

CE TRANSPORTATION ENGINEERING Ph.D DEFENSE Announcement

Expanding Vehicular Microscopic Traffic Simulation for Policy Analysis An Application to PierPASS in California

By:

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Abstract:

Freight operations are critical to our prosperity, but they also generate substantial external costs in the form of additional congestion, air pollution, and health impacts. Unfortunately these external costs are not well understood. In this dissertation, I focus on the drayage trucks that serve the San Pedro Bay Ports (or SPBP, i.e. the Ports of Los Angeles and Long Beach in Southern California), which is the largest port complex in the country. Freight routes providing access to the SPBP comprise a major rail-line (the Alameda Corridor) flanked by the I-110 and I-710 freeways, which both carry thousands of trucks per day. A number of policies have been implemented to reduce emissions on the ocean-side (e.g., limiting ship speeds and managing their queues) and in the Ports (e.g., providing power to docked ships so they do not have to run their engines). On the land-side, two policies were implemented: the Clean Trucks Program, which regulates drayage truck emissions and provides funds for their upgrade, and the PierPASS program (the focus of my dissertation), which shifts drayage trucks traffic from mid-day and peak hours to the evening and night hours. However, external costs from drayage trucks remain a major concern for communities adjacent to the ports because they bear a disproportionate fraction of the health impacts (respiratory and cardiovascular illness, cancer, and premature death) associated with the pollution generated by ports operations. In this context, my dissertation analyzes some of the benefits of shifting freight traffic to off-peak periods with an emphasis on congestion, air pollution (NO_x, and PM) and related health impacts, using an innovative approach that expands microscopic traffic simulation model. My results will inform policy makers concerned with crafting cleaner logistics policies.