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Raising Truck Speed Limits in California Could Increase Mobility But May Also Increase Crashes

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Issue

Highway speed limits inherently represent a trade-off between safety and mobility. While higher speed limits shorten travel times and foster economic benefits (especially for the trucking and logistics industries), they can also increase the likelihood and severity of crashes, as higher vehicle speeds require longer stopping distances and generate more energy during a collision. Highway speed limits are increasing nationwide.

While there is no consensus on the optimal speed limit (Figure 1), research generally shows that lower speed limits reduce the frequency and severity of crashes. Likewise, there is mixed evidence on whether a universal speed limit (trucks and passenger vehicles subject to the same speed limit) or a differential speed limit (trucks subject to a lower speed limit than passenger vehicles) is safer. While some evidence indicates that setting lower speed limits for heavier trucks that are slow to stop has safety benefits, other research suggests that differential speed limits create bottlenecks that may actually cause more crashes as cars attempt to overtake slower trucks. California is one of only seven states that set differential speed limits.

Researchers at UC Davis explored the implications of California changing its speed limits by first reviewing existing speed limit safety studies, and then developing statistical models using California traffic and crash data. These models were used to predict how changing highway

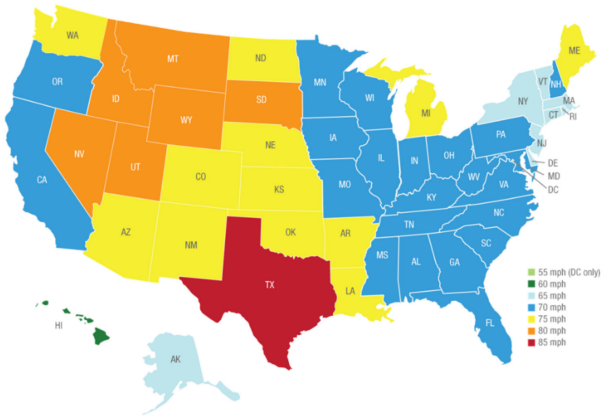

Figure 1. Maximum Interstate Speed Limits in the United States.

speed limits for trucks and cars would affect the likelihood of crashes involving trucks, involving speeding (driving above the posted speed limit), or resulting in a fatality. The data used as the basis for the models were from most of the state, excluding Caltrans districts covering the north coast, northeast, and eastern Sierra regions, where traffic volume and speed data were unavailable. The models predicted the safety impacts of maintaining current differential speed limits (65 miles per hour (mph) for cars and 55 mph for trucks on most roads), setting uniform speed limits at either 65 mph or 75 mph, and adjusting differential speed limits either upward by 15 mph or downward by 5 mph.

Key Research Findings

Existing research examining the impacts of changing speed limits on crashes and vehicle speeds have inconsistent findings. Some studies that analyzed the impact of raising the speed limit found an increase in mean speeds and fatal crashes, whereas others found no significant impact on crash severity or frequency. This is partly due to the different datasets and methodology used by the various studies reviewed as part of this research.

Changes to the speed limit will affect urban and rural areas differently. The percentage increase in predicted fatal crashes in rural areas is far less compared to urban areas for all scenarios with increased truck speed limits. For example, the 65 mph uniform speed limit scenario is projected to increase fatal crashes by 1.6% in urban areas and only 0.1% in rural areas. However, the trend is predicted to be the opposite for speeding-related crashes, which are expected to increase on rural roads and decrease on urban roads.

Higher truck speed limits may increase the number of fatal crashes. Based on the predictive models, each scenario with an increased truck speed limit is anticipated to increase fatal crashes, with the greatest increases seen in the scenarios with the highest speed limits. The scenario that analyzed a lower truck speed limit predicted fewer fatal crashes. The relationship is not as clear for speeding-related crashes, with most of the scenarios resulting in very small changes.

Separate speed data for cars and trucks are needed to adequately compare differential and uniform speed limit scenarios. The dataset used for the study highlighted in this brief consists of aggregated average vehicle speeds for all traffic (trucks and passenger cars). Because California currently has differential speed limits, this data allows for reliable comparison with other differential speed limit scenarios. However, more detailed data would be needed to derive average speeds of trucks and passenger cars separately to compare policies that would change differential speed limits to uniform speed limits.

Incorporating more information about road design and conditions will produce more accurate modeling results. The dataset used for the analysis featured in this brief was limited to crash and traffic attributes. A model incorporating geometric information such as median and shoulder width, road profile, curvature, and alignment for individual crashes would be better able to predict the safety impact of changing the speed limit.

More Information

This policy brief is drawn from the report "Assessing the Impact of Raising Truck Speed Limits on Traffic Safety and Throughput", authored by Sarder Rafee Musabbir and Professor Michael Zhang, at the University of California, Davis. The report is available on the UC ITS website at: www.ucits.org/research-project/2019-11. A follow-on study is also in progress that will incorporate road geometric information and estimate the monetary cost components of different speed limits. More information about the follow-on study can be found at: www.ucits.org/research-project/2021-36. For more information, please contact Professor Michael Zhang at hmzhang@ucdavis.edu.

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