BRT IN METRO DHAKA: TOWARDS ACHIEVING A SUSTAINABLE URBAN PUBLIC TRANSPORT SYSTEM

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BRT in Metro Dhaka: Towards Achieving a Sustainable Urban Public Transport System

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Abstract

Dhaka the capital city of Bangladesh having a population of 15 million has a rudimentary public transport system comprising cycle rickshaws, para-transit, taxis and buses. The rapid rise in population along with increased and versatile urban land use patterns have generated considerable travel demand as well as numerous transport problems in the city. The capacity of the road is significantly reduced by poor operating conditions, inadequate traffic management and efficient road use. The number of privately owned cars, on the other hand, is increasing day by day because of undeveloped public transport system and lack of door to door services within public transport network. Major shares of road space remain occupied by small capacity vehicles. Buses being the only mode of mass transit available in Dhaka they carry about 1.9 million passengers per day. The share of mass transit is low, 27 percent of vehicular trips where walking and other non-motorized travels still remain as the dominant travel modes.

In view of the worsening traffic congestion and deterioration in accessibility, level of service, comfort, safety and operational efficiency, it is time to introduce the Bus Rapid Transit (BRT). For achieving sustainable urban transport in Dhaka, the Strategic Transport Plan (STP) suggested the development of six major corridors as mass transit routes including three BRT corridors. It will start from Uttara and end to Sadarghat covering about 21.7 Kilometer road. In this paper an attempt has been made to provide an overview of the public transportation system in metro Dhaka in terms of the key issues, characteristics and improvement options. In particular the paper discusses the aspects and potentials of introducing BRT in Dhaka to cater for ever increasing public transport demand towards alleviation of congestion level and achieving a sustainable urban public transport system.
1. **Introduction**

Dhaka, the capital city of Bangladesh with current population of 17 million has been growing at astonishing levels since the independence. Its metropolitan area is home to almost 15 million people in an area of 1,528 km² (about 17 million in the Greater Dhaka). By 2020, the megacity’s population is expected to rise to 20 million people. It is also one of the most densely populated cities in the world, with more than 45,000 people per square meter in the core area (ADB, 2011). Per capita income averages around US$ 900 per year, and around 30 percent of the population lives in miserable conditions, with very poor access to transport services (Ministry of Finance, GoB, 2012).

The rapid urbanisation process, high vehicular population growth and that of the mobility, inadequate transportation facilities and policies, varied traffic mix with over concentration of non-motorised vehicles, absence of dependable public transport system and inadequate traffic management practices have created a significant worsening of traffic and environmental problems in the metropolitan Dhaka. Road traffic congestion continues to remain a major problem and indeed is deteriorating rapidly resulting in massive losses. The greater challenge thus for transportation professionals is to develop a system of urban transport that meet the basic mobility needs for all urban dwellers at desirable safety and avoiding the unacceptable level of congestion and its consequent overwhelming adverse environmental effects.

Various projects around the world have indicated that BRT is an effective alternative for congested cities at a relatively low construction and operation cost. It is urged that Bus Rapid Transit (BRT) has been seen as a "creative, emerging public transit solution" which can be cost-effective in addressing urban congestion (Currie, 2006, Levinson et al. 2003, U.S. General Accounting Office, 2001). The purpose of this paper is to introduce the key transport and traffic characteristics in metro Dhaka and to discuss the potential of introducing BRT in Dhaka metro city and restructuring of existing bus network to cater for ever increasing public transport demand towards alleviation of congestion level and achieving a sustainable urban public transport system.

2. **Overview of Transport system in Dhaka**

2.1 **The Problem Characteristics**

The transport system in Dhaka includes many different modes of travel - both motorized and non-motorized. These diverse modes often use the same road space, resulting in a high level of operational disorder. The city’s transport environment and system are unique among cities of comparable size in the world, being predominantly road based with a substantial share of non-motorized transport. Buses and minibuses, the cheapest mode available as mass transit, are constrained by poor service conditions: long waiting, delay on plying, overloading and long walking distance from the residence/work place to bus stoppages are some of the problems that users confront daily. This situation has resulted in deterioration in accessibility, level of service, safety, comfort and operational efficiency, causing increased costs, loss of time, air pollution and psychological strain, and posing a serious risk to the economic viability of the city and the sustainability of its environment.

In addition, the city’s road space is limited, with few alternative connector roads, lacking of effective maintenance and management, most of it with geometrical conditions that make then not accessible to buses. With non-motorized transport as a significant mode, there are no effective bi-cycle lanes and safe walkways, and the footpath available for pedestrian is occupied in great proportion by vendors and others. Most of signals are manually controlled and police have to control traffic, without properly coordinated automated systems. With policy formation and control shared between governments agencies poorly coordinated, there has been a lack of organized effort to handle the situation.
Vehicular Growth

In Bangladesh, motorised traffic is growing rapidly, around 300 new motorised vehicles are coming to road every day. The number of registered motorised vehicle grew from 7,37,400 in 2003 to 17,51,834 in June, 2012. More than 40% of all registered vehicles (7,08,197) are in Dhaka (BRTA, 2012). Trends of motor vehicle growth are shown in Figure 2.

It can be observed from the Figure 2 that, the number of privately owned motor vehicles particularly motorcycles and cars are growing rapidly which increased by 200% and 250% respectively over the period of 8 years. Motorcycles constitute around 42% of total motorised vehicles. Public transport such as buses and minibuses has not grown substantially despite the demand for public transport services has increased considerably. There are 11,060 buses and 8,583 minibuses plying on roads which represents only about 3% (buses and minibuses combined) of total motorised traffic. The share of bus fleet (buses and minibuses combined) has been in fact declining (see figure 3). Cars and motorcycles are becoming increasingly necessity to get around, especially given the unsatisfactory alternative of slow, overcrowded, undependable, and dangerous public transport services (Pucher et al., 2005).
2.2 Modal Share

The latest BRT study estimated that on an average day 21 million trips are taking place in Dhaka metropolitan area (ALG, 2011). Despite the rapid growth of motorised traffic in Dhaka, non-motorised transport still remains the dominant mode for the city dwellers who are mostly middle and low income groups. More than 40% of the city trips (see Table 1) are served by walking and rickshaw (DHUTS, 2010). The varied traffic mix and heavy concentration of non-motorised vehicles with almost 70% of the available road space is occupied by rickshaws and their dominance is expected continue in the foreseeable future (Hoque and Hossain, 2004). Currently, rickshaw movements are however restricted in some major roads.

Table 1: Modal share in metro Dhaka

<table>
<thead>
<tr>
<th>Mode</th>
<th>Percentage of Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td>60.1</td>
</tr>
<tr>
<td>Rickshaw</td>
<td>20.1</td>
</tr>
<tr>
<td>Bus</td>
<td>12.8*</td>
</tr>
<tr>
<td>Auto-rickshaw</td>
<td></td>
</tr>
<tr>
<td>Passenger Car</td>
<td>7.0**</td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

* Transit
** Motorized (Non Transit)
The modal distribution by income groups is shown in Table 2. It shows that trips on foot is made by the low income group (73%) while most of the rickshaw trips are made by the middle income group (59%) (DHUTS, 2010). The significance of walk and rickshaw trips is clearly evident as they relate to 97% of the city dwellers.

**Table 2: Modal share of trips with respect to income groups**

<table>
<thead>
<tr>
<th>Income Group</th>
<th>Proportion of Income Groups (%)</th>
<th>Modal Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (&lt;12500)</td>
<td>48</td>
<td>73</td>
</tr>
<tr>
<td>Medium (12500-55000)</td>
<td>49</td>
<td>26</td>
</tr>
<tr>
<td>High</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>


Around 30% of the total travel are attributed to bus trips (ALG, 2012). Buses comprise only 9.7% of the vehicle mix that combines all vehicles and pedestrians, but bus passengers account for 77% of all public transport users (Bhuiyan, 2007). However, Dhaka, is perhaps the only city of its size without a well-organized, properly scheduled bus system or any type of mass rapid transit system. Much is needed to be done to serve existing transport needs better. The challenge is to establish an overall framework for a multi-modal transport system that effectively serves current and future land uses and satisfies demand to the greatest extent possible.

### 2.3 Bus Transit in Metro Dhaka: Major Issues of Concern

There are many concerns related to the current bus service as per the information and the feedback obtained by different studies and surveys, among them are (ALG, 2011):

- **Traffic Operational hazards**: High level of operational disorder, rapid population growth and the absence of proper planning and control considerably diminishes the efficiency and effectiveness of the existing transport systems. Some striking features are:
  - Buses stop anywhere to take passengers at will without using recognized bus stops.
  - Many drivers do not abide by basic driving rules and regulations.
  - Ineffective enforcement of traffic laws and widespread disregard of regulations.
  - Poor traffic engineering practices such as road markings, signs, traffic signals, turn restrictions etc.
  - Haphazard crossing of roads by pedestrians not only at intersections but also at mid-blocks of the roads.
  - Pedestrian walkways are either non-existent or in poor physical condition, or blocked by various obstacles, thus forcing pedestrians to walk on the road.
  - Poor road surface conditions and inadequate drainage system that cause disruption to the smooth flow of traffic as well as are safety hazards.
  - Parking on the roads thereby reducing capacity.
  - Encroachment by vendors and hawkers who illegally occupy public spaces causing negative impacts to traffic operations on roads.
• **Safety Concern**: Some of the major safety issues are:
  - *Irresponsible and careless driving* – excessive speed; overtaking without proper precautions; overloaded vehicles, talking over the cell phones and allowing passengers on the roof-top.
  - *Poor road geometry and poor condition of vehicles* – insufficient road width; sharp bends; and narrow bridges; brake failures; and lack of proper maintenance.
  - *Poorly trained drivers* - a large number have only fake or no licenses, and are often poorly trained, unfamiliar with basic traffic laws and often act improperly.
  - *Careless movement of pedestrians* – at traffic intersections in urban areas; and around market places.

• **Service and Behavioural Issues**:
  - Neither the bus service providers nor the bus service users follow any norms to improve the current pitiable situation.
  - Lack of communication in the existing bus services. The ticket counters cannot inform the passengers exactly when the next bus is arriving at the particular counter and they are not equipped to communicate with the buses.
  - For most of the buses and minibuses, fare collection is conducted generally inside the bus which very often creates chaotic situation. On the other hand, at some bus stops, there are too many ticket booths, depending on the number of major operators serving on that route.
  - Traffic police sometimes stop buses and negotiate different issues until they are satisfied. This leads to enormous sufferings of the passengers.
  - Little care about the quality of bus services by the operators, companies, drivers and conductors.

3. **Bus Rapid Transit (BRT) in the context of Dhaka**

Revitalization of public transport is a core issue and improving the quality of public transport, increasing public transport capacity and thus relieving traffic congestion are urgent matters. There are several options in addressing mass transit facilities like Bus way/ BRT, Tram, LRT (Light Rail Transit) and Metros (*Hoque and Hossain*, 2004). With relative advantages, BRT option is seen as an urgent consideration for Dhaka.

3.1 **BRT Preference**

Bus Rapid Transit (BRT) combines the benefits of light rail transit with the flexibility and efficiency of bus transit. Developing countries with high transit-dependent populations and limited financial resources have increasingly attempted the use of BRT systems because of their low costs and relatively fast implementation times. The cost of a BRT project is considered to be approximately one-third of a LRT project, which is a cost that developing countries can afford. BRT can be integrated into urban and suburban environments in ways that foster economic development and transit and pedestrian friendly design. Examples of regions that have integrated BRT successfully include Adelaide, Boston, Ottawa, and Brisbane (*Levinson et al.*, 2003). The successful BRT systems in many cities can now be taken as an example for other developing countries to follow in the future. e.g. Bogota, Curitiba (*Leal and Bertini*, 2003).

The Strategic Transport Plan (STP), for Metro Dhaka, recommended a package of comprehensive programs for the development of transport infrastructure over 20 year period. Of most significant of the programs were three Bus Rapid Transit (BRT) routes within the development of six major corridors as mass transit routes as a means for achieving sustainable urban transport in the city. Three radial corridors as follows are thought to be potentially suitable for Bus Rapid Transit (BRT) introduction (see Figure 1).
• **Corridor A**: Starting in Uttara in the north and following Dhaka Mymensing Road, Pragati Road, DIT Road Toyenbee Circular Road to Saidabad Bus Terminal.

• **Corridor B**: Starting at Gabtalli and following Mirpur Road, Zahir Raihan Sharani Road to Saidabad Bus Terminal

• **Corridor C**: Starting at International Airport following Airport Road, Shaheed Tazuddin Road and ending in Ramna area

These three BRT corridors are now actively been considered by the government with the support from the development partners such as the World Bank and the Asian Development Bank. Most of the BRT Corridor C (BRT line-3) will go at grade. However, some parts of the alignment will be elevated in order to segregate it from the mixed traffic lanes, avoid pedestrian crossings and reduce number of road intersections. Anyhow, BRT will always go segregated from mixed traffic lanes (ALG, 2012). The authors have been playing important role in developing the preliminary design phase of the BRT Line-3 (Corridor C). A brief summary of the expected benefits and effects of BRT system is given in the following section.

**Figure 4: BRT and MRT Corridors proposed by STP**

3.2 BRT in Dhaka for Sustainable Public Transport System

The BRT project is envisaged to have the transport improvements and is expected to contribute in achieving sustainable structural transport improvements and organisational changes in the city transport crisis. Some of the likely improvements are and consequences of BRT for sustainable public transport are (DTCB and ALG, 2011):
• **Improved Travel Performance**: Decrease bus and general purpose traffic journey times in the corridor. Improvements in connectivity from the corridor to all parts of the city, through high-quality interfaces with connecting buses and rickshaws.

• **Improvements in attractiveness of public transport**: Promotion of service that attracts new users with alternative private transport options and that offers enhanced services to those who depend on public transport.

• **Congestion reduction**: Shifts in market to public transport. Improvements in traffic behavior through system design, improved management and effective enforcement techniques that lead to reductions in congestion.

• **Supporting special needs groups**: Overall increases in mobility and specific improvements in availability and quality of mobility for the urban poor. Improved trip and comfort characteristics for special needs groups such as the elderly, handicapped and women in general.

• **Industry support**: Provide opportunities for effective private sector participation support for existing bus and rickshaw industries.

• **Keeping costs reasonable**: A relatively low-cost of implementation sensitive to the local needs of Dhaka.

• **Effective regulation**: Develop an effective and accountable system of regulation to select BRT operators; set fares; establish equipment, performance, and good governance standards to be met by franchise holders.

• **Enhancement of management**: Build capacity to manage corridor transport systems. To develop an improved public transport management regime through new institutional and organizational frameworks to manage the corridor transport systems and to develop a high level of service efficiency in the corridor through optimized scheduling and bus speeds that maintain a high level of fleet and passenger efficiency.

• **System integration**: Better synchronisation of the public transport systems with road and infrastructure development.

• **Safety enhancement**: Overall increase in safety in the corridor through the design of system elements and enforcement approaches that promote safety.

• **Pollution reduction**: Reducing environmental pollution and ensuring World Bank’s social and environmental safeguard policies not only in construction period but also when the BRT is in full operation.

• **Enhancement of facilities for pedestrians**: Augmentation of pedestrian sidewalks and overbridges/crossings throughout the corridor, for public access in general.

• **Urban environmental management/Landscape Planning**: Integrate transport more effectively with land uses and to improve the urban environment. The project will take a proactive environmental stance in developing a strong environmental improvement mandate.
4. Conclusions

There is an ever increasing urgency of mitigating the complex transport problems in Dhaka. Poor traffic management, lack of road spaces and the absence of organised public transport resulted in severe traffic congestion, massive delays, increased fuel wastage and resource losses. The context and the expected benefits of Bus Rapid Transit (BRT) system towards achieving the sustainable public transport system in Dhaka are discussed in the paper.

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