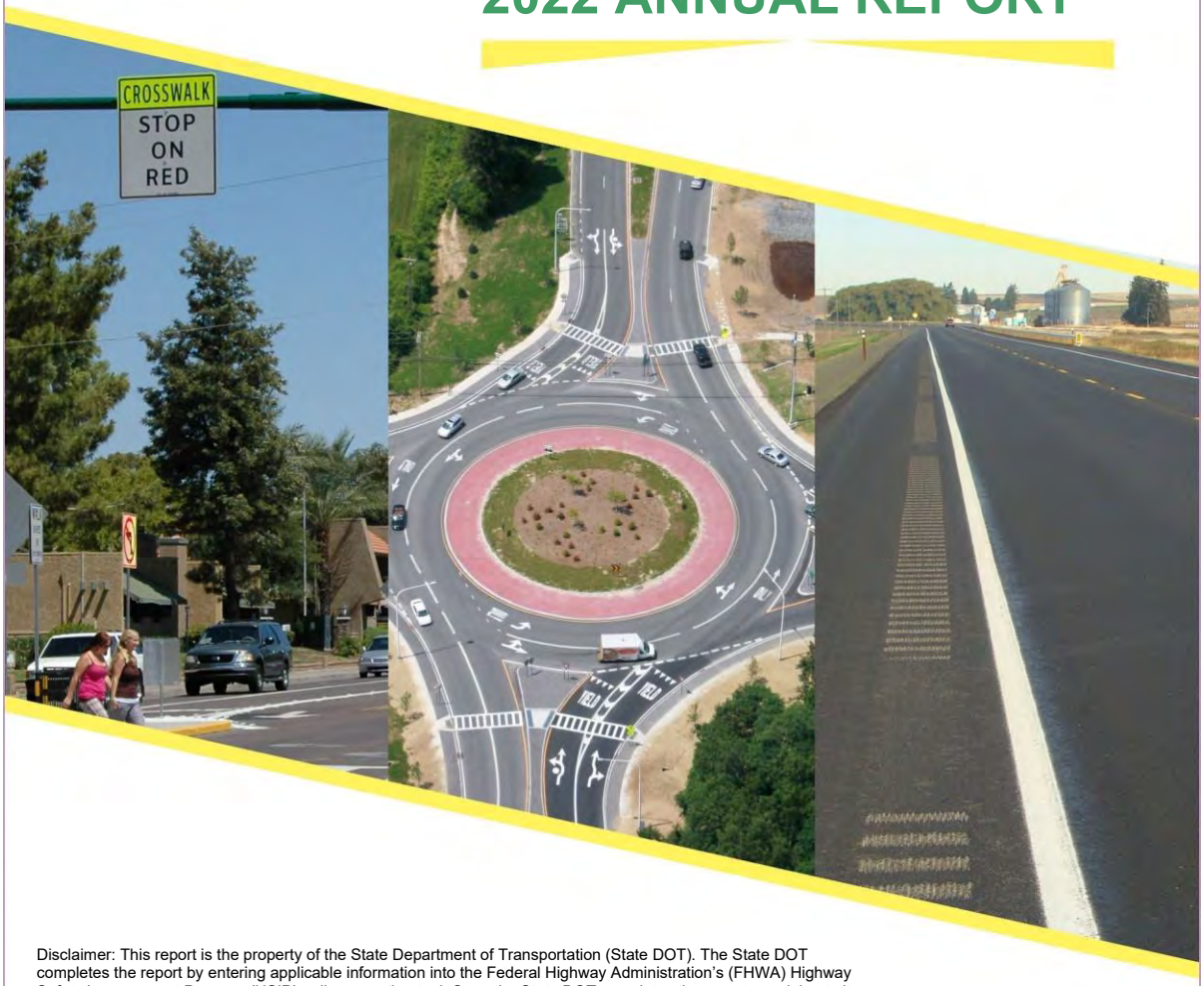
KANSAS

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2022 ANNUAL REPORT



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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. 407 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

In Kansas, we continue to utilize HSIP dollars in various independently managed programs, further outlined in this report. Collectively, these programs cover more than 140,000 centerline miles of public roads in Kansas and apply a multitude of proven countermeasures designed to reduce fatal and serious injury crashes statewide. Like many other states, Kansas has experienced data anomalies due to the social consequences of the COVID-19 pandemic. While there has been a reduction in traffic volumes, Serious Injury and Fatality rates have increased in 2020 and 2021. This has created a challenge when generating meaningful safety performance measures during the affected years. National researchers have indicated that decreased traffic resulted in increased travel speeds. These national findings were also present in Kansas, igniting an initiative to focus on speed management in the coming years.

Since completing the 2021 Annual Report, we continue to work on the SHSP Implementation. In the first quarter of FFY22, we completed a diagnostic process to identify barriers to SHSP implementation. As a result, we outlined a plan for the next three years of implementation, including a strategy prioritization process and a schedule for completed action plans. This will continue to require engagement from the Executive Safety Council and Emphasis Area Teams for the coming years.

We continue to populate data for KDOT use in a new SPF Tool, allowing us to conduct network screening and identify systemic needs. We believe the tool will be fully functional by the end of calendar year 2022.

Two program evaluations have been completed. While inconclusive, the evaluations allowed us to further analyze these programs and identifying potential improvement areas.

KDOT also initiated a process to develop a Safety Engineering Programs Manual. This ongoing effort has allowed us to revisit our state and federal fund structure and improve funding alignment with SHSP goals.

We continue to work on the creation of a Kansas-specific CMF list to be consistently used throughout KDOT and in coordination with our external partners.

This reporting period saw many new hires to the Bureau of Transportation Safety, including planning and engineering staff and analysts to support evaluations and project development needs.

Lastly, we have used state funds to launch new safety engineering programs, to hire data, communications, and behavioral safety staff; conduct safety data projects; and to make a significant investment in a new crash reporting system. Our goal is for each of these projects and documents to substantively inform and improve our overall HSIP processes, the outcome of which is reductions in fatal and serious injury crashes.

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.

Our HSIP is comprised of 8 programs, which are all individually managed within KDOT. These programs include Intersections, Signing, Pavement Marking, Lighting, Rail-Highway Grade Crossings, Guardrail, High Risk Rural Roads (HRRR), and General Safety Improvements. Each program is further described within this report except the RHCP, which is covered separately in its own report.

Where is HSIP staff located within the State DOT?

Other-Planning and Design

The State Highway Safety Engineer administers the HSIP in the Bureau of Transportation Safety within the Division of Planning and Development. Seven of the eight sub-programs are now managed within the Division of Engineering and Design: Intersections, Signing, Pavement Markings, and Lighting are managed in the Bureau of Traffic Engineering, the Bureau of Local Projects manages HRRR, and Rail-Highway Grade Crossing and Guardrail is managed by the Bureau of Road Design. The Bureau of Transportation Safety manages General Safety Improvements.

How are HSIP funds allocated in a State?

- Other-Headquarters

A committee comprised of the HSIP Program Manager (State Highway Safety Engineer), FHWA Division Safety Engineer, program managers, and management meets quarterly to measure program progress based on planned obligations and estimate and distribute allocations moving forward. Historical precedent informs decisions, but actual distribution is based on anticipated needs over the next two years. The share of crashes per program area is considered when setting goals for program spending. We are actively improving our HSIP by implementing data-driven distribution of dollars to each program.

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

Lighting, Pavement Markings, Signing, and Guardrail are exclusive to the State Highway System, although projects may impact intersecting non-state roads. Intersections and General Safety Improvement projects may also include off-system local roads. HRRR is exclusive to local major collectors.

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

- Design
- Districts/Regions
- Local Aid Programs Office/Division
- Maintenance
- Operations
- Planning
- Traffic Engineering/Safety

Describe coordination with internal partners.

The lighting program coordinates with KDOT District and area staff as well as the KDOT Structural Engineer and the Bureau of Traffic Engineering. The State Structural Engineer evaluates lighting support such as poles, foundations, and trusses in coordination with the lighting program manager. District and Area staff provide location information, and they may also submit project requests to the program manager. Traffic Engineering may generate traffic studies resulting in a recommendation to install lighting. The Signing program is based on the age of signs within District maintenance subareas. These subareas typically follow county line boundaries. Area Offices may complete a sign inventory for each project, and in previous years, KDOT has employed maintenance forces instead of contractors. However, due to KDOT staffing shortages, the responsibility has returned to contractors. Area Offices administer the projects once let. The Pavement Marking program manager works closely with District and Area Engineers to identify recommended routes based on field experience and data collected on retro-reflectivity. The Bureau of Traffic Engineering is often involved due to traffic studies or other recommendations. KDOT Research is also involved to verify that material used in a pilot or added to the Pre-Qualifications list is high quality and durable. The Intersection program identifies projects through solicitation, traffic study recommendations, and input from District/Area staff who have been approached by the community or local law enforcement. Additionally, TEAP (Traffic Engineering Assistance Program) reports may identify. When an intersection is located on the State Highway System, the District and Area offices are included. The HRRR program is managed through the Bureau of Local Projects and utilizes a scoring rubric to rank potential projects. District Offices are often involved in this process. The General Safety Improvements program also partners with District staff to scope and select project requests.

The Guardrail program partners with District and Area offices based on the MOU for the Guardrail Set-Aside Program dated August 19, 2019.

Identify which external partners are involved with HSIP planning.

- FHWA
- Local Government Agency
- Regional Planning Organizations (e.g. MPOs, RPOs, COGs)

Describe coordination with external partners.

Intersections program: KDOT identifies projects through soliciting cities' recommendations, Traffic Engineering Assistance Program reports (TEAP) or KDOT traffic studies . The Bureau of Traffic Engineering will enter into agreements with cities and/or counties depending on project requirements.

HRRR program: Projects are identified through solicitation to counties and their recommendations. The Bureau of Local projects then enters into an agreement with the project owner. Additionally, projects may be identified through studies such as Traffic Engineering Assistance Program reports (TEAP), road safety audits, and Local Road Safety Plans. All programs: The FHWA oversees planning and provides program guidance as needed. The MPOs are involved in the Transportation Improvement Program (TIP) approval process.

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

The dollar amounts provided are supplemental information only. Projects funded with advanced construction (ACHSIP) are not included in this report but will be reported when funds are converted. Advanced Construction is utilized to balance program funding in the event that another program is not able to obligate the funds as originally expected.

For this question, the apportioned dollar amount is what was made available to each program prior to the beginning of the fiscal year; this value varies from year to year based on anticipated need and does not include carry-over. Please note that the values for obligations may include adjustments made on projects reported in a previous report or may include PE on projects we will report in the future and should not be expected to match totals from the project listing table below.

The following amount was apportioned for FFY-2022:

Program distribution is as follows:

- Lighting: $2,500,000
- Pavement Marking: $5,000,000
- Signing: $4,000,000
- Intersection Safety: $7,000,000
- General Safety Improvements: $0
- HRRR:
    - $3,071,977 HSIP
    - $3,150,110 HRRR Penalty
- Guardrail: $0

The following amount was authorized in SFY-2022:

- Lighting: $2,267,677.21 HSIP
- Pavement Marking: $2,677,208.87 HSIP
- Signing:
    - $10,944,768.32 HSIP
    - $2,949,500 Advanced Construction HSIP
- Intersection Safety:
    - $3,971,937.93 HSIP
    - $12,961,330 Advanced Construction HSIP
- GSI: $174,374.98 HSIP
- HRRR:
    - $3,840,130.15 HSIP
    - $3,150,110 HSIP Penalty
- Guard Rail:
    - $1,586,365.21 HSIP
    - $3,150,094.83 Advanced Construction HSIP

Program Methodology

Select the programs that are administered under the HSIP.

- HRRR
- Intersection

- Sign Replacement And Improvement
- Other-Pavement Marking
- Other-Lighting
- Other-General Safety Improvements
- Other-Guardrail

Program: HRRR

Date of Program Methodology:2/11/2011

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Funding set-aside

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• Fatal and serious injury crashes only	• Traffic • Volume • Population • Lane miles	• Horizontal curvature • Functional classification • Roadside features • Other-LRSP

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- Excess proportions of specific crash types
- Other-LRSP

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?

No

Describe the methodology used to identify local road projects as part of this program.

This program applies only to local roads (non-state owned and operated).

How are projects under this program advanced for implementation?

- Competitive application process
- Other-Scoring Rubric
- selection committee

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

Available funding:2
Other-Scoring Rubric :1

What is the funding approach for this program? The FHWA HRRR Special Rule Requirement is considered in addition to the HRRR funding set aside.

Program: Intersection

Date of Program Methodology:8/25/2016

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Other-Must satisfy a need based on the HSM, address crashes, and have a B/C>1.

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

- Traffic
- Volume
- Population

Roadway

- Functional classification
- Other-Turn lanes

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- Critical rate
- Excess expected crash frequency with the EB adjustment
- Level of service of safety (LOSS)
- Other-B/C ratio
- Other-Observed crashes and patterns

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?

No

Describe the methodology used to identify local road projects as part of this program.

Process is same except local road projects include a periodic solicitation letter to all cities with population of 5,000 or greater requesting project proposals.

How are projects under this program advanced for implementation?

- Competitive application process
- selection committee

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:3
Other-Crash patterns:1

Program: Sign Replacement And Improvement

Date of Program Methodology:7/1/2006

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- Other-10 year sign replacement for retro-reflectivity per the MUTCD

What is the funding approach for this program?

Other-HSIP % based on project development pipeline for SFY

What data types were used in the program methodology?

Crashes	Exposure	Roadway
	• Other-Sign Age	• Other-District Request

What project identification methodology was used for this program?

- Other-Projects are programmed based on sign age and replacement need per District Sub-Area

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

No

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

How are projects under this program advanced for implementation?

- Other-Projects selected based on sign age per District Sub-Area

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

Other-Per established cyclical program:1

Program: Other-Pavement Marking

Date of Program Methodology:4/30/2022

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Other-HSIP % based on roadway departure crashes

What data types were used in the program methodology?

Crashes	Exposure	Roadway
• All crashes	• Volume • Population • Other-If we considered only traffic volumes, only high volume districts (1 and 5) would get funded, thus population is taken into account. At the district level, we then consider higher volume routes first and take into account retro-readings.	• Other-Retro-reflectivity.

What project identification methodology was used for this program?

- Crash frequency
- Other-Mobile retro-reflectivity data

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

No

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

How are projects under this program advanced for implementation?

- Other-Pavement Marking Specialist works closely with district maintenance engineers to select projects.

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

Available funding:2
Other-Retro-reflectivity scoring:1
Other-Pavement Marking Condition Review:1

Program: Other-Lighting

Date of Program Methodology:5/15/2022

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Other-HSIP % based on intersection/roadway departure crashes

What data types were used in the program methodology?

Crashes

- Other-Night-time unlit crashes

Exposure

- Volume

Roadway

- Other-Intersections and Interchanges

What project identification methodology was used for this program?

- Crash rate
- Other-Traffic Studies and Public/District Requests

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

No

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

How are projects under this program advanced for implementation?

- selection committee

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:1
Available funding:2

Program: Other-General Safety Improvements

Date of Program Methodology:6/24/2022

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

What data types were used in the program methodology?

Crashes

- Fatal and serious injury crashes only

Exposure

- Traffic
- Volume

Roadway

- Roadside features

What project identification methodology was used for this program?

- Crash rate

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

Available funding:2
Other-Share of fatal crashes:1
Other-District Priority :1
The original General Safety Improvement Program is being reinvented as a state-funded safety program focused on passing lanes, intersections, and segments. This funding category continues to exist for special projects as needed or when consistent with our Strategic Highway Safety Plan.

Program: Other-Guardrail

Date of Program Methodology:8/19/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- Other-FHWA Agreement for blunt end terminal replacements

What is the funding approach for this program?

Funding set-aside

What data types were used in the program methodology?

Crashes

Exposure

- Traffic
- Volume
- Other-Speed

Roadway

- Roadside features
- Other-NHS

What project identification methodology was used for this program?

- Other-Tiered approach based on AADT and posted speed, then strategically bundled by geography

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

No

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

How are projects under this program advanced for implementation?

- Other-Memorandum of Understanding

- Other-Tiered prioritization

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

Available funding:2
Other-Priority List:1
What is the funding approach for this program? Funding set aside selected based on required spending amount set by FHWA via MOU 2019.

- Projects will focus on removal and replacement of blunt ends on the mainline lanes along the NHS routes.
- Where existing guardrail installations are entirely replaced, the replacement will be consistent with KDOT's Roadside Safety Hardware Eligibility Process.
- Each blunt end guardrail location will be evaluated for the appropriate treatment but will focus on the blunt end terminal.
- Some set-aside projects may require right-of-way (ROW) acquisition. Where ROW is required the project schedule will be such to allow adequate time for environmental reviews and ROW acquisition to take place.
- The set-aside projects are expected to be categorical exclusion environmental classification.

What percentage of HSIP funds address systemic improvements?

83

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

- Install/Improve Lighting
- Install/Improve Pavement Marking and/or Delineation
- Install/Improve Signing

Percentage is based on project cost only.

What process is used to identify potential countermeasures?

- Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)
- Engineering Study
- SHSP/Local road safety plan
- Other-10-year replacement cycle
- Other-Risk factors for systemic programs

"Engineering Study" includes Traffic Studies and utilizing existing Road Safety Audits.

Does the State HSIP consider connected vehicles and ITS technologies?

No

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.

The intersection program uses the Highway Safety Manual Part B along with Part C for the expected, predicted and observed crash frequency. We also use the Level of Service of Safety, crash patterns, and cost-benefit analysis to determine if a project qualifies for funding.

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

- CMF Standardized List - KDOT has hired a consultant to research and compile a list of CMFs commonly used in Kansas. In addition, they will recommend a CMF value that best represents the scenarios experienced within our state. This project is ongoing and expected to be completed in 2024.
- Network Screening - KDOT currently uses AASHTOWare's former software, Safety Analyst, to perform initial network screening on the state system. The Level of Service of Safety (LOSS) is used to identify and rank locations with the potential for the highest safety improvements. In addition, intersections are screened using crash frequency. Soon, the intersection screening process will be using predictive network screening.
    - SPF Tool - KDOT has purchased software that will replace the former AASHTOware Safety Analyst. The software company staff is currently calibrating SPFs for Districts 2, 4, 6, and soon to be District 3. KDOT staff has been testing the tool and making customized changes to replace Safety Analyst fully. This tool is expected to be fully implemented beginning in CY 2023.
    - GIS Mapping - Another consultant project is developing a GIS tool to generate project locations for the state-funded Clear Zone Safety Improvement Program. This project will generate a map based on specified criteria for qualifying locations. In addition, KDOT will be provided with a fluid dashboard that all internal staff can use to influence project submissions. The hope is that this project will open the door for more intense and effective network screening that KDOT can utilize within HSIP subprograms.
- Safety Engineering Programs Manual - KDOT has hired a consultant to construct a manual that includes all state and federally funded safety programs. The purpose of this manual is to provide consistency and clear direction on how programs are managed and funded and how projects are ultimately selected. This project also encompasses the restructuring of the HSIP programs to improve alignment with the Strategic Highway Safety Plan. The manual will be completed for KDOT use in late 2022, though implementing the HSIP subprogram transition will likely take a few years to complete.
- SHSP Implementation – Over the past year KDOT has worked with a consultant to identify the highest priority strategies of the SHSP to focus implementation efforts. By end of SFY23 ten strategies will have robust action plans indicating how, when and where strategies will be executed.
- Safety Corridors – As part of the SHSP Implementation, the Executive Safety Council initiated a program to implement safety corridors statewide. First, KDOT conducted preliminary studies to identify locations, and this ongoing effort will likely come to fruition in 2023. These corridors will likely be phased beginning with Education and Enforcement, followed by Engineering countermeasures based on problems identified within the corridor.
- Local Field Liaison – The Local Technical Assistance Program (LTAP) has created a position for a Local Field Liaison that will work closely with KDOT staff and our local partners. The Local Field Liaison establishes a connection with local partners so that KDOT can funnel HSIP funding to local partners more effectively.
- Vulnerable Road User Assessment – KDOT released a Request for Proposals to complete the first ever Kansas Vulnerable Road User Assessment. Results of this work will inform effective programming for pedestrian and cyclist safety improvements throughout the state. The assessment will be complete by November 2023.

Project Implementation

Funds Programmed

Reporting period for HSIP funding.

State Fiscal Year

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

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	$21,571,977	$25,464,245	118.04%
HRRR Special Rule (23 U.S.C. 148(g)(1))	$3,150,110	$3,150,110	100%
Penalty Funds (23 U.S.C. 154)	$0	$0	0%
Penalty Funds (23 U.S.C. 164)	$0	$0	0%
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	$8,381,764	$9,387,625	112%
Totals	$33,103,851	$38,001,980	114.8%

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

16%

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

16%

HRRR is the only program that have programmed and obligated funds on the local system. For this reporting period, the Intersection Program had no locally owned projects programmed or obligated for SFY22.

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

3%

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

3%

The non-infrastructure safety projects include LRSPs and TEAP Studies. Mobile retroreflective inventory of pavement markings has been categorized as non-infrastructure, but the current project was accounted for in last year's report therefore we will not duplicate in this report.

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.

All Programs:

- Federal Regulation 646.214B and 23USC109.E requires project review if the project terminus is within a certain distance of a railroad crossing. If the rail crossing is not up to date (lights, crossbucks, gate arms, etc...), this must be done before any additional work is completed. This has caused significant project delays or complications when scheduling around RR updates.
- KDOT continues to conduct Network Screening using predictive models, however, intersection and spot treatments analysis has been pending the completion of the Intersection Inventory scheduled to be completed by the end of calendar year 2022. Beginning in 2023, the Agency plans to have completed network screening and evaluations for all on-system segments and intersections.

Signing Program:

- Lack of ability to develop and maintain a signing inventory to keep track of sign age and retro-reflectivity

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
C-4790-03	Miscellaneous	Local road safety plans	20	Counties	$927479	$1030533	HSIP (23 U.S.C. 148)	N/A	Multiple/Varies	0		Other Local Agency	Spot and Systemic Safety	Local Road Safety	Roadway Departure and Intersection
C-4966-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	121	Miles	$176820	$176820	HSIP (23 U.S.C. 148)	Rural	Major Collector	0		Other Local Agency	Systemic	Signing	EDC5-Signing
C-4963-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	30	Miles	$176820	$176820	HSIP (23 U.S.C. 148)	Rural	Major Collector	0		Other Local Agency	Systemic	Signing	EDC-5 Signing
C-4986-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	90	Miles	$479067	$479067	HSIP (23 U.S.C. 148)	Rural	Minor Collector	0		Other Local Agency	Systemic	Signing	EDC-5 Signing
C-5057-01	Intersection geometry	Add/modify auxiliary lanes	1	Intersections	$365126	$405696	HSIP (23 U.S.C. 148)	Rural	Major Collector	0		Other Local Agency	Systemic	Intersections	Speed Management
C-5059-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	82	Miles	$250357	$250357	HSIP (23 U.S.C. 148)	Rural	Major Collector	0		Other Local Agency	Systemic	Signing	EDC-5 Signing
C-5061-01	Roadside	Roadside grading	2	Miles	$862500	$862500	HSIP (23 U.S.C. 148)	Rural	Major Collector	0		Other Local Agency	Systemic	Roadway Departure	EDC-5 Clear Zone
C-5065-01	Roadway	Pavement surface – high friction surface	1.46	Miles	$1011145	$1123495	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Minor Arterial	0		Other Local Agency	Systemic	Lane Departure	EDC 5-Pavement Friction
KA-6544-01	Roadway delineation	Improve retroreflectivity	14.36	Miles	$1105782	$1105995	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	5,600	70	State Highway Agency	Systemic	Roadway Departure	EDC5-Pavement Markings
KA-6502-01	Roadway delineation	Improve retroreflectivity	11.25	Miles	$440409	$440409	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	33,000	75	State Highway Agency	Systemic	Roadway Departure	EDC5-Pavement Markings
KA-6500-01	Roadway delineation	Improve retroreflectivity	3.235	Miles	$434140	$434175	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	3,230	55	State Highway Agency	Systemic	Roadway Departure	EDC5-Pavement Markings
KA-6348-01	Roadway delineation	Improve retroreflectivity	.3	Miles	$64495	$64495	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	18,900	55	State Highway Agency	Systemic	Roadway Departure	EDC5-Pavement Markings
KA-6349-01	Roadway delineation	Improve retroreflectivity	13.770	Miles	$1054688	$1054688	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	41,906	70	State Highway Agency	Systemic	Roadway Departure	EDC5-Pavement Markings

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
KA-6501-01	Roadway delineation	Improve retroreflectivity	.216	Miles	$88913	$88913	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	4,430	55	State Highway Agency	Systemic	Roadway Departure	EDC5-Pavement Markings
KA-6347-01	Roadway delineation	Improve retroreflectivity	20.829	Miles	$471281	$471281	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	24,500	75	State Highway Agency	Systemic	Roadway Departure	EDC5-Pavement Markings
KA-5284-01	Intersection geometry	Add/modify auxiliary lanes	2	Intersections	$390000	$5733351	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	5,000	65	State Highway Agency	Spot	Intersections	Speed Management
KA-5563-01	Intersection geometry	Add/modify auxiliary lanes	4	Intersections	$2617208	$3147951	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	8,560	50	State Highway Agency	Spot	Intersections	Speed Management
KA-5710-01	Intersection traffic control	Intersection signing –other	2	Intersections	$134912	$152093	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	9,400	70	State Highway Agency	Spot	Intersections	EDC-5 Signing
KA-5498-01	Intersection geometry	Add/modify auxiliary lanes	1	Intersections	$891000	$990000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	23,000	65	State Highway Agency	Spot	Intersections	Speed Management
KA-4563-02	Speed management	Traffic calming feature	1	One Order of Portable Rumble Strips and Materials	$162000	$180000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		State Highway Agency	Systemic	Work Zones	Speed Management
KA-6092-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	83.864	Miles	$626522	$627412	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	0		State Highway Agency	Systemic	Roadway Departure	EDC-5 Signing
KA-6096-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	91.874	Miles	$2330575	$2330575	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	0		State Highway Agency	Systemic	Roadway Departure	EDC-5 signing
KA-6095-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	86.359	Miles	$2295681	$2296364	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	0		State Highway Agency	Systemic	Roadway Departure	EDC-5 Signing
KA-6107-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	107.16	Miles	$436703	$527055	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	0		State Highway Agency	Systemic	Roadway Departure	EDC-5 Signing
KA-6106-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	128.023	Miles	$637722	$637829	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	0		State Highway Agency	Systemic	Roadway Departure	EDC-5 Signing
KA-4744-05	Roadway signs and traffic control	Roadway signs (including post) - new or updated	13.64	Miles	$2508919	$3004434	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		State Highway Agency	Systemic	Roadway Departure	EDC-5 Signing

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
KA-6094-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	53.517	Miles	$1131226	$131328	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	0		State Highway Agency	Systemic	Roadway Departure	EDC-5 Signing
KA-6111-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	115.187	Miles	$826441	$826619	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	0		State Highway Agency	Systemic	Roadway Departure	EDC-5 Signing
KA-6093-01	Roadway signs and traffic control	Roadway signs (including post) - new or updated	97.43	Miles	$681789	$684532	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	0		State Highway Agency	Systemic	Roadway Departure	EDC-5 Signing
KA-6158-01	Lighting	Interchange lighting	2	Interchanges	$391870	$391870	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	0		State Highway Agency	Systemic	Intersections	EDC-5 Lighting
KA-6281-01	Lighting	Intersection lighting	1	Intersections	$257045	$257045	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	0		State Highway Agency	Spot	Intersections	EDC-5 Lighting
KA-6279-01	Lighting	Lighting - other	2	Intersection and an Interchange Lighting Upgrade	$261600	$261600	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	0		State Highway Agency	Systemic	Intersections	EDC-5 Lighting
KA-4020-03	Lighting	Lighting - other	1	PE ONLY Project Cancelled	$3600	$3600	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	0		State Highway Agency	Systemic	Intersections	EDC-5 Lighting
KA-6283-01	Lighting	Interchange lighting	1	Interchanges	$262395	$262395	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	0		State Highway Agency	Systemic	Intersections	EDC-5 Lighting
KA-5495-02	Lighting	Interchange lighting	1	Interchange Approach near Railroad	$1755315	$1755387	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	0		State Highway Agency	Systemic	Intersections	EDC-5 Lighting
KA-6284-01	Lighting	Interchange lighting	1	Interchanges	$282760	$282760	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	0		State Highway Agency	Systemic	Intersections	EDC-5 Lighting
KA-5496-01	Lighting	Interchange lighting	4	Interchanges, Tangent areas and Approaches	$1067971	$1071461	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	0		State Highway Agency	Systemic	Intersections	EDC-5 Lighting
KA-5495-01	Lighting	Interchange lighting	4	Interchanges and Tangent Areas	$1539987	$1547078	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	0		State Highway Agency	Systemic	Intersections	EDC-5 Lighting
C-4983-01	Roadside	Roadside - other	0.60	Miles	$524241	$583119	HSIP (23 U.S.C. 148)	Rural	Major Collector	0		Other Local Agency	Systemic	Roadway Departure	EDC-5 Clear Zone

2022 Kansas Highway Safety Improvement Program

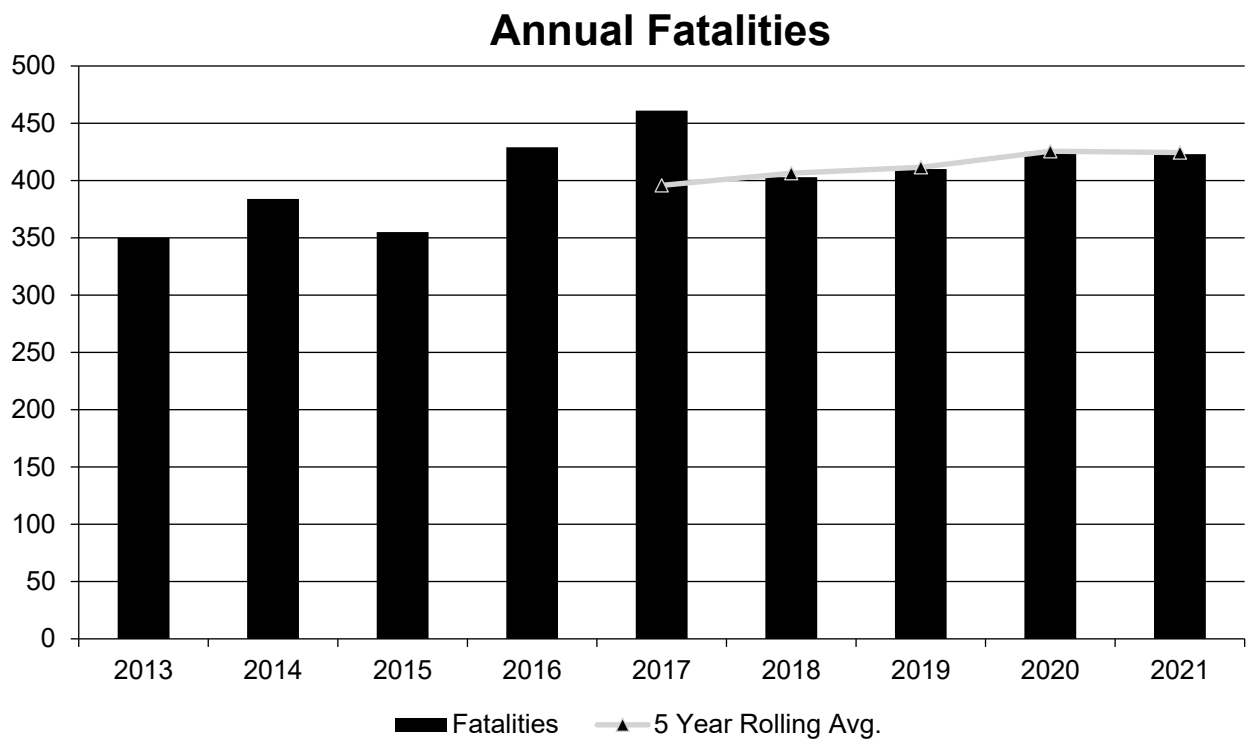
PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST($)	TOTAL PROJECT COST($)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
X-2216-22	Railroad grade crossings	Railroad grade crossings - other	1	Statewide Pre-empted Intersections with Rail Crossing	$200000	$200000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0		State, City or County Ownership	All state and locally owned intersections interconnected with a railroad crossing	Intersections	Speed Management

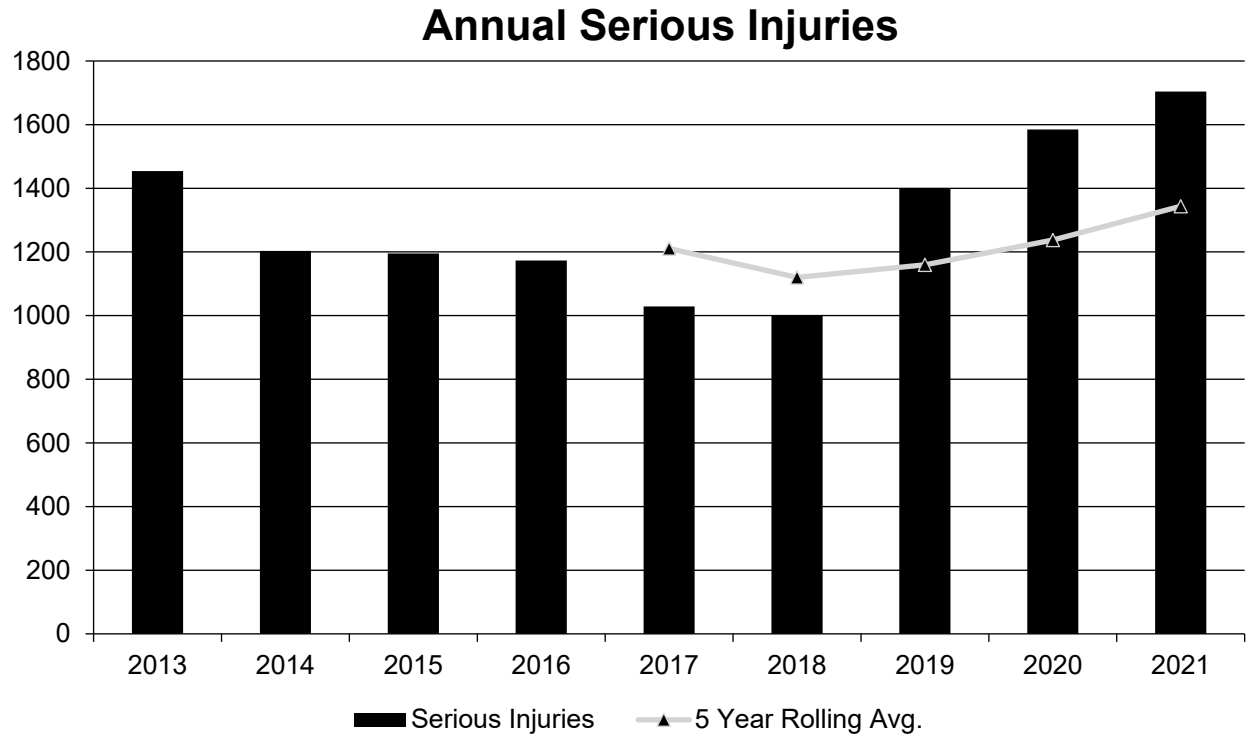
Safety Performance

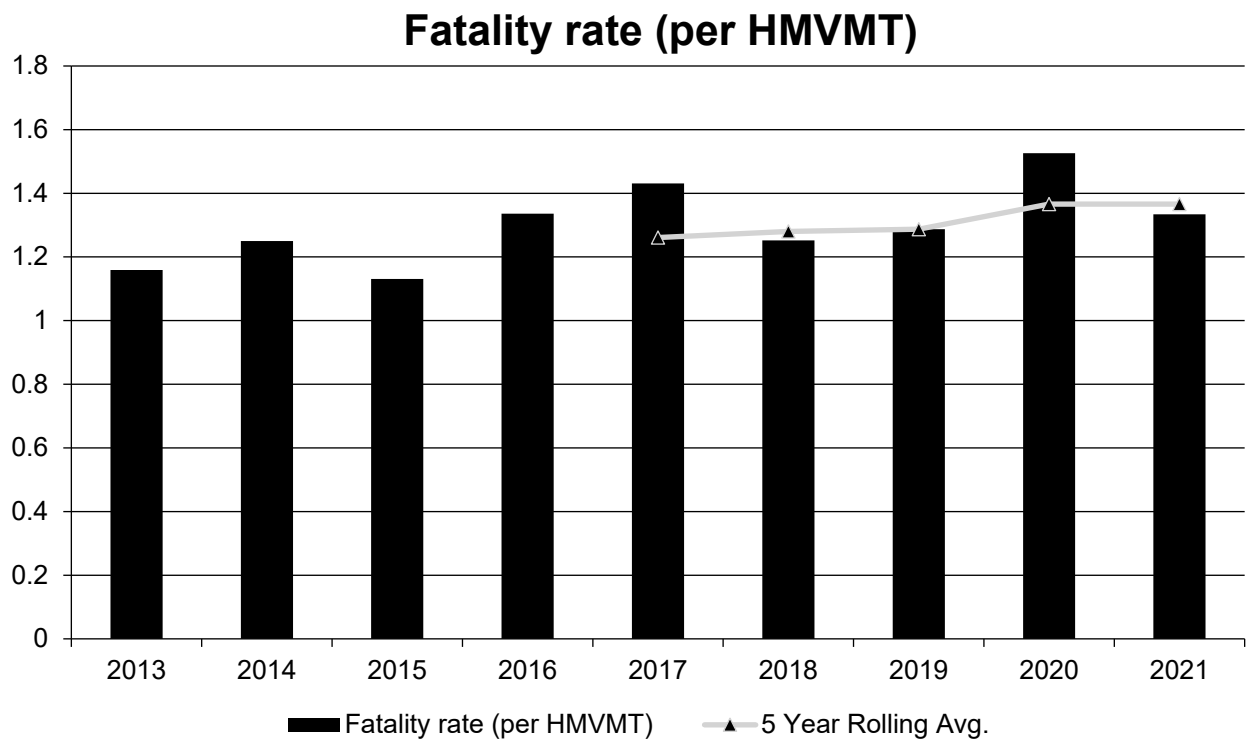
General Highway Safety Trends

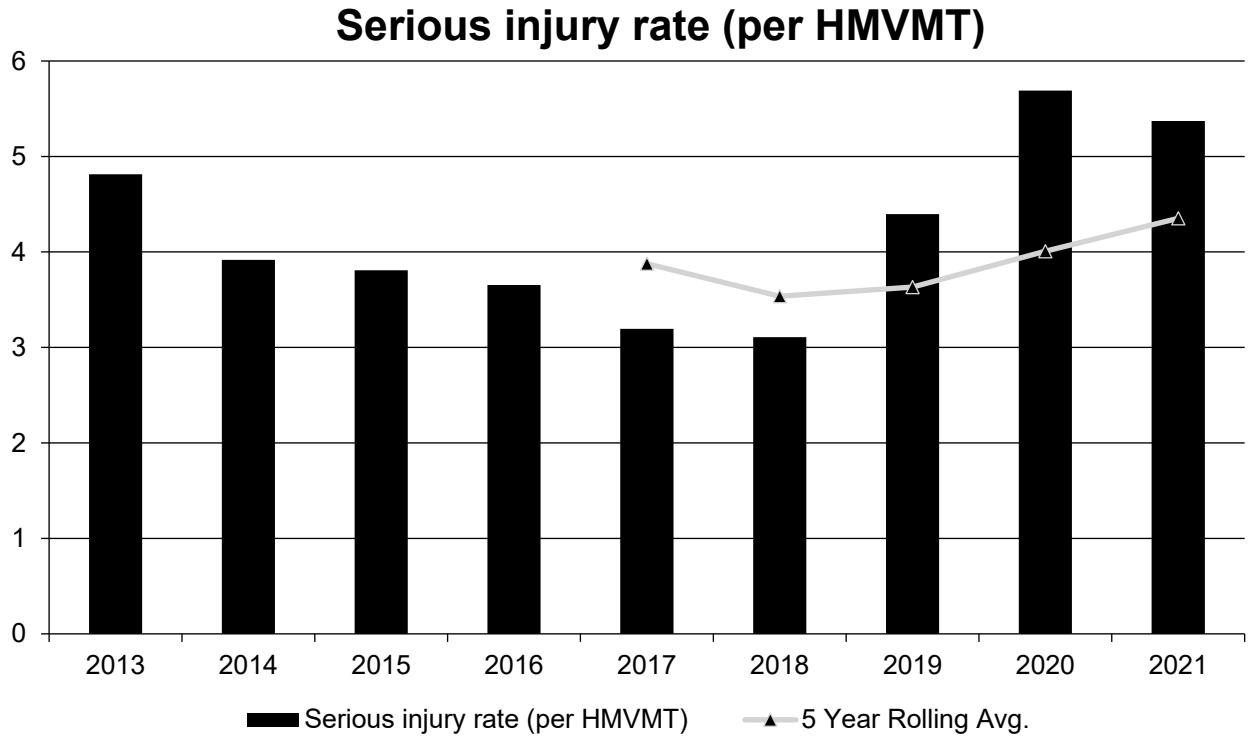
Present data showing the general highway safety trends in the State for the past five years.

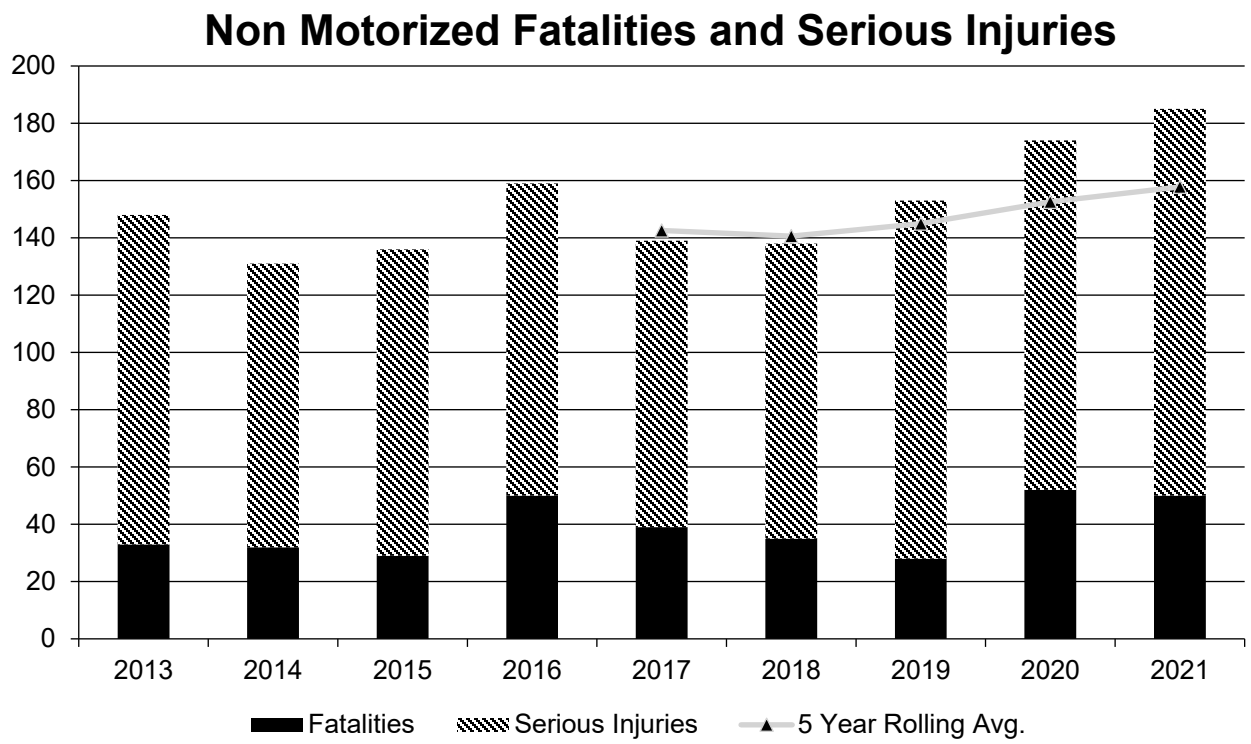
PERFORMANCE MEASURES	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fatalities	350	384	355	429	461	403	410	425	423
Serious Injuries	1,454	1,203	1,195	1,173	1,029	1,000	1,400	1,585	1,704
Fatality rate (per HMVMT)	1.159	1.250	1.131	1.336	1.431	1.252	1.287	1.526	1.334
Serious injury rate (per HMVMT)	4.813	3.917	3.808	3.654	3.195	3.107	4.396	5.690	5.372
Number non-motorized fatalities	33	32	29	50	39	35	28	52	50
Number of non-motorized serious injuries	115	99	107	109	100	103	125	122	135


Annual Fatalities
500
450
400
350
300
250
200
150
100
50
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Fatalities
5 Year Rolling Avg.


Annual Serious Injuries
1800
1600
1400
1200
1000
800
600
400
200
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
Fatality rate (per HMVMT)
5 Year Rolling Avg.


Serious injury rate (per HMVMT)
6
5
4
3
2
1
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
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 2021

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	28	55.8	0.09	0.18
Rural Principal Arterial (RPA) - Other Freeways and Expressways	12.4	28.8	0.04	0.09
Rural Principal Arterial (RPA) - Other	65.2	121.2	0.21	0.39
Rural Minor Arterial	53.2	113.4	0.17	0.37
Rural Minor Collector				
Rural Major Collector	34.2	102	0.11	0.33

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 Local Road or Street				
Urban Principal Arterial (UPA) - Interstate	26.2	77	0.08	0.25
Urban Principal Arterial (UPA) - Other Freeways and Expressways	14.8	43.4	0.05	0.14
Urban Principal Arterial (UPA) - Other	20.2	54.6	0.07	0.18
Urban Minor Arterial	17.8	123.6	0.06	0.4
Urban Minor Collector				
Urban Major Collector	12.4	81.4	0.04	0.26
Urban Local Road or Street				

Year 2021

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	210.8	472.4	0.68	1.53
County Highway Agency				
Town or Township Highway Agency				
City or Municipal Highway Agency				
State Park, Forest, or Reservation Agency				
Local Park, Forest or Reservation Agency				
Other State Agency				
Other Local Agency	201.2	835.8	1.37	4.35
Private (Other than Railroad)				
Railroad				
State Toll Authority	12.4	34.6	0.04	0.11
Local Toll Authority				
Other Public Instrumentality (e.g. Airport, School, University)				
Indian Tribe Nation				

Crash data is incomplete for functional class at the time of this report.

Safety Performance Targets

Safety Performance Targets

Calendar Year 2023 Targets *

Number of Fatalities:400.0

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

The 2023 five-year moving average projection based upon the trendline indicates 445 fatalities. A 10% percent reduction would derive our goal of 400 fatalities in 2023. Based on recent history, the trendline of the target, the ten percent reduction goal is realistic and attainable. The 2023 HSP and 2023 HSIP five-year moving average targets are equal.

Number of Serious Injuries:1100.0

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

The 2023 five-year moving average projection based upon the trend line indicates 1,348 serious injuries. An eight percent reduction in this projection would derive our target of 1,100 serious injuries in 2023. With the change in definition to suspected serious injury, there was a sharp increase in crashes meeting the definition. This is an artificial increase, not an actual degradation of safety. To re-establish a trendline for this category, it was determined to "back-cast" how many suspected serious injuries would have occurred in past years with the new definition. We used a conversion factor to inflate previous years' crashes by 1.46 (46% increase). This allows for a steady, downward trend that we predict would have occurred apart from the definition change. Consistent with national crash trends during the COVID-19 pandemic, 2020 defied that trend with a rise in suspected serious injuries, but we do not expect that to continue, that suspected serious injuries will resume falling. It is this trend upon which we based our suspected serious injury target. Based upon recent history, the trendline of the target, the eight percent reduction goal is realistic and attainable. The 2023 HSP and 2023 HSIP five-year moving average targets are equal.

Fatality Rate:1.290

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

The 2023 five-year moving average projection based upon the trendline indicates a fatality rate of 1.44. A seven percent reduction in this projection would derive our goal of 1.29 fatality rate in 2023. Based on recent history, the trendline of the target, the seven percent reduction goal is realistic and attainable. The 2023 HSP and 2023 HSIP five-year moving average targets are equal.

Serious Injury Rate:3.540

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

The 2023 five-year moving average projection based upon the curvilinear trendline indicates 4.374 serious injury rate per 100 million VMT. An eight percent reduction in this projection would lead to our goal of 3.540 serious injury rate per 100 million VMT in 2023. With the change in definition to suspected serious injury, there was a sharp increase in crashes meeting the definition. This is an artificial increase, not an actual degradation of safety. To re-establish a trendline for this category, it was determined to "back-cast" how many suspected serious injuries would have occurred in past years with the new definition. We used a conversion factor to inflate previous years' crashes by 1.46 (46% increase). This allows for a steady, downward trend that we predict would have occurred apart from the definition change. Consistent with national crash trends during the COVID-19 pandemic, 2020 defied that trend with a rise in suspected serious injuries, but we do not expect that to continue, that suspected serious injuries will resume falling. It is this trend upon which we based our suspected serious injury target. Based on recent history, the trendline of the target, the eight percent reduction goal is realistic and attainable. The 2023 HSP and 2023 HSIP five-year moving average targets are equal.

Total Number of Non-Motorized Fatalities and Serious Injuries:160.0

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

Target was set with a goal of 125 fatalities and serious injuries in 2030. From there a target was established a downward trendline was projected to identify the 2023 target of 160.

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

The state of Kansas is fortunate in that both the SHSP and HSP administrators are in the KDOT Bureau of Transportation Safety, making coordination simple and encourages multidisciplinary collaboration. Both plans rely heavily on the same data sources to establish strategies and goals. These data sources include but are not limited to FARS, the statewide crash database, and observational surveys. The three identified performance measures – fatalities, fatality rate, and serious injuries – have the same definition and goals. We have been and will continue to provide each MPO with the data necessary to calculate their 2023 targets. At present, we are not certain whether individual MPOs will adopt the state targets or their own.

Does the State want to report additional optional targets?

No

Describe progress toward meeting the State's 2021 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.

PERFORMANCE MEASURES	TARGETS	ACTUALS
Number of Fatalities	364.0	424.4
Number of Serious Injuries	1190.0	1343.6
Fatality Rate	1.160	1.366
Serious Injury Rate	3.726	4.352
Non-Motorized Fatalities and Serious Injuries	138.0	157.8

Based on the data provided in this report, we can conclude the following:

- Kansas' highest contributing crash areas are on the local road system, rural locations, and are correlated to roadway departure, which also aligns with the HRRR program areas.
- Even though rural areas typically see the highest proportion of crashes, our most populous urban districts, including the Kansas City Metro Area in District One and the Wichita Area in District Five, share the largest percentage of fatal and serious injury crashes.
- HSIP expenditures per district generally reflect the share of fatal and serious injury crashes. However, spending on the local system has been underrepresented.
- The Signing subprogram has no associated crash data, yet Kansas spends nearly 25% of HSIP obligation in this area. KDOT is actively working to identify state funding sources with the goal of removing the signing subprogram from the HSIP program by 2027.

With Kansas' ambitious goals for safety, we anticipate that we may show actual performance that does not meet our targets. With each, our goal is to become more specific in identifying data-driven countermeasure distribution and project selection.

Moving forward, KDOT will take the following actions to improve safety performance:

- Expand predictive data analysis tools to better develop our network screening process, including intersections and statewide SPFs,
- Complete the safety program evaluations and the safety program manual to improve alignment of the subprogram structure, SHSP, and crash data,
- Continue to coordinate with the Executive Safety Council and the Emphasis Area Teams, and to implement the current SHSP,
- Review standards and policies to determine if they can better reflect the Safe System approach,
- Complete and implement projects previously listed under “Noteworthy Practices”, and
- Continue to supplement the HSIP with state safety funding.

Applicability of Special Rules

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

Yes

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	2015	2016	2017	2018	2019	2020	2021
Number of Older Driver and Pedestrian Fatalities	50	78	74	64	75	79	79
Number of Older Driver and Pedestrian Serious Injuries	93	105	107	94	135	151	158

The data above reflect our interpretation of the older driver rule. This data does not include fatal crashes where an older driver was involved but did not have serious injuries.

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

- Benefit/Cost Ratio
- Change in fatalities and serious injuries
- Other-HSIP Program Evaluations

In 2021, KDOT worked with the FHWA Division Office to complete an HSIP Assessment. The assessment created a structure for program-level evaluation. Programs must be evaluated individually as each process is unique. For this reporting period, we have completed an evaluation for the Lighting and Signing programs.

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

The University of Kansas Transportation prepared evaluations for two subprograms: lighting and signing using crash data and project information provided by KDOT.

Signing: Researchers evaluated high-performance signing projects installed as part of the HSIP. The authors compared crashes that took place three years before and after the installation of improvement projects, excluding the installation year. Crash data from 2012 to 2020 was extracted from the KCARS database and included a complete list of subareas and Interstate sections. Projects completed in both 2015 and 2016 show a reduction in fatal, injury, and PDO crashes after the installation of signs. Researchers found that the aggregate benefit-cost ratio was beneficial at 8.56 for the HSIP sign replacement projects.

Lighting: To evaluate the lighting subprogram, researchers compared the crashes three years before and after the installation of updated lighting projects, excluding the installation year. Researchers estimated the benefit-cost ratio was 0.0044 for all weather conditions, while the benefit-cost ratio during no adverse weather conditions was a benefit of 0.255. When crashes were not impacted by weather conditions, “after” crash costs were lower than “before” crash costs. Maximum benefit occurred at a project location where the light was not previously located. While this report shows no benefit during adverse weather conditions, this analysis leads KDOT to conduct further investigations at the project level.

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

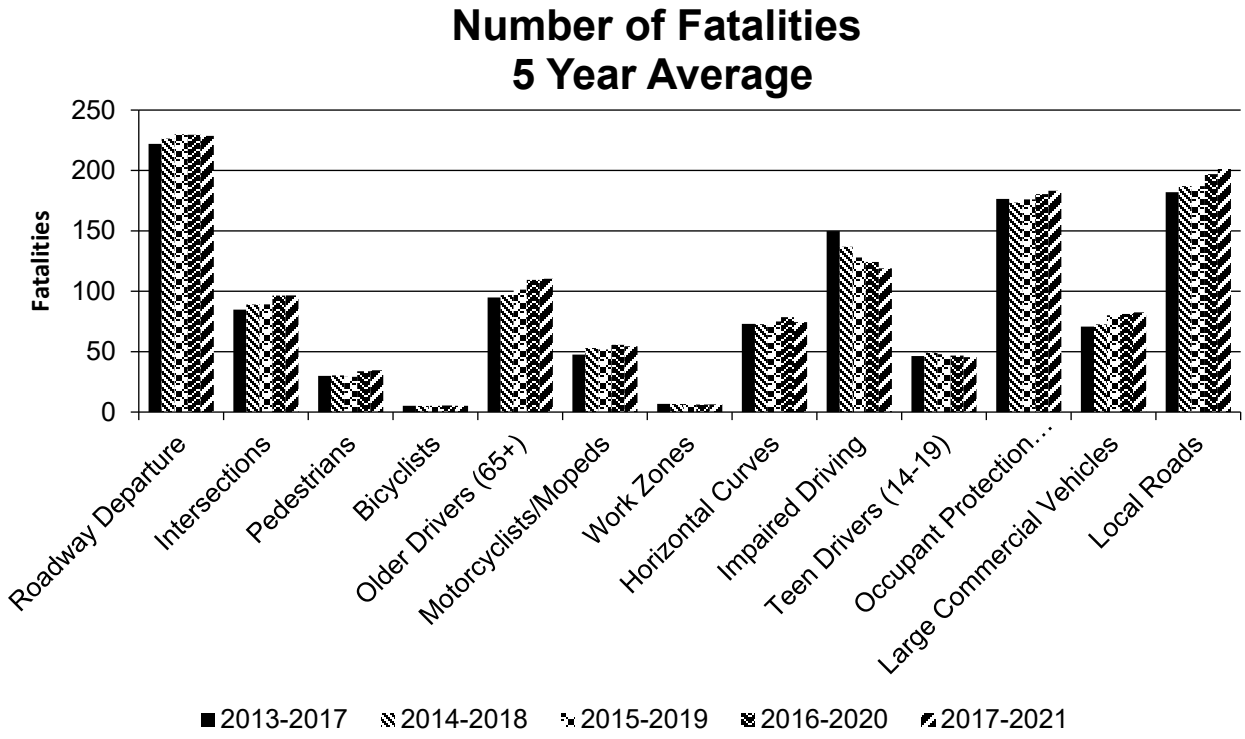
- HSIP Obligations
- Increased awareness of safety and data-driven process
- Increased focus on local road safety
- More systemic programs

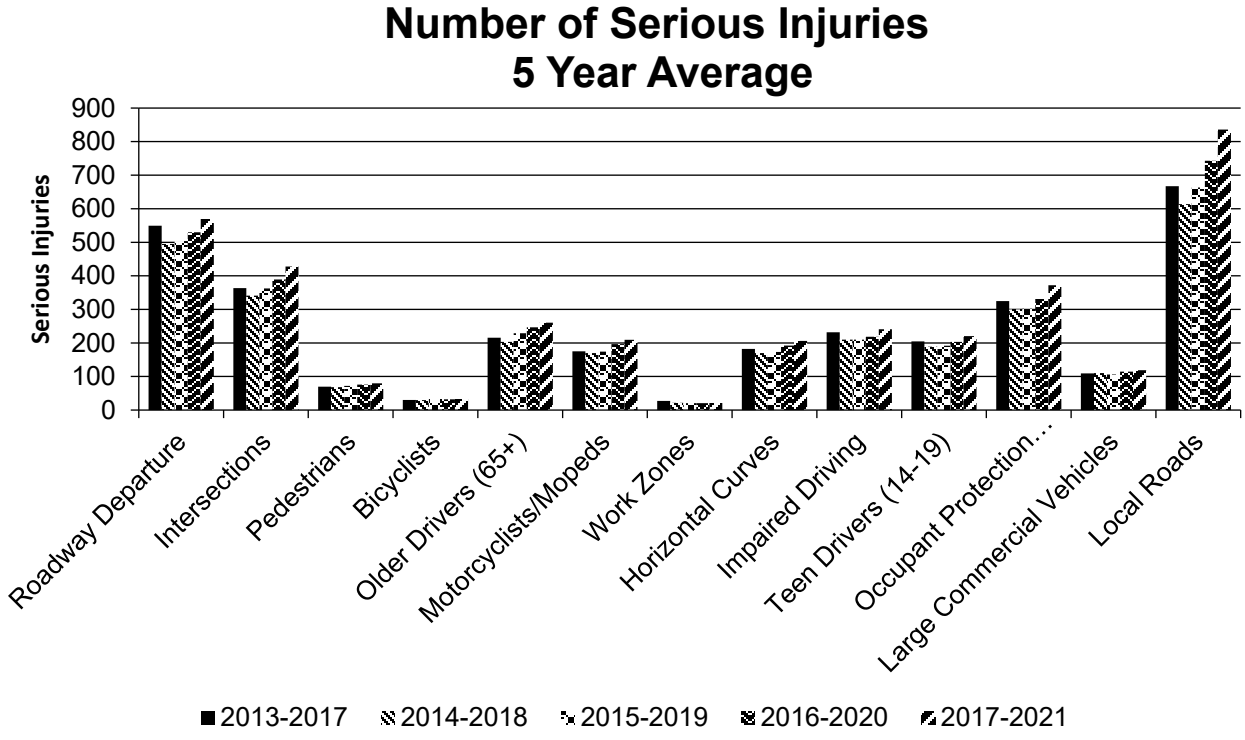
Effectiveness of Groupings or Similar Types of Improvements

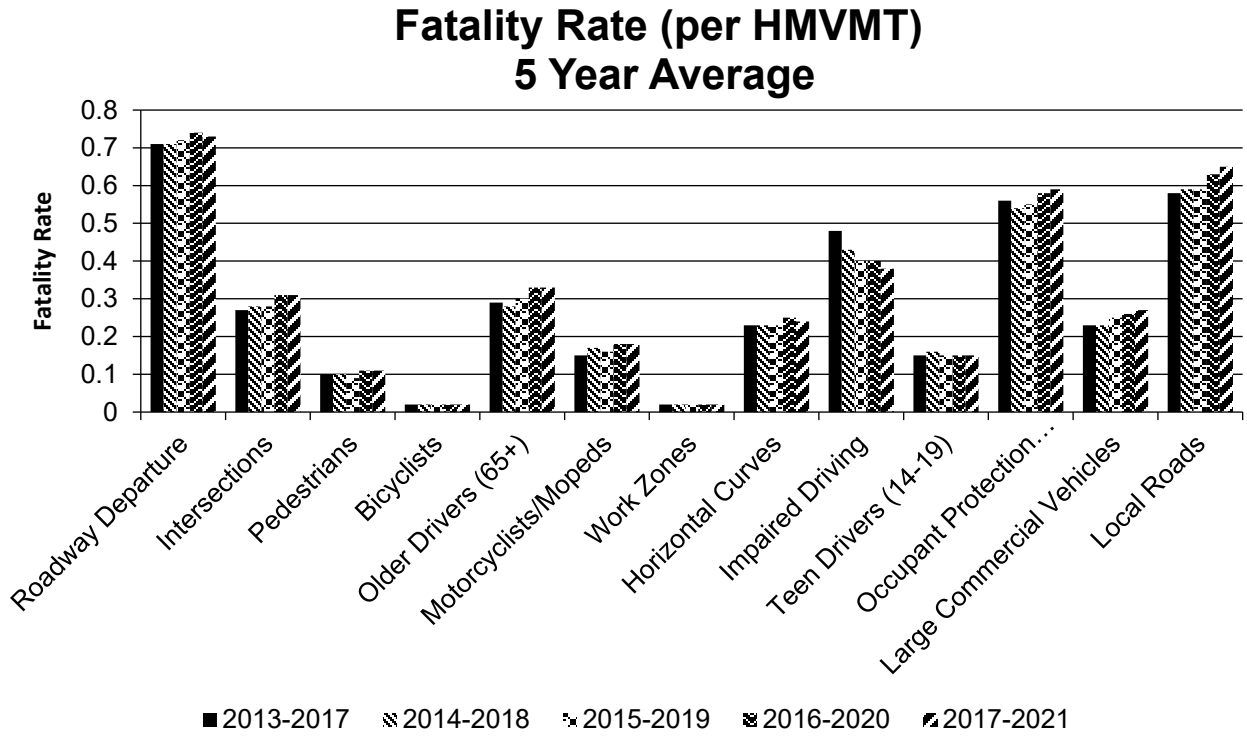
Present and describe trends in SHSP emphasis area performance measures.

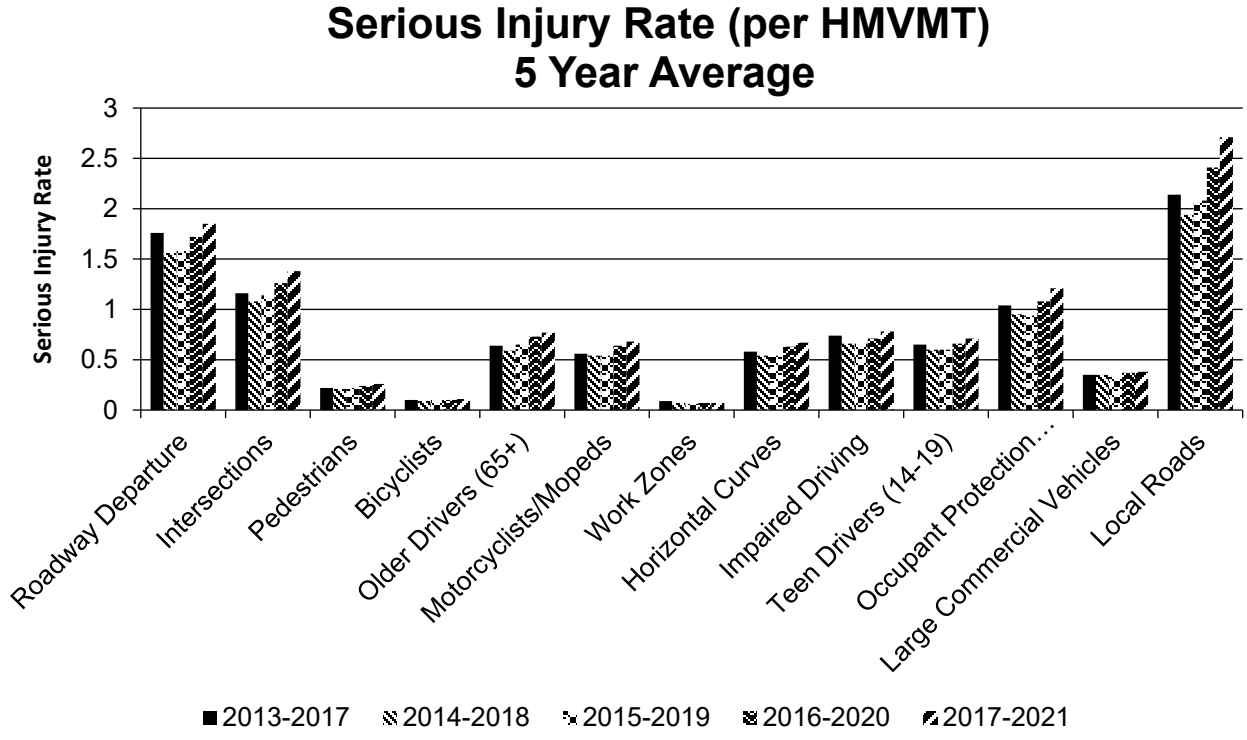
Year 2021

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	Run-off-road	228.6	569.4	0.73	1.85
Intersections	Intersections	96.6	428	0.31	1.38
Pedestrians	Vehicle/pedestrian	34.6	79.6	0.11	0.26
Bicyclists	Vehicle/bicycle	5.2	33	0.02	0.11
Older Drivers (65+)	Other (define)	110.4	260.6	0.33	0.77
Motorcyclists/Mopeds	Other (define)	54.4	209.4	0.18	0.68
Work Zones	All	6.4	21.2	0.02	0.07
Horizontal Curves	All	74.4	206	0.24	0.67
Impaired Driving	All	119	241	0.38	0.78
Teen Drivers (14-19)	All	45.4	220.6	0.15	0.71
Occupant Protection (unbelted)	All	183.2	372.2	0.59	1.21
Large Commercial Vehicles	Truck-related	82.6	118.8	0.27	0.38
Local Roads	All	201.2	835.8	0.65	2.71


Number of Fatalities
5 Year Average
Fatalities
250
200
150
100
50
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers (65+)
Motorcyclists/Mopeds
Work Zones
Horizontal Curves
Impaired Driving
Teen Drivers (14-19)
Occupant Protection…
Large Commercial Vehicles
Local Roads
2013-2017
2014-2018
2015-2019
2016-2020
2017-2021


Number of Serious Injuries
5 Year Average
Serious Injuries
900
800
700
600
500
400
300
200
100
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers (65+)
Motorcyclists/Mopeds
Work Zones
Horizontal Curves
Impaired Driving
Teen Drivers (14-19)
Occupant Protection…
Large Commercial Vehicles
Local Roads
2013-2017
2014-2018
2015-2019
2016-2020
2017-2021


Fatality Rate (per HMVMT)
5 Year Average
Fatality Rate
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers (65+)
Motorcyclists/Mopeds
Work Zones
Horizontal Curves
Impaired Driving
Teen Drivers (14-19)
Occupant Protection…
Large Commercial Vehicles
Local Roads
2013-2017
2014-2018
2015-2019
2016-2020
2017-2021


Serious Injury Rate (per HMVMT)
5 Year Average
Serious Injury Rate
3
2.5
2
1.5
1
0.5
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers (65+)
Motorcyclists/Mopeds
Work Zones
Horizontal Curves
Impaired Driving
Teen Drivers (14-19)
Occupant Protection…
Large Commercial Vehicles
Local Roads
2013-2017
2014-2018
2015-2019
2016-2020
2017-2021

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)
K-15 at 71st, 63rd, 47th and MacArthur Rd Sedgwick Co	Urban Principal Arterial (UPA) - Interstate	Intersection traffic control	Modify traffic signal – add additional signal heads	159.00	156.00			2.00	1.00	49.00	37.00	210.00	194.00	
Douglas and Hydraulic - Wichita, KS	Urban Major Collector	Intersection traffic control	Modify traffic signal –other	10.00	6.00			1.00		12.00	2.00	23.00	8.00	
I-70 in Dickinson Co., KS (15.2 miles)	Rural Principal Arterial (RPA) - Interstate	Roadway delineation	Improve retroreflectivity	31.00	47.00	1.00	2.00	3.00		10.00	10.00	45.00	59.00	
I-35 Johnson Co., KS (2.574 miles)	Urban Principal Arterial (UPA) - Interstate	Roadway delineation	Improve retroreflectivity	231.00	191.00			1.00	3.00	70.00	75.00	302.00	269.00	
US-169 Johnson Co., KS (3.24 miles)	Rural Principal Arterial (RPA) - Other	Roadway delineation	Improve retroreflectivity	38.00	58.00		1.00		1.00	17.00	11.00	55.00	71.00	
US-59 Franklin Co., KS (7.755 miles)	Rural Principal Arterial (RPA) - Other	Roadway delineation	Improve retroreflectivity	14.00	14.00					2.00	2.00	16.00	16.00	
US-69 Miami Co., KS (10.8 miles)	Rural Principal Arterial (RPA) - Other	Roadway delineation	Improve retroreflectivity	63.00	53.00	1.00			1.00	11.00	5.00	75.00	59.00	
US-54 Allen Co., KS (5.435 miles)	Rural Principal Arterial (RPA) - Other	Roadway delineation	Improve retroreflectivity	22.00	21.00				2.00	3.00	4.00	25.00	27.00	
US-54 Bourbon Co., KS (3.54 miles)	Rural Principal Arterial (RPA) - Other	Roadway delineation	Improve retroreflectivity	13.00	24.00		1.00			5.00	3.00	18.00	28.00	
I-435 Wyandotte Co., KS (11.982 miles)	Urban Principal Arterial (UPA) - Interstate	Roadway delineation	Improve retroreflectivity	51.00	78.00			1.00	2.00	20.00	18.00	72.00	98.00	
I-70 Wyandotte	Urban Principal	Roadway delineation	Improve retroreflectivity	266.00	256.00	4.00		7.00	8.00	67.00	67.00	344.00	331.00	

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)
Co., KS (5 miles)	Arterial (UPA) - Interstate													
I-670 Wyandotte Co., KS (1.6 miles)	Urban Principal Arterial (UPA) - Interstate	Roadway delineation	Improve retroreflectivity	50.00	67.00		1.00	3.00	2.00	18.00	32.00	71.00	102.00	
K-5 Wyandotte Co., KS (2 miles)	Urban Principal Arterial (UPA) - Other	Roadway delineation	Improve retroreflectivity	9.00	2.00					5.00	2.00	14.00	4.00	
K-15 Sedgwick Co., KS (3.5 miles)	Urban Principal Arterial (UPA) - Other	Roadway delineation	Improve retroreflectivity	59.00	46.00					21.00	7.00	80.00	53.00	
I-70 Lincoln Co., KS (7.229 miles)	Rural Principal Arterial (RPA) - Interstate	Roadway delineation	Improve retroreflectivity	39.00	40.00			1.00	3.00	2.00	10.00	42.00	53.00	
I-35 Coffey Co., KS (2.6 miles)	Rural Principal Arterial (RPA) - Interstate	Roadway delineation	Improve retroreflectivity	13.00	16.00			1.00		2.00	2.00	16.00	18.00	
I-35 Osage Co., KS (11.474 miles)	Urban Principal Arterial (UPA) - Interstate	Roadway delineation	Improve retroreflectivity	40.00	56.00		3.00	3.00	2.00	16.00	9.00	59.00	70.00	
US-50 Lyon Co., KS (7 miles)	Rural Principal Arterial (RPA) - Other	Roadway delineation	Improve retroreflectivity	46.00	43.00	1.00		1.00	3.00	11.00	4.00	59.00	50.00	
US-59 Douglas Co., KS (1.2 miles)	Rural Principal Arterial (RPA) - Other	Roadway delineation	Improve retroreflectivity	28.00	36.00				1.00	2.00	6.00	30.00	43.00	
K-15 at Meadowlark	Urban Principal Arterial (UPA) - Other	Intersection geometry	Intersection realignment	7.00	2.00					3.00		10.00	2.00	
Claflin and College in Riley Co., KS	Urban Minor Arterial	Intersection traffic control	Modify traffic signal –other	10.00	5.00				1.00	8.00	2.00	18.00	8.00	
I-70 Polk Quincy Viaduct Shawnee Co.	Urban Principal Arterial (UPA) - Interstate	Lighting	Horizontal curve lighting	21.00	22.00	1.00		5.00	2.00	1.00	1.00	28.00	25.00	.88

For the 2022 HSIP Annual Report, the Kansas Department of Transportation (KDOT) is starting to evaluate previous projects within the HSIP Annual Reporting tool. We have selected projects from the 2017 HSIP Annual Report unless crash data was unavailable for the three-year period of before and after analysis.

For lighting installation projects, we evaluated all before and after crashes at the horizontal curve where the lighting was installed. Only “intersection” and “intersection-related” crashes were used to evaluate crash data at intersections. For pavement marking projects, we used the before and after crash data that matched the approximate locations by miles. The limits of the project were matched as closely as possible.

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

Using roadway departure crash data from the pre-installation years of 2014 to 2016 and the post-installation years of 2018-2020, KDOT reported a 11% crash reduction for an urban segment horizontal curve included in the Polk Quincy Lighting Project (KA 4539-01). The Safety Analyst tool provided the Level of Service of Safety (LOSS) that measures the potential for safety improvements. For the segments of I-70 that are impacted by this project there is one segment that displayed a reduction in the LOSS. For example, a change from a LOSS III to an LOSS II the analysis is stating that the potential for any additional safety countermeasures is lower. The evaluation of this project clearing shows improvements in safety along the horizontal curve by the reduction in crashes, crash severity and an improved LOSS.

Using only “intersection” and “intersection related” crash reports, four intersection projects were also reported in the pre-installation years of 2014 to 2016 and the post-installation years of 2018 to 2020. Three intersections show a crash reduction of at least 50%. Similarly, analysis of the crash severity displayed the same benefit wherein three of the four projects reduced crash severity ranging from 63% to 100%. This analysis included fatal and all injury crashes. The project updating traffic signals in four locations along K-15 showed a crash reduction of 8% and a 25% reduction in crash severity.

Seventeen pavement marking project locations were also reported using the same pre- and post-installation years. Eight of the seventeen locations listed in this 2017 HSIP Annual Report show either a reduction or no change in the number of crashes. Additional analysis showed that nine of seventeen locations showed a reduction in roadway departure crashes. Analyzing roadway departure crashes solely, we found that three of these nine locations had reductions below 20%, and only one of these locations had no change in the frequency of roadway departure crashes. This shows that, as a whole, the pavement marking program is performing well as it continues to improve the retro-reflectivity of the markings.

Compliance Assessment

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

11/19/2021

What are the years being covered by the current SHSP?

From: 2019 To: 2024

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

2025

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

*Based on Functional Classification (MIRE 1.0 Element Number) [MIRE 2.0 Element Number]

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	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
ROADWAY SEGMENT	Segment Identifier (12) [12]	100	100					100	100	100	100
	Route Number (8) [8]	100	100								
	Route/Street Name (9) [9]	100	95								
	Federal Aid/Route Type (21) [21]	100	100								
	Rural/Urban Designation (20) [20]	100	100					100	100		
	Surface Type (23) [24]	100	80					100	65		
	Begin Point Segment Descriptor (10) [10]	100	100					100	100	100	100
	End Point Segment Descriptor (11) [11]	100	100					100	100	100	100
	Segment Length (13) [13]	100	100								
	Direction of Inventory (18) [18]	100	98								
	Functional Class (19) [19]	100	100					100	100	100	100
	Median Type (54) [55]	90	50								

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	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Access Control (22) [23]	100	95								
	One/Two Way Operations (91) [93]	100	99								
	Number of Through Lanes (31) [32]	100	99					100	98		
	Average Annual Daily Traffic (79) [81]	100	100					100	100		
	AADT Year (80) [82]	100	100								
	Type of Governmental Ownership (4) [4]	100	98					100	98	100	98
INTERSECTION	Unique Junction Identifier (120) [110]			100	100						
	Location Identifier for Road 1 Crossing Point (122) [112]			100	100						
	Location Identifier for Road 2 Crossing Point (123) [113]			100	100						
	Intersection/Junction Geometry (126) [116]			70	60						
	Intersection/Junction Traffic Control (131) [131]			50	20						
	AADT for Each Intersecting Road (79) [81]			100	100						
	AADT Year (80) [82]			100	100						
	Unique Approach Identifier (139) [129]			100	100						
INTERCHANGE/RAMP	Unique Interchange Identifier (178) [168]					99	99				
	Location Identifier for Roadway at Beginning of Ramp Terminal (197) [187]					99	99				

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	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Location Identifier for Roadway at Ending Ramp Terminal (201) [191]					99	99				
	Ramp Length (187) [177]					99	99				
	Roadway Type at Beginning of Ramp Terminal (195) [185]					99	99				
	Roadway Type at End Ramp Terminal (199) [189]					99	99				
	Interchange Type (182) [172]					20	20				
	Ramp AADT (191) [181]					100	100				
	Year of Ramp AADT (192) [182]					100	100				
	Functional Class (19) [19]					100	100				
	Type of Governmental Ownership (4) [4]					100	85				
Totals (Average Percent Complete):		**99.44**	**95.22**	**90.00**	**85.00**	**92.18**	**90.82**	**100.00**	**95.67**	**100.00**	**99.60**

*Based on Functional Classification (MIRE 1.0 Element Number) [MIRE 2.0 Element Number]

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.

K-Hub is KDOT's new Linear Referencing and Transportation Database System, which contains LiDAR data for all 140,000 public road miles in Kansas. It is currently being set up to have the event data items for MIRE FDE. The LiDAR data collection and extraction project created four Esri geodatabases including intersection data, guardrail data, signs, and roadway shoulder data for the State Highway System. KDOT is participating in the Application of Enterprise GIS for Transportation (AEGIST) Pooled Fund Study which helps states migrate to the enterprise level for creating, maintaining, and governing data related to roadways and their characteristics, elements, and events, which is based on a consensus best practices approach to the management of technology, data, and transportation system assets. KDOT staff attends webinars on MIRE data collection to learn about other states' best practices. KDOT continues to work toward the goal of updating all MIRE Fundamental data elements of all public roads by September 30, 2026.

Optional Attachments

Program Structure:

Project Implementation:

Safety Performance:

Evaluation:

HSIP Signing Report_kansas_final.docx
HSIP Lighting Report_kansas_final.docx
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.