ABSTRACT

U.S. Department of Transportation (USDOT) affirmed the initiative of Integrated Corridor Management (ICM) to mitigate traffic congestion on urban corridor networks by systematically leveraging and diverting the traffic to better utilize available capacities of parallel arterials. ICM strategies would be of utmost importance when traffic incidents happened along freeways that may cause significant delays. By effectively diverting upcoming traffic to the adjacent arterials via variable message signs and real-time traveler information system, e.g. mobile devices, the impact of incidents can be alleviated. To fully understand the effectiveness of ICM strategies, a framework needs to be developed to model, simulate, and analyze the ICM operations under different scenarios. In this study, a VISSIM simulation model is developed and calibrated based on the field-collected video and sensor data for the Seattle South of Downtown (SoDo) area, which is selected by USDOT to evaluate the applicability and robustness of ICM strategies as one of the pioneer sites for ICM studies. The analysis aims to quantify the network-wide ICM performance, by empirically diverting traffic to the adjacent arterials in response to incident management for freeway operations. Multiple scenarios were built in the simulation model to account for different diversion rates, as well as recurrent and non-recurrent congestion situations. As expected, with more traffic diverted into the arterials, the arterial's performance degrades while the improvements in terms of travel time and delay for the freeway become marginal. By quantitatively analyzing the delay, throughput, and travel time of freeway segments and arterial network, the trade-off in the overall system performance is carefully studied and understood. The research findings set up a solid foundation for ICM strategy development and traffic system operation optimization.