Agency	Spot	Pedestrians	
R1 WWD TRAFFIC CONTROL ENHANCEMENT	Advanced technology and ITS	Advanced technology and ITS - other	10	Highway Segments	$343496	$381662	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		State Highway Agency	Systemic	Intersections	
2019 COLORADO SHSP UPDATE	Non-infrastructure	Transportation safety planning	1	Plan / Study	$450000	$500000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		All public roads	Systemic	Data	
SAFETY CIRCUIT RIDER 2019	Non-infrastructure	Transportation safety planning	1	Year-Help develop many plans, reports, tranings, etc.	$290700	$323000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		All public roads	Systemic	Data	

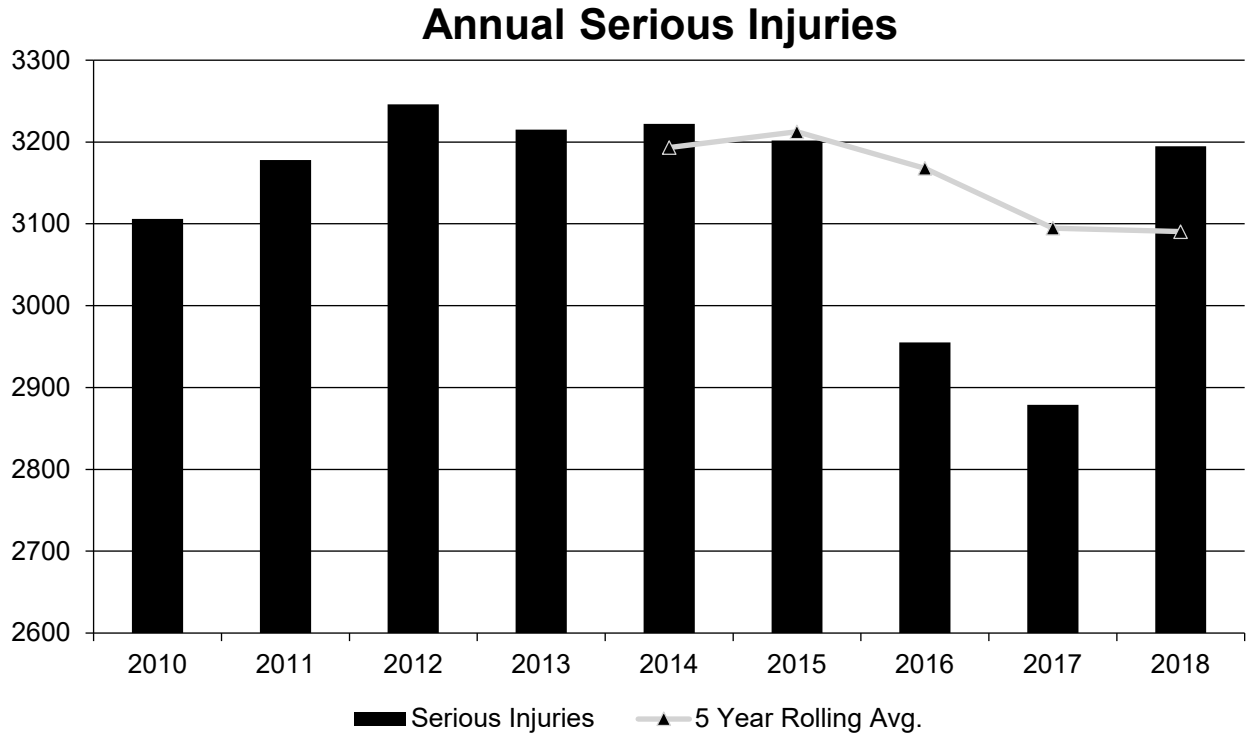
Safety Performance

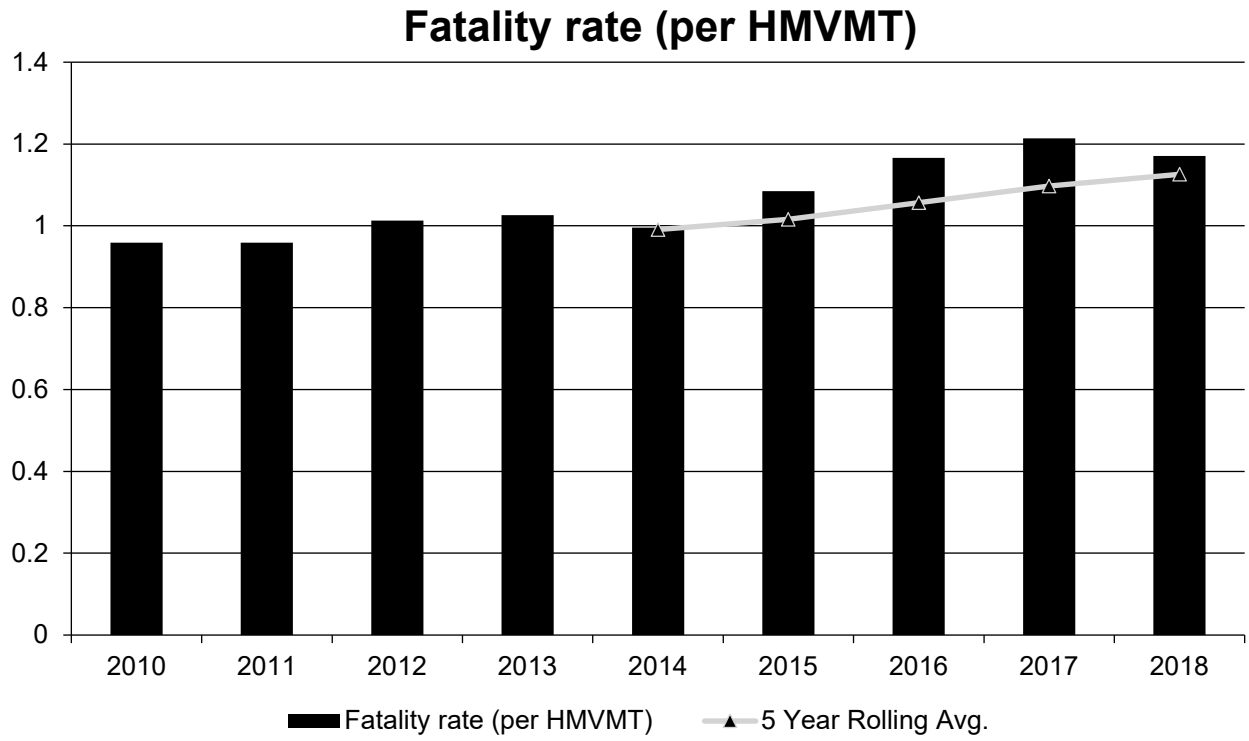
General Highway Safety Trends

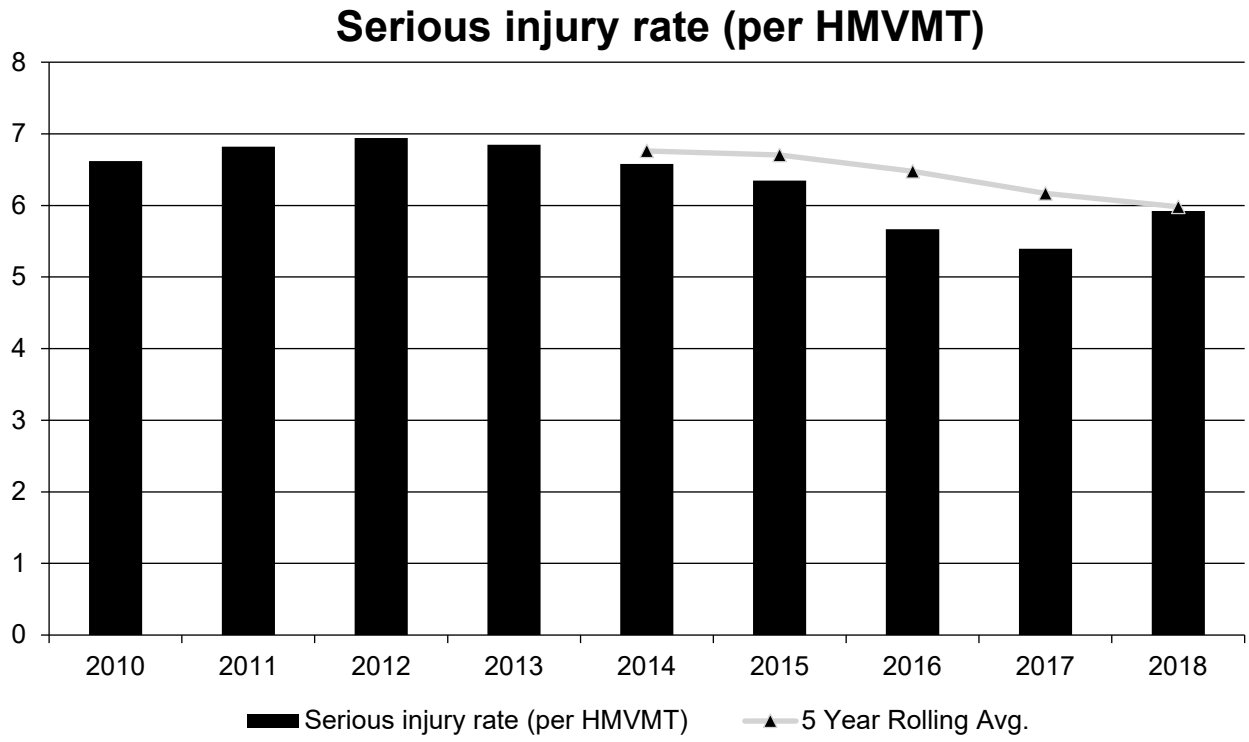
Present data showing the general highway safety trends in the State for the past five years.

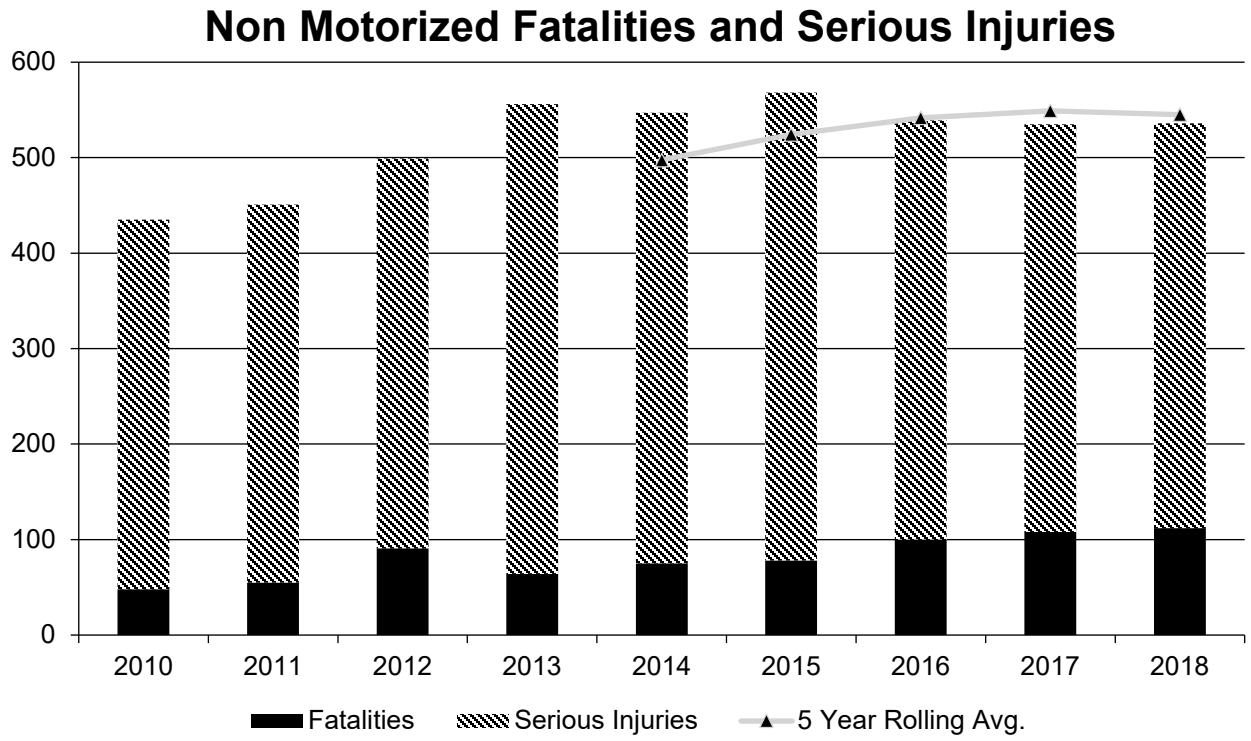
PERFORMANCE MEASURES	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fatalities	450	447	474	481	488	547	608	648	632
Serious Injuries	3,106	3,178	3,246	3,215	3,222	3,202	2,955	2,879	3,195
Fatality rate (per HMVMT)	0.959	0.959	1.013	1.026	0.996	1.085	1.166	1.214	1.171
Serious injury rate (per HMVMT)	6.617	6.819	6.941	6.845	6.577	6.348	5.666	5.393	5.922
Number non-motorized fatalities	48	55	91	64	75	78	100	108	112
Number of non-motorized serious injuries	387	396	408	492	472	490	439	427	424


Annual Fatalities
700
600
500
400
300
200
100
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
Fatalities
5 Year Rolling Avg.


Annual Serious Injuries
3300
3200
3100
3000
2900
2800
2700
2600
2010
2011
2012
2013
2014
2015
2016
2017
2018
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
Fatality rate (per HMVMT)
5 Year Rolling Avg.


Serious injury rate (per HMVMT)
8
7
6
5
4
3
2
1
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
Serious injury rate (per HMVMT)
5 Year Rolling Avg.



Describe fatality data source.

State Motor Vehicle Crash Database

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

Year 2018

Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Principal Arterial (RPA) - Interstate	47.4			
Rural Principal Arterial (RPA) - Other Freeways and Expressways	1			
Rural Principal Arterial (RPA) - Other	82.6			
Rural Minor Arterial	45.6			
Rural Minor Collector	22			
Rural Major Collector	36.6			
Rural Local Road or Street	22.8			

Functional Classification	**Number of Fatalities (5-yr avg)**	**Number of Serious Injuries (5-yr avg)**	**Fatality Rate (per HMVMT) (5-yr avg)**	**Serious Injury Rate (per HMVMT) (5-yr avg)**
Urban Principal Arterial (UPA) - Interstate	47.6			
Urban Principal Arterial (UPA) - Other Freeways and Expressways	20.6			
Urban Principal Arterial (UPA) - Other	139.8			
Urban Minor Arterial	66			
Urban Minor Collector				
Urban Major Collector	21			
Urban Local Road or Street	31.2			

Year 2015

Roadways	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
State Highway Agency	298.8			
County Highway Agency	85.6			
Town or Township Highway Agency	2.2			
City or Municipal Highway Agency	97			
State Park, Forest, or Reservation Agency	0			
Local Park, Forest or Reservation Agency	0			
Other State Agency	0			
Other Local Agency	3.4			
Private (Other than Railroad)	0			
Railroad	0			
State Toll Authority	0			
Local Toll Authority	0			
Other Public Instrumentality (e.g. Airport, School, University)	0			
Indian Tribe Nation	0			

Provide additional discussion related to general highway safety trends.

Following the trend seen across the country, fatalities have seen a decrease in Colorado in 2018. Even with increased VMT, fatality rates have also decreased. When comparing 2018 to the previous year, the data has shown that there are four specific areas where the fatalities increased from 2017: Urban, Older Driver (age 65 or older), Bicyclist, and Alcohol Impaired. The number of motorcycle fatalities in 2018 were the same as the previous year. Serious injuries increased in 2018, although the five year average did slightly decrease.

Safety Performance Targets

Safety Performance Targets

Calendar Year 2020 Targets *

Number of Fatalities:618.0

Describe the basis for established target, including how it supports SHSP goals.

CDOT analyzed fatal crash data going back to 2002, developed multiple models, created best fit curves, and determined targets based on examination of the various predicted values. Contributing factors were considered, including the following: population growth, increases in VMT, economic growth, potential funding changes, and legislative changes. All of the models indicated flattening trend in fatal crash numbers, resulting in short term targets with a decrease in fatal crashes. The SHSP is an aspirational goal of moving Colorado towards zero deaths and is the long term vision for the state. The targets recognize the uptick in fatalities and the need to focus on programs to reduce crashes in order to pursue the aspirational goal. The target of 618 is the predicted five year rolling average.

Number of Serious Injuries:3271.0

Describe the basis for established target, including how it supports SHSP goals.

CDOT analyzed serious injury crash data going back to 2002, developed multiple models, created best fit curves, and determined targets based on examination of the various predicted values. Contributing factors were considered, including the following: population growth, increases in VMT, economic growth, potential funding changes, and legislative changes. All of the models indicated future increases in serious injury crash numbers, resulting in short term targets with an increase in serious injury crashes. The SHSP is an aspirational goal of moving Colorado towards zero deaths and is the long term vision for the state. The targets recognize the uptick in serious injury crashes and the need to focus on programs to reduce crashes in pursuit of the aspirational goal. The target of 3271 is the predicted five year average.

Fatality Rate:1.140

Describe the basis for established target, including how it supports SHSP goals.

CDOT analyzed fatal crash data going back to 2002, developed multiple models, created best fit curves, and determined targets based on examination of the various predicted values. The fatality rate is based on the assumption that fatal crashes and VMT are both increasing in the near term. Contributing factors were considered, including the following: population growth, increases in VMT, economic growth, potential funding changes, and legislative changes. All of the models indicated future decreases in fatality rates, resulting in short term targets with a decrease in the fatal rate. The SHSP is an aspirational goal of moving Colorado towards zero deaths and is the long term vision for the state. The targets recognize the uptick in the fatality rate and the need to focus on programs to reduce crashes in order to pursue the aspirational goal. The target of 1.143 is based on the five year moving average.

Serious Injury Rate:6.075

Describe the basis for established target, including how it supports SHSP goals.

CDOT analyzed serious injury crash data going back to 2002, developed multiple models, created best fit curves, and determined targets based on examination of the various predicted values. Contributing factors were considered, including the following: population growth, increases in VMT, economic growth, potential funding changes, and legislative changes. The serious injury rate is based on the assumption that serious injury crashes and VMT are both increasing in the near term. The SHSP is an aspirational goal of moving Colorado towards zero deaths and is the long term vision for the state. The targets recognize the uptick in serious injury crashes and the need to focus on programs to reduce crashes in pursuit of the aspirational goal. The target of 6.075 is the predicted five year average.

Total Number of Non-Motorized Fatalities and Serious Injuries:670.0

Describe the basis for established target, including how it supports SHSP goals.

CDOT analyzed the non-motorized fatalities and serious injury data going back to 2007, developed multiple models, created best fit curves, and determined targets based on examination of the various predicted values. Contributing factors were considered, including the following: population growth, increases in VMT, economic growth, potential funding changes, and legislative changes. All of the models indicated increases in the non-motorized crashes. The SHSP is an aspirational goal of moving Colorado towards zero deaths and is the long term vision for the state. The targets recognize the uptick in the fatality rate and the need to focus on programs to reduce crashes in order to pursue the aspirational goal. The target of 670 is based on the five year moving average.

Describe efforts to coordinate with other stakeholders (e.g. MPOs, SHSO) to establish safety performance targets.

The CDOT offices of transportation safety (which is also the SHSO) and traffic engineering coordinated with the Colorado Department of Health and Environment to evaluate historical crash data and develop various trend models. CDOT and the MPO’s participated in FHWA training on the new rule making and requirements for establishing targets. Various meetings have been held with CDOT management, planners, MPO’s, and CDPHE staff to review CDOT’s proposed targets. CDOT has memorandum of understanding (MOU) with the MPO's which details each agency's roles and responsibilities in this process. Meetings are ongoing with individual MPO’s to present data, review CDOT’s process, and provide assistance in the establishment of individual MPO goals or adoption of the statewide goals. The MPO’s continue to work toward establishing their targets or adopting CDOT’s targets. They are aware of the February 2020 deadline and are working toward this goal. CDOT will continue to coordinate with these organizations to support this effort. The HSIP safety performance targets data source is the same as the HSP.

Does the State want to report additional optional targets?

No

Describe progress toward meeting the State’s 2018 Safety Performance Targets (based on data available at the time of reporting). For each target, include a discussion of any reasons for differences in the actual outcomes and targets.

Number of Fatalities
Calendar Year 2018 Target: 610

The observed 5-year rolling average for 2018 was 584.6, which meets the target. The number of fatalities in 2018 were less than the previous year, which was the first time since 2011 that fatalities have decreased annually in Colorado.

Number of Serious Injuries
Calendar Year 2018 Target: 3,350
The observed 5-year rolling average for 2018 was 3,090.6, which meets the target. Although the number of serious injuries had increased in 2018, they had been decreasing annually for several years prior to 2018.

Fatality Rate
Calendar Year 2018 Target: 1.20
The observed 5-year rolling average for 2018 was 1.126, which meets the target. Although the Fatality Rate had decreased in 2018, it had been increasing annually for several years prior to 2018, which accounts for a higher trend and target.

Serious Injury Rate
Calendar Year 2018 Target: 6.79
The observed 5-year rolling average for 2018 was 5.981, which meets the target. The Serious Injury Rate in 2018 was more than the previous year, but 2018 was the first time since 2012 that Serious Injury Rate has increased annually in Colorado.The 5-year average has also decreased every year since 2014.

Total Number of Non-Motorized Fatalities and Serious Injuries
Calendar Year 2018 Target: 586
The observed 5-year rolling average for 2018 was 545, which meets the target. The number of Non-Motorized Fatalities and Serious Injuries in 2018 was slightly less than the previous year.

Applicability of Special Rules

Does the HRRR special rule apply to the State for this reporting period?
Yes

Colorado must obligate $2,826,084 of HRRR in Federal FY 2019

Provide the number of older driver and pedestrian fatalities and serious injuries 65 years of age and older for the past seven years.

PERFORMANCE MEASURES	2012	2013	2014	2015	2016	2017	2018
Number of Older Driver and Pedestrian Fatalities	57	68	55	74	92	90	91
Number of Older Driver and Pedestrian Serious Injuries	241	250	228	226	235	240	272

2018 serious injury totals are considered preliminary and are subject to change. Annual fatalities and serious injuries from previous years have been revised and updated in this report.

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

- Benefit/Cost Ratio
- Lives saved
- Other-Before and After Studies

Based on the measures of effectiveness selected previously, describe the results of the State's program level evaluations.

Overall, the HSIP in Colorado has had a positive impact on reducing crashes at select locations. CDOT routinely evaluates the observed crash history at locations after an HSIP project has been implemented. The output of each evaluation is a calculated benefit/cost (B/C) ratio of the project which helps CDOT assess its effectiveness of the HSIP.

Prior to this reporting period, 48 completed HSIP projects have been evaluated. Each project have sufficient post-installation crash data available (typically three to five years) to determine a realized B/C ratio which was then compared to those calculated at the time of project HSIP eligibility review. These reports can be found at the following location:

https://www.codot.gov/library/traffic/hsip/studies

CDOT is continuing this process with the evaluation of 29 new HSIP projects. A final report describing the findings of this endeavor is expected to be issued within the next reporting period.

What other indicators of success does the State use to demonstrate effectiveness and success of the Highway Safety Improvement Program?

- # miles improved by HSIP
- HSIP Obligations
- Increased awareness of safety and data-driven process
- Increased focus on local road safety
- More systemic programs
- Organizational change
- Other-Realized Positive B/C Ratio

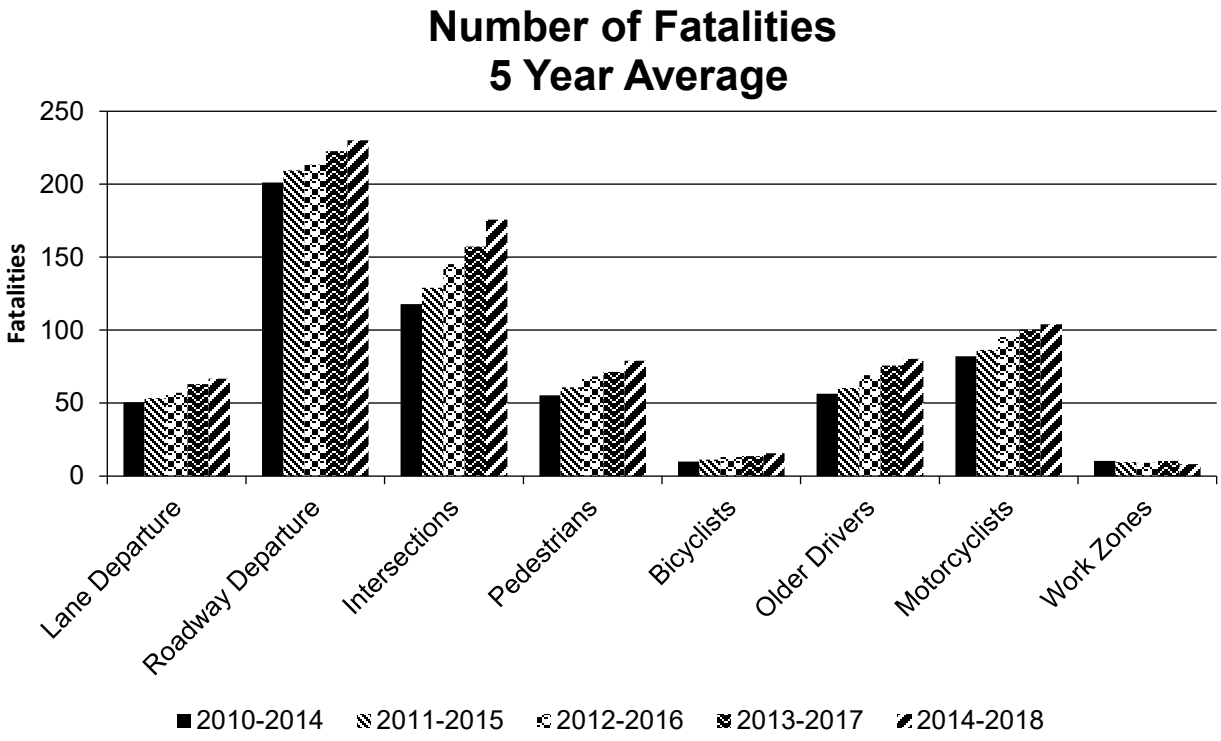
Effectiveness of Groupings or Similar Types of Improvements

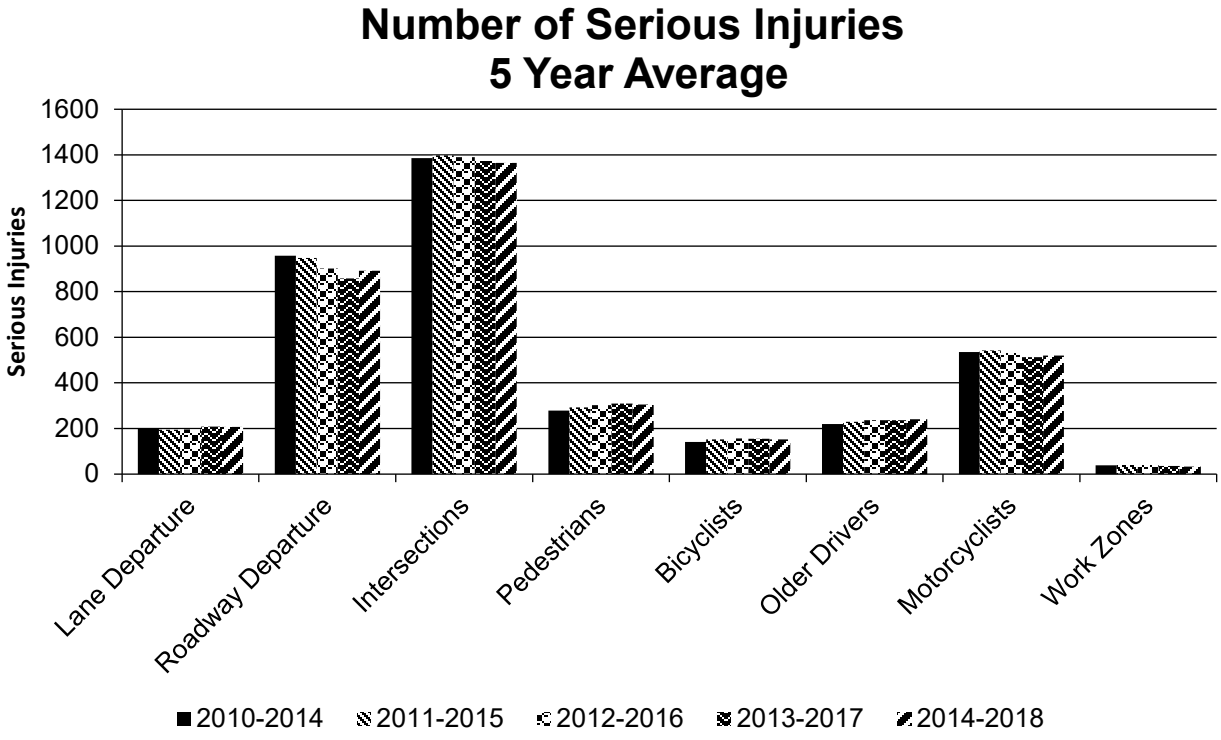
Present and describe trends in SHSP emphasis area performance measures.

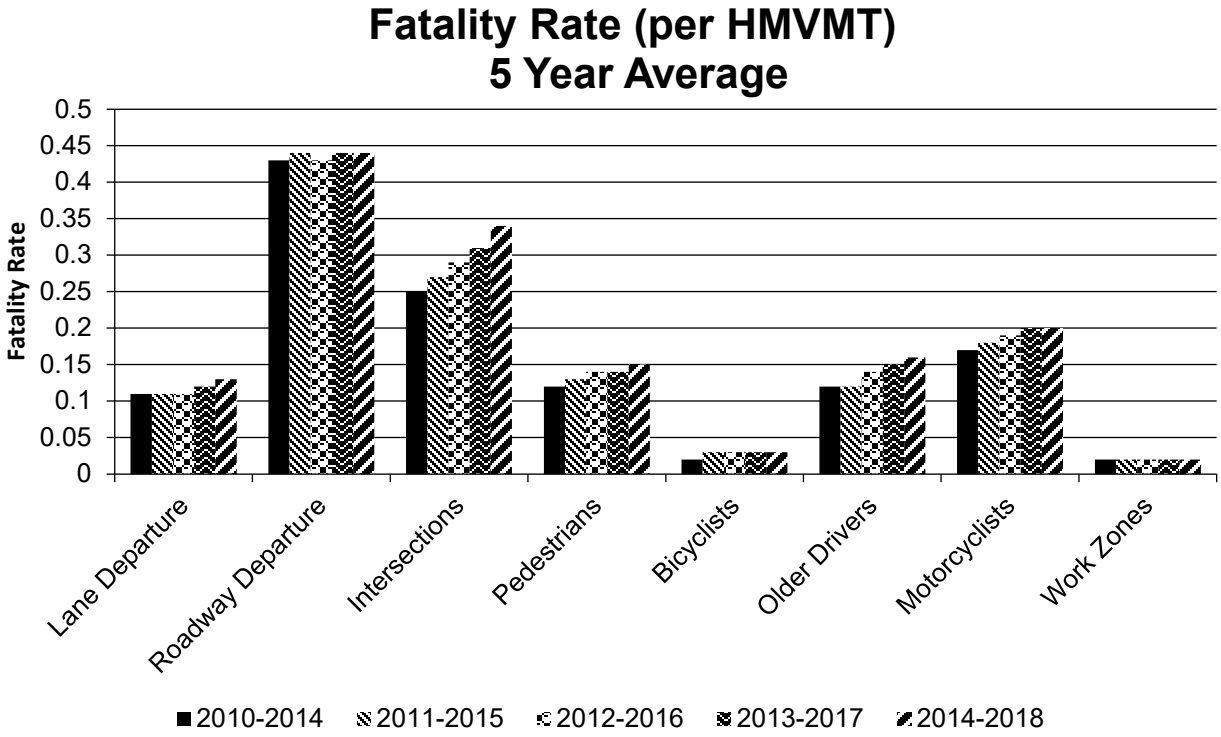
Year 2018

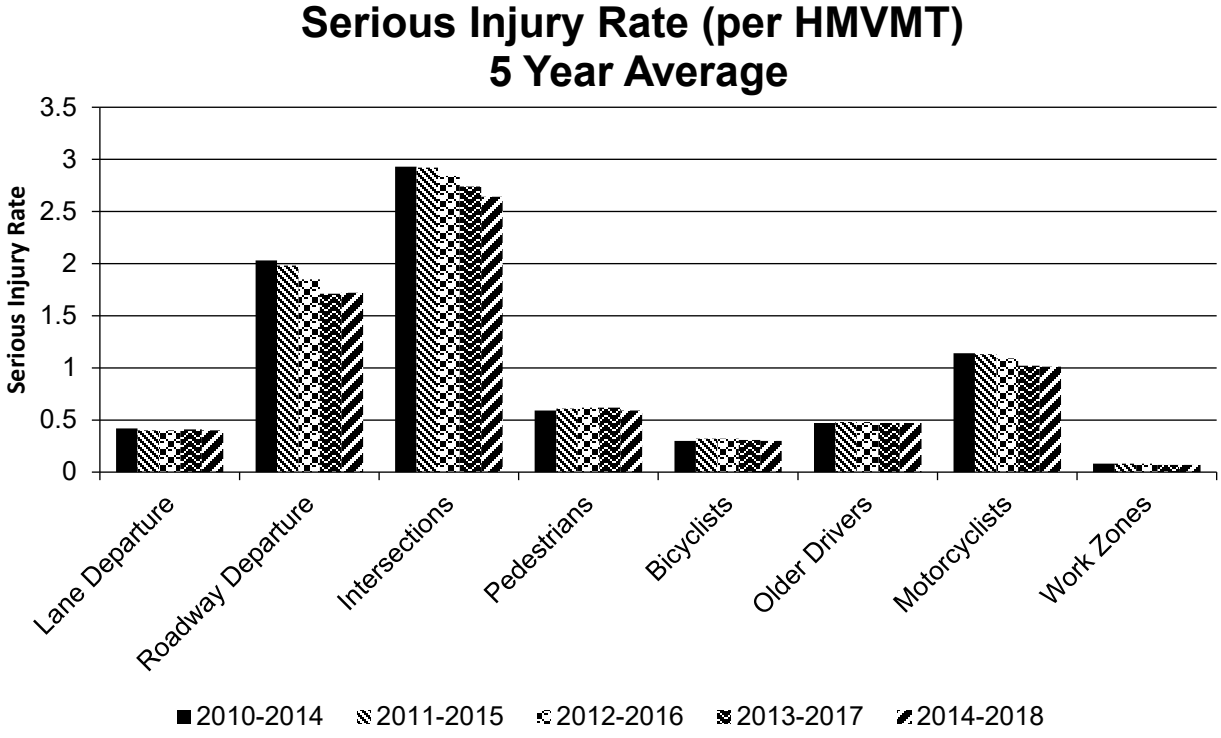
SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Lane Departure		66.8	207.2	0.13	0.4

SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Roadway Departure		230.2	891.8	0.44	1.72
Intersections		175.8	1,364.2	0.34	2.64
Pedestrians		79	305	0.15	0.59
Bicyclists		15.6	152.2	0.03	0.3
Older Drivers		80.4	241	0.16	0.47
Motorcyclists		104	520.2	0.2	1.01
Work Zones		8.2	33.6	0.02	0.07


Number of Fatalities
5 Year Average
Fatalities
250
200
150
100
50
0
Lane Departure
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
2010-2014
2011-2015
2012-2016
2013-2017
2014-2018


Number of Serious Injuries
5 Year Average
Serious Injuries
1600
1400
1200
1000
800
600
400
200
0
Lane Departure
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
2010-2014
2011-2015
2012-2016
2013-2017
2014-2018





2018 serious injury totals are considered preliminary and are subject to change. Annual fatalities and serious injuries from previous years have been revised and updated in this report.

Has the State completed any countermeasure effectiveness evaluations during the reporting period?

No

Over the next reporting period, a new 2019 study that evaluates the effectiveness of 29 HSIP projects will be posted to the website below. The website already contains previously conducted before and after studies that have evaluated a total of 48 HSIP projects.

https://www.codot.gov/library/traffic/hsip/studies

Project Effectiveness

Provide the following information for previously implemented projects that the State evaluated this reporting period.

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL OTHER INJURY BEFORE	ALL OTHER INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
Colfax Avenue (US 40) / Youngfield Street	Urban Principal Arterial (UPA) - Other	Intersection geometry	Intersection geometry - other	25.00	13.00			1.00		10.00	6.00	36.00	19.00	3.33

The above described project is one example of a before and after evaluation that was completed by CDOT & its consultants to evaluate and aid in understanding the overall effectiveness of the HSIP in Colorado. In the case of the example, the project was designed to mitigate rear end and right angle crashes. In this example, the intersection was realigned to improve turns and add a protective/permissive southbound left turn lane. Span wire was also replaced with mast arms.

In the interest of being concise for this portion of this annual HSIP report, we have only provided this one example; however, for further examples of various HSIP projects for which before and after studies were completed, please review the reports entitled "2015 Study" and "2016 Study" on the following CDOT public website:

https://www.codot.gov/library/traffic/hsip/studies

Compliance Assessment

What date was the State's current SHSP approved by the Governor or designated State representative?

03/16/2015

What are the years being covered by the current SHSP?

From: 2015 To: 2020

When does the State anticipate completing it's next SHSP update?

2020

Provide the current status (percent complete) of MIRE fundamental data elements collection efforts using the table below.

ROAD TYPE	MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	
ROADWAY SEGMENT	Segment Identifier (12)	100	100					100	100	100	100
	Route Number (8)	100	100								
	Route/Street Name (9)	100	100								
	Federal Aid/Route Type (21)	100	100								
	Rural/Urban Designation (20)	100	100					100	100		
	Surface Type (23)	100	100					100	100		
	Begin Point Segment Descriptor (10)	100	100					100	100	100	100
	End Point Segment Descriptor (11)	100	100					100	100	100	100
	Segment Length (13)	100	100								
	Direction of Inventory (18)	100	100								
	Functional Class (19)	100	100					100	100	100	100
	Median Type (54)	100									
	Access Control (22)	100	100								

ROAD TYPE	MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	
	One/Two Way Operations (91)	100	100								
	Number of Through Lanes (31)	100	100					100	100		
	Average Annual Daily Traffic (79)	100	50					100	100		
	AADT Year (80)	100	50								
	Type of Governmental Ownership (4)	100	100					100	100	100	100
INTERSECTION	Unique Junction Identifier (120)			100							
	Location Identifier for Road 1 Crossing Point (122)			100							
	Location Identifier for Road 2 Crossing Point (123)			100							
	Intersection/Junction Geometry (126)			100							
	Intersection/Junction Traffic Control (131)			100							
	AADT for Each Intersecting Road (79)			100	50						
	AADT Year (80)			100	50						
	Unique Approach Identifier (139)										
INTERCHANGE/RAMP	Unique Interchange Identifier (178)					100					
	Location Identifier for Roadway at Beginning of Ramp Terminal (197)					100					
	Location Identifier for Roadway at Ending Ramp Terminal (201)					100					
	Ramp Length (187)					100					

ROAD TYPE	MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	
	Roadway Type at Beginning of Ramp Terminal (195)					100					
	Roadway Type at End Ramp Terminal (199)					100					
	Interchange Type (182)					100					
	Ramp AADT (191)					100					
	Year of Ramp AADT (192)					100					
	Functional Class (19)					100					
	Type of Governmental Ownership (4)					100					
Totals (Average Percent Complete):		**100.00**	**88.89**	**87.50**	**12.50**	**100.00**	**0.00**	**100.00**	**100.00**	**100.00**	**100.00**

*Based on Functional Classification

Describe actions the State will take moving forward to meet the requirement to have complete access to the MIRE fundamental data elements on all public roads by September 30, 2026.

STRAC (TRCC) Strategic Plan (2019) - Appendix B.
CDOT Plan to Collect MIRE Fundamental Data Elements

CDOT currently has approximately 6,950 intersection/junctions, 437 interchanges, 9,180 non-local paved roadway segments, 76,766 paved local roadway segments and 39,372 unpaved local segments. Of the date elements required, CDOT has the vast majority of them available through on-going collection programs. Notable exceptions are:

- Median Type for Off-System, non-local paved roadway segments that are not HPMS Samples;
- AADT numbers for Rural Collector and Local paved roadway segments;
- Intersection Geometry and Intersection Traffic Control for Off-System non-local paved intersections.

Due to the magnitude involved with collecting the missing data elements and the potential system changes that will need to be made, CDOT intends to utilize the next 2-3 years to research and assess various methodologies to meet the 10-year deadline for providing the required information. This planning stage will consist of the following assessment activities:

1. Contact other State DOT's and survey what methodologies they are employing to meet these requirements.
2. Research and monitor 3rd party big data providers. Technology and data collection is progressing rapidly; there is a possibility that companies aware of these requirements may move to collect this information for retail sale.
3. Research other potential sources for the required data elements, including local jurisdictions and MPOs
4. If 3rd party data is not available and other potential sources do not exist, we will move forward with developing a long term plan for collection, including locating and procuring funding.
5. We have identified a tool that will be implemented this fall that will assist us to manage the intersections as an object that will encompass all required elements.

MIRE Fundamental Data Elements for Non-Local (Based on Functional Classification) Paved Roads

Roadway segment	CDOT
Segment Identifier (12)	Currently available for all public roads
Route Number (8)	Currently available for all public roads
Route/street Name (9)	Currently available for all public roads
Federal Aid/Route Type (21)	Currently available for all public roads
Rural/Urban Designation (20)	Currently available for all public roads
Surface Type (23)	Currently available for all public roads
Begin Point Segment Descriptor (10)	Currently available for all public roads
End Point Segment Descriptor (11)	Currently available for all public roads
Segment Length (13)	Currently available for all public roads
Direction of Inventory (18)	Currently available for all public roads
Functional Class (19)	Currently available for all public roads
Median Type (54)	Currently available for all On-System roadways and HPMS segments
Access Control (22)	Currently available for all public roads
One/Two-Way Operations (91)	Currently available for all public roads
Number of Through Lanes (31)	Currently available for all public roads
Average Annual Daily Traffic (79)	Currently available for all fed-aid roads. Will have to collect for Rural Collector roadway segments
AADT Year (80)	Currently available for all fed-aid roads. Will have to collect for Rural Collector roadway segments
Type of Governmental Ownership (4)	Currently available for all public roads
Intersection	CDOT
Unique Junction Identifier (120)	Currently available
Location Identifier for Road 1 Crossing Point (122)	Currently available
Location Identifier for Road 2 Crossing Point (123)	Currently available
Intersection/Junction Geometry (126)	Currently available for On-System. Will need to be collected on the paved non-local OffSystem roads
Intersection/Junction Traffic Control (131)	Currently available for On-System. Will need to be collected on the paved non-local OffSystem roads
AADT (79) [for Each Intersecting Road]	Currently available for all fed-aid roads. Will have to collect for Rural Collector roadway segments
AADT Year (80) [for Each Intersecting Road]	Currently available for all fed-aid roads. Will have to collect for Rural Collector roadway segments
Unique Approach Identifier (139)	Will need to be created for all paved non-local roads
Interchange/Ramp	CDOT
Unique Interchange Identifier (178)	Currently available
Location Identifier for Roadway at Beginning Ramp Terminal (197)	Currently available
Location Identifier for Roadway at Ending Ramp Terminal (201)	Currently available
Ramp Length (187)	Currently available
Roadway Type at Beginning Ramp Terminal (195)	Element can be extracted from existing data
Roadway Type at Ending Ramp Terminal (199)	Element can be extracted from existing data
Interchange Type (182)	Currently available
Ramp AADT (191)	Currently available
Year of Ramp AADT (192)	Currently available
Functional Class (19)	Element can be extracted from existing data
Type of Governmental Ownership (4)	Element can be extracted from existing data

Did the State conduct an HSIP program assessment during the reporting period?

No

When does the State plan to complete its next HSIP program assessment.

2023

Optional Attachments

Program Structure:

HSIP_2016.pdf

Project Implementation:

Safety Performance:

Evaluation:

Compliance Assessment:

Glossary

5 year rolling average: means the average of five individuals, consecutive annual points of data (e.g. annual fatality rate).

Emphasis area: means a highway safety priority in a State's SHSP, identified through a data-driven, collaborative process.

Highway safety improvement project: means strategies, activities and projects on a public road that are consistent with a State strategic highway safety plan and corrects or improves a hazardous road location or feature or addresses a highway safety problem.

HMVMT: means hundred million vehicle miles traveled.

Non-infrastructure projects: are projects that do not result in construction. Examples of non-infrastructure projects include road safety audits, transportation safety planning activities, improvements in the collection and analysis of data, education and outreach, and enforcement activities.

Older driver special rule: applies if traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65 in a State increases during the most recent 2-year period for which data are available, as defined in the Older Driver and Pedestrian Special Rule Interim Guidance dated February 13, 2013.

Performance measure: means indicators that enable decision-makers and other stakeholders to monitor changes in system condition and performance against established visions, goals, and objectives.

Programmed funds: mean those funds that have been programmed in the Statewide Transportation Improvement Program (STIP) to be expended on highway safety improvement projects.

Roadway Functional Classification: means the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide.

Strategic Highway Safety Plan (SHSP): means a comprehensive, multi-disciplinary plan, based on safety data developed by a State Department of Transportation in accordance with 23 U.S.C. 148.

Systematic: refers to an approach where an agency deploys countermeasures at all locations across a system.

Systemic safety improvement: means an improvement that is widely implemented based on high risk roadway features that are correlated with specific severe crash types.

Transfer: means, in accordance with provisions of 23 U.S.C. 126, a State may transfer from an apportionment under section 104(b) not to exceed 50 percent of the amount apportioned for the fiscal year to any other apportionment of the State under that section.