

SAFE SYSTEM PILOT APPLICATION SUMMARY

EVALUATING SAFE SYSTEM ALIGNMENT IN MICHIGAN'S HIGHWAY SAFETY IMPROVEMENT PROGRAM

CASE STUDY | JUNE 2024

To advance implementation of the Safe System Approach (SSA), Federal Highway Administration (FHWA) developed three (3) resources for measuring SSA alignment—Safe System Project-Based Alignment Framework, Safe System Policy-Based Alignment Framework, and Safe System Roadway Design Hierarchy. These resources were introduced, applied, and refined through a series of eight (8) pilot workshops. The Safe System Pilot Application Summaries provide an overview of each pilot application, the approach used to assess Safe System alignment, and outcomes from the pilot effort.

The [Safe System Policy-Based Alignment Framework](#) offers a series of questions and considerations to help agencies assess policy and program alignment with the SSA. The Framework is based on seven criteria. These criteria include the SSA principles: 1) death and serious injury are unacceptable; 2) humans make mistakes; 3) humans are vulnerable; 4) responsibility is shared; 5) safety is proactive; and 6) redundancy is crucial, as well as equity. A series of prompts guide the user to evaluate the level to which the policy or program is aligned with each criterion. Similar to the [Highway Safety Improvement](#)

[Program Self Assessment Tool](#), there are five levels of alignment—Initiation (an agency has started to address the initiative), Development (an agency has developed a plan or approach to address the initiative), Execution (an agency has executed a plan or approach to address the initiative), Evaluation (an agency has assessed performance of the initiative), and Integration (an agency has integrated the initiative into agency culture). The user assigns a score within the appropriate level.

The Policy-Based Alignment Framework can be used to:

- ✓ **BENCHMARK PROGRESS** toward improving the SSA alignment of agency policies.
- ✓ **RAISE THE LEVEL OF AWARENESS** and promote adoption of SSA-related practices and strategies.
- ✓ **IDENTIFY GAPS** in existing policy and program efforts.
- ✓ **GENERATE STRATEGIES** to improve SSA alignment in agency policies and programs.
- ✓ **TRACK PROGRESS** of SSA alignment.
- ✓ **INFLUENCE A CHANGE** in agency business practices.





MICHIGAN DEPARTMENT OF TRANSPORTATION PILOT BACKGROUND

The purpose of the Michigan Department of Transportation (MDOT) pilot was to identify potential updates to MDOT's Highway Safety Improvement Program (HSIP) procedures and Safety Call for Projects Process to incorporate the SSA. MDOT's goal was to build upon its current data-driven practices that focus on fatalities and serious injuries and assess their HSIP policies using a Safe System lens. As part of this review, MDOT considered the following:

- ▶ Designing for human behavior
- ▶ Including equity
- ▶ Evaluating the application of technology and proven safety countermeasures
- ▶ Weighing vulnerable road user impact on project selection
- ▶ Collaborating with partners
- ▶ Integrating safety considerations for other projects



THE APPROACH

The MDOT Safe System pilot applied the Safe System Policy-Based Alignment Framework to MDOT's HSIP Manual, Safety Manual, HSIP Manual for Local Roadways, and Safety Call for Projects. MDOT gathered staff from across the agency—both from headquarters as well as region representatives—in a one-day workshop to discuss the current HSIP documents and identify opportunities to better align the various aspects of MDOT's HSIP with the SSA. Organized by the Framework criteria, workshop participants identified the following opportunities for MDOT's documents and HSIP program.

Death and Serious Injury are Unacceptable

The policy could focus on eliminating fatal and serious injury crashes versus all crashes. The current phrasing in the MDOT manuals include a "reduction" of fatalities and serious injuries. Additionally, all three documents discuss the "Call for Projects" process that requires an analysis of the prioritization of projects for review; however, the analysis typically requires the use of Time of Return equation, which includes a blend of both fatal and serious injury crashes and property damage only (PDO) crashes. To align with the SSA principle, "fatalities and serious injuries are unacceptable," participants suggested modifications to include the use of wording such as "eliminating fatal and serious injuries" or the adoption of methods that strongly consider fatal and serious injury crashes in analyses and prioritization procedures

Humans Make Mistakes

The policy could acknowledge that humans make mistakes and that systems could be built to make sure that when they occur, the crashes do not yield fatal and serious injuries. Additionally, human factors and behavior generally play a significant role in crashes; thus, developing strategies and policies to accommodate human behavior is critical to creating a safe system. To

account for this element, MDOT could consider adding additional language or creating a sub-document for reference that includes improvements and strategies to accommodate human errors and behavior (e.g., distracted driving). This document may explain how design principles are used to mitigate human mistakes, such as allowing more time for decisions, improving field of view, providing traffic calming, increasing user perception or expectations, or applying speed management principles.

Humans are Vulnerable

The policy could recognize that the human body can only withstand a certain amount of kinetic energy which is directly affected by speed and angle of collision. It may identify strategies that discuss vulnerable road users (e.g., pedestrians, bicyclists), speed management (e.g., policy improvements, design improvements, etc.), and angle of collision. MDOT could consider setting appropriate speed limits based on road context and all users of the roadway network. Considering roundabouts at intersections being designed or evaluated for signals is one process that could be implemented. Another idea involved adopting a process to determine target speeds for roadways. This approach to speed setting matches the context of the roadway to the desired speed of motor vehicles which improves safety for all road users, not only those in motor vehicles.

Responsibility is Shared

The policy could address how the responsibility of eliminating fatalities and serious injuries can be shared among all roadway users. Shared responsibility can be a challenge for some DOTs. In many cases, the State DOT may only be able to provide funding for infrastructure improvements. Therefore, consideration of other improvements like education campaigns or targeted enforcement falls outside of the purview of the DOT. MDOT understands the importance of engaging multidisciplinary teams and involving local agencies. All three MDOT manuals discussed the importance of Road Safety Audits (RSA) and the need for a multidisciplinary team to review study locations. Additionally, MDOT has a Local Safety Initiative (LSI) as outlined in some of their HSIP manuals. While the State legislature sets funding for local roadways that cannot be allocated, MDOT is developing a systemic call for projects for local agencies. With this program, local agency match requirements were also relaxed, affording local agencies the ability to fund safety improvements on their roadways.

Safety is Proactive

The policy could proactively account for risks and behaviors that could lead to fatal and serious injury crashes. MDOT has a separate systemic project program that streamlines low-cost treatments to reduce risks quickly and proactively on the roadways. The HSIP policies discuss using systemic safety analysis and practices which aim to use low-cost solutions to reduce risks on the roadway. The strategies in the HSIP manual, HSIP Manual for Local Agencies, and Safety Manual are primarily focused on infrastructure and engineering improvements. Minor improvements such as providing a background as to how the systemic analysis will reduce the risk for fatalities and serious injuries and adding a discussion on how education, enforcement, and vehicle technology applications can be integrated to supplement or complement the infrastructure and engineering improvements could improve alignment with the SSA.

Redundancy is Crucial

The policy language could highlight how various infrastructure elements provide layers of protection and how behavioral, education, and enforcement strategies provide another layer of protection if the infrastructure fails. MDOT may consider having a precursor in all manuals

to discuss the Safe System Approach and the importance of the layers of protection (i.e., the Swiss cheese model). This could explain that when one part of the system fails, the other parts provide support to ensure the system keeps operating optimally. In many cases, MDOT does provide redundancy in the roadway network. For example, MDOT is currently using [rumble strips](#) and [safety edge](#) as common features of specific roadways. A statement in the MDOT Safety Manual detailing how both rumble strips and safety edge provide redundancy in the roadway network may help demonstrate alignment with SSA.

Equity

The policy could prioritize communities and users of the transportation network that are disproportionately impacted by safety challenges and include solicitation of input from those communities and users. Additionally, policy language may include considerations and strategies for addressing inequities in transportation safety investments for all users. To accommodate equity in their policies, MDOT may consider integrating environmental justice measurements into prioritization methods or evaluate what portion of the selected safety projects improve both safety and mobility for disproportionately impacted communities and users. Such considerations could include Black, Indigenous, People of Color (BIPOC) populations and geographic communities who are historically underserved when dealing with transportation mobility and safety.

Mission

Applying the Safe System Approach through statewide strategies and initiatives that accommodate human mistakes and injury tolerance levels to move Michigan
Toward Zero Deaths

Vision

Eliminate fatal and serious injury crashes on
Michigan's roadways

Goals

Eliminate fatalities from 1,131 in 2021 to 0 by 2050.
Eliminate serious injuries from 5,979 in 2021 to 0 by 2050.



OUTCOMES

As a result of the Safe System pilot and related efforts, MDOT has instituted the following:

A goal of ZERO fatalities and serious injuries

With the adoption of the 2023–2026 Strategic Highway Safety Plan (SHSP), MDOT and its leadership have adopted a vision to eliminate fatal and serious injury crashes on Michigan’s roadways. A [letter from the governor states](#), “As a national traffic safety leader, MDOT has revised its Mission, Vision, and Goals, to incorporate the Safe System Approach as the strategy to advance roadway safety for all roadway users. With these changes, MDOT’s plan provides the framework to reduce traffic crashes, and eliminate fatalities and serious injuries on our roadways.”¹

Holistic approach to integrating SSA

In addition to the SHSP, several other MDOT safety-related manuals were updated to include the SSA, including the Safety Programs Guide, Call for Projects, and HSIP Implementation Plan. The focus of the Local Safety Call for Projects is funding projects that have the ability to reduce fatal and serious injury crashes and those crashes involving vulnerable road users.

Exemplifying the paradigm shift

MDOT is holding SSA workshops throughout the year and putting together case studies on SSA roadway improvements to promote the principles internally. Shifting the discussion around safety, while tying it to existing efforts demonstrating the SSA through real-world examples, has been key for MDOT to securing buy-in.



APPLYING THE SAFE SYSTEM POLICY-BASED ALIGNMENT FRAMEWORK IN YOUR AGENCY

The [Safe System Policy-Based Alignment Framework](#) can be used to assess Safe System alignment of any policy, procedure, program or plan. The following is a summary of the lessons learned from the MDOT pilot that may benefit other agencies applying the Policy-Based Alignment Framework.

- ▶ **WORDS MATTER**—Policy documents could clearly spell out the agency’s commitment to zero while acknowledging the human element.
- ▶ **START WITH THE BASICS**—Understanding the SSA takes time and repetition. Correlate what the agency is currently doing to the SSA so that people can connect the dots—people often relate to examples.
- ▶ **FOCUS SCOPE OF REVIEW**—Reviewing multiple manuals under one framework can be daunting and can lead to more high-level, generic recommendations. It is recommended that each manual be reviewed on its own. Once complete, consider how all manuals and policies (even those not within the safety program) work together for the agency’s alignment with the SSA. For example, speed management was a focus of the recommendations for MDOT, but MDOT policies for setting speed limits or managing speeds were not reviewed as part of this effort.
- ▶ **COMPILE BEST PRACTICES**—As more agencies begin to adopt the SSA into their policies and programs, it may be helpful to review how other agencies are implementing the SSA and evaluate if similar practices could be adopted in your agency.

*“Start changing the safety culture in-house before asking others to make changes. This will take time, so do not expect change overnight. **Keep the conversation going!**”*

— MARK BOTT

State Traffic and Safety Engineer (retired)
at Michigan Department of Transportation

¹ 2023-2026 State of Michigan Strategic Highway Safety Plan.

For more information about the Safe System Policy-Based Framework and other FHWA Safe System related tools and resources, please visit:

<https://highways.dot.gov/safety/zero-deaths>.

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ZERO IS OUR GOAL
A SAFE SYSTEM IS HOW WE GET THERE