

## Analysis of Non-Conventional Roundabout Performance in Mixed Traffic Conditions

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**Abstract :** Traffic congestion is the most critical issue faced by those in the transportation profession today. Over the past few years, roundabouts have been recognized as a measure to promote efficiency at intersections globally. In developing countries like India, this type of intersection still faces a lot of issues, such as bottleneck situations, long queues and increased waiting times, due to increasing traffic which in turn affect the performance of the entire urban network. This research is a case study of a non-conventional roundabout, in terms of geometric design, in a small town in India. These types of roundabouts should be analyzed for their functionality in mixed traffic conditions, prevalent in many developing countries. Microscopic traffic simulation is an effective tool to analyze traffic conditions and estimate various measures of operational performance of intersections such as capacity, vehicle delay, queue length and Level of Service (LOS) of urban roadway network. This study involves analysis of an unsymmetrical non-circular 6-legged roundabout known as "Kala Aam Chauraha" in a small town Bulandshahr in Uttar Pradesh, India using VISSIM simulation package which is the most widely used software for microscopic traffic simulation. For coding in VISSIM, data are collected from the site during morning and evening peak hours of a weekday and then analyzed for base model building. The model is calibrated on driving behavior and vehicle parameters and an optimal set of calibrated parameters is obtained followed by validation of the model to obtain the base model which can replicate the real field conditions. This calibrated and validated model is then used to analyze the prevailing operational traffic performance of the roundabout which is then compared with a proposed alternative to improve efficiency of roundabout network and to accommodate pedestrians in the geometry. The study results show that the alternative proposed is an advantage over the present roundabout as it considerably reduces congestion, vehicle delay and queue length and hence, successfully improves roundabout performance without compromising on pedestrian safety. The study proposes similar designs for modification of existing non-conventional roundabouts experiencing excessive delays and queues in order to improve their efficiency especially in the case of developing countries. From this study, it can be concluded that there is a need to improve the current geometry of such roundabouts to ensure better traffic performance and safety of drivers and pedestrians negotiating the intersection and hence this proposal may be considered as a best fit.

**Keywords :** operational performance, roundabout, simulation, VISSIM

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