



Large Scale Truck Duty Cycle Evaluation and Assessment of Fuel Efficiency and Emission Reduction Technologies

The Oak Ridge National Laboratory (ORNL) is conducting research to better understand truck fuel economy and emissions in normal everyday use, as part of a study sponsored by the Department of Energy (DOE) Vehicle Technologies Program (VTP). By collecting duty cycle data (velocity, acceleration and elevation) during normal operations of literally thousands of vehicles for an extended period of time, the research team will develop a statistically meaningful dataset that characterizes truck usage across a broad range of trucking applications. This data will then be used to analyze the benefits that advanced fuel efficiency and emissions technologies can provide for specific trucking applications. This research will help provide guidance to technology developers, government agencies, and fleets and individual truck owners for investing in technologies that are best suited to real-world use.

Quantifying Use by Trucking Application

The diversity of applications in the trucking industry—as evidenced by a very broad range of vehicle sizes and configurations as well as large differences in the velocities and accelerations experienced in different uses—requires that different technologies be used to optimize fuel efficiency for different types of trucks. For example, very different approaches are needed to optimize fuel efficiency and emissions for a garbage truck operating at low speeds and making very frequent stops than for a tractor-trailer

transporting goods across the country while driving at steady highway speeds. Different trucks span the full spectrum of uses and speeds, but detailed duty cycle information is not available for most truck applications, and it is not possible to select the best combination of technologies to optimize fuel efficiency for a particular use without knowledge of the duty cycle. This lack of duty cycle data represents a distinct knowledge gap in our understanding of truck usage. ORNL's research will fill this gap with detailed measurements and analysis of truck duty cycles on a large



Advanced fuel efficiency technologies, including hybridization, lightweight materials, low rolling resistance tires, accessory electrification, engine efficiency improvements, and aerodynamic drag reduction, can provide significant improvements in fuel economy, but the right technologies must be selected for each application.

Research Areas

Freight Flows

Passenger Flows

Supply Chain
Efficiency

Transportation:
Energy
Environment

Safety
Security

Vehicle
Technologies

Oak Ridge National Laboratory
managed by
UT-Battelle, LLC
for the
U.S. Department of Energy
under Contract number
DE-AC05-00OR22725

scale basis across the U.S., and a national database of truck duty cycles will be developed.

Assessment of Fuel Efficiency and Emissions Technologies

Trucking fleets and individual owner/operators are certainly interested in reducing fuel consumption and emissions, but investments in new technology are normally only made when there is a clear benefit and economic justification. It can take many years to

understand the benefits of a technology that has been recently deployed, especially to the point that users feel confident that the technology will pay for itself. This time delay can be a hindrance to large-scale implementation and adoption of new technologies. ORNL is developing new tools that will permit users to select a particular trucking application and, based on an analysis of the characteristic duty cycle data, assess the energy savings and emissions reduction potential of individual technologies or technology combinations.

For more information please contact:
Tim LaClair
(865) 946-1305
laclairtj@ornl.gov

Center for Transportation Analysis
2360 Cherahala Boulevard
Knoxville, TN 37932
865-946-1311
Website: cta.ornl.gov