Abstract:

This study developed an enhanced crash prediction model incorporating simulated rear-end conflicts. Despite advances in crash predictive models such as Safety Performance Functions in Highway Safety Manual, accurate prediction of crash frequencies is still challenging due to limited crash data and microscopic intersection operational characteristics (e.g., traffic signal controls, lane configurations, and driver aggressiveness) not being considered. On the other hand, the simulated conflict-based surrogate safety assessment approach, which utilizes microscopic traffic simulation model and the Surrogate Safety Assessment Model, serves as a pragmatic supplement to the Safety Performance Function-based safety assessment. This study used simulated traffic conflicts to enhance the Safety Performance Function-based model structure, to exploit the advantages of both methods. To this end, we tested various forms of the simulated conflicts-incorporated crash prediction models, and calibrated the model parameters based on AADT and crash data. The enhanced functions performed better in both the calibration and validation datasets in predicting crash frequencies, and this study finally proposes a rear-end conflict-incorporated crash prediction model, which performed best among the proposed models. The findings are promising because the proposed model can complement existing Safety Performance Function-based methods which are limited in their ability to accurately assess many combinations of...
Intersection geometrics and traffic control, particularly at signalized locations. Future researchers should consider developing similar, simulation-enhanced safety models for a wider variety of intersection and highway facilities, using a broader inventory of roadway and crash data.

Stichworte:
traffic safety, Safety Performance Function (SPF), microscopic traffic simulation model, traffic conflict, surrogate safety measures

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