

URBAN ROAD NETWORK MANAGEMENT POLICY IN KHULNA METROPOLITAN CITY AND ITS IMPROVEMENT

Md. Sayed Rahman^{*1}, Quazi Sazzad Hossain² and Md. Esraz-Ul-Zannat³

¹ Student, Khulna University of Engineering & Technology, Khulna-9203, Bangladesh,
e-mail: rahman.ce10@gmail.com

² Professor, Khulna University of Engineering & Technology, Khulna-9203, Bangladesh,
e-mail: sazzad1999@yahoo.com

³ Assistant professor, Khulna University of Engineering & Technology, Khulna-9203, Bangladesh,
e-mail: esrazuz@gmail.com

ABSTRACT

Nowadays there are a number of difficulties obstacles the performance of urban transportation facilities. Local authorities have many teams working hard to manage the elements of road network to maximize the performance and serviceability but road construction and maintenance, parking facilities, safety review, traffic signals sometimes not so effective of better management and strategic view of the overall transportation strategy. With the increase of population the traffic problems are also increased which are triggered by the inefficient road network management policy. In this paper an attempt is made to reveal the road network management policy in Khulna Metropolitan City. For this purpose existing transportation management policy and strategy was studied and questionnaire survey was conducted to responsible authorities to get the clear scenario of the fact. It not only reveals the steps of responsible authority to work but also helps to identifying the deficiencies and recognizing the need of advance management policy. Aspects and challenges of transport in Khulna Metropolitan City is also discussed in brief and finally recommended some systematic measures to improve the overall transportation strategy.

Keywords: Transportation facilities, road network management policy, transportation strategy, GIS

1. INTRODUCTION

1.1 Background of the Study:

The rapid development of urbanization with poor planning and decision making policy has led to detrimental effect of urban environment that caused serious urban related problem one of which is transport (Morita et al., 2004). Urbanization in Asia has been rapid in past 30 years and Bangladesh is not different from this passion. Khulna is the third largest metropolitan city in Bangladesh. According to BBS 2009 the population of the city was 1.39 million currently the population of the city is 1.5 million with a population density 67,994 per km². There are total number of roads 1215 including 158 km metaled road, 67 km semi-metaled road, 18 km un-metaled (Kancha) road (District Statistics 2011). There are 16 automated traffic signal points but most of them are unable to proper functioning. There are total number of registered Rickshaw 10606, Van 1690, 683 Easy Bike and Auto-rickshaw, 568 Tempo and total number of non-registered Rickshaw 1609, Van 1184, Easy bike and Auto-rickshaw 159 and Tempo 38. There are also having a large proportion of buses, Trucks and private Cars. It is projected that the city population will increase 2.64 million in the year of 2025 (UNHABITAT 2008/09). This rapid growth of population exerts extra force on transportation system. In some areas population growth is so faster that it causes large congestion and extra pressure on road network. To reduce this problem and cope with the future demand of excess pressure on transportation system better road network management policy is a growing concern.

1.2 Aim and Objectives:

The aim of this study is to investigate the existing road network management policy and reveals this existing scenario. To fulfil this aims consultation is performed with local responsible authority and finally this study focused on some recommendations for the improvement of overall strategy.

2. METHODOLOGY

This study mainly is concerned about the existing road network management policy at present condition in Khulna Metropolitan City. Extensive questionnaire survey and field survey was performed to provide a clear view of existing road network management policy. Questionnaire survey was performed with Khulna City Corporation (K.C.C) officials. Existing policy and strategy related to transportation management was studied. Deficiencies and lacking were identified of the existing transportation system. In field survey the physical condition of road network and its performance were observed. Hindrance of mobility to traffic flow and the variation of transport modes in road network were also studied.

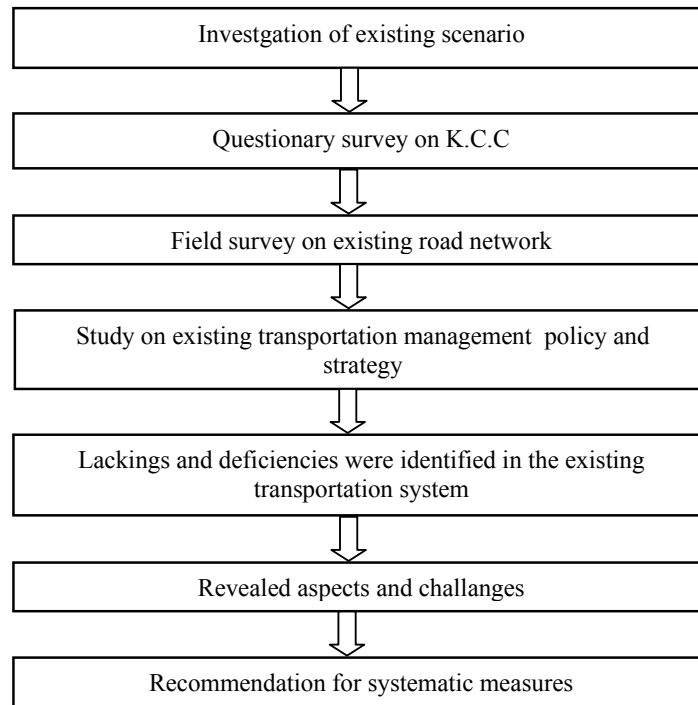


Figure 1: Flow chart of methodology.

3. ROAD NETWORK CLASSIFICATION:

Generally Local Government Institution (LGIs) or Regional Government Organization is responsible for transportation policy or they share the roles. In Khulna Metropolitan City K.C.C (Khulna City Corporation) has relatively a massive role in wide ranging fields such as city planning, road construction, transportation, environmental concern, public works and public health as well as social order keeping. Table 1 shows the road network classification and responsible authority for transport related issues in Bangladesh.

4. TRADITIONAL APPROACH OF TRANSPORTATION SCENARIO OF KHULNA CITY:

Traditionally the planning of a road network focused on economic and social impact mainly. Accessibility of the area is the first concern. With the advancement of urbanization the necessity of transportation is increased. As a result existing unpaved roads are paved; roads which are paved get widened or reconstructed. Focusing on the necessity new roads is constructed. In some cases some minor roads are got some standards that they become comparative with major roads. In Khulna Metropolitan City, Khulna City Corporation is responsible for the maintenance and monitoring of the roads. The first step of their work is defining problem and identifying the nature of the problem. By using available data and planning methods next step of working forward is to generate and evaluate alternatives. Planning studies and evaluations are included in the unified planning work for working forward. A short range program of transportation improvements are developed based on long range transportation plan that sometimes aimed to achieves area's goals using regulating, operating and financial tools. Project development is the final criteria before starting the project construction. In all cases of project development there are three important factors that need to concerned for working forward: (i) Public concern,

(ii) Economic development and (iii) Political issue. The traditional approach of transportation scenario is given in Figure 1.

Table 1: Road network classification and responsible organization

Road types	Identifying definitions	Responsible organization
National Highway	Highways connecting National capital with Divisional Headquarters or sea ports or land ports or Asian Highway	RHD
Regional Highway	Highways connecting District Headquarters or main river or land ports or with each other not connected by national Highways.	RHD
Zila Road	Roads connecting District Headquarters with Upazila Headquarters or connecting one Upazila Headquarters to another Upazila Headquarters by a single main Roads connecting District Headquarters with Upazila Headquarters or connecting one Upazila Headquarters to another Upazila Headquarters by a single main connection with National/Regional Highway, through shortest distance/ route.	RHD
Upazila Road	Roads connecting Upazila Headquarters with Growth Center/s or one Growth Center with another Growth Center by a single main connection or connecting Growth Center to Higher Road System, through shortest distance/route.	LGI/ LGED
Union Road	Roads connecting union Headquarters with Upazila Headquarters, Growth Centers or local markets or with each other.	LGI/ LGED
Village Road	a) Roads connecting Villages with Union Headquarters, local markets, farms and ghats or with each other. b) Roads within a Village.	LGI/ LGED

(RHD: Roads and Highways Department, LGI: Local Government Institute, LGED: Local Government and Engineering Department) Source: Planning Guidelines for Rural Road Master Plan, Local Government Engineering Department (LGED), GIS Unit December, 2010.

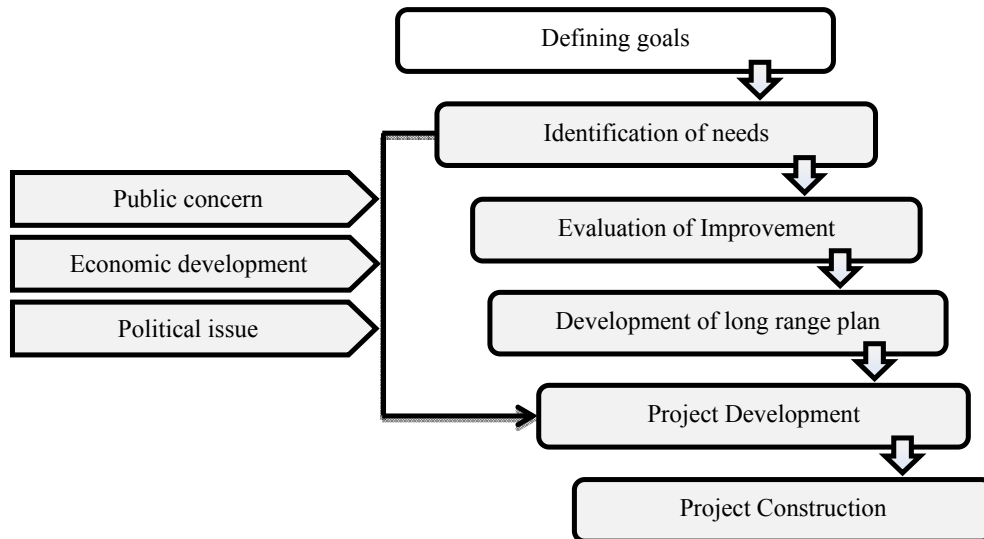


Figure 2: Traditional approach of transportation scenario of Khulna metropolitan city.

5. DEFICIENCIES OF EXISTING SCENARIO

In existing strategy there is a huge lacking of transportation database system management. Without availability of information improvement planning and maintenance will hamper. Identification of alternative improvements is another requirement of existing scenario. There is a lack of prioritization which will hamper quick response of

responsible organization. System performance monitoring is an important criterion that ensures optimization of implemented plan. In existing scenario there is a lack of advanced monitoring system. Figure 2 shows the deficiencies of traditional approach of transportation strategy.

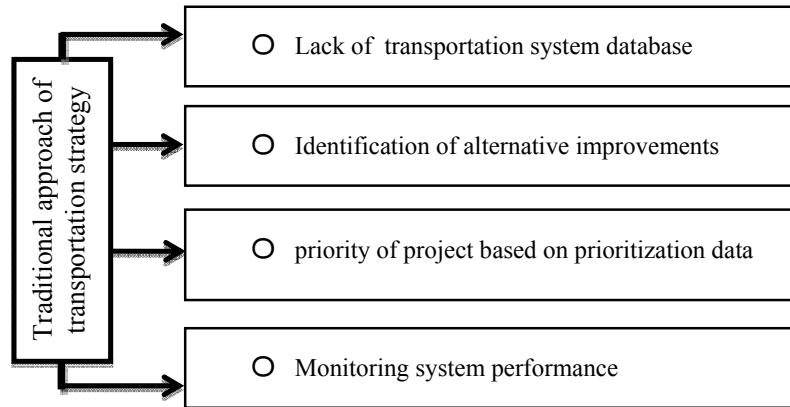


Figure 3: Deficiencies of traditional approach of transportation strategy

6. ASPECTS AND CHALLENGES:

The main aspect of transport in Khulna Metropolitan City is the heterogeneous characteristics. Mobility is hampered because of the sharing of streets by a variety of transport modes that differ in travel behaviour including cycle, rickshaw, pushcart, motorcycles, cars, buses, tracks etc. A variety of public transport system has been developed to meet the demand of large community. Table 2 shows the variety of transport modes in Khulna Metropolitan City. It is a challenge in urban road network for local authority to accommodate this continuous heterogeneous traffic. Crucial interaction between social, physical and administrative and institutional aspects is another great challenge for proper road network management policy of responsible organization that is illustrated in Figure 3.

Table 2: Transport modes in Khulna Metropolitan City (Urban area)

Transport volume	Transport mode	
	Public	Private
Mass Transit	Bus	
Middle-size Transit	Mini bus	Mini bus, Micro bus, Jeep
Light Transit	Taxi	Car Motorcycle
	Auto rickshaw, Try cycle	Auto rickshaw, Try cycle
	Rickshaw	Non-motorized Vehicle (Rickshaw, Bicycle)

7. RECOMMENDATIONS:

Efficient management of the road network has several objectives:

- i. Routine management, e.g. safety monitoring and audits, parking management and enforcement, traffic signal maintenance, installing and maintaining efficient systems, such as Urban Traffic Management and Control (UTMC) and bus priority etc. Routine management requires effort to avoid degradation of control, e.g. out of date signal timings, as well as actively seeking improvements.

- ii. Response to incidents, where incidents should be interpreted broadly to include planned and un-planned maintenance and roadworks, vehicle breakdowns, accidents etc.
- iii. Reliability and predictability, where journey times and congestion are minimized, and public transport operate to schedule.

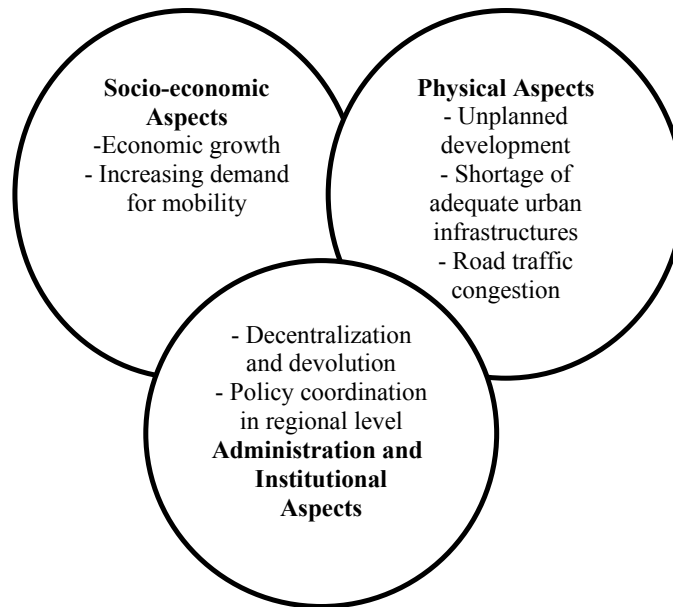


Figure 4: Interaction between socio-economical, physical and Administration and Institutional Aspects (Morita et al., 2004)

7.1 GIS Applications for Urban Roads:

For the better road network management policy Geographical Information System (GIS) is an efficient tool. Geographic Information System in transportation (GIS-T) is one of the leading GIS application field. GIS-T can cover a broad scope of transportation applications for infrastructure planning and management, transportation safety analysis, travel demand analysis, traffic monitoring and control, public transit planning and operations, environmental impacts assessment, Intelligent Transportation Systems (ITS), routing and scheduling, vehicle tracking and dispatching, fleet management, site selection and service area analysis it can perform significantly. It will be a more effective tool for local authority by providing facilities of holding huge database, give prioritization of road network, and help to identify the alternative improvements and also assisting monitoring system performance.

7.2 ITS Applications for Urban Roads:

Intelligent Transport System is a more advanced tool in modern transportation engineering. It is an advanced application which aims to provide innovative services in different modes of transportation and traffic management and enable various users to be better informed and make safer, more coordinated, and 'smarter' use of transport networks. Especially in urban areas for a cleaner, safer and more efficient transport system the contribution of intelligent transport system is significant. For achieving goals in urban road network management policy smart technologies and ITS can play a great role. Despite some difficulties in our context the implementation of ITS will give more advanced and better solution in road network management strategy. In existing situation traffic can benefit from several possible ITS applications such as: Intersection control, Incident detection, Vehicle classification, Monitoring, Revenue collection, Historical traffic data, Congestion maps and travel time estimates, Public transport information, Individual vehicle management, Accident handling.

8. CONCLUSIONS:

With the growth of urbanization demand of mobility is increasing day by day. Shortage of adequate infrastructure causes road traffic congestion which becomes more acute for poor management policy and strategy. Like as many cities of developing countries in Asian perspective traffic congestion is growing as an

important problem in Khulna Metropolitan City. The traditional characteristics of management policy make the problem more acute to solve. In this study the existing practice of road network management policy is observed and exploded with its deficiencies in the context of transportation planning view. The challenges of socio-economic aspects, physical aspects and administration and institutional aspects are also exploded and finally some advanced transportation engineering strategy is recommended which will be helpful to cope up with the challenges of urban road network management policy.

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