

An Overview of Some Importance Road Signs, Markings and Their Meaning and Why Are They Importance to Road Users

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Abstract

Traffic control devices are an important part of road infrastructure, among which road markings and road signs play a significant role. Road markings and signs represent basic means of communication between the road authorities and road users and, as such, provide road users with necessary information about the rules, warnings, obligations, and other information related to the upcoming situations and road alignment. The core aim of this research is to understand some importance road signs and road markings by the motorists which most of drivers did not understand or failed to observe while driving on the road and moreover presented meaning of some road signs and markings used on the road as well. Similarly, the study pointed out why these signs and road markings are importance to motorists and pedestrians. The study used secondary data from other scholars published in peer-reviewed journals, conference proceedings, professional report, and hardcopies of text books, magazines and newspapers to provide this paper. The most significant characteristic of road sign and road markings is their retro reflectivity. The researcher found out that the studies carried out to date regarding the impact of road signs and road markings retro reflectivity on the occurrence of road accidents provided inconclusive results particularly on the areas of snow, during rainfall and heavy storms. The previous research carried out by many scholars indicated high impact of road signs and road markings on road safety in dry areas both to motorists and pedestrians. Therefore, the researcher of this paper has recommended when road signs and road markings to be effectively; road signs and markings must be designed and implemented in a way that the messages they convey are clear, unambiguous, visible and legible during the days and nights and in any weather conditions. Moreover, maintenance of road signs and markings damages by vehicles or faded due to time is equally important.

Key words: *Road signs, road markings, pedestrians.*

Introduction

Road signs can be defined as a communication tool to road users. In fact, the role of the road signs is to make the motorist for a subsequent action that is necessary according to the layout of the road in advance. Such communication can be an advice, an order, or, finally, a prohibition, and it is related to the driver's behavior that should be taken on the road. The fundamental aim of these signs is to improve the safety of the traffic (Fisher, 1992). Such contents are predominantly communicated by pictures and texts. In the late 1800s road signs were the milestones that served to provide the road users or the pedestrian with the information related to the distance and/or the direction to follow to reach a determined place, which now is beyond this (Crundall and Underwood, 2001). Road markings are lines and symbols that show roads alignment. They indicate the number of lanes on the road, where it is permissible to overtake, and where to stop for pedestrians etc. Road markings include centre lines, edge lines, lane lines, zebra crossing or pedestrians crossing, pavement messages, and are reflective in order to be visible at all the time of the day. In 1911, the first documented use of road markings was established when the center line was painted on Trenton River Road in Wayne County, Michigan in USA when got the idea after seeing milk leaking from a milk truck on the road. (European Road Federation, 2014).

Traffic control devices date back to the time of ancient civilizations, whereby roads were marked in a primitive way, using trees or stones. Technological advancement, construction, the interconnectedness of evolving geographical areas, the need for faster transport, and the migration of people and goods led to the need to establish a legal framework for managing transportation networks across the globe. The first International Convention on Motor Traffic

was held in Paris in 1909, and it addressed problems related to the construction of motor vehicles, international traffic, road signs, and lighting. Among other things, the convention demarcated the basic shapes of road signs, such as danger signs were defined as equilateral triangles with the top facing upwards, mandatory signs as circles, and notice signs as rectangles. The Paris Convention was supplemented by two new conventions related to road and motor traffic (the International Convention relating to Road Traffic and the International Convention relating to Motor Traffic), the conclusions of which were adopted in Paris in 1926. However, the conclusions mentioned did not deal comprehensively with the matter of road signs and lighting, which is why a convention on one system of road signals was held in Geneva in 1931 (Nowak, R. United Nations Road Safety Conventions, 2014).

In 1949, the United Nations Economic and Social Council concluded that the current conventions from 1926 and 1931 were obsolete and organized a new conference in Geneva the same year. The convention unified colors, shapes, and basic sizes of road signs and defined the use of symbols instead of words to make the signs more understandable to people from different countries, cultural and linguistic origins, and to illiterate people (Babić, D.et.al; 2022). The Vienna Convention is used in 69 countries worldwide. In the USA, the system is based on the US Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) (Virginia Department of Transportation, 2012). Nigeria adopted the road sign system in the 1970s. Nigeria's Federal Road Safety Commission (FRSC) in the 2008 revised edition of the Highway Code, notes that road traffic signs in Nigeria bear same characteristics with those of the developed countries. On categorisation, FRSC groups the signs into:

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traffic signs, signals, road signs and pavement markings (Motunrayo, 2012).

Methodology

Based on the aim of this review, the identified studies have been categorized into three groups: (1) Studies on the importance of road sign and road marking to motorists. (2) Studies the meaning of some road signs and road markings on the road and (3) why these road signs and road markings on the road are importance to road users. There were many studies in literature review relate to at least one of the above groups were published in peer-reviewed journal, conference proceeding, or as a professional report. Other materials was also consulted such as hard copies of text books, magazines, newspapers to be able to have genuine information and up to date reports from various concern organisations to make this review presentable.

Road sign's function/role (Kadyali, 2013):

1. To give timely warning of hazardous situations when they are not self-evident.
2. To regulate traffic by conveying message to drivers when to STOP, GIVE WAY or LIMIT their speeds etc.
3. To supply information on highway route, directions and points of interest.

Classification of road sign (Kadyali, 2013):

1. Cautionary or warning signs: These are signs that warn the road users of certain hazardous situations on and nearby to the roadway.
2. Mandatory or Regulatory signs: These signs inform the road users of certain laws, regulations, prohibitions or restrictions which have to be complied

with; any cases of non-compliance are chargeable of legal action.

3. Informatory signs: These signs provide guidance to the road users in respect of direction and place, identification, facilities like roadside rest area, petrol stations, parking etc.

Siting of road sign (Kadyali, 2013):

1. The road sign should normally be placed on the left side of carriageway but can be repeated above the carriageway as overhead sign if the condition permit.
2. No part of road sign should be less than 0.6m away from the kerb.
3. No part of road sign should be less than 2m from the edge of carriageway.
4. Road sign should not less than 2m above the kerb on kerb road and not less than 1.5m above on unkerbed roads.
5. Road sign may be placed on the median of a divided carriageway and not cause any obstruction to the movement of vehicles.
6. All road sign especially cautionary/warning sign and mandatory/regulatory sign should have reflective materials or be lighted for better visibility and legibility at night except those in lighted streets built-up areas.

Function of road marking (Kadyali, 2013):

1. To guide and control traffic on the highway.
2. To serve as a psychological barrier.
3. To describe traffic path and it lateral clearance from traffic hazards.

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4. To aid pedestrian and cyclists in channelizing their movement into safe locations.

Classification of road marking (Kadyali, 2013):

1. Longitudinal marking: lines indicating parking restrictions, no overtaking zones etc.
2. Intersections marking: Stop lines, Giveaway lines, pedestrian crossing, direction arrow etc.
3. Hazardous locations: Carriageway transition marking, obstruction approach, road-rail level crossing etc.
4. Parking marking: parking space limits, parking restriction, bus stop etc.
5. Word messages: The word messages painted on the pavement like STOP, SCHOOL, RIGHT TURN ONLY, EXIT ONLY etc.
6. Object marking: physical obstructions with the carriageway and may be serious hazards to the moving vehicles. Examples are; piers, abutments, monuments, trees etc.

Some road signs and their meaning:



Figure 1. Stop sign
DPWH Manual, 2012.

This type of road sign shown in Fig.1 is normally located at intersections, railway crossings etc.

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The purpose of this sign is to bring traffic to a break. It brings the vehicle to a stop behind the stop line. If there is no stop line, the front of the vehicle must come to a stoppage in line with the stop sign. At a three or four-way stop, you may not move off before all the other vehicles that stopped before you. Go on only when is safe (SA Learner Driver Manual).



Figure 2. Roundabout

DPWH Manual, 2012.

Roundabout is located on any road where there are multiple roads interconnecting. The purpose of this road sign as in Fig.2 is to indicate that you must move in a clockwise direction at the junction. Right of way to vehicle approaching from the right within the roundabout, Proceed clockwise at the junction if it is safe to do (SA learner driver manual).



Figure 3. Children crossing
Fleyeh, 2008.

Figure 3 above located especially near schools, playgrounds and sports fields. This is to warn drivers that children might be crossing the road. So, the drivers should slow down immediately and look out for children who could be crossing the road unexpectedly or playing around the road (DPWH Manual, 2012).



Figure 4. Animal crossing
DPWH Manual, 2012

Figure 4 above sign normally located in domestic animals area. The purpose of this is to warn drivers that there may be free ranging animals such as cattle, horses or sheep on the road. So, the drivers should slow down and be on the lookout for the next 2 km for animals (SA Learner Driver Manual).



Figure 5. T-junction
SA Learner Driver Manual

Figure 5 are placed on the road before you reach the place where two roads meet. The purpose of the figure 5 is to warn drivers that you are approaching an intersection where you have to turn sharp to the right or left. Drivers hoping to slow down and be prepared to stop and go round the corner at a safe speed (SA Learner Driver Manual).



Figure 6. Rail crossing
DPWH Manual, 2012

Figure 6 of railway crossing above are normally located close to a railway line. The purpose of this

sign is to inform drivers that there is a railway crossing with one or more tracks ahead. The drivers are expected to slow down their movement. The driver should stop no closer than 3m from the nearest track, and not stop on the track or in the railway reserve area (DPWH Manual, 2012).



Figure 7b. Gentle curve



Figure 7a. Gentle curve

Fleyeh, 2008.
Fleyeh, 2008.

Figures 7a and 7b above are use on road to warn the drivers that there is a gentle curve ahead to the left or right. This is to ensure that you drive at such a speed that you can take the curve safely or stop within the distance that you can see (DPWH Manual, 2012).

Figure 8, which is speed limit use on public road. The purpose of this signs is to inform drivers of the speed limit applicable on the road. The restriction applies from the sign varies from road to road (DPWH Manual, 2012).



Figure 8. Speed limit
DPWH Manual, 2012.

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Figure 9 is informing drivers that there is construction works that is happening ahead. Therefore, the drivers are to move slowly due to the heavy duty machines working around the area and workers as well (Babić, et.al; 2022).



Figure 9. Road work
Babić, .et.al; (2022).

Some road markings and their meaning

The mark on the road in figure 10 below indicate centre line or separation line that is solid white. The drivers or motorists should be very careful when driving to maintain a lane. The first left lane is for high speed vehicles, the second lane for medium speed and third lane for low speed and vehicles preparing to park at the shoulder (DPWH Manual, 2012).



Figure 10. Separation line
DPWH Manual, 2012

The figure 11 of road sign below that indicate lane-line which the motorists are allow to pass left and right provided that the way is clear. Under this situation the drivers can cross and over take other vehicles without any law violation (DPWH Manual, 2012).



Figure 11. Lane-line
DPWH Manual, 2012

Figure 12 is a double solid yellow line. The road sign informs the drivers that never cross to pass other vehicles unless permitted. Therefore, crossing or over taking other vehicles under this scenario without permission is prohibited (DPWH Manual, 2012).



Figure 12. Double solid yellow lines
DPWH Manual, 2012

Figure 13 below which is a yellow line marking on the road. This type of road marking below is telling motorists that overtaking from both direction is not allowed by other vehicles. Therefore, overtaking on the road with single yellow line is prohibited or done with extra care.



Figure 13. Yellow line
DPWH Manual, 2012

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Figure 14 below which is broken and solid yellow lines, passing is permitted on the side of the broken lines but not on the side of the solid line (DPWH Manual, 2012).



Figure 14. Broken and solid yellow lines
DPWH Manual, 2012.

Figure 15 indicate the pedestrian crossing. This is the only point where pedestrians are allowed to cross the road. Drivers must slow down toward this point and give way to pedestrian at this marking point (Ogunmola, 2013).



Figure 15. Pedestrian crossing
DPWH Manual, 2012.

Discussion

Clear and efficient signing and marking is an essential part of highway and traffic engineering. The purpose of this study is to overview of some importance road signs, markings and their meaning and why are they importance to road users. Signs and markings are used to control and guide traffic and to promote road safety. Great Britain is thought to have one of the safest road networks in the world and the quality of its traffic

signs and markings make a significant contribution to this. To be effective, signs and markings must be designed and implemented in a way that the messages they convey are clear, unambiguous, visible and legible. Maintenance of signs and markings is equally important. One of the primary objectives of road signs, signals and markings is to provide useful information to the drivers so that the resulting appropriate behavior will prevent Right To Information (RTI), they also indicate legally enforceable speed regulations at specific locations. Research shows that inadequate and poorly maintained road signs and markings are often refer to as a significant contributing factor to RTIs. Research by a UK Road markings Trade Association (RTA) has found a correlation between the quality and condition of signs and markings and the number of deaths and serious injuries occurring at locations on UK roads. Using cost benefit analysis, road marking improvements are shown to be amongst the most effective road safety devices available to highways engineers (RSMA, 2011).

In Nigeria, there are quite a few researches on the need to develop literacy in road furniture and Release Transportation unit for Staging (RTS) among them (Okoko, 2006). FRSC (2016) acknowledged that the human factor, which includes illiteracy, accounts for ninety percent of the causes of RTCs on Nigerian roads. Lack of understanding of traffic signs could be a significant reason behind fatal road accidents (Razzak and Hasan, 2010). Improved road safety can also be achieved by improving road layout to assist drivers at bends and junctions. This can be achieved by consistency of design and proper siting of road markings and signs (G.Yannis, 2011).

Conclusion

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Traffic signs are resources that provide motorists and pedestrians with vital knowledge about specific road conditions. Many research has shown that drivers and pedestrians' had a medium degree of understanding of the traffic signs and markings. Road signs could be regulatory, prohibitory, mandatory or informative. White, yellow, blue, red and black colours are used for road signs and the letterings, while the shapes vary depending on the messages they convey (Akpan, et al. 2015). To improve the understanding, more initiatives can be taken, such as public awareness seminars for drivers and pedestrians monthly organized by driving schools, high schools, colleges, universities, government offices, and private offices. (Masum Ahmed, 2022). One of the pioneer studies regarding the road markings and occurrence of road accidents was conducted in 1981 with the aim of analysing the impact of road marking enhancements on road safety (Babi'c, D.et.al; 2022). Road markings help to regulate traffic, particularly in terms of guiding road users and helping them to predict the traveling route and boundaries of the road and so forth. (Road sign and marking, 2017). Road markings are particularly important in night-time conditions when the amount of light available to the drivers reduces, which narrows and shortens the human field of vision and weakens perception of colour, shape, texture, contrast, and movement. In these conditions, the most significant characteristic of road markings is their retro reflectivity. Studies carried out to date regarding the impact of road markings retro reflectivity on the occurrence of road accidents provided inconclusive results. The need for "good" road markings is that, marking at all times should remain visible to both the drivers and the intelligent vehicle irrespective of time of the day and weather conditions (Babi'c, D.et.al; 2022).

Recommendations:

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Based on the findings above, it is recommended that:

1. There is need for the road agency and maintenance to educate motorists some importance road signs and markings used on the road for safety.
2. The road signs and markings materials should be identify even during the day and night time by the drivers.
3. The road signs and markings should be replace immediately when bad weather cover them, faded or damage by vehicles.
4. The concern agency should also be out on the road to physically enforce compliance with the road signs and markings.

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