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Investigation of Autonomous/Connected Vehicles in Work Zones

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Abstract

It is anticipated that autonomous truck platooning could lead to many benefits, such as maximizing existing road capacity, decreasing fuel consumption through drafting, and reducing emissions. Despite the voluminous research on truck platooning, very little has been relevant to provide guidance to departments of transportation for operation in work zones.

This study is the first research project that examined truck platooning in work zones. A networked or federated simulator was used in which a vehicle driven by a human subject encountered a truck platoon with the lead truck driven by a human driver. The experiment involved 10 scenarios composed of differences in education, truck signage, and number of trucks in the platoon.

The results point to the importance of education as the post-education vehicle speeds increased between 8.6% and 12.9% across scenarios, and the distance headways decreased between 28.8% and 30%. The vehicles increased in efficiency while still staying under the work zone speed limit.

On the other hand, the use of truck signage changed driver behavior in an arguably undesirable way by increasing the percentage of platoon bypasses. As the post-simulator survey revealed, 94% of the subjects believed it was safer not to bypass the truck platoon and yet about 34% chose to do so.

This initial investigation into truck platooning near work zones is a beginning upon which further investigations on education, signage, and platoon size policies can continue.