

INVESTIGATION OF PROBLEMS ASSOCIATED WITH USAGE OF PRIVATE CAR AND POSSIBLE MEASURES TO MINIMIZE ITS USE

T.Saha*¹ and M.M. Rahman²

¹Student, Bangladesh University of Engineering and Technology, Bangladesh, e-mail: troyee91@gmail.com

²Professor, Bangladesh University of Engineering and Technology, Bangladesh, e-mail: mizanur@ce.buet.ac.bd

ABSTRACT

The Transportation system is a key component of the development and advancement of a country. In Dhaka city, the overall traffic management most often collapses due to excessive traffic congestion and sometimes this is inevitable. Studies revealed that increasing number of private car is one of the major obstructions to smooth traffic flow. The purpose of this paper is to evaluate the problems associated with this mode of transportation. Both primary and secondary data have been gathered from different regions of Dhaka city to expose various aspects of car usage. Primary data have been collected both manually and by using video camera. For user's perception study, questionnaire survey has also been done. Lack of adequate parking space, random driving, covering more space on pavement, energy inefficiency, cost inefficiency etc. are some observations perceived from the study. The study also exposed that there is substantial increase in the rate of "accidental death" due to private cars. Finally some proposals have been suggested to reduce the problems related to car usage and to encourage those measures necessary for sustainable development of traffic system of the city.

Keywords: *accidental, congestion, management, obstruction, sustainable*

1. INTRODUCTION

The traffic demand of Dhaka city is increasing with the growth of population in the recent years. Dhaka city is overwhelmed with traffic management problems such as traffic congestion, inadequate public transportation, accidents on roads etc. As there is no proper planning about efficient use of road space, congestion has become an inevitable part of people's lives. Increasing number of private cars in this overpopulated city has added to this problem. The existing roadways were not constructed for huge amount of traffic. Therefore residents of Dhaka have to waste their valuable time in congestion, which is resulted due to lack of supply of road space to meet the traffic demand. According to Bangladesh Road Transport Authority, the number of registered cars in Dhaka city is 223239, up to the year of 2015, which is 23.5 % of the total vehicles in Dhaka city. Day by day the level of congestion is becoming intolerable due to excessive cars on the roads. The average number of rider in passenger car is two according to Roads and Highways Department (RHD). Car occupies more space on road, but with fewer riders in it. That's why this increasing trend of using car and dependency on car should be declined as soon as possible. Otherwise the city will be uninhabitable.

The objective of this study is to find out different problems which are caused due to massive amount of private cars. The factors that affect the tendency of people to use different modes are also found out from the study. Another purpose is to measure the reduction in effective width due to illegal parking.

2. METHODOLOGY

Primary data have been collected from Kalabagan intersection and Dhanmondi area of Dhaka city to represent the present scenario. Primary data have been collected manually by the researcher from field survey. Video camera method was used to gather primary data as this method is beneficial if various data are to be extracted from the same video. More persons are required to perform a field survey if data are collected manually. Therefore video camera has been used for collecting primary data. To examine user's perception, questionnaire survey has been done among both type of user, who owns car and uses this mode and who uses public transportation for different purposes.

3. DATA COLLECTION AND ANALYSIS

3.1 Study Area

Kalabagan intersection was selected as study corridor for observing number of buses crossing that point. Many schools and shopping malls in Dhanmondi area were surveyed to find out if there is parking space or not.



Figure 1: Study area (Dhanmondi)

3.2 Data Collection Period

Data have been collected in the morning and evening peak hour for 1 week. Collected data were averaged and average value is presented in this paper.

3.3 Factors Behind The Increasing Trend

In Dhaka city, demand of road space is higher than the supply. In recent years increasing number of car has created a challenge for the planners and engineers of the country. Some factors are responsible for the excessive dependency on private cars.

3.3.1 Increase In Per Capita Income

From 2011 to 2015, in the span of five years, per capita income has increased by more than 1.5 times (World Bank data). As a result, people’s purchasing power has also increased which is evident from the increasing number of passenger car in the whole country and in Dhaka city.

Table 1: Relation between per capita income and purchasing car

Year	Per capita income (dollars)	Number of registered car in Bangladesh*	Number of registered car in Dhaka *
2015(up to October)	1314	17352	15129
2014	1,092.7	14699	12972
2013	954.4	10472	9231
2012	858.9	9224	8187
2011	838.5	12950	11423

* Bangladesh Road Transport Authority

3.3.2 Insufficient Public Transportation

People can rely on public transport if the supply of this mode is sufficient to meet people’s demand. Unfortunately there is a lack of supply of public vehicles in this city. As a result, those who can afford a car, shift their choices to private car, though sometimes it becomes very expensive for those with a middle range income. People need to wait for 10-30 minutes, on an average, for buses and sometimes they do not get to board

the bus due to huge number of passengers already present in the bus. So, this inconvenience compels them to use car.

3.4 Choice of Mode Based On Different Characteristics

People's preferences of mode depend on various factors, such as their sex, age or status.

3.4.1 Based On Gender

When questionnaire survey was conducted among 237 people, there was quite difference in male's and female's choices. Male members use public transportation more than female members. 53% of men use public transport whereas only 37% of women use this mode. It's observed from the study that female prefers CNG more than male does. It might be because of the reduced access they have in public buses. The percentage of female members who use other modes is 22; conversely 8% male members use others. Other mode means rickshaw, hiring taxi or micro, walking etc.

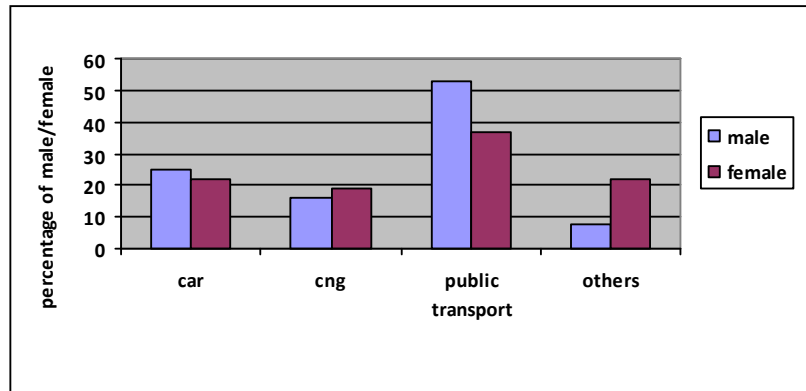


Figure 2: Choice of mode based on sex

3.4.2 Based On Age

Different persons ranging from age of under 15 year to above 50 year were asked about their preferences of modes. Children below 15 years, use car mostly. Their percentage is 66. Only 19% children use public transport. Other children prefer rickshaw to walking. If the destination is very closer, only then they walk to any place. That's why only 2% answered walking.

Table 2: Choice of mode as a factor of age

Age(year)	Car	Public transport	Walking	Rickshaw	Total
Under 15	66%	19%	2%	13%	100%
15-30	36%	39%	8%	17%	100%
30-50	21%	56%	11%	12%	100%
Above 50	31%	41%	9%	19%	100%

People who are in age group of 15-30 year, sometimes use car if they own car, sometimes ride on public transport. There is no significant difference about their choice about car and bus. This is evident from their answers. 36% people of this group use car to reach their journey's end point, while 39% people use buses. Those who are younger, age of around 22, use rickshaw. So, the total percentage using rickshaw is 17.

Another group of people, aged 30-50year, usually prefer public transport. 56% people of this group answered they use buses during their journey. Only 21% of them use private car. People of this group also walk and use rickshaws. When they find it difficult to access to bus, they walk to reach another bus stoppage and they also use rickshaw if time is limited to reach some place.

3.4.3 Based On Status

Sometimes it's observed that purchasing a car is mere a part of showing one's status to others. Status is a contributing factor behind using car. People use car even if the distance to his destination is very small. People consider it as a symbol of his status, which indirectly let other people know about their earning.

Table 3: Relation between monthly income and choice of mode

Monthly income(taka)	Private car (%)	Public transport (%)	Other private vehicles	Total
<25,000	0	85	15	100%
25,000-50,000	2	77	21	100%
50,000-1,00,000	37	35	28	100%
>1,00,000	63	13	24	100%

Buying a car and maintaining car is expensive. So, if one earns a decent salary, he can decide on having a car. From the survey, it's seen that those who earn less than 25,000 taka a month do not buy car. As they cannot pay the regular cost of fuel with their small income, so they mostly use public transport as this mode is cheaper than other mode. Only 15% of them told that they use other private vehicles, such as CNG or taxi if there is no space in the bus during peak hour. They share these vehicles with their colleagues.

People with a salary ranging from 25,000 taka to 50,000 taka hardly think about buying a car. That is why only 2% told that they use private car. Most people of this range use public transport (77%). When they face problems in finding buses, sometimes they hire CNG.

With a decent amount of salary, people try to buy a car and manage its expenses. The number of people using car and bus are closer. This is because some people can afford a car with this salary if other familial expenses are less in his family. But those who have to manage his children's educational fees rarely think about purchasing car. Others (28%) use taxi to go to some place.

Those who earns more than 1 million taka use car sometimes because of their need, or sometimes only to inform others about their status. 63% people of this group use car. These people are occupying road space more than any public transport. In spite of having the ability to buy a car, some people seem less interested in car. It might be because he does not require car that much, and he is also not interested to show others. Another reason might be when his children use car; he finds no alternative and rides on bus.

3.5 Parking Space Scenario

One of the major problems of private car is it needs a place to be parked. Whenever people go to some place, stay there for short or long period of time, the car needs to be parked at the place. Most of the time it is found there is no parking space. Sometimes people are not willing to park at parking area by paying for it.

3.5.1 Parking Space Availability

People use car for different purposes. Some people use car for sending their children to school, universities or some use car for going to their offices. Sometimes car is used for shopping purposes.

Table 4: Percentage of structure having parking provision

Type of structure	% with parking space
School	0%
Private University	27%
Public University	100%
Shopping malls	84%

As car is needed to be parked, there should be sufficient space for it. After doing the survey in Dhanmondi area, 13 schools were visited by the researcher in this area. But there is no parking space allotted for students' car

parking. Drivers of those cars park the car on the road in front of the school. It's really unfortunate to say that none of those schools is considering the importance of parking. As a result cars are using road space, increasing the level of congestion in that road and also nearby area.

In universities, one difference has been noticed in available space for parking based on whether the university is run by public money or privately. 12 private universities were surveyed, and only 27% of those have parking space in their campus. This is because private universities in this city are run in a building which is rented from others. Those buildings are actually constructed for other purposes, but owners of private universities use the building as a university campus. That is why, most of the time the building does not have any parking area. If owner has to manage for parking space, he needs to pay extra money for that. So, only few of those have their own parking space. On the other hand, 100% of the public universities have parking space. So, students can park their cars in the campus when they do not have drivers and drive the car on their own.

Among the shopping malls of dhanmondi area, about 84% malls have their own parking space. But unfortunately, by doing field survey, it was found that most of the people park their cars on-street near the shopping centre to avoid paying money for parking. Lack of law enforcement is responsible for this type of behaviour. Some of the owners said that they would park inside the mall if it were free of charge.

3.5.2 Effect of Inadequate Parking Space

From the secondary data, the road width of in front of gate 1 of new market area is found to be 90 feet. Cars are parked on both side of the road connecting Azimpur to Mirpur perpendicularly. Thus almost half of the total carriageway is wasted. It's found that only 55.56 % of the road is effectively used by normal users. Another gate is on the northern side of new market. Road in front of that gate is 54.4 feet wide, but 24.4 feet is used by cars parked in two parallel row, and one perpendicular row. So, 60.66 % remains to be effective. The road width is lowest near gate 3, but effective road width is maximum in this road if the cars are parked in parallel row, resulting in 76.39% space in use.

Table 5: Effective width reduction due to parking

Name of gate of new market area	Road width(ft.)*	Road width blocked by parking of car(ft.)	Effective width in use (%)
Gate 1	90	40	55.56
Gate 2	54.4	24.4	60.66
Gate 3	36	8.5	76.39

*(Zannat, Ahmed, Mitra, Rafiq, Hasan, Akhter, Fahad, 2013)

3.6 Safety Concern

Though many people find car as a safe mode of travelling, it's evident from the accident data of previous years that accidents occurred where passengers were going to some place by their cars.

Table 6: Percentage of accident by cars compared to the total accident

Year	Fatal	Grievous	Simple	Number of casualties by car	Number of casualties by all casualty classes	Percentage of accident by cars
2013	9	8	11	28	2505	1.12
2012	38	59	29	126	5914	2.13
2011	26	52	31	109	5535	1.97
2010	29	32	13	74	4018	1.84
2009	27	33	13	73	3844	1.90
2008	38	59	29	126	5914	2.13

Source: Accident Research Institute (ARI, BUET)

From the above table, it is observed that the number of victims in road accidents in car is not few at all. The number was highest in 2012 and 2008. Though in the year of 2013, the number of victims reduced to 28, it does not mean there is nothing to worry. It means passengers can be sufferer because of accidents even when they are not even thinking of any accidents. The reason behind this is that, drivers are sometimes not attentive during

driving. They have a tendency to overtake the leader vehicle, they sometimes becomes very impatient. As a result of this, 167 fatal accidents occurred from 2008 to 2013, which is really alarming.

3.7 Potential Solutions To Minimize Car Usage

To find appropriate solution for the problems related to private cars, the contributing factors behind this increasing trend needs to be understood better. Solutions should be checked for its feasibility by applying these in real situation. Some of the solutions that were found to be effective in other countries are:

- a. High occupancy vehicle (HOV) lanes
- b. Pricing for on-street parking
- c. Carpooling
- d. Road pricing
- e. Car ownership restrictions
- f. Encouraging public transport
- g. Promoting active transport

As schools of Dhanmondi area do not provide with parking spaces, pricing for on-street parking could be a possible measure to reduce the number of car parked on street. At Kalabagan intersection, people wait for 10-30 minutes for buses which discourage them to rely on public transportation. So, encouraging public transport by increasing its number and seat capacity and promoting active transport, dependency on car could be lessened.

4. CONCLUSIONS

It is found from the study that, choice of mode depends on person's age, social position, even gender. 37% female use public transport which is less than that of male. So, the overall system of buses should be modified to encourage women to use bus. This percentage indicates that the environment of public vehicle is not favourable for women. It's also found that no school in dhanmondi area has parking space and only 27% private university has parking provision. There should be law about this matter so that no institution can develop its campus without any provision for parking. Another negative point is car is parked on street in front of shopping malls in spite of having sufficient parking lot in 84% of malls. Consequently, effective road width reduces to 55.56% near new market area.

In spite of many modern features installed in cars, rider can be affected due to fatal, grievous, simple accidents. So the causes behind this danger need to be discovered and adequate steps should be taken to minimize this to lowest possible number.

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