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Estimating Statistical Model for Driver U-Turn Gap Acceptance Behavior

Wafaa Ghalib Jabar ^a and Dr. Khawla H. H. Shubber ^b

^a higher diploma student, Civil Engineering Department, University of Kufa/ Al-Najaf, Iraq.
wafaalmoosawi@gmail.com

^b Prof. Civil Engineering Department, University of Kufa/ Al-Najaf, Iraq.

Corresponding author: khawla.shubber@uokufa.edu.iq

Abstract: Gap acceptance is the most important parameter in determining the capacity of U-turn opening. U-turn safety and efficiency are affected by the behavior of drivers on gap acceptance. The driver required a sufficient gap length to cross the U-turn section. This study is a trial to find a statistical model for driver gap acceptance behavior. A video recording has been used to collect traffic volumes and characteristics for microscopic information such as the number, types of vehicles, opposing through traffic, turning movement, time headway acceptable gap, queue length, and the number of lanes in each direction. The studied area was located within an urban area characterized by a large number of commercial shops and governmental offices. The highway segment was located at the extended of Al-Ghadeer sector toward Al-Escan highway. That link between the Jameea and Al-salam sectors on one



side and Al-Escan and Al- qadesiya sectors on the other side with Najaf-Kufa highway in Najaf city. This segment was a 4-lane divided highway containing on-street parking in each direction and five mid-block U-turns with acceleration lane distribution along the median. Four U-turn facilities were selected as a case study. The traffic volumes for each direction were calculated manually every 15 minutes. Traffic volume and traffic composition were determined manually. A simple software program called EVENT written in C-language provides a system for data counting and enables digital counting for available gaps. The queue length is determined for every 30 seconds and then determine the average queue length for every 15 minutes. Results show gap length gives a higher influence on U-turn gap acceptance decision than wait time; and U-turn driver age, vehicle type of both U-turning and opposing through traffic, and queue time did not influence gap acceptance decision at a 95% confidence interval; U-turn gap acceptance decision connected in equation with gap length, and wait time under the percentage correctness of about 50%. Average travel speeds are an essential factor in driver gap acceptance decisions. It may be the absence factor that made the model more corrective. Future research could also focus on the control and management of such a medium opening to ensure traffic flow and safety. Some of the proposed improvement plans can be studied in detail to assess efficiency and effectiveness.

Keywords: U-Turn, gap acceptance, Median opening, statistical analysis.