

# **Planning for Pedestrians and Environmental Traffic Management in Dhaka City**

**Mohd. S. Kiwan**  
**Asif-uz-Zaman Khan**

## **Introduction**

Environmental issues are receiving a great deal of attention in recent times during the formulation of transport policies of developed countries. This has paved the way for achieving a balanced and compatible coexistence of pedestrians and vehicles. As a result, the severity of accidents has reduced considerably and urban areas have been rejuvenated. Developing countries, such as Bangladesh, are lagging behind in this respect and facing the consequences.

Pedestrianization is a technique considered to be an important component of environmental traffic management. Dhaka City, as well as other urban areas of Bangladesh, have been facing fast deterioration of pedestrian traffic safety, mobility and accessibility, and the pedestrianization of these urban areas remains a far cry from the desirable situation. A high proportion of trips in Dhaka City is made on foot. There is hardly any scope for overlooking pedestrians while planning the transportation system of Dhaka.

This paper highlights the impediments to the pedestrianization and proper environmental traffic management of Dhaka. It also comes up with solutions in the form of some policies and strategies that could be applied not only in the capital city but in other urban areas of Bangladesh as well.

## **The Concept of Environmental Traffic Management and Pedestrianization**

Environmental traffic management and pedestrianization are two of the most important interrelated concepts in the pedestrian traffic planning process. Environmental traffic management consists of a number of interrelated techniques designed to protect the environment of an area from the unfavourable impact of the vehicular traffic (Buchanan, 1963). This is done through appropriate actions which limit the entry of superfluous traffic and redistribute the internal traffic in an orderly manner so that they have less impact on the surrounding environment. The performance of any environmental traffic management

measure in improving the environmental quality of an area can be assessed by some performance indicators such as mobility, noise and air pollution, and the number of fatal and serious accidents (Antoniou, 1971). A decrease in the number of these types of accidents and lesser noise or other pollution after some environmental traffic management measures are taken will indicate a positive outcome of the implemented measure.

Pedestrianization is the outcome of the pedestrian planning process (Bovy, 1975). It is basically the process of reserving streets strictly for pedestrian use. It is the most extensive form of environmental traffic management. Though it was introduced long ago in a city of former Federal Republic of Germany, it is only recently that pedestrianization is being recognized as an important element in the rejuvenation of urban activity centres. Implementation of these concepts is in the primitive stage in developing countries.

It has long been considered by planners that the volume of retail trade increases with the introduction of pedestrian street (Manheim, 1986). Shopping centres located within a pedestrian precinct are usually successful. Pedestrian precinct generally implies a zone where pedestrians are given priority over automobiles or other motorized transportation. The precinct may incorporate wider footpaths, parking prohibition, restricted or no car access, slower speed limits—all playing a part in better pedestrian circulation (Untermann, 1984). Efficient pedestrian area leads people to appreciate the quality of urban environment.

From the above discussion it is evident that, it is better to undertake planning for pedestrians through environmental traffic management. It is of no use planning for pedestrians separately, without giving regard to the overall environment of the area. In fact, to ensure sustainability, planning for pedestrians should be considered as a part of the environmental traffic management process.

### **Problems Faced by the Pedestrians in Dhaka City**

Safety, comfort, convenience, and visual quality are some of the problems faced by the pedestrians of Dhaka (Kiwani, 1988). Lack of safety implies that there are potential sites for vehicle-pedestrian conflict. Lack of comfort results from close proximity of the pedestrian areas to vehicle flows or vehicle parking sites. Inconvenience of the amblers stems from inadequate access to public transport and also inadequate pedestrian access system within the area. Visual intrusion to the passer-by mainly occurs due to inappropriate street layout and streetscape.

Level Of Service (LOS) of walkways is another aspect where the pedestrians of Dhaka City are lagging behind. The level of service on walkways varies when the rate of pedestrian flow and space available to each pedestrian is taken into account (Table 1).

**Table 1.** Walkway Level Of Service (LOS) Criteria.

LOS	Module (m <sup>2</sup> /Ped.)	Flow (Ped./minute/ m of width)	Speed (M/sec)	Comments
A	3.2 or more	23 or less	1.3 - 1.4	Free flow No conflicts
B	2.3 - 3.2	23 - 33	1.2 - 1.4	Normal walking speed Minor conflicts
C	1.4 - 2.3	33 - 49	1.1 - 1.2	Restricted flow Some conflicts Walking speed controlled
D	0.9 - 1.4	49 - 66	1.0 - 1.1	Conflict Walking speed restricted Difficulty in passing
E	0.5 - 0.9	66 - 82	0.7 - 1.0	Frequent adjustment of gait Walking speed restricted
F	0.5 or less	variable to 82	less than 0.7	Shuffling and bunching Extreme restriction of speed Breakdown of flow

**Source:** Davis and Braaksma (1987).

It can be seen from Table 1 that space per pedestrian (module) is reduced as rate of flow increases and the level of service falls correspondingly. From the flow characteristics between LOS 'E' and LOS 'F' where the pedestrian flow is greatly retarded by the presence of too many pedestrians and there is frequent conflict between the walkway users, and flow occurs mainly by shuffling, it is evident that level of service of most of Dhaka's walkways will fall under these three categories. This is particularly true in case of commercial areas. For example, the LOS was found to vary between 'D' and 'F' on sidewalks in the vicinity of New Market, Dhaka (Table 2).

**Table 2.** LOS of Sidewalks in New Market Area.

Section	Module	LOS (m <sup>2</sup> /Pedestrian)
East sidewalk		
1	0.56	E
2	0.44	F
3	0.64	E
4	1.05	D
Westsidewalk		
1	0.72	E
2	0.72	E
3	0.58	E
4	0.52	E

**Note:** Weather: Fine, Survey period: 13 hours (0700-2000 hrs), Day: Sunday.

**Source:** Kiwan (1988).

The low level of service of Dhaka's walkways is due to the fact that the space available for the pedestrians is too little in comparison to the volume of pedestrian traffic. Pedestrian mobility and accessibility diminish due to insufficient walkway capacity (O'Flaherty, 1974). Whatever space is available is further curtailed due to the presence of activities such as the one carried out by the street vendors, and occupation of space reserved for pedestrians for other purposes such as temporary storage of construction materials. The pedestrians are, therefore, forced to move on to the carriageway raising the chances of collision with vehicular traffic. Furthermore, most of the streets do not have footpaths and the existing ones are not continuous making the pedestrians susceptible to traffic accidents.

Intersection is one of the most vulnerable places for a vehicle-pedestrian conflict (Untermann, 1984). Though a number of pedestrian over-bridges and underpasses have been constructed in recent times in Dhaka, absence of these facilities at key locations, such as Mohakhali intersection, aggravates the situation.

Lack of safety remains the major problem faced by the pedestrians of Dhaka City and other places of Bangladesh. Pedestrians are most prone to road accidents and the number of casualties involving pedestrians is quite high in comparison to the total road fatalities. Figures in Table 3 will justify the statement.

**Table 3.** Victims of Road Accidents in Bangladesh in 1999.

	Fatal	Grievous	Simple	Total
Pedestrian	1317	449	115	1881
Cycle	102	58	13	173
Rickshaw	121	183	79	383
Micro bus	50	67	37	154
Mini bus	116	126	83	325
Bus	292	296	288	876
Truck	250	195	168	613
Pick up	17	44	23	84
Tempo	135	143	103	381
Baby Taxi	75	127	84	286
Motor Cycle	72	98	33	203

**Source:** Workshop on Land Transport Policy, August 2000.

From Table 3, it can be seen that pedestrians constitute the highest share of 51 percent among the fatal road accident Victims.

### Issues Pertaining to Pedestrian Planning

It has been seen in the preceding section that a number of problems including lack of safety engulf the pedestrians. Walk mode makes up around 61 percent of the total trips in Dhaka (DDC *et al.*, 1993). In addition, another 12 percent of trips have a walk-mode component. The absence of adequate and appropriate public transport has a bearing on the modal choice of people, especially the ones belonging to the low-income groups (Hossain,

1987). This has forced these people to resort to walking. In spite of a high proportion of trips made by walking in Dhaka, little has been done to improve pedestrian amenities.

With the increase in population the situation will worsen. Free movement by pedestrians will be constrained further. Pedestrian safety will decline even more. These issues point towards taking immediate steps to enhance pedestrian safety and increase their mobility. It is time to acknowledge that walking is an essential element that must be integrated with the overall city transportation system.

It must also be realized that pedestrians are the most vulnerable group when it comes to getting exposed to the ever deteriorating street environment and the surroundings as a result of adverse impacts of traffic pollution, both physical and visual. So far these impacts have not been taken into account while formulating different transport policies. Impediments to efficient pedestrian flow also hinder the retail trade activities of commercial centers.

If the issues related to pedestrianization are continuously overlooked, then the problems will grow to a proportion that would be hard to solve. Unless proper strategies, keeping the pedestrian movement issue at the forefront, are adopted and implemented within a short time there will be serious reverberation on Dhaka's urban environment. On the other hand, if appropriate policies are formulated immediately they will pave the way for revitalization of urban life of this city.

### **Proposed Strategies and Measures for the Pedestrians**

Pedestrian precincts have produced fruitful results in the developed countries (Bickerton, 1985). As a result the streets are increasingly being considered as 'living space'. The existing traffic situation in urban areas of Bangladesh warrants innovations in transport planning, the aim of which should be to ensure an appropriate balance among all road users and deal with the entire transport network in the city, instead of single streets.

To augment the situation in Dhaka City, there should be a general change in attitude accompanied by a demand for a quality environment. Concerned institutions should incorporate private and public sector inputs in planning for pedestrian areas and improvising the street atmosphere. Thus, it is proposed that the views of transportation planners, engineers, landscape architects and designers are accommodated through an interdisciplinary approach and arrangements are made for these professionals to make up a team with real estate and development specialists.

The proposed strategies incorporating the issues discussed so far will focus on:

- Pedestrian priority areas
- Pedestrianization of shopping centres
- Traffic controls on major roads
- Restriction on traffic in the Central Business District
- Restriction of traffic in residential areas
- Environmental considerations
- Walkway facilities and information

These are discussed in brief in the following subsections.

**Pedestrian Priority Areas**

There may be places of high pedestrian flow where there is no scope of making them exclusive for pedestrian movement only. These places may be designated as 'Pedestrian Priority Areas'. It could be done through some measures that would prioritize the pedestrian activities. The measures would include imposition of certain restrictions on vehicle access to the area. Though complete restriction is not sought here, the measures would discourage vehicles to enter these areas.

It can be ensured that the speed of the vehicles entering the area is within acceptable limit through some humps. Their spacing would depend on the allowable speed limit. Other steps, such as rational parking, can be used to complement this measure. In order to make this arrangement successful, a change in the attitude of concerned authorities and the road users is essential.

**Pedestrianization of Shopping Streets**

In Dhaka, there are a number of streets where the intensity of shopping has grown to such an extent that they can hardly accommodate the increasing pedestrian flow. As a result pedestrians are spilling over on the carriageway obstructing vehicular traffic flow. These streets can be declared as pedestrian precincts with no vehicular access. However, before making them pedestrian streets, the implications of this measure on the traffic of the surrounding road network should be carefully studied. Alternative roads should be available to accommodate the diverted traffic.

This measure is often applied in developed countries. It improves the shopping conditions, which results in the increase of market turn over. This is accompanied by improvement of the environmental conditions and pedestrian safety. Very recently a small link in the Gulistan Square in Dhaka has experienced this measure and is already showing signs of improvement.

**Traffic Controls on Major Roads**

Major roads refer to the streets where the main function is to provide mobility. Providing access is the secondary function of these roads. Some traffic controls can be imposed on these roads to improve the environment resulting in the increase of pedestrian amenity. These controls include:

- Control of access to abutting lands.
- Some regulatory measures such as signs, markings, signals and islands should be placed appropriately guiding traffic in the desired way.
- Restrictions on turns, such as U-turn and right turn.
- Restriction on parking.
- Introduction of one-way operation where necessary.
- Design and construction of medians on Dhaka's arterial roads taking into account the capacity and safety requirement.

**Traffic Restraint in the Central Business District**

The measure which is usually most effective in the Central Business District (CBD) is parking restriction. However, its effectiveness depends on enforcement. To ensure strict enforcement, strict rules and regulations should be introduced if not already present and the number of police personnel should be rationally increased.

On-street parking restriction will raise demand of off-street parking facilities. Off-street parking can be provided in limited numbers, as reducing the volume of private vehicles inside the CBD should be the aim of the policies. In this case the number of private vehicles entering the CBD can be reduced by improving the public transport facilities. Clock-wise and counter clock-wise circular bus or motorized paratransit service with some fare control can be introduced in the CBD, such as Motijheel, to facilitate the movement of people from one office to another and provide almost 'door to door' service. Decentralization of some activities in the CBD, which generates a huge traffic can also be a useful tool in reducing the number of vehicles.

**Traffic Restraint in Residential Areas**

The main function of the streets within a residential area is to provide access to the abutting plots. Thus, through movement should be discouraged in the residential area to preserve residential amenity and encourage pedestrian friendly environment. The one way street system employed in the residential zones of many countries is not proposed for Dhaka as this might create confusion, and result in long detours and frequent breaking of rules which might ultimately worsen the situation. Limited efforts were recently made to convert some roads in residential areas, like Dhanmondi, to one-way streets. Such efforts ended with no success.

Cul-de-sacs can be provided in the local street network to stop through movement. This measure might be particularly effective in the Dhanmondi area of Dhaka where through traffic between Mirpur Road and Satmasjid Road is quite disturbing for the residents as well as the pedestrians. Humps can be provided to restrict the speed of the vehicles, thus enhancing the pedestrian safety within these areas.

Through environmental traffic management in residential areas, the residents should be provided with a network of roads and walkways designed for residential use and play areas for the children. The main objective is to establish pedestrian priority.

**Environmental Considerations**

Environmental issues should have a bearing on pedestrian planning. So far they have not been quite effectively reflected in the transportation policies for Dhaka City. As pedestrians are directly exposed to the environment, matters such as establishment of environmental standards related to traffic pollution and safety should receive more attention from the concerned authorities. Strict enforcement of the laws governed by the

standards should be ensured. It should be understood that environmental pollution and safety considerations have a direct influence on the pedestrians' behavior and health.

Natural environmental conditions, such as heat, rain and humidity, also influence pedestrian activities. Thus, impact of micro climate should be taken into account during planning of pedestrian areas and walkways. Shading of walkways by physical structures and trees as well as lighting provision during nighttime has an effect on pedestrian behavior. To create an atmosphere congenial for the pedestrians, arrangement of adequate lighting at nighttime in pedestrian areas, use of arcades in shopping areas, etc. should be ensured.

### **Walkway Facilities and Information**

A number of features can be identified that are required for the convenience of the pedestrians. These include public telephones, toilets, and mailboxes. Provision of appropriate signs, direction and connotation graphics and street maps on walkways facilitates pedestrian traffic to a great extent. These features are rarely available on the streets of Dhaka.

### **Conclusion**

Developing countries are incorporating environmental issues in their transport policies for quite sometime, while in Bangladesh this practice is yet to gather momentum. Though a high percentage of trips are made on foot in Dhaka, the pedestrians hardly get an environment that is favourable to walking. So far pedestrian planning has not received due attention from the transport policy makers. The consequences of this negligence are being increasingly felt nowadays.

In this paper it has been shown that serious pedestrian-vehicle conflict exists. The matter is also reflected in the statistics of accidents, which furnishes the fact that pedestrians are mostly the victims of fatal road accidents in Bangladesh. Instead of considering the pedestrian issue separately the authors recommend to integrate it with the overall transport planning process and solve the problems through relevant techniques of environmental traffic management.

A set of strategies has been put forth in the paper which is applicable not only for Dhaka, but also other urban areas of Bangladesh. Some administrative and institutional development may be required for proper implementation of the strategies. It is believed that adoption of these recommended policies will facilitate harmonious coexistence between pedestrians and vehicles.

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