Time & Location: November 3, 2016 at 11:00 AM in Engineering 2 180
Title: A Framework for Assessing Sustainability Impacts of Heavy-Duty Vehicle Routing Strategies

The impact of freight on our transportation system is further accentuated by the fact that trucks consume greater roadway capacity and therefore cause more significant problems including traffic congestion, delay, crashes, air pollution, fuel consumption, and pavement damage. There is a growing need to quantify the actual effects of truck traffic to support the ability to safely and efficiently move goods and people in areas where expansion of roadways is not an option. On one hand, trucks need to efficiently serve commerce and industry, while at the same time their activities need not contribute to a decline in the quality or public safety. In the current practice, there is no methodology for real time management of traffic, specifically on truck routes, to reduce travel duration and avoid truck travel delays due to non-recurring congestion (i.e. traffic incidents) and to estimate impacts on traffic flows, economy, and environment. The objective of this study is to develop a real time truck re-routing strategy and to quantify its’ impact on travel time, emissions, traffic safety, pavement performance and consequently assess the effects on the economy and environment. In order to estimate non-recurrent congestion based travel delay and fuel consumption by real time incident management micro-simulation models (VISSIM), significant corridors with high truck percentage were selected. Furthermore, tailpipe emissions (on-site) due to traveled distance, acceleration-deceleration and idling are determined with MOVES emission simulator program. Economic Input Output-Life Cycle Assessment Model is utilized to gather fuel consumption related upstream (off-site) emissions. Consistently, fuel costs and emission values are lower, even though extra miles are traveled on the alternative route. In conclusion, our study confirms that real time truck re-routing strategies in incident conditions have high economic and environmental impacts.

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Approved for distribution by Amr Oloufa, Committee Chair, on November 3, 2016.

The public is welcome to attend.