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RESEARCH ARTICLE

ASSESSMENT OF TRAFFIC SIGNS AND ITS REMEDIAL MEASURES: A CASE STUDY OF ARADA SUB-CITY

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ABSTRACT

Clear and effective traffic signs are essential for the efficient operation of the road network, for the enforcement of traffic regulations and for road safety. In our country due to poor trend, after an accomplishment of road construction, traffic sign management is not given proper assessment and management. This paper aimed at assessing the traffic signs in Arada Sub-city as traffic signs play a great role in minimizing traffic accidents and traffic congestions making the traffic flow smooth. This sub-city was chosen in a purposive sampling technique because the sub-city is at the center of the city whereby it is the busiest business center with a high traffic flow. Four research questions were forwarded to be answered at the end of the study. The first one was to identify what type of traffic signs were installed in the sub-city while the second one was to check the condition of the existing traffic signs, and the third question checked the causes of failure for problematic traffic signs followed by the last question which asked what kind of remedial measure could be taken for the problems observed. The researcher used a descriptive survey study which was appropriate for this study. Observation, questionnaire and interview were used as data collection instruments. To make the assessment convenient, the sub-city was divided into nine sites and the traffic signs on the major roads of each site were observed; their type, height, age, legibility, visibility, condition were assessed. In addition, two sets of questionnaire were prepared for thirty traffic police officers and fifteen AA TMA (Addis Ababa Traffic Management Agency) workers while two sets of interviews were prepared for the shift manager of Arada Sub-city Traffic Police Office and infrastructure asset management expert of AA TMA. Then the data gathered through these instruments were analyzed. The result reveals that only few redundantly used type of signs dominated the sub-city; other types of traffic signs that are important are not used. There are not sufficient traffic signs in the sub-city. The posted signs do not have any standard and quality. The condition of most of the signs shows that most of them have several problems and need solutions; so some remedial measures were given for the problems. Finally in light of the research findings which show that there are several problems in relation to the traffic signs in Arada Sub-city the recommendations are made in order maintain a safe and secure highway environment.

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INTRODUCTION

Road Transport is one of the most frequently used modes of transportation systems in most countries of the world. Traffic signs are essential components of the transportation system. During the day and night, traffic signs provide vital guidance to road users regarding traffic regulations, destinations, safe speeds, and unexpected road conditions. Road regulations and traffic signs as we know them today are not older than a hundred years. All states should stipulate equal traffic signs, that these traffic signs should not contain written instructions or information. Addis Ababa, with an area of 540 km² is divided into 10 sub-cities and 116 Woredas.

The city is the country's political and economic center, the seat of Head Offices of African Union and United Nations Economic commission for Africa. Arada Sub-city is one of the ancient Sub-cities of Addis Ababa. Most of their governmental structures, residences, social, economic, and political infrastructures were established mostly here in Arada. Currently a lot of buildings are being built for different purposes such as workshop, administration, education, health and business centers. Arada sub city, as the one of the busiest city centers of Addis Ababa, has high traffic flow and congestion. Though this sub-city, as a center for all the remaining sub cities, has high traffic flow a lot of problem is observed in its traffic sign assessment and management. Due to this, the condition the signs are in is critical and a lot of problems are observed in relation to the traffic signs.

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So the main purpose of this study is to assess the degree of the problem in Arada Sub-city as it is the center for all the other sub-cities and busiest from the rest of them.

Objectives of the study

General Objective: The general objective of this research is to assess the traffic signs in Addis Ababa Arada sub city and give remedial measures to maintain a safe and secure highway environment.

Specific Objectives

- To identify the traffic signs installed in study area.
- To check the condition of the existing traffic signs.
- To check the causes of failure for the existing signs.
- To suggest remedial measures for the problems observed.

Literature Review

A “traffic sign” means any object, device, line or mark on the road whose objective is to convey to road users, or any specified class of road user, restrictions, prohibitions, warnings or information, of any description (Bangladesh Road Transport Authority, 2000). Traffic signs play a vital role in directing, informing and controlling road users' behavior in an effort to make the roads as safe as possible for everyone. This makes knowledge of traffic signs essential. Not just for new drivers or riders needing to pass their theory test, but for all road users, including experienced professional drivers (Department for Transport London, 2000). Traffic signs must be visible at night. They should preferably be reflectorized so that they show up clearly in vehicle headlights. Traffic signs should be constructed and erected so that they will last for many years without any attention apart from occasional cleaning (Bangladesh Road Transport Authority, 2000). The main function of traffic signs are to regulate, warn, and inform. There is a different group of signs for each function, and the signs in each group have a uniform shape to help drivers recognize them quickly.

Regulatory Signs: These signs give orders. They tell drivers what they must not do (prohibitory), or what they must do (mandatory). Most of them take the form of a circular disc, although two signs, the Stop sign and the Give Way sign, have distinctive individual shapes (Department of Transport an Roinnlompair, 2010).

Warning Signs: These warn drivers of some danger or difficulty on the road ahead. Most of them take the form of an equilateral triangle with its apex uppermost (Department of Transport an Roinnlompair, 2010). Warning signs or cautionary signs give information to the driver about the impending road condition. They advise the driver to obey the rules. These signs are meant for the own safety of drivers. They call for extra vigilance from the part of drivers. The color convention used for this type of signs is that the legend will be black in color with a white background. The shape used is upward triangular or diamond shape with red borders (Kadiyali, 1987).

Information Signs: Most of these signs give drivers information to enable them to find their way to their destination. It is a varied group of signs, but they are all

either square or rectangular in shape (Department of Transport an Roinnlompair, 2010)

METHODOLOGY

This study was designed to be a descriptive survey study. The data collection instruments chosen for this study were questionnaire, interview, observation and which are mainly used in survey study to gather the necessary data. Observation was the major data collection instruments while questionnaire and interview were supportive data collection instruments. Qualitative and quantitative studies were employed in this study area. Arada Sub-city was chosen using purposive sampling technique. The traffic signs found in the major roads of Arada Sub-city were divided into nine sections and observed. Their visibility, legibility, and condition were analyzed. Thirty traffic police men are allocated in each day in the sub-city. In the questionnaire, generally 30 traffic police officers in Arada Sub-city. The problems were observed and researches related to the topic were searched and read to assess their purpose and their findings. For observation, classified the study area into nine sections. Data collection of the signs on the road was carried out by using inspection methods and using cameras. In addition, the collected signs were plotted in a geographic information system. Moreover, questionnaire, interview, and document analysis were used for data collection. The data gained from data collection process were analyzed in tables and graphs using MS Excel. Causes of failure, and the remedial measures for them were also suggested. Finally the conclusion was drawn followed by giving recommendations for the problems.

RESULTS AND DISCUSSION

The study area is divided into nine sites to easily address the objective of the study. In each site type, height, visibility, legibility, condition of the sign, and causes of failure with remedial measures are presented. For the signs the types, the visibility, legibility, and condition of the signs are presented in number and percent while the causes of failure for those signs that are in bad conditions are explained.

Sign Types: A total of 175 traffic signs are installed in Arada Sub-city. From the four sign types the most commonly used sign is a regulatory sign. R29 or no-parking sign takes the vast majority number; there are sixty-eight R29 signs in the sub-city. From distribution of the traffic signs in the sub-city is that they are not evenly distributed and only one type of sign is given attention which implies that the signs were not installed in consideration with the need and condition of the roads in the area

Sign Type	No of Sign	Percent
Warning	19	11
Regulatory	143	82
Obligatory	11	6
Informative	2	1
Total	175	100

Condition of the signs: Signs that are considered ‘good’ are those that can continue giving service for road users without any maintenance or replacement, and 40% of the signs in Arada Sub-city are in good state.

On the other hand, Signs that are deemed to be 'medium' are those that can continue giving service after some maintenance; these signs need some form of repair. However, signs that are considered 'poor' must immediately be changed or replaced. Based on this, 70% of the traffic signs in Arada Sub-city are in poor condition. The researchers concluded that, condition of the traffic signs in general, only 40% installed signs in the sub-city can continue giving service without a problem while 60% of them either need maintenance or should be immediately replaced. This shows that more than half of the installed signs in the sub-city have several problems and the problem should be attended soon.

Traffic signs data mapping in a geographic information system (GIS): To overcome the problems encountered the position of each sign was taken and then the longitude and latitude of the each sign was noted using GPS. After which their longitude and latitude were displayed in the Arc GIS. Then the category of the traffic signs was identified. After that Arada Sub-city road map and its boundary was added followed by leveling by category on arc GIS map and creating attribute table field with code of each of the sign. Finally arrangement of the lay out paper was done.

Conclusion

The number of signs posted in Arada Sub-city is not sufficient. Though the visibility and legibility of the traffic signs is not in a critical condition as most of the signs are visible and legible to road users, their condition is in a critical stage. Eleven types of causes of failure were identified among the traffic signs that are in medium and poor condition. From these problems posts which are loose in their foundation take the leading place while signs which are damaged due to accident or other harm take the second place followed by sign plates that are loose. Two major remedial measures were suggested for the problems observed. The first one specifies the type of traffic signs that should be posted in each of the nine sites specifically and the type of signs that should be posted throughout the whole sub-city in general. The second remedial measure forwards the solution for the causes of failures that are observed in each sign in each of the nine sites.

Recommendation

Traffic signs should be produced and installed according to international standards and quality as this helps the traffic signs to be more effective and give service for a longer time. Their height, legibility, visibility, their position and distance from the carriageway should be considered well when they are produced and posted.

Traffic signs must be inspected at least twice a year to see if there are problems and immediate solution should be given to the problems observed. Traffic signs should be regularly cleaned and taken care of. Other obstacles that hide them or hinder their work such as trees and bushes or grasses should be regularly cleared from their areas. All the traffic signs should be available in a modern and computerized system as this helps to get anyone full information about the signs and to make the work of the concerned bodies easier in conducting sign inventory.

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