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A Study on Traffic Control Device at Some Selected Locations of Chattogram City, Bangladesh

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ABSTRACT: This paper aimed to identify the different types of road signs, signals & marking catalogued by the BRTA in its traffic manual and to check the level of implementation of these signs, signals & marking at a selected area in Chattogram City. For this purpose, a test road convenient to most drivers and also not a straight one was chosen; the route from Wasa Circle - Newmarket. Most of the traffic studies are conducted on a straight route, but the primary reason for selecting this route is that it has a lot of diversions and curves where the presence of road signs, signal & marking are very much necessary. Most of the drivers who agreed to volunteer for research didn't know the sign "keep right / keep left"; moreover, the pest-hello road of Chittagong City handles very fast-moving vehicles, but there weren't any speed limits neither speed breakers. Questionnaire Survey and photographic evidence were collected for the purpose. It has been observed that, street lighting is not sufficient enough. The placement of signal was wrong at almost 25% of intersections; signal lights direction was wrong at almost 15% of intersections, and controller cabinet conditions were not satisfactory for most of the interactions. Among 140 surveyors, 81% of people knew about the road marking pedestrian crossing, 84% lane line, 78% barrier line, 85% no parking, 95% special speed limit and 100% people knew about the signal standard. Only 12% of people knew about the marking of the zigzag line. The study period was short. Extension of study area and no. of surveyors will provide better results.

KEYWORDS: Traffic control device, Questionnaire Survey, Driver understandings.

I. INTRODUCTION

The traffic system of Chittagong city is predominantly road based. The amount of traffic in Chittagong city is very high. An effective traffic control system is very important in Chittagong city to control the pressure of traffic. Traffic signs, signals, and marking play a vital role in controlling the city's traffic system. Clear and effective traffic signs, signals, and markings are essential for the road network's efficient operation, for the enforcement of traffic regulations, and road safety. Traffic signs, signals are the oldest and most frequently used traffic control devices currently in use. Road markings are used as a means of controlling and guiding traffic. Traffic signs, signals, and marking provide a means of communicating important information about the roadway to the road users. In contrast, they can get a clear and exact indication of their safe activities. They also help achieve an acceptable level of road traffic quality & to increase safety with orderly and predictable moments of all traffic, both drivers and pedestrians. Traffic sign, signal, and marking utilize colour, shape, symbol, or words to convey information. Intersections are a great concern due to conflicting traffic movements, crashes, and vehicle delays. Traffic signs, signals, and marking in intersections provide orderly movements of vehicles, improve safety, provision for the progressive flow of traffic, and minimize traffic flow. This study aims to briefly understand the different types of road signs, signals, and marking being used in the world proposed in the road traffic manual of Bangladesh by the BRTA.

Therefore the main objective of the proposed study is:

- To examine various types of road signs; signals and markings used in the study area.
- Assessing driver's point of view about road sign, signal, and marking.
- To provide some recommendations, and suggestions for a possible user-friendly effective traffic device system.



II. RELATED WORK

Comprehension study on traffic control device was carried out by The Texas Transportation Institute (TTI). (1, 2, 3) Drivers between the ages of 14 to 24 were reported to have the lowest comprehension levels (1). A 1981 TTI study reported that older drivers and the lower educated were more likely to have lower understanding level of traffic control devices (2). Recommendations in those studies were to emphasis more on driver education. Young drivers must have a basic understanding of traffic control devices and know the severity of hazards posed by misunderstanding them; however, only limited data exist on teenage drivers' knowledge of these devices. A further study at Texas, USA showed, the traffic control devices that proved most difficult for teenage drivers to comprehend were flashing beacons, left-turn signal displays, and symbols signs. Furthermore, the results indicated that additional efforts required in education and creating responsibilities among teenage drivers. A research carried out on 9000 drivers of residents of Bahrain, Kuwait, Oman, Qatar, and United Arab Emirates to have a relation on their accident involvement and understanding of warning and regulatory signs. Their personal characteristics were also investigated. Result showed that on average, drivers really understood 56% of all 28 signs. The overall conclusion was that personal characteristics, rather than accident involvement rates, are most clearly associated with comprehension capabilities (5, 6). A study was carried out in 2003 on driver understanding of the current U.S. system of yellow– white pavement markings through a driver survey. The survey was used to evaluate drivers' ability to describe the pavement marking color code, drivers' reliance on pavement marking patterns. Approximately 75% of the drivers surveyed understood the basic concept that a single broken yellow line separates opposing traffic on a two-lane road. The presence of a solid line (either double solid or solid and broken) in the centerline increases comprehension of directional flow to approximately 85%; more than 90% of the drivers surveyed understood that a solid line (either double solid or solid and broken) prohibits passing. Almost 95% of drivers indicated that passing is permitted with a broken line. The survey results indicate that the yellow–white pavement marking system is better understood than previously believed (7).

III. METHODOLOGY

Firstly a preliminary survey was done on the test road to identify the strategic points and see if road signs, signal & markings have been appropriately used or used at all the data were recorded as photographic evidence. Secondly, a questionnaire was distributed among 140 drivers randomly chosen. The questionnaire asked specific questions regarding their knowledge on road sign have been implemented. The drivers were chosen to keep in mind the criteria that they had to be completely sure of the paths in the selected road test so that their answers were relevant to our personal analysis of the existing condition of the road signs, signals & marking in the test road. Finally, another used was the interview method to add an innovation to the usual techniques used in such kind of survey. Only those interviewed participated in travel through the test road while photographic evidence was being collected. The traffic officers who were interviewed were also limited to those who were posted for duty on the selected road. The interview method didn't contain any specific questions. Rather the subjects were just asked to speak freely on what they think about the road signs, signals & marking conditions of Chittagong City. This method was thought not very useful but still helped to understand that the implementation of road signs, signals & roadway marking was just an important part of traffic system.

IV. EXPERIMENTAL RESULTS

Figure shows some results of the questionnaire asked to the drivers. Questions were asked about educational qualification, driving experience, types of vehicles drive, knowledge about traffic control device and some suggestions reading improving the present condition. Fig. 1 shows educational qualification of the drives. Maximum 40% completed secondary education and minimum 7% were honours and above. Fig 2 shows the driving experience in years. It is observed that, 34% of the driver was within 5 years driving experience which is maximum in this case and only 13% was with more than 15 years' experience. Most of the driver's driving experience was low. Fig. 3 shows types of vehicle driven by the drivers. Here, 50% were bus drivers and 6% were driving private cars. Fig. 4 shows driver understands of sign, signal and markings. Result shows, 60% of the drivers knew about sign, signal and markings, 13% knew about sign, 20% of signal and 7% of markings. Fig. 5 shows some suggestions about improving traffic control device from frivers. Drivers suggested on increasing road sign, mandatory education, strict law, license approval, improving roadway conditions, proper use of traffic sign, increase and improve roadway markings and increase public awareness. The percentages are shown in Fig. 5.

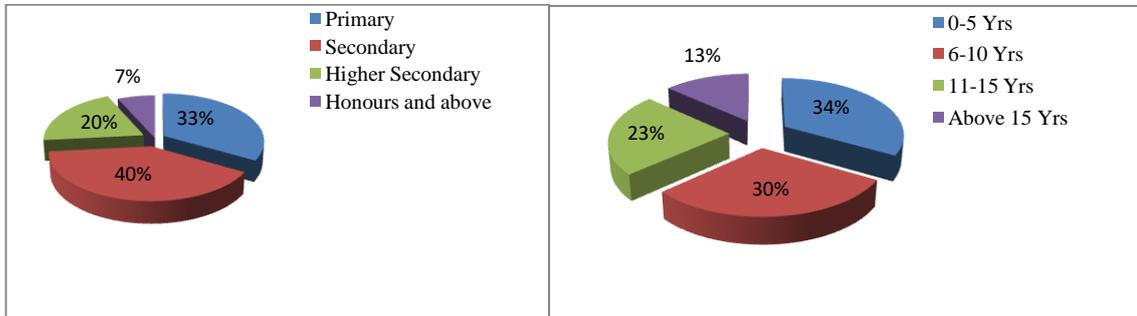


Fig 1: Educational qualification of driver

Fig 2: Driving experience

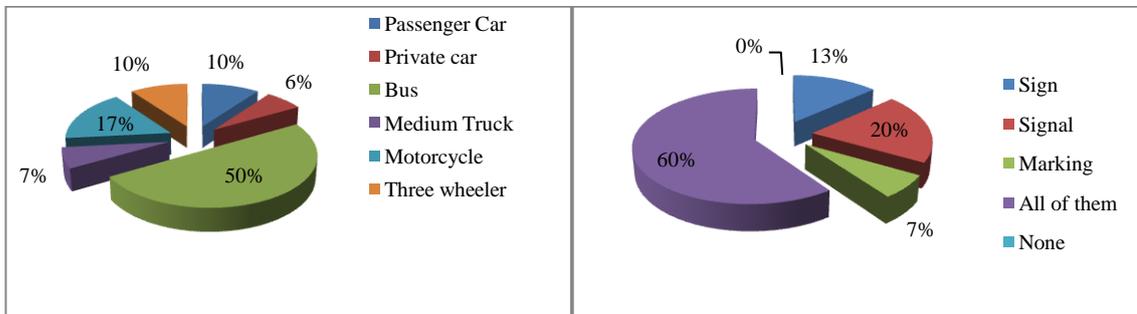


Fig 3: Types of vehicles drive

Fig 4: Driving's recognition on TCD

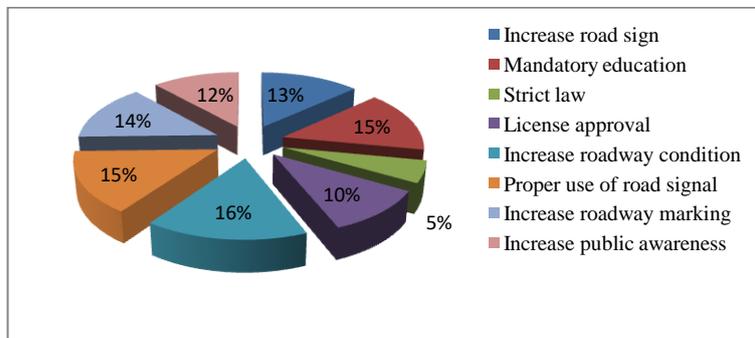


Fig 5: Driver's suggestion about improving the condition

Table shows drivers understanding of different kinds of signs. Table 1 shows driver understands of warning signs. Some signs were recognized by all the drivers. These were narrow road sign, road hump, and traffic signal ahead signs. Signs for major road ahead and T-junction were known to 33% and 60%. The reason may be limited use of these types of signs in Bangladesh. Table 2 shows, driver understandings of regulatory signs. No left turn, no U turn, no use of horn, one way traffic, stop signs were recognized by 100% drivers. Whereas, keep left, turn left was recognized by 73% and 77% drivers. Table 3 shows, driver understandings of informatory signs. It is observed that, level of understanding was good in this case except for recommended route for pedestrians, cycles & rickshaws (63%).

Table 1: Driver understandings of warning signs

Sign	Meaning of the sign	Percentage Correct (%)
	Roundabout	83
	T Junction	60
	Major road ahead (Crossroads)	33
	Side road right (left if symbol reversed)	80
	Pedestrian crossing	93
	Road narrows on both sides	100
	Double bend first left	80
	Sharp change of direction to the left	67
	Two way traffic crosses one way road	90
	Road hump	100
	Narrow bridge	87
	Road works	100



	T Junction (Turn left or right only)	83
	Traffic signals ahead	100

Table 2: Driver understandings of regulatory signs

Sign	Meaning of the sign	Correct (%)
	No overtaking	83
	No left turn	100
	No U-turn	100
	Special (restricted) speed limit	93
	No use of horn	100
	Turn left (right if arrow reversed), one way movement	87
	Keep left (right if arrow reversed)	73
	Turn left ahead (right if arrow reversed)	77
	One way traffic	100
 	Stop	100

Table 3: Driver understandings of informatory signs

Sign	Meaning of the sign	Correct (%)
	Parking place	93
	Hospital	100
	Fire station	83
	Recommended route for pedestrians, cycles & rickshaws	63
	Bus stop	100

Based on the conditions it can be said that, traffic related knowledge should be compulsory at primary school level. Government should arrange seminar to aware drivers, helpers and pedestrians about the proper use of traffic control device. Traffic signs and marking should more clearly visible for drivers to understand the meaning of these. There should be separate lane for non-motorized vehicles. Footpath should free from hawkers and should establish more foot over bridge for smooth movement of pedestrians. Authority should take necessary steps to use digital traffic control signals, marking and LED signs.

V. CONCLUSION

After investigation a large numbers of physical and operational deficiencies have been observed in traffic signal at a selected area in Chittagong City. Physical deficiencies have been observed largely in placement of signal, traffic signal light, signal head, and pole and must arm. Moreover, pedestrian signal and signal visibility that create pedestrians and drivers facing difficulties, increase conflict and collision, reduce operating conditions, increase possible traffic hazard and unsafe driving conditions at intersections. The study clearly suggests that there is indeed a lack of road signs, signals & marking at the implementation level and the problem is much deeper as most of the drivers are uneducated so it makes little difference if road sign signal & marking are there or not. A total of 6 signalized intersections in Chittagong city are study limit. The placement of signal is wrong at 20% intersections, signal light direction is wrong at 12% intersections and controller cabinet conditions are not satisfactory for most of the intersections. 87% people know about the road marking pedestrian crossing, 82% lane line, 76% barrier line, 66% no parking, 95% special speed limit and 98% people know about signal standard. Only 2% people know about the marking of zigzag line. The number of people we asked question was few if the number was large then the result would be better. Study period was short that's why the study area was also short.

Based on the study it is recommended that, traffic signs should be placed in a place that is well visible. The traffic sign should be placed in the right place. The informative sign must be given at the specified place. Illegal parking must be prevented. Where there is no signal light, a signal light should be installed. The sign must be placed in the correct direction. Zebra crossings should be provided at road crossings. Care should be taken to ensure that the marking is not removed. Invalid U-turns must be prevented. Illegal shops on footpaths need to be evicted. Roads and sidewalks need



to be repaired properly. Overall, proper combination of education, engineering and enforcement will be helpful to improve the current situation to a large extent.

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