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Research

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Evaluation and Simulation of New Roundabouts Traffic Parameters by Aimsun Software

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New roundabouts are innovation and revolutionary in roundabout design, with the risk of incidents in these roundabouts far less than traditional common roundabouts. These types of roundabouts control the traffic flow at the entrance and exit of the roundabout, with the guidance of drivers to isolated lines before entering the roundabout and guidance to the spiral lines inside the roundabout as channelized. Another advantage of these roundabouts is the much more balanced division of traffic flows than traditional ones. In Iran, in view of the many problems of capacity, flow and safety of intersections and intersections, this type of roundabout can be very useful in certain conditions. In this research, how these roundabouts are compared and also the comparison of different input capacities based on the origin - destination demand matrix for new roundabouts and common roundabouts of two lanes with the help of Aimsun traffic simulation software have been investigated. For this purpose, the values of traffic indicators of delay time, density, flow, stop time and travel time of computer simulations for new roundabouts and common roundabouts have been investigated and compared. According to the demand matrix of the origin-destination models loaded in the software and comparisons done, the optimal model for the highest capacity and the lowest delay time and travel time is presented. In this simulation, 8 to 16 percent increase in traffic flow and a decrease of 34 to 59 percent for travel time and delay time in the new roundabouts is shown in comparison with the common two-lane roundabouts.

Key words: 2 Lane Roundabout, Density, Delay Time, Stop Time, Capacity, Travel Time.Copyright © 2018 Hamid Shaker et al. This is an open access paper distributed under the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/).*Journal of Civil Engineering and Materials Application* is published by *Raika Pajuhesh Pars*; Journal p-ISSN xxxx-xxxx; Journal e-ISSN 2588-2880.

1. INTRODUCTION

In the past, the roundabouts of urban gatherings and traditional ceremonies were considered. Nowadays, the roundabouts of traffic control and the symbol of civilization are considered (1). Roundabouts are nowadays considered as a facility for the passage of vehicles. Whenever added to the input traffic to the roundabout, the roundabout control will be out of a simple oversight mode and the traffic analysis of the roundabouts will enter into a complex process (2). Failure to apply the principles of traffic engineering and accurate estimation of supply and demand in urban planning and comprehensive plans of the country have brought about the conditions in cities facing cluster nodes in the roundabouts and intersections and, consequently, waste of time, waste of energy resources and human and biological effect (3-5). Therefore, in this case, traffic experts are trying to figure out the status quo and provide solutions to improve the quality and safety of the traffic (6, 7). International studies have shown that one of the safety concerns that create two lanes concentric

roundabouts is that the increase in the curvature of the vehicle paths has a relative velocity between the devices that enter the roundabout and the moving vehicles around the roundabout. Therefore, results in a lower rate of collision between the vehicles entering and exiting (8, 9). The curvature of the vehicle paths in the two lanes concentric roundabouts leads to a complex problem. Sometimes this problem is moderated, as in the ASSHTO standard of geometric design of highways and streets (10). The guide states that "the proper speed of vehicles along the roundabout is the most important key to design" (10). In the comprehensive analysis of several roundabouts in Germany, Beryllon and Boomer conclude that line alignment in roundabouts should be distributed according to principles "and the upper limit of 60 meter for the outer diameter of the roundabout is preferred (11, 12). CROW, entitled "integrated roundabouts", has proposed a lower speed, which includes maintaining traditional access lines instead of changing them to tangent access lines mentioned above (11). It can be concluded that the two lanes