DRIVER MANDATORY LANE CHANGE BEHAVIOR: USE OF GOVERNING GAP IN CRITICAL GAP ESTIMATION

Srinadh Kandada
Civil, Architecture and Environmental Engineering
Missouri University of Science and Technology
104D Butler Carlton Hall
1401 N. Pine Street
MO 65409
Phone: (573)341-4647
Email: skp6d@mst.edu

Ghulam H. Bham, Ph.D. (Corresponding Author)
Civil Engineering Department
University of Alaska, Anchorage
3211 Providence Drive
Anchorage, AK 99508
Phone: (907) 786-6053
Email: ghbham@uaa.alaska.edu

Transportation Research Board
92nd Annual Meeting, 2013
DRIVER MANDATORY LANE CHANGE BEHAVIOR:
USE OF GOVERNING GAP IN CRITICAL GAP ESTIMATION

Srinadh Kandada, skp6d@mst.edu, Missouri University of Science and Technology
Ghulam H. Bham, ghbham@uaa.alaska.edu, University of Alaska, Anchorage

ABSTRACT

This study analyzed the driver gap acceptance and rejection behavior during mandatory lane changes on a multilane freeway. During a lane change, drivers were more receptive to either the leading or the trailing gaps with vehicles in the target lane which governed the drivers’ lane change and is termed as the governing gap. Drivers maneuvered till the governing gap was greater than the critical gap, then accepted the gap and made a lane change. In this process, drivers reduced the non-governing gap to increase the length of the governing gap. The drivers, as a result, were found to be consistent with respect to the governing gap and inconsistent with respect to the non-governing gap. The governing gap, therefore, addresses the consistent driver behavior and avoids categorization of drivers as inconsistent. Consistent driver behavior is further augmented in this paper by considering the largest rejected less than the accepted gap (LRLA) as the effective rejected gap. Critical gaps were estimated based on the accepted and LRLA gaps, firstly, by categorizing the drivers based on the governing gap and the type of maneuver, and secondly, by categorizing the drivers based on the relative speeds. For a simple lane change model, categorization by governing gap and type of maneuver will be sufficient with a critical gap value distribution defined by empirical data. For a sophisticated lane change model, in addition to maneuver types, critical gaps estimated based on difference in relative speeds will help better replicate the realistic lane change behavior of drivers.