

Vehicular Parking : Policy and Guidelines for Dhaka

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Introduction

This study was carried out as part of Dhaka Urban Transport Project Phase-II (DUPT-II) to prepare policy recommendations and guidelines for vehicular parking. With the aim of providing efficient movement of traffic and good accessibility, parking practices, problems, opportunities and demands in the context of greater Dhaka transportation planning were analyzed in this study.

The traffic of Dhaka comprises of pedestrian and vehicular movement; the vehicular traffic is divided again into motorized and non-motorized traffic, as well as private and public transport. Goods and passengers often need to change their mode of transport to reach their destination. This requires vehicles to wait, stop or park at some points on the road network. These are the points where the demand for parking facility comes into being, because interchange of modes of transport needs vehicles to move at zero speed, which is called Traffic at Zero Speed. Traffic at zero speed can be of different types such as parking, waiting and stopping. Allocation of road space between moving vehicles and stationary vehicles is an important component of a traffic management strategy. The study analyzes existing parking facilities and practice in Dhaka City and their impact on economy and health, and then proposes a parking policy and a set of guidelines.

Methodology

As the study was a part of Dhaka Urban Transport Project Phase-II, which is a continuation of Dhaka Integrated Transport Study and Dhaka Urban Transport Project Phase-I (Mott MacDonald, 1996a, 1996b and 1997), most of the data and information were taken from these studies. The study involves the following methodology for analyzing the present and future scenario, and preparing a recommendation for parking policy.

- * Literature survey was carried out to get a thorough understanding about the problem in general and specific to Dhaka City parking facilities.
- * Primary information was collected through studying parking facilities and practice in important zones of Dhaka City. For this purpose parking demand and trends during different periods of the day and different days of the week were observed at Elephant Road and Motijheel commercial area. Interviews with key persons were conducted to understand the planning and execution process of parking facilities of Dhaka.
- * Information was collected from secondary sources for understanding the existing facilities, practices, problems and opportunities of parking provision of the City.

- * The information was reviewed to formulate a comprehensive parking policy and a workable guideline for Dhaka City.

In this paper the word 'parking' covers parking, waiting and stopping of vehicles, if not otherwise mentioned.

Observations and Analysis of the Present Situation

It is generally acknowledged that traffic system of Dhaka is severely affected by uncontrolled and indiscriminate parking of vehicles. The capacity of the link of a road network can be constrained by the capacity of its intersection. Indiscriminate parking, stopping or waiting of different types of vehicles reduces capacities of intersections. Huge losses are incurred everyday due to delays at intersections. For example, annual delay cost at Mogbazar, Jatrabari and Sonargaon intersections are respectively Taka 659.12 lacs, Taka 711.91 lacs and Taka 619.16 lacs according to the DUTP-1 (Mott MacDonald, 1997).

At present on-street parking is not controlled or balanced in accordance with the road hierarchy. DITS proposed road classification that comprises four classes of roads:

- Primary : Roads having a major urban significance catering for relatively high traffic volumes and/or long distance travel.
- Secondary : Roads of less importance than a primary road but still catering for relatively high volumes of traffic and/or long distance traffic and on which through traffic predominates.
- Connector : Roads that connect the local road system to the primary and secondary roads and which serve both local and through traffic.
- Local : Roads serving predominantly local short distance traffic and access to urban land.

According to the Structure Plan 1995-2015, DMDP, (RAJUK, 1995), the second major influence on the form of Dhaka's growth has been transport. Due to the poor institutional and regulatory framework and also reluctance to enforce existing laws the capacity of existing roads is reduced significantly. Moreover the road hierarchy is poorly established and most new development is taking place without any coherent road system, which affects the expected level of accessibility to land. The overall gross density of Dhaka in 1991 was 174 ppa (persons per acre); in the inner zones it was 221 ppa. Two-thirds of the population over the past decades have been accommodated at higher densities in established areas and only one third through new land development. By 2005 the average density will increase to 209 ppa. Proper distribution of population is distorted by the lack of appropriate transport system. It is expected that the impact of DMDP structure plan will be the reduction of the share of population in older established areas to 64.5 percent in 2015, compared to 82.5 percent in 1991. Lack of a proper urban transport system and required accessibility to urban land has created an unbalanced density distribution in Dhaka.

Angle parking on major roads increases the probability of accidents, especially for pedestrians. Indiscriminate parking in links and intersections of the road network increases air pollution hazard in the microclimate by creating environmental hot spots. Concentration of Pb in the hot spots of Dhaka is estimated to be ten times higher than the average. Bangladesh Atomic Energy Commission has estimated that deaths due to air pollution might be as high as 15,000/year in Bangladesh. Increased idling time by vehicles has in fact increased air pollution from motor vehicle emission, because fuel is not burnt as efficiently as under normal running condition. A proper parking plan can help reduce air pollution by reducing the congestion and keeping away hot spots from strategic locations. Air and noise pollutions in the urban environment of Dhaka are increased by congestion, resulting substantially from indiscriminate parking.

According to the DITS survey there were 450 buses, 1,300 coasters (mini buses) and 50 small buses in 1988; with the growth trend of that period, it was estimated that there would be 4,792 buses and 3,946 minibuses in 1991. But at present there are some 1,400 buses plying on Dhaka's streets, of them a large portion is in a very poor state. The number of office and private cars is still very limited, generating only eight percent of the vehicular trips. The higher income group, which consists of three percent of the urban population, makes only 40 percent of their vehicular trips by car. On the other hand, a survey on Motijheel commercial area showed that 60 percent of all vehicles parked on-street were cars. Cars account for only 2.9 percent of vehicular trips and 1.5 percent of total trips. At present haphazard parking of different vehicles, through choking the roads, has become the prime cause of reducing the productivity of bus services. As a result investment in bus sector is discouraged.

Another survey conducted by DITS (Dhaka Integrated Transport Study) shows that bicycle ownership was 42,000, which is slightly lower than car ownership in Dhaka, which was 45,600 in 1992. Currently bicycles account for less than 2 percent of vehicular trips in Dhaka, while in Delhi bicycle accounts for more than 18 percent of all vehicular trips; in the Netherlands about 50 percent of passenger trips are made by bicycle. Money spent on one university bus could be enough to buy 700 bicycles, which will give twice the output at a fraction of the running cost. Another estimate in DITS Working Paper -7 shows that a large passenger bus in Dhaka produces an output of 20,000 passenger-km/day while 700 bicycles can produce almost 17,500 passenger-km/day at only a fraction of the running cost. Though it is an environment friendly and less capital-intensive mode, bicycles have not been promoted in Dhaka's transport system.

Available on-street and off-street parking places, which are at the disposal of public agencies, are not properly managed. It was estimated during DUTP-II study that annually Taka 3.75 crores could be earned on account of on-street parking charges. On the other hand some Taka 4.73 crores could be earned annually from bus and truck terminals of Dhaka. These could be a source of much required fund to provide proper parking facilities for the city. Leasing out of parking space to private contractors could be a better way to manage the existing parking facilities. Due to the lack of proper management of existing parking facilities the local authority is losing an opportunity to create funds for its future projects and the city dwellers are losing the facilities they could have enjoyed.

Due to the practice of uncontrolled parking, the traffic safety level of Dhaka City has dropped substantially. Accessibility to urban land determines the use and subsequently the value of the land. Unplanned parking of vehicles reduces the capacity of roads. Indiscriminate parking has also affected the efficiency of mass public transport system by reducing its operating speed.

The growth of vehicular traffic had drawn attention for reappraisal of transport policies, because of its associated problems like air and noise pollution, congestion, accident, etc. Unlimited growth of vehicular traffic is no more considered feasible in the growing cities of today. Proper management of parking types and amount are considered as an effective tool for keeping balance between private and public transport. Effective and efficient parking facility for a city depends on the proper mix of off-street and on-street parking, including private parking spaces.

Demand and supply for parking are needed to be regularly assessed. The figures should be broken down into short-stay and long-stay parking. This information should be complemented with information like purpose of trip, variation of parking demand by the time of the day and day of the week, month and year. Public consultations before introducing a parking policy is important because it influences directly and indirectly the travel pattern of the people. Intensive public motivation coupled with legislative measures are essential for effective enforcement of parking policies.

Any parking policy by the government should be followed by parking guidelines and parking plans. Parking guidelines will help to chalk out different standards, e.g. control and charges for parking spaces, parking controls applied to different hierarchy of roads, time limits and waiting restrictions etc.

“Parking” in traffic engineering is stopping and leaving a vehicle and thereby occupying a road space continuously until the driver returns. “Waiting” and “stopping” on the other hand are usually short-term stops, with a driver remaining present, and able to move the vehicle if necessary. Therefore the impacts of parking, waiting or stopping are different on the road transport system of a city. In the traffic management of Dhaka these distinctions are not considered.

To provide an effective parking system for Dhaka the following steps have to be taken,

- Determination of objectives of the parking system.
- Formulation of appropriate parking policy and guidelines.
- Preparation of parking plan for different segments of the road network of Dhaka.
- Enforcement and implementation of the plan.

Objectives

The following objectives have been identified as the basis of the Parking Policy for Greater Dhaka.

- i. *Ensuring efficient use of road network.* Allocation of road space between the needs of moving vehicles and stationary vehicles is an important component of traffic management. Therefore effective control over parking can increase road capacity virtually at no capital cost.

- ii. *Facilitating Dhaka Urban Transport Plan.* To ensure the development of desired urban environment for Dhaka City a two-stage plan, namely Structure Plan and Urban Area Plan, have been prepared. And to match the present and future demand of the land use of the city, in the light of its Structure and Urban Area Plans, a comprehensive transport plan for urban Dhaka is under preparation.

Parking policy can influence the distribution and composition of modal split of generated traffic. As an effective tool for traffic and transport management, parking policy can facilitate and promote Dhaka Urban Transport Plan and thereby the Structure Plan and Urban Area Plan of the city.

- iii. *Ensuring traffic safety and protecting urban environment.* It is important that safety from traffic hazard is ensured and the urban environment is protected. For instance, improper on-street parking can increase the risk of accidents and pollution related to vehicular traffic, a new parking lot can degrade an urban environment by demolishing a green space or by attracting more private vehicles.
 - iv. *Improving accessibility to urban land.* Accessibility to urban land is provided by the road network. The horizontal expansion of roads and the speed of traffic flow determine the level of this service. Waiting restriction and parking control measures can influence the level of accessibility. Waiting, such as van or truck delivering to shops or stopping, or a bus picking up passengers is often essential for the effective operation of a road transport system. But parking on the Right-of-Way (RoW) is usually an unproductive use of road space.
 - v. *Encouraging mass public transport system.* Dhaka is over burdened with population and its development is constrained by lack of resources, especially land resource. Another problem in Dhaka is its air pollution, largely contributed by fumes emitted from vehicles. These are two reasons among many other that persuade planners and policy makers to promote mass public transport system for the city. Parking policy can substantially influence the modal choice for people's travel demand.
 - vi. *Encouraging use of bicycle.* In many developing countries bicycle use is substantial. Being an environment friendly mode bicycles can fulfill the transport demand of lower and middle-income groups and of students of all income groups. Parking policy can facilitate and encourage the use of bicycles in Dhaka.
 - vii. *Improving management of available parking spaces.* Regular assessment of existing and future demand and supply of parking spaces, both on-street and off-street, should be made. The composition of mode in parking demand should be regulated by using different tools, such as parking charge, parking time, parking restriction, to match Dhaka City's transport plan. Proper management of the city's available parking spaces can provide funds the city needs desperately for the development of its transportation sector.
- 3.8 *Facilitating interchange between different modes of transport.* Proper parking provisions are required for facilitating interchange of modes for passengers and goods.

Recommendations

The recommendations of the paper are divided into two parts : the first part describes the parking policies and the second part elaborates the policies into some guidelines.

Vehicle Parking Policy for Greater Dhaka

Eight objectives were set above as the basis for the development of a Parking Policy for Dhaka. Based on those objectives thirty-seven policies are chalked out, which are grouped into following headings:

- * Road and Intersection
- * Business and Industrial district
- * Shopping centre and Street
- * Educational Institution
- * Residential Neighbourhood
- * Bus and Truck Terminal
- * Management and Funding of Public Parking Facilities.

Policies

At present the parking policy of Dhaka prohibits parking on all roads except those specially designated for parking. The reality of the situation is the opposite; parking is allowed everywhere except on roads in front of some privileged residential and office blocks. The present approach to parking management is a negative one. Provision for parking is a part of road transportation network– this must be recognized, and at the same time, it is also to be understood that this service cannot be delivered free of cost. The following policies are geared for realization of the above listed objectives.

Road and Intersection

- * Primary roads are designed for vehicle moving from one region to another of the city. The trip length is longer and the vehicles are allowed to move at a greater speed. Therefore parking on these roads will hamper the movement of the traffic by reducing the capacity of the road and will also increase the probability of accidents, especially fatal accidents. But stopping facilities for buses, three-wheelers and other mass public transport have to be there on these roads. Other important issues are the provision for stopping of vehicles in emergency and the need for vehicles to deliver goods at some designated period of the day. Parking on primary roads is to be discouraged. Waiting and stopping provision is to be provided at designated places.
- * Secondary roads provide communication channels for traffic between the districts within a region of the city. It serves the traffic at two levels; first, it provides access to a district and second, it helps to move from one district to another at a faster speed. So, these roads need both the characteristics of primary roads and access roads to certain degrees. This is why besides having stopping and waiting, parking provision is also required, but not at the cost of reducing traffic speed. Parking on secondary roads are to be allowed only in designated parking places. Waiting and stopping provision should be provided.

- * Parking is to be allowed on connector and local roads, except places designated as no parking.
- * Pedestrians in large numbers use local and connector roads; their safety is one of the major concerns in management of these roads. Another characteristic of these roads is the narrower width and intimate scale of design. These roads are also frequently intersected by each other and provide access to individual plots. These are few factors, among others, which call for discouraging parking of Heavy Motor Vehicles (HMV). Small vehicles, private or public, can park, stop or wait on local and connector roads. HMV should not be allowed to park, stop or wait on local and connector roads without special permissions.
- * Unless crossing streams of traffic are separated by means of grade separation there will be always some delay at road intersection since two different streams of traffic tend to use the same road space at a time. The level of efficiency of traffic movement at intersections largely determines the operational capacity of the road network of the city. Intersection clearway must be defined, and vehicles must be restrained from parking, stopping or waiting in this clearway.

Business and Industrial Districts

- * There are plenty of spaces in the business and industrial districts of Dhaka where on-street parking can be arranged through proper management. Properly managed parking spaces can be a source of income for creating parking facilities for meeting the future demand and at the same time increase road efficiency for moving vehicles. The potential of on-street parking, stopping and waiting spaces must be identified and managed properly.
- * The present practice in business and industrial districts is to park vehicles on major roads, while the minor roads are left unused. Reversing the trend can greatly increase the road efficiency and the supply side of the parking problem. On-street parking needs to be located on roads placed in the lower order of hierarchy.
- * This will help people to park vehicles at proper parking places even if they are at some distance from their destination. At the same time it will increase pedestrian safety in the zone and ensure safe pedestrian crossing throughout the district
- * The present practice of parking staff buses just in front of the office is not a good practice. This reduces the effective use of the parking place, which could have been used by a larger number of vehicles for shorter periods of parking. Staff buses should be encouraged to park in a less congested area, preferably in the periphery of the zone
- * In the planned industrial and business zones of Dhaka there are a few places designated as public car parks, but at present they are occupied for other purposes. If these lands can be recovered and managed properly they can reasonably increase supply of car parking facilities. Spaces designated as off-street car parks should be cleared off and brought under proper management.
- * Double or triple parking of vehicle on the road makes parking management difficult, as a result the efficient use of road space is affected. It also reduces the capacity of the road. Double or triple parking of vehicles should be strictly prohibited.

- * It is observed that a number of commercial and industrial buildings either do not have parking spaces or they have converted those spaces to use for other purposes. It must be ensured that buildings have off-street parking spaces as required by the local building construction rules. And also maintenance of such spaces must be ascertained.
- * Growth of private vehicles and their demand for parking space will become critical at some point in future. Therefore, imposing higher parking charges will influence people to opt for public transport for their work trips. Parking charges in business and industrial districts must be gradually increased to encourage people to use public transport for work trips.
- * Provision of safe and convenient parking space for bicycles will encourage their use, protect the urban environment and support the Dhaka Urban Transport Plan. Adequate and safe bicycle parking spaces should be provided in business and industrial districts.

Shopping Centre and Street

- * Wholesale markets attract two types of vehicles mainly– heavy goods vehicles (HGV) and smaller vans, pushcarts etc. Their activities are loading, unloading and transshipment of goods. It will facilitate the interchange of different modes of transport. Provision should be made for HGV and smaller vans to carry out loading, unloading and transshipment of goods properly in wholesale markets or streets.
- * Most of the shopping centres in Dhaka do not provide parking spaces as required by the building construction rules. Therefore enforcement of building rules should be ensured, this would help to increase supply of parking facilities. Proper and adequate off-street parking facilities in new shopping centres must be ensured.
- * Already congested shopping streets like Elephant Road, New Baily Road etc. do not have enough parking spaces to meet the present demand, so it will be appropriate to put restrictions on further development without providing enough parking spaces. Development of new floors in congested shopping streets must be discouraged.
- * It will not be feasible to ban parking in already developed shopping streets, rather it will be possible to control the use of road space within a tolerable limit, with restriction of time and space. Parking of vehicles should be limited to a reasonable amount to ensure proper movement of traffic in already developed congested shopping streets.
- * Safe and convenient dropping bays can substantially reduce traffic congestion in front of shopping centres.

Educational Institution

- * If drop-off and collection of students can be done within the school premises then the practice of double and triple parking in front of schools or other institutes will tend to cease. It will also ensure the safety of the students.
- * Schools and colleges should not be located on primary roads.
- * Locating schools and colleges on primary roads increases the probability of accidents and also hampers the character of these roads as channels for high- speed traffic.

Schools and colleges located on primary roads must have sufficient off-street parking facilities, drop-off and collection bays within their premises and designed safe entry and exist facilities.

- * Big colleges and universities should have their own off-street parking facilities.
- * Closely spaced bus stops will encourage and facilitate students of higher level institutions to use bus services.
- * Provision of safe bicycle parking facilities will encourage students to use bicycles.

Residential Neighbourhood

- * Pedestrians frequently use neighbourhood roads and they are designed in an intimate scale to match the characteristics of the residential area. Parking of heavy motorized vehicles will generally damage the intimacy of scale and safety of the environment. Heavy motor vehicles should not be allowed to park, wait or stop inside residential neighbourhood roads.
- * Parking and waiting of private transport can be allowed without damaging the environment of a residential neighbourhood if it is done in a planned way but parking of public vehicles will affect the environment; small public vehicles can only be allowed to stop and wait in a residential neighbourhood road. Private vehicles may be allowed to park and wait, but small public transport should be allowed only to wait and stop at designated places in residential neighbourhoods.

Bus and Truck Terminal

- * DUTP-I prepared a conceptual plan for three inter-district bus terminals in Dhaka. Preparation of detail plans and execution of those plans will greatly help to improve the terminal facilities for buses.
- * In reality the English Road, Dholai Khal Road and Tejgaon truck stands are in operation in an unmanaged way. Proper management can increase the efficiency and also help generate funds for constructing a new planned truck terminal. DITS Working Paper-5 states that charging Tk.10 for a truck a day at Tejgaon truck stand can generate a fund of Tk. 3,600,000 annually. As a short-term measure, some of the existing truck parking areas like Tejgaon, English Road and Dholai Khal Road may be declared as truck terminals and managed for better use and generating funds for the future.
- * This will help facilitate the interchange among different modes of transport. Sufficient and safe parking, drop-off and pick-up spaces for different modes of transport at bus terminals should be provided.

Management and Funding of Public Parking Facilities

- * Parking facility is a service provided for personal consumption; therefore it has to be paid for like all other services. All public parking places should be used against some parking charges.
- * Charges for public parking places should be fixed considering the present and future demands for parking in that certain zone of the city.

- * Parking charges should be fixed at a rate to cater for four issues mainly; the cost of providing parking spaces, maintaining that space, generating funds for expansion of parking space in future and encouraging the planned mix of public and private modes of transport. Parking charge in business and industrial districts of Dhaka should gradually increase to encourage the use of mass public transport system.
- * Private entrepreneurs should be encouraged to build off-street parking facilities in accordance with the transportation plan of the city. They should be free to fix their parking charges. This will attract resources needed for this sector, which is difficult to be funded from public sources.
- * Public parking places should preferably be leased out through tender for efficient management of those facilities.
- * Implementation of this policy could be done by RAJUK with the help of BRTA or DMP. Buildings like cinema halls, theatres, shopping centres, community centres, large scale residential and office blocks, reputed chain stores etc. attract large volumes of traffic, which on many occasions disrupt the traffic flow in the vicinity. Therefore, consideration must be given to whether the capacity of the road is enough to bear the load of new traffic that will be generated by the proposed development.
- * Roads that are properly marked and have signs placed are easy to manage by the authority; it is also easy for the users to understand and move on the road according to regulations.

Vehicle Parking Guidelines for Greater Dhaka

On the basis of the above policies the following guidelines are proposed. During the preparation of these guidelines a basic principle of management was kept in mind, that is, while there will be some strict measures, at the same time there must be enough flexibility in the regulations to cope with the development of the city.

Guidelines

- i Parking, waiting or stopping on intersection clearway (the area inside an intersection area and within 30 meters of the intersection for primary roads and secondary roads) should be prohibited.
- ii Parking, stopping or waiting, except for buses at designated bus stops, on primary and secondary roads during peak hours, that is from 8:00 a.m. to 10:30 a.m. and 4:30 p.m. to 7:00 p.m. should be prohibited, except on weekends and holidays.
- iii Angle parking on primary roads should be prohibited. During off-peak period parallel parking may be allowed on segments of primary roads where the average travel speed can be maintained at a rate higher than or equal to 25 km/hr (approximately 70 percent of free flow speed, 35 km/hr.)
- iv More than one row of parking on any road should be prohibited.
- v Bus/human hauler stop clearway should be properly marked, maintained and protected on all bus/human hauler routes.

- vi Minimum bus stop clearway should be as follows:
 - (a) Run-in taper should be at a rate of 1:5 and of 15 m lengths.
 - (b) Bus stop length should be 12m X n (number of buses using the stop simultaneously)
 - (c) Run-out taper should be at a rate of 1:5 and of 15 m length.
 - (d) Width of bus stop lane should be 3 m.
- vii Schools, colleges, universities or any other educational institutions located on primary roads and secondary roads should have only one safe entry-exit facility.
- viii Schools, colleges, universities or any other educational institutions which have different orders of roads along its boundary, the entry and exit to its parking lot should be given from the lower order road with following exceptions:
 - (a) if the road of lower order is a dead-end residential access road then the entry and exit point can be given from the higher order road, but
 - (b) under no circumstances entry and exit points should be given from a primary road if the premise has access to a lower order road.
- ix Markets, shopping centres or any other commercial and large scale residential developments (more than ten residential units) located on primary and secondary roads should have properly designed safe entry-exit from its parking lot.
- x. For markets, shopping centres or any other commercial and large scale residential (more than ten residential units) development which have different orders of road along its boundary, the entry and exit to its parking lot should be given from the lower order road with following exceptions:
 - (a) if the road of lower order is a dead-end residential access road then the entry and exit point could be given from the higher order road, but
 - (b) in no circumstances entry and exit points should be given from a primary road if the premise has access to a lower order road.
- xi Off-street parking for all types of buildings should be provided in such a number, at such locations and with such improvement as required by the Building Construction Rules.
- xii In addition to off-street parking provision required by Building Construction Rules, adequate provision for pick-up/drop-off space should be kept for educational institutions, markets and shopping centres, commercial and recreational buildings.
- xiii Breakdown or emergency stopping lane of minimum 1m width should be provided on primary roads.
- xiv Loading/unloading can be allowed on primary and secondary roads from 10:00 p.m. to 7:30 a.m., on connector and local roads at any time except during peak hours, that is, from 8:00 a.m. to 10:30 am and 4:30 p.m. to 7:00 p.m.
- xv Parking charges should be determined according to the hierarchy and importance of road.
- xvi Following provisions for safe and sufficient bicycle parking facilities should be kept in all schools, colleges, universities and other commercial and industrial establishments.

Land use	Bicycle parking space
School/college	1 per 10 students over 6 years old
Edu. Institute/University	1 per 100 full time students
Office	1 per 200 m ² gross floor area
Industry	1 per 150 m ² gross floor area

- xvii Local Area Parking Plans should be developed for different parts of the city. These plans should be regularly monitored and reviewed.

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