TIDC Transportation Infrastructure Durability Center AT THE UNIVERSITY OF MAINE

Leveraging Probe Data to Model Speeding on Limited Access Highway Segments during the COVID-19 Pandemic

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Abstract

Stay-at-home orders - imposed to prevent the spread of COVID-19 - drastically changed the way highways operate. Despite lower traffic volumes during these times, the rate of fatal and serious injury crashes increased significantly across the United States due to increased speeding on roads with less traffic congestion and lower levels of speed enforcement. We used a mixed effect binomial regression model to investigate the impact of the stay-at-home order on odds of speeding on urban limited access highway segments in Maine and Connecticut. The model also establishes a link between traffic density (vehicles per mile) and the odds of speeding. For this purpose, hourly speed and volume probe data were collected on limited access highway segments for the U.S. states of Maine and Connecticut to estimate the traffic density. The traffic density then was combined with the roadway geometric characteristics, speed limit, as well as dummy variables denoting the time of the week, time of the day, and COVID-19 phases (before, during and after stay-at-home order), and the interactions between them. Density, represented in the model as Level of Service, was found to be associated with the odds of speeding, with better levels of service such as A, or B (low density) resulting in the higher odds that drivers would speed. Furthermore, we found that during the stay-at-home order, the odds of speeding by more than 10, 15, and 20 mph increased respectively by 54%, 71% and 85% in Connecticut, and by 15%, 36%, and 65% in Maine during evening peak hours. Additionally, one year after the onset of the pandemic, during evening peak hours, the odds of speeding greater than 10, 15, and 20 mph were still 34%, 29%, and 19% greater in Connecticut and 35% 35% and 20% greater in Maine compared to before pandemic.

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