

Quantifying Freeway Capacity Reductions by Rainfall Intensities Based on Stochastic Nature of Flow Breakdown

Authors : Hoyoung Lee, Dong-Kyu Kim, Seung-Young Kho, R. Eddie Wilson

Abstract : This study quantifies a decrement in freeway capacity during rainfall. Traffic and rainfall data were gathered from Highway Agencies and Wunderground weather service. Three inter-urban freeway sections and its nearest weather stations were selected as experimental sites. Capacity analysis found reductions of maximum and mean pre-breakdown flow rates due to rainfall. The Kruskal-Wallis test also provided some evidence to suggest that the variance in the pre-breakdown flow rate is statistically insignificant. Potential application of this study lies in the operation of real time traffic management schemes such as Variable Speed Limits (VSL), Hard Shoulder Running (HSR), and Ramp Metering System (RMS), where speed or flow limits could be set based on a number of factors, including rainfall events and their intensities.

Keywords : capacity randomness, flow breakdown, freeway capacity, rainfall

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