



Differential Truck Speed Limit on Rural Two-Lane Highways: Survey of Practice

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Executive Summary

Background

In 2017, California Department of Transportation (Caltrans) District 2 issued a Transportation Concept Report that evaluated current roadway operational conditions and identified potential highway improvements for US 395. During the development of the Transportation Concept Report, members of the public and elected officials commented on the perceived negative operational impact of the differential speed limit (55 mph for trucks, 65 mph for other vehicles). The public perceived that the differential speed limit between trucks and other vehicles creates adverse operational and safety impacts on two-lane state highways. Limited research had been done about the comparative benefits of these speed limit policies on rural two-lane highways. Four studies of two-lane highways somewhat supported the use of uniform speed limits, and virtually all states have reduced or eliminated the use of differential speed limits. As a result, the Transportation Concept Report included a recommendation to evaluate the potential benefit of a universal speed limit for US 395.

Caltrans is seeking information from other state transportation agencies about best practices with truck speed limits on rural two-lane highways, and lessons learned from the implementation of a universal speed limit. A follow-up study will evaluate the potential benefits of implementing a universal speed limit on rural multilane highways and freeways.

To assist Caltrans in this information-gathering effort, CTC & Associates conducted an online survey of state transportation agencies that examined their experience with using differential truck speed limits on rural two-lane highways. A literature search identified publicly available sources of national and state policy and guidance to supplement survey findings.

Summary of Findings

Survey of State Practice

An online survey was distributed to members of the American Association of State Highway and Transportation Officials (AASHTO) Committee on Traffic Engineering who were expected to have knowledge of or experience with differential truck speed limits on rural two-lane highways, and developing and implementing a uniform speed limit policy. For the purposes of the survey and this Preliminary Investigation, these speed limits were defined as follows:

- *Differential speed limit:* Lower maximum speed limit is set for heavy trucks and other vehicles with three or more axles.
- *Uniform speed limit:* Maximum speed limit is the same for all vehicles.

Twenty-five state transportation agencies responded to the survey. Only one agency—Montana Department of Transportation (DOT)—has made the change from a differential to uniform speed limit on some rural two-lane highways. Oregon DOT has not transitioned from a differential speed limit but recently studied an increase in maximum differential speed limits. Two agencies—Tennessee and Utah DOTs—currently apply differential truck speed limits on rural two-lane highways and are not considering changing to a uniform speed limit. The remaining 21 state transportation agencies reported that their agencies have never applied differential truck speed limits on rural two-lane highways.

Survey results are summarized below in four categories:

- Agencies adopting a uniform speed limit on some rural two-lane highways.

- Agencies examining changes in maximum differential speed limits.
- Agencies not considering a uniform speed limit.
- Agencies that have never applied differential truck speed limits.

Agencies Adopting a Uniform Speed Limit on Some Rural Two-Lane Highways

Montana DOT is the only respondent to transition from a differential to uniform speed limit on some rural two-lane highways. In Montana, the speed differential still exists statutorily, but the agency has lowered the vehicle speed limit to the truck speed limit in two corridors with a high proportion of truck traffic relative to total traffic. Also, recent modifications to legislation allow the agency to apply a speed zone to cover longer road segments.

Studying the Issue

A Montana DOT study examining the change from differential to uniform speed limits on selected roadways considered crash frequency, crash severity, travel speed/speed limits, road geometry and traffic volumes with truck proportions when evaluating the impact of the speed limit change. Not included in the assessment was an examination of economic benefits (such as reduced traffic delay) or cost (such as fuel consumption). The agency contacted representatives from the trucking industry, government/political leaders (state or local), and the traveling public in an outreach campaign to potential stakeholders. Stakeholders from automobile clubs and associations, the tourism industry and state travel associations were not contacted.

Study Findings

Findings that supported elimination of the speed differential were elevated traffic volumes with a high truck proportion; crash data, including commercial vehicle crashes; and citation data. The respondent reported no findings or data that opposed elimination of the speed differential, and noted that both the engineering data and the traveling public supported the findings. The respondent also reported that all the stakeholders contacted in the outreach campaigns—the trucking industry, government/political leaders and the traveling public—supported the study findings.

Outcomes and Recommendations

The respondent did not report on anticipated outcomes of the study, but did note that the agency had not anticipated the positive public support, “both from the trucking and [a] daily driver perspective.” The respondent suggested that other agencies considering the elimination of speed differentials on rural two-lane highways should focus on high-volume corridors with 10% or more trucks and crash data.

Agencies Examining Changes in Maximum Differential Speed Limits

Instead of reporting on a transition from differential to uniform speed limits, the Oregon DOT respondent provided details of a change in existing differential speed limits on selected highways and interstates in Oregon, and an analysis of the impact of raising those speed limits.

Issues Prompting the Study

Oregon already had in place a differential truck speed limit on March 1, 2016, when the Oregon Legislature mandated raising the maximum speed limits for both cars and trucks on approximately 1,400 miles of highways and interstates in the eastern portion of Oregon, including some rural highways. The revised speed limits are:

- 65 mph to 70 mph for cars; 55 mph to 65 mph for trucks (primarily interstates).
- 55 mph to 65 mph for cars; 55 mph to 60 mph for trucks.

A preliminary analysis of this speed increase focused on the overall impact of the speed increase and not on removal of the differential truck speed.

Study Findings

Researchers examined crash frequency, crash severity, travel speed and speed limits. Findings were preliminary, and no conclusions were made. If the agency finds that an increase in crashes is due to the speed differential, which existed before the speed increase, it may decide to lower vehicle speeds to eliminate the differential. Current statutes allow Oregon DOT to lower car speeds to the truck speed, but not increase truck speed to the car speed.

Outcomes and Next Steps

The next data assessment is expected to include a more detailed analysis of the conditions that lend themselves to increased crash risk, which may include identifying key features in higher crash segments of raised speeds. The respondent noted that the agency would need data to understand what contributes to increased crash risk within a segment, such as curves, intersections, access density or lack of passing opportunity.

The respondent also noted that the agency recently reviewed most interstate truck speeds and, for the most part, lowered the truck speed differential on these roadways from 10 mph to 5 mph.

Agencies Not Considering a Uniform Speed Limit

Tennessee and Utah DOTs are not considering changing to a uniform speed limit on rural two-lane highways. Tennessee DOT recently eliminated differential truck speeds in urban areas after reviewing research that indicated a differential speed limit did not have much effect on air quality. The Utah DOT respondent noted that differential speed limits are “helpful when addressing geometric concerns,” with high weight or high center of gravity vehicles most likely impacted by travel speeds.

Agencies That Have Never Applied Differential Truck Speed Limits

Six of the 21 agencies that reported never having applied differential truck speed limits on rural two-lane highways provided additional information about their agencies’ current speed limit practices and policies, primarily as they relate to interstates. For example, in Arkansas, new legislation increases speed limits on interstates only for all vehicles except trucks (70 mph for trucks and 75 mph for other vehicles). In Indiana, proposed legislation would eliminate the differential truck speed on rural interstates, largely to reduce crashes and vehicle operating costs. Missouri legislators have raised the question about lowering truck speed limits on interstates, freeways, expressways and similar road types, but Missouri DOT has never pursued the issue. The New Hampshire DOT respondent added that speed differential is “more problematic than speeding.”

Related Research and Resources

A literature search of recent publicly available research identified a limited number of publications and resources related to differential truck speed limits on rural two-lane highways. Some publications expand the analysis to consider rural interstates, and urban and suburban areas.

Among the national guidance is a National Cooperative Highway Research Program project in process that is establishing guidance for the setting of speed limits. Publications describing state research and practices include a 2017 journal article that assesses the differences in

driver speed selection in five states, with a particular emphasis on the differences between uniform and differential speed limits.

The authors of a 2015 journal article noted that “[e]xisting research literature has shown that traffic fatalities increase at higher speed limits.” The authors’ findings provided further evidence that both overall and truck-involved fatalities increased with maximum speed limits. States with differential speed limits were found to have marginal differences in total fatalities as compared with states with uniform speed limits. However, truck-involved fatalities were significantly lower in states where differential limits were in place.

A 2017 Alaska Department of Transportation and Public Facilities report examines the use of differential speed limits on segments of two-lane rural roads in the state. The outcome, based on public perception, traffic data and video analysis, suggests that the practice did not provide safety and operational benefits. A 2015 conference paper analyzes the long-term impact of differential speed limits on rural freeways in Idaho (from 1992 through 2011). Results indicated that implementation of the differential speed limit policy has contributed to the improved safety conditions on rural freeways in Idaho. Researchers cited the considerable reduction in the 85th percentile and the pace speeds for trucks and the improved compliance of truck speed limits.

Finally, the four studies cited in the initial Transportation Concept Report issued by Caltrans District 2 include a July 2016 Montana DOT report, journal articles and a conference paper that examine the safety and traffic implications of car/truck differential speed limits on two-lane highways.

Gaps in Findings

Although a considerable number of state DOTs responded to the survey, the number of participants reporting experience with changing a differential speed limit to a uniform speed limit was very limited. Reaching out to nonresponding states to potentially identify additional states that have considered or have already changed to a uniform speed limit for rural two-lane highways could provide useful information. In addition, most of the current research addressed speed limit policies on rural interstate and multilane highways, and not on rural two-lane highways.

Next Steps

Moving forward, Caltrans could consider:

- Contacting the Montana DOT respondent to learn more about the agency’s experience with transitioning from a differential to uniform speed limit on some rural two-lane highways.
- Reviewing the speed limit legislation and other resources provided by Montana and Oregon DOTs.
- Engaging with Oregon DOT as the agency continues to gather data and analyze the impact of increasing maximum differential speeds on some rural highways.
- Gathering information from agencies that did not respond to the survey to obtain further guidance and perspectives.

Detailed Findings

Background

The Transportation Concept Report for US 395 is a long-range planning document for California Department of Transportation (Caltrans) District 2 that evaluates current roadway operational conditions and identifies potential highway improvements. The plan, completed in 2017, considers various planning elements, such as development and growth trends, land uses and local road connections, and emphasizes stakeholder involvement in the planning process.

During the development of the Transportation Concept Report, members of the public and elected officials commented on the perceived negative operational impact of the differential speed limit (55 mph for trucks, 65 mph for other vehicles). Public perception is that the differential speed limit between trucks and other vehicles creates adverse operational and safety impacts on two-lane state highways.

As part of the Transportation Concept Report planning process, investigators reviewed 18 studies that compared other state practices and policies using differential speed limits and uniform speed limits. Only four of these studies addressed differential speed limit policy on two-lane highways; the focus of the remaining studies was on multilane facilities. The four studies of two-lane highways somewhat supported the use of uniform speed limits, and virtually all states have reduced or eliminated the use of differential speed limits. As a result, the Transportation Concept Report included a recommendation to evaluate the potential benefit of a universal speed limit for US 395.

To determine whether adopting a universal speed limit could be a cost-effective way to improve operation and safety, Caltrans sought information from other state transportation agencies about current and best practices with truck speed limits on rural two-lane highways, and lessons learned from the implementation of a universal speed limit. A follow-up study will evaluate the potential benefits of implementing a universal speed limit on rural multilane highways and freeways.

To assist Caltrans in this information-gathering effort, CTC & Associates summarized the results of an online survey of state transportation agencies that examined their experience with using differential truck speed limits on rural two-lane highways. In addition, a literature search was conducted to identify publicly available sources of national and state policy and guidance related to this issue. Findings from these efforts are presented in this Preliminary Investigation in two topic areas:

- Survey of state practice.
- Related research and resources.

Survey of State Practice

An online survey was distributed to members of the American Association of State Highway and Transportation Officials (AASHTO) Committee on Traffic Engineering who were expected to have experience using differential truck speed limits on rural two-lane highways, and developing and implementing a uniform speed limit policy. For the purposes of the survey and this Preliminary Investigation, these speed limits were defined as follows:

- *Differential speed limit:* Lower maximum speed limit is set for heavy trucks and other vehicles with three or more axles.
- *Uniform speed limit:* Maximum speed limit is the same for all vehicles.

[Appendix A](#) provides the survey questions. The full text of survey responses is presented in a supplement to this report.

Summary of Survey Results

Twenty-five state transportation agencies responded to the survey:

- Alabama.
- Arkansas.
- Connecticut.
- Delaware.
- Idaho.
- Illinois.
- Indiana.
- Iowa.
- Kentucky.
- Louisiana.
- Massachusetts.
- Michigan.
- Minnesota.
- Missouri.
- Montana.
- Nebraska.
- New Hampshire.
- New Mexico.
- North Dakota.
- Ohio.
- Oregon.
- Rhode Island.
- Tennessee.
- Utah.
- Wisconsin.

Only one agency—Montana Department of Transportation (DOT)—reported adopting a uniform speed limit on some rural two-lane highways.

Rather than reporting on the transition from a differential truck speed limit to a uniform speed limit, the Oregon DOT respondent discussed a change in maximum differential speed limits. In 2016, the Oregon Legislature raised maximum speed limits for cars and trucks on rural highways in eastern Oregon. A preliminary study examined the impacts of raising these speeds but did not consider the speed differential between cars and trucks.

Two agencies—Tennessee and Utah DOTs—currently apply differential truck speed limits on rural two-lane highways and are not considering changing to a uniform speed limit. Respondents from the remaining 21 state transportation agencies reported that their agencies have never applied differential truck speed limits on rural two-lane highways.

All of the agencies participating in the survey except Massachusetts DOT (an agency reporting that it has never applied differential truck speed limits on rural two-lane highways) are available for follow-up conversations regarding their states' truck speed limit policies.

Below are survey results in four categories:

- Agencies adopting a uniform speed limit on some rural two-lane highways.
- Agencies examining changes in maximum differential speed limits.

- Agencies not considering a uniform speed limit.
- Agencies that have never applied differential truck speed limits.

Agencies Adopting a Uniform Speed Limit on Some Rural Two-Lane Highways

Montana DOT is the only respondent to transition from a differential truck speed limit to uniform speed limit on some rural two-lane highways. Survey findings are summarized below in three categories:

- Defining the problem.
- Studying the issue.
- Outcomes and recommendations.

Defining the Problem

Table 1 summarizes aspects of the speed limit policy change in Montana, including:

- Issues that prompted the agency to consider eliminating the differential speed limit.
- Approach taken to define the problem.
- Current state laws, codes or regulations on truck speeds.

Documentation related to truck speed legislation or regulations is available in [Related Resources](#) on page 10.

Table 1. Transition From a Differential Speed Limit to Uniform Speed Limit on Some Rural Two-Lane Highways

Topic Area	Description
Issues Leading to Elimination of Differential Truck Speed Limit	<ul style="list-style-type: none"> • Statutorily, the speed differential still exists, but the vehicle speed limit has been lowered to the truck speed limit in two corridors where the proportion of trucks is high relative to total traffic. • Recent changes to legislation allow the agency to apply a speed zone to cover longer road segments.
Approach to Defining the Problem	<ul style="list-style-type: none"> • Both corridors had a large proportion of truck traffic. • The routine engineering study used measured speeds, crash and citation data. Results showed that vehicles were already traveling at or near the speed of trucks.
Current State Laws, Codes or Regulations on Truck Speeds	<p>Interstate</p> <ul style="list-style-type: none"> • Vehicles: 80 mph • Trucks: 70 mph <p>Interstate (urban)</p> <ul style="list-style-type: none"> • Vehicles: 65 mph • Trucks: 65 mph <p>Other public highway</p> <ul style="list-style-type: none"> • Vehicles: 70 mph • Trucks: 65 mph <p>Nighttime</p> <ul style="list-style-type: none"> • Vehicles: 65 mph • Trucks: 65 mph

Studying the Issue

Table 2 describes a Montana DOT study that examined differential speed limits in the following categories:

- Safety and operational data used in the study.
- Outreach campaigns to stakeholders (individuals and organizations).
- Findings that supported or opposed eliminating the speed differential.
- Stakeholders' responses to study findings.

The respondent noted that the agency had “very positive feedback” to the study and would not have made any changes to the study process.

Table 2. Speed Limit Study Parameters: Montana Department of Transportation

Topic Area	Description
Safety and Operational Data Used in Study	<ul style="list-style-type: none"> • Crash frequency. • Crash severity. • Travel speed/speed limits. • Road geometry. • Traffic volumes and truck traffic proportions.
Outreach Campaigns to Potential Stakeholders?	Yes. Stakeholders contacted during the study: <ul style="list-style-type: none"> • Trucking industry. • State or local government or political leaders. • Traveling public.
Data That Supported Elimination of Speed Differential	<ul style="list-style-type: none"> • Elevated traffic volumes with a high proportion of truck traffic. • Crash data, including commercial vehicle crashes. • Citation data.
Data That Opposed Elimination of Speed Differential	Very little. Engineering data supported the findings, and the public also supported the change.
Additional Data Needs Identified During/After Study	None.
Stakeholders That Supported Study Findings¹	<ul style="list-style-type: none"> • Trucking industry. • State or local government or political leaders. • Traveling public.

¹ None of the stakeholders opposed the study findings.

Outcomes and Recommendations

Study Assessment

While Montana DOT did not reach a decision based on study findings, the respondent noted that except for the statutory uniform speed limits for urban interstates and nighttime conditions, the agency has only implemented uniform speed limits in a few corridors, and these were done as special speed zones. Though not reporting on anticipated outcomes of the study, the

respondent noted that the agency had not anticipated the positive public support, “both from the trucking and [a] daily driver perspective.”

Recommendations

The Montana DOT respondent suggested that other agencies considering the elimination of speed differentials on rural two-lane highways should focus on high-volume corridors with 10% or more trucks and crash data.

Related Resources

Below are resources provided by the survey respondent or located in a search of the literature.

§61-8-312 Special Speed Limitations on Trucks, Truck Tractors and Motor-Driven Cycles, Montana Code Annotated, 2019.

https://leg.mt.gov/bills/mca/title_0610/chapter_0080/part_0030/section_0120/0610-0080-0030-0120.html

From the code:

(1) Except as provided in 61-8-303, 61-8-309, 61-8-310, and subsection (2) of this section, the speed limit for a truck or truck tractor of more than 1 ton “manufacturer’s rated capacity” traveling on:

- (a) an interstate highway, as defined in 60-1-103, is 70 miles an hour; and
- (b) any other public highway is 65 miles an hour.

(2) Except as provided in 61-8-303, 61-8-309, and 61-8-310, the speed limit for a vehicle subject to a term permit under 61-10-124(2)(d) or a truck-trailer-trailer or truck tractor-semitrailer-trailer-trailer combination of vehicles subject to special permits under 61-10-124(4) is 65 miles an hour unless otherwise stated in the permit.

Related Resource:

§61-8-303 Speed Restrictions, Montana Code Annotated, 2019.

https://leg.mt.gov/bills/mca/title_0610/chapter_0080/part_0030/section_0030/0610-0080-0030-0030.html

From the code:

(1) Except as provided in 61-8-309, 61-8-310, and 61-8-312, the speed limit for vehicles traveling:

- (a) on an interstate highway outside an urbanized area of 50,000 population or more is 80 miles an hour at all times and the speed limit for vehicles traveling on interstate highways within an urbanized area of 50,000 population or more is 65 miles an hour at all times;
- (b) on any other public highway of this state is 70 miles an hour during the daytime and 65 miles an hour during the nighttime;
- (c) in an urban district is 25 miles an hour.

“Short-Term Evaluation of Transition From Differential to Uniform Speed Limit for Trucks and Buses on Two-Lane Highways,” Raha Hamzeie, Bijan Vafaei, Jonathan Kay, Peter Savolainen and Timothy Gates, *Transportation Research Record* 2637, pages 83-88, January 2017.

Citation at <https://journals.sagepub.com/doi/10.3141/2637-10>

From the abstract: As of November 2016, Montana was the only state to maintain a differential speed limit on two-lane two-way rural highways, with a daytime statutory speed limit of 70 mph for cars and light trucks and 60 mph for trucks exceeding a 1-ton payload capacity. Although differential speed limits are common on freeways, the use of differential limits on two-lane roadways presents unique safety and operational issues because of passing limitations and the resultant platooning that occurs. Given these concerns, the speed limit was changed from the differential 70 mph to 60 mph speed limit to a uniform 65 mph limit for all vehicles along 55 [miles] of two-lane highway in April 2013. This study evaluated the short-term operational and safety impacts associated with this transition. Given the limited time period over which data were available following the speed limit change, surrogate safety measures were investigated to provide immediate feedback as to these impacts. A series of field studies was performed on two-lane rural highways in Montana, which predominantly possessed the 70 mph to 60 mph differential speed limit, as well as on selected locations along the 55 [miles] where the uniform speed limit was implemented. The locations with 65 mph speed limits generally exhibited shorter platoon lengths and less high-risk passing behavior. Overall, the preliminary findings provide some general support for transitioning to a uniform 65 mph speed limit on two-lane rural highways.

Safety and Operational Impacts of Differential Speed Limits on Two-Lane Rural Highways in Montana: Project Summary, Timothy Gates, Jonathan Kay, Sterling Frazier, Jacob Finkelman, Peter Savolainen, Brendan Russo and Raha Hamzeie, Montana Department of Transportation, July 2016.

<https://rosap.ntl.bts.gov/view/dot/31483>

Note: This project summary presents highlights from a study cited in the Transportation Concept Report that is the basis for this Preliminary Investigation (see page 25). *From the project summary:*

- *Impact of speed limit policy on free flow speeds:* [T]ransitioning from a 70/60 mph differential speed limit to a uniform 65 mph speed limit on two-lane roadways in Montana would likely decrease the overall mean and 85th percentile travel speeds, although truck speeds would be expected to increase. Ultimately, the expected convergence of the speed profiles for passenger vehicles and heavy trucks associated with the change to a uniform speed limit would consequently reduce the variability in travel speeds.
- *Safety performance evaluations:* [C]rashes on two-lane highways in Montana tended to increase with driveway density, horizontal curvature and on highways of higher functional class, as well as on segments located in District 1, which includes the most urbanized areas of the state. In contrast, fewer crashes were experienced on segments with wider shoulders or where passing relief lanes were in place.
- *Impact of speed limit policy on platoon length and high-risk passing behavior:* [L]onger platoons and greater speed variability contributed to an increased occurrence of high risk passing events. It follows that roadways with differential speed limits, particularly where high volumes of trucks or other slower moving vehicles are present, would likely experience greater platooning and subsequent high-risk passing attempts, thereby increasing the risk of passing-related crashes. Collectively, these findings support the results of the preliminary crash data analysis, providing further indication that use of the

uniform 65 mph speed limit on two-lane highways may provide safety benefits over the prevailing 70/60 mph differential limit.

- *Speed limit preferences of motorists and the trucking industry:* Motorist support for the uniform 65 mph speed limit varied based on age and vehicle type, as motorists over the age of 30 showed greater support for the 65 mph limit than younger motorists, who favored the current 70 mph maximum limit. However, truck drivers, and the trucking industry in general, were overwhelmingly supportive of uniform speed limits, particularly 65 mph, while the current 70/60 mph limit garnered little support. ... [S]upport for uniform 65 mph limits was particularly strong among motor carriers from outside of Montana, where such limits are common on two-lane roadways.

Agencies Examining Changes in Maximum Differential Speed Limits

Rather than reporting on a transition from differential to uniform speed limits, the Oregon DOT respondent provided details of a change in existing differential speed limits on selected highways and interstates in Oregon, and an analysis of the impact of raising those speed limits. Survey findings are summarized below in three categories:

- Issues prompting the study.
- Study findings.
- Outcomes and next steps.

Issues Prompting the Study

Oregon already had in place a differential truck speed limit on March 1, 2016, when the Oregon Legislature mandated raising the maximum speed limits for both cars and trucks on approximately 1,400 miles of highways and interstates in the eastern portion of Oregon, including some rural highways. The revised speed limits are:

- 65 mph to 70 mph for cars; 55 mph to 65 mph for trucks (primarily interstates).
- 55 mph to 65 mph for cars; 55 mph to 60 mph for trucks.

A preliminary analysis of this speed increase focused on the overall impact of the speed increase and not on removal of the differential truck speed. However, the respondent noted that future analyses could result in removal of the differential truck speed. The authors of the preliminary analysis (cited on page 14) noted that “[s]peed limit differentials, especially on two-lane sections of highway, have the potential to create additional interaction and conflict opportunities between vehicles in the traffic stream.”

Study Findings

Researchers examined crash frequency, crash severity, travel speed and speed limits. The study produced the following key findings:

- Increase in average speeds and more vehicles traveling at higher speeds.
- Increase in total crashes and increase in truck-involved crashes.
- Increase in fatal and injury crashes (for speeds raised to 65 mph cars/60 mph trucks).

Findings were preliminary, and no conclusions were made. The main purpose of the study was to evaluate the speed increases, not to determine whether to eliminate the speed differential. If the agency finds that an increase in crashes is due to the speed differential, it may decide to lower vehicle speeds to eliminate the differential. Current statutes allow Oregon DOT to lower car speeds to the truck speed, but not increase truck speed to the car speed.

Outcomes and Next Steps

The next data assessment is expected to include a more detailed analysis of the conditions that lend themselves to increased crash risk, which may include identifying key features in higher crash segments of raised speeds.

The respondent also noted that the agency recently reviewed most interstate truck speeds and, for the most part, lowered the truck speed differential from 10 mph to 5 mph (see page 15 for a publication describing this engineering investigation). The reactions from the trucking industry were positive, and while the agency received some negative reactions from the traveling public, not as much as anticipated; in fact, some members of the public felt the change “smoothed traffic flow.” The agency plans further evaluations of the speed change.

Related Resources

§811.111 Violating a Speed Limit; Penalty, Oregon Revised Statutes, 2019.

https://www.oregonlegislature.gov/bills_laws/ors/ors811.html (scroll to §811.111)

This statute governs the speeds set for certain rural highways. *From the statute:*

(3) A person commits the offense of violating a speed limit if the person drives a vehicle on the portion of State Highway 95 beginning at the Idaho state line and ending at the Nevada state line at a speed greater than:

- (a) Sixty-five miles per hour for vehicles described in subsection (1)(b) of this section; or
- (b) Seventy miles per hour for all other vehicles.

(4) A person commits the offense of violating a speed limit if the person drives a vehicle on the portion of State Highway 20 beginning in Bend and ending in Ontario at a speed greater than:

- (a) Sixty miles per hour for vehicles described in subsection (1)(b) of this section; or
- (b) Sixty-five miles per hour for all other vehicles.

(5) A person commits the offense of violating a speed limit if the person drives a vehicle on the portion of State Highway 197 beginning in The Dalles and ending at its intersection with State Highway 97 and the portion of State Highway 97 beginning at its intersection with State Highway 197 and ending at the California state line at a speed greater than:

- (a) Sixty miles per hour for vehicles described in subsection (1)(b) of this section; or
- (b) Sixty-five miles per hour for all other vehicles.

(6) A person commits the offense of violating a speed limit if the person drives a vehicle on the portion of State Highway 31 beginning in Valley Falls and ending in La Pine at a speed greater than:

- (a) Sixty miles per hour for vehicles described in subsection (1)(b) of this section; or
- (b) Sixty-five miles per hour for all other vehicles.

(7) A person commits the offense of violating a speed limit if the person drives a vehicle on the portion of State Highway 78 beginning in Burns Junction and ending in Burns at a speed greater than:

- (a) Sixty miles per hour for vehicles described in subsection (1)(b) of this section; or
- (b) Sixty-five miles per hour for all other vehicles.

(8) A person commits the offense of violating a speed limit if the person drives a vehicle on the portion of State Highway 395 beginning in Burns and ending in John Day at a speed greater than:

- (a) Sixty miles per hour for vehicles described in subsection (1)(b) of this section; or
- (b) Sixty-five miles per hour for all other vehicles.

(9) A person commits the offense of violating a speed limit if the person drives a vehicle on the portion of State Highway 395 beginning in Riley and ending at the California state line at a speed greater than:

- (a) Sixty miles per hour for vehicles described in subsection (1)(b) of this section; or
- (b) Sixty-five miles per hour for all other vehicles.

(10) A person commits the offense of violating a speed limit if the person drives a vehicle on the portion of Oregon Route 205 beginning in Burns and ending in Frenchglen at a speed greater than:

- (a) Sixty miles per hour for vehicles described in subsection (1)(b) of this section; or
- (b) Sixty-five miles per hour for all other vehicles.

(11) A person commits the offense of violating a speed limit if the person drives a vehicle on the portion of State Highway 26 beginning in John Day and ending in Vale at a speed greater than:

- (a) Sixty miles per hour for vehicles described in subsection (1)(b) of this section; or
- (b) Sixty-five miles per hour for all other vehicles.

Related Resource:

Volume 19: Utilities, Vehicle Code, Watercraft, Aviation, Oregon Revised Statutes, 2019.
https://www.oregonlegislature.gov/bills_laws/Pages/ORS.aspx (scroll to Volume 19)

Statutes governing speeds are available in the following chapters:

- **Chapter 810: Road Authorities; Courts; Police; Other Enforcement Officials**
https://www.oregonlegislature.gov/bills_laws/ors/ors810.html
- **Chapter 811: Rules of the Road for Drivers**
https://www.oregonlegislature.gov/bills_laws/ors/ors811.html.

Preliminary Analysis of Speed Limit Changes in Eastern Oregon, Christopher Monsere, Sirisha Kothuri and Jason Anderson, Oregon Department of Transportation, November 2018.
https://www.oregon.gov/odot/Engineering/Docs_TrafficEng/PSU-Report_Prelim-Analysis-Speed-Limit-Changes-Oregon.pdf

From the introduction:

This report is the summary of a preliminary analysis of the speed and crash performance changes for Oregon highways and interstates where speed limits were increased by the Oregon legislature effective March 1, 2016. This action raised speed maximum speed limits for cars and trucks on approximately 1,400 miles of highways and interstates in Eastern Oregon. Posted speed limits were increased to 70 mph (cars) and 65 mph (trucks) and 65 mph (cars) and 55 mph (trucks).

Key findings from the analysis are presented in Chapter 4 (beginning on page 42 of the report, page 47 of the PDF) and include the following:

- Speeds have increased on the highways where the posted speed limits were increased.
- Total crashes have increased at a rate higher than both the traffic volume and the crash performance change on control sections than the control sections might suggest.
- Total truck-involved crashes have increased at a rate higher than both the total traffic volume and the truck-related crash performance change on the control sections.

Related Resources:

“Preliminary Analysis of Speed Limit Changes in Eastern Oregon,” Chris Monsere, Oregon Transportation Commission Meeting, January 2019.

https://www.oregon.gov/odot/Engineering/Docs_TrafficEng/PSU-Summary_Prelim-Analysis-Speed-Limit-Changes-Oregon.pdf

Highlights of the preliminary analysis are provided in this presentation.

Speed Zones, Engineering, Oregon Department of Transportation, undated.

<https://www.oregon.gov/ODOT/Engineering/Pages/Speed-Zones.aspx>

This web page provides information about speed zone related topics and standards, including access to the preliminary analysis of speed limit changes in eastern Oregon (under the tab “Speed Limits”).

Update to Issues Report for Interstate Speed Changes, Christopher Monsere, Sirisha Kothuri and Ali Razmpa, Oregon Department of Transportation, June 2017.

https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Truck-Speed-PSU-Issues-Report-2017.pdf

From the introduction: Currently, the Oregon Department of Transportation is investigating the potential for increasing the truck speed limit from 55 to 60 mph in segments where the current speed limit is 65 [mph] for cars/light vehicles and 55 mph for trucks. This report summarizes the literature on the operational and safety impacts of raising speed limits, the effect of uniform versus differential speed limit policies, and truck equipment and work zone policies.

2017 Oregon Interstate Highway Speed Limit Engineering Investigation: Executive Summary, Oregon Department of Transportation, June 2017.

https://www.oregon.gov/odot/Engineering/Docs_TrafficEng/Truck-Speed-Exec-Sum-2017.pdf

Additional resources available at <https://www.oregon.gov/ODOT/Engineering/Pages/Truck-Speed.aspx>

Although the focus of this Preliminary Investigation is on rural two-lane highways, the respondent from Oregon DOT shared this summary of a recent engineering study to “identify the potential impacts of increasing the truck speed limit of the interstates, specifically those that currently posted at 55 [mph] for trucks and 65 [mph] for cars.” Investigators evaluated crash and speed data, road characteristics, traffic volumes, restrictions, congestion levels, emergency medical response times and adverse weather conditions. The results suggested that “in the areas where the speed is currently set at 65 mph for cars and 55 mph for trucks the posted speed limits on Oregon’s interstate highways could be reasonably set at 60 mph for trucks.”

Related Resources:

Review of Interstate Truck Speeds: Preliminary Data and Process, Doug Bish, Oregon Department of Transportation, March 2017.

https://www.oregon.gov/odot/Engineering/Docs_TrafficEng/Truck-Speed-Presentation.pdf

This presentation provides the preliminary findings of the engineering investigation.

Interstate Speed Study Map, Oregon Department of Transportation, March 2017.

https://www.oregon.gov/odot/Engineering/Docs_TrafficEng/Interstate-Speed-Study-2017.pdf

The study area for the engineering investigation is detailed in this map.

Agencies Not Considering a Uniform Speed Limit

Two agencies participating in the survey—Tennessee and Utah DOTs—are not considering changing from a differential truck speed limit to a uniform speed limit on rural two-lane highways. Both agency respondents briefly described the benefits of maintaining a differential truck speed limit on these highways:

Tennessee. The respondent reported that Tennessee DOT has not considered the benefits of maintaining a differential truck speed limit on these highways. The agency recently eliminated differential truck speeds in urban areas, so it could follow up with rural areas but is not currently considering that next step.

The respondent added that the agency was prompted to consider eliminating the differential speed limit for trucks in urban areas after reviewing research that indicated a differential speed limit did not have much effect on air quality. (According to the respondent, the agency conducted spot speed studies to define the issue.) Currently there are no state laws specific to truck speed limits.

Utah. The Utah DOT respondent noted that differential speed limits are “helpful when addressing geometric concerns with travel speeds that are most likely to impact high weight or high center of gravity vehicles.”

Agencies That Have Never Applied Differential Truck Speed Limits

Of the 21 agencies that reported never having applied differential truck speed limits on rural two-lane highways, six respondents provided additional information about their agencies’ practices and policies, primarily as they relate to interstates:

Arkansas. The Arkansas Legislature recently passed legislation that increases speed limits on interstates only for all vehicles except trucks. The truck speed limit will remain 70 mph; the speed limit for other vehicles will increase from 70 mph to 75 mph.

Indiana. Indiana DOT, in accordance with state code, does use differential truck speed limits for rural interstates. However, the agency is backing proposed legislation that would eliminate this differential. This stance is largely based on the results of a recent study that found this change would reduce crashes (by approximately 20%) and vehicle operating costs (see [Supporting Documents](#) below).

Louisiana. The agency has assigned a 10 mph difference in speed limits on one long interstate bridge.

Missouri. Legislators in Missouri have raised the question about lowering truck speed limits on interstates, freeways, expressways and similar road types. Missouri DOT, however, has never pursued or implemented differential speed limits for trucks on any route type.

New Hampshire. The New Hampshire DOT respondent believes “that speed differential is more problematic than speeding,” adding that he “would not support formalizing differential speeds by creating different regulatory speed limits between trucks and passenger vehicles. Despite the “physics that require longer stopping distances for larger vehicles,” the respondent believes it is “more problematic to legislate different speeds by class of vehicle.”

Ohio. Ohio DOT's only experience with differential speed limits for trucks is on interstates. The respondent noted that because the speed limit differential between cars and trucks "created additional congestion and potentially reduced safety," the agency has removed differential speed limits and has one uniform speed limit.

Supporting Documents

Indiana

Predicting the Impact of Changing Speed Limits on Traffic Safety and Mobility on Indiana Freeways, Andrew Tarko, Raul Pineda-Mendez and Qiming Guo, Indiana Department of Transportation, May 2019.

<https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=3233&context=jtrp>

This study investigated the safety and mobility effects of changing the speed limits on Indiana freeways. *From the executive summary:*

Speed limit was found to affect mobility and safety mostly in non-congested traffic conditions, while no significant effects were found in congested conditions. A limited effect was detected in intermediate traffic conditions on rural freeways.

The effect of replacing the existing differential 70/65-mph speed limit on rural freeways with a uniform 65-mph limit could not be estimated confidently due to insufficient suitable data. Converting to a uniform 70-mph speed limit, however, could be expected to

- increase car speeds by 1.4 mph and increase truck speeds by 0.6 mph;
- reduce crash frequency by approximately 20% at all severity levels;
- produce an economic loss of \$21.6 million per year, mostly due to higher vehicle operation costs; and
- result in a \$479.3 million annual net benefit if the comprehensive cost of crashes is considered.

A 5-mph increase from the current typical 55-mph to a 60-mph speed limit on urban freeways would be expected to

- increase the average speed of cars by 1.4 mph and increase average truck speed by 1.0 mph;
- increase the expected number of crashes by 4% and the fatal and injury crash proportion by 18%;
- produce an economic savings of \$37.2 million per year; and
- result in a loss of \$275.0 million per year when considering the comprehensive cost of crashes.

Related Resources:

Predicting the Impact of Changing Speed Limits on Traffic Safety and Mobility on Indiana Freeways, Joint Transportation Research Center, Purdue University, 2019.

<https://docs.lib.purdue.edu/cgi/viewcontent.cgi?filename=2&article=3233&context=jtrp&type=additional>

Findings from the report cited above are summarized in this two-page brief.

Impacts to Traffic Safety and Mobility of Changes in Speed Limits for Indiana Freeways, Raul Pineda and Andrew Tarko, Poster, Joint Transportation Research Program, Purdue University, 2017.

<https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=4158&context=roadschool>

This poster presents the findings of a study that investigated the use of differential speed limits and uniform speed limits in Indiana. The objectives were to determine if the differential speed limits on rural freeways increase the difference between truck and nontruck speeds, estimate the safety and mobility effect of removing the differential speed limits on rural freeways, and estimate the safety and mobility effect of raising the speed limits on urban freeways from 55 mph to 60 or 65 mph. Among the safety effects compiled through a literature review were:

- Differential speed limits have two opposite effects: They slow trucks down but they increase the speed variation.
- Although differential speed limits may increase rear-end crashes, they may also reduce other types of crashes.
- Joint application of differential speed limits and truck lane restrictions is beneficial.
- Differential speed limits used around ramp intersections increase unsafe interactions between trucks and nontrucks.

Related Research and Resources

A literature search of recent publicly available resources identified publications that are organized into the following topic areas:

- National research.
- State research and practices.
- Transportation Concept Report resources.

Some publications cited below expand an examination of speed differentials on rural two-lane highways to consider rural interstates, and urban and suburban areas.

National Research

Note: Although the completion date for the following project has passed, the status is listed as active with the anticipated completion of Phase II as fourth quarter 2019. A presentation of the preliminary findings of Phase II follows the project description. Although rural roads are considered in this phase, the primary focus is on urban and suburban roads.

NCHRP 17-76: Guidance for the Setting of Speed Limits, start date: October 2016; completion date: April 2019.

Project description at <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4052>

From the project description: The objectives of this research are to (1) identify and describe factors that influence operating speed and (2) provide guidance to make informed decisions related to establishing speed limits on roadways. The guidance should address the following, at a minimum: 1. An approach for determining the relationship between operating, design, posted and statutory speeds and how the differences among them impact safety performance. This

may also include quantitative and/or qualitative models to predict the safety performance associated with the differences between operating, posted, statutory and design speeds. [2.] Identification and classification of nationwide data including, but not limited to, geometric design, access density, signal density, traffic volume characteristics, and enforcement practices that may impact operating speed. 3. An analysis of the 85th percentile speed and other statistical measures and factors as appropriate methods for setting speed limits. 4. Implications of setting a speed limit lower than those recommended using the factors identified above. The focus of the research should be on roadway functional classifications of minor arterials and higher as defined by AASHTO.

Related Resources:

NCHRP 17-76 Guidance for the Setting of Speed Limits, Texas A&M Transportation Institute, Michigan State University, *AASHTO Meeting*, June 18, 2019.

<https://traffic.transportation.org/wp-content/uploads/sites/26/2019/07/NCHRP-17-16-Guidelines-for-the-Setting-of-Posted-Speed-Limits.pdf>

This presentation summarizes the preliminary findings of the second phase of this study. The focus of this phase is to provide guidance and tools for making informed decisions related to establishing speed limits primarily in urban and suburban roads, although rural roads are considered.

“Current Attitudes Among Transportation Professionals With Respect to the Setting of Posted Speed Limits,” Kay Fitzpatrick, Randy McCourt and Subasish Das,

Transportation Research Record 2673, pages 778-788, 2019.

https://www.researchgate.net/publication/331641627_Current_Attitudes_among_Transportation_Professionals_with_Respect_to_the_Setting_of_Posted_Speed_Limits

In 2018, the National Committee on Uniform Traffic Control Devices Task Force surveyed state and local agencies to identify current and potential approaches to the setting of posted speed limits. *From the abstract:*

The survey found that many states and local agencies have their own laws or criteria for the setting of speed limits (many are very detailed). Professionals who perform posted speed limit studies rarely only use the 85th percentile speed. It is clear from the survey that analysts who establish speed zones utilize many factors beyond the 85th percentile in their studies, including the context, that is, where the street is and what function it serves. The use of the 85th percentile for rural roads or interstate/freeways is different from urban streets (on urban streets, the 85th percentile plays a less significant role). The industry knowledge and use of USLIMITS2 are very limited. USLIMITS2 is a web-based tool designed to help practitioners set speed limits and is maintained by the Federal Highway Administration. Setting of reasonable speed zones requires consideration of many factors that are currently not well defined in the Manual on Uniform Traffic Control Devices (MUTCD).

The following was included in the report conclusions:

The development of a national speed management guide for states and local agencies is encouraged to aid in establishing uniform procedures for the setting of speed zones. The NCHRP Project 17-76 is tasked with developing such a guide.

USLIMITS2, Speed Management Program, Office of Safety, Federal Highway Administration.

<https://safety.fhwa.dot.gov/uslimits/>

From the web page: USLIMITS2 is a web based tool designed to help practitioners set reasonable, safe, and consistent speed limits for specific segments of roads. USLIMITS2 is applicable to all types of roads ranging from rural local roads and residential streets to urban freeways. However, the tool is not applicable to school zones or construction zones.

State Research and Practices

Multiple States

“Driver Speed Selection on High-Speed Two-Lane Highways: Comparing Speed Profiles Between Uniform and Differential Speed Limits,” Brendan Russo, Peter Savolainen, Timothy Gates, Jonathan Kay and Sterling Frazier, *Traffic Injury Prevention*, Vol. 18, No. 5, pages 521-527, July 2017.

Citation at

<https://www.tandfonline.com/doi/abs/10.1080/15389588.2016.1261123?journalCode=gcpj20>

From the abstract: [T]he objective of this study was to assess differences in driver speed selection with respect to the posted speed limit on rural [two]-lane highways, with a particular emphasis on the differences between uniform and differential speed limits. Data were collected from nearly 59,000 vehicles across 320 sites in Montana and [four] neighboring states. Differences in mean speeds, 85th percentile speeds and the standard deviation in speeds for free-flowing vehicles were examined across these sites using ordinary least squares regression models. Ultimately, the results of the analysis show that the mean speed, 85th percentile speed and variability in travel speeds for free-flowing vehicles on [two]-lane highways are generally lower at locations with uniform 65 mph speed limits, compared to locations with differential limits of 70 mph for cars and 60 mph for trucks. In addition to posted speed limits, several site characteristics were shown to influence speed selection including shoulder widths, frequency of horizontal curves, percentage of the segment that included no passing zones, and hourly volumes. Differences in vehicle speed characteristics were also observed between states, indicating that speed selection may also be influenced by local factors, such as driver population or enforcement.

“Longitudinal Analysis of Rural Interstate Fatalities in Relation to Speed Limit Policies,” Amelia Davis, Elizabeth Hacker, Peter Savolainen and Timothy Gates, *Transportation Research Record 2514*, pages 21-31, 2015.

Citation at <https://journals.sagepub.com/doi/10.3141/2514-03>

From the abstract: Existing research literature has shown that traffic fatalities increase at higher speed limits. A related issue is the establishment of maximum speed limits for trucks and buses. As of 2014, eight states have a differential speed limit in place that establishes a higher limit for passenger vehicles than for trucks and buses. This study aimed to inform the continuing debate regarding the safety impacts of speed limits by comparing states with various speed limit policies. The study included a longitudinal comparison of state-level rural [i]nterstate fatalities in the United States from 1999 through 2011. In addition to an examination of differences in traffic fatalities as a function of maximum speed limits, comparisons were also made between states with differential limits for truck[s] and buses. Random parameter negative binomial models were estimated for annual total and truck-involved fatalities. A random parameter framework allowed for consideration of temporal correlation in annual fatality counts within states as well as for

unobserved heterogeneity across states. The results of this study provided further evidence that both overall and truck-involved fatalities increased with maximum speed limits. States with differential speed limits were found to have marginal differences in total fatalities as compared with states with uniform speed limits. However, truck-involved fatalities were significantly lower in states where differential limits were in place. The effects of speed limit policies as well as other covariates were found to vary significantly across states.

“Vehicle Speed Characteristics in States With Uniform and Differential Speed Limit Policies: Comparative Analysis,” Brendan J. Russo, Emira Rista, Peter T. Savolainen, Timothy J. Gates and Sterling Frazier, *Transportation Research Record 2492*, pages 1-9, 2015. Citation at <https://journals.sagepub.com/doi/abs/10.3141/2492-01>

From the abstract: The purpose of this study was to examine the travel speed characteristics of passenger vehicles, trucks and buses in states with different speed limit policies, primarily to ascertain the effects of differential speed limits (DSLs) versus those of uniform speed limits (USLs) for large vehicles. Spot-speed studies were conducted in the neighboring states of Indiana, Michigan and Ohio; these studies permitted examination of speed characteristics under several speed limit settings along the same freeways. The sites included urban and rural locations, with speed limits at individual locations that varied from 55 to 70 mph. These sites included USLs and DSLs, with 5 mph differentials on rural freeways in Indiana and 10 mph differentials at rural locations in Michigan. Spot-speed data were collected at 157 freeway sites in the three states along flat, tangent segments. Regression models were estimated to ascertain differences in the mean speeds, the 85th percentile speeds, and the standard deviation in speeds across locations. The results showed passenger vehicle speeds to be quite consistent across the three states where a common 70 mph limit was in effect. Speeds varied more at locations with lower posted limits and between trucks and buses. Speeds were most consistent in Ohio at locations with higher USLs. The variability in travel speeds for all vehicles was found to be highest on freeways with DSLs, followed by urban freeways with USLs of 55 mph.

“Framework Development of Speed Zone Guidelines Based on Current Best Practices,” Krishna Prasad Shrestha and Pramen Prasad Shrestha, *TRB 94th Annual Meeting Compendium of Papers*, Paper #15-4986, 2015.

Citation at <https://trid.trb.org/view/1338967>

From the abstract: Studies have shown that speed zoning often is considered a cure-all for crashes and other traffic-related problems. While establishing speed zones, a realistic speed limit should be determined and used. If not, it can result in an increased number of crashes as well as requests from the public to decrease speed limits. A proper guideline is required to ensure consistent speed limits, reduce differential speeds and defend against public requests to reduce the speed limits arbitrarily. This paper reviews the literature on speed, crashes, enforcement techniques, and speed zone manuals. In addition, a nationwide semi-mixed-mode questionnaire survey was conducted to identify best practices for establishing speed zones. Consequently, traffic engineers from the Nevada Department of Transportation (NDOT) were interviewed in order to provide recommendations for preparing the guidelines. This paper presents a six-step framework for establishing speed zones, based on results from the literature review, survey and interviews; it provides relevant studies that support the processes. Recommendations for future research are based on a critical evaluation of state DOTs manuals that are currently available. Specifically, this study identified a lack of research and documentation about detailed design of speed zones. The findings and the recommendations provided in this paper can be used to develop a proper speed-zone manual by state DOTs and transportation agencies across the United States.

“The Effect of State Regulations on Truck-Crash Fatalities,” Grant W. Neeley and Lilliard E. Richardson Jr., *American Journal of Public Health*, Vol. 99, No. 3, pages 408-415, March 2009. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2661438/>

From the abstract: To improve traffic safety, states limit truck length and weight, and some set lower speed limits for trucks than for other vehicles. We examined the impact of truck-specific restrictions and general traffic-safety policies on fatality rates from crashes involving large trucks. We used state-level data from 1991 to 2005 with a cross-sectional time-series model that controlled for several policy measures. We found that higher speed limits for cars and trucks contributed to higher fatality rates, but differential speed limits by vehicle type had no significant impact. Truck-length limitations reduced fatalities in crashes involving large trucks. Our model estimates suggested that if all states had adopted a speed limit of 55 miles per hour for all vehicles in 2005, an additional 561 fatalities would have been averted.

Alaska

Analyzing Driver Behavior in Passing Zones With Differential Speed Limits on Two-Lane Two-Way Undivided Highways in Alaska, Osama Abaza, Alaska Department of Transportation and Public Facilities, December 2017.

<http://dot.alaska.gov/stwddes/research/assets/pdf/4000-143.pdf>

Based on recommendations from an earlier study, Alaska Department of Transportation and Public Facilities evaluated the potential safety and operational benefits of differential speed limits on the Seward Highway. Six level passing lane sections of the highway used differential speed limits for the two lanes in each 1-mile passing section during summer 2016 for approximately one month. To determine the effectiveness of this practice, researchers evaluated driver surveys, traffic data and video analysis. *From the report summary:*

Driver surveys indicated general public disapproval for the DSL [differential speed limit] system. A major concern expressed in the surveys was the confusing nature of this implementation. Without comprehensive driver education, many drivers did not know how to use the new speed limits, resulting in a perceived increase in risky passing and driving behaviors. Though the purpose of DSLs is to improve safety and efficiency in PL [passing lane] zones, the surveys indicated that the new system had the opposite effect. ... The results from traffic analysis complement the conclusions drawn from the driver surveys, that the DSL system has an adverse effect on roadway safety. Differential speed limit conditions result in a decrease in the speed differential between the lanes[;] the mean speed in the right and left lane in PLs actually grows closer under DSL conditions than under USL [uniform speed limit] conditions, making passing more difficult. This effect means that passing is less frequent and driver behavior becomes more aggressive, with an increase in risky maneuvers since drivers are not as easily able to pass when they feel they need to. These results demonstrate that when vehicles are able to pass, there is an increase in the likelihood that they will pass unsafely, that is, at very high speeds or by passing on the right. ... Video analysis demonstrated that, due to the increased difficulty in passing found under DSL conditions, more platoons formed among vehicles in these PLs. Platoons greatly increase driver frustration and the likelihood of riskier driving, and are an undesired highway attribute. The likelihood of changing lanes was reduced under the DSL condition. Thus, the DSL condition was shown through video analysis to be adverse to a desired outcome. Overall, all methods of analysis and performance criteria considered in this project, including the trials, showed that the DSL technique does not demonstrate benefits supporting a permanent installation, as it decreases safety and mobility along PLs. Please note that this conclusion is based on a short implementation period of the DSL system. A prolonged period of testing might have a different outcome.

Related Resource:

“Examining the Impact of Differential Speed Limit on Driver Behavior in Passing Lanes of a Two-Lane Highway in Alaska,” Sajid Raza and Ghulam Bham, *TRB 97th Annual Meeting*, Paper #18-06636, 2018.

Citation at <https://trid.trb.org/view/1497364>

From the abstract: This paper presents the evaluation of DSL implementation by lane[,] i.e., posted speed limits of 65 and 55 mph on the left and right lanes, respectively[,] on passing lanes of a two-lane highway near Anchorage, Alaska. The objective was to analyze the impact of DSL on drivers’ speeding behavior and traffic volume split by lane. Data (speed, traffic volume, classification) were collected at different locations in the two passing lanes with uniform speed limit (USL) and DSL during peak days of the week. Results indicated that the speed difference between the left and the right lanes reduced significantly due to DSL.

Idaho

“Long Term Impact of Differential Speed Limits on Rural Freeways in Idaho,” Sherief Elbassuoni, Michael Dixon and Ahmed Abdel-Rahim, *TRB 94th Annual Meeting Compendium of Papers*, Paper #15-5844, 2015.

Citation at <https://trid.trb.org/view/1339447>

From the abstract: The main focus of this research is to evaluate the long-term operation and safety impact of Differential Speed Limits (DSL) on rural freeways in Idaho. The analysis of speed data covered three periods: period 1: January 1992 – April 1996 (Uniform Speed Limit (USL) of 65 mph); Period 2: April 1996 – June 1998 (with a USL of 75 mph); and Period 3: July 1998 – December 2011 (with a DSL of 75 mph for passenger cars and 65 mph for commercial truck vehicles). The analysis showed that since the implementation of the DSL policy, Idaho’s speed trends have stabilized with no sizable change. The mean speed for trucks and passenger vehicles are very close to their respective posted speed limits. The 85th percentile speeds have also stabilized at about [5] mph above the respective speed limits. DSL implementation also visibly improved the compliance rate of truck speed limit. The considerable reduction in the 85th percentile and the pace speeds for trucks and the improved speed limit compliance rate indicate that the DSL policy favorably impact truck driver behavior by reducing the most extreme truck speeds. Implementation of the DSL policy has contributed to the improved safety conditions on rural freeways in Idaho. Crash rate analysis showed that DSL favorably affects safety. Crash rates for all crash types were highest during the period 1996 to 1998 with a USL of 75 mph. When DSL policy was implemented in 1998, the crash rates decreased considerably and continued to decline since then.

Louisiana

Literature Review of the Implications of Differential Speed Limit Implementation, Haggai Davis III, Ravindra Gudishala, Kirk Zeringue, Chester Wilmot, Julius Codjoe and Matthew Roberts, Louisiana Transportation Research Center, December 2017.

<https://rosap.nhtl.bts.gov/view/dot/36841/Email>

In 2017, the Louisiana Legislature requested information about the benefits and costs of differential speed limits on interstates in terms of safety, mobility and operations, and fuel consumption and emissions. The literature review conducted in response to this request includes a brief discussion of Montana’s use of differential and uniform speed limits on rural two-lane highways (page 15 of the report, page 24 of the PDF).

Michigan

“Economic Analysis of Speed Limit Policy Impacts,” Timothy Gates and Peter Savolainen, *TRB 94th Annual Meeting Compendium of Papers*, Paper #15-3593, 2015.

Citation at <https://trid.trb.org/view/1338181>

From the abstract: Recently, nationwide speed limit policy modifications have resulted in a general upward trend in many states, including newly proposed legislation to raise the maximum speed limits on freeways and high speed rural non-freeways in Michigan. This legislation also proposed to eliminate the freeway differential speed limit between passenger vehicles and trucks/buses. Research was performed to assess the tangible economic impacts associated with the speed limit policy alternatives under consideration in Michigan. The economic assessment included systemwide estimation of the agency and user costs and benefits for each policy alternative, including those related to necessary infrastructure modifications, increased fuel consumption, reduced travel times and fatal crashes. Calculation of the benefit/cost ratios indicated that none of the proposed speed limit increase scenarios present a favorable economic condition compared to the current policy. This was especially true for the proposed policy scenarios that involved an increase in the maximum speed limit, opposed to only increasing the truck/bus speed limits, due in large part to the substantial infrastructure costs associated with geometric modifications that will ultimately be necessary for compliance with state and federal design speed requirements. Such costs will be especially severe for non-freeways and select urban freeways in dense urban areas, which are currently posted at 55 mph. Consequently, speed limit increases on high speed roadways should only be considered for sections of roadway where design speed compliance is largely maintained after the increase to avoid costly geometric improvements.

Evaluating the Impacts of Speed Limit Policy Alternatives, Peter Savolainen, Timothy Gates, Elizabeth Hacker, Amelia Davis, Sterling Frazier, Brendan Russo, Emira Rista, Martin Parker, Fred Mannering and William Schneider, Michigan Department of Transportation, July 2014.

https://www.michigan.gov/documents/mdot/RC-1609_478401_7.pdf

This study evaluated the potential impact of proposed speed limit increases. (The legislation proposed raising speed limits in general while maintaining a speed differential between passenger vehicles and trucks and buses on rural freeways.) The analysis evaluated a broad range of traffic safety, operational, environmental and economic considerations. While the focus was on urban and rural interstates, implications to rural nonfreeways are also discussed, including the following recommendation for future research (page 128 of the report, page 145 of the PDF):

Further research is necessary into the potential effects of speed limits on non-limited access facilities, particularly two-lane highways where the maximum posted speed limit is currently 55 mph. On these types of facilities, road geometry plays a much larger role than the posted speed limit on speed selection as drivers generally travel at speeds as dictated by prevailing road conditions. Nationally, most states recognize a 55 mph limit on such facilities. The analysis of traffic speed and crash data for a diverse range of two lane facilities, in combination with economic data required for infrastructure upgrades, represent important areas of research prior to increasing speeds on these roadways.

Transportation Concept Report Resources

Note: The Transportation Concept Report below is the basis for this Preliminary Investigation. Following this resource are the four publications related to differential speed limit and uniform speed limit on rural two-lane highways that were cited in the report (see *Related Resources* below).

Appendix P: Speed Differential—Literature Review, United States Route 395 Transportation Concept Report, District 2, California Department of Transportation, December 2017.

http://20kjas4dkce22gtr446kqbc.wpengine.netdna-cdn.com/wp-content/uploads/2018/03/US395TCR_PublicDraft_ReducedSize.pdf

Appendix P of the report (beginning on page 184 of the report, page 192 of the PDF) includes a recommendation to establish a research project to evaluate the potential benefit of a universal speed limit for US 395.

Related Resources:

Safety and Operational Impacts of Differential Speed Limits on Two-Lane Rural Highways in Montana, Timothy Gates, Peter Savolainen, Brendan Russo, Raha Hamzeie, Jonathan Kay, Sterling Frazier and Jacob Finkelman, Montana Department of Transportation, July 2016.

https://www.mdt.mt.gov/other/webdata/external/research/docs/research_proj/differential_speed/Final_report_Jul-16.pdf

From the abstract: A series of field studies were performed on two-lane rural highways in Montana, which predominately possessed the 70 mph/60 mph differential speed limit, and in neighboring states where uniform 65 mph speed limits prevailed. The locations with 65 mph speed limits generally displayed less variability in travel speeds, shorter platoon lengths, less high-risk passing behavior, and fewer crashes. Surveys were performed to determine the speed limit policy preferences among motorists and members of the trucking industry in Montana. Although motorist support for the uniform 65 mph speed limit was mixed, the trucking industry strongly supported the uniform 65 mph limit over the current differential limit. Overall, the collective findings support transitioning to a uniform 65 mph speed limit on two-lane rural highways in Montana. Selective implementation of this new speed limit is advised initially, and candidate highways should possess relatively high traffic volumes, relatively high truck percentages and limited passing opportunities.

“Safety and Traffic Implications of Differential Car and Truck Speed Controls for Two-Lane Highways,” Amir Ghods and Frank Saccomanno, *Journal of Transportation Engineering*, Vol. 142, No. 11, November 2016.

Citation at [https://ascelibrary.org/doi/abs/10.1061/\(ASCE\)TE.1943-5436.0000888](https://ascelibrary.org/doi/abs/10.1061/(ASCE)TE.1943-5436.0000888)

From the abstract: In this paper, a microscopic simulation model is presented that assesses the safety and traffic implications of differential car/truck speed limits for two-lane highway operations, with emphasis on the overtaking maneuver. Three speed control strategies are considered: uniform posted speed limits (USLs), differential posted car–truck speed limits (DSLs) and differential mandated truck speed limits (MSLs). Mandated limits involve the use of on-board truck limiters or governors with preset maximum thresholds. The results from several simulation tests suggest that DSLs and MSLs reduce the average travel speed (ATS) of the traffic stream. DSL and MSL controls were found to slightly increase head-on time-to-collision (TTC) and percentage time spent following (PTSF). The total number of

overtakes was found to increase slightly for DSL and MSL controls compared to USLs. While the number of car–truck overtakes increased significantly for DSLs and MSLs, the number of car–car overtakes resulted in a significant decrease. It was concluded that three measures of ATS, TTC and car–car overtaking positively impacted safety, while PTSF, car–truck and total number of overtakes negatively impacted safety because of differential speed limit controls.

“Effect of Car/Truck Differential Speed Limits on Two-Lane Highways Safety Operation Using Microscopic Simulation,” Amir Ghods, Frank Saccomanno and Guiseppe Guido, *Procedia—Social and Behavioral Sciences*, Vol. 53, pages 834-841, October 2012.

<https://www.sciencedirect.com/science/article/pii/S1877042812043947>

From the abstract:

The safety implications of car–truck speed limits have not been adequately researched for two-lane highways. On two-lane highways speed controls can have a significant effect on vehicles’ interactions. Two different types of speed control strategies are considered: [u]niform and [d]ifferential. Safety implications are considered using three overtaking-related indicators: 1) number of vehicles overtaking, 2) percentage time spent in “desire to overtake mode,” and 3) average time-to-collision with the oncoming vehicle prior to returning to the original lane. Vehicle interactions affecting safety are estimated through the application of a calibrated microscopic traffic simulation model to a 6 [kilometer] straight segment of two-lane highway.

From the conclusions:

Although differential speed strategies (DSL [differential speed limit] and MSL [differential speed controls with truck speed limiters]) were observed to have a minimal increase in the total number of overtake manoeuvres in comparison to a uniform strategy (USL [uniform speed limit]), the effect on the nature of the overtakes[,] i.e.,] car-car versus car-truck[,] was significant. Differential speed strategies increased the number and rate of car-truck overtakes over the range of volumes considered in this analysis. This suggests a negative effect on safety resulting from differential speed strategy applied to two-lane rural highways. On a positive side DSL and MSL strategies have reduced the number of car-car overtakes at different volumes, hence increasing safety. This latter relationship suggests a calming effect of slower trucks on the speed of the traffic stream, which results in fewer interactions between cars. No significant effect was observed concerning differential speed control strategies and both average TTC [time-to-collision] and PTDO [percentage time spent in “desire to overtake mode”]. The effect on TTC was due to volume; highest TTC for car-car and car-truck interactions at very low volumes, decreasing to a minimum in the range between 500 vph [vehicles per hour] to 800 vph and increasing slightly thereafter. This indicator suggests the highest head-on risk is experienced in the mid-volume region. The average speed of traffic decreases in a nonlinear fashion with volume with differential speed strategies indicating a downward shift in this relationship.

“Assessing the Safety Impacts of Overtaking on Rural Two-Lane Highways for Differential Cars and Trucks Speed Limits Using Microscopic Simulation,” Amir Ghods, D. Duong, Frank Saccomanno and B. Hellinga, *24th World Road Congress Proceedings*, 2011.

Citation at <https://trid.trb.org/view/1278493>

From the abstract: This paper presents a micro-simulation platform for modelling overtaking gap acceptance behavior and applies the model to rural two-lane highways subject to reduced truck speed limits. The safety implications of differential truck speed limits for two-lane highways for different traffic volumes were evaluated based on changes in number of overtaking [maneuvers] and risk of gap acceptance behavior. It was found that the imposition of reduced speed limits for trucks increases the number of car–truck overtaking [maneuvers] and hence compromises safety while it does not significantly decrease or increase gap acceptance risk. The two-lane highway microscopic framework was shown as a viable road safety assessment alternative.

Note: The following publication appears to be related to the four resources cited in the Transportation Concept Report.

“Safety Implications of Truck/Car Speed Limits for Two-Lane Highway Operations,” Amir Ghods and Frank Saccomanno, *TRB 92nd Annual Meeting Compendium of Papers*, Paper #13-2329, 2013.

Citation at <https://trid.trb.org/view/1241449>

From the abstract: This paper uses simulation to assess the effect on safety of different speed control strategies applied to two-lane highway operations. Two different types of speed control strategies are considered: uniform speed limit (USL) and car-truck differential, which is introduced in two different ways: discretionary differential car and truck posted speed limits (DSL) and mandated truck speed limiters (MSL). Safety implications are considered using three overtaking-related indicators: 1) number of vehicles overtaking; 2) percentage time spent in “desire to overtake mode” (PTDO); and 3) average time-to-collision (TTC) with the oncoming vehicle prior to returning back to the original lane. Vehicle interactions affecting safety are estimated through the application of a calibrated microscopic traffic simulation model to a 6 [kilometer] straight segment of two-lane highway with zero and -3% grade. Differential speed strategies (DSL and MSL) were observed to have a slight increase in the total number and rate of overtaking maneuver in comparison to the uniform control strategy (USL). DSL strategies significantly increased the number and rate of car-truck overtakes over the range of volumes considered in the simulation, suggesting a negative effect on safety. At the same time the number of car-car overtakes were reduced suggesting a positive effect on safety. No considerable effects were observed concerning differential speed control strategies and average TTC and PTDO for the studied cases. The number of overtakes were found to be higher on the level segment than the downgrade segment for the control strategy; although, not very significant for MSL. Car-car and car-truck overtakes appeared to be consistently higher in level section than the grade section; however, this was opposite where the MSL strategy was considered.

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CTC contacted the individuals below to gather information for this investigation.

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Appendix A: Survey Questions

The following survey was distributed to state transportation agencies expected to have knowledge of or experience with differential speed limits for trucks and other vehicles on rural two-lane highways.

Differential Truck Speed Limit on Rural Two-Lane Highways

Note: The response to the question below determines how a respondent is directed through the survey.

(Required) Has your agency **considered reducing** or **eliminating** the use of **differential truck speed limits** on rural two-lane highways and adopting a uniform speed limit? For purposes of this survey, these speed limits are defined as follows:

- **Differential Speed Limit:** Lower maximum speed limit is set for heavy trucks and other vehicles with three or more axles.
- **Uniform Speed Limit:** Maximum speed limit is the same for all vehicles.

Response options:

- No. Our agency has never applied differential truck speed limits on rural two-lane highways. (Directs the respondent to the **Wrap-Up** section of the survey.)
- No. While our agency does apply differential truck speed limits on rural two-lane highways, we're **not considering** changing to a uniform speed limit. (Directs the respondent to the **Agencies Not Considering a Uniform Speed Limit** section of the survey.)
- Yes. Our agency **has considered** changing a differential speed limit to a uniform speed limit or **has already made that change** on rural two-lane highways. (Directs the respondent to the **Background** section of the survey and the sections that follow it.)

Agencies Not Considering a Uniform Speed Limit

Please briefly describe the benefits of maintaining a differential truck speed limit on these highways, including the safety and operational impacts.

Note: After responding to the question above, the respondent is directed to the **Wrap-Up** section of the survey.

Background

1. Please briefly describe the events or issues that prompted your agency to consider eliminating the differential speed limit for trucks.
2. What was your approach to defining the problem?
3. Please describe your state's current laws, codes or regulations on truck speeds.
- 3A. If available, please provide links to documentation related to truck speed legislation or regulations in your state. Send any files not available online to carol.rolland@ctcandassociates.com.

4. (Required) Did your agency conduct a study or assessment to determine whether to eliminate the differential speed limit for trucks?
 - No (skips the respondent to **Implementation and Assessment**)
 - Yes (skips the respondent to **Studying the Issue**)

Studying the Issue

1. What safety and operational data or information was needed for the study? Select all that apply.
 - Crash frequency
 - Crash severity
 - Other safety data
 - Travel speed/speed limits
 - Road geometry
 - Economic benefits (such as reduced traffic delay)
 - Cost (such as fuel consumption)
 - Other (please describe)
2. Did your agency conduct any outreach campaigns to potential stakeholders when examining the speed limit policy?
 - No (please skip to **Question 3**)
 - Yes (please respond to **Question 2A** below)
- 2A. Please identify the stakeholders that were contacted during the study. Select all that apply.
 - Trucking industry
 - State or local government or political leaders
 - Automobile clubs and associations (such as AAA)
 - Tourism industry
 - State travel associations
 - Traveling public
 - Other (please describe)
3. Please describe the findings or data that **supported** your state's elimination of the speed differential.
4. Please describe the findings or data that **did not support** elimination of the speed differential in your state.
5. What additional data or information needs were identified during and after the study?
6. What stakeholders (individuals and organizations) **supported** the study findings? Select all that apply.
 - Trucking industry
 - State or local government or political leaders
 - Automobile clubs and associations (such as AAA)
 - Tourism industry
 - State travel associations
 - Traveling public
 - Other (please describe)
7. What stakeholders (individuals and organizations) **did not support** the study findings? Select all that apply.
 - Trucking industry
 - State or local government or political leaders
 - Automobile clubs and associations (such as AAA)
 - Tourism industry
 - State travel associations
 - Traveling public
 - Other (please describe)
8. What do you wish you had done differently during the study?

Implementation and Assessment

1. What decision did your agency reach?
 - Retained the differential speed limit for trucks
 - Adopted a uniform speed limit
 - Decided to revisit the issue later
 - Other (please describe)
2. What outcomes did you anticipate?
3. What outcomes didn't you anticipate?
4. What are your top three recommendations for other agencies considering the elimination of speed differentials on rural two-lane highways?
5. Please provide links to documents associated with your agency's truck speed limit policy (other than those you have already provided). Send any files not available online to carol.rolland@ctcandassociates.com.

Wrap-Up

1. Are you available for follow-up conversations regarding your state's truck speed limit policies?
 - No
 - Yes
2. Please use this space to provide any comments or additional information about your previous responses.