

Development towards Sustainable Transportation Planning in India through Management of Non-motorized Transport

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Abstract:

Cities should respect nature, ecology, and environment into transportation planning. They should promote Non-motorized transport and use of renewable energy sources for building low-carbon eco cities. This is the key towards sustainable transportation development. A sustainable transportation must provide the accessibility and mobility that is needed by the people in safe and environmental friendly way. This is very difficult task in developing mega cities where the needs and travel demand of people are not only varied but are conflicting in practical. If large number of people cannot afford to use of motorized transport mode-public/private then they have to either walk or ride bicycle for their mobility.

Promoting non-motorized transportation means roads should be provided with safe infrastructure, either by physically segregating road space for cyclist and pedestrians from motorized traffic, or by reducing speed of the motorized traffic. Both measures imply to

ensure the safety and mobility of non-motorized users.

In this paper it is shown that pedestrian, cyclist and non-motorized vehicles are the most critical elements in Indian urban traffic. The road design elements should meet the requirement of these modes of transport for enhancing sustainability of transportation system.

Keywords:

Non-motorized vehicles, sustainable transportation, mega cities, transportation planning, road infrastructure, low-carbon eco cities.

Introduction:

One of the greatest challenges in transportation planning is to plan and invest in infrastructure for sustainable urban transport. Transportation plays a crucial role in urban development by providing access for people to market, workplace, public station, health services and other key services.

The existing reality however, is that urban transportation systems in most developing cities are very different from ideal. The most frequently mentioned transportation problem of cities is traffic congestion. The number of private vehicles has been increasing continuously and dominating on roads. As a result the transportation sector is heavily responsible for air pollution, noise, health issues, greenhouse gases emission and accidents. In order to return urban places to create more livable, the cities urgently need to change the direction of urban transport development towards more sustainable future.

The knowledge of what is appearing and how to improve a situation is already with transport planner, when the transport planner or decision maker takes these improvements tools and applies into city, positive outcomes and benefit for city inhabitant can results.

Issues and challenges of transportation system:

1. Uncontrolled motorization - with rapid urbanization and economic growth, motorization has been accelerating in cities of developing countries. Owning a private vehicle or two wheeler motorized vehicle is a major aspiration for people in these cities.

City	Total vehicle*	Compound annual growth rate of vehicle
Delhi	6302	7.9
Chennai	2919	11.6
Mumbai	1694	6.6
Pune	1153	8.3
Kolkata	581	4.5
Bangalore	3016	8.7
Hyderabad	1691	11.6

*in thousand

Table1. Compound annual growth rate of vehicle in Indian cities

Table 1 depicts the registered vehicle population in 7 metropolitan cities. Delhi has the highest vehicle population, which exceeds the combined vehicle population reported by Chennai, Kolkata and Mumbai. The top 5 cities are Delhi, Bangalore, Chennai, Mumbai and Hyderabad accounted for 54% of total vehicle in metro cities.

In the developing cities, however the trend is still largely in favor of the expansion of infrastructure for private vehicle. Policies for more and more road construction have clearly failed to cope with increasing demand from rapid motorization. Resulting circle as depicted in figure 1. This cycle shows how the increase of infrastructure to alleviate travel demand will have apparently positive consequences in short term, but

some month later these will be much greater congestion then before.

Road safety- The road safety is serious and universal problem to the metropolitan cities. The importance of focusing on road safety has reached such a degree that 2011-2020 has been defined as the decade of action for road safety, by the World Health Organization.

Some recent fact from world health organization-

More than 1.3 million people die annually on the road in the world and another 10- 20 million people are injured.

Less than one-third of countries have taken necessary measure like- low speed zones to reduce speed in urban areas.

Over 90 per cent of deaths on the roads occur in low- income and middle- income countries, which have only 48 per cent of the world's registered vehicles.

Year	2008	2010	2012
Delhi	8864	9351	8620
Chennai	4243	4499	7570
Mumbai	25162	25677	29906
Pune	1833	2141	2347
Kolkata	8737	2180	2396
Bangalore	10505	7709	8418
Hyderabad	3427	3088	3286

Table 2 Traffic accidental data of Indian cities.

Table 2 depicts the registered accidents and casualties in metropolitan cities. Almost half of those killed in traffic accidents are pedestrians, cyclist, and passengers in public transport and motorcyclist.

Environmental pollution -

“Urban transport represents one of the fastest growing sources of greenhouse gas emissions that contribute to global climate change” - UNCRD, 2009

Transportation is second largest sector contributing to global carbon dioxide (CO₂) emission from fossil fuel combustion. Motorized vehicle are reported to be biggest source of air pollution causing 70 per cent of the total air pollution in metro cities.

Non Motorized Vehicles (NMV):

A sustainable transport system must provide mobility and accessibility to all urban residents with environmental friendly and safe manner. Non motorized vehicle are most critical element in mixed traffic, if any city compromise with infrastructure design of NVM and does not meet the requirements of those elements, all modes of transportation operate in suboptimal conditions. If available road infrastructure provide a safe and convenient environment for non

motorized mode, then it also result in improved efficiency of public transport and enhanced capacity of corridor when measured in passenger per hour.

Non motorized vehicle is any vehicle that is propelled or drawn by the muscular power. Non motorized vehicles include cycles, cycle-rickshaws, Hand carts etc. NMVs offer low cost private transport, emit no pollution, use renewable energy, emphasize use of labor rather than capital for mobility, and are well suited for short trips in most cities regardless of income, offering an alternative to motorized transport for many short trips. NMVs have a most important role to play as a complementary mode to public transportation.

Cities in India exhibit widely varying modal mixes. NMVs account for 25 to 80 percent of vehicle trips in many Indian cities, more than anywhere else in the world. However, the future of NMVs in many Asian cities is threatened by growing motorization, loss of street space for safe NMV use, and changes in urban form prompted by motorization. Despite recurrent efforts made by some local authorities to suppress cycle rickshaws in preference to motorized transport modes, the number and use of these vehicles is growing in many cities in response to

otherwise unmet transport needs. The Indian Planning Commission in 1979 estimated that the number of cycle rickshaws in India would increase from 1.3 million in 1979 to 2.2 million by 2001. In Indian cities, bicycles typically account for 10 to 30 percent of all person trips (including walking) and for 30 to 50 percent of the traffic on primary urban roads. Cycle-rickshaw traffic typically accounts for 10 to 20 percent of the traffic on primary urban roads and for 5 to 20 percent of all person trips in Indian cities.

Employment Generation by NMVs'-

Direct manufacturing accounts for only a small share of the large amount of total employment related to non-motorized transport. Additional people are employed servicing and repairing NMV fleets, mostly through small informal sector businesses. Throughout India, NMVs form the foundation for a large informal sector providing goods or services on the street or transporting people and goods on a for-hire basis.

Small informal sector enterprises, as well as formal private sector firms, have played and will continue to play a major role in non-motorized transport systems. Promotion of the NMT sector can stimulate substantial employment growth and microenterprise development, especially in low income cities,

particularly benefitting the poor. Where cycle-rickshaws are declining, frequently due to regulatory suppression, taxes, licensing requirements, bans, and even confiscation, hundreds of thousands of low income people are threatened with loss of employment.

Most of the developing countries are dependent on other gulf countries for their needs of oil and petroleum. Over half of low and lower-middle income countries import more than 90 percent of their commercial energy, with most of these imports in the form of petroleum. In non-oil-exporting Asian cities, consumer expenditures on motorized private and public transport usually require more foreign exchange and less local labor than expenditures for alternative non-motorized modes. Thus, a shift from NMVs to motorized modes may have significant impacts on regional economies and foreign exchange requirements.

Facilities For NMVs' - In many NMV dependent cities, bicycle networks can best be preserved by keeping cars and motorcycles out of many existing streets in neighbourhoods. Creation of "environmental districts" -- motor vehicle restricted and traffic calmed areas -- can be a most effective strategy for supporting use of NMVs, walking and public transport. The safety and congestion

problems associated with automobiles and pedal-powered modes have much in common when comparing situations where one or the other of these has clear local dominance in traffic. Different problems occur when there is a more even mixture of automobiles and non-motorized traffic. Hence the best way to manage this situation is by segregating the two channels with appropriate safety provisions. For such segregation of traffic channels following types can be implemented.

- 1) **Special Bicycle Roads** - independent of the road network and dedicated to bicycle use only.
- 2) **Semi-Independent Bicycle Roads** - positioned on one or two sides of motor vehicle lanes with physical separation.
- 3) **Non-Independent Bicycle Roads** - positioned on one or two sides of motor vehicle lanes but without physical separation.
- 4) **Mixed Traffic Roads** - where motor vehicles and bicycles share the same right-of way.
- 5) **Pedestrian-Bicycle Roads** - where bicycles and pedestrians share the same right-of way.

Conclusion:

As discussed above, the issues and challenges of transportation system such as uncontrolled motorization, road safety, environmental pollution

etc. can be minimized by planned and controlled utilization of Non-motorized transport system which includes management of non-motorized vehicles' traffic flow. Existing socio-economic patterns and land-use distribution ensure the presence of NMVs in the whole city and on the complete road network. Efficient public transportation systems cannot be designed without taking account of the slow vehicles on the road.

If they continue on their present path of rapid and uncontrolled motorization, they may face very high long-term economic and environmental costs with diminishing benefits. If they instead follow the models of proper NMV transportation systems while building their transport plans, they may be able to stabilize or increase the appropriate use of non-motorized vehicles with large positive long-term economic and environmental consequences.

To summarize, NMVs offer no universal remedy to growing problems of traffic congestion, air pollution, energy use, global warming, and regional economic development, but they should be seen as a potentially important element in addressing these problems. As we enter the 21st century, NMVs may play a growing

role in urban transport systems world-wide.

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