

MPC-540

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Project Title:

Updating and Implementing the Grade Severity Rating System (GSRS) for Wyoming Mountain Passes

University:

University of Wyoming

Principal Investigators:

Khaled Ksaibati, Ph.D., P.E.

Professor

University of Wyoming

Phone: (307) 766-6230

Email: khaled@uwyo.edu

ORCID: 0000-0002-9241-1792

Dick T. Apronti, Ph.D.

Postdoctoral Research Associate

University of Wyoming

Phone: (307) 223-6317

Email: dapronti@uwyo.edu

ORCID: 0000-0002-2072-2030

Research Needs:

The proposed study is aimed at achieving two main goals. First, the FHWA's GSRS model will be updated to reflect the current truck population characteristics. This will be achieved by carrying out field tests with an instrumented vehicle to update parameters in the model that reflect current truck characteristics and braking systems. The second objective of the study is to evaluate Wyoming mountain passes and their warning systems with regard to truck downgrade crashes. By doing this, the best means of communicating with truck drivers to reduce the probability of runaway truck incidences can be recommended.

By achieving the two goals, the study will present recommendations that will counter the occurrence and severity of downgrade truck crashes on Wyoming mountain passes. A new software will be developed for estimating maximum safe speeds for truck weight categories using the new parameters. The estimates from the new software will be more consistent with current truck characteristics and a combination of these estimates with an effective warning system will encourage compliance by truck drivers.

Research Objectives:

1. Update the FHWA's GSRS model to reflect the current population characteristics.
2. Evaluate Wyoming mountain passes and their warning systems with regard to truck downgrade crashes.

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Research Methods:

The overall methodology of this study is aimed at meeting two main goals. The first goal is to evaluate Wyoming mountain pass warning systems to recommend the "best" warning system to implement for reducing truck crashes. This will involve tasks that include site visits to examine the current road signs and road geometry. Crash and citation data involving mountainous terrain will also be analyzed to determine which warning systems are effective.

The second goal is to review and update the FHWA GSRs model for estimating safe truck descent speeds. This goal will be achieved by carrying out tasks that include determining an appropriate truck type that is representative of current truck populations. The representative truck will be used in field tests to update and validate the GSRs model parameters to enable estimation of accurate maximum safe truck descent speeds that are more applicable to current truck populations.

Expected Outcomes:

The outcome of the study will be an updated model for determining safe descent truck speeds on Wyoming mountain passes. An evaluation of existing advance warning systems will inform WYDOT on the most effective means of addressing runaway truck crashes. A recommendation on the best practice for signing or notifying truck drivers about safe descent speeds will be made to WYDOT. It is believed that the research outcomes will be of immediate interest not only to WYDOT but also other states departments of transportation.

Relevance to Strategic Goals:

- Safety
- Economic Competitiveness

The project outcomes will address two main strategic goals associated with the MPC program and the U.S. Transportation Research Board as well as the USDOT's requested emphasis areas described as follows:

1. Economic Competitiveness – Improved safety on mountain passes for freight trucks will save on life and property costs associated with yearly runaway truck crashes.
2. Safety – The recommendations of the study will be aimed at improving safety for trucks on Wyoming mountain passes by recommending safe descent speeds for truck drivers to descend steep grades.

Educational Benefits:

Both graduate and undergraduate students will be working on this study. The study will provide the students with an excellent opportunity to interact with transportation professionals and learn about transportation related studies.

Tech Transfer:

The study findings will be submitted to peer review journals for publication. Technical reports will also be produced and submitted to WYDOT that will detail the study processes and outcomes.

Work Plan:

1. Literature Review
2. Evaluate Existing Warning Systems on Wyoming Mountain Passes
3. Review and Upgrade the FHWA GSRS Model
4. Recommend an Appropriate Warning System for Implementing the Updated GSRS Advisories for Truck Drivers
5. Prepare final report. Present findings and recommendations

The overall methodology of this study is summarized under Research Methods. The proposed methodology is structured as a thirty-month effort. It is envisioned that the aforementioned study objectives will be achieved by completing five major tasks.

Project Cost:

Total Project Costs:	\$194,152
MPC Funds Requested:	\$95,162
Matching Funds:	\$98,990
Source of Matching Funds:	Wyoming Department of Transportation

References:

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