

Enhancing Urban Traffic Safety: A Study on Roundabout Capacity, Mobility and Safety Measures in Dar-es-salaam.

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Background

There has been an increase in the delays and congestion points in Dar es Salaam due to the increase in number of vehicles users. This presses on the need of developing various means of controlling the flow of traffic in the roads. Controlled and uncontrolled intersections have been adopted to reduce potential conflicts between vehicles, pedestrians and bicycles (MoW, 2011). Roundabouts have been adopted worldwide because of lesser conflicts points, being cheaper and reduction of road accidents, hence promoting safety.

Aim

This study aims at enhancing urban traffic safety by studying roundabout capacity, mobility and safety measures kept for the road users. Are the pedestrians and cyclists provided with proper safety facilities at the roundabout? What is the capacity of the roundabout and how it affects urban safety?

What are the peak hours, congestion points and overall traffic performance of roundabouts and how does it affect the safety of the road users?

Method

The primary data of traffic safety at roundabout will be collected by interviews and questionnaires to the road users. The necessary facilities to be provided to enhance urban traffic safety for all road users are also observed at each leg of the roundabout. The overall traffic performance is also analyzed by observing the congestion points at peak and non-peak hours.

The methodology used in capacity estimation is based on the gap acceptance theory by using formulars used in the Highway Capacity Manual. The necessary input parameters were recorded by video cameras from site such as critical gap, follow up time and conflicting circulating traffic volume.

The capacity of roundabout approach for single lane roundabout is estimated by the following equation.

$$C_A = (VC * e^{VC*TC/3600}) \div (1 - e^{-VC*TF/3600})$$

Where C_A represents the approach capacity (veh/hr)

VC represents the conflicting circulating traffic (veh/hr)

TC represents the critical gap (s)

TF represents the follow up time (s)

Source : Highway Capacity Manual

Results

Most of the roundabouts have zebra crossing provided for pedestrians and cyclists at the entrance and a certain distance from the entry and exit section. However it is better to provide raised splitter island so as to aid the safety of the roundabouts.

The capacity of the roundabout is affected by the configuration in the approaching and circulating section therefore proper road signs should be inserted in order to promote safety.

The mobility of the roundabout is affected by the social and economic activities taking near the roundabouts and therefore evacuation measures should be taken to ensure safety of civilians and road users.

Conclusions

- It is important for a road designer to provide safety facilities for all road users especially pedestrian and cyclists and provide proper dimensions of the roundabout to fit the capacity.
- If the project is economically viable, the addition of an extra lane for motor cyclists when initiating movement through the roundabout.
- This will help in ensuring traffic safety during movement and providing the smooth control of traffic when using the road facilities.