SPR RESEARCH PROGRAM
SECOND-STAGE PROPOSAL SUMMARY

PROBLEM NUMBER AND TITLE

26-67 Evaluation of Traditional Versus Speed Safety Camera Enforcement Methods for Effectiveness Across Different Types of Speed Zones and Conditions

PROBLEM SUMMARY

Approximately one-third of traffic fatalities are attributable to speeding, but resources for speed zone enforcement are limited. Traffic fatality rates in Oregon have not declined substantially over recent years, and the fatality rate on urban roads in Oregon has increased. Oregon jurisdictions have limited resources to implement Safe System Approach elements, including enforcement of safer speeds. Speed safety cameras (SSC) are a mature technology that can provide continuous and efficient enforcement over large areas.

However, Oregon jurisdictions lack guidance on how to optimize traditional and SSC enforcement methods across different speed zones and roadway contexts.

ODOT OBJECTIVES

This study aims to explore the strategic prioritization of enforcement efforts across different speed zones, with the goal of maximizing road safety outcomes while addressing fairness considerations in the SSC deployment process. Specific objectives will address recent research and practices from other states, evidence base to support developing SSC or fixed photo radar (FPR) guidelines, needs for SSC deployment protocols, and developing a Safety Needs Assessment method to determine where SSC could be most effective. The final deliverable will provide recommendations for local jurisdictions to develop SSC performance measures and processes to optimize speed reduction over time and space, while minimizing cost and complexity for implementing jurisdictions.

BENEFITS

This project supports safety for Oregonians by helping prioritize SSC implementation where it can be most effective. If implemented, this study could support speed zone compliance and reduce serious injuries and fatalities on Oregon roads.

SCHEDULE, BUDGET AND AGENCY SUPPORT

Estimated Project Length: 19 months.
Estimated Project Budget: $190,000
ODOT Support: This problem statement ranked highest in need, and highly viable, as perceived by the ODOT Traffic Safety and Human Factors Expert Task Group.

- Angela Kargel, State Traffic Engineer, Angela.J.KARGEL@odot.oregon.gov

FOR MORE INFORMATION

For additional detail, please see the complete STAGE 2 RESEARCH PROBLEM STATEMENT online at:
https://www.oregon.gov/odot/Programs/ResearchDocuments/26-67

SPR RESEARCH PROGRAM
SECOND-STAGE PROBLEM STATEMENT
FY 2025

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26-67 Evaluation of Traditional Versus Speed Safety Camera Enforcement Methods for Effectiveness Across Different Types of Speed Zones and Conditions

RESEARCH PROBLEM STATEMENT

According to the National Highway Traffic Safety Administration (NHTSA), there are approximately 1.18 traffic fatalities per 100 million vehicle miles traveled (VMT) (NHTSA, 2024), with roughly 30% being speeding-related (NHTSA, 2023). In Oregon, during the 2019-2023 period, the fatality rate on rural non-interstate roads increased during and post-COVID but is now trending towards 2019 levels. Conversely, the fatality rate on all other roads (urban) increased from 0.87 to 1.16 over the same period, marking a 33.3% rise. Between 2018 and 2022, the urban crash rate involving speeding increased by 33% for fatalities and severe injuries (incapacitating injuries) (data provided by Christina McDaniel-Wilson, former ODOT Traffic Safety Engineer).

Traditional enforcement methods, such as manual police interventions, can be effective but are resource-intensive and limited in coverage. Advances in technology have made speed safety cameras (SSC)—formerly known as automated speed enforcement (ASE)—a viable alternative, offering continuous and efficient enforcement over large areas. Speed safety cameras are a proven safety countermeasure, capable of reducing crashes on urban arterials by up to 54% (FHWA, n.d.; Shin et al., 2009). SPR 873 has laid the groundwork for SSC guidelines in Oregon by providing updated best practices from other jurisdictions, and surveying public perception. However, optimizing the deployment of traditional versus automated enforcement methods requires an understanding of their effectiveness across different types of speed zones and varying conditions.

RESEARCH OBJECTIVES

This research aims to explore the strategic prioritization of enforcement efforts across different speed zones, with the goal of maximizing road safety outcomes while addressing fairness considerations in the SSC deployment process. A key challenge is balancing the number of SSC locations while considering safety, population statistics, and equity measures. In Oregon, local jurisdictions can develop their own fairness measures regarding SSC placement, but the Oregon Department of Transportation (ODOT) can provide evidence-based measures, guidance, reporting templates, and recommendations.

This study's objectives to meet this aim are to:

- review ODOT's current practices and needs for speed enforcement, including recent research and practices from other states;
- build the evidence base to support developing SSC or fixed photo radar (FPR) guidelines;
- assess needs for SSC deployment protocols, including input from local jurisdictions and avoiding overburdening lower-income or disadvantaged populations; and
- develop a Safety Needs Assessment method to determine where SSC could be most effective.

WORK TASKS, COST ESTIMATE AND DURATION

Task 1: TAC Meeting #1 will bring the TAC and research team together to review the project needs and schedule, covering ODOT's current practices supporting speed enforcement, and how to engage with practitioners to evaluate use of speed safety cameras (SSC) in this study, including existing standards and methods, such as the ODOT Traffic Manual.

Task 2: Draft Literature Review will sharpen the needs of the present study based on previous work evaluating traditional and speed safety camera enforcement, spanning existing ODOT documents, peer DOT studies, practices, and peer-reviewed literature. This review will help inform the most effective research methods and data to evaluate where SSC could be most effective.

Task 3: Draft Research Methodology will specify an approach for working with local jurisdictions to test SSC installation locations for effective speed reduction. The research team will engage local jurisdiction staff in determining data collection criteria and potential SSC site feasibility, in addition to establishing matching control sites—either SSC sites before SSC implementation, or other sites with matching conditions. Data collection will address intersection context, such as location in school zones, crash history including injury severity, and roadway classification. Conditions for camera site feasibility will consider the camera viewshed, access to power, and constructability. The research team will address spatial halo effects of speeding deterrence by including at least two speed measurement locations at each SSC site, and temporal halo effects by including speed measurements at two or more times—at least during SSC installation and after removal of the system.

Task 4: TAC Meeting #2 is intended to set the course for the completion of the project by reviewing the draft research methodology, and informing the research team of changes necessary to 1) achieve the study's stated aim and objectives, and 2) direct the methods to be most implementable by jurisdictions in Oregon.

Task 5: Data Collection includes the time and resources necessary to follow the Draft Research Methodology, using input from the TAC in Task 4.

Task 6: Data Analysis follows the Draft Research Methodology to provide a statistical review of results on speeding behaviors, and leverage insights from working with jurisdictions in the process to support implementation in the field.

Task 7: Draft Final Report will include development of a Publication ready Draft Final Report in the prescribed ODOT report format that emphasizes practice-ready findings from the study to support implementation, and also sufficiently describes the research process and analysis to support replication of the study.

Task 8: TAC Meeting #3 will include a review of the Draft Final Report, and Draft Research Note prior to the TAC meeting.

Task 9: Final Report involves editing the Draft Final Report to incorporate edits identified by the ODOT research coordinator following TAC Meeting #3.

Key Deliverables: *Final report with recommendations for local jurisdictions to develop SSC performance measures and processes to optimize speed reduction over time and space, while minimizing cost and complexity for implementing jurisdictions.*

Estimated Project Length: 20 months.
Estimated Project Budget: $190,000

IMPLEMENTATION

Close engagement of the project technical advisory committee (TAC) will be key for implementation of the project, including any changes to the ODOT Traffic Manual. Appendix 2 in the current ODOT traffic manual contains updates for SSC-related legislative changes over the past eight years (ODOT Traffic Engineering Section, 2024). However, proposed or future SSC legislative changes will require a significant update to the fixed photo radar (FPR) camera guidelines. This research will provide evidence and material to support the development of updated SSC or FPR guidelines, particularly concerning the relationships between enforcement type, speed compliance, crash rates, and equity.

This project could lead to the establishment of protocols for SSC deployment, including a Safety Needs Assessment on state highways to determine where SSC could be most effective. It would also gather input from local jurisdictions to provide a statewide picture of SSC needs. The Federal Highway Administration's guide emphasizes that equity must be considered in the implementation of safety programs to determine whether SSC is a suitable countermeasure or if other speed management measures should complement or replace it (Federal Highway Administration, 2023).

POTENTIAL BENEFITS

This project directly addresses the safety research priority of the ODOT Research Advisory Committee by helping prioritize SSC implementation where it can be most effective. If implemented, this study could support speed zone compliance and reduce serious injuries and fatalities on Oregon roads. If not completed, ODOT and Oregon jurisdictions will be able to follow existing guidance on SSC, but may waste costs or safety resources if SSC systems are installed in less-than-ideal contexts.

PEOPLE

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STAFF REVIEW PAGE

LITERATURE CHECK

TRID&RIP

☒ A review of TRID & RIP databases found no existing research that answers the research question

There are two ongoing studies that address automated speed enforcement, but neither focus on Oregon's statewide needs. "Evaluating the effectiveness of urban speed cameras on traffic safety in a period of dramatic change" only evaluated a single roadway (Roosevelt Boulevard) in one month (June 2020), and has limited applicability to the Oregon statewide context (Guerra, 2024). Similarly, "Effectiveness of Automated Speed Enforcement in School Zones and Guidance for Continuous Usage in Georgia" is limited to school zones in Georgia (Dissanayake, 2024). When complete, these studies may be valuable for the literature review of an ODOT study.

ODOT DECISION LENSES

Climate: This research is not focused on climate and will not include analysis of climate.

Equity: This study will address fairness of SSC implementation across different road users, and can support equity-related objectives of the ODOT Strategic Action Plan and Oregon Transportation Plan. With legislation potentially expanding SSC in scope and location, there is a need to ensure that a reasonable number of SSC locations are established to counter the perception of SSC as a "money grab." Fine structures can also be adapted to enhance equity and safety outcomes, such as implementing flat or progressive fines. It is also important to analyze SSC in relation to the distribution of marginalized populations and identify those who would benefit from SSC expansion in high-priority safety corridors and the spatial distribution of vulnerable users.

Safety: Improving implementation of SSC can support safety culture for all road users by setting expectations for compliance with speed zones when traditional law enforcement is not visible. SSC technologies have improved in recent years, and therefore this study supports using the best available technologies in practice. Further, this study is focused on the strategic investment of SSC for greatest effectiveness.

TECHNOLOGY & DATA ASSESSMENT

☒ No Identified T&D output

☐ At the end of this project, the implementing unit(s) within ODOT will need to coordinate the adoption of new technology or data in order to realize the full potential of this research.

CROSS-AGENCY IMPACTS

- List ODOT partners or impacted units.
    - ODOT Traffic Engineering Section
    - Oregon DMV - Transportation Safety Office
    - Oregon State Police
    - Local jurisdiction police departments

- Identify any issues of concern raised by ODOT partners. Note expected mitigation that addresses these

concerns.

- Traffic Safety and Human Factors Expert Task Group members raised the issue that driver speeding may explain more about enforcement effectiveness than crash data, which guided development of this problem statement to focus on speeding behaviors, which may also be more directly related to SSC implementation.
- Also, changes in Oregon law may impact how SSC can be implemented by jurisdictions, which guided how this problem statement emphasizes review of state law and jurisdictional guidance in the literature review. Therefore, findings should be informed by current law and input from jurisdictions.