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RESEARCH REPORT

Unsettled Issues in Commercial Vehicle Platooning

Jody E. Muelaner, PhD

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About the Editor

Dr. Jody E. Muelaner is a chartered mechanical engineer with a background in metrology, aerospace manufacturing, and machine design. He now specializes in writing about technical topics in a way that the target audience can easily understand.

His writing has included technical reports for Rolls-Royce and Airbus, peer-reviewed journals, and the United Kingdom (UK) Government reports, as well as magazines and websites. He has published several hundred articles and received the Sage Best Paper Award in 2010.

Starting out in machine design, Dr. Muelaner initially worked on sawmills, waste processing machinery, domestic appliances, and medical devices. After moving into metrology, his research focused on modeling and optimizing uncertainty in manufacturing systems, enabling right-first-time assembly, and the design of innovative laser instruments. He founded Muelaner Engineering Ltd. in 2018 to provide consultancy and technical writing services within advanced manufacturing and sustainable transport. Dr. Muelaner lives with his family in Bristol.

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Unsettled Issues in Commercial Vehicle Platooning

Abstract

Platooning has the potential to reduce the energy consumption of commercial vehicles while improving safety; however, both advantages are currently difficult to quantify due to insufficient data and the wide range of variables affecting models. Platooning will significantly reduce the use of energy when compared to trucks driven alone, or at a safe distance for a driver without any automated assistance. Platooning will also reduce stopping distances—multiple states in the US have passed laws authorizing truck platoons to operate at shorter gaps than are authorized for normal, human-driven trucks. However, drivers typically do not currently leave the recommended gaps and, therefore, already gain much of the potential energy savings by drafting lead vehicles, albeit illegally. The automated systems associated with platooning cannot be programmed to flout safety recommendations in the way that human drivers routinely do. Therefore, actual energy savings may be minimal while safety may be greatly improved. More data will be needed to conclusively demonstrate a safety gain.

Recommended safe gaps are currently highly generalized and must necessarily assume worst-case braking performance. Using a combination of condition monitoring and vehicle-to-vehicle communications, platooning systems will be able to account for the braking performance of other vehicles within the platoon. If all the vehicles in a platoon have a high level of braking performance, the platoon will be able to operate in a more efficient, tighter formation. Driver acceptance of platooning technology will increase as the systems become more effective and do not displace jobs. The increased loading of infrastructure must also be considered, and there may be requirements for upgrades on bridges or restrictions on platooning operation.

NOTE: SAE EDGE™ Research Reports are intended to identify and illuminate key issues in emerging, but still unsettled, technologies of interest to the mobility industry. The goal of SAE EDGE™ Research Reports is to stimulate discussion and work in the hope of promoting and speeding resolution of identified issues. SAE EDGE™ Research Reports are not intended to resolve the challenges they identify or close any topic to further scrutiny.

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