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**SAFER URBAN ENVIRONMENT:  
A CASE OF DHAKA'S TRANSPORTATION AND TRAFFIC**

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**Abstract:** The paper focuses on briefly examining the transportation and traffic situation in Dhaka with reference to the stresses it causes to the urban dwellers. In Dhaka, the tendency to regard traffic to that of fast vehicular, ignoring other modes led to the neglect of those groups in the settlement who either preferred those other modes or of necessity had to use them as the case with pedal rickshaws and boats. This phenomenon coupled with mismanagement in the traffic system, is identified as the pivotal factor effecting the safety of Dhaka's urban environment. Urban environmental quality is dictated by the types and location of transportation facilities and distribution of density of land uses to control the pollution levels. In this paper, an attempt has been made to co-relate physiological and psychological stresses caused on the urban dwellers due to the traffic congestion. It is suggested that a balanced and judicious policy regarding traditional and modern modes of transportation is likely to keep the environmental quality within acceptable limits.

**Keywords:** Urban; Environment; Dhaka; Safety; Traffic; Transportation

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## **Introduction**

The paper focuses on briefly examining the transportation and traffic situation in Dhaka with reference to safety, congestion, accidents, psychological stresses etc., and propose strategies to ensure safer urban environment. Because transportation can not be separated from land use and sociological parameters, the urban environment is evaluated here in that context.

Detail research on the subject is beyond the scope of this paper. The study will sometimes look deviated from the main issue because environmental elements mentioned above are an out come of an intricate system of diversified factors and therefore difficult to comprehend and deal with independently. Most of the data/ information is gathered from secondary sources and authors' personal experiences of field situation. Unless otherwise mentioned, the author through field survey gathers the data/information. The paper has made an attempt to analyze the information from the viewpoint of an urban designer.

## **Transport and the Urban Environment**

***Effect of Transport on Urban Environment:*** Urban environment is the physical surrounding of settlement, with artifacts, vegetation, air, water, soil and other natural resources, together

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contributing to the overall aesthetic, health and safety of human settlement habitats. Environmental impact is “ Side effects on the environment and its habitants of projects and actions that generate changes. In the case of urban transports, such impact includes: air and noise pollution by vehicles, the severance of established communities, ground vibrations to adjoining buildings etc.” (Merlock, 1978; Dimitriu, 1970).

There are a number of reasons for deteriorating urban environment with respect to noise, safety, vibration, stress and accidents including that of the mixture of traffic, poor traffic management, urban land use patterns, topographical constraints and the prevalence of thorough traffic that is channeled through the city center. There is little doubt that with careful policy and planning, some of the problems may be considerably reduced without involving extra cost or with very little investment. “... The pace of urbanization and urban traffic growth in the (third world) country is so great that high cost solutions of the kind commonly adopted by industrialized nations can not always be afforded nation-wide” (Dimitriu, 1970).

If the roads in built up areas were allowed to carry traffic to their full capacity, there would be adverse influence on the local environment of the settlement in terms of noise, atmospheric pollution, vibration etc. The concept of environmental capacity thus stems here. The tendency to regard traffic that of fast vehicular, ignoring other modes led to the neglect of those groups of settlement who either preferred those other modes or of necessity had to use them as the case with rickshaw and boat in Dhaka. Boat has been almost totally abandoned and for rickshaws there is no proper policy in the urban traffic and transportation system. A balanced and judicious policy regarding traditional and modern modes of transportation is likely to keep the environmental quality within acceptable safety limits.

***Transport Versus Safer Urban Environment in Third World Cities (TWC):*** The growth pattern of TWC is similar to those that occurred in the west but are unfolding faster and farther. Many cities were formed around water transport facilities and later, along rail systems. Motor vehicles altered the city shape once again. Business becomes critically dependent on adequate communication and transport system for the movement of goods and services through out the city.

Types and location of transportation facilities, besides distribution of the density of land uses, dictate environmental quality and safety. Many roads were constructed, canals and water bodies filled – these moves of so called development in haste and confusion resulted in a new set of problems of which environmental impacts like floods, water logging, traffic congestion etc. are the manifestation. Human needs for space in travel depends, most importantly, on the types of vehicle chosen and the speed at which it moves. Group vehicles require less ground space per person than individual vehicle. Movement at slow speed requires less space than movement at high speed and naturally settlement population is influenced by it. The means of transportation not only provides space but also consumes space and thus guides urban form, environmental quality and settlement population.

Large growth in urban population leads to increase in transport trips and therefore spread of the urban area give rise to the expansion of road network, larger journeys and the consumption of more fuel creating more pollution. Increase in the household income of a section of population created a greater propensity for travel and marked increase in car ownership, with a consequent demand for more road capacity; increase in services activities lead to increased volumes of service vehicles and freight and therefore more noise and vibration (Mowla, 1991). Taken together, these factors result in a substantial increase in transport demand, which in turn has significant implications on safer urban environment and efficiency. The rapid rate of transport mobilization attends on rapid urbanization and income growth has led to a situation where according to Zahavi (1976), two kinds of population explosions have been worrying the authorities in many parts of the world during recent times- of people and cars. Lin (1983) suggested that “Urban authorities should thus perhaps

worry more about the former, especially since the ownership and use of motor vehicles-particularly of private automobile – is very costly in public and private resource requirements. It is likely to be more easily controlled by appropriate policy actions than is the rate of urban population growth.”

***Transportation and Traffic of Dhaka in its Historical Context:*** Very little is known about Dhaka prior to 15<sup>th</sup> century, the very phenomenon of its growth is not different from those of many urban entities around the world. Center of trade and commerce emerged, usually on the bank of the rivers. Many of such centers which enjoyed geographical, locational and infrastructure advantages further grew. Dhaka is no exception having large flood free land and good riverine transportation (Mowla, 1990). In 1700 AD, Dhaka was the twelfth greatest prosperous city of the world and capital of eastern state of Mughal empire. Paths were created to cater for horse-carriage, elephants and pedestrian movement. In 1864 AD the Dhaka municipality was established. In 1947 Dhaka became the capital of the than East Pakistan (Mowla, 1997a).

In 1971, Dhaka became the capital of independent Bangladesh. Present population is around 9 million. Road and street facilities within the main metropolitan area comprise some 2500-km (Annon, 1991). About 40% of these road facilities are within the main metropolitan area, comprised of about 225 km. The road network within metropolitan area consists of about 800-km streets, the 500-km being local streets, 300km being major streets (of which about 100-km distributor street, 20-km access/ egress streets). The road and street system has grown haphazardly to meet present day need and has never been conceived comprehensively. As a result, a kind of ‘unbalanced’ traffic flow has incurred. System nodal points, which connect heavily traveled links, are familiar sights of traffic congestion, delay stress and often accidents.

No matter by what means people travel, they end up as pedestrian on urban side walks and therefore ultimate limit on the smooth functioning of an urban area is its provision for pedestrian circulation. Yet, planning for pedestrian in urban areas has been badly neglected. Historical street layouts frequently did allocate as much as half the right-of –way to walk ways, that too with slow moving vehicles and low structures on its either sides, creating a harmonious traffic environment. Gradually, with real estate pressure, buildings were forced to get taller and thereby attracting more pedestrian trips. No effort was made to set the buildings back further from building line, on the contrary more encroachments were made. When the motor vehicle arrived on the scene, roadways began to be widened, likewise at the expense of walkway space- thus the pedestrian was squeezed into leftover space (if any) between the traffic and the building wall. Environmental impact of this situation can be well imagined.

### **Roots of Traffic and Transportation Problem**

***General Traffic and Transportation Problem:*** Dhaka suffers from severe shortage of finance and equipment in traffic and transportation sector. Rapid increase in population and therefore unplanned expansion of temporary housing and transportation network in the city makes the problem more acute (Mowla, 1997b). Dhaka is presently being served by a large variety of vehicular modes such as motor vehicles, buses, trucks, maxis, rickshaws, tempos, pushcarts etc. The Multiplicity of such vehicular modes with diverse dimensional and operational characteristics is one of the root causes of undesirable traffic environment and movement in the city.

There is little doubt that the weakness in traffic management coupled with the use of the private automobile and large number of rickshaws along side motorized traffic in the same road are the major causes of environmental problems. Poor performance of private operators to protect subsidized state services, with control on fares, routes and licenses together with the political uncertainty is another factor for the chaos that prevails in urban environment besides poor management and corruption in the nationalized services.

**Identification of Urban Environmental Problem:** The city's major thoroughfare system, although occupying a low percentage of the total network, carries around 80-85% of total traffic. Therefore, the need for reducing the traffic and proper maintenance of the city's major thoroughfare system is urgent. Poor maintenance often forces traffic to leave straight path, turn abruptly, these tendencies impede traffic flow and is often the cause of accidents. High traffic coupled with poorly maintained roads is a prime cause of noise and vibration (frequent horns and bumping).

It may be noted that Universities and educational institutions occupy vast central portion of Dhaka, Dhaka cantonment and the old airport occupy the north northwestern corner. As a consequence, a traffic net work has cropped up which forces undesirable circuitous movements for all classes of vehicles. This problem of circuitous movement becomes worse when a particular link of the system (such as Abdul Ghani road) is restricted for use by all classes of vehicles. To make things worse, the Motijheel - Dilkhusa C/A (the CBD) is located in the proximity of the junction of a number of widely traveled inter district corridors (Mowla, 1994). In the absence of alternate parallel facilities at close spacing, the vehicles are forced to move through the CBD, causing traffic congestion, delays and serious stresses and consequently accidents. Deficiencies in vehicular parking facilities are playing very undesirable role, creating physical as well as visual intrusion, hindering traffic movements and reducing road capacities substantially through parking and un parking maneuvers and illegal occupation of street right of ways.

The prudent use of resources for transport is important because of the very large quantities involved. Resources cost, however, are by no means the whole cost imposed by transport upon society. Matters affecting the quality of life and indeed life itself rather than the standard of living are the questions to be asked. Road accidents, psychological stresses and noise pollution are the by-products of unplanned transport capabilities.

**(a) Accidents:** Most travel accidents occur in roads. Society should have an obligation for those who are involuntarily exposed to risks during their normal daily lives. Above all there is an obligation to provide for the safety of pedestrians because pedestrians are especially vulnerable. Every one most frequently be a pedestrian. Accidents are not the only distressing consequences of an unsafe transport system; danger generates the fear of accidents. An opinion survey conducted on Dhaka road users regarding their attitude towards urban environment shows that they are highly concerned due to the accidents and its fear (42%). Once again it is the walking and rickshaws that are most effected and it is children, old people and the less affluent who suffer most.

**(b) Noise:** Most types of mechanical transport produce noise. The opinion survey that is mentioned above reveals that second highest category (33%) is concerned about excessive noise levels (including noise of horn) in the city roads. According to a crud measurement of noise levels in important traffic intersections of the city shows that each of these locations had more than 70 dB(A) sound level during day time and is basically due to horn and faulty silencers of public transport. Excessive use of horn is identified as due of anger and frustration in traffic jam situation or to warn slow moving vehicles on the road. Muktadir and Ahmed (1987) noted that "The noise higher than 70 dB(A) can cause an increased rate of heart beat, an increase in body temperature, a slowing down of the digestive and the respiratory systems and so on." More than 50 million people living in Bangladesh urban areas, mostly in Dhaka, endure the cacophony of city traffic that is louder than the level health officials deem safe (Khan, 1998). A survey reveals that high noise levels cause about 5% -7% of permanent deafness in Dhaka. The same survey found a sound level of 53 to 84 dB in various Educational Institution and Hospital locations, where recommended sound level is below 45 dB. The main source of noise are buses and trucks (Annon, 1998). Data shows slow moving rickshaws comprise about 60% of vehicles (Mowla,1994). According to available information, the present volume of rickshaws in the city is well over 2,00,000. There are more than 1500 tempos and baby taxis plying in the city. The table also indicates the comparatively high percentage of cars and meagerness of bus services to which a densely populated city is entitled reasonably. These are among the causes of deteriorating urban environment as mentioned before.

**Some more Data and Interpretation:**

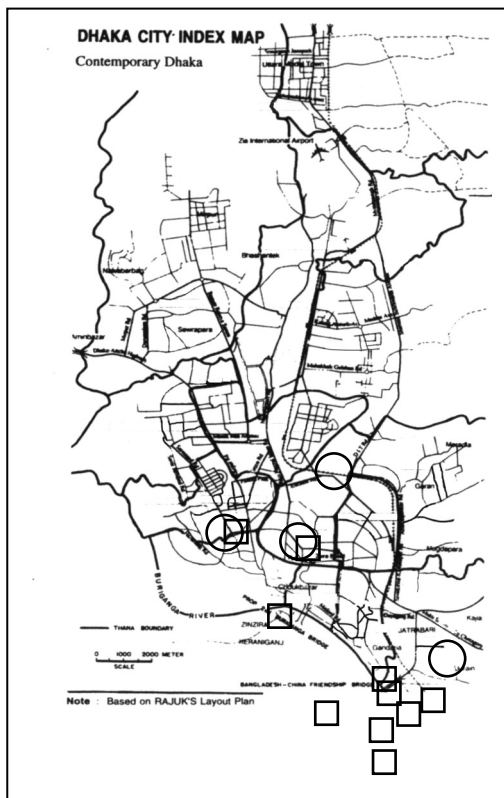


Fig. 1. Map of Dhaka showing traffic and transportation study locations.

**Waiting time surveyed in-**

- Farmgate area
- Malibagh area
- Kamalapur area
- Asadgate area

**Composition of vehicles-**

- Hatkhola
- Nawabpur
- Chakbazar
- Islampur
- Narindah
- Farmgate
- Gulistan
- Paltan
- Science laboratory
- Asadgate

(a) The average percentage of various types of powered and non-powered vehicles are as indicated below:

Powered	Per cent	Non-powered	Per cent	Miscellaneous
Motor car	19.24	Rickshaw	59.38	1.76
Bus	2.13	Bicycle	3.31	
Truck	1.26			
Motor cycle	5.92			
Auto rickshaw	7			
<b>Total:</b>		<b>100 %</b>		

Deficiencies in bus services are exemplified in data shown below. These also show the number of passengers waiting at different selected stoppages from 7:30 am to 6:30 p.m. thus suffering from stress. More incidences of public violence are recorded in these spots indicating some sort of correlation between stress and violence.

Stoppage	No of persons waiting (11 hrs.)*
Farm gate	2075
Mali Bagh	766
Kamlapur	835
Asad Sate	704
<b>Total</b>	<b>5228</b>

\* Average hourly waiting rate per stoppage = 95 persons

(b) The number of persons killed in road accidents has increased manifold over the years, especially in Dhaka Urban Area (Mowla, 1994).

	Street accidents (persons killed) in Dhaka		
	1975	1985	1993
Number of accidents recorded	71	220	325
Death per 10,000 inhabitants	3.5	5	6.5

Statistics and newspaper reports show that about 80% of pedestrian accidents in Dhaka occurred in unpredictable locations, which may be an indicator of less adherence to or ignorance to traffic rules. Areas of Dhaka having separate Rickshaw lanes have least accident records. Mirpur road a major arterial road also serving as a corridor for cross-country traffic is identified to be the most dangerous road in the city.

(c) Ratio of powered and non-powered vehicles and pedestrian and vehicle ratio at different road points of the city area as follows

A. Old Dhaka		
Road point	Power and non-powered vehicle ratio pedestrian and vehicle ratio	
Hat Khola	0.6137 : 1	0.5831 : 1
Nawabpur	0.2024 : 1	1.0103 : 1
Chak Bazar	0.0962 : 1	2.1051 : 1
Islampur	0.1212 : 1	2.3462 : 1
Narinda	0.1121 : 1	1.3462 : 1

A. New Dhaka		
Road point	Power and non-powered vehicle ratio pedestrian and vehicle ratio	
Farm gate	1.5275 : 1	1.1933 : 1
Gulistan	0.5328 : 1	0.6508 : 1
Paltan	0.6021 : 1	0.4950 : 1
Science Lab.	0.7620 : 1	0.2870 : 1
Asad Gate	1.1528 : 1	0.4649 : 1

Pedestrian - vehicular and powered – non-powered vehicle conflict is a serious problem in Dhaka, particularly in old Dhaka where despite heavy volume of pedestrian traffic, there are almost no footpaths. Environmental problems arising out of this is described before. Study also shows that foot paths/side walks constructed in different parts of the city are not in a balanced state in so far as their width and utilization are concerned, results are, therefore obvious.

### **Probable Approach to Reduce the Traffic and Transportation problem**

#### ***Policy:***

- (a) It is essentially crucial that alternatives involving no new construction and low capital investment are fully examined.
- (b) Reintroduction of water modes and travel may be explored. This may greatly reduce socio-economic and environmental problems of the city of Dhaka.
- (c) Segregation of slow and fast moving traffic may be examined.
- (d) Department of Environment is given more judicial power to monitor and implement urban environment improvement strategies.

- (e) Relocation or decentralization of some of the heavy traffic generating activities may be considered. e.g. Inland port located at old Dhaka is one of the causes of congestion / environmental deterioration. Since it serves the whole city, the goods unloaded in this port are carried all the way through the busy roads to different parts of the city. Decentralization of some of the inland port facilities along peripheral river system almost without extra cost may substantially reduce overall noise, vibration and accidents from city roads caused by trucks.

### **Recommendations**

Inherent characteristics of slow and fast moving mode of transport is short and long distance haulage respectively, which may be born in mind for any urban environmental improvement policy/planning. To make room for additional public transport in the existing roads and to improve environmental capacity of existing arterial roads- the modal split concept may be applied in Bangladesh context. The traffic load from main arterial roads may be considerably reduced by:

- (a) Confining slow moving mode of traffic within physical neighborhoods and thus reducing of noise and accidents. (Motorized vehicles tend to use horn more frequently when obstructed by slow moving vehicles).
- (b) Dhaka is encircled by rivers- this can be advantageously utilized for long distance haulage for both passenger and freight – and thus considerably reducing movement of trucks and buses across the city which are the main cause of vibration and noise. [According to Mowla (1994), A bus or truck causes 15 times more noise and vibration than smaller motor vehicles]. Mechanized boats and country boats may be effectively used as an alternative to truck/ bus and rickshaw respectively, especially for peripheral locations.
- (c) Private ownership of cars may be discouraged whereas public transport may be encouraged with adequate maintenance infrastructure.

In the older parts of settlements the environmental improvements may be achieved as follows. The focus here is on outdoor environment – the open spaces, the streets and alleys.

- (a) There are small alleys and roads that are seldom used by vehicles. These roads and alleys can be closed to vehicles, landscaped and converted to pedestrian malls and parks to the benefit of everyone.
- (b) Roadside standpipes and garbage bins are hindrances to circulation and therefore cause accidents and stress. They can be recessed in nooks and corners which are not difficult to find. Such condition is the result of indifference and thoughtlessness of the concerned officials. Officials are also unable to identify the root problems.
- (c) Urban environmental problems are an offshoot of lack of management. Area licensing; separation of traffic by modes and direction; and strict adherence to traffic rules should improve the environment considerably. Even in places of high car ownership, pedestrian circulation should be encouraged (Mowla, 1987a).
- (d) In old Dhaka a large population walks but pavements do not exist. Investigation into creation of pedestrian malls may be a worthwhile exercise.

### **Conclusion**

Foregoing brief study of traffic and transportation situation in Dhaka with a view to identifying their environmental impact in the Urban area shows that it is possible to considerably reduce adverse environmental impacts in terms of noise, stress, accidents, vibration etc with deep sighted understanding of the context. Where constraints are many and competing demands on finance

numerous; ingenuity, imagination and creativity are our only hope. In the absence of basic necessities of life, idealized dreams of future are a luxury and sometimes suicidal (Mowla, 1997b). As a concluding remark, it may be mentioned here that, since transportation is not an end in itself but simply a means of achieving certain goals and objective and as long as those goals can be achieved by less hazardous means and with less investments then why these should not be adopted? The paper has forwarded some insight into the direction and it is believed that with proper studies, low or no cost alternatives can actually be adopted in Dhaka to improve Urban Safety and reduce environmental problems.

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